DISPLACED COMMERCIAL RISK IN ISLAMIC BANKING INSTITUTIONS IN MALAYSIA

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ABSTRACT

Islamic banks are exposed to a unique risk such as Displaced Commercial Risk (DCR). DCR arises from the assets managed on behalf of the investment account holders which may be borne by the Islamic bank's own capital, when the Islamic banks forgo part or all of its share of profits on the investment account holders funds, in order to increase the return to the investment account holders. In a dual banking system, DCR could be a threat to the Islamic banks given the competition of fixed and higher return from the conventional banks. However, DCR would not be a threat to Islamic banks if their account holders choose Islamic banks due to religious obligatory factor. The difficulty for the banks, then, is how to estimate or measure this DCR and how much capital they to set aside to protect against such exposure. Based on the Islamic Financial Services Board (IFSB), in particular the Capital Adequacy Standard (CAS), the Central Bank of Malaysia used the standardized approach capital adequacy guidelines in the context of Islamic practices. However, there are some weaknesses in using this approach and significant efforts need been made to design a more appropriate capital regulation for Islamic banks. The regulator would not be able to determine a standard ratio for Islamic banks generally as it depends on a myriad of banks' specific characteristics such as to what extent they will agree to absorb the losses and the availability of historical data on the performance of their assets. We propose the Value at Risk (VaR) model as an alternative method to measure the additional capital charges required to cover the displaced commercial risk. Pertaining to this issue, this research aims to analyse the determinants of DCR and to examine the impact of DCR on Islamic bank performance. We find that DCR is one of the factors that affect bank performance on both profitability and stability, at least in the case of Malaysian Islamic banks. This empirical evidence implies that Islamic banks operating in a dual banking system are adversely affected by DCR. The results draw the attention of the Islamic banks and regulators on the need to improve the level of understanding among the Islamic banks' customers regarding the nature of return that is to be expected from Islamic deposits. Since displaced commercial risk is due to floating depositors.

ABSTRAK

Bank-bank Islam terdedah kepada risiko yang unik seperti Risiko Komersil teralih (DCR). DCR timbul daripada aset yang diuruskan bagi pihak pemegang akaun pelaburan dimana ia mungkin ditanggung oleh modal bank Islam itu sendiri, apabila bank-bank Islam memindahkan sebahagian atau kesemua bahagian keuntungan bank kepada dana pemegang akaun pelaburan, dalam usaha untuk meningkatkan pulangan kepada pemegang akaun pelaburan. Dalam sistem dwi perbankan, DCR boleh menjadi ancaman kepada bank-bank Islam memandangkan wujud persaingan bagi pulangan tetap dan lebih tinggi daripada bank-bank konvensional. Walau bagaimanapun, DCR tidak akan menjadi ancaman kepada bank-bank Islam sekiranya pemegang-pemegang akaun memilih bank Islam disebabkan oleh faktor agama. Bank akan mengalami kesukaran seterusnya adalah bagaimana untuk menganggar atau mengukur DCR ini serta berapa banyak modal yang diperlukan oleh bank Islam untuk melindungi daripada terdedah kepada risiko tersebut. Berdasarkan Lembaga Perkhidmatan Kewangan Islam (IFSB), khususnya kepada Standard Kecukupan Modal (CAS), Bank Negara Malaysia telah menggunakan garis panduan kecukupan modal dalam konteks perbankan Islam. Walau bagaimanapun, terdapat beberapa kelemahan dalam menggunakan pendekatan ini serta beberapa usaha diperlukan bagi merekabentuk peraturan modal yang lebih sesuai bagi bank-bank Islam. Pengawal selia tidak dapat menetapkan nisbah standard terhadap bank-bank Islam secara umum kerana ia bergantung kepada pelbagai ciri-ciri khusus bank, seperti sejauh mana mereka akan bersetuju untuk menyerap kerugian dan ketersediaan data terdahulu berkaitan prestasi aset mereka. Kami mencadangkan Model Penentuan Nilai Risiko (VaR) sebagai satu kaedah alternatif bagi mengukur caj modal tambahan yang diperlukan untuk melindungi risiko komersil teralih. Berkaitan dengan isu ini, kajian ini bertujuan untuk menganalisis penentu-penentu DCR serta mengkaji kesan DCR terhadap prestasi bank Islam. Kami mendapati bahawa DCR adalah salah satu faktor yang mempengaruhi prestasi keuntungan serta kestabilan bank-bank Islam di Malaysia. Bukti empirikal menunjukkan bahawa bank-bank Islam yang beroperasi dalam sistem dwi perbankan akan dipengaruhi oleh DCR. Hasil kajian yang perlu di ambil perhatian oleh bank-bank Islam dan pengawal selia adalah mengenai keperluan bagi meningkatkan tahap kefahaman di kalangan pengguna berkaitan sifat pulangan yang dijangkakan daripada deposit Islam. Oleh kerana masalah risiko komersial teralih ini berlaku disebabkan oleh pendeposit yang tidak menentu.

ACKNOWLEDGEMENTS

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AAOIFI	:	Accounting and Auditing Organisation for Islamic Financial Institutions
BNM	:	Bank Negara Malaysia
CAS	:	Capital Adequacy Standard
CBA	:	Central Bank of Malaysia Act
CPI	:	Consumer Price Indices
DCR	:	Displaced Commercial Risk
IAH	:	Investment Account Holders
IAS	:	International Accounting Standards
IFSB	:	Islamic Financial Services Board
IIFS	:	Institutions offering Islamic Financial Services
IMF	:	International Monetary Fund
KLSI	:	Kuala Lumpur Shariah Index
LIBOR	:	London Interbank Offered Rate
PLS	:	Profit and Loss Sharing
UAE	:	United Arab Emirates
SAC	:	Shariah Advisory Council
SSB	:	Shariah Supervisory Board
VaR	:	Value at Risk

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CHAPTER 1: INTRODUCTION

1.1   RESEARCH BACKGROUND

The Islamic banking system has been introduced by Bank Islam Malaysia Berhad which is the first Islamic bank in Malaysia since 1983. Later in 1993, government announced a system known as the *Interest-Free Banking Scheme* in order to increase the amount of players in the system instead of allowing a new Islamic bank to operate. This system is often known as *Islamic windows* that allowing existing conventional banks to introduce Islamic banking products to clients alongside with their conventional banking facilities.

The Islamic banking system in Malaysia is based on dual or parallel banking system, a system which agrees interest-free and interest-based banking to compete and co-exist for deposits and financing. Additionally, the multi-religious and multi-cultural which is the unique part in Malaysia lead to the Islamic banking probable to deal with conditions where the demand for and supply of excess funds are no longer made on the basis of faith alone as well as on other factors such as return on deposits, the cost of financing and accessibility. Furthermore, the non-religious and religious fundamentals in the market segment of the Malaysian Islamic banking are believed to affect performance as the changes in market interest rates may affect Islamic bankers' balance sheet management strategy.

In general, Islamic banks provide all banking services such as deposit, financing and other products and services which similar to the conventional banks. Among all the services provide by the Islamic banks, deposits from the customers is one of the important financial source. They use these deposits to increase their size for financing operations and resulted in increasing the return for the shareholders. In Malaysia, the

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Islamic banking system plays a vital role in mobilising deposits and financing facilities to customers in enhancing the strong growth of the economy. This has led Islamic banks in Malaysia to have a promising future. Their performance has been significantly growing. This growing phenomena can be seen with the percentage of financing to deposit ratio of Islamic banks within 13 years (2001-2013) where a slower pace of growing (25.6 per cent) in the year 2012 (2011:24.4 per cent, 2010:22.6 per cent) (Table 1.1).

In light with Table 1.1, we can conclude that Islamic banking deposit services have gained its reputation amongst Malaysians. Furthermore, Malaysia government has also targeted to have 40 per cent of the total banking assets in the country held in the Islamic banking system by the end of 2020.

However, as we can see, Malaysian Islamic banking institutions are strongly capitalised and recorded sound financial performance. Islamic banks run side by side with the conventional banks which require them to perform well and be profitable for their depositors. They have managed to sustain profitability despite during the most volatile market conditions. The operations of domestic banking continue to perform reasonably well despite tightening measures in some markets and changes in the intensity of the impact of capital flows across economies in the region.

Table 1.1: Key Financial Indicators of Islamic Banking

Islamic Banking System	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Assets	17,404.8	20,119.1	20,917.3	24,857.4	43,432.9	60,772.3	90,346.5	250, 988.1	303,244.1	351,195.0	434,665.5	494,585.7	556,508.5
% of Total Assets of entire banking system	10.9	13.2	14.2	11.0	9.3.8	12.8	15.3	17.4	19.6	20.7	22.4	23.8	25.0
Total Financing	7,671.0	9,159.9	9,764.5	11,423.1	20,627.1	40,635.6	70,657.3	150,499.0	186,864.3	222,214.3	268,251.5	314,980.9	370,673.8
% of Total Financing of entire banking system	11.1	13.9	15.1	11.7	9.8	13.0	16.6	18.9	21.6	22.7	24.3	25.8	27.5
Total Deposits	14,375.6	16,401.4	17,583.8	20,753.7	35,625.5	40,553.2	60,635.3	194,385.5	235,938.1	277,549.8	340,695.8	386,196.8	436,327.6
% of Total Deposits of entire banking system	12.5	14.9	16.3	12.6	11.6	14.5	17.1	18.8	20.7	22.6	24.4	25.6	26.6

Source: Bank Negara Malaysia, 2013.

Generally, Islamic banks' risk exposure are no different with their conventional counterparts. Islamic banks also deal with liquidity, leverage, credit, settlement, operational, market and commercial risk which similar to conventional banks. However, the severity of these risks is different for Islamic banks due to their unique business model. In addition to that, Islamic banks are also exposed to further risks that stem from the different characteristics of the balance sheet structure and their compliance with Shariah principles. Among these unique risks, displaced commercial risk is one of the risks that different to the conventional banks.

The displaced commercial risk arises in the case of Islamic financing activities due to the profit sharing nature of the Islamic business model as oppose to the fixed return nature of the conventional banks. The displaced commercial risk became apparent because of the competitive need of Islamic banks to benchmark the rates of return they pay to profit sharing investment account holders with the deposit rates of conventional banks. Consequently, the shareholders of Islamic banks are pressured to forgo part of their share of the returns for the sake of depositors, to avoid depositors' withdrawals from a specific bank and moved to another with offering a higher rate. Market pressures may result from other banks, either Islamic or conventional which provide a higher returns.

For example, Islamic banks use management fees to guarantee the same level of returns to investment account holders as the result of the banks failing to offer competitive rates. If these fees are insufficient to cover the displaced commercial risk, then the bank is constrained to lose some or its entire reserves in order to maintain the expected level of profit sharing investment account rate of return. If both management fees and reserve accounts fail to cover displaced commercial risk, then the bank will turn to increase its

equity capital in order to preserve the confidence of investment account holders and to avoid a massive withdrawal of investment deposits, which may lead to a serious liquidity problems.

In order to further understand the customers' behaviour, BNM (2014) conducted a survey which provides a useful insight on depositors' behaviour (Figure 1.1). Majority of the depositors (75 per cent) revealed that they make commitments to buy financial products without fully understanding their feature. In addition, the survey also showed that the depositors' behaviour is focused in profit motive. Profits are the most dominant factor in purchasing decisions, with 92 per cent of the customers declared understood the benefits of a product. In contrast, only 25 per cent of the costumers understood the costs and risks associated with a product.
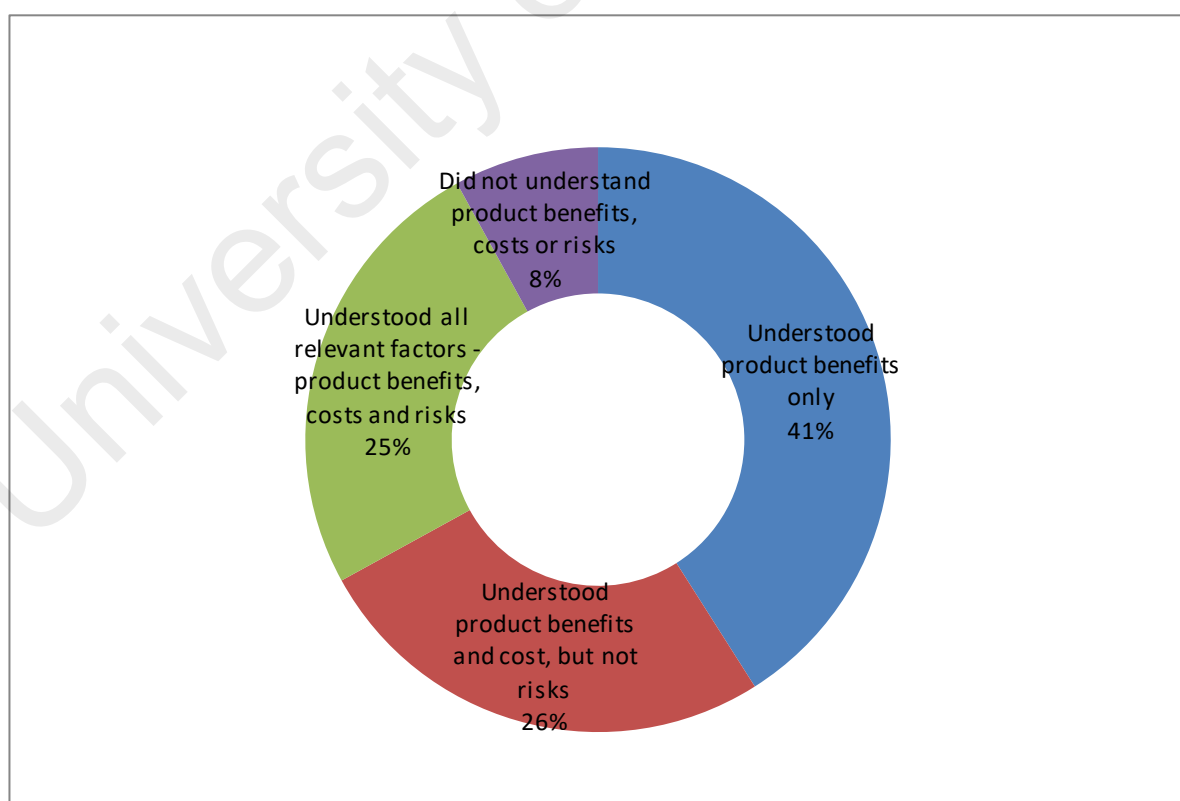
Source: Bank Negara Malaysia, 2014.

Figure 1.1: Factors Understood By Depositors Before Making Deposits

Furthermore, on the liability side, Islamic banks delivered more fixed rate funding instruments such as tawarruq[1] (fixed rate deposits) with longer contractual maturities to narrow the re-pricing gap against Islamic banks' fixed rate assets (Figure 1.2). Tawarruq are accepted by Islamic banks in the end of 2014. Based on Figure 1.2, most of the funds are organised through tawarruq, somewhat indicating that most of the depositors have a profit motive in using the Islamic banks' facilities.
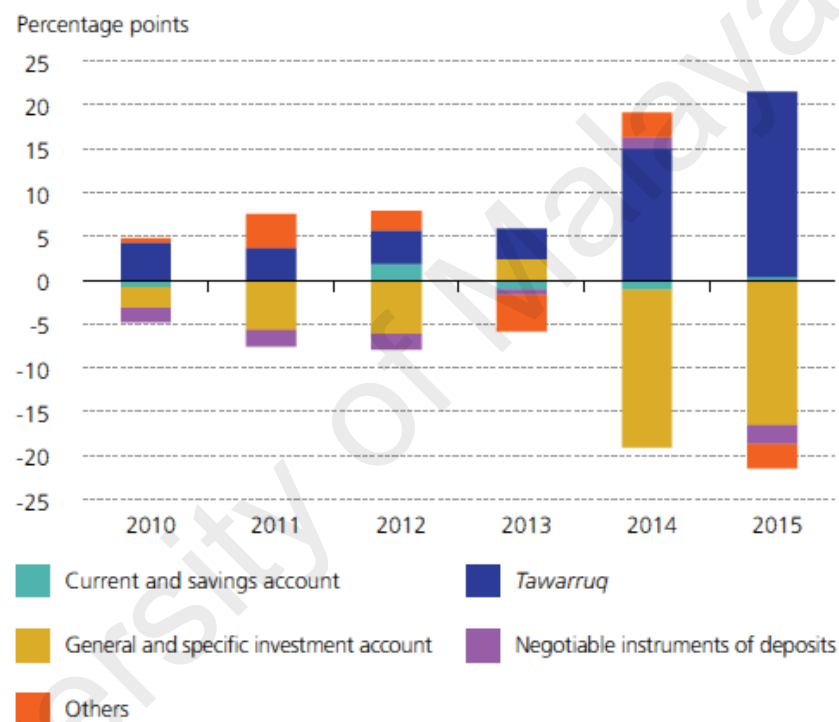
Source: Bank Negara Malaysia, 2015.

Figure 1.2: Change in Deposit Composition on Islamic Banking

Firoozye (2009) revealed that the tawarruq is more likely to profit oriented instead of religious oriented. It is most significant when a customer purchases a commodity from a seller on a deferred payment basis, and the customer sells the same commodity to a third party on a spot payment basis (meaning that payment is made on the spot). The intention of the product purchases is not for the customer's use or ownership. The

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[1] Tawarruq refers to a muamalah with two step of transactions. At the first level, the buyer will purchase an asset on credit from the original seller, and at the second level, the buyer will then sell the asset on cash basis to a third party.

customer basically borrows the cash needed to make the initial purchase. Later, when they secures the cash from the second transaction, the customer pays the original seller the instalment or lump sum payment they owe (which is cost plus mark-up, or murabahah transaction). This is considered to have a profit motive in order to get the additional quick cash from the contract.

Furthermore, previous studies demonstrated that profit motive is the customers' selection standards for Islamic banking as their banking facility provider instead of religion factor. This is similar to the study conducted by Abdul Aziz et al. (2012), where there are still have a groups of depositors who often compare the profit of Islamic deposits of all Islamic banks other than religious depositors. They choose the highest return offered by certain Islamic banks.

Unlikely to the religious oriented depositors, the return oriented depositors who often compare the return of Islamic deposits among all banks may lead to the cause of volatility in the Islamic bank's deposits. The liquidity may move among Islamic banks and make certain Islamic banks difficult in planning for the robust long-term financial portfolio.

Echchabi and Olaniyi (2012) revealed that the preference of Islamic banking attributes in Malaysia is based on a combination of service quality and accessibility associated with it. Similar study also conducted by Awan and Bukhari (2011) where the customers highly value on the factor product structures and value of services according to their importance instead of religious belief in the evaluation of the Islamic bank selection standard.

At the same time, Rustam et al. (2011) argued that the issues such as cost and benefit to the company, quality of service delivery, size and status of the bank, convenience, and friendliness of bank personnel are considered critical in bank selection. This argument was further supported by other studies which demonstrated that high return to deposit holders as the most important standards of banking selection, followed by quality of service, availability of the ATM machine, diversity of loan facilities, confidentiality, fast and efficient service as well as the variety of products offered (Ahsan et al., 2014; Kishada and Wahab, 2013; Mahamad and Tahir, 2010; Nawi et al., 2013; Ullah, 2014).

Additionally, previous studies also revealed that Islamic bank customers in Malaysia are primarily emphasis is placed on fast and efficient facility, bank's status, image and confidence instead of motivated by the religious factor (Haitbaeva et al., 2014; Kaytanci et al., 2013; Ozsoy et al., 2013; Saad, 2012; Selamat and Abdul Kadir, 2012; Thambiah et al., 2012). The importance of the religious factor as the primary motivation for Islamic bank selection is still remain inconclusive even these previous studies have concluded that Islamic and conventional banks play the similar important role in determinants of customer's bank selection, such as convenience, quality of service as well as rates of return.

The characteristics of the depositors are believed play an important role in determine the persistence of displaced commercial risk. Previous studies (Anuar et al., 2014; Cevik and Charap, 2011; Daher et al., 2015) have demonstrated that majority of the depositors choosing Islamic banks are return oriented instead of religion oriented despite Islamic banks are complying with the Shariah teachings that totally reject interest-based banks in general perception. As the result, this leads to the strategic behavior among

depositors, which involves dynamic movements of deposits in a manner that is highly sensitive to interest rate movements.

In the market, namely, the depositors behave intentionally in setting up their deposit account as in the following situation. Firstly, depositors apply short term deposit instrument in order for them to get highest return in the shortest maturity. The problem arises when returns, adjusted by changing the percentage of return that is allocated to the Islamic bank and shareholders. Islamic banks earn their living from their share of returns. It is up to the Islamic bank to amend the ratio of its share in favour of the deposit holders as long as shareholders consent to such loss.

Secondly, depositors possess a short-term economic observation and return oriented in nature. Whenever an unfavorable economic condition seems to cause interest rate hike and an unstable financial market, transferring funds into the conventional bank or conventional financial market is their best financial choice. If the Islamic banks are unable to offer the expected rate of return, the depositors will withdraw their funds to get for another better offer banks.

Thirdly, some of the Islamic banking depositors have bank accounts both in the Islamic bank and conventional bank. They frequently compare the deposit profits from Islamic and conventional banks and choose the highest profit between them. If the interest rates increase in conventional banks, customers that desire higher returns can simply switch to conventional banks. Consequently, the displaced commercial risk is found in Islamic banks.

Based on the examples given above, the nature of the customers are greatly determine the persistent of displaced commercial risk. Depositors are free to select either bank and also given the right to shift between them. Due to this reason, the depositors can take this opportunity to get the benefit from the return offer. The more return-oriented they are, the more sensitive they will be whenever there is a wedge between the rate of return among Islamic banks and the conventional counterparts.

In line with the previous discussion, it is therefore, this study aim to conduct a study concentrating on the displaced commercial risk of Malaysian Islamic banking institutions. Malaysia practices a dual banking system where the Islamic banking system goes in parallel with the conventional system and hence it is very convenient for the profit-oriented depositors to switch to alternative institutions whenever there is a decline in return from the Islamic banks.

1.2   PROBLEM STATEMENT

Based on the discussion above, two research problems were identified which led to the possibility of displaced commercial risk. Firstly, depositor behaviour in the Malaysian economy suggested that they are very return sensitive and deposits are being shifted from Islamic bank to conventional bank whenever there is a difference in the rate of return between the Islamic bank and conventional bank. These collectively suggest that displaced commercial risk is prevalent to Islamic banking, and could possibly be a threat to an Islamic bank. Earlier studies showed that the motives for customers choose Islamic banking because of the profit intention, as well as the other elements such as quality of bank offerings, confidentiality, status, speed of transaction, cost benefit, stability, competency and professionalism, consider factors in Islamic bank's selection.

Apart from the fulfilment of religious responsibilities may or may not be a main element in bank selection, other purposes are reported to have a significant effect of the consumers' choices. One of these significant bank selection criteria is the possible profits from investing in an Islamic bank. In other word, in considering purposes responsible for choosing Islamic banks as depository institutions, religious motives did not stand out as being the only significant ones; bank customers are profit interested.

In this regards, we can conclude that the several previous researches have been determining aspects in influencing saving among the depositors in the Islamic bank's perspective. They observe the existence of profit intention among the Islamic bank's depositors. The existence of profit motive has many effects, one of which is the propensity of depositors to withdraw their funds and remove it to the conventional bank if the latter offers higher profit (interest rates). This situation to become worse if not managed well.

Depositors of Islamic banking put the profit motive as priority in making their economic decisions. Therefore, in the circumstance of the existence of profit intention among the Islamic bank's depositors in Malaysia, the banks will be exposed to the displaced commercial risk.

Secondly, the interest rate movement between banks also implied the existence of displaced commercial risk. It happened when the interest rate in conventional banks increases, Islamic banks have to figure out the market trend by raising the deposit rate accordingly. At the same time shows the profit intention among the Islamic bank depositors as reflected by the significant effect of the Islamic banks' rate of return on Islamic bank deposit. When the rate of return declines, they will definitely decrease

their deposits in Islamic banks and they could shift their funds to the conventional banks. This phenomena indicates the displaced commercial risk problem.

Similarly, we also find that interest rate in conventional banks and rate of return in Islamic banks are significant predictors' of Islamic banks savings deposit. The depositors will withdraw their fund where the interest rate is greater than the rate of return. In other words, the interest rate is the significant variable in determining the deposit in Islamic bank. Therefore, interest rate and rate of return play an important role in order to attract more depositors.

Several factors triggered the idea to us to conduct study in these areas. Firstly, while the nature of risks faced by Islamic banking and finance literature, there have been many discussions about credit risk, liquidity risk, operational risk, benchmark risk and legal risk. It is unfortunate that the displaced commercial risk problem has hitherto received little attention. Earlier studies within the displaced commercial risk issue are more focussed on the concepts. However, up to date, there is a lack of empirical studies that deals with displaced commercial risk in the literature. Therefore, this study aims to fill this gap by offering an empirical support on the displaced commercial risk in the situation of an economy with a dual banking system; as well as examining the impact of displaced commercial risk on Islamic bank's performance.

Secondly, the development of risk measurement, especially displaced commercial risk in Islamic banks has been fairly restricted in scope so far. In order to determine whether the displaced commercial risk is a threat to Islamic banks, this study adopted a relatively new measure of measuring displaced commercial risk that is using the Value at Risk

(VaR) method. This method has been proposed yet it is not being adopted in Malaysia so far.

1.3   RESEARCH QUESTIONS

The following specific research questions are developed to address and investigate the broader research objectives:

    i.   How can the displaced commercial risk be estimated using Value at Risk model?

    ii.   What are the impacts of displaced commercial risk on Islamic bank performance, namely stability and profitability?

1.4   RESEARCH AIM AND OBJECTIVES

This research attempts to fill the gap in the empirical literature on risk management in Islamic banking. It recognises upfront that Islamic banking faces its own unique risks due to the nature of Shariah compliance.

The aim of this research is to explore and analyse a unique risk to IBs that is Displaced Commercial Risk (DCR). This research is to examine whether DCR is a pertinent threat to the Malaysian Islamic banks.

In fulfilling the identified research aim, the following specific objectives are developed:

    i.   To estimate Displaced Commercial Risk for Islamic banks. This will be achieved by using Value at Risk approach.

    ii.   To examine the impact of Displaced Commercial Risk on Islamic bank stability.

iii.   To examine the impact of Displaced Commercial Risk on Islamic bank profitability.

1.5   SIGNIFICANCE OF THE STUDY

This study follows in the footsteps of the previous studies from Archer and Abdel Karim (2006), Kasri (2008), Kasri and Kassim (2009), Toumi and Viviani (2009), Toumi et al (2011), Erwin and Rahmatina (2010), Sayd et al (2012), and Hamdi and Zarai (2013) in accordance with the majority of other research analysing the pressure of displaced commercial risk in banking system. Islamic banks are facing a huge number of risks such as displaced commercial risk. As the result, this risk may threaten Islamic banking industry's survival and achievement. Up to date, there is no study examines the displaced commercial risk focusing on the Islamic banking system in Malaysia. This study differs from the other research in several important aspects and add in several key aspects to the existing literature on banking performance.

First, this study is an academic research of displaced commercial risk which has not been widely covered from both economics and finance perspectives. The outputs from this research are essential ingredients for the Islamic banks to express appropriate strategies to overcome the existence of displaced commercial risk in Malaysian Islamic banking.

Furthermore, there are many researches or studies conducted on Islamic banks performance in Malaysia. However, the analysis on displaced commercial risk and attempt to understanding whether the displaced commercial risk is a threat to Islamic bank's performance have not been considered extensively before, which should be

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studied as it fills an important gap. In addition, this study is important for the experts such as Islamic Financial Services Board (IFSB), The National Economic Action Council (NEAC) Ministry of Finance to know whether this risk issue could threaten the performance of the whole financial institutions. This study also purifies a source of reference to policy makers and academicians, which is rather rare in both academic and professional groups.

1.6   ORGANIZATION

There are five chapters that organize the whole of the study and the following section provides the explanation of each of the chapters:

Chapter 1, being the first chapter, is the introductory chapter, which briefly clarifies the background of the research, the content of the research, how the whole research was constructed and the extent to which this research benefits the society.

Chapter 2, this chapter aims to provide an idea about the concepts of displaced commercial risk based on the literature review. This includes a general definition of risk. Second, it presents the types of unique risks in the Islamic financial services industry. This chapter will focus on the explanation of the Displaced Commercial Risk (DCR) and the perceptions of Islamic banks about these risks. Third, we are looking at the determinants of bank performance, which is measured by bank profitability and bank stability. Fourth, in the literature, the three relevant supervisory authorities for Islamic banks in identifying DCR are discussed. Then, the chapter proceeds by discussing the methodology used by previous studies in examining this issue, including the method employed to quantify the displaced commercial risk using Value at Risk (VaR). This chapter concludes with the research gap identification.

Chapter 3, this chapter highlights the methodology of the study as well as the modelling by discussing issues with regards to data collection and the research framework. This section also could be divided into two parts. The first part focuses on the approaches that will be used to measure displaced commercial risk, which is the one used by the Central Bank of Malaysia and Value at Risk approach. The second part consists of the empirical modelling employed to analyse the impact of displaced commercial risk on bank performance. A more discussion detailing the research strategy of this research, opening with some types of research strategy continues. The conclusion of this study is discussed in the last part of this section.

Chapter 4, this chapter is an empirical exploration of the model developed in the previous chapter. This chapter aims to discuss the findings of the models. It begins by presenting the estimations of DCR which was done using two approaches, Value at Risk model (DCR_{VaR}) and the capital charge needed for displaced commercial risk calculated based on Central Bank of Malaysia ($DCR\alpha$). Then, it proceeds to the second part which is modelled estimation on the impact of DCR on Islamic banks' performance.

Chapter 5, the central idea of this final chapter aims to discuss the findings and results in this study. This chapter consists of four sections. Section one outlines the introduction. Section two provides a concise summary of the research which the objectives and rationale of the study are further discussed. Section three discusses the practicable recommendations and implications that could be obtained from the findings. Section four discusses the contributions and limitations of the study as well as suggestions for future studies, respectively.

2.1   INTRODUCTION

Islamic banking is a commerce, so there are risks connected to various views of the business and have to be managed. Allah mentioned in Al Quran about risk in Surah al-A'raf verse 34[2]. This Surah clearly shows us on the existence of risks by resembling it to the death of the mankind. From the Surah Yusuf verses 47 to 49[3], we also can see the clear evidence that strategic steps were taken in order to prevent and reduce expected risks, since a risk that is not well managed can bring harm to certain parties. Not only that, there is a hadith from Prophet Muhammad SAW which was narrated by Ibn Majah regarding risk is al-kharaj bi al-daman[4]. In regards to Islamic hadith, Islamic institutions also are led and guided to manage their risks well.

This chapter aims to deliver an idea about the theories of displaced commercial risk based on the literature review. This comprises a general definition of risk. Second, it presents the character of unique risks in the Islamic financial services activity. This chapter will focus on the explanation of the Displaced Commercial Risk (DCR) and the ability to see on Islamic banks about these risks. Third, we are looking at the determinants of bank performance, which is measured by bank profitability and bank stability. Fourth, in the literature, the three relevant supervisory authorities for Islamic banks in identifying DCR are discussed. The agencies are The Islamic Financial Services Board (IFSB), The Bank Negara Malaysia (BNM), and The Accounting and Auditing Organization for Islamic

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[2] Which means "And for every nation is a specified term. So when their time has come, they will not remain behind an hour, nor will they precede it".

[3] Prophet Yusuf answered: "You shall sow for seven consecutive years as usual. Store all that you reap, left in the ear, apart from the little you eat. After that will come seven years of hardship which will consume all but a little of what you stored up for them".

[4] Al-kharaj bi al-daman which means profit or return is the price for the risks that one should bear.

Financial Institutions (AAOIFI). Then, the chapter proceeds by discussing the methodology used by previous studies in examining this issue, including the method employed to quantify the displaced commercial risk using Value at Risk (VaR). This chapter concludes with the research gap identification.

2.2   DEFINING RISK

The explanation of risk can be different from one party to another, depending on their point of views. The risk is defined as a situation in which there happens an exposure to difficulty or there are may be a difference from the desired results that is expected or hoped for. The possibility of risk can be expressed as chances, ranging from 0 to 100 per cent (Lichtenstein et. al., 1978). Therefore, the chance is neither impossible nor definite. This meaning does not require that the chance is quantified, only that it must exist. The amount of risk may not be assessed, for whatever reason, but the probability of the adverse result must be between 0 and 100 per cent (Campbell and Picciotto, 1998).

According to Bakr et al. (2012), the word risk means that opportunities can be expressed through uncertainty. In general, the situations of risk share common features. First, banks care about the outcomes. The delivery of a bank's decision is surrounded by uncertainties which both pose threats to success and offers an opportunity for increasing success. Second, banks, as well as customers, do not know what will happen in the future. But risk suffered by the bank is usually minimal and the profit margin is determined in advance. In each situation, the result is uncertain. It seems that risk involves two essential components of risk, which are exposure and uncertainty.

Exposure is one thing to not know if an offer is a profit or loss (De Giorgi, 2005). A self-conscious being is exposed to a suggestion if the bank or clients would care whether or not the offer is profit. It is possible to be exposed to a proposition without knowing of or considering the proposition. Like uncertainty, experience is a personal condition based on the statistics given, but it is entirely different from uncertainty. The degree to which bank is uncertain of a proposition does not affect the degree to which bank is exposed to that proposition (Rockafellar et. al., 2006).

Meanwhile, uncertainty is a state of not knowing whether an offer is a profit or loss. However, Knight (1921) clarified the difference between uncertainty and risk where uncertainty should be taken in a different sense than the concept used for of risk, from which it has never been explained properly. The important fact, in some cases is that risk means a number subject of assessment, and at other times it is not of this character as clearly explain before. It will seem that a proper risk, or a measurable uncertainty. In short, Knight defined only assessable uncertainty to be a risk and provided.

It is true that risk that is assessable is easier to cover. Holton (2004) claims that there are two requirements that are appropriate for such risk exists. The first is uncertainty about the possible outcomes generated from the result of a research and the other is that the outcomes need to be considered in terms of preparing the utility. This argument based on the previous study by Vogel and Hayes (1998) has decided the prohibitions according to the degree of risk involved: pure rumor, uncertain effect, unknowable future advantage, and inexactitude.

The Islamic financial concept of gharar is generally translated as uncertainty, hazard, and risk. Gharar is forbidden yet it would be meaningless to prohibit risk. Islam does not even

support the avoidance of risk. Definitely, incurring the commercial risk is permitted, even encouraged, provided it is fairly shared. More precisely, gharar refers to transactions conditioned on uncertain events.

A possible understanding of the gharar is that they ban only risks affecting the existence of the item as to which the parties perform, rather than just its price. In the Islamic finance, such risks rise either: a) because of the parties' lack of information (jahl, ignorance) about that item; b) because the item does not exist; or c) because the item avoids the parties' control. Therefore the researchers (Khan and Bhatti, 2008; Farook et. al., 2012), might use one of these three quality to identify transactions infected with the type of risk criticize as gharar.

In this condition, the term risk is used to mention a condition in which the chances of different effects are either known or can be inferred with practical accuracy. The risk is diverse from uncertainty, which refers to conditions in which the probabilities of alternative effects are not known or cannot be precisely discerned. Whilst both risk and uncertainty refer to conditions where a result cannot be precisely predicted, an uncertain condition represents a far greater situation of ignorance than does a risky condition.

Then, Longenecker et al. (2006) highlights the risk is the likelihood that a problem will change into a tragedy. Weakness and problem are not safe, if it is taken separately. But if it comes together, they would be of a risk or, in other words, the possibility that a bad situation will occur. However, risks can be managed or reduced. If we are alerted of how we are managing the situation, and if we are conscious of the weaknesses and problem we had with the existing risks, then we need to take steps to ensure that these risks will not be

turned into worse. Risk management has not only helped to prevent a bad situation, but also helps to make economic growth are more sustainable. Economic growth will be sustainable if persons can make a better life without creating damaging to the long-term period.

While Marhavilas and Koulouriotis (2012) and Ali and Naysary (2014) defines risk is reflected the institution will be exposed to the danger, where the threat will exist in any insecure situations are likely to be loss and harmful. The future possibilities of these institutions may suffer unexpected losses that might affect the achievement of the institutional successful.

Financial liberalization has shown a tremendous progress in recent years, with emerging markets participating actively in this process. At the same time, the developed markets have provided an opportunity to refine some of the financial instruments, to innovate new ones and at the same time improve the overall national and global financial systems. However, the past and current financial crises created financial risks. Risk management is considered as an organized approach to controlling uncertainty. This uncertainty is a result of a sequence of social activities including strategy development to achieve it, risk assessment and mitigation of risk.

2.2.1   Types of Risk in Banking

There are a number of risks that can be distributed into different categories according to how its realization will have impacts on the activity of the institution and its situation. For instance and according to Harland et al. (2003), risk can be distributed into foreign exchange risk, interest rate risk, market risk, credit risk, and equity risk.

Interest rate risk is the risk that occurs on volatility in the interest rates led to capital of banks and financial results become negative. The exposure of banks towards interest rate could be seen in previous studies (Lynge and Zumwalt, 1980; Yourougou, 1990; Flannery and James, 1984; Saunders and Yourougou, 1990; Chance and Lane, 1980; Aharony et al., 1986; Flannery, 1983; and Flannery et al., 1997). These scholars believe that the fluctuations in interest rates can cause adverse effects on the two different situations, namely both on its economic gain and a bank's earnings, but complementing each others.

Foreign exchange risk (also recognized as an exchange rate risk or currency risk) is a financial risk that occurs when financial contract is denominated in a currency other than the base currency of that country (Cooper and Mello, 1991; Baz and Pascutti, 1996; Minton, 1997; Duffie and Huang, 1996; Hakala and Wystup, 2002 and Hentschel and Kothari, 1997). The other group of studies (Sun, Sundaresan, and Wang, 1993; Koticha, 1993; Bailey and Chung, 1995; Mozumdar, 1996; Shapiro, 1996; Duffie and Singleton, 1997; Minton, 1997; Carrieri et al., 2004; and Phylaktis and Ravazzolo, 2004) identifies the three main kinds of exchange rate risk are as economic risk, transaction risk and translation risk.

Credit risk is one of the core risks that totally affect the banks' sustainability as happened from the financial crisis in 1997. IFSB (2005) define the possibility of credit risk will lead to the failure of counterpart to meet their needs in accordance with the terms agreed. This explanation is appropriate to Islamic Financial Services (IIFS) to manage the financial exposure of leases and receivables (Such as, Ijarah, Diminishing Murabahah and Musharakah contracts) and working capital financing projects or transactions (Such as, the contract of Istisna', Mudarabah and Salam).

The expected risk in these contracts rises as an effect of the failure of debtors to meet their financial obligations on the periods of maturity. So, losses are incurred by Islamic banks. Each category of contract in Islamic banks will give a different effect of credit risk to the banks' return (Altman and Saunders, 1998; BIS, 1999; Sarker, 1999; and Khan, 2012). Various financial instruments are sensitive to credit risk: credit derivatives, vulnerable claims, corporate bonds, and so on.[5] Therefore, several steps are suggested to solve the problem of credit risk: (i) asking bank to determine the marginal amounts of economic capital, as suggested by Gordy (2003) and Mingo (2000), and (ii) developing methods to better measure the credit risks (Altman and Saunders, 1998; Mester, 1997; and Allen et al., 2002).

Equity risk is the financial risk inherent in a particular part of the equity holdings. Equity risk is not referring to the risk in paying into building equity or real estate in properties, however normally refers to equity in businesses through the buying of stocks (Jin and Myers, 2006; Bleck and Liu, 2007). There are two ways to limit equity risk suggested by Damodaran (2008).

The first way is issuing with the variety of stocks. Most of the professionals inspire investors to hold several stocks in order to offer diversity. The idea is that, if suddenly there is one significant share of failures, it will affect the portfolio to become less.

Second, to avoid equity risk is in a more specific variation of the categories of equities that the investor owns. For instance, holding stock in diverse sectors like technology, energy,

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[5] Hou and Jin (2002), argued that banks should take into corporate bonds in their asset distribution system. Corporate bonds by definition is based on the credit risk (and possibly other risks such as liquidity risk), since the bond issuers might be unable to refund coupons or principals of the debt.

agriculture, or retail, helps to move down equity risk. Thus, does buy into a bunch of global stocks, rather than maintaining all stock investments rooted in the same economy. All of these approaches help investors to balance out their stock purchases and smaller the risk that their total values will involve sudden price drops.

Lastly, market risk is the possibility that an investment's actual profit will be diverse than predictable. This includes the chance of losing some or all of the actual investment. The researchers (Engle, 1982; Bowers et al., 1986; Santomero and Babbel, 1997; Samuelson, 1999; Bodie, 1999; Schirripa and Tecotzky, 2000; Dercon, 2005; Raghavan and Li, 2006; and Bask, 2007) detail that, market risk is the risk that the financial mechanism's value will change as a result of market price fluctuations, regardless of whether these variations are caused by factors, typical for individual instruments or their issuer, or by factors relating to all the instruments traded on the market.

The other study by (BIS, 1996; Loretan, 1997; Levine et al., 2000; Francois, 2001; Abul and Antonious, 2004; and Duval, 2008), market risk is the risk of opposite deviations of the mark to market value of the transaction portfolio during the period obligatory to liquidate the businesses. Islamic financial institutions take up risk sharing capitals, whereas conventional banks take guaranteed returns on their investments, as the lenders or investors have nothing to do with the loss of the borrower[6].

Based on these views, we can say that risk is a situation of opportunity. The risk also is a probabilistic condition that can occur and affect the activity of a business negatively or

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[6] They get fixed rate of interest on their investment and they are not worry where the borrowed money is being consumed. Opposite to this practice, investor or Islamic bank is aware of the proper use of loan and watch the activities of the borrower due to his risk is involved and he can lose total investment in the situation of business failure or misuse of a loan.

positively (opportunity). Only those who undertake a risk, bear the uncertainties and face the probable adverse outcome may gain rewards. Subjective utility, probability, and state preferences are instruments for characterizing the uncertainty and exposure components of risk.

In this section, we also learned based on the literature about different types of risks that a bank might face. However, the Islamic finance's perception about risk is not different from those of other economists. Furthermore, Islamic banks face unique challenges in specific risk, such as displaced commercial risk.

2.3 THE EXPOSURE OF RISK IN ISLAMIC BANKING

The risk view of an Islamic bank is almost parallel to the conventional bank. However, the Islamic banks deal with two types of risks. First, they have in common with conventional banks such as liquidity risk, credit risk, operational risk and market risk. But due to the specificities of the Islamic banks, the landscape of these risks may change. Second, the Islamic banks deal with as a result of their unique liability and asset structures. So, the techniques and processes of risk management and identification available to the Islamic banks could be set into two category standard techniques. The first set of techniques which are the same to those of conventional framework and not in different with the Islamic principles of finance and the second set of techniques which are adapted or new and are supposed to comply the Shariah law.

Islamic banks face unique challenges in specific risks. Risk must be present in any financial transaction in order for such transaction to comply with Shariah rules and regulations.

Unique risks in Islamic banks appear both from the whole financial infrastructure and the contractual project of instruments based on Shariah principles. For a variety of risks, Islamic banks may be more exposed than conventional banks (Ahmed, 2001; Iqbal and Mirakhor, 2007; Mohammed and Kayed, 2007; Bacha, 2007). Even in the case of risks affecting the Islamic banks nowadays is much different than that of the risks impacting them a period ago. Changes and Globalization in product offerings, process, technology, and the nature of financial transactions create new kinds of challenges and risk of the executives and boards of these institutions.

In classical Islamic principle, it was recommended that Shariah classifies all risks into three meaningful groups (Lapidus, 1996; Irshad, 2006): Firstly, the concept of essential risk. This concept is stated in the Prophet Muhammad SAW's saying, *al-kharaj bi al-dhaman*[7]. In other words, it relates right of the profit of an asset to carrying the risks develop from its ownership. This maxim includes the concept of *al-ghunm bi al-ghunm*[8]. In other words, it relates to the risk of profit of Islamic financing. The groups who enter into an agreement are qualified for its benefit as long as there is some form of correlated risk. Without the risk, the business would not be Shariah compliant.

Secondly, speculation or gross uncertainty which can be translated as *gharar katheer* (too much uncertainty). Muslims are strictly forbidden from entering into this second type of risks as such risks make a contract or a transaction void from a Shariah point of view. Whereas in conventional finance, this is a form of tradable risk which can be sold and separated on, or which can be reduce against. This form of risk can be further categorized into the following sub-types of prohibited risks: a) Risk in taking Ownership such as the

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[7] Which can be express as 'the profit belongs to him who bears responsibility'.
[8] Which means entitlement of gain is connected to the responsibility for a loss.

sale of a run-away camel or commodity or property that has to be repossessed; b) Risk in Existence as such the sale of a non-existent item, such as crops, on a future basis; c) Risk in Standard such as type, quantity or specifications of the subject matter of contract being unknown; d) Risk in Aggregate such as sale price or rent being unknown in a sale or lease contract; and e) Risk in Time of Settlement such as a deferred sale without fixing the exact period.

Thirdly, can be reported as a degree in between the two categories noticeably above. This can involve a variety of types of risk, including credit risk, market risk, operational risk and equity risk. This is not a risk that is part of an existing financing instrument's inherent structure. Therefore, this type of risk can reduce against or avoided.

The classification of Islamic banking risks is tackled throughout the literature, where some scholars provides a classification of the different risks inherent in Islamic banks. In contrast, others focus only on those risks unique to Islamic banks. The way scholars map out risks varies from one to another. For instance, Khan and Ahmed (2001) categorise Islamic banking risks into credit, benchmark, liquidity, operational, legal, withdrawal, fiduciary and displaced commercial risks. Meanwhile, Akkizidis and khandelwal (2008) classify the groups of risks in Islamic banks into credit, market, equity, liquidity, rate of return, operational and legal risks.

Moreover, Greuning and Iqbal (2008) and Iqbal and Mirakhor (2007) discuss asset liability management risk which results from mismatching the maturities of liabilities and assets on the balance sheet, as one component of Islamic banks' risk categories. On the other hand, some research limits the classification of risks to those that arise specifically in Islamic

banks likes commodity risk, mark up or benchmark risk, legal and Shariah compliance risk, rate of return risk, and equity position risk. Iqbal and Mirakhor (2007) provide a broader view of risks faced by Islamic banks by presenting financial risks, business risks, treasury risks and governance risks as the four main categories of risks. Islamic banks hold unique risks such as rate of return risk, Shariah risk, mark up risk, commodity price risk, and equity position risk, as a reaction of their operational variations. As a result of the specific nature of Islamic banks, Shariah risk, rate of return risk, displaced commercial risk, and withdrawal risk all clearly arise in Islamic banks.

As stated by Tafri et al. (2011) the several risk categories are all present in conventional financing in opposite values. An Islamic bank faces a variety of unique risks in addition to the risks faced by a conventional bank. Several types of risks exist only on Islamic banking and other than that is common among both conventional and Islamic banks. The types of risk are equal between both Islamic and conventional banking are the market risk, operational risk, liquidity risk and credit risk.

Though a large literature on different aspects of Islamic finance and banking exists, studies on the specific risks faced by Islamic banks are limited. For Islamic banks, in addition to the risks faced by the traditional conventional banks, they are also facing other risks in line with their Shariah based banking operations such as Shariah risk, fiduciary risk, rate of return risk, withdrawal risk and displaced commercial risk (Ahmed, 2002 and Farook et. al., 2012).

Figure 2.1 summarizes an outline of the risk profile of operating IFIs. Overall, risks are organized into five broad categories: business, transaction, governance, treasury and

systematic risks (Schroeck, 2002; Dahlia et al., 2004; Ahmed, 2006; Hassan and Dicle, 2006; Ahmed and Khan, 2007; Helmy, 2012).

This figure illustrates the Transaction risk categories included Market risk, and Credit risk. Market risk is the risk associated with change in the market value of holding assets. However, credit risk is the failure of counterpart to meet his or her requirements timely and on the agreed terms of the contract.

Then, Business risk categories include Insolvency risk, displaced commercial risk (DCR), and Withdrawal risk. DCR is the risk of separation between expectations for returns and assets' performance on liabilities. Withdrawal risk is the risk where the bank is exposed to the risk of withdrawal of deposits, and Insolvency risk is the risk of bank's failure to meet its requirements when they fall due.

Categories of Treasury risks include Liquidity risk, and Hedging risk. Liquidity risk is the risk of bank's failure to access liquid funds to meet its requirements. However, hedging risk is the risk of inability to mitigate and manage the different categories of risks.

The Governance risks categories have three types: Operational risk, Fiduciary risk, and Transparency risk. Operational risk is the risk of failure of internal practices as related to systems or people. Fiduciary risk is the risk of facing legal recourse action in case the bank breaches its fiduciary duty towards shareholders and depositors. Transparency risk is the risk of the consequences of choices based on incomplete or inaccurate information which is the effect of poor disclosure.

Lastly, System risk category comprises two types: Institutional risk, and Regulatory risk. Institutional risk is the risk of divided between product description and practices. Regulatory risk is the risk of noncompliance with regulations due to misperception, mistakes or bad management.
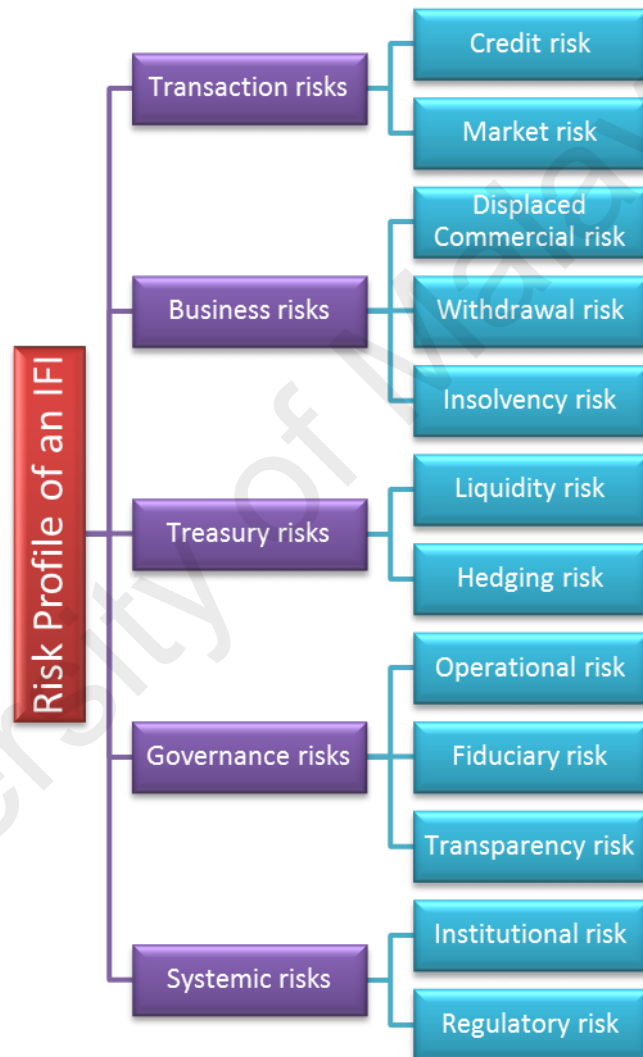
Figure 2.1: An Overview of the Risk Profile of Operating IFIs

Some of the main risks faced by Islamic banks are discussed below.

2.3.1 Shariah Risk

Shariah is the essence of Islamic financial operations and products. Bhambra (2007) claim that if customers became realize that the products they have in their portfolio were not Shariah compliant, this would seriously affect customer confidence in the Islamic transaction concerned or, on a larger scale, in the Islamic financial services industry as an entire.

Greuning and Iqbal (2008) and Iqbal and Mirakhor (2008) clarify that Shariah risk is highly connected to the functioning and structure of Shariah panels at the institutional and systemic level, and this specific risk could be of two categories; the first is due to the failure to comply with Shariah law and the second is caused by non-standard operation. Hence, it is clearly a great challenge for regulators.

For example, while some Shariah scholars examine the terms of a istisna' or murabahah contract to be agreed with the customer, others argue that the customer has the option to decline even after put an order and paying the commitment charge. While different philosophy considers different operation to be acceptable, the bank's risk is higher in nonbinding cases and may lead to litigation in the case of unsettled business (Greuning and Iqbal, 2008).

2.3.2 Rate of Return Risk

The rate of return risk is explained as the uncertainty in the profits earned by Islamic banks on their assets (Iqbal and Mirakhor, 2007). In most Islamic banks, the rate of return risk in

the banking book is likely to be much more significant than the market risk in the trading book. One way of observing at this risk is the risk normally associated with overall balance sheet exposures where gaps arise between balances and assets of the depositors.

Iqbal and Mirakhor (2007) discuss that the rate of return risk is diverse from the interest rate risk in two conditions. First, there is less uncertainty in the rate of return earned on their investments if investments are hold till maturity, since the conventional commercial banks process of interest-based fixed income securities on the assets side. However, since Islamic banks have a mix of equity-based investments and mark-up based, this uncertainty are greater. Second, the return of deposits in conventional banks is fixed. In contrast, the returns on deposits in Islamic banks are estimated but not pre-agreed.

Another significant issue in this risk is the use of external standard of return. Many Islamic banks use an external standard such as the London interbank offered rate (LIBOR) to charge the mark-up in sales-based contracts, which may not be closely connected to the domestic return. This condition highlights the significance of developing a domestic the rate of return standard, so that both assets and deposits can be aligned with similar standards (Sundararajan, 2007).

2.3.3   Fiduciary Risk

AAOIFI (1999a) states the fiduciary risk as being officially liable for a breach of the investment agreement either for mismanagement of investors' funds or for non-compliance with Shariah rules. Meanwhile, Greuning and Iqbal (2008) and Iqbal and Mirakhor (2007)

clarify fiduciary risk as the risk that exists from an institution's failure to perform in accordance with implicit and explicit standards applicable to its fiduciary control.

Once the objective of shareholders and investors diverge from the activities of the bank, the bank has revealed to fiduciary risk and hence will lead to serious impact. First, it may require the bank to pay a penalty or repayment, which can result in a financial loss. Second, it can cause deposit withdrawal risk and reputational risk, creating panic among depositors, who may rush to issue their funds. Third, it can influence the bank's cost and access to liquidity. Fourth, it can have a negative effect on the market price of shareholders' equity. Finally, it may result in insolvency if the bank is unable to meet the demands of current investment account holders (Iqbal and Mirakhor, 2007; Greuning and Iqbal, 2008).

2.3.4   Withdrawal Risk

Other type of problem in Islamic banking is withdrawal risk, which effects of the pressures from competition an Islamic bank aspects from both Islamic banks and conventional banks (Greuning and Iqbal, 2008). The withdrawal probability due to lower rate of return is a unique characteristic of an Islamic bank as a return on their deposits can fluctuate (Ahmed, 2002).

Customers are willing to protect the actual value of their assets, therefore Islamic bank could be exposed to this type of risk if customers are getting a lower rate of return than they would take from another bank. Ahmed (2002) describes that in an Islamic view, the actual value of deposits will decrease not only due to zakat inflation, but also inflation dues. However, if an Islamic bank is operating inefficiently and keeps generating lower returns,

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depositors eventually will choose to move their money, eroding the contract value of the bank (Greuning and Iqbal, 2008).

2.3.5 Reputational Risk

According to Iqbal and Mirakhor (2007), reputational risk is the risk that irresponsible activities or performance of management will damage the confidence of the bank's customers. Reputational losses may be reflected in reduced operating returns as customers and trading counterparties move to competitors.

Reputational risk is normally related to operational risk, although there are significant differences between the two. According to Basle II, operational risks are related to internal procedure, people (clients, products and business practices employment practices; internal fraud; and workplace safety), and external systems (damage or loss of assets, and external fraud). Reputational risk in turn is connected to the strategic positioning and performance of the bank, exploitation, conflicts of interest, individual expert conduct, compliance and incentive systems, leadership, and the current corporate culture. Reputational risk is usually the significance of management processes rather than separate events, and therefore needs risk control approaches that contrast materially from operational risk (Walter, 2006).

The Islamic financial system is a relatively new industry. A single failed organization could give a bad reputation to other banks that have not engaged in irresponsible behaviour. However, all Islamic banks in a given market are vulnerable to such risk. Standardization of practices and contracts, relationship between Islamic financial institutions, self-

examination, and establishment of industry associations are some of the steps required to prevent this particular risk (Greuning and Iqbal, 2008).

2.3.6   Displaced Commercial Risk

One of the risks that become a challenge to overcome is Displaced Commercial Risk (DCR). Based on the literature, this particular risk occurs when banks in order retain and attract more profit and loss sharing (PLS) depositors are under market pressure to pay higher returns to their clients, which should help to discourage depositors from withdrawing money. Other factors that lead customers to withdraw their saving are Shariah non-compliance and bad news or rumour about a financial situation (Ergec and Arslan, 2013).

Like the other financial institutions, the operations of Islamic banks face some financial risk problem. The displaced commercial risk is the interesting topic for discussion because of some situations. First, some of the Islamic banking depositors position the banks indifferently from the conventional ones, namely rational depositors. They expect Islamic banks to give a competitive return, provide comprehensive banking services and offer various deposit instruments (Haron and Wan Azmi, 2008). Consequently, there is a potential of displaced commercial risk.

Second, the conventional banks can offer attractive return from a variety of banking products which sometimes do not link with the real business activities. Islamic banks, on the other hand, are obliged by the Shariah principles to produce a profit from the real and actual business activities and bear the loss as well.

Third, when an economic or financial crisis occurs, the increasing trend of interest rate brings Islamic banks into a dilemma. It is because the rational depositors expect to receive a higher return from Islamic banks. If Islamic banks cannot afford such expectation, it may lead to a severe displaced commercial risk.

In practice, the persons who spend in these accounts assume them to perform like bank deposits rather than like mutual funds. This is especially the case for unrestricted investment accounts. If the bank's real returns on assets are weak, and consequently, the bank pays out less than its competitors, it operates the risk that users will withdraw their money and put them another place. This is known as displaced commercial risk.

Thus, displaced commercial risk is referred to unexpected losses that the bank can absorb to ensure that Investment Account Holders (IAH) are remunerated at a reasonable rate (Toumi et al., 2012). Archer and Abdel Karim (2006) claim that displaced commercial risk is potentially a well-organized and value creating a means of distribution risks between two groups of an investor with different risk variation abilities and priority. In other words, displaced commercial risk is the transmission of the risk related with deposits to equity holders (IFSB, 2005 and Ahmed, 2003) or the risk of difference between the expectation of return and asset performance on liabilities[9]. This risk is one of the generating factors of withdrawal risk where the bank is exposed to the risk of deposit withdrawals from their customers (El-Hawary et al., 2003).

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[9] In bank institutions, can divide into two categories: shareholders and bank. Firstly, in bank institutions: Displaced commercial risk may negative impact on the value of the bank's capital. Return on equity will decrease. Secondly, shareholders are exposed to the risk of not get their share of the bank's gain (refer Chapter 3 [Methodology] for further explanations).

Htay and Salman (2013) opined that displaced commercial risk is defined as a risk and a pressure faced by an Islamic bank to pay its investors-depositors a rate of return more than what should be payable under the real conditions of the investment agreement. Displaced commercial risk arising from competitive pressures on Islamic banks to maintain and attract investors (fund providers).

Displaced commercial risk arises when investment account holder funds invest in assets such as ijarah or murabahah with long-term maturity periods and the rate of return which may not be competitive with other investments (Kozarević et al., 2013).

For example, Islamic banks spend funds in ijarah or murabahah assets which profit a lower rate of return compared to the current assumption of investment account holders. Although, the institutions offering only Islamic Financial Services (IIFS) are not required to perform such income smoothing, they may find that due to trade pressure or supervisory authority, they are virtually compulsory to do so (Haron and Hin Hock, 2007).

Consequently, Islamic banks may be stressed in fluctuating standard to provide distributions similar to other institutions or risk losing their depositors. In the Islamic banking literature, this risk also mentions to the risk that investment account holders will withdraw their money in many, if the returns paid show a trend opposite to the investment account holder hopes of instruments or deposits of a comparable features, and thereby subjecting the Islamic banks to ruin (Farook et. al., 2012).

Under a dual banking system, the strength of the financial system and interest rates are of great importance for the policy maker in advance the Islamic banking industry. Islamic

banks are not remote from the interest rate up and down in their existence under a dual banking system. It is the displaced commercial risk that threatens Islamic banking benefits in a changing market interest rate condition (Erwin and Rahmatina, 2010). This especially attributable the risk faced by Islamic banks on the liabilities side, as a result of the mobilization of deposits which are on Mudharabah contract. IFSB (2005) describe the displaced commercial risk as:

"… *the risk arising from assets managed on behalf of Investment Account Holders which is effectively transferred to the Islamic Financial Institutions own capital because the Institution forgoes part or all of its mudarib's share (profit) of on such fund, when it considers this necessary as a result of commercial pressure in order to increase the return that would otherwise be payable to Investment Account Holder's*" (IFSB, 2005)[10].

Some differentiation may also be made with an interest rate degree give by conventional banks. Next, as the degree of Islamic deposit decline when interest rates upward, the banks are also vulnerable to displaced commercial risk. In Islamic banking view, the displaced commercial risk happen due to a market constraint that the Islamic bank charge a return that exceeds the rate that has been obtained on assets funded by investment account holders when the return on assets is under-performing as proportionately with competitors' price.

Following a discussion in the Islamic bank margin reacts negatively to interest rate volatility. This is in line with the researchers of Angbazo (1997), Kasri (2008) and Valverde and Fernandez (2007). That is, as market interest rate volatility increases, ceteris

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[10] Supported by Sundararajan (2008) also shows that reveal Islamic bank to displaced commercial risk, where Islamic bank as mudarib forgoes some or all of its profit sharing and passes these to the client, usually to match the investment returns provide by challenger in the market.

paribus, Islamic banks need to increase their deposit rate or to decrease their financing rate. The basis margin of the conventional bank's operation faces interest rate risk, where it to the Islamic principles where it faces the displaced commercial risk.

In the deposit market, as market interest rate increases, it is possible that Islamic bank's customer withdrawn their fund and transfer it to the conventional counterpart, a problem known as displaced commercial risk. In the credit market financing, however, demand for Islamic bank financing will also increase when market interest rates increase, as their prices are normally lower as compared to the credit interest rate of the conventional banks. Hence, as the market interest rate swings, no matter whether it increases or decreases, Islamic banks are exposed to a certain degree of risk, which possibly comes from the movement of either their depositors or users of funds. Thus, the higher the volatility of market interest rate, the bigger the displaced commercial risks faced by Islamic banks such that the banks need to increase their deposit rate or to decrease their financing rate or operate at a lower margin.

From a different angle, the AAOIFI has recognized the displaced commercial risk as the risk when an Islamic bank is unsuccessful to create adequate profits and performed poorly during a duration to pay its investors' depositors a rate of return higher than what should be payable under the real terms of the investment agreement (AAOIFI, 1999b). Furthermore, Rosly (1999) states that, the DCR derives pressures from competition on bank to attract and maintain investors (fund providers). The decision of banks to give up their rights for some or their whole mudarib share in returns in favor of Investment Account Holders (fund provider) is a commercial result.

On the other hand, the situation of displaced commercial risk is competitive pressure may encourage the bank to release some of its management charges in order to pay a competitive profit to its PSIA holders. In this way, some of the PSIA holders' asset risk is absorbed by the shareholders. Displaced commercial risk is possibly a well-organized and value creating a means of sharing risks between two groups of investor with different risk diversification ability and priorities: First, less wealthy PSIA holders who are not, and second, wealthy shareholders who are possibly well diversified. In exercise, however, Islamic banks set up assets with the purpose of minimizing any need to forgo management payment.

A research operated by Khan and Ahmed (2001) finds that the DCR is the possible risk faced by the Islamic banks similar with the other risks like the liquidity risk and operational risk. Andrew (2004) also added, DCR is the risk of transfers of shareholders' funds for the intend of the smoothing of investors' returns[11]. It means that DCR is related to the point that Islamic banks could find themselves under pressure to smooth the rate of return of the Profit Sharing Investments Accounts (PSIA) in order to maintain competitive and not losing clients. Furthermore, the actual return of PSIA would be funded by shareholders' returns (Christos and Alexandros, 2009).

The significance of such smoothing is that a prudential supervisory structure for a product that is not treated continuously or according to concept across the banks. In an effort to deliver a level of regulatory confidence, the procedures issued by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) with the implementation of a displaced commercial risk charge provide an effort to protect this risk. A more

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[11] Smoothing process are (For further details, refer to IFSB, 2010): a) Adjusting the mudarib share; b) Usage of prudential deposits; and c) Move from shareholders' funds.

advanced technique to dealing with displaced commercial risk from a capital adequacy view was developed by the IFSB in its degree of capital adequacy (IFSB, 2006).

In general, the practice exposes displaced commercial risk in Islamic banks, which needs dealing with adequate capital. Based on the rules or commercial pressure, the greater of Islamic banks absorbs a part of losses normally incurred by investment account holders in order to reduce possibility massive withdrawal of reserves. Note that if the banks had to give some of their profit shares to meet the consumers' expectation and remain competitive in the transaction, this could recommend a bad risk management process which increases their operational cost and reduces their gross profit margin.

Therefore, under commercial pressure, the most of Islamic banks manage the rate of return due to their investment account holders at the cost of profits normally allocate to shareholders, in order to offer them a good return and motivate them to keep their deposits in the bank (Khan and Ahmed, 2001; Archer and Abdel Karim, 2006).

Consequently, an Islamic bank is fully exposed to displaced commercial risk due to lower rate of return on Investments Deposits, which explains the logic of improving the returns distributed to Investment Account Holders (Khan and Ahmed, 2001).

Once it happens and cannot be managed properly, Islamic banks at least be taken over by the government (banking authority) or may go bankrupt. To avoid withdrawal funds, the owners of the bank will need to divide some of their own portion in returns to the investment depositors. As a result, some Islamic banks provided minimum guaranteed

profits to depositors, although it is not permissible by the Shariah principles (AAOIFI, 1999b).

As such, the Islamic banks can decide to put aside their rights to their entire mudarib share of profits in order to maintain and satisfy their fund providers and prevent them from switch their funds to another. Hence, confirms the previous finding of Mangkuto (2004). Taken together, these results suggest that the Islamic banks are revealed to several banking risks which will inevitably affect the bank margin.

An Islamic bank involved in such self-imposed exercise to encourage its investment account holders not to withdraw their money in the bank to invest them elsewhere. Therefore, during bad times the bank can move some part or all of its shareholders' returns, and this can affect its own capital. Such as the International Islamic Bank for Investment & Development in Egypt, which allocate all of its gains to investment account holders, while the shareholders be given nothing from the mid to late 1980s[12] (Warde, 2000).

2.4   BANK PERFORMANCE

Another important concern regarding DCR is its impact on bank performance, usually referred to in the context of profitability and stability. Yet, bank performance is determined by the interaction of multiple factors in a complex manner. Hence, gauging the impact of DCR on bank performance requires the understanding of the other determinants as well.

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[12] In year 1988, the bank allocates to its depositors an amount more than its profits, and the dissimilarity appeared in the bank's accounts as "loss carried forward". It is also shown that this bank was subject to short-term takeover by the Central Bank of Egypt.

Evaluating bank performance is a complex process that involves assessing interaction between the internal determinants which includes bank specific variables and external activities, reflection on macroeconomic variables that are expected to affect the profitability and stability of financial institutions.

Determinants of bank profitability and stability can be split between those that are internal and those that are external. Internal determinants of bank profitability can be defined as those factors that are influenced by the bank's management decisions and policy objectives. Management effects are the results of differences in bank management objectives, policies, decisions, and actions reflected in the differences in bank operating results, including profitability.

External determinants of bank profitability are concerned with those factors which are not influenced by the specific bank's decisions and policies, but by events outside the influence of the bank. Several external determinants are included separately in the performance examination to isolate their influence from that of bank structure so the impact of the formers on profitability may be more clearly discerned.

Following the early work by Short (1979) and Bourke (1989), many studies have attempted to identify some of the determinants of bank profitability. Their studies have focused analyses on the banking system of individual countries. They are applied to pooled time series approach, regressing performance measures against a variety of internal (staff expenses, capital ratios, liquidity ratios) and external (concentration ratios, government ownership, interest rates, market growth and inflation) determinants of bank profitability. However, the studies by Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga

(1999), Abreu and Mendes (2002), Staikouras and Wood (2004), Goddard et al. (2004), Athanasoglou et al. (2006), Micco et al. (2007) and Pasiouras and Kosmidou (2007) investigate a panel data set.

We will also review the theoretical literature of the banking system from the perspective of Islamic bank stability. There have been a number of studies concentrating on the investigation of bank stability in Islamic banks (Noor and Ahmad, 2011; Abedifar et al., 2013). However, not many studies have empirically investigated comparing the stability of Islamic banks versus displaced commercial risk.

Noor and Ahmad (2011) study investigates the performance of the World Islamic banks within the context of Asia Financial Crisis in 1997 and the Global Financial Crisis of 2008 consisting of 25 countries in the Muslim world during the period 1997-2009. The empirical finding of this study suggests that Islamic banks are well prepared for the global financial crisis.

In most studies, variables such as bank size, risk and overhead costs are used as internal determinants of banking profitability. Pasiouras and Kosmidou (2007) find a positive and significant relationship between the size and the profitability of a bank. Other authors, such as Berger et al. (1987), provide evidence that costs can be reduced only slightly by increasing the size of a bank and that very large banks are often even facing scale inefficiencies. In other words, the effect of size could be nonlinear, with profitability initially increasing in size and then declining for other reasons[13] (Athanasoglou et al.,

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[13] To this situation, the (uncertain) effect of bank size on profitability derived from possible economies of scope in addition to a possible too big to fail argument in favour of larger size. The too big to fail argument states that large banks may benefit from this implicit guarantee that, other things being equal, has the effect of decreasing their cost of funding (Iannotta et al., 2007).

2008). However, Barros et al. (2007) find that larger and more diversified banks are more likely to perform poorly, suggesting that smaller and specialized banks can more efficiently reduce asymmetric information problems associated with lending. Micco et al. (2007) find no correlation between the relative bank size and the ROA for banks, i.e., the coefficient is always positive but never statistically significant.

This is also consistent with previous researches, such as Mercieca et al. (2007) which study the importance of bank size on stability in Islamic banks. Their research were present that some of the results separately for sub-samples of all banks, large banks and small banks, using the benchmark for Islamic banks. The logarithm of total asset is considered as a proxy for size. Large banks can benefit from both scale economies and diversification as claimed by Hughes et al. (2001). At the same time, larger banks might be riskier (Kane, 2010). The researchers Cihak and Hesse (2010) was observed that small Islamic banks tend to be financially stronger than large Islamic banks.

According to Berger (1995), the variable of total asset is expected to be negatively related to DCR. The benefits of economies of scale and market power allow large banks to remain more stable than their smaller counterparts. However, larger banks might be prepared to accept more risk, in anticipation of government safety net measures for the bail out of large distressed banks (O'Hara and Shaw, 1990). This also taken together with the evidence from the literature that the size of banks is might be influenced DCR. Following Laeven (2013), the large banks, on average, create more DCR when a bank has insufficient capital, unstable funding, engage more in market based activities, or are organizationally complex.

There appears to be a consensus that bank profitability is directly related to the quality of the assets on its balance sheet. That is, poor credit quality has a negative effect on bank profitability and vice versa. This relationship exists because of an increase in the doubtful assets, which do not accrue income, requires a bank to allocate a significant portion of its gross margin to provisions to cover expected credit losses. Thus, profitability will be lower. Among the studies that show a relationship between profitability and asset quality are Alexiou and Sofoklis (2009), Athanasoglou et al. (2008), Chiorazzo et al. (2008) and DeYoung and Rice (2004).

Another determinant of bank profitability is the risk a bank is facing. In the case of Islamic banking system, the decreasing ability of Islamic banks to collect deposits from customers would explain a large proportion of the fall in profitability. Bourke (1989), and Molyneux and Thornton (1992), among others, find a negative and significant relationship between the level of risk and profitability. This result might be explained, for example by taking into account that financial institutions that are exposed to high DCR also have a higher accumulation of unpaid loans. These loan losses, lower the returns of the affected banks.

Abedifar et al. (2013) study investigates risk and stability features of Islamic banking using a sample of 456 banks from 22 counties over the period 2001-2008. They were found that there was no significant difference between Islamic and conventional banking in terms of insolvency risk. In addition, they claim that Islamic banks write-off credit more frequently or/and lower loan recoverability in comparison with traditional banks.

Cost efficiency, measured by the cost to income ratio is expected to be negatively related to bank stability. A number of studies have focused on the impact of efficiency (Boyd et al.,

2006; Agoraki et. al, 2009; Casu and Girardone, 2009; Demirguc-Kunt and Huizinga, 2010) on DCR. According to Demirguc-Kunt and Huizinga (2010), DCR are likely to be determined by the level of bank efficiency. For instance, banks operating with low levels of efficiency have higher costs largely due to inadequate credit monitoring and inefficient control of operating expenses. Declines in cost and revenue, efficiency will temporally precede increases in DCR due to credit, operational, market and reputational problems.

Since the early 1990s, advances in information, communications and financial technologies have allowed banks to perform many of bank services more efficiently. Consequently, the cost to income ratio, a proxy for operational efficiency, has been declining almost everywhere to different degrees (Albertazzi and Gambacorta, 2009), suggesting that banks have lower expenses for a given level of output. Previous studies find a positive and highly significant effect of efficiency on profitability (e.g. Garcia-Herrero et al., 2009). This would imply that operational efficiency is a prerequisite for improving the profitability of the banking system, with a more profitable banks having the most efficiency.

Among the previous studies that report a relationship between the relative percentage of loans to bank assets (LOAST) and profitability or, similarly, an inverse relationship between liquidity and profitability are Barros et al. (2007), Chiorazzo et al. (2008), DeYoung and Rice (2004), Goddard et al. (2004) and Iannotta et al. (2007). This greater relative proportion of loans in the portfolio of the bank are usually coupled with a greater liquidity risk arising from the inability of banks to accommodate decreases in liabilities or to fund increases on the assets side of the balance sheet. Consequently, a bank holding a

low proportion of liquid assets (with greater liquidity risk) is more likely to earn high profits.

Thus, the ratio of loans to total assets (LOAST) is naturally expected to be negatively related to bank stability, since the greater is the bank's loan exposure, the higher is the potential of default risk (Liu et al, 2010).

A further bank specific variable is the ownership of a bank. Micco et al. (2007) study the bank ownership is influencing the performance of a bank. According to these researchers, state owned banks operating in developing countries tend to have a lower profitability, lower margins and higher overhead costs than comparable private owned banks due to the lack of market monitoring and the non-option of selling the value of the bank on the market. Demirguc-Kunt and Huizinga (2001) suggest that international ownership banks have a significant impact on bank profitability. Foreign banks are shown to be less profitable in developing countries because the authors consider the foreign banks to be less familiar with the local environment and therefore being less profitable compared to a locally owned bank. In contrast, Bourke (1989) as well as Molyneux and Thornton (1992) report that the ownership status is irrelevant for explaining bank profitability. They find little evidence to support the theory that privately-owned banks are more profitable than state-owned banks. Furthermore, Beck et al. (2006) controlled for the age of the bank since longer established banks might enjoy performance advantages over relative newcomers. Their results for the Nigerian market indicate that older banks perform worse as new entrants into the market were better able to pursue new profit opportunities.

External determinants of bank profitability used in the literature are factors such as interest rate, inflation, the GDP development, or variables representing market characteristics (e.g. market concentration). Most studies have thereby shown a positive relationship between inflation, central bank interest rates, GDP growth and bank profitability (e.g., Bourke, 1989; Molyneux and Thornton, 1992; Demirguc-Kunt and Huizinga, 1999; Athanasoglou et al., 2008). Furthermore, there is some evidence that legal and institutional characteristics of a country matter.

Among the studies that report a positive relationship between interest rates and bank profitability are Bourke (1989), Claeys and Vennet (2008), Demirguc-Kunt and Huizinga (1999), Garcia-Herrero et al. (2009) and Molyneux and Thornton (1992). Despite this, as Avkiran (2009) points out, when management makes a conscious decision to pursue a high level of interest rate risk in conventional banks (e.g. by maintaining a high proportion of fixed rate assets relative to fixed rate liabilities), an increase in interest rates would lead to a fall in profitability and vice versa. This inverse relationship may also be caused by a time lag to pass changes in interest rates on to customers, particularly when interest rates decline.

Wall (1985) introduces the relationship between bank profitability and inflation, stating that the effect of inflation on bank profitability depends on how inflation affects both salaries and the other operating costs of the bank. In this context, Perry (1992) concludes that the extent to which inflation impacts bank profitability depends on whether the extent of inflation is fully anticipated. If the inflation rate is fully anticipated by the bank's management, the bank can adjust interest rates appropriately to increase revenues faster than costs, which should have a positive impact on profitability. Previous studies by

Alexiou and Sofoklis (2009) confirm a positive relationship between inflation and profitability.

Diversification (DIV), measured by the ratio of non-interest income to total operating income, is expected to be negatively related to DCR. However, previous studies of empirical evidence (for the US, Europe and Japan) suggests that diversification into non-core banking activities is associated with increased risk and lower returns (Stiroh, 2004; Lepetit et al., 2008; Mercieca et al., 2007; Laeven and Levine, 2007; Demirguc-Kunt and Huizinga, 2010; Liu and Wilson, 2010).

To measure the effects of market structure on bank profitability, the structure, conduct performance (market-power) hypothesis states that increased market power yields monopoly profits. According to the results of Bourke (1989), and Molyneux and Thornton (1992), the bank concentration ratio shows a positive, statistically significant relationship with the profitability of a bank. The earlier research undertaken by Short (1979), and found support for the view that concentration was positive and moderately related to profitability. The results also provide some evidence for the Edwards-Heggestad-Mingo hypothesis (Edwards and Heggestad, 1973; and Heggestad and Mingo, 1976) of risk avoidance by banks with a high degree of market power. In contrast, the results Demirguc-Kunt and Huizinga (1999), and Staikouras and Wood (2004) indicate a negative, but statistically insignificant relationship between bank concentration and bank profits.

Boyd et al. (2006) and De Nicolo and Loukoianova (2007) find that the risk of bank (in this study is DCR) increases in less competitive markets, while Jiménez et al. (2012) find that DCR decrease with a rise in the market power (HERFIN) of incumbent banks. Turk-Ariss

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(2010) assesses how different degrees of market power affect bank stability in developing banking systems. The results suggest that an increase in market power leads to greater bank.

Based on the previous literatures, the number of control variables at the individual Islamic banks to determine of bank stability are a return on asset, cost to income ratios, the ratio of total loans to total assets, the ratio of loan loss provisions to total loans, the value of total asset, displaced commercial risk, income diversity, dummy variable, and the herfindahl index. Later, in chapter 3 (Methodology) that bank performance will be examined using two different dimensions analysis with regard to bank profitability and stability.

2.5   REGULATORY BODIES: GUIDING PRINCIPLES OF DCR IN MALAYSIA

It is possible to identify three relevant supervisory authorities for Islamic banks in identifying DCR. At the internal level: The Islamic Financial Services Board (IFSB, Malaysia) and Bank Negara Malaysia (BNM). However, in the external level: The Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI, Bahrain).

2.5.1   AAOIFI Standards

Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) is an independent body dedicated to the development of international standards applicable for Islamic financial institutions. The AAOIFI organisation started producing standards as early as 1993 based in Bahrain.

AAOIFI standards have been developed in consultation with leading Shariah scholars, with several countries adopting them. Although AAOIFI standards are not binding on members, over the last few years the organisation has made significant progress in encouraging the widespread adoption of the standards.

Among the countries that use the AAOIFI standards are either mandatory or recommended include Bahrain, Malaysia, UAE, Saudi Arabia, Lebanon, Syria, Sudan and Jordan. Prior to implementation of AAOIFI standards, many financial institutions in these countries were operating under a semi-regulated market (Al-Baluchi, 2006), where accounting policies were determined with the assistance of the bank's Shariah Supervisory Board (SSB). In addition, over this period, International Accounting Standards (IAS) or respective national accounting standards were followed by Islamic banks. Hence, the unique requirements of Islamic financial institutions were not being met. To give two examples:

i.   Fiduciary risk: The Mudarabah contract places liability for the loss on the mudarib.

ii. Displaced commercial risk: Where Islamic banks smooth the returns Investment Account Holders (IAH) by varying the percentage of profit has taken as mudarib share.

AAOIFI's Statement on the Purpose and Calculation of the Capital Adequacy Ratio for Islamic Banks (AAOIFI, 1999a) takes into consideration what it terms displaced commercial risk. The Statement states that: *An Islamic bank is liable to find itself under commercial pressure to pay a rate of return to its PSIA holders which is sufficient to induce those investors to maintain their funds with the bank, rather than withdrawing them and investing them elsewhere.*

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Furthermore, AAOIFI's Financial Accounting Standard No.11: Provisions and Reserves (AAOIFI, 1999b) require Islamic banks to disclose any amounts paid by the Islamic bank from its mudarib share to investment account holders in order to increase the latter's rate of return.

As a result, with the support of banking authorities, AAOIFI standards were created. It is hoped that the development of AAOIFI standards will go a long way in promoting the convergence in Shariah standards and leading to further growth in this nascent market.

2.5.2 IFSB Principles

The Islamic Financial Services Board (IFSB) was established under the sponsorship of the International Monetary Fund (IMF), and in close cooperation with the IMF and Basel Committee on Banking Supervision, has become one of the most influential international organizations that promote Islamic finance and its standards. IFSB tries to adapt the existing standards and guidelines of the mentioned organizations and adjusts them in accordance with the Shariah principles to IFIs.

The IFSB was established in 2002. To ensure the sound and stable development of the Islamic financial industry, it needs to be supported by a strong regulatory and supervisory framework. The IFSB is an international body hosted by Malaysia. It has the important mandate of developing the prudential standards in accordance with the unique features of the Islamic financial institution (Iqbal and Molyneux, 2006).

The IFSB focus is very much on the standardization of procedures and the way Shariah rulings are interpreted across the industry. Since its establishment the IFSB has issued 17 standards, guiding principles and technical notes in the areas of risk management, corporate governance, transparency and market discipline, and etc. IFSB are closely cooperating with the Basel Committee on Banking Supervision, the International Organization of Securities Commissions and the International Association of Insurance Supervisors (IFSB, 2011).

The IFSB has set two principles for rate of return risk and DCR, as shown in Table 2.1.

Table 2.1: IFSB Principles for Rate of Return Risk and DCR

Principle 6.1	IIFS shall establish a comprehensive risk management and reporting process to assess the potential impacts of market factors affecting rates of return on assets in comparison with the expected rates of return for investment account holders (IAH)
Principle 6.2	IIFS shall have in place an appropriate framework for managing displaced commercial risk, where applicable.

In table 2.1 shows: a) The first principle is to ensure that IIFS have in place an effective risk management and reporting framework to assess and manage the effects of the market elements on the rate of return to meet the IAH expectations and to be in a competitive position with the conventional banks. b) The second principle is to encourage banks to effectively manage their displaced commercial risk to be able to compete with conventional banks.

In addition, the IFSB standards on capital adequacy and risk management guiding principles mark the first steps in an ongoing process of developing prudential standards and filling regulatory gaps in the field of Islamic finance. Apart from that, Archer and Haron

(2007) proof those Islamic banks are exposed to a number of unique risks that are different from those faced by conventional banks. They argue that the complexities of a number of their products, as well as their relative novelty in the contemporary financial services market, combined with the fiduciary obligations of Islamic bank when it acts as a Mudarib, imply that for Islamic banks displaced commercial risk is a very important consideration. Because of that, the IFSB has taken the position while Investment Account Holders may be considered in the absence of misconduct and negligence by the Islamic bank to bear credit and market risks of assets in their funds have been invested by the bank.

2.5.3   BNM

Bank Negara Malaysia was established on 26 January 1959 under the Central Bank of Malaysia Act 1958 (CBA, 1958). The CBA (1958) has been repealed by the Central Bank of Malaysia Act 2009 which became effective on 25 November 2009. It is a statutory body wholly owned by the Government of Malaysia. The Bank reports to the Minister of Finance, Malaysia and keeps the Minister informed of matters pertaining to monetary and financial sector policies.

In this regard, on July 2011, the Guidelines for the Recognition and Measurement of Profit Sharing Investment Account as Risk Absorbent set out by BNM. This guideline distributes the minimum qualifying requirements for Islamic banking institutions to accord PSIAs as a risk absorbent mechanism under the Risk Weighted Capital Ratio (RWCR) calculation. For the purpose of this Guideline, DCR is defined under paragraph 1.9 (i)[14] (BNM, 2011). This

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[14] 1.9 (i): Displaced Commercial risks (DCR) refer to the risk arising from the assets managed on behalf of the IAH which is effectively transferred to the Islamic banking institutions' own capital where the Islamic banking institutions forgo part or all of its portion of profits on PSIAs, in order to increase the rate of return that would otherwise be payable to the IAH.

Guideline complements and is consistent with the prudential standards issued by the IFSB, in particular, the Capital Adequacy Standard (CAS) and Guiding Principles on Corporate Governance.

The application of DCR requires Islamic banking institutions to allocate adequate capital to cover credit and market risk exposures arising from the assets funded by the PSIAs, which would otherwise be absorbed by the IAH. This measurement of additional risk borne by the Islamic banking institutions arising from the application of the DCR is represented by alpha (α), which quantifies the risk to be absorbed by the Islamic banking institutions for the purpose of the RWCR calculation under the Capital Adequacy Framework. Following Figure 2.2, briefly shows how α have related to the sampling method.
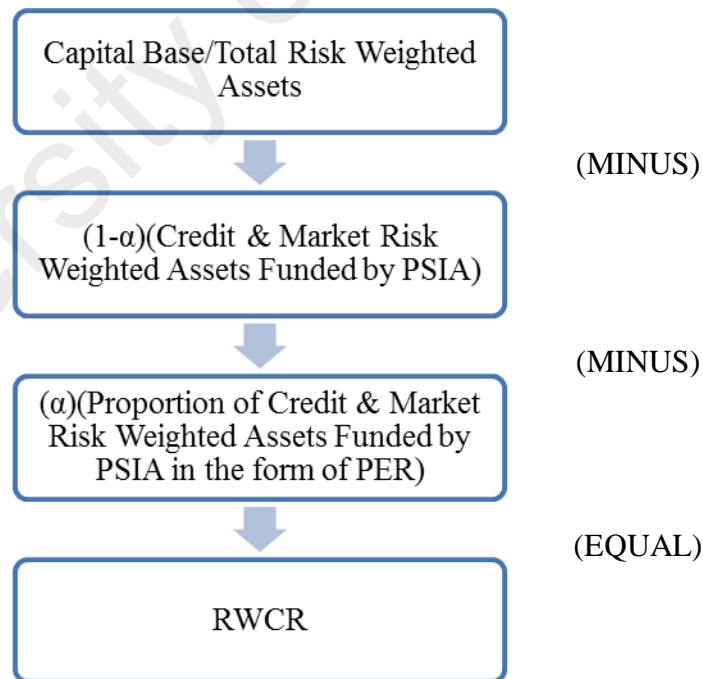
Figure 2.2: Sample Calculation of RWCR for Islamic Banking

Where;

Alpha (α) represents the proportion of commercial risk borne by Islamic banking institutions following the application of DCR. The residual value of (1-α) represents the proportion of the commercial risks required to be absorbed by the IAH. PSIAs balances include Profit Equalisation Reserves (PER).

2.6   EMPIRICAL EVIDENCE

This section presents the various techniques used by previous studies to quantify DCR.

2.6.1   Technique and Models

According to the Islamic Financial Services Board (IFSB, 2010), there are four main methods utilised by Institutions offering Islamic Financial Services (IIFS) to manage displaced commercial risk. They are as follows: Firstly, an IIFS forgoing some portion of its share of profits (Islamic Financial Institution's Mudarib fee). Islamic Financial Institutions give up part of its management fee in order to absorb expected losses. An IIFS may adjust the profit-sharing percentages so as to be able to give the account holder the expected returns. For example, similar to the idea of Value-at-Risk (VaR), the risk of the investors (unrestricted mudarabah depositors) can be quantified by a measure of Profit at Risk (PaR) based on the historical profits and the volatility of returns[15].

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[15] Sundararajan (2004). Assuming normal distribution, Profit at Risk (PaR) can be calculated as equal to $Z\alpha*\sigma p*\sqrt{T}$ where $Z\alpha$ = is the constant that gives the appropriate onetailed confidence interval with a probability of $1-\alpha$ for the standard normal distribution (e.g. $Z...01 = 2.33$ for .99% confidence interval), T holding period or maturity of investment account as a fraction of month and σ as standard deviation of the monthly profit as a percentage of assets.

Secondly, an IIFS transfers amounts from shareholders' current or retained profits. A portion of the IIFS shareholders' profits would be given to account holders to meet the expected returns. Then, according to Greuning and Iqbal (2008), the attempt to manage the displaced commercial risk has led to the development of two standard practices in the banking industry, namely the Profit Equalization Reserve (PER) and Investment Risk Reserve (IRR). In examining the provisioning behavior of PER, Ismail and Shahimi (2006) find that the provisioning decisions should be based on the entire future profile of expected losses and PER decisions should not be independent of the way in which financings are priced.

Thirdly, Profit equalisation reserves (PER). In times of higher profits, some of the funds' income, representing both the IIFS and account holders' portions, would be set aside in a reserve amounts from the investment profits before allocation between the shareholders and the investment account holders and the calculation of the management fee which would be released in times of lower profitability to give additional returns to account holders. The PER is used as a tool to align the rate of return offered by Islamic banks to the market rate of return offered by conventional banks in order to eliminate or at least reduce the sharp fluctuations of returns on investment deposits and to prevent future shocks. The basis of computing this reserve should be predefined, reviewed, and approved by the board of directors before entering into a contract with the depositors and investment account holders.

Lastly, Investment reserve risk (IRR). In times of higher profits, some of the account holders' portion of profits would be set aside in a reserve amount from the investment profits attributable to the investment account holders, after deducting the Islamic

Financial Institution's management fee which would be released in times of lower profitability to give additional returns to account holders.

We conclude that these variables can be used as a measure of DCR. This will help Islamic banks to arrive at an accurate estimate of exposure to DCR. In chapter 3 and 4, empirical evidence is used to sharpen our view on how to determine and measure DCR.

2.6.2   Value at Risk (VaR)

Value at Risk (*VaR*) was designed to measure DCR. *VaR* represents an extension of valuation methods for derivative instruments (see Jorion, 2002). This is measure the worst expected loss that an institution can suffer over a given time interval under normal market conditions at a given confidence level.

VaR emerging as one of the most popular tools with received much attention from practitioners, regulators, and researchers. For example, the Basle Committee on Banking Supervision requires a bank to use *VaR* to determine the minimum capital to support their trading portfolio. Furthermore, the Securities and Exchange Commission requires registrants to provide quantitative information about market risk with *VaR* being one of the disclose alternatives. Moreover, Chance (2001) and Hull (2003) note that *VaR* is widely used by corporate treasurers, dealers, fund managers, and financial institutions.

The exposure to displaced commercial risk raises hence questions on the best measurement which actually reflects the losses to be borne by Islamic banks (Sundararajan, 2007). The development of an internal model based on *VaR* to measure the displaced commercial risk

is an appropriate method to measure effectively the capital charge for this risk. A measurement of the actual risks sharing function of returns smoothing policies between the Islamic bank and the Investment Account Holders has to be the basis of calculation of capital requirement (Sundararajan, 2005).

While, the model on *VaR* is also shown in study a case of Bahrain Islamic Bank as an alternative method to measure the additional capital charge required to cover the displaced commercial risk, especially that the IFSB (2005) capital framework and the capital requirements directive allow for an internal model approach (Toumi and Viviani, 2009). They find that the capital requirement to displaced commercial risk as proposed under the simple risk weight supervisory discretion approach of IFSB (2005) is higher than the capital requirement that result from the *VaR* model. The supervisory discretion approach proposed by IFSB (2005) is subject to many criticisms since the IFSB recommend to all Islamic banks in the same jurisdiction, the same proportion of risk weighted assets funded by Investment Accounts without taking into account the actual returns smoothing peculiar to each Islamic bank.

A variety of approaches exists for estimating *VaR*. The most common assumption in these models is that historical data is the best estimator for future changes. However, every approach has besides this assumption its own specific set of assumptions. The following models can be distinguished: a) The Variance-Covariance Approach: This approach assumes that risk factor returns are always (jointly) normally distributed and that the change in portfolio value is linearly dependent on all risk factor returns; b) The Historical Simulation Approach: This approach assumes that asset returns in the future will have the

same distribution as they had in the past; and c) Monte Carlo Simulation Approach: This approach future asset returns are simulated.

The Variance-Covariance method is commonly used to address the correlation factor. Trading portfolio of a bank usually includes more than one product and currency. Under this method, we need to collect the historical volatility data and then examine the correlation between each variable.

The Historical Simulation method is based on the assumption that history will repeat itself. This method has several advantages in comparison to variance-covariance method. Firstly, there is no need for presumptions about variable distribution, because the calculated risk value with the defined confidence level is the loss of certain portfolio over a period. Secondly, there is no need to calculate every position's dispersion and covariance. Thirdly, there is no need for random corrections when simulation details are defined.

The Monte Carlo Simulation method is similar in some respects to applying the historical and the variance-covariance methods. In this method, for example, we need to obtain a series of values from changes in market factors. These values of changes in market factors are then added to the current market value, and thus a series of alternative value are derived just like the historical simulation method. However, the main difference between these two methods lies in the way of obtaining the series of changes in the market factors.

2.6.3   DCR: PER and IRR Analysis

Reserves are formed when the bank deems prudently necessary, after taking the consent of holders of investment accounts. These reserves are considered as part of shareholder's equity and/or the rights of investment account holders, according to relevant case. When the balance exceeds the prudent limits, the amount shall be credited to relevant party's income.

There are two types of reserves to minimize the adverse impact of income: a) The Profit Equalization Reserve (PER), which is funded by setting aside a portion of gross income before deducting the bank's own share as an agent. The reserve provides a protection to ensure smooth future returns and to increase the owner's equity for bearing future shocks. b) The Investment Risk Reserve (IRR), which comes out of the income of the investors' depositors after allocating the bank's share to offset the risk of future investment losses. Of course, the basis of computing, such reserve should be predefined and fully disclosed.

The practice of setting aside income is reflected in AAOIFI (FAS 11 - Provisions and Reserves). Paragraphs 16 and 17 provide the following descriptions of PER and IRR (AAOIFI, 1999b).

Paragraphs 16: Profit equalisation reserve
This is the amount appropriated by the Islamic bank out of the mudarabah income, before allocating the mudarib share, in order to maintain a certain level of return on investment for investment account holders and increase owners' equity.

Paragraphs 17: Investment risk reserve

This is an amount appropriated by the Islamic bank out of the income of investment account holders, after allocating the mudarib share, in order to cater against future losses for investment account holders.

These descriptions are subject to governance issues and lack of transparency, especially the PER and IRR methods. IFSB (2010) has addressed these issues and tried to come up with recommendations on how to improve transparency and deal with governance issues which need to be tackled. First, there is the limited disclosure of such reserves and lack of transparency, which negatively affect the credibility of the bank. Second, investment account holders do not have the right to influence the use of such reserves and to verify the exposure of the overall investment. Third, such reserves are in favor of the long term investors at the expense of the short term investors. Finally, it is sometimes requested that investment account holders waive their rights to these reserves.

In light of these gaps, it is strongly important for Islamic banks that are maintaining such reserves to standardize the practice, and to fully and clearly disclose the basis of computing such reserves. Also, the rights of investment account holders to these reserves should be clearly stated and explained to the depositors. The short term depositors may feel that maintaining such reserves is against their interest, seeing as how they are subsidizing long term depositors. Therefore, Greuning and Iqbal (2008) suggest that only long term depositors should bear the cost of such reserves and not the short term depositors.

PER and IRR build up in order to smooth the returns actually paid out to the PSIAs owned by investment account holders. The PER is created from the total income before the profit

allocation between shareholders and Investment Account Holders and the calculation of

Mudarib Share. PER was introduced to the liability side of the bank's balance sheet. The

purpose of PER account is to shift the displaced commercial risk back to the account

holders by transferring a proportion out of the mudarabah income, before allocating the

mudarib share. The reasoning behind this accounting manipulation is to maintain a certain

level of return on investment for the investment account holders as well as to increase

owners' equity. By doing so, the bank is able to smooth the returns of the account holders

and continue paying competitive returns, especially in times when their investment

portfolio has underperformed.

This method of managing account holder's funds by the creation of PER may have ethical

implications (Latiff, 2010). To fulfil its fiduciary duty, the bank should give the account

holders the actual profit amount due to them as per the pre-agreed profit ratio. Since the

transfer of the amount may differ from one year to another depending on the accumulated

balance in the PER account, the account holders may either benefit or not from this

accounting treatment. While it is important to ensure that account holders should get

exactly what is due to them, it is also pertinent to ensure that the viability of the bank

remains intact as an ongoing concern for the benefit of the account holders.

However, the IRR is retained only from the profits attributed to Investment Account

Holders, after deduction of Mudarib share. The Profit Equalization Reserve is needed to

smooth a low rate of return and reduce the volatility of Investment Account Holders

returns. On the other hand, the IRR is needed to cover potential losses on assets invested in

Investment Account Holders funds (Archer and Abdel Karim, 2006; Grais and Kulathunga,

2007; Sundararajan, 2008). In the contract, in general, Investment Account Holders agree in

advance on the proportion of their income that may be allocated to both reserves, which is determined by the management of the bank at their own discretion. A percentage of PER and the totality of IRR belong to Investment Account Holders but retained by the Islamic bank. The remainder part of accumulated PER thus belongs to shareholders. These reserves are generally invested by the Islamic bank to generate additional returns to Investment Account Holders (Archer and Abdel Karim, 2006).

The table 2.2 provides a summary of the key differences between the Profit equalization reserve and Investment risk reserve.

Table 2.2: The Differences between The Two Types of Reserve

	PER	**IRR**
Source	Mudarabah income	IAH income
Purpose	Profit stabilization Smoothing	Protect against future losses
Step of appropriation	Before mudarib share is allocated	After mudarib share is allocated
Ultimate recipient	IAH and mudarib	IAH
Measurement	Shall be measured as the amount deemed prudent by the management of the Islamic bank in order to maintain a certain level of return on investment for investment account holders and increase owners' equity.	Shall be measured as the amount deemed prudent by the management of the Islamic bank in order to cater against future losses for investment account holders.
DCR	Positive if these reserves are insufficient Positive if there is a transfer of some proportion of shareholders returns to depositors.	

The following Figure 2.3 represents how an Islamic Bank calculates the profit attributed to shareholders and Investment Account Holders and illustrates the retention of different reserves (Profit Equalization Reserve and Investment Risk Reserve). The investment in an asset is jointly financed by investment funds and shareholders' capital.
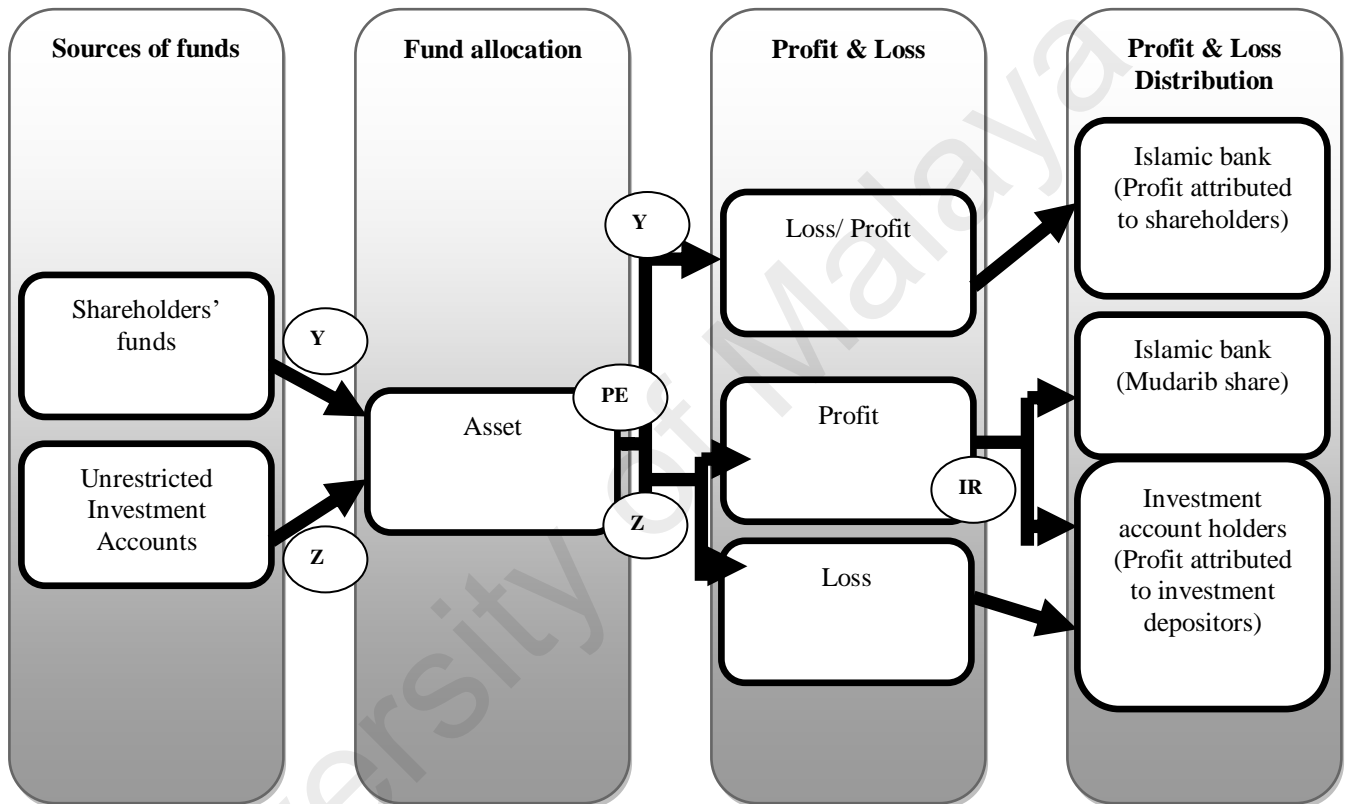
Figure 2.3: Provision of Sources of Funds

Islamic bank policies regarding Profit Equalization Reserves and Investment Risk Reserve play a critical role in the management of displaced commercial risk (Sundararajan, 2008). If these reserves are adequate to avoid the transfer of income from shareholders to Investment Account Holders, there is no exposure of the Islamic bank to displaced commercial risk. In the opposite case, if these reserves are insufficient and the transfer of some proportion of

shareholder returns to depositors is necessary, then the displaced commercial risk is positive (Sundararajan, 2008).

Although Islamic banks are not obliged to carry out such returns smoothing in theory, they are virtually forced to do so under commercial pressure or supervisory authority pressure (Haron and Hin Hock, 2007; Fiennes, 2007; Archer et al., 2010). In some countries (e.g. Qatar and Malaysia), the supervision authority takes the view that Islamic banks should not allow Investment Account Holders to suffer a loss of their capital or a major fall in their returns, so Islamic banks have a constructive obligation to continue this practice of returns smoothing. Thus, instead of being voluntary, the practice becomes obligatory and Profit Sharing Investment Account being regarded as virtually certain capital (Fiennes, 2007; Archer et al., 2010).

The issues in Managing PER and IRR in Islamic Banks, by Sundararajan (2004) examine the corporate governance issues of investment account holders who deposit their savings into bank as a rabbul mal. Sundararajan (2004) argues that the use of IRR is key to covering potential losses on assets invested with investment account holder's funds, and PER is needed to smooth the returns, so that a desired return to investment account holders can be provided in the face of volatility in asset returns, and thereby help manage the level of DCR.

2.7   GAP IN THE LITERATURE

The present chapter follows in the footsteps of Angbazo (1997), Valverde and Fernandez (2007), Archer and Abdel Karim (2006), Kasri (2008), Toumi and Viviani (2009), and

Erwin and Rahmatina (2010), in terms of analyzing displaced commercial risk. However, our study differs from the above papers in several important aspects and adds several key aspects to the existing literature on the displaced commercial risk.

First, to the best of our knowledge, there is no econometric study that has examined the issue of the displaced commercial risk for the Malaysian Islamic banking. Data from Islamic banks in Malaysia offers a particularly advantageous environment to analyse these issues as Malaysia has a dual banking system environment. Another important concern in this study is regarding displaced commercial risk and its impact on bank performance. Therefore, the present study fills an important gap in the existing literature and improves the understanding of displaced commercial risk in Malaysian Islamic banks.

Second, we provide recent evidence by analysing the years from 1994 to 2014. The changes that have occurred in the banking sector over the last twenty years, an updated consideration of these issues is necessary and may provide additional insights.

Third, we extend earlier work by using alternative method to measure displaced commercial risk in Malaysia using the Value at Risk (VaR) developed by Leavens (1945), Markowitz (1952) and Roy (1952). The inclusions of these additional literatures improve our understanding of displaced commercial risk in significant ways.

CHAPTER 3: METHODOLOGY

3.1   INTRODUCTION

This chapter highlights the methodology of the research as well as the modelling by discussing issues with regards to data collection and the research framework. This chapter also could be divided into two parts. The first part focuses on the approaches that will be used to measure displaced commercial risk, which is the one used by the Central Bank of Malaysia and Value at Risk approach. The approach based on Value at Risk to measure the displaced commercial risk is an appropriate method to measure effectively the capital for this risk. The second part consists of the empirical modelling employed to analyse the impact of displaced commercial risk on bank performance. The results obtained are used for making inferences in measuring potential losses of displaced commercial risk among the Islamic bank in Malaysia.

This chapter presents the various aspects of research methodology and research design for this study. It describes the methods used and how the data be used to address the aims of the research. A further discussion detailing the research strategy of this research, starting with some types of research strategy continues. The problem of multicollinearity, heteroscedasticity and autocorrelation are also discussed in the section on discussions of the methods of data collection, the selected techniques use in data analysis as well as the selected variables. The conclusion of this research is discussed in the final part of this section.

3.2   CONCEPTUAL FRAMEWORK

The banks play a central role in the money creation process; the payment system, the financing of investment and economic growth. This conceptual framework is expected to lead the research to have a better result for a new level of understanding about the approaches that will be used to measure displaced commercial risk and also to examine the influence of DCR to bank performance (i.e, stability and profitability) of Islamic banks (Refer Figure 3.1). This figure presents the overall conceptual research framework.

This conceptual framework can be classified into two parts: examining the measurement of the displaced commercial risk and the impact of displaced commercial risk on bank performance.

3.2.1   The Measurement of the Displaced Commercial Risk

For the purpose of measurement of displaced commercial risk, this section describes an approach for estimating this risk. We are to reveal two measurement approach for calculating the displaced commercial in Islamic banks of Islamic banks.

In the first approach, using the Central Bank of Malaysia capital adequacy guidelines for Islamic banks. Based on this approach, PSIA is preserved as similar to deposits. So, IAH does not fully absorb the risk. Therefore, Islamic banks are required to hold regulatory capital function of the extent of risks borne by Investment Account Holders. In this approach, IFSB (2005) recommends to include a proportion alpha per cent of risk-weighted assets financed by PSIA for the calculation of capital adequacy ratio. The alpha per cent

reflects the displaced commercial risk which is the extent of risks displaced to shareholders from investment account holders.

In the second approach, applied the methodology based on the Value at Risk model. We propose a Value at Risk model would be an alternative method to measure the additional capital charge required to cover the displaced commercial risk. The assessment of the displaced commercial risk using the Central Bank of Malaysia capital adequacy guidelines is subject to many weaknesses since the IFSB recommend to all Islamic banks in the same jurisdiction, the same proportion of risk-weighted assets funded by Investment Accounts without taking into account the actual returns smoothing peculiar to each Islamic bank.

3.2.2   The Impact of DCR on Islamic Bank Performance

The recognition of factors that affect the success of financial institutions is one of the most important topics that stir the interest of researchers in the financial field where the researchers could recognize a set of external and internal factors that have statistically significant effect on the success of financial institutions. The same goes to Islamic banks. This study also investigates the impact of DCR on Islamic banking performance, focusing on bank profitability and bank stability. The two major components that directly influence bank performances are bank specific characteristics and macroeconomic variables; were included as control variables.

3.2.2.1 Bank specific variables

Now, we turn to investigate the explanatory power of bank specific variables as determinants of bank performance. After an extensive literature review, three bank specific variables are selected for this study. First, displaced commercial risk. Second, the market power and third, bank characteristics. Figure 3.1 can be illustrated as follows:

First, displaced commercial risk (DCR) as the variable of interest in this research study. DCR measure the capital required by Islamic banks in Malaysia to cover the displaced commercial risk. DCR illustrates the situation faced by the Islamic banks where equity holders have to transfer (or sacrifice) a part of their profit or incur a portion of depositors' loss to avoid deposit withdrawal. Therefore, it forces the Islamic banks when they underperform and are incapable to generate enough profits for distribution to account holders.

Second, the Hirschman Herfindahl index as a proxy of market power. The relative size and distribution of the banks in a market are taken into consideration by the Hirschman Herfindahl index. The value of Hirschman Herfindahl index approaches zero when there is a large number of banks with relatively similar size in the market. As the number of banks in the market decreases, as well as the increase in the difference in size between these banks, it leads to an increase in the value of the Hirschman Herfindahl index[16].

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[16] Al-Muharrami et. al. (2006) indicate that this indicator assigns a greater weight to larger banks than smaller banks. In other words, it attaches importance to the larger banks.
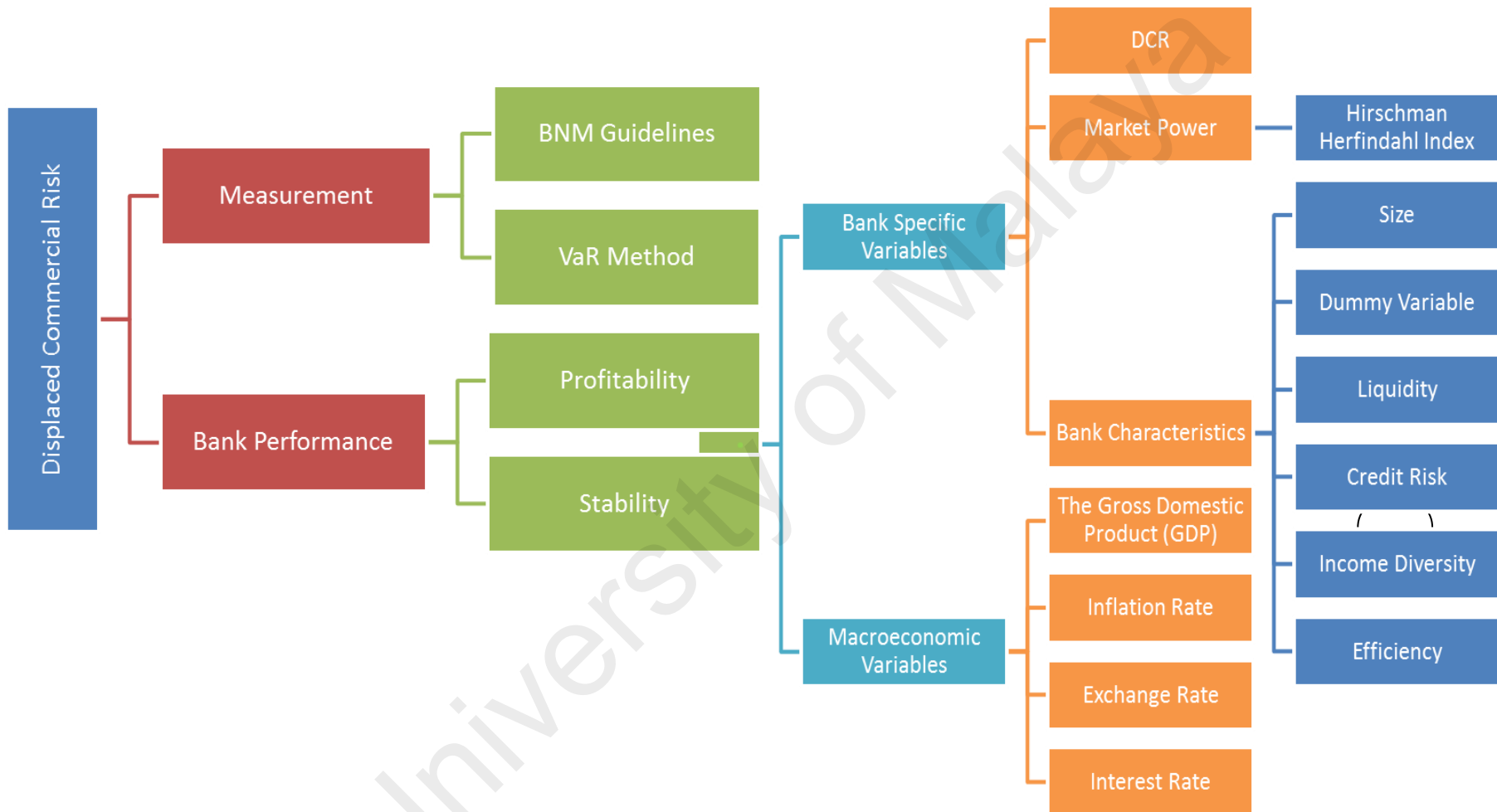
Figure 3.1: Conceptual Framework

Third, we are also constructing a measure of DCR on Islamic banking performance, which we interact with certain bank characteristics. These interactions allow us to verify whether bank specific characteristics lead to diversity in DCR related to bank performance. We focus on six major bank characteristics which are likely to influence bank performance: size, dummy variable, bank liquidity, credit risk, income diversity, and cost efficiency. *Banks' size* is captured by the total assets. The impact of bank size on bank performance is not determined a priori. However, larger banks are more likely to take more risks than smaller banks if they believe that they are too big to fail, whereas a total of loans to assets describe *banks' liquidity* structure.

We constructed a set of *dummy variables* describing bank ownership through time (local and foreign Islamic banks). We assume that the local owned banks may be more stable than foreign owned banks because foreign owned banks only serve some financial service demands (i.e. export financing or financial leasing) or specific groups of clients (i.e. foreign-owned multinationals and/or large export-oriented domestic enterprises), which might lead to greater earnings volatility. Additionally, *credit risk* is captured by the ratio of loan loss provisions to total loan and we expected that a higher ratio would decrease bank stability.

We include a measure of *income diversity* to take into account of the diversification across different of income. We expected that the greater income diversity tends to increase the stability in those banks. Lastly, the other factors likely to impact on bank performance is *cost efficiency*. It measures the bank's operating costs as a proportion of its total income. We expected that the higher cost to income ratios, those banks are less efficient. Similarly, higher cost to income ratios, have a negative link to the stability.

3.2.2.2 Macroeconomic variables

Macroeconomic variables play an important role in banking sector performance. There are four macroeconomic variables are particularly important: the gross domestic product (GDP), inflation rate, exchange rate and interest rate. First, we use the GDP where we expect higher growth reflects better conditions for bank performance. Next, we use an inflation rate (CPI) where this variable also contributes to the profitability and stability of the Islamic banking sector. Then, we use exchange rate where we expected that the increase in the nominal exchange rate or positive change in the nominal exchange rate (the devaluation of national currency) affects bank performance in a negative manner. Finally, the interest rate is measured by 3-months interbank lending rates.

3.3 DCR ESTIMATION

3.3.1 DCR and its Relation to Capital Structure in The Islamic Bank

The goal of this section is to examine how the consideration of capital structure in the Islamic bank can be used to estimate the DCR conceptually. First, we apply the concepts of capital structure in the specific context of Islamic banks. Then, through the concept review, we estimate the model of the DCR of Islamic banks (in subsection 3.4).

As shown in Table 3.1 is the main components of the capital structure of an Islamic bank are shareholders' equity and two broad categories of deposit accounts: current and, profit sharing investment account (PSIA).

Table 3.1: Capital Structure of the Islamic Bank

Assets	Liabilities
Cash & cash equivalents Sales receivables Investment in securities Investment in leased assets Investment in real estate Equity investment in joint ventures Equity investment in capital ventures Inventories Other assets Fixed assets	Current Accounts (CA) Other liabilities
	Equity of Profit Sharing Investment Accounts (PSIA)
	Profit Sharing Investment Accounts (PSIA) Profit Equalization Reserve (PER) Investment Risk Reserve (IRR)
	Shareholders' Equity (SE)
	Total capital = CA + PSIA + SE

Sources: IFSB (2007)

As a financial intermediary, the basic mechanism of the Islamic bank is to accept deposits from surplus persons on the liability side and offer financing on the assets side to the deficit persons. The basic idea is to activate this mechanism on acceptable Islamic modes which preclude payment or receipt of interest and conform to the jurist rules of Shariah[17].

The existence of PSIA is the consequence of the principle of profit and loss sharing. Profit and loss must be the counterpart of a risk taking. From the financial analysis point of view, PSIA are neither financial liabilities nor equity instruments in the conventional terms. Investment account depositors supply funds to an entrepreneur party (the Islamic banks) for trading and investment purposes while the bank contributes by supplying its expertise. Profits from operations funded by PSIA are divided between the bank and PSIA depositors according to ratios agreed in advance. Moreover, PSIA depositors have

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[17] Islamic banks have a unique capital structure, using funds collected via deposit in investment accounts based on the profit and loss sharing principles. Meanwhile, conventional banks use a debt financing system which is based on interest (Ismail and Arshad, 2008).

no voting rights since they do not own any portion of the bank's equity capital. As owners of the bank, shareholders receive a proportion of profits as a reward for their management of PSIA funds.

Displaced commercial risk comes from the possibility that the rate of return on deposit investment falls below a floor. From the balance sheet identity, we know that the amount invests in asset, *A*, is the sum of Profit Sharing Investment Account, *PSIA*, and bank shareholders' funds, *SE* (Refer Table 3.1). Accordingly, in the equation can be written as follows:

$$A = L \tag{1}$$

Where;

A is the amount of investment in asset

L is the liability side

On the other hand:

$$L : PSIA + SE$$

Then, from equation (1),

$$A = PSIA + SE \tag{2}$$

Focusing on the typical sources of funds for Islamic banks (liability side), it must be noted that an IFIs gathers financial resources through: 1) demand deposits (non-interest bearing), which are similar to conventional current accounts; 2) two possible forms of profit sharing investment accounts (PSIAs), structured according to mudarabah, namely restricted or unrestricted, which are differentiated on the basis of the different level of freedom in the mandate given to the IFIs acting as mudarib. This source of funds may be compared to the structure of mutual funds; and 3) equity.

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These sources of funds (demand deposits; restricted PSIAs; unrestricted PSIAs; equity) differ in term of absorption of losses and stability/profitability, as highlighted in Figure 3.2. Among these sources of funds, unrestricted PSIA certainly represents the most important category. Although this source enjoys the same degree of absorption as equity (from this viewpoint unrestricted PSIA can be considered as a bank's performance bond), it is not as stable as equity due to the displaced commercial risk that it bears (from this viewpoint unrestricted PSIA can be compared to mutual funds) specifically on the issue of displaced commercial risk linked to PSIA.
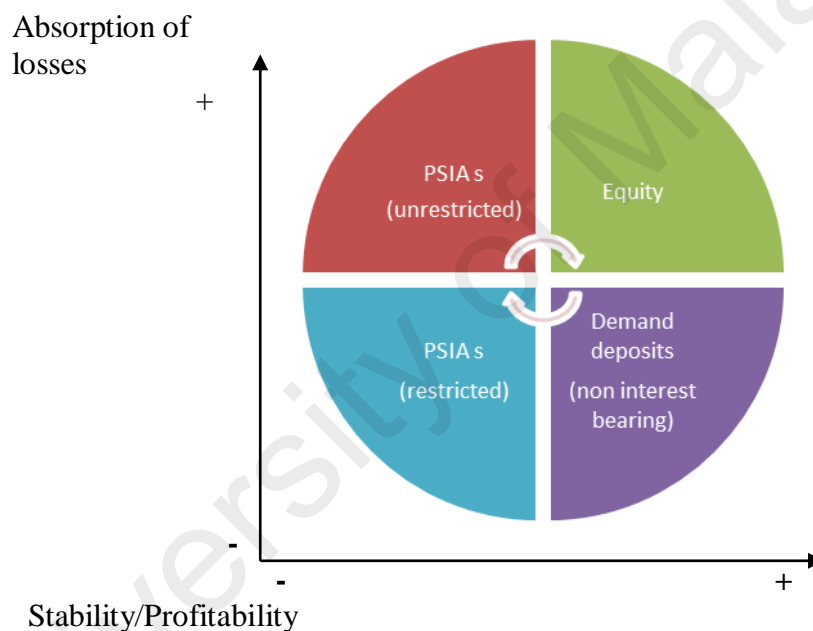
Figure 3.2: The Sources of Funds Differ in term of Absorption of Losses and Stability/Profitability.

However, the structure of the Islamic bank may have a unique impact on the performance and risk exposure. Displaced commercial risk is attached to the structure of Islamic bank's capital. On the liability side, if the Islamic banks pay a lower return to the account holders than the rate paid by other banks or pass some losses to these depositors, they may withdraw their deposits from the Islamic banks. Thus, there may

be a greater risk of deposit withdrawal for Islamic banks than for conventional banks (Sundararajan and Errico, 2002). Especially, for small Islamic banks this risk is higher and thus more problematic. To manage this risk, Islamic bank forgo part of their profit share as a mudarib to pay competitive returns to the mudarabah account holders.

In case Islamic bank incurs some loss, all that loss may be taken to the income accounts of Islamic banks, which otherwise has been shared with account holders. This activity exposes the equity holders of Islamic bank to a displaced commercial risk. In other word, this risk_borne by shareholders of Islamic financial institutions due to the volatility of returns over and above the normal risks when account holders were to share the loss in accordance with mudarabah contract. This situation would effect Islamic bank's capital.

Next, we will describe an approach in estimating DCR and identifying the issues of DCR which arises as a result of the risk characteristics of profit sharing investment accounts (PSIA).

The measurement of DCR has been a more critical issue in decision finance, banking and other fields. For many years, some authors have attempted to link measures of risk directly to preference models and develop explicit forms of risk value (or risk return) models (Markowitz, 1959; Stone, 1973; Bell, 1988; Coombs and Bowen, 1971; Coombs and Lehner, 1981, 1984; Dyer, 1987; Fishburn, 1982, 1984; Keller et al., 1986; Luce, 1980; Luce and Weber, 1986; Pollatsek and Tversky, 1970; Sarin, 1987; Sarin and Weber, 1993; Weber, 1984; Weber and Bottom, 1990).

DCR occurs when it is recognized the rate of return was lower than expected rate of return. It means that a potential loss when the competitive need of Islamic banks to benchmark the rates of return, they pay to profit sharing investment account holders with the deposit rates of conventional banks. The implication of that, the shareholders of Islamic banks make up shortfalls in contractual returns payable to investment account holders. Afterward, there is a potentiality that customer might switch from Islamic deposits to conventional deposits, especially in the dual banking system.

Some of the Islamic banking depositors positions the banks indifferently from the conventional ones, namely rational depositors (Explained from Chapter 2). For example, when Islamic banks offer deposit products to depositors, the revenue sharing rate of Mudarabah deposit contract should be attractive enough. It is because there is a level of tolerance among depositors to value the return of Islamic deposits which is defined as the difference between the depositors' expected rate of return of depositing money in conventional deposits and the Islamic deposit return from Islamic financing. Normally, depositors expect to earn a higher return from Islamic deposits than from conventional ones.

Therefore, if

$$\left| r_e D_c - r_e D_i \right| \geq \varphi_n$$

When the $r_e D_c$ is less than $r_e D_i$, a DCR might not occur or φ_n^+

Where;

$r_e D_c$ The Conventional Deposit Return

$r_e D_i$ The Islamic Deposit Return

φ_n A level of tolerance among depositors to value

In the case of

$$\left| r_e D_c - r_e D_i \right| < \varphi_n$$

When the $r_e D_c$ is higher then $r_e D_i$, a DCR might occur or φ_n^-

To prevent a migration of the deposits, Islamic bank will pay the deficit using its own fund. This will reduce the number of total earning of the bank. According to displaced commercial risk, under a PSIA with the customer and the institution[18] share the profits of the underlying investment which is a losses will be borne by the customer[19] according to the principle of mudarabah.

In the balance sheet, the amount of investment in asset, *A* is equal to the liability, *L*. On the liability side, are the sum of *PSIA* and *SE* (Refer equation (2)).

$$A = PSIA + SE \qquad (2)$$

From the profit on asset, the PER is retained (Refer Figure 2.3 in Chapter 2: Provision of sources of funds). PER is a Profit Equalisation Reserve, retained out of profits before allocation between bank as fund manager; and PSIA used to smooth payouts to PSIA holders. The amount referred to is PSIA portion. Shareholders' portion is included in their reserves. The profit on asset net on provisions and PER for the year is:

$$r_a - r_a P \qquad \text{or} \qquad (1-P)\, r_a$$

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[18] For example Islamic bank as a mudarib
[19] For example the customer as a rabbul mal

Where P is the proportion of profit retained and r_a is the profit on asset, which represents the profit available for distribution between the shareholders and the investment account holder.

Due to PER by setting aside amounts from the investment profits before allocation between the shareholders and the investment account holder; so, from the equation (2), the profit on an asset is then divided between the profit going to PSIA and SE in a proportion of their investment. This obtains:

$$(1-P)\overline{r_a} = \frac{PSIA}{A}(1-P)\overline{r_a} + \frac{SE}{A}(1-P)\overline{r_a} \qquad (3)$$

Then,

$$(1-P)\overline{r_a} = h_a(1-P)\overline{r_a} + (1-h_a)(1-P)\overline{r_a} \qquad (4)$$

Which is $\overline{r_a}$ is revenue on asset jointly financed by PSIA funds and shareholders' funds while h_a is % of investment account holders profit share, on the other word is the weight attached to market benchmarks in the decision on pay-outs to investment account holders.

Then, the Islamic bank charges a service fee/commission on the profit as manager of the investment accounts or the commission in percentage of asset return. c, represent the mudarib share. The return on the investment account net of charge before the retention of IRR is:

$$(1-c)h_a(1-P)\overline{r_a}$$

The Islamic bank retains the IRR, a proportion i of the income attributed to investment account holders. Bank Negara Malaysia, in its guidance to Islamic Banks on the rate of return calculations proposes some limits on the size of PER that can be built up, and on the amount that can be deducted from gross income. There are no guidance or limits on IRR in the BNM Guidance documents.

The return on investment account:

$$\overline{r_i} = (1-i)(1-c)h_a(1-P)\overline{r_a}$$

Where;

$\overline{r_i}$ is the return on the investment account.

i is a proportion of IRR taken for the year.

Accordingly, summarizing the distribution of profits and the retention of the different reserves and the mudarib share were described from the equation (4) to (6);

$$(1-P)\overline{r_a} = h_a(1-P)\overline{r_a} + (1-h_a)(1-P)\overline{r_a} \qquad (4)$$

$$(1-P)\overline{r_a} = (1-c)h_a(1-P)\overline{r_a} + ch_a(1-P)\overline{r_a} \qquad (5)$$

$$(1-P)\overline{r_a} = (1-i)(1-c)h_a(1-P)\overline{r_a} + i(1-c)h_a(1-P)\overline{r_a} \qquad (6)$$

The income is attributed to Investment Accounts Holders after setting aside:

1) provisions,

2) reserves (Profit Equalization reserve and Investment risk reserve) and

3) deducting the Islamic Bank's share of income called 'Mudarib share'.

The allocation of income is determined by the management of the bank within the allowed profit sharing limits as per the terms and conditions of the investment accounts.

3.3.2 Central Bank Guidelines (BNM)

In this section, we will examine the Central Bank Malaysia's approach to finding the capital requirement for displaced commercial risk. The capital charge needed for displaced commercial risk is calculated based on Central Bank of Malaysia capital adequacy guidelines. As discussed in the previous chapter (Chapter 2 in subsection 2.5.3), the Risk-Weighted Capital Adequacy Framework sets out the approach for the computation of capital required by banking institution in order to calculate displaced commercial risk. This guideline complements and consistent with the prudential standards issued by the Islamic Financial Services Board (IFSB), in particular the Capital Adequacy Standard (CAS) and Guiding Principles on Corporate Governance.

The calculation of the Risk-Weighted Capital Ratio (RWCR) differs, depending on the requirements of Basel I or Basel II. The RWCR requirement based on Basel I, banking institutions are required to maintain a minimum RWCR of 8 per cent at all times at the displaced commercial risk.

RWCR for banking institutions:

$$RWCR = \frac{CB}{CRWA + LERWA + MRWA}$$

Where:

RWCR	=	Risk-Weighted Capital Ratio
CB	=	Capital Base
CRWA	=	Credit Risk-Weighted Asset
LERWA	=	Large Exposure Risk-Weighted Asset for Equity Holdings
MRWA	=	Market Risk-Weighted Asset

The RWCR requirement based on Basel II, requirement as Basel I shall apply. In addition, for banking institutions with Islamic banking operations, the minimum RWCR of 8 per cent has to be complied at the conventional, Islamic banking operations and overall (conventional plus Islamic banking operations) level. Applicable on banking institutions adopting the revised approaches according to the stipulated timelines. The calculation of the Risk-Weighted Capital Ratio (RWCR) is derived as follows:

$$RWCR = \frac{CB}{CRWA + LERWA + MRWA + ORWA}$$

Where:

RWCR	=	Risk-Weighted Capital Ratio
CB	=	Capital Base
CRWA	=	Credit Risk-Weighted Asset
LERWA	=	Large Exposure Risk-Weighted Asset for Equity Holdings
MRWA	=	Market Risk-Weighted Asset
ORWA	=	Operational Risk-Weighted Asset

For banking institutions with Islamic banking operations, the RWCR shall be derived as follows:

$$RWCR_{conventional} = \frac{CB_{conventional}}{TRWA_{conventional}}$$

$$RWCR_{Islamic} = \frac{CB_{Islamic}}{TRWA_{Islamic}}$$

$$RWCR_{Overall} = \frac{CB_{Overall}}{TRWA_{Islamic} + TRWA_{Conventional}}$$

Where:

TRWA   =   Total Risk-Weighted Assets

For banking institutions with an Islamic banking subsidiary, the consolidated RWCR shall incorporate the Islamic banking subsidiary Risk-Weighted Asset which will be computed based on a separate guideline for Islamic banking subsidiary to be issued by the Bank at a later date.

For banking institutions with an Islamic banking operations, Mudarabah based deposit funds placed by customers, which are also known as profit sharing investment accounts (PSIA) in the form of either the General Investment Accounts (GIA) or Specific Investment Accounts (SIA) may be eligible for recognition as an absorbent for credit risk and market risk inherent in the assets funded by the PSIA. The type and significance of PSIA that can be recognised as a risk absorbent for purposes of the RWCR computation of a banking institution would be subject to the Bank's specific approval on minimum requirements. The minimum requirements for the recognition of PSIA as a risk absorbent and alpha (α) will be provided in a separate guideline. Alpha (α) represents the proportion of losses from credit and market risk exposures borne by

the banking institution, as a result of DCR arising from income smoothing practices for PSIA holders. Alpha (α) is expressed as a specified percentage of assets funded by PSIA.

The RWCR of the Islamic banking operations will be computed as follows:

$$RWCR_{Islamic} = \frac{CB_{Islamic}}{TRWA^*_{Islamic}} - (1-\alpha)^{**}(CMRWA_{PSIA})^{***} - (\alpha)(CMRWA_{PER})$$

Where:

$CMRWA_{PSIA}$	=	Credit and Market Risk-Weighted Assets funded by PSIA
$CMRWA_{PER}$	=	Credit and Market Risk-Weighted Assets funded by PER of PSIA
***	=	PSIA balances include its PER
**	=	(1-α) represents the significant of PSIA that is recognized as risk absorbent for RWCR computation purposes and approved by the bank
*	=	Total Risk-Weighted assets is the sum of credit, market and operational risk-weighted assets of Islamic banking operations

However, there are some weaknesses of this approach and significant efforts need be made to design a more appropriate capital regulation for Islamic banks. Since the IFSB (2005) recommend to all Islamic banks in the same jurisdiction, the same proportion of risk weighted assets funded by PSIA without taking into account the actual returns smoothing policies unusual to each Islamic bank.

Likewise, there has been an inconsistency in defining the restricted investment deposits. According to the international accounting standard developed by the AAOIFI (2008), PSIA deposits cannot be recognized as liabilities of Islamic banks and should not be reflected on the bank statement of financial position. This is because the depositors are highly involved in investment decisions. Thus, it can be argued that PSIA financed assets should be excluded from the risk weighted assets in the denominator of the RWCR.

The VaR model we proposed would be an alternative method to measure the additional capital charge required to cover the displaced commercial risk.

3.3.3 Value at Risk (VaR) Method

In this section, we want to know the bank equity amount necessary to absorb the displaced commercial risk. This section is important because it is focused on demonstrating of the *VaR* approach to quantify DCR for Islamic banking institutions in Malaysia where have implement the dual banking system. *VaR* methodology is used to estimate the potential loss of value resulting from market movements over a specified period of time within a specified probability of occurrence, under normal business situations

In spite of the existing reserve level, the return on investment can fall below the benchmark level[20]. The equity level uncovered by the reserve amount will be obtained by the *VaR* for a given probability level α.

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[20] The investment account holders compares his return with the return of a benchmark $\bar{r_b}$, this return is not necessarily known at the date of the investment.

Looking for this equation;

$$p(\bar{r_i} + E - \bar{r_b} \leq VaR) = \alpha$$

then;

$$p(\bar{r_i} - \bar{r_b} \leq VaR - E) = \alpha \qquad (7)$$

Where, E is the part of accumulated amount of reserve attributed to Investment Account Holders. $\bar{r_i}$ is the return on the investment account. $\bar{r_b}$ is a return on benchmark.

A variety of approaches exist for estimating *VaR* (description in Chapter 2). In this study, we are using the Variance-Covariance Approach called Parametric *VaR* because one of its fundamental assumptions is that the return distribution belongs to a kind of parametric distributions such as the normal or the lognormal distributions. *VaR* can simply be expressed as:

$$VaR_{1-\alpha} = -x_\alpha \times P \qquad (a)$$

Where:

- VaR_α is the estimated VaR at the confidence level $100 \times (1-\alpha)\%$.

- x_α is the left-tail α percentile of a normal distribution $N(\mu, \sigma^2).\text{x}_\alpha$. x_α is described in the expression $P[R < x_a] = \alpha$ where R is the expected return. In order for *VaR* to be meaningful, generally set the confidence level of 95% which yields a 1.65 factor assuming a normal distribution or 99%, which yields a 2.33 factor assuming a normal distribution. x_α is generally negative.

- P is the marked-to-market value of the portfolio.

Jorion (2002), states that the sum of a large number of independent and identically distributed random variables will be approximately normally distributed (i.e., following a Gaussian distribution[21], or bell-shaped curve) if the random variables have a finite variance. But the question is, even if any research has a large enough sample of historical returns, is it realistic to assume that the returns of any given fund follow a normal distribution? Thus, this paper suggests concerning the return distribution to a standard normal distribution which has a zero mean and a standard deviation of one. Using a standard normal distribution enables us to replace x_α by Z_α through the following permutation:

$$Z_\alpha = (x_\alpha - \mu) / \sigma \qquad \text{(b)}$$

Which yields:

$$x_\alpha = \mu + Z_\alpha \times \sigma \qquad \text{(c)}$$

Z_α is the left-tail α percentile of a standard normal distribution. Consequently, can re-write equation (a) as:

$$VaR_{1-\alpha} = -(\mu + Z_\alpha \times \sigma) \times P \qquad \text{(d)}$$

Back from the equation (7), by subtracting the mean and dividing by the standard deviation of the deviation between the profit on investment and in benchmark [refer from the equation (b)] will obtain;

$$p\left(\frac{\overline{r_i} - \overline{r_b} - \left(E\left(\overline{r_i}\right) - E\left(\overline{r_b}\right)\right)}{\sigma\left(\overline{r_i} - \overline{r_b}\right)} \leq \frac{VaR - E - \left(E\left(\overline{r_i}\right) - E\left(\overline{r_b}\right)\right)}{\sigma\left(\overline{r_i} - \overline{r_b}\right)} \right) = \alpha$$

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[21] The normal distribution proposed by Karl F. Gauss (1777-1855), which showed that the mean converges to a normal distribution as the number of observations increases. Also, as the number of independent draws increases, the distribution converges to a smooth normal distribution.

If the investment and benchmark profit follow the standard normal law and isolating the *VaR* it comes:

$$VaR_\alpha = Z_\alpha \sigma\left(\overline{r}_i - \overline{r}_b\right) + E + \left(E\left(\overline{r}_i\right) - E\left(\overline{r}_b\right)\right)$$

Z_α is a quantile of the standard normal law for the level of probability α

3.3.3.1   Analytical VaR in the % of a Portfolio between Two Profits

Now, this study do it value of *VaR* in the percentage amount in an investment account (PSIA). It is made easier to interpret *VaR* value. By developing the standard deviation (volatility) of the difference between the investment and benchmark profit, the *VaR* is:

$$VaR_\alpha = PSIA\left\{Z_\alpha\left[V\left(\overline{r}_i\right) + V\left(\overline{r}_b\right) - 2Cov\left(\overline{r}_i, \overline{r}_b\right)\right]^{1/2} + e + \left(E\left(\overline{r}_i\right) - E\left(\overline{r}_b\right)\right)\right\}$$

Where, *e* is the amount of reserve expressed of investment account.

And, *VaR* expressed as percent of investment account can be re-written as:

$$\frac{VaR_\alpha}{PSIA} = Z_\alpha\left[V\left(\overline{r}_i\right) + V\left(\overline{r}_b\right) - 2Cov\left(\overline{r}_i, \overline{r}_b\right)\right]^{1/2} + e + \left(E\left(\overline{r}_i\right) - E\left(\overline{r}_b\right)\right) \tag{8}$$

The Islamic bank invests the amount of investment accounts in a well diversified portfolio. The portfolio analysis lay out by Markowitz (1952, 1959 and 1987). The benchmark is also a well-diversified portfolio. Diversified *VaR* in these cases means the portfolio *VaR* taking into account diversification benefits between components. It is

close to the beta. Beta risk is the basis for capital asset pricing model (CAPM) developed by Sharpe (1964).

According to the CAPM, the risk premium on all assets should depend on beta. Betas of investment and benchmark portfolios are respectively β_a, β_b with $f\beta_a > \beta_b$.

The relation between expected return and beta then becomes the familiar Sharpe CAPM equation:

$$\text{(Sharpe CAMP)} \quad E(R_i) = R_f + \left[E(\mathrm{R}_m) - R_f \right]\beta_{im} \quad , i = 1, ..., N.$$

Using the CAPM equation, can write:

$$E\left(\overline{r_i}\right) = fE\left(\overline{r_a}\right)$$

$$E\left(\overline{r_i}\right) = f\left[R_f + \beta_a \left[E\left(R_m\right) - R_f \right]\right]$$

and

$$E(\overline{r_b}) = R_f + \beta_b \left[E(R_m) - R_f \right]$$

The following relations:

$$V\left(\overline{r_i}\right) = f^2\beta_a^2 V\left(R_m\right)$$

$$V\left(\overline{r_b}\right) = \beta_b^2 V\left(R_m\right)$$

$$Cov\left(\overline{r_i}, \overline{r_b}\right) = f\beta_a\beta_b V\left(R_m\right)$$

From equation (8), *VaR* is:

$$\frac{VaR_\alpha}{PSIA} = \left(f\beta_a - \beta_b \right)\left[Z_\alpha \sigma\left(R_m\right) + \left(E\left(R_m\right) - R_f\right)\right] + e + \left(f-1\right)R_f \tag{9}$$

In the simplest case were the benchmark portfolio is the risk free asset and the invested portfolio is equal to the market portfolio, the *VaR* becomes:

$$\frac{VaR_\alpha}{PSIA} = f\left[Z_\alpha \sigma\left(R_m\right) + \left(E\left(R_m\right) - R_f\right)\right] + e + \left(f-1\right)R_f \tag{10}$$

3.3.4 Definition of variable

In order to estimate the DCR, a basic framework and definitions are required for measuring the DCR in Islamic banks. Since there are no specific supervisory disclosure requirements on PER or IRR other than those in applicable accounting standards, this research, based on available accounting standards, proposes the use of the variables specified below:

(a) Mudarabah Profits

The existing applicable accounting standards state that when an Islamic bank (bank shareholders) mixed its own funds with the Mudarabah funds of IAH (Rabbul mal), profits are first allocated between Mudarib's own funds (shareholders' funds) and IAH funds according to the capital contribution of each of the two parties. The share of the shareholders as a Mudarib for its role as fund manager is then deducted from the share of profits allocated to IAH.

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Based on this, Mudarabah profits (before allocating Mudarib share) attributable (i.e after appropriations to or releases from PER) between IAH (Rabbul mal) and the shareholders as a Mudarib can be defined as investment income from balance sheet assets plus trading income minus provisions, minus appropriations to PER, minus income attributable to sources not included in the investment pool.

(b)   Rate of Return to IAH

The IAH gets their returns only for the specified profit-sharing ratio applied to Mudarabah profits. The amount of profit distributed to IAH is, therefore, the agreed share of Mudarabah profit net of appropriations to (or plus releases from) PER and, where applicable, IRR plus any income transfer from shareholders' funds. This is not the same as the income attributable to PSIA. The amount of the agreed Mudarabah profit share of PSIA before any transfers in or out of the PER and/or IRR (Damak and Volland, 2008).

Both AAOIFI standards[22] and the rate of return Framework of BNM[23] recognize Profit Equalization Reserve and Investment Risk Reserve. Profit Equalization Reserves refer to account appropriated out of gross income in order to maintain a certain level of return for PSIA; and this is apportioned between investment account holders and shareholders in the same proportions that apply to the sharing of profits. Investment Risk Reserves are reserves attributable entirely to investment account holders but maintained

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[22] Accounting and Auditing Organization for Islamic Financial Institutions (2001) has recommended and allowed the Islamic banks to set aside some portion of the profit under two special types of reserves, namely, profit equalisation reserve and investment risk reserve.

[23] The objectives of this framework are: i) Set the minimum standard in calculating the rates of return, ii) Provide the same playing level and term of reference for the Islamic banking institutions in deriving the rates of return and iii) Provide BNM with an effective yardstick to assess the level of efficiency of the Islamic banking institutions (Bank Negara Malaysia, 2001).

specifically to absorb periodic losses in whole or in part and also to smooth the rate of return actually paid out over time.

(c)   Rate of Return to Shareholders' Equity

The returns to shareholders are derived from both their share of the returns in the pool of investment assets acquired using the mixed IAH or shareholders' funds, plus their share of Mudarabah profits for the services as a Mudarib, and the net earnings from other funds. For example, income from other bank services and other non-PSIA assets that are funded from other sources.

In practice, there are two methods of determining the rate of return on shareholders' equity. In the first method, the rate of return on capital is endogenous, determined internally by management. If the banks' management chooses a transfer of income to IAH, this will be reflected in the return to shareholders' equity, given that the IAH receives a targeted return commensurate with their risk-bearing capacity.

The second approach is to assume that the return to a component of capital in the mixed pool is proportional to its contribution to the pool, and hence the investment return on capital is the same as the return obtained from assets funded by the mixed funds. In this case, there is no transfer of profit from shareholders to IAH.

d) A market benchmark

This represents alternative returns available to depositors generally, including IAH, in the market. For simplicity, the actual pay out to IAH can be modelled as a weighted average of the market benchmark rate.

This study supposes that all Islamic banks invest in Kuala Lumpur Shariah Index (KLSI) and FTSE Bursa Malaysia Emas Shariah Index. These indices have been designed to provide investors with a broad benchmark for Shariah-compliant investment.

The Kuala Lumpur Shariah Index (KLSI) was launched in 1999 to meet the demands from local and foreign investors who seek to invest in securities which are consistent with the Islamic principles of Shariah. Investors seeking to make investments based on Shariah principles now have a benchmark for making better informed decisions. The Shariah Index is a weighted-average index, which comprises of securities from the Main Board which have been designated as Shariah Approved Securities by the Shariah Advisory Council (SAC) of the Securities Commission.

The new index will run parallel with the existing Shariah index (KLSI) for nine months. The KLSI is deactivated on November 2007, making the FTSE Bursa Malaysia EMAS Shariah Index the singular benchmark index for Malaysia Shariah compliant investments. It has happened because the FTSE Bursa Malaysia EMAS Shariah Index provides investors with a clearer picture of quality Shariah investments in the Malaysian market. It uses globally adjusted criteria that make it easier for institutional investors to track Shariah compliant investment offerings more effectively

The FTSE Bursa Malaysia EMAS Shariah Index applies the principles set out by the Malaysian Securities Commission's Shariah Advisory Council (SAC) on the design of this index. The general criteria stipulate that Shariah-compliant companies must not be involved in any of the following core activities: financial services based on riba (interest); gambling; manufacture or sale of non-halal products or related products; conventional insurance; entertainment activities that are non-permissible according to Shariah; manufacture or sale of tobacco-based products or related products; stockbroking or share trading in Shariah non-compliant securities; and, other activities deemed non-permissible according to Shariah.

e) Profit sharing investment accounts (PSIAs)

Theoretically, Islamic banks do not pay interest on customers' deposit accounts. Instead, customers' funds are placed in PSIAs. Under this arrangement, the returns for the bank's customers are their agreed share of the returns on the assets in which their funds are invested, and if these returns are negative so are the returns to the customers. The bank is entitled to a contractually agreed share of positive returns or profits as remuneration for its work as asset manager. However, if the returns are zero or negative, the bank receives no remuneration but does not share in any loss.

Islamic banking institutions mobilise a large proportion of their deposits in the form of mudarabah (profit-sharing) contract. Under the mudarabah contract, depositors (known as investment account holders or IAH) agree to participate in the financial activities undertaken by the Islamic banking institutions (as mudarib) and share the profit generated from financing and/or investment activities based on an agreed profit-sharing ratio. The IAH shall bear the losses arising from the assets funded under the mudarabah

contract or commonly known as profit-sharing investment account (PSIA), except in the case of misconduct, negligence or breach of contract terms by the Islamic banking institutions.

In Malaysia, Islamic banking institutions generally offer two types of PSIA namely, the General Investment Account (GIA-I, Unrestricted Mudarabah accounts) and the Specific Investment Account (SIA-I, Restricted Mudarabah accounts). With the first type, the depositors authorize the Islamic bank to invest the funds in a manner which the Islamic bank deems appropriate without laying down any restriction as to where, how and for what purpose the funds should be invested. With the second type, the depositors impose some restrictions as where, how and for what purpose their funds are to be invested (Ismail, 2010). In this paper, we are using the GIA-I for the purpose of quantifying the DCR because GIA-I is a flexible investment in which we can hold an array of investment such as funds, shares, investment trusts and exchange traded funds within a single account.

3.4   MODEL ESTIMATION

3.4.1   Impact of Displaced Commercial Risk on Islamic Bank Performance

This study also investigates the impact of DCR on Islamic banking performance, focusing on bank profitability and bank stability. Based on the analysis of panel data, we estimate a modified econometric model following Hassoune (2002), and Cihak and Hesse (2010) that allows us to examine the impact of DCR on Islamic bank performance, while controlling for specific variables of the bank and macroeconomic variables.

We start with the general estimation model for bank stability can be specified as follows: -

$$z_{i,t} = \alpha + \delta\,pft_{i,t} + \beta bc_{i,t} + \omega m_{i,t} + \gamma rf_{i,t} + \varphi mp_{i,t} + \varepsilon_{i,t} \tag{12}$$

Where the dependent variable is the $z_{i,t}$, z is a Z-score as a proxy of bank stability for bank i at time t, pft contains time varying return on asset (ROA) as the indicator the bank's profitability, bc is a vector of bank characteristic variables, m is macroeconomic variables, rf is the variable of interest in this research study (DCR), mp stands for market power (Herfindahl Index), and $\varepsilon_{i,t}$ is the residual.

However, two models will be estimated, which is the first model to examine the impact of DCR on bank stability, with bank specifics variables as the control factors (i.e, bank profitability, bank characteristics, and market power). The second model extends the first model by including the macroeconomic factors as control variables to capture macroeconomic developments that are likely to affect the Islamic bank stability in Malaysia.

Hence, the specific estimation model can be specified as:

Model 1 for Bank Stability

$$\begin{aligned} BS1_{i,t} = {} & \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t} \\ & + \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t} \end{aligned}$$

$$\tag{13}$$

Where;

BS is used as a proxy measure of the banking stability; *ROA* is return on assets as a proxy of profitability; *AST* is the total assets of a bank as a proxy of size; *OWN* is the ownership as a proxy of dummy variable. Assume the value of (1) if the bank is a local Islamic bank and (0) is a foreign Islamic bank in Malaysia. The dummy variable (OWN) is comprised to detect whether there are efficiency differences between local Islamic bank and a foreign Islamic bank operating in Malaysia; *LOAST* is the ratio of loans to total assets as a proxy of bank liquidity; *LPLO* is the ratio of loan loss provisions to total loans is incorporated as an independent variable in the regression analysis as a proxy of credit risk; *DIV* is the Income Diversity proxies by a measure of diversification across different sources of income; *COST* is cost to income ratios as a proxy of cost efficiency; *DCR* is displaced commercial risk; and *HERFIN* is the Herfindahl index, defined as the sum of squared market shares (in terms of total assets) of all Islamic banks in the Malaysia.

Model 2 for Bank Stability

$$BS2_{i,t} = \gamma_{0i} + \gamma_1 ROA_{i,t} + \gamma_2 AST_{i,t} + \gamma_3 OWN_{i,t} + \gamma_4 LOAST_{i,t} + \gamma_5 LPLO_{i,t} + \gamma_6 DIV_{i,t} + \gamma_7 COST_{i,t}$$
$$+ \gamma_8 EXCH_{i,t} + \gamma_9 INFL_{i,t} + \gamma_{10} GDP_{i,t} + \gamma_{11} INT_{i,t} + \gamma_{12} DCR_{i,t} + \gamma_{13} HERFIN_{i,t} + \mu_{2i,t}$$

(14)

Where;

EXCH is the exchange rates; *INFL* is the inflation rate; *GDP* Gross domestic product; *INT* is the interest rate ratios; and μ is an error term for bank.

Next, we also examine the impact of DCR on Islamic bank profitability. As to the explanatory variables, we divide them into four different categories, namely bank's

stability, bank-specific characteristics, macroeconomic variables, and market power determinants of Islamic bank profitability.

The general estimation model for bank profitability can be specified as follow:

$$p_{i,t} = \alpha + \delta s_{i,t} + \beta bc_{i,t} + \omega m_{i,t} + \gamma rf_{i,t} + \varphi mp_{i,t} + \varepsilon_{i,t} \qquad (15)$$

Where the dependent variable is the $p_{i,t}$, p is a ROA as a proxy of bank profitability for bank i at time t, s contains time varying Z-score as the indicator the bank's stability, bc is a vector of bank characteristic variables, m is macroeconomic variables, rf is the variable of interest in this research study (DCR), mp stands for market power (Herfindahl Index), and $\varepsilon_{i,t}$ is the residual.

However, two models will be estimated, which is the first model to examine the impact of bank profitability to the bank specifics (i.e, bank stability, bank characteristics, and market power). While the second model test again the first model included the macroeconomic factors as a control variable to capture macroeconomic developments that are likely to affect the quality of Islamic bank stability in Malaysia.

Hence, the specific estimation model can be specified:

<u>Model 1 for Bank Profitability</u>

$$ROA1_{i,t} = \vartheta_{0i} + \vartheta_1 S_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t}$$

$$(16)$$

Where;

ROA is return on the asset used as a proxy measure of the banking profitability; *S* as a proxy of bank stability; *AST* is the total assets of a bank as a proxy of size; *OWN* is the ownership as a proxy of dummy variable. Assume the value of (1) if the bank is a local Islamic bank and (0) is a foreign Islamic bank in Malaysia. The dummy variable (OWN) is comprised to detect whether there are efficiency differences between local Islamic bank and a foreign Islamic bank operating in Malaysia; *LOAST* is ratio of loans to total assets as a proxy of bank liquidity; *LPLO* is the ratio of loan loss provisions to total loans is incorporated as an independent variable in the regression analysis as a proxy for credit risk; *DIV* is the Income Diversity proxies by a measure of diversification across different sources of income; *COST* is cost to income ratios as a proxy of cost efficiency; *DCR* is displaced commercial risk as the variable of interest in this research study; and *HERFIN* is the Herfindahl index, defined as the sum of squared market shares (in terms of total assets) of all Islamic banks in the Malaysia.

Model 2 for Bank Profitability

$$ROA2_{i,t} = \gamma_{0i} + \gamma_1 S_{i,t} + \gamma_2 AST_{i,t} + \gamma_3 OWN_{i,t} + \gamma_4 LOAST_{i,t} + \gamma_5 LPLO_{i,t} + \gamma_6 DIV_{i,t} + \gamma_7 COST_{i,t}$$
$$+ \gamma_8 EXCH_{i,t} + \gamma_9 INFL_{i,t} + \gamma_{10} GDP_{i,t} + \gamma_{11} INT_{i,t} + \gamma_{12} DCR_{i,t} + \gamma_{13} HERFIN_{i,t} + \mu_{2i,t}$$

(17)

Where;

EXCH is the exchange rates; *INFL* is the inflation rate; *GDP* Gross domestic product; *INT* is the interest rate ratios; and μ is an error term for bank.

3.4.2   Data Sources and Description

This study utilized secondary data collected in Bank Negara Malaysia's Statistical Bulletin and the particular bank's annual report database. These reports were obtained from the respective banks' website. This study adopts annual report data since the interest is to observe the long term impact of displaces commercial risk. Besides, annual data represent the highest periodicity for which data are systematically available. We use data on Islamic banks in the database from 17 banking systems of Islamic banks.

The study periods span from 1994 to 2014, using a unbalanced panel data of 357 observations. This field of investigation has not yet been tested. The study applied static panel data approach. The approach of the static panel data analysis allows studying a model closer to theoretical lessons on the impact of DCR on Islamic bank performance.

A list of participating banks and the years of data involved are given in Table 3.2. Our calculations are based on individual bank data drawn from the available annual report database. We use data on Islamic banks in the database from 17 banking systems of Islamic banks. Our sample covers banks in the following rules: a) Affin Islamic Bank Berhad; b) Alliance Islamic Bank Malaysia Bhd; c) Al Rajhi Banking & Investment Corporation (Malaysia) Berhad; d) AmIslamic Bank Berhad; e) Asian Finance Bank Berhad; f) Bank Islam Malaysia Berhad; g) Bank Muamalat Malaysia Berhad; h) CIMB Islamic Bank Berhad; i) EONCAP Islamic Bank Berhad; j) Hong Leong Islamic Bank Berhad; k) HSBC Amanah Malaysia Bhd; l) Kuwait Finance House (Malaysia) Berhad; m) Malayan Islamic Banking Bhd; n) OCBC Al Amin Bank (Malaysia) Bhd; o) Public Islamic Bank Berhad; p) RHB Islamic Bank Berhad; and q) Standard Chartered Saadiq Bhd.

Table 3.2: List of Participating Islamic Banks and Years of Data

List of Banks	Period of time
1. Affin Islamic Bank Berhad	1996 - 2014
2. Alliance Islamic Bank Malaysia Bhd	1996 - 2014
3. Al Rajhi Banking & Investment Corporation (Malaysia) Berhad	2006 - 2014
4. AmIslamic Bank Berhad	1996 - 2014
5. Asian Finance Bank Berhad	2006 - 2014
6. Bank Islam Malaysia Berhad	1994 - 2014
7. Bank Muamalat Malaysia Berhad	2000 - 2014
8. CIMB Islamic Bank Berhad	1997 - 2014
9. EONCAP Islamic Bank Berhad	1996 - 2014
10. Hong Leong Islamic Bank Berhad	1996 - 2010
11. HSBC Amanah Malaysia Bhd	1996 - 2014
12. Kuwait Finance House (Malaysia) Berhad	2005 - 2014
13. Malayan Islamic Banking Bhd	1996 - 2014
14. OCBC Al Amin Bank (Malaysia) Bhd	1996 - 2014
15. Public Islamic Bank Berhad	1996 - 2014
16. RHB Islamic Bank Berhad	1998 - 2014
17. Standard Charted Saadiq Bhd	1996 - 2014

We are aware that there had been a few mergers and acquisitions of Islamic banks during this period. Therefore, the number of Islamic banks listed in the central bank bulletin has changed accordingly. However, to be consistent, this research utilizes the latest formal list of Islamic banks from the central bank. Where mergers have taken place within the existing banks, during the studied period, this research proceeds by using the data of the anchor bank prior to the merger.

In November 2011, The Hong Leong Islamic Bank Berhad completed its merger with EONCAP Islamic Bank Berhad as part of a larger merger between Hong Leong Bank and EON Bank Berhad. The milestone marked the first of such mergers between two Islamic banks in Malaysia and had provided the Hong Leong Islamic Bank Berhad with improved scale and a deepened foothold within the highly competitive Islamic banking industry. From a strategic standpoint, the focus remains on the provision of holistic solutions based on the tenets and principles of Shariah law. Innovative solutions in structured finance, capital markets, personal financial services and wealth management

are amongst the Hong Leong Islamic Bank Berhad's many offerings in addition to the development of its own business niche in fee-based income and investment banking model.

Then, our case study considers 17 Islamic banks in Malaysia investigate until 2014 as a sample and try to measure potential losses resulting from the displaced commercial risk from the annual report for each Islamic bank in Malaysia. The methodology applied is based on Value at Risk model.

Analysis of the data obtained from annual report involved univariate statistics consisting of the descriptive analysis and mean value. The data was analysed using statistics with STATA Version 14 and EVIEWS Version 8. In addition, cross-tabulation and Chi-square tests were employed. However, in relation to the investigation of the impact of DCR on bank stability, we consider the Z-score models were estimated as a dependent variable.

The Z-score models were developed as a measure stability of Islamic banks because it combines the banks' capital and profits with the risk they face in a way that is grounded in theory. The other measure of performance is a Return on Assets (ROA). This approach remains the most interesting to measure bank profitability because it is focused on the analysis of other data showing the banking structure. To ensure robust result, other factors that could possibly influence bank stability, such as bank specific characteristics and macroeconomic factors are also included as control variables.

3.4.3   Definition and Construction of Variables

From section 3.4.2, it is realized that the essential elements of DCR variable to measure the bank stability and profitability models of the Islamic banks. However, other variables will be considered such as bank specific characteristics and macroeconomic variables as control variables to avoid omitting variables bias.

Therefore, this section is aimed at providing a more comprehensive discussion about to what extent the bank specifics (i.e profitability, stability, market power, DCR, bank characteristics) and macroeconomic variables (i.e. GDP, interest rate, inflation rate, and exchange rate) are able to influence the bank stability and profitability with respect of DCR on Islamic bank soundness.

We use a variation of Z-score as pointed out by Boyd and Runkle (1993), De Nicolo (2000), Lepetit et al. (2008), Cihak and Hesse (2007), Cihak and Hesse (2008), Cihak and Hesse (2010), Laeven and Levine (2009), Kangarlouei et al. (2012), Rajhi and Hassairi (2013), as an indicator of banking stability; and Return on Asset (ROA) as indicated by Berger (1995), Bourke (1989), Molyneux and Thornton (1992), DeYoung and Rice (2004), Iannotta et al. (2007), Athanasoglou et al. (2008), Chiorazzo et al. (2008), Alexiou and Sofoklis (2009), Garcia-Herrero et al. (2009), and Hakenes and Schnabel (2011), as an indicator of banking profitability.

3.4.3.1   Estimation of Bank Stability

In this investigation, we test an econometric model to assess the impact of the DCR on the bank stability using Z-score, which is a bank's stability indicator. This section

utilizes Z-score method used by Cihak and Hesse (2008), and Hasan and Dridi (2010) as a proxy to estimate of the Islamic banking stability. This method measures how many standard deviations a bank is away from exhausting its capital base (a distance-to-default measure). The Z-score also captures the probability of default of a banking system and compares the buffer of a banking system (capitalization and returns) with the volatility of those returns. The Z-score is computed as follows:

$$Z = \frac{K + \mu}{\sigma} \qquad (18)$$

Where;

K is equity capital as a percentage of assets,

μ is average return as percentage of assets, and

σ is standard deviation of return on assets as a proxy for return volatility.

Which are covers:

$$Zscore = \frac{CAP + ROA}{\sigma(ROA)}$$

Dependent variable is Z-score; and **Independent variables** are:

ROA (Return on Assets) = Net Income / Total Assets;

CAP (Capital to Asset Ratio) = Equity / Total Assets;

σ(ROA) = standard deviation of the return on assets (proxy for the variation of return)

This index combines in a single indicator: (i) profitability, given a return on assets (ROA); (ii) inverse of leverage measure, given an equity-to-asset ratio (CAP) (equity

here is defined as total equity from the balance sheet of a bank); and (iii) return volatility, given a standard deviation of ROA [σ(ROA)].

This study also uses a variation of Z-score as an indicator of banking stability. To take advantage of variation as possible, we use the twenty years rolling Z-score, which is computed by using the twenty years, moving average of return on assets (profitability) plus the twenty years, moving average of equity to assets (capitalization) over the twenty years standard deviation (of return on assets). All of the variables in our sample, including the dependent variable, have been transformed into natural logarithms.

The outcome indicate that higher (lower) values of Z-score imply lower (higher) insolvency risk because higher (lower) values of Z-score correspond with higher levels of equity relative to a potential shock to the earnings of a bank. Thus, banks with (lower) risky loan portfolios can maintain a low risk of insolvency as long as they are adequately capitalized[24]. In other word, a higher (lower) Z-score indicates lower (higher) risk implies higher stability (De Nicolo et al., 2003).

3.4.3.2 Estimation of Bank Profitability

There are two popular measures in the banking literature to a measure of bank profitability are the rate of return on assets (ROA) and the rate of return on equity (ROE). The ROA is defined as

$$ROA = \frac{NI}{TA}$$

Where:

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[24] The risk index suggested by Hannan and Hanweck (1988) was used by Liang and Savage (1990), Eisenbeis and Kwast (1991), Sinkey and Nash (1993), and Sinkey and Blasko (2001)

ROA is Return On Assets

NI is Net Income

TA is Total Asset

However, the ROE is measured as net income scaled by stockholders' equity. In this study, we use the ROA as a measurement of bank profitability, instead of the alternative ROE, because an analysis of ROE disregards financial leverage and the risks associated with it (Flamini et al., 2009).

3.4.3.3   Bank Specific Factors

Dependent Variables

Z-SCORE

The *Z-SCORE* as a proxy for bank stability because it combines banks' buffers (capital and profits) with the risks they face in a way that is grounded in theory (Cihak and Hesse, 2010). This measure is calculated as the sum of a bank's average ROA and average Capitalization Ratio divided by the standard deviation of ROA (the volatility of ROA). This indicator considers the risk of failure to depend fundamentally on the interaction of the income generating capacity, the potential magnitude of return shocks, and the level of capacity reserves available to absorb sudden shocks. This indicator reveals the degree of exposure to operating losses, which reduce capital reserve that could be used to offset adverse shocks. entities with low capital and a weak financial margin relative to the volatility of their returns will score high on this indicator.

ROA

ROA as a proxy for bank profitability. ROA has also been the indicator of measuring managerial efficiency (Samad, 2004). Since bank assets' purpose is to generate revenues and produce profits, this ratio helps both management and investors see how well the bank can convert its investments in assets into profits.

Banks cannot be permanently solvent if they are not profitable. High earnings are necessary to implement investments and make full provision for the absorption of losses. Maechler et al (2007) shows that profitability is negatively related to the probability of insolvency. and Olson and Zoubi (2008) find that Islamic banks are more profitable than conventional banks.

Independent Variables

COST

Cost to income ratios (*COST*) as a proxy of cost efficiency. Such studies include those by Hassan and Bashir (2003) who look at the determinants of Islamic banks' performance and show that Islamic banks to be just as efficient if one uses standard accounting measures such as the cost to income ratio. Other studies that followed a similar approach are those by Sarker (1999) who examines the performance and operational efficiency of Islamic banks, while Bashir (1999) investigates the risk and profitability of banks. Cost to income ratio and bank stability is expected to be negative, assuming that generally speaking inefficiency provides an incentive to banks to take on riskier activities in order to improve their stability (Berger and De Young, 1997; Kwan and Eisenbeis, 1995; and Fiordelisi et al., 2010).

However, some studies also expect a different sign on bank profitability. The previous studies evaluate the impact of COST on bank profitability and find that a positive and highly significant (Garcia-Herrero et al., 2009). This would imply that operational efficiency is a prerequisite for improving the profitability of the banking system, with the most profitable banks having the lowest efficiency ratios. Therefore, a positive relationship between profitability and COST is possible.

LOAST

An important decision that the managers of Islamic banks must take refers to the liquidity management and specifically to the measurement of their needs related to the process of deposits and loans. For that reason, the ratio of total loans to total assets (*LOAST*) is used as a measure of liquidity. Higher figures denote lower liquidity. Without the required liquidity and funding to meet obligations, a bank may fail. Thus, in order to avoid insolvency problems, banks often hold liquid assets, which can be easily converted to cash. However, liquid assets are usually associated with lower rates of return. It would therefore reasonable to expect higher liquidity to be associated with lower bank stability and profitability.

LPLO

The ratio of loan loss provisions to total loans (*LPLO*) is incorporated as an independent variable in the regression analysis as a proxy of credit risk (Delis and Kouretas, 2011). The coefficient of the *LPLO* variable is expected to enter the regression models with a negative sign. In this vein, Miller and Noulas (1997) point out that the greater the exposure of banks to high risk loans, the higher would be the accumulation of unpaid loans and profitability and stability would be lower. Miller and Noulas (1997) suggest that the decline in loan loss provisions is in many instances the primary catalyst for

increases in profit margins. Furthermore, Thakor (1998) also suggests that the level of loan loss provisions is an indication of the bank's asset quality and signals changes in future performance.

AST

The *AST* variable is the value of total asset included in the regression models as a proxy of size to capture for the possible cost advantages associated with size (economies of scale). We include the log of total assets to control for changes in the bank's size since Bannier and Hansel (2008) as well as Martin-Oliver and Saurina (2007) provide empirical evidence that the banking institution's size is a strong determinant of stability and profitability effects.

In the literature, mixed relationships are found between size and stability/profitability. *AST* is also used to control for cost differences related to bank size and for the greater ability of the large bank to diversify. In essence, *AST* may lead to positive effects on bank profitability and stability if there are significant economies of scale. On the other hand, if increased diversification leads to higher risks, the variable may exhibit negative effects.

Based on the previous study that larger banks will be less risky (e.g., Boyd and Runkle (1993), Boyd et al. (2006), Laeven and Levine (2009), Houston et al. (2010), Beltratti and Stulz (2012)), due to the increased ability to diversify their income streams, in all spectrums including geographic, customer and industry (De Young and Roland, 2001). However, Cihak and Hesse (2008) find that there are significant variations in bank stability between large and small Islamic and conventional banks.

DCR

The variable being tested. We belief that the Islamic system of banking unlike the conventional system is intrinsically stable in nature. However, it cannot be denied that the usual risks, such as displaced commercial risk, are still involved in the Islamic banking system. Moreover, the failure in implementing the monetary policies of the central bank, as the only source of capital generation, as well as partial realization of Islamic law of contracts may introduce financial instability in the banking system.

The displaced commercial risk (DCR) is the unique risks and this risk is given attention by the IAHs, industrial players and regulators. The main cause of the problem is that Islamic banks are operating together with the conventional banks in the dual banking system. Islamic banks are prohibited to provide a fixed rate of return while conventional banks are providing it. In addition, the Islamic banks are encouraged to involve in the profit and loss sharing type of investment with IAHs. As a result, the IAHs will be receiving the return based on the profitability of the investments, rather than a fixed amount of return. IAHs as rational decision makers might decide to withdraw the deposits if rate of return is lower, compared to the conventional banks. This will cause Islamic banking unstable and get lower profit.

DIV

DIV is the Income Diversity proxies by a measure of diversification across different sources of income. We control for Income Diversification since a number of banking studies find that diversification influences risk. This variable is to control for differences in the structure of the bank's income and also to capture the degree to which banks diversify from traditional lending activities to other activities (Demirgüç-Kunt and Huizinga (2010); and Baele et al. (2007)).

Income diversity is calculated as:

$$1 - \left| \frac{(Net\ interest\ income - Other\ operating\ income)}{Total\ operating\ income} \right|$$

In this formula, net interest income is interest income minus interest expense and other operating income includes net fee income, net commission income, and net trading income. Income diversity takes values between zero and one with higher values indicating greater diversification. The asset and income diversity measures are complementary in that asset diversity is based on stock variables and income diversity is based on flow variables.

Greater income diversity tends to increase stability and profitability, large Islamic banks, suggesting that a move from lending-based operation to other sources of income might improve stability and profitability in those banks.

OWN

OWN is dummy variable. To distinguish the impact of bank type on the Z-score, this paper include a dummy variable that takes the value of 1 if the bank in question is a local Islamic bank, and 0 otherwise (i.e., if it is a foreign Islamic bank). For example, if local Islamic banks are relatively weaker than foreign Islamic banks, the dummy variable would have a negative sign in the regression explaining Z-scores. Six foreign Islamic banks and eleven local Islamic banks are recorded.

HERFIN

HERFIN is the Herfindahl index as a proxy of market power. To account for cross-bank variation in financial stability caused by differences in market concentration, this paper

include the Herfindahl index, defined as the sum of squared market shares (in terms of total assets) of all Islamic banks in the Malaysia.

Calculating concentration ratios in this way addresses the fact that the Islamic banking is further globalizing and that banks compete not only within national boundaries but also cross-border. As both theoretical and empirical studies are conclusive about the impact of banking market power on the bank's stability (Uhde and Heimeshoff, 2009; Beck et al., 2006; Schaeck et al., 2006; De Nicolo et al., 2003). The studies show that a positive sign for the interaction of the HERFIN and the bank's stability and profitability would indicate that a higher share of Islamic banks rise bank stability and profitability.

3.4.3.4   Macroeconomic Factors

GDP

Gross domestic product (*GDP*) is among the most commonly used macroeconomic indicators to measure the total economic activity within an economy. The *GDP* is expected to influence numerous factors relating to the supply and demand for loans and deposits. Favorable economic conditions will affect positively on the demand and supply of banking services, but will have either positive or negative influence on bank profitability levels.

The GDP is utilized as a control variable since the banks' investment opportunities may be correlated with macroeconomic cycles and its impact on the level of bank risk (Laeven and Majoni, 2003; Cihak and Hesse, 2008). The inclusion of this variable is based on the view that economic increases indicate improving conditions for banks and therefore reduce the likelihood of bank insolvency, whereas a recession will have the

opposite effect. Hence, banks' operating under a higher level of GDP to be more stable and get more profit is predicted. It is mean that, a positive sign of the coefficient of real GDP growth with bank stability and profitability if investment opportunities arise under economic booms.

INFL

Another important macroeconomic condition which may affect both the costs and revenues of banks is the inflation rate (*INFL*). The findings of the relationship between inflation and profitability are mixed. Staikouras and Wood (2004) points out that inflation may have direct effects, i.e. increase in the price of labour and indirect effects, i.e. changes in interest rates and asset prices on the profitability of banks. Perry (1992) suggests that the effects of inflation on bank performance depend on whether the inflation is anticipated or unanticipated. In the anticipated case, the profit rates are adjusted accordingly, resulting in revenues to increase faster than costs subsequently positive impact on bank profitability. On the other hand, in the unanticipated case, banks may be slow to adjust their interest rates resulting in a faster increase of bank costs compared to bank revenues and consequent negative effects on bank profitability.

However, the researcher of Guru et al. (2002) in Malaysia and Jiang et al. (2003) in Hong Kong show that a higher inflation rate leads to higher bank profitability. Nevertheless, the study of Abreu and Mendes (2002) and Demirguc-Kunt and Huizinga (1999), reports a negative coefficient for the inflation variable. It notice that banks in developing countries tend to be less profitable in inflationary environments, particularly when they have a high capital ratio. In these countries, bank costs actually increase faster than bank revenues.

Why we are using the INFL variable also because of to capture the effects of macroeconomic shocks on banks' balance sheets. *INFL* has been used in previous studies of banking to proxy for macroeconomic mismanagement, which has been found to adversely affect the financial system and real economy (Lown and Morgan, 2006; Buch et al., 2010). Furthermore, higher inflation can distort decision-making, intensify information asymmetry and introduce price volatility.

INT

Economists such as Irving Fisher and Hyman Minsky believe that economic recession is the due outcome of providing loans with high interest rates (*INT*) which in the long run turn out to be outstanding debts on the behalf of clients and leads to speculation. It is why the advocates of Islamic banking believe that the elimination of interest and speculation in addition to *Kali bi Kali* (debt business) puts the financial sector and economic activities in a one to one relationship.

Thus, analyzing the impact of the changes in the *INT* upon Islamic banks is important for: a) financial stability, and b) risk in banking.

First, the involvement of Islamic banks in interest-free banking refers to a possibility for positive contribution to financial stability. The reasons for such a positive contribution include their protection against fluctuations in interest rates, small possibility of bankruptcy, unlikeness to integrate with international markets and obligation to stay away from speculations (Kassim et al., 2009).

Second, risk in banking is another factor requiring attention to the impact of the *INT* upon Islamic banking. In this case, we focus on DCR. In economies employing dual

banking system in particular, whether the Islamic banks are affected by the *INT* bears importance for banking risk. The view that the Islamic banks are not influenced by interest rates when they actually do[25] is a huge flaw that needs to be taken into consideration in terms of banking risk (Kassim et al., 2009).

Islamic banking units are influenced by *INT* because they are subjected to negative fund gap. It will be happened because the Islamic banks suffer from over-dependency on fixed rate asset financing (such as al-bay' bithaman ajil and Murabahah contracts), funds gap will always be negative where all Islamic liabilities are interest-sensitive[26]. In case of increase in *INT*, the demand for Islamic loans also increases because of the relatively reduced cost compared to the conventional bank loans. Islamic banks have to maximize the profitability rates in the deposits in order to meet this demand.

In economies with dual banking system, the conventional banks enjoy the flexibility to engage in both regular banking activities and interest-free banking as well, whereas the Islamic banks are unable to benefit from arbitrage advantages because of their limited competence to make transactions in interest-free financial markets only (Kaleem and Isa, 2003). However, the Islamic banks are more sensitive to the changes in *INT* compared to the conventional banks because they are operating in shallow financial markets (Kassim et al., 2009). A number of empirical studies focusing on dual banking system underline that *INT* strongly affects the Islamic banking system. The probable reasons cited in these studies for such an impact include influence by *INT* upon deposits, the encounter with a negative fund gap and deprivation from arbitrage

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[25] Bacha (2004) and How et al. (2005) are empirical works concluding that the Islamic banks operating in a dual banking system face an interest rate risk.

[26] Rosly (1999) concludes that the Islamic banks appears to be the bank suffering from a decline in profitability while conventional banks increase interest margins, suggesting that Islamic banks are negatively affected by changing in the interest rates.

opportunities. It was found in many empirical researches that the change in *INT* may affect the deposits reserved in Islamic banks.

Examples of empirical studies referring to a positive relationship between the volume and size of the deposits and the return of Islamic deposits in Islamic banks, and a negative correlation between the size of Islamic deposits and the *INT* include Kassim, et al. (2009), Haron and Ahmad (2000), Kasri and Kassim (2009), Sukmana and Kassim (2010), and Zainol and Kassim (2010). This negative relationship refers to a DCR for the Islamic banks. An increase in the *INT* take the deposit holders from Islamic banks to the conventional banks because of the advantages involved in keeping money in the latter.

EXCH

EXCH is exchange rates as the proxy of market risk. According to the existing literature (Shahid and Abbas, 2012; Shayegani and Arani, 2012) on the banks that the increase in the *EXCH* or positive change in the exchange rate affects financial stability and profitability in a positive manner and this study has confirmed this finding. The exchange rate increase has given a higher degree of stability and profitability to the banks. It is also found that the capital of the previous period as a variable has a reverse relationship with the financial stability and profitability of banking. This relationship is statistically valid, but as the index is very small, it can be ignored.

The exchange rate can use as a stabilizing tool. In theory, when the exchange rates are stable, exports have performed well, and equilibrium exchange rates may have appreciated because of productivity increases and economic reforms, making the actual real exchange rates more competitive (Ismail, 2010; and Ismail and Arshad, 2008).

Following the response of the exchange rate to the DCR is negative within a short time period. This could be due to the capital inflow to the foreign currency (US) because an investment in the US's financial assets is more competitive than a financial investment in Malaysia. Thus, demand for the US currency will be increased; meanwhile, demand for domestic currency will be decreased, thus the banks' deposit fund also decreased which subsequently depreciates the domestic currency. However, in long time period the accumulated response of the exchange rate to the DCR is positive. A possible reason is that the BNM has increased the domestic interest rates to offset the capital outflow to the foreign country. The accumulated response of the bank's deposit fund is relatively small, which is indicated that foreign monetary policy is not important in influencing the domestic stock market.

Shows in Table 3.3 summarizes the variables utilized in the estimations. It follows with the hypotheses and expected coefficients.

Table 3.3: Description of the Variables

Variables	Description	Hypotheses	Proxy	Expected coefficients (Profitability	Expected coefficients (Stability)	Author
Bank Stability						
Z-score	$z = (k+\mu)/\sigma$, Defined as sum of equity capital as percent of assets plus average return as percent of assets divide standard deviation of return on assets for the years 1994 - 2012	The regressions confirm the result from the simple comparison of z-scores that large Islamic banks tend to be less stable than small Islamic banks. Small Islamic banks tend to be more stable.	Bank stability			Čihák and Hesse (2008)
Bank Profitability						
ROA	Net Income/ Average of Total Assets.	The return on assets (ROA) is perhaps the single most important ratio for comparing the efficiency and operational performance of banks.	Proxies for the bank's expected earnings; Bank profitability			Alexiou and Sofoklis (2009); Garcia-Herrero et al. (2009); Hakenes and Schnabel (2011)

Table 3.3: Description of the Variables, continued

	Bank characteristics					
AST	Total assets of a bank	Size is mixed relationships with profitability & stability. If increased diversification leads to higher risks, the AST may exhibit negative effects. On the other hand, AST may lead to positive effects on bank profitability & stability if there are significant economies of scale.	Bank size	+/-	+/-	Čihák and Hesse (2008 and 2010); Mercieca et al. (2007)
OWN	Assume: The value of (1) if the bank is a local Islamic bank, and (0) is a foreign Islamic bank in Malaysia.	If local Islamic banks are relatively weaker than foreign Islamic banks, the dummy variable would have a negative sign in the regression explaining z scores. But, if local Islamic banks are relatively stronger than foreign Islamic banks, the dummy variable would have a positive sign in the regression explaining z scores.	Dummy variable	-/+	-/+	Original

Table 3.3: Description of the Variables, continued

LOAST	Ratio of loans to total assets	The ratio of loans to total assets (LOAST) is naturally expected to be negatively related to bank stability, since the greater is the bank's loans exposure, the higher is the potential of default risk.	Bank liquidity	-	-	Čihák and Hesse (2008 and 2010); Liu et al, (2010)
LPLO	Ratio of loan loss provisions to total loan	It is shows how much a bank is provisioning in year t relative to its total loans. The coefficient of the LPLO variable is expected to enter the regression models with a negative sign. The greater the exposure of banks to high risk loans, the higher would be the accumulation of unpaid loans and profitability and stability would be lower.	Credit risk	-	-	Delis and Kouretas (2011)

Table 3.3: Description of the Variables, continued

COST	Ratio of cost to income	Higher cost to income ratios have a consistently negative link to the z-scores; the sign is consistently significant. However, we expect a positive sign in bank profitability. This would imply that operational efficiency is a prerequisite for improving the profitability of the banking system.	Bank cost efficiency	+	-	Čihák and Hesse (2008); Bourkhis and Nabi (2010).
DIV	Income Diversification as 1 – ((Net Income - Other Operating Income)/Total Operating Income).	Greater income diversity tends to increase stability and profitability large Islamic banks, suggesting that a move from lending-based operation to other sources of income might improve stability and profitability in those banks.	Diversification across different sources of income	+	+	Schaeck at al. (2006); Demirguc-Kunt and Huizinga (2010); Liu and Wilson (2010).

Table 3.3: Description of the Variables, continued

		The variable of interest in this research study					
DCR	Unexpected loss to shareholders when PSIA are treated as being in between pure investment and deposit-like products **minus** Unexpected loss to shareholders when PSIA are treated as pure investment products	The IAHs will be receiving the return based on the profitability of the investments, rather than fixed amount of return. IAHs as rational decision makers might decide to withdraw the deposits if rate of return is lower, compared to the conventional banks. This will cause Islamic banking unstable.	Bank risk The capital required by Islamic banks in Malaysia to cover the displaced commercial risk.	-	-	Htay and Salman (2013)
		Macroeconomic variables					
EXCH	Year on year change in the exchange rate, local currency (Ringgit Malaysia) per U.S. dollars (percent).	GDP growth rate and exchange rate had significant positive impact on the financial stability and profitability of all banks.	Proxy for market risk To adjust the impact of macroeconomic cycle at banking level.	+	+	Shahid and Abbas (2012)

Table 3.3: Description of the Variables, continued

INFL	The inflation rate (INFL). The annual percentage change in a Consumer Price Indices (CPI).	To capture the effects of macroeconomic shocks on banks' balance sheets, we use Inflation (INFL). Furthermore, higher inflation can distort decision-making, intensify information asymmetry and introduce price volatility. Consequently, a negative relationship between INFL and bank stability is expected.	Proxy for macroeconomic mismanagement, which has been found to adversely affect the financial system and real economy	+/-	-	Čihák and Hesse (2008 and 2010); Lown and Morgan (2006); Buch et al. (2010).
GDP	Growth rate of nominal gross domestic product (GDP).	GDP growth rate and exchange rate had significant positive impact on the financial stability and profitability of all banks.	Macroeconomic indicator to measure total economic activity within an economy. (economic development)	+	+	Čihák and Hesse (2008 and 2010); Shahid and Abbas (2012)

Table 3.3: Description of the Variables, continued

INT	The Interest rate (INT).	Islamic banks are more sensitive to the changes in interest rates compared to the conventional banks. The Islamic banks give a negative response to interest rates.	Subjected to negative fund gap	-	-	Ergec and Arslan (2011)
	Banking Sector					
HERFIN	Sum of squared market shares of banks @ the sum of the square of the share of each bank's assets over the total assets of the banking system	A positive sign for the interaction of the market share and the Islamic bank would indicate that a higher share of Islamic banks increases their profitability and stability.	Market power	+	+	Berger (1995); Čihák and Hesse (2008 and 2010)

3.5   EMPIRICAL STRATEGY

The previous equations: (14), (15), (17) and (18) shows that analysis will be based on panel data that consists of several time periods. It combines the more informative data, more variability, less collinear among variables, more degrees of freedom and more efficient. It also enables us to study more complicated models, for example, bank specific and macroeconomic factors change can be better handled with panel data than by a pure cross-section or pure time-series data.

The general estimation for the panel data analysis is a regression bank stability model of the form:

$$z_{i,t} = \alpha + \delta \, pft_{i,t} + \beta bc_{i,t} + \omega m_{i,t} + \gamma rf_{i,t} + \varphi mp_{i,t} + \varepsilon_{i,t} \qquad (12)$$

$$\text{for} \quad i = 1, 2, ..., N \quad \text{and} \quad t = 1, 2, ..., T$$

N and T are the cross section and time series dimensions respectively. Where the dependent variable is the $z_{i,t}$, z is a Z-score as a proxy of bank stability for bank i at time t, pft contains time varying return on asset (ROA) as the indicator the bank's profitability, bc is a vector of bank characteristic variables, m is macroeconomic variables, rf is the variable of interest in this research study (DCR), mp stands for market power (Herfindahl Index), and $\varepsilon_{i,t}$ is the residual.

The advantages of panel data over cross-sectional or time series data are as follows. Since panel data relate to individual banks over time, there is bound to be heterogeneity in these units. The techniques of panel data estimation can take such heterogeneity explicitly into account by allowing for individual specific variables.

Panel data usually contain more degrees of freedom and more sample variability than cross-sectional data which may be viewed as a panel with $T = 1$, or time series data which is a panel with $N = 1$, hence improving the efficiency of econometric estimates (Hsiao et al., 1995). It means that, panel data are more accurate inference of model parameters.

Panel data also involve at least two dimensions: a cross-sectional dimension and a time series dimension. Under normal circumstances one would expect that the computation of panel data estimator or inference would be more complicated than cross-sectional or time series data. However, in certain cases, the availability of panel data actually simplifies computation and inference. On the other hands, panel data can simplify computation and statistical inference.

There are several types of panel data analytic models. There are pooled analysis, fixed effects models, and random effects models. Among these types of models are dynamic panel, robust, and covariance structure models. Solutions to problems of heteroskedasticity and autocorrelation are of interest here. We will try to summarize each kind of panel data analysis with consider the collection data structure.

3.5.1 Pooled Analysis

Pooled analysis combines time series for several cross-sections. Pooled data are characterized by having repeated observations (most frequently years) on fixed units (most frequently variables and sectors). This means that pooled arrays of data are one that combines cross-sectional data on N spatial units and T time periods to produce a data set of $N \times T$ observations.

However, when the cross-section units are more numerous than temporal units $(N > T)$, the pool is often conceptualized as a 'cross-sectional dominant'. Conversely, when the temporal units are more numerous than spatial units $(T > N)$, the pool is called 'temporal dominant' (Stimson, 1985).

3.5.1.1   Ordinary Least Squares (OLS)

In this study, the OLS will first be used to estimate the developed model followed by the GLS. Given this preamble, we can write the generic pooled linear regression model estimable by Ordinary Least Squares (OLS) procedure:

$$z_{it} = \beta_1 + \sum_{k=2}^{k} \beta_k X_{kit} + e_{it} \qquad (19)$$

$$\text{for} \quad i = 1, 2, ..., N \quad \text{and} \quad t = 1, 2, ..., T \quad \text{and} \quad k = 1, 2, ..., K$$

Where N refers to a cross-sectional unit; T refers to a time period and K refers to a specific explanatory variable. Thus, z_{it} and X_{it} refer respectively to Z-score as a proxy of bank stability (dependent variable) and independent variables [pft contains time varying return on asset (ROA) as the indicator the bank's profitability, bc is a vector of bank characteristic variables, m is macroeconomic variables, rf is the variable of interest in this research study (DCR), mp stands for market power (Herfindahl Index), for bank i and time t, and e_{it} is a random error and β_1 and β_k refer respectively to the intercept and the slope parameters. Moreover, we can denote the $NT \times NT$ variance-covariance matrix of the errors with typical element $E\left(e_{it} e_{jt}\right)$ by Ω.

The OLS adopts the criterion of minimizing $\sum \hat{\mu}_i^2$ (sum of residuals squares). Each of the residuals is given equal weight even though some of the residuals are much closer to the sample regression function. In the other words, all residuals receive equal importance (unweighted) no matter how close or how widely the individual observations scattered is from the sample regression function.

3.5.1.2   Generalized Least Squares (GLS)

The OLS fails to consider the variability in the listed variables. Ideally, the estimating scheme should be devised in such a manner that observations coming from populations with smaller variability.

The usual OLS method does not follow this strategy and therefore does not make use of the information contained in the unequal variability of the variable z, example bank stability in the equation. It assigns equal weight or importance to each observation. Unlike OLS, the GLS takes such information into account explicitly and is therefore capable of producing estimators that are Best, Linear, Unbiased Estimator (BLUE). Best means that the coefficient of the variable(s) has the smallest variance possible. Linear properties require equations to be set up in a linear rather than quadratic manner. Unbiased estimator means that the estimated variables correctly estimate the actual variable, also called efficient estimated variables (Gujarati and Porter, 2010).

Whereas, Generalized Least Squares (GLS) was introduced by Aitken (1935). The model equation is of the same form as that used in OLS (Equation 19) with one main difference. The residuals need not follow the same assumptions as required by OLS.

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The GLS equation is identical to the OLS equation (Equation 19):

$$z_{it} = \beta_1 + \sum_{k=2}^{k} \beta_k X_{kit} + e_{it}$$

for $\quad i = 1, 2, ..., N \quad$ and $\quad t = 1, 2, ..., T \quad$ and $\quad k = 1, 2, ..., K$

with the exception that:

$$e_{it} \ \square \ N(0, \Omega)$$

Where Ω refers to the variance-covariance matrix. According to Parks-Kmenta method (Kmenta, 1986), this equation must be estimated by GLS because this estimation procedure is based on less restrictive assumptions concerning the behaviour of regression disturbance and thus concerning the variance-covariance matrix (Ω), than the classical regression model. Therefore, the GLS estimation has a special interest in connection with time series and cross-section observations.

The GLS is designed to produce an optimal unbiased estimator of β for situations with heterogeneous variance. In such cases, OLS estimates are unbiased and consistent but inefficient. OLS tends to underestimate the parameter standard errors which in turn affect the hypothesis testing procedures.

Regarding the problem of estimating parameters β of the generalized linear regression model, we can write the following expression:

$$\left(x' \Omega^{-1} x \right)^{-1} x' \Omega^{-1} y$$

This estimation is based on the assumption that the variance-covariance matrix of the errors (Ω) is known. However, since in many cases the variance-covariance matrix is unknown, we cannot use GLS but feasible generalized least squares (FGLS). It is feasible because it uses an estimate of variance-covariance matrix, avoiding the GLS assumption that Ω is known. Consequently, we need to find a consistent estimate of Ω, say, $\hat{\Omega}$ to substitute $\hat{\Omega}$ for Ω in the formula to get a coefficient estimator β. Thus we denote the FGLS estimates of β by $\hat{\beta}$.

The GLS on the other hand minimizes the weighted sum of residual squares. At GLS, the weight assigned to each observation is proportional to its σ_i, that is observations coming from a population with larger σ_i will get the proportionately larger weight in minimizing residual sum of squares (RSS). The ideal estimation is to give more weight to observations that are closely clustered around their mean than those that are widely scattered about.

A previous study by Kmenta (1986) also focused the Parks-Kmenta method combines the assumptions concerning serial correlation, contemporaneous correlation and panel heteroskedasticity of errors. The particular characterizations of these assumptions are:

$$E\left(e_{it}^2\right) = \sigma_{it} \qquad (20)$$

$$E\left(e_{it}e_{jt}\right) = \sigma_{ij} \qquad (21)$$

$$e_{it} = \rho_i e_{it-1} + v_{it} \qquad (22)$$

In the other words, this approach deals with errors complications by specifying respectively a model for heteroskedasticity (equation 20), a model for contemporaneous

correlation (equation 21), and a model for serial correlation so called *AR(1)* (example: first-order autoregressive model), where ρ_i is a coefficient of first-order autoregressiveness. In this model we allow the value of the parameter ρ_i to vary from one cross-section unit to another (equation 22).

Though the OLS as well as the GLS estimation methods are very special, they however, ignore all individual bank differences. These estimation methods assume that all Islamic banks have the same behaviours[27] in designing the bank stability and profitability structure. These assumptions of uniform behavior deny any form of heterogeneity, which is in practice, very likely to prevail.

3.5.2   Fixed Effects Estimation

The fixed effects model is a useful specification for accommodating individual heterogeneity in panel data. Assume we have an economic correlation that involves bank stability as a dependent variable, *BS*1, and independent variables (ROA is return on assets; AST is the total assets of a bank; OWN is the ownership; LOAST is the ratio of loans to total assets; LPLO is the ratio of loan loss provisions to total loans; DIV is the Income Diversity; COST is cost to income ratios; DCR is displaced commercial risk; and HERFIN is the Herfindahl index). We have panel data for *BS1, ROA, AST, OWN, LOAST, LPLO, DIV, COST, DCR,* and *HERFIN*. The panel data include of N - units and T - time periods, and hence we have N times T observations. The bank stability linear regression model without the intercept is:

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[27] Islamic banks in Malaysia have been placed under the purview of BNM.

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t}$$

(13)

Where $BS1_{i,t}$ is the amount of *BS* for the *i*th unit for the *t*th time period; $DCR_{i,t}$ is the amount of *DCR* for the *i*th unit for the *t*th time period, and $\mu_{1i,t}$ is the error for the *i*th unit for the *t*th time period. The fixed effects regression model, which is a supplement of the bank stability linear regression model, is:

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + v_i + \varepsilon_{1i,t}$$

Where;

$$\mu_{1it} = v_i + \varepsilon_{1it}$$

We have elaborated the error term for the classical linear regression model into two parts. The component v_i describe all unobserved factors that vary across unit, but are fixed over time. The component ε_{1it} describe all unobserved factors that fluctuate across units and time. We suppose that the net impact on *BS* of unobservable factors for the *i*th unit that are fixed over time is a constant parameter, designated α_i. Therefore, we can revise the fixed effects model as:

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 + \alpha_5 + \alpha_6 + \alpha_7 + \alpha_8 + \alpha_9 + v_i + \varepsilon_{1i,t}$$

We have substitute the unobserved error component v_i with a set of fixed parameters, $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 + \alpha_5 + \alpha_6 + \alpha_7 + \alpha_8 + \alpha_9$, one for each of the N units in the sample. Such as, α_1 represents the net effect on *BS* of unobservable factors that are fixed over time for unit one. These N constant parameter controls for the net effects of all unobservable factors that differ across units but are fixed over time. Intuitively, we are applying each unit as a control for itself. This is due variation in y over time cannot be clarify by factors that vary across units, but do not fluctuate over time.

3.5.3   Random Effects Estimation

The random effects model a regression with a random constant term (Greene, 2008). One way to handle the ignorance or error is to assume that the intercept is a random outcome variable. The random outcome is a function of a mean value plus a random error. But this cross-sectional specific error term γ_1, which indicates the deviation from the constant of the cross-sectional bank must be uncorrelated with the errors of the variables if this is to be modeled. The time series cross-sectional regression model is one with an intercept that is a random effect.

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t}$$

$$\vartheta_{0i} = \vartheta_1 + \gamma_1$$

$$BS1_{i,t} = \vartheta_1 + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \varepsilon_{1i,t} + \gamma_1$$

Under these circumstances, the random error γ_1 is heterogeneity specific to a cross-sectional unit, in this case, country. This random error γ_1 is constant over time. Therefore, the random error $\varepsilon_{1i,t}$ is specific to a particular observation. For γ_1 to be properly specified, it must be orthogonal to the individual effects. Because of the separate cross-sectional error term, these models are sometimes called one-way random effects models. Owing to this intra-panel variation, the random effects model has the distinct advantage of allowing time-invariant variables to be included among the regressors.

3.5.4 The Breusch and Pagan Lagrangian Multiplier Test: Between the Pooled Effects and Random Effects

Breusch and Pagan's (1980) Lagrange multiplier (LM) test examines if individual or time specific variance components are zero, $H_0 : \sigma_\mu^2 = 0$. This measurement provides a test of the random effects model against the GLS with non-effects model. Breusch-Pagan Lagrange Multiplier is a test of:

H$_0$: The individual effects do not exist and GLS with non-effects is applicable, versus

H$_1$: The GLS with non-effects is not applicable[28].

or

$$H_0 : \sigma_\mu^2 = 0$$

$$H_1 : \sigma_\mu^2 \neq 0$$

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[28] Note that random effects is better of the estimation process.

For example, the random effects model decrease to the GLS with non-effects one if the variance of the individual effects is zero. Denote the residual from the GLS with non-effects regression as $\hat{\varepsilon}_{it}$. Define;

$$S_1 = \sum_{i=1}^{N} (\sum_{t=1}^{T} \hat{\varepsilon}_{it})^2 \quad \text{and} \quad S_2 = \sum_{i=1}^{N} \sum_{t=1}^{T} \varepsilon_{it}^2$$

Test statistic;

$\lambda = \frac{NT}{2(T-1)} \left(\frac{S_1}{S_2} - 1 \right)^2$, distributed as a χ^2 statistic with 1 degree of freedom under the null hypothesis. If χ^2 exceeds the critical value we conclude GLS with non-effects is inappropriate and random effects is preferable. However, if the null hypothesis is not rejected in either test, the GLS with non-effects regression is favored.

3.5.5 The Hausman Test: Between the Fixed Effects and Random Effects

The parameter estimator of the GLS with random effects is to be tested with Hausman test to determine its suitability in explaining the variable effects. In the random effects model, individual effects do not correlate with the explanatory variables. The explanatory variable is asymptotically efficient. Hausman (1978) argues that the random effects should move randomly as explained by the characteristic of the random variable in the random effect model. However, in the fixed effect model, the random variable is treated as fixed even though the specification for the parameter estimator with fixed effect is consistent and unbiased but not efficient.

A development in the panel data literature is a general model of interactive fixed effects proposed by Bai (2009). Specifically, Bai (2009) considers the model effects. For example:

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + V_i U_t + \varepsilon_{it}$$

in which V_i and U_t are matrices containing individual and time fixed effects V_i and U_t. In this framework, V_i and U_t are allowed to interact with each other, and be correlated with bank specific and macroeconomic variables. While, ε_{it} is a random error term, and i and t denote individual and time, respectively. Specifically, Bai (2009) considers the case of large n and large T, and does not impose any a priori structure on the nature of $V_i' U_t$, noting that the standard two-way error component model with additive fixed effects is a special case by setting $V_i' = [v_i, 1]$ and $U_t = [1, u_t]'$.

In order to estimate the interactive fixed effects model, Bai (2009) proposes the interactive effects estimator, with $\hat{\beta}$ IE being the interactive effects estimator of β. Note that when the fixed effects interact, standard fixed effects estimators are incapable of eliminating the fixed effects, and hence yield inconsistent estimates of β. Since the standard additive effects model is shown to be a special case of the interactive effects model, $\hat{\beta}$ IE a consistent estimator of β regardless of whether or not the fixed effects are additive or interactive, but inefficient in the case of additive effects. The standard fixed effects estimator, $\hat{\beta}$ FE, is both consistent and efficient in the special case that the fixed effects are additive (and inconsistent otherwise).

Hence, the proposed structure and nesting of the standard additive model as a special case of the interactive effects model, suggests that a Hausman test is applicable for testing between the additive and interactive fixed effects models. Bai (2009) proposes the following test procedure. Let the null hypothesis be of additive fixed effects, and the alternative hypothesis be of interactive fixed effects. Bai (2009) shows that the standard Hausman test between $\hat{\beta}$ IE and $\hat{\beta}$ FE applies and follows a χ^2 distribution with degrees of freedom equal to the dimension of x_{it}.

Amini et al. (2012) suggests a much better indicator than the ordinary R^2 as a benchmark to choose between the fixed and the random effects estimation method.

In a fixed-effects kind of case, the Hausman test is a test of;

H_0: *That random effects would be consistent and efficient, versus*
H_1: *That random effects would be inconsistent[29].*

The Hausman test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results. The result of the test is a vector of dimension covariance matrix [b –B], which will be distributed chi-square. So if the Hausman test statistic is large, one must use fixed-effects. If the statistic is small, one may get away with random effects.

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[29] Note that fixed effects would certainly be consistent.

3.5.6   Econometric Issues

The estimates of validity, multicollinearity, heteroskedasticity and autocorrelation are some of the issues that need to be identified and addressed in the least squares estimation techniques. With certain exceptions, maximum likelihood approach has to cater the multicollinearity problem alone.

3.5.6.1   Test on Multicollinearity

A widely used method to test the existence of multicollinearity between independent variables is by calculating Variance Inflation Factor (VIF) for each independent variable. VIF can be calculated through the equation;

$$VIF = \frac{1}{(1 - R^2)}$$

Multicollinearity happen when two or more independent variables are highly or perfectly correlated (Hsiao, 2003). The difference between 2 types of multicollinearity are: a) Perfect multicollinearity; and b) Near multicollinearity.

Perfect multicollinearity happen when two or more explanatory variables are perfectly correlated. Perfect multicollinearity does not occur often, and usually results from the way which variables are set up. If we have perfect multicollinearity, then we can acquire estimates of the parameters. Near multicollinearity happen when two or more explanatory variables are highly correlated. This is the more similar with the multicollinearity problem.

To detect severe multicollinearity, two approaches are often times used. a) Indications; and b) Diagnostic plan.

One way to identify severe multicollinearity is to look for indications of severe multicollinearity. Three familiar indications of multicollinearity are the following: i) *High R^2 and Low t-Statistics*; ii) *Wrong Signs for Estimated Coefficients*; and iii) *Estimated Coefficients Sensitive to Changes in Specification*.

High R^2 and Low t-Statistics: The multicollinearity does not influence the R^2 statistic. It only affects the estimated standard errors and hence *t*-statistics. A possible indications of severe multicollinearity is to evaluation an equation and get the relatively high R^2 statistic, but find that most or all of the individual coefficients are insignificant, i.e., *t*-statistics less than 2.

Wrong Signs for Estimated Coefficients: A second possible indications of severe multicollinearity is incorrect signs for theoretically significant variables, or theoretically significant variables that are statistically insignificant.

Estimated Coefficients Sensitive to Changes in Specification: A third possible indications of severe multicollinearity is when we delete or add an independent variable, or delete or add an observation or two, and the evaluations of the coefficients change dramatically.

The procedure often used to identify severe multicollinearity is correlation coefficients (Johnston, 1984; and Carl and Praveen, 2002). The simplest way is to estimate the sample correlation coefficients among all pairs of independent variables in the sample.

High correlation coefficients between pairs of explanatory variables show that these variables are very correlated, and therefore we may have severe multicollinearity.

The data were duly tested for multicollinearity by using Pearson's correlation as well as the conditional index. When multicollinearity exists two or more independent variables are related to each other and overlapping of the data would occur. Therefore, one or more variables are redundant. The presence of multicollinearity can be seen from the results which are an overstatement of the standard error, example the standard error tends to be large with leading to small t value and high R^2

Sometimes eigenvalues, condition indices and the condition number will be referred to when examining multicollinearity. While all have their uses, we will focus on the condition number. The condition number (κ) is the condition index with the largest value; it equals the square root of the largest eigenvalue (λ_{max}) divided by the smallest eigenvalue (λ_{min}), example;

$$\kappa = \sqrt{\frac{\lambda_{max}}{\lambda_{min}}}$$

When there is no collinearity at all, the eigenvalues, condition indices and condition number will all equal one. As collinearity increases, eigenvalues will be both greater and smaller than 1 (eigenvalues close to zero indicate a multicollinearity problem), and the condition indices and the condition number will increase. An informal rule of thumb is that if the condition number is 15, multicollinearity is a concern; if it is greater than 30 multicollinearity is a very serious concern. These are just informal rules of thumb.

3.5.6.2   Test of Heteroskedasticity

Heteroskedasticity occurs when the error variance has non-constant variance. There are some steps to use the sample data to identify the existence of heteroskedasticity.

3.5.6.2.1   Breusch-Pagan Test, and Harvey-Godfrey Test

There are a set of heteroskedasticity tests that need an assumption about the arrangement of the heteroskedasticity, if it exists. That is, to use these experiments we choose a specific functional form for the connection between the variables and the error variance that we consider determine the error variance. The major difference between these experiments is the functional form that each test assumes. Two of these tests are the Harvey-Godfrey Test and the Breusch-Pagan test (Gujarati, 2003). The Breusch-Pagan test suppose the error variance is a linear function of one or more variables (Johnston, 1984). The Harvey-Godfrey Test suppose the error variance is an exponential function of one or more variables. The variables are usually suppose to be one or more of the explanatory variables. Example, assume that the regression model is given by:

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_t$$

We suppose that all of the assumptions of classical linear regression model are fulfilled, except for the assumption of constant error variance. Instead we suppose the error variance is non-constant. We can write this assumption as follows:

$$Var(\mu_t) \; = \; E(\mu_t^{\,2}) \; = \sigma_t^{\,2} \;\; \text{for} \;\; t = 1, 2, ..., n$$

Suppose that we assume that the error variance is related to the explanatory independent variable. The Breusch-Pagan test suppose that the error variance is a linear function of independent variable. We can write this as follows:

$$\sigma_t^2 = \vartheta_{oi} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t} + \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t}$$

The Harvey-Godfrey test suppose that the error variance is an exponential function of independent variable. This can be written as follows:

$$\sigma_t^2 = \exp(\vartheta_{oi} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t} + \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t})$$

or taking a logarithmic transformation

$$\ln(\sigma_t^2) = \vartheta_{oi} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t} + \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t}$$

The null-hypothesis of constant error variance (no heteroskedasticity) can be stated as the following restriction on the parameters of the heteroskedasticity equation:

$$H_o : \alpha_2 = 0$$
$$H_1 : \alpha_2 \neq 0$$

To test the null-hypothesis of constant error variance (no heteroskedasticity), we can practice a Lagrange multiplier test. This follows a chi-square distribution with degrees of freedom equal to the number of restrictions we are analysing. In this case where we

have insert only one variable, X_t, we are attempt one restriction, and therefore we have one degree of freedom. Because the error variances σ_t^2 for the n-observations are unknown and unobservable, we must use the squared residuals as estimates of these error variances (Baltagi, 2001).

To calculate the Lagrange multiplier test statistic, proceed as follows: a) Regress Y_t against a constant and X_t apply the OLS estimator; b) Compute the residuals from this regression, $\hat{\mu_t}$; c) Square these residuals, $\hat{\mu_t^2}$. For the Harvey-Godfrey Test, take the logarithm of these squared residuals, $ln(\hat{\mu_t^2})$; d) For the Breusch-Pagan Test, regress the squared residuals, $\hat{\mu_t^2}$, on a constant and X_t, apply OLS. For the Harvey-Godfrey Test, regress the logarithm of the squared residuals, $ln(\hat{\mu_t^2})$, on a constant and X_t, apply OLS. This is called the auxiliary regression; e) Seek the unadjusted R^2 statistic and the number of observations, n, for the auxiliary regression; f) Compute the *LM* test statistic as follows:

$$LM = nR^2$$

Once we have compute the test statistic, we were differentiate the value of the test statistic to the critical value for some has been set level of significance. If the results test statistic exceeds the critical value, then reject the null-hypothesis of constant error variance and determine that there is heteroskedasticity. If not, do not reject the null-hypothesis and determine that there is no evidence of heteroskedasticity.

3.5.6.2.2. White's Test

The White test is a normally test for heteroskedasticity. It has the following advantages:
a) It does not rely on the assumption that the errors are normally distributed; b) It does
not require to specify a model of the structure of the heteroskedasticity, if it occurs; and
c) It precisely tests if the presence of heteroskedasticity causes the *OLS* formula for the
variances and the covariances of the estimates to be incorrect. Example, assume that the
regression model is given by:

$$Y_t = \beta_1 + \beta_2 X_{t2} + \beta_3 X_{t3} + \mu_t \quad \text{for} \quad t = 1, 2, ..., n$$

We suppose that all of the expectation of classical linear regression model are fulfilled,
except for the assumption of constant error variance. For the White test, suppose the
error variance has the following general structure.

$$\sigma_t^2 = \alpha_1 + \alpha_2 X_{t2} + \alpha_3 X_{t3} + \alpha_4 X_{t2}^2 + \alpha_5 X_{t3}^2 + \alpha_6 X_{t2} X_{t3} \quad \text{for} \quad t = 1, 2, ..., n$$

Note that, we comprise all of the explanatory variables in the function that explain the
error variance, and therefore we are apply a general functional form to define the
structure of the heteroskedasticity, if it exists. The null-hypothesis of constant error
variance (no heteroskedasticity) can be expressed as the following restriction on the
parameters of the heteroskedasticity equations:

$$H_o : \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

$$H_1 : \text{At least one is non-zero}$$

To test the null-hypothesis of constant error variance (no heteroskedasticity), we can apply a Lagrange multiplier test. This follows a chi-square division with degrees of freedom equal to the number of restrictions we are testing. Such as, if we are testing 5 restrictions, and then we have 5 degrees of freedom. Once again, because the error variances σ_t^2 for the n-units are unknown and unobservable, we must use the squared residuals as evaluate of these error variances. To analyze the Lagrange multiplier test statistic, take action as follows: a) Regress Y_t against a constant, X_{t2}, and X_{t3} apply the *OLS* estimator; b) Determine the residuals from this regression, $\hat{\mu}_t$; c) Square these residuals, μ_t^2; d) Regress the squared residuals, $\hat{\mu}_t^2$, on a constant, $X_{t2}, X_{t3}, X^2_{t2}, X^2_{t3}$ and $X_{t2}X_{t3}$ apply *OLS*; e) Search the unadjusted R^2 statistic and the number of observations, n, for the auxiliary regression; and f) Compute the *LM* test statistic as follows:

$$LM = nR^2$$

Once we have compute the test statistic, link the value of the test statistic to the critical value for some predetermined level of significance. If the calculated test statistic exceeds the critical value, then reject the null-hypothesis of constant error variance and finalize that there is heteroskedasticity. If not, do not reject the null-hypothesis and decide that there is no evidence of heteroskedasticity.

3.5.6.3   Test of Autocorrelation

Autocorrelation occurs when the errors are correlated. This research study using the Durbin-Watson d test to identify the existence of autocorrelation.

3.5.6.3.1   The Durbin-Watson d Test

The most usually used test for first-order autocorrelation is the Durbin-Watson *d* test. It is essential to note that this test can only be practice to test for first-order autocorrelation, it cannot be practice to test for higher-order autocorrelation. Also, this test cannot be used if the lagged amount of the dependent variable is cover as a right-hand side variable. Such as, assume that the regression model is given by:

$$BS1_{i,t} = \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t}$$
$$+ \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t}$$

$$\mu_t = \rho\mu_{t-1} + \varepsilon_t \quad \text{where} \quad -1 < \rho < 1$$

We need to test for first-order positive autocorrelation. Economists normally test for positive autocorrelation because negative serial correlation is highly unusual when using economic data. The null and alternative hypotheses are:

$$H_0 : \rho = 0$$
$$H_1 : \rho > 0$$

Note that this is a one-sided or one-tailed test.

To do the test, continue as follows:

a) Regress dependent variable against a constant, independent variables apply the *OLS* estimator;

b) Use the *OLS* residuals from this regression to calculate the following test statistic:

$$d = \left. \sum_{t=2}\left(\hat{\mu_t}\hat{\mu_{t-1}}\right)^2 \middle/ \sum_{t=1}\left(\hat{\mu_t}\right)^2 \right.$$

Note the following: i) The numerator has one fewer observation than the denominator. This is because an observation must be used to calculate $\hat{\mu_{t-1}}$; ii) It can be exposed that the test-statistic d can take any value between 0 and 4; iii) It can be point if $d = 0$, then there is extreme positive autocorrelation; iv) It can be exposed if $d = 4$, then there is extreme negative autocorrelation; v) It can be point if $d = 2$, then there is no autocorrelation.

c) Select a level of significance for the test and look the critical values d_L and d_U using the table statistic. Such as, given the critical values for a 5 per cent level of significance. To find these two critical values, we require two pieces of information: n = number of observations, k' = number of right-hand side variables, not including the constant. In example, $n = 37$, $k' = 2$. Therefore, the critical values are: $d_L = 1.36$, $d_U = 1.59$.

d) Relate the value of the test statistic to the critical values using the following decision rule.

If $d < d_L$ then reject the null and determine there is first-order autocorrelation.

If $d > d_U$ then do accept the null and conclude there is no first-order autocorrelation.

If $d_L \leq d \leq d_U$ the test is inconclusive.

Note: A rule of thumb that is sometimes used is to finalize that there is no first-order autocorrelation if the d statistic is between 1.5 and 2.5. A d statistic less than 1.5

indicates positive first-order autocorrelation. A *d* statistic of more than 2.5 indicates negative first-order autocorrelation. However, strictly speaking, this is not correct.

3.6   CONCLUSION

Bank risk is among the important topics discussed by many researchers since few decades ago. Most studies are related conventional banking selection criteria. Research on bank risk, especially in unique displaced commercial risk specification under the framework of Islamic banking are still limited. Besides, most studies on the Islamic banking structure are exploratory studies in which the purpose is to find the element affecting Islamic bank selection.

The design of the research is to examine the capital requirement for displaced commercial risk is conducted by two approaches. First, based on the Central Bank of Malaysia capital adequacy guidelines (DCRα). Second, based on the VaR model would be an alternative method to measure the additional capital charge required to cover the displaced commercial risk (DCR$_{VaR}$). Nevertheless, we find that the result under the DCRα is different than the DCR$_{VaR.}$. Also, there are some weaknesses of BNM guidelines.

This chapter intends to develop the theoretical model for displaced commercial risk. This research tries to add on this literature by analyzing next to the displaced commercial risk in Islamic bank using panel data approaches as a main tool of analysis.

In order to acquire deeper understanding on displaced commercial risk, the analysis is focused on Islamic bank performance in Malaysia such as Islamic bank's stability and

Islamic bank's profitability. We are using the rate of return on assets (ROA) to estimate of bank profitability and utilize the Z-score method to analyse of bank's stability in the Islamic banking system of Malaysia. Understanding this unique risk to be helpful to Islamic banks in identifying the appropriate strategies needed to improve management of bank risk and retain existing ones.

CHAPTER 4: ESTIMATION RESULT

4.1   INTRODUCTION

This study documents empirical findings from models developed in previous chapter. It begins by presenting the estimations of DCR which was done using two approaches, Value at Risk model (DCR_{VaR}) and the capital charge needed for displaced commercial risk calculated based on Central Bank of Malaysia (DCR_α). Then, it proceeds to the second part which is the impact of DCR on Islamic banks' performance. This part begins by exploring the descriptive statistics of the sample.

4.2   MEASUREMENT OF DCR

In this study, we used two approaches to measure DCR, the standardized based on Central Bank of Malaysia capital adequacy guidelines produced by the Islamic Financial Services Board (IFSB) and Value at Risk (*VaR*). Details of the results of these approaches are described below.

4.2.1   Central Bank of Malaysia Approach

The following Table 4.1, represent the results consist of the various variables of Islamic banks in order to assess the displaced commercial risk in the year 2010.

Table 4.1: The Variables for Using the BNM Technique (2010)

Bank	CRWA	MRWA	TRWA (CR +MR)	TLSF	PSIA	%PSIA of TLSF	TRWA funded by PSIA	ALPHA (α)
1. Affin Islamic Bank Bhd	3131480	4599	3136079	7557275	165909	0.0220	68993.7	0.1359
2. Alliance Islamic Bank Malaysia Bhd	2758187	0	2758187	4881779	221792	0.0454	125221.7	0.1321
3. Al Rajhi Banking & Investment Corporation (Malaysia) Bhd	3818112	111689	3929801	5917568	234131	0.0396	155620.1	0.1726
4. AmIslamic Bank Bhd	12777426	266048	13043474	17980881	584188	0.0325	423912.9	0.1400
5. Asian Finance Bank Bhd	790186	8002	798188	2.24E+09	51668910	0.0230	18358.3	0.4661
6. Bank Islam Malaysia Bhd	12489781	576707	13066488	30399948	1597904	0.0526	687297.3	0.1623
7. Bank Muamalat Malaysia Bhd	8677935	63805	8741740	16739221	671916	0.0401	350543.8	0.1750
8. CIMB Islamic Bank Bhd	7623657	285115	7908772	36038393	774805	0.0215	170038.6	0.1721
9. EONCAP Islamic Bank Bhd	4476583	6148	4482731	7957456	240759	0.0303	135826.7	0.1541
10. Hong Leong Islamic Bank Bhd	3464498	245301	3709799	9962346	184836	0.0186	69002.3	0.2078
11. HSBC Amanah Malaysia Bhd	4443562	29276	4472838	6753635	300403	0.0445	199041.3	0.1750
12. Kuwait Finance House (Malaysia) Bhd	8817375	180981	8998356	10884455	256265	0.0235	211461.4	0.2376
13. Malayan Islamic Banking Bhd	34517755	483259	35001014	44157541	1327622	0.0301	1053530.5	0.1066
14. OCBC Al Amin Bank (Malaysia) Bhd	2668660	14447	2683107	4305378	44996	0.0105	28172.6	0.1555
15. Public Islamic Bank Berhad	12906044	14746	12920790	23660885	779399	0.0329	425094.0	0.1290
16. RHB Islamic Bank Bhd	7124858	30513	7155371	13111820	328379	0.0250	178884.3	0.1356
17. Standard Chartered Saadiq Bhd	2471871	0	2471871	4071578	340878	0.0837	206895.6	0.1363

Where;

CRWA	=	Credit risk weighted assets	TRWA	=	Total risk weighted assets (Credit risk + Market risk)
MRWA	=	Market risk weighted assets	TLSF	=	Total liabilities and shareholders' funds
			PSIA	=	General investment deposit (PSIA)

Applying the formula of Risk-Weighted Capital Ratio (RWCR), we calculate the charge of capital required to displaced commercial risk using the methodology described above. The RWCR of the Islamic banking operations will be computed as follows:

$$RWCR_{Islamic} = \frac{CB_{Islamic}}{TRWA^{*}_{Islamic}} - \left(1 - \alpha\right)^{**} \left(CMRWA_{PSIA}\right)^{***} - \left(\alpha\right)\left(CMRWA_{PER}\right)$$

Where:

CB	=	Capital Base
TRWA	=	Total Risk-Weighted Assets
CMRWA$_{PSIA}$	=	Credit and Market Risk-Weighted Assets funded by PSIA
CMRWA$_{PER}$	=	Credit and Market Risk-Weighted Assets funded by PER of PSIA
***	=	PSIA balances include its PER
**	=	(1-α) represents the significant of PSIA that is recognized as risk absorbent for RWCR computation purposes and approved by the bank
*	=	Total Risk-Weighted assets is the sum of credit, market and operational risk-weighted assets of Islamic banking operations

Table 4.2 shows the results of DCR$_{\alpha}$ in the amount of capital required to cover the displaced commercial risk for different banks:

Table 4.2: The DCRα Results

Bank	The charge of capital required to DCR (RM'000)
1. Affin Islamic Bank Berhad	9,356.45
2. Alliance Islamic Bank Malaysia Bhd	16,553.67
3. Al Rajhi Banking & Investment Corporation (Malaysia) Berhad	26,836.57
4. AmIslamic Bank Berhad	59,328.45
5. Asian Finance Bank Berhad	8,572.77
6. Bank Islam Malaysia Berhad	111,469.29
7. Bank Muamalat Malaysia Berhad	61,406.69
8. CIMB Islamic Bank Berhad	29,262.87
9. EONCAP Islamic Bank Berhad	21,941.00
10. Hong Leong Islamic Bank Berhad	15,007.38
11. HSBC Amanah Malaysia Bhd	34,816.72
12. Kuwait Finance House (Malaysia) Berhad	50,337.57
13. Malayan Islamic Banking Bhd	112,177.92
14. OCBC Al Amin Bank (Malaysia) Bhd	4,360.45
15. Public Islamic Bank Berhad	54,904.46
16. RHB Islamic Bank Berhad	24,299.89
17. Standard Chartered Saadiq Bhd	28,207.06

The finding in Table 4.2 indicates that the number of capital required for each Islamic bank in Malaysia in 2010. Among the highest amount of DCRα in 2010 is Malayan Islamic Banking Bhd and Bank Islam Malaysia Berhad. The result demonstrates that the greater the expected shortfall between asset returns and deposit rates, the greater the pressure on both banks to subsidise investment account holder returns using shareholders' fund, and consequently, the larger is the capital requirement will be.

This finding complies with that of Archer and Abdel Karim (2006) who indicate that since the bank as an agent is not liable for losses, but shares the profits with the investment account holder, it may have an incentive to maximize the investment funded by the account holder and attract more account holders than it has the capacity to handle. This can lead to investment decisions that are risky that the investment account

holder is willing to accept. The misalignment may lead to higher displaced commercial risk, which needs higher capital requirements.

Additionally, Figure 4.1 and Table 4.3 shows the trend of capital required by Islamic banks in Malaysia to cover the displaced commercial risk ratio in 20 years, between 1994 to 2014 using the BNM technique. The findings show that there is a sharp increase in DCRα for each Islamic bank. This situation occurs from pressures from regulators on each Islamic bank to pay market related returns and avoid any loss of principal, in order to prevent possible risks that might arise from customer withdrawals from banks that offer below market returns.

It is supported by Sundararajan (2008) who states that in his survey of a sample Islamic bank showed that, over 60 percent of Islamic banks' funding is derived from profit sharing investment accounts (PSIA). In principle, the profit sharing investment accounts held by investment account holders, all losses on investments financed by their funds are to be borne by investment account holders. Thus, the reasonable needs of Islamic banks to protect the cash flows from investment account holder's funds against variations in the Islamic bank's income from assets financed by those funds, thereby exposing banks to the displaced commercial risk.

Generally, starting in 2001, all banks need the amount of capital to cover the displaced commercial risk. Using the BNM technique, the average of capital required by this year to cover the DCRα scenario is 1.40 per cent of the total of investment account. Adoption of the dual banking system that is coupled with highly floating customers who seek profit, bringing the problem of displaced commercial risk.

In 2002, the average amount of DCR climbed gradually to just over 1.50 per cent. This amount has increased from 2002 to 2004, before ending at a peak of average 1.97 per cent. In 2004, most of the Islamic banks are exposed to higher DCR because of the percentage of the profit sharing investment account of total liabilities and shareholders' funds slightly decline from the previous corresponding year. This reflects the trend of thinning margins within the banking institution, given the increasing price driven competition within an environment of excess liquidity (Taktak et al., 2010).

There was a steep fall in capital needed to cover the DCR in 2005. The bank's strategy is to maintain the proportion relating to IAH in reserve within the IAH equity, with the purpose of smoothing returns to IAH, and in particular, to enhance their returns if these are below those of competitors. This implies that there will be years in which the balance of reserve will be increased. In this case, the banks would be able to absorb losses of DCR.

However, it can clearly be seen that there has been a large increase the number of DCR from 2006 to 2010. Since economic growth slowdown due to the significant effect of the global financial crisis, the sharp decline in business and consumer spending and, at the same time, a sharp rise in unemployment, these pressures give rise to DCR. Moreover, poor risk management on the part of the board of directors during the financial crisis that was a result of their inability to access risk-related data, and limited capacity to process such information (Pirson and Turnbull, 2011).

In 2011, the amount of capital required by Islamic banks to cover the DCR decreased. During this year, the bank's risk weighted capital ratio (under Basel II) before deduction of the proposed dividend strengthened in 2011 due to various measures implemented to

strengthen the bank's capital position. Most of Islamic banks focused on implementing the various initiatives under its three strategic priorities, namely, strategic alignment, innovation and compliance and risk, to continue putting the bank on a much stronger footing reflecting its leadership position in the market as well as Islamic services.

Then, the capital required by Islamic banks to cover the DCR, increased steadily from 2012 to 2014. We see the issue of replacing existing products in light of new guidelines issued by BNM in order to ensure compliance with the new requirements of the Islamic Financial Services Act 2013 (IFSA). Therefore, we consider that, in doing so to some extent will cause depositors withdrawing their deposit and DCR increased.

In order to comply with the IFSA, banks had to distinguish deposit products, which are guaranteed products under the Act, from investment account products, which are not guaranteed. A significant portion of deposit product that utilised the underlying Shariah principle of mudharabah and wakalah, which disallowed the bank from guaranteeing any return on deposit to the depositor or to giving surety to the depositor on getting back the principal deposit placement in full from a Shariah perspective, automatically would have become inconsistent with the new definition of deposit. As a result, the bank had to stop offering deposit products based on mudharabah or wakalah principles. Empirical findings indicate that, Islamic bank faced the displaced commercial risk problem.

Table 4.3: The Capital Required by Islamic Banks in Malaysia to Cover the DCRα (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Bank 1									0.93	1.58	1.47	0.52	0.38	0.47	0.66	0.98	0.94	0.88	1.09	1.12	1.33
Bank 2								0.14	0.12	0.13	0.36	0.49	1.43	2.40	1.91	1.56	1.66	1.70	2.01	1.92	1.55
Bank 3										0.12	0.34	0.65	2.62	2.68	2.41	1.85	1.91	1.38
Bank 4								0.53	0.75	0.60	0.70	2.14	2.92	6.96	7.86	7.94	5.93	4.68	4.61	7.22	7.29
Bank 5													0.31	0.35	0.69	0.86	0.87	0.89	0.85	0.65
Bank 6				2.14	3.16	4.63	4.80	5.71	5.80	6.25	6.39	3.68	2.51	3.42	4.52	4.89	11.15	10.22	11.59	12.15	13.86
Bank 7							2.70	4.08	1.87	1.94	2.87	1.84	2.65	3.33	3.53	5.36	6.14	4.91	5.06	5.67	5.89
Bank 8												0.05	0.23	1.44	1.08	2.49	2.93	4.86	5.97	6.60	7.94
Bank 9									0.48	0.97	1.28	1.97	0.98	1.37	1.30	1.79	2.19				
Bank 10								0.13	0.28	0.28	0.33	0.16	1.52	1.48	1.40	1.52	1.50	1.40	2.70	3.38	3.92
Bank 11									0.18	0.85	0.32	0.73	0.77	1.31	1.40	4.23	3.48	3.58	3.19	4.02	4.97
Bank 12												1.34	0.81	4.41	7.16	7.11	5.03	3.57	4.87	4.69	4.80
Bank 13								1.16	4.92	4.95	3.19	2.61	3.73	5.16	3.51	9.04	11.22	12.01	9.62	12.50	16.91
Bank 14								0.17	1.28	0.58	0.30	0.38	0.33	0.12	0.09	0.32	0.44	0.55	2.10	2.43	3.03
Bank 15								0.33	0.39	1.48	4.05	2.19	2.57	5.40	4.66	0.94	5.49	6.05	6.43	6.16	6.69
Bank 16									1.44	1.41	3.99	1.00	2.06	3.12	2.64	2.74	2.43	2.25	3.24	3.43	3.43
Bank 17								0.11	0.16	0.03	0.31	0.41	2.62	3.47	3.34	2.09	2.82	2.61	3.55	4.25	3.10
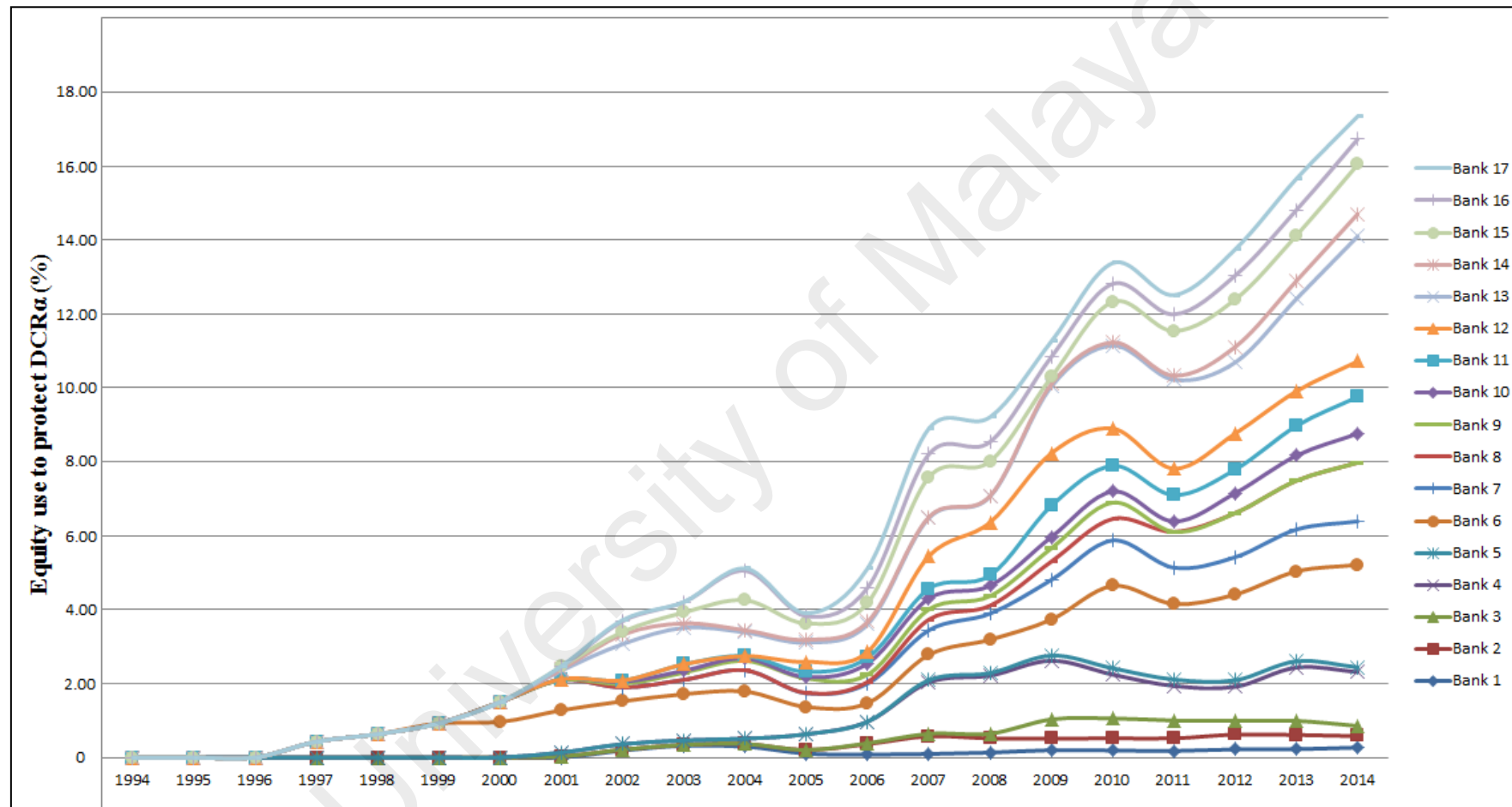
Figure 4.1: The Capital Required to Cover The DCRα

4.2.2 Value at Risk: Sample for 1 year (2010)

Further, this study tries to estimate DCR by using an alternative method, which is based on potential losses resulting from the displaced commercial risk on Islamic banks in Malaysia.

The invested portfolio is equal to a Shariah-Compliant market portfolio. In fact, Islamic finance laws require assigning capital in socially responsible investments and Shariah approved activities. Several Islamic Market Indexes[30] are introduced in financial markets to represent Islamic-compliant portfolios. To serve as a market benchmark, the returns of the Kuala Lumpur Shariah Index (KLSI) (formerly the new index known as the FTSE Bursa Malaysia Emas Shariah Index) are used as a proxy for the returns on the market portfolio and the risk free[31] rate is proxies by the twelve-month Malaysian Islamic Treasury Bills (MITB)[32].

The following Table 4.4, represent the sample of results consist of the various variables of Islamic banks in order to assess the displaced commercial risk in year 2010 using the Value at Risk (VaR) approach. The historical data concerning market benchmark, risk free and annual report for each selected bank.

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[30] Bursa Malaysia, Kuala Lumpur Composite Index, Kuala Lumpur Syariah Index, Dow Jones Islamic Market Indexes, S&P Islamic Index, FTSE Islamic Global Index, etc.

[31] The calculation of the risk free rate is as follows: $R_f = (1+R)^{12/12} - 1$ (Treynor and Mazuy, 1966).

[32] MITB are short-term securities issued by the Government of Malaysia based on Islamic principles. MITB are structured based on the Bai' Al-Inah principle, part of the sell and buy back concept. Bank Negara Malaysia, on behalf of the Government, will sell the identified government assets on a competitive tender basis to form the underlying transaction of the deal. Allotment will be based on the highest price tendered (or lowest yield). The actual price of the MITB will be determined after the profit element has been imputed (discount factor). Successful bidders will pay cash to the Government, and subsequently sell back the assets to the Government at par based on credit terms. In return, the Government will issue MITB to the bidders to represent the debt created.

Table 4.4: The Various Parameters of Formula (From Equation 10)

Bank	p	k	i	f	e	E(Rm)	σm	Rf
1. Affin Islamic Bank Bhd	0	0	1.2613	2.2613	0	3.9179	2.7034	0.0272
2. Alliance Islamic Bank Malaysia Bhd	0.2550	0	1.0821	1.5512	0.0261	3.9179	2.7034	0.0272
3. Al Rajhi Banking & Investment Corporation (Malaysia) Bhd	0	0	1.0609	2.0609	0	3.9179	2.7034	0.0272
4. AmIslamic Bank Bhd	0.0700	0	1.3313	2.1682	0.0030	3.9179	2.7034	0.0272
5. Asian Finance Bank Bhd	0.0064	0	1.5981	2.6147	0.0009	3.9179	2.7034	0.0272
6. Bank Islam Malaysia Bhd	0.0345	0	1.0358	1.9655	0.0189	3.9179	2.7034	0.0272
7. Bank Muamalat Malaysia Bhd	0	0	1.2026	2.2026	0	3.9179	2.7034	0.0272
8. CIMB Islamic Bank Bhd	0	0	1.8325	2.8325	0	3.9179	2.7034	0.0272
9. EONCAP Islamic Bank Bhd	0	0	1.2518	2.2518	0	3.9179	2.7034	0.0272
10. Hong Leong Islamic Bank Bhd	0.0030	0	1.1341	2.1404	0.0002	3.9179	2.7034	0.0272
11. HSBC Amanah Malaysia Bhd	0	0	1.5703	2.5703	0	3.9179	2.7034	0.0272
12. Kuwait Finance House (Malaysia) Bhd	0	0	1.8694	2.8694	0	3.9179	2.7034	0.0272
13. Malayan Islamic Banking Bhd	0.0430	0	1.4619	2.3561	0.003	3.9179	2.7034	0.0272
14. OCBC Al Amin Bank (Malaysia) Bhd	0.0657	4.1371	1.3072	6.7622	0.0083	3.9179	2.7034	0.0272
15. Public Islamic Bank Berhad	0.0305	0	1.8729	2.9605	0.0035	3.9179	2.7034	0.0272
16. RHB Islamic Bank Bhd	0.0009	0	1.1917	2.1936	0.0002	3.9179	2.7034	0.0272
17. Standard Chartered Saadiq Bhd	0	0	3.7436	2.7436	0	3.9179	2.7034	0.0272

Where;

p   = Profit equalization reserve / total income

k   = Income attributable to shareholder / Income attributable to the depositors

           (deposit and placements of banks)

i   = Investment risk reserve / Income attributable to the depositors (deposit from

           customer)

f   = (1-p)(1-k)(1-i)

e   = Profit equalization reserve / general investment deposit (PSIA)

E(Rm) = the daily returns of the market index prices for a period of 2 years. The daily

           expected returns

σm   = the daily volatility of returns

Rf   = Risk free. Using the CAPM equation

Applying the equation (10) in the previous chapter for different holding period and confidence level,

$$\frac{VaR_\alpha}{PSIA} = f\left[Z_\alpha \sigma(R_m) + \left(E(R_m) - R_f\right)\right] + e + (f-1)R_f \tag{10}$$

Table 4.5 shows the results of DCR$_{VaR}$ and the amount of capital required thus to cover the displaced commercial risk for different banks and confidence level are:

Table 4.5: DCR$_{VaR}$ Results

Bank	The confidence level of DCR$_{VaR}$ (Percentage)		The amount of capital required to cover DCR$_{VaR}$ (RM'000)	
	99%	95%	RM (99%)	RM (95%)
1. Affin Islamic Bank Bhd	5.4117	1.2546	7,183.99	6,143.60
2. Alliance Islamic Bank Malaysia Bhd	5.6948	1.3843	13,954.46	10,028.65
3. Al Rajhi Banking & Investment Corporation (Malaysia) Bhd	4.9345	1.1358	19,520.38	15,922.79
4. AmIslamic Bank Bhd	5.1870	1.2011	52,830.82	46,661.01
5. Asian Finance Bank Bhd	6.2540	1.4473	8,397.63	7,892.30
6. Bank Islam Malaysia Bhd	4.6884	1.0751	96,330.12	71,878.75
7. Bank Muamalat Malaysia Bhd	5.2719	1.2227	49,890.54	31,554.35
8. CIMB Islamic Bank Bhd	6.7718	1.5646	8,899.44	6,258.28
9. EONCAP Islamic Bank Bhd	5.3890	1.2494	20,900.35	10,802.44
10. Hong Leong Islamic Bank Bhd	5.1240	1.1892	14,302.79	13,803.04
11. HSBC Amanah Malaysia Bhd	6.1474	1.4223	30,333.68	27,728.15
12. Kuwait Finance House (Malaysia) Bhd	6.8595	1.5846	29,787.18	16,077.90
13. Malayan Islamic Banking Bhd	5.6343	1.3030	106,657.80	92,863.81
14. OCBC Al Amin Bank (Malaysia) Bhd	6.0828	1.3997	3,822.16	2,978.72
15. Public Islamic Bank Berhad	5.0799	1.1564	43,453.50	21,277.56
16. RHB Islamic Bank Bhd	5.2505	1.2179	23,148.17	19,945.64
17. Standard Chartered Saadiq Bhd	5.3056	1.2062	16,072.23	12,146.70

The findings show that the capital required by Malayan Islamic Banking Bhd to cover the displaced commercial risk (DCR_{VaR}) is found to use 5.63 per cent of the total of investment accounts at 99 per cent confidence in one year holding period. Whereas, the amount of capital required by Malayan Islamic Banking Bhd in Ringgit to cover the DCR is RM 106.7 million[33] with 99 per cent confidence and a holding period of one year. While at 95 per cent confidence level, the capital required to cover displaced commercial risk use about 1.30 per cent in 2010 with the amount of capital required in Ringgit to cover the DCR is RM 92.9 million.

This finding is consistent with the findings of BNM (2010) reported that almost half of the deposit in Islamic bank is in the form of mudarabah (profit-sharing and loss bearing) contracts. Of this, about 70 per cent were in the form of Profit Sharing Investment Account (PSIA) where the depositors have expectations for the protection of their principal investments and certainty of the returns. Given these expectations, Islamic banking institutions were exposed to the DCR.

In addition Table 4.5 also faces the highest DCR_{VaR} in 2010 is Kuwait Finance House (Malaysia) Bhd. The findings show that the capital required by Kuwait Finance House (Malaysia) Bhd to cover DCR_{VaR} is found to use 6.86 per cent of the total investment accounts at 99 per cent confidence level. Interestingly, when the variable (i) especially type of investment risk reserve is insufficient due to negligence and misconduct in the markets or the transfer of some proportion of shareholder returns to depositors is necessary then the displaced commercial risk is higher. It is supported by Sundararajan (2008).

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[33] 5.39% * Investment Deposit (PSIA)

Furthermore, Figure 4.2 and Table 4.6 shows the trend of capital required by Islamic Banks in Malaysia to cover the displaced commercial risk ratio between the years 1994 to 2014 using the Value at Risk (VaR) method at 99 per cent confidence level. The findings show that there is a sharp increase in DCR_{VaR} for each Islamic bank. This situation finds that Islamic deposits give a negative response to a shock in interest rates. This negative relationship refers to a displaced commercial risk for the Islamic banks[34].

It was found in many empirical researches that the change in interest rates may influence the deposits reserved in Islamic banks. Examples of empirical studies referring to a negative correlation between the size of Islamic deposits and the interest rate include Kassim, et al. (2009), Haron and Ahmad (2000), Kasri and Kassim (2009), Sukmana and Kassim (2010), Zainol and Kassim (2010), and Imran and Mark (2011).

Figure 4.3 indicates that the value of capital by Islamic banks to cover the displaced commercial risk give a positive response to the interest rates. In year 2005 and 2011, the decreases in the interest rate are explained by depositors shifting their fund from another bank and move it to the Islamic banks, thus improving the Islamic bank deposit outstanding. Furthermore, at the level of Islamic deposits increase when interest rates decline, the Islamic banks are less exposed to displaced commercial risk. This is in line with the finding of Hamdi and Zarai (2013) as well as our empirical evidence that the decrease in interest rate gives a positive response to displaced commercial risk.

Particularly, in 2011, Figure 4.2 demonstrate that the level of displaced commercial risk for Islamic banks has declined is due to a return on deposits accepted adjusted

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[34] An increase in the interest rates take the deposit holders from Islamic banks to the conventional banks because of the advantages involved in keeping money in the latter. This find that an increase in interest rates reduces the size of the Islamic deposits, also causing shrinkage in the amount of Islamic funds and finances.

accordingly, and the level of profit equalisation reserves declined. The creation of profit equalisation reserves is to ensure that Islamic banks return remained competitive and stable. During times of higher returns to depositors, Islamic banks can choose to not utilize the profit equalisation reserves. This was part of the Islamic banks' strategy to preserve competitiveness of returns offered to depositors, as more pronounced valuation losses were recorded during the period which coincided with heightened financial market volatilities both on the global and domestic fronts. Subsequently, the level of profit equalisation reserves improved as the Islamic banking system recorded persistent growth in financing income amidst continued portfolio expansion.

Then, the capital required by Islamic banks to cover the DCR increased steadily from 2012 to 2014. It was found that, the Islamic banking systems faced significant downward pressures on profitability, particularly in the first half of 2012, as financial market sentiments were dampened and demand for financing and financial services, particularly from businesses, remained subdued during the period. The increased competition in the financial markets, particularly the retail based segments continue to pose challenges to banks in sustaining revenue growth of the financial portfolios.

Table 4.6: The Capital Required by Islamic Banks in Malaysia to Cover the DCR$_{VaR}$ (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Bank 1				0.00	0.01	0.01	0.05	0.07	0.09	0.11	0.14	0.29	0.26	0.35	0.45	0.64	0.72	0.67	0.80	0.95	0.95
Bank 2								0.00	0.03	0.06	0.12	0.18	0.19	1.53	1.32	1.11	1.40	1.70	1.92	1.78	1.47
Bank 3													0.00	0.00	0.57	1.51	1.95	1.78	1.52	1.55	1.35
Bank 4				0.00	0.01	0.04	0.05	0.08	0.13	0.13	0.17	0.19	0.90	5.89	6.12	5.56	5.28	3.64	4.07	6.58	5.95
Bank 5														0.27	0.28	0.57	0.84	0.95	0.61	0.60	0.46
Bank 6						0.02	0.03	0.02	0.03	0.03	0.06	0.08	0.25	1.85	3.00	3.80	9.63	9.70	11.36	11.18	12.90
Bank 7							0.01	0.01	0.01	0.06	0.07	1.37	1.84	2.10	3.48	4.79	4.99	4.30	4.31	4.80	4.48
Bank 8												0.02	0.06	0.11	0.64	0.79	0.89	0.97	1.46	2.06	2.27
Bank 9			0.00	0.00	0.00	0.03	0.03	0.11	0.22	0.13	0.35	0.41	0.46	0.61	0.48	1.09	2.09				
Bank 10						0.00	0.00	0.00	0.04	0.09	0.29	0.29	0.73	1.19	1.36	1.45	1.43	1.36	2.11	3.10	3.70
Bank 11						0.00	0.00	0.05	0.06	0.09	0.13	0.23	0.42	1.24	1.31	2.49	3.03	3.20	2.67	3.43	4.57
Bank 12												0.00	0.01	1.07	4.49	3.58	2.98	2.60	3.74	3.30	2.93
Bank 13				0.01	0.01	0.10	0.47	0.62	0.71	1.58	1.62	1.25	3.57	4.49	2.83	7.90	10.67	11.26	8.87	10.30	12.18
Bank 14					0.00	0.01	0.03	0.02	0.02	0.04	0.04	0.05	0.05	0.07	0.08	0.30	0.38	0.47	1.94	1.20	2.93
Bank 15				0.00	0.00	0.01	0.05	0.12	0.26	0.46	1.08	0.99	1.33	3.30	4.15	0.91	4.35	5.42	5.60	5.71	6.32
Bank 16					0.00	0.02	0.08	0.19	0.28	0.29	0.29	0.65	1.14	2.62	2.53	2.65	2.31	1.98	2.22	2.75	2.75
Bank 17						0.00	0.00	0.02	0.04	0.10	0.12	0.17	0.21	0.33	0.45	0.52	1.61	2.18	2.51	1.37	1.51
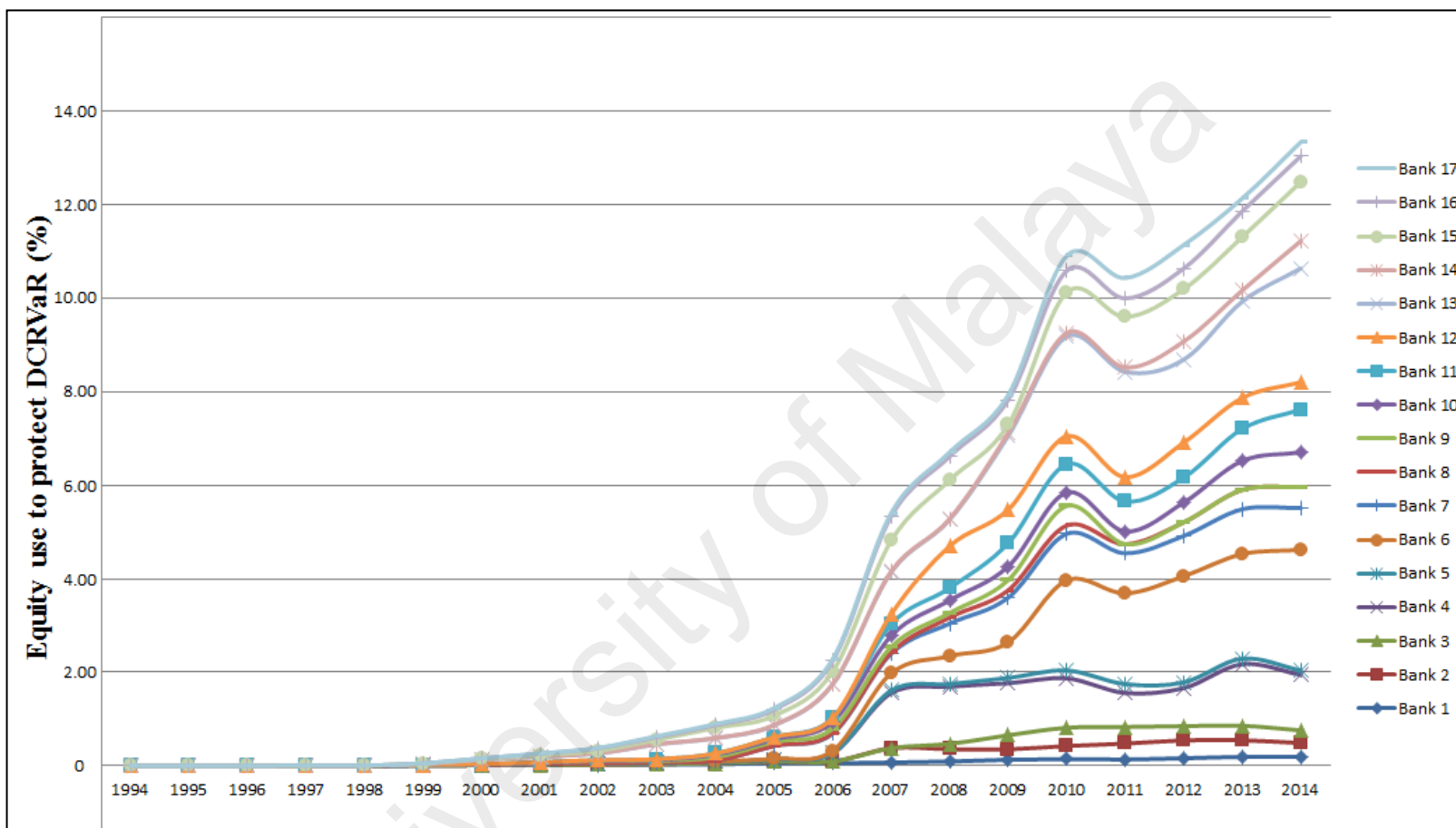
Figure 4.2: The Capital Required to Cover The DCR$_{VaR}$
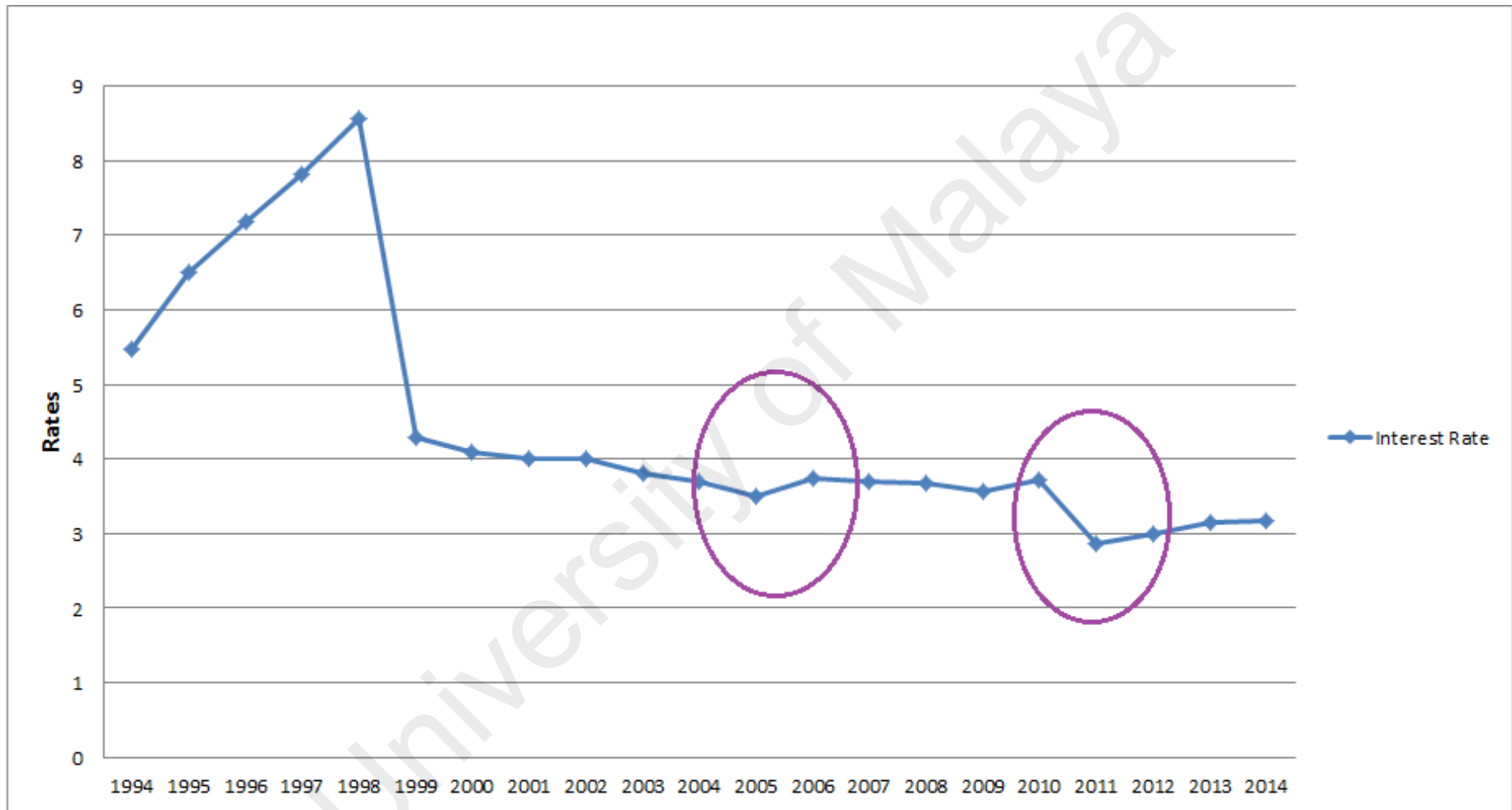
Figure 4.3: The Fluctuations in Interest Rates

Meanwhile, Table 4.7 provides descriptive statistics on our sample. These are used to examine the bivariate relationship by comparing the average (mean) for each variable. We can see that Bank 4 recorded the highest average value in the data distribution with mean 3.24, while Bank 12 shows the lowest average value of 1.41 and least disperse in terms of the distribution of data.

Besides that, other statistical characteristics of the variables that include the standard deviation, skewness, kurtosis (the height) and Jarque Berra (the variation of the distributions) are being analysed.

The standard deviation is used in determining the variation of the data. Bank 9 variables have the highest standard deviation value of 3.33. Larger standard deviations indicate larger amount of capital needed to cover the losses of DCR. While the lowest dispersion value is the Bank 12 with a standard deviation of 2.50.

In measuring skewness, it is found that all the Islamic bank has a positively scattering data. Next, kurtosis tests were carried out to observe the normality of the data distribution. Most of the banks in the criteria for a normally distributed data except Bank 3, Bank 4, Bank 5, Bank 11, Bank 13, Bank 14, Bank 15 and Bank 17.

Jarque-Bera test is then used to confirm the extent of the data normality distribution. From this test, results in Table 4.7 demonstrate that all variables are significant at a level 5 per cent. This shows that almost all of Islamic banks DCR data used in this study are not normally distributed.

Table 4.7: DCR_{VaR} Descriptive Statistics of Islamic Banks at 99% Confidence Level

	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Bank 1	2.0005	0.6198	2.5287	0.9836	2.3821	3.3659**
Bank 2	2.9454	1.9988	2.9880	0.6402	2.1092	1.9262**
Bank 3	2.3175	0.4007	2.6988	0.5258	1.5755	2.4820**
Bank 4	3.2381	2.3165	3.2548	0.4592	1.7296	1.9456**
Bank 5	2.3861	0.9012	2.5423	0.5483	1.6443	2.4073**
Bank 6	2.2717	0.4032	2.6466	0.7061	1.9167	2.5076**
Bank 7	2.3602	0.2855	2.8031	0.6189	1.8795	2.2068**
Bank 8	2.5725	1.5185	2.7891	0.7419	2.1410	2.3273**
Bank 9	2.9574	1.0322	3.3260	0.6860	2.0378	2.2232**
Bank 10	2.3933	1.8747	2.5170	0.5965	1.9098	2.0678**
Bank 11	2.9604	2.0317	2.8827	0.2132	1.3069	2.4134**
Bank 12	1.4098	0.0000	2.5017	1.2890	2.9712	5.2623**
Bank 13	1.9277	0.0000	2.9440	0.8512	1.7966	3.4407**
Bank 14	2.4839	0.0000	3.2165	0.6335	1.6164	2.7865**
Bank 15	2.2079	0.6148	2.5558	0.5822	1.7748	2.2618**
Bank 16	2.2087	0.2151	2.8090	0.8926	2.3817	2.8255**
Bank 17	2.3285	0.0000	3.0062	0.6434	1.6597	2.7328**

*Note: ** Significant at 5 percent level*

4.2.3 Comparison DCR_{VaR} and DCRα Method

The result obtained by the model we proposed will be compared to the capital charge needed for displaced commercial risk calculated based on Central Bank of Malaysia capital adequacy guidelines. The Central Bank of Malaysia (BNM) had examined it is a prudential system for Islamic finance in order to ensure its system is in line with international standards, including the standards produced by the Islamic Financial Services Board (IFSB). BNM fixed the minimum ratio of 8 per cent for displaced commercial risk (equivalent to the value of alpha). In other words, Islamic banks in Malaysia must bear at least 8 per cent of the credit and market risk-weighted assets financed by investment accounts to mitigate the displaced commercial risk. The rest (92 per cent) is to be borne by Investment Account Holders.

Table 4.8: The Comparison Amount of Capital Required to Cover DCR (Ringgit) in 2010

Bank	The charge of capital required to DCRα	The amount of capital required to cover DCR$_{VaR}$	Changes in value between DCRα and DCR$_{VaR}$
1. Affin Islamic Bank Bhd	9,356.45	7,183.99	2,172.46
2. Alliance Islamic Bank Malaysia Bhd	16,553.67	13,954.46	2,599.21
3. Al Rajhi Banking & Investment Corporation (Malaysia) Bhd	26,836.57	19,520.38	7,316.19
4. AmIslamic Bank Bhd	59,328.45	52,830.82	6,497.63
5. Asian Finance Bank Bhd	8,572.77	8,397.63	175.14
6. Bank Islam Malaysia Bhd	111,469.29	96,330.12	15,139.17
7. Bank Muamalat Malaysia Bhd	61,406.69	49,890.54	11,516.15
8. CIMB Islamic Bank Bhd	29,262.87	8,899.44	20,363.43
9. EONCAP Islamic Bank Bhd	21,941.00	20,900.35	1,040.65
10. Hong Leong Islamic Bank Bhd	15,007.38	14,302.79	704.59
11. HSBC Amanah Malaysia Bhd	34,816.72	30,333.68	4,483.04
12. Kuwait Finance House (Malaysia) Bhd	50,337.57	29,787.18	20,550.39
13. Malayan Islamic Banking Bhd	112,177.92	106,657.80	5,520.12
14. OCBC Al Amin Bank (Malaysia) Bhd	4,360.45	3,822.16	538.29
15. Public Islamic Bank Berhad	54,904.46	43,453.50	11,450.96
16. RHB Islamic Bank Bhd	24,299.89	23,148.17	1,151.72
17. Standard Chartered Saadiq Bhd	28,207.06	16,072.23	12,134.83

The comparison between the DCR$_α$ and DCR$_{VaR}$ reveals that the Islamic banks in Malaysia charge of capital needed to displaced commercial risk under the simple risk weight supervisory discretion approach of IFSB (2005) is different than capital charge requirement calculated based on the Value at Risk model.

The capital requirement to displaced commercial risk under the simple risk weight supervisory discretion approach of IFSB (2005) and the capital requirement that results from Value at Risk model are shown in Table 4.8. The findings show that, in 2010, the capital required by Islamic banks to cover displaced commercial risk using DCRα is about 20 per cent higher than the capital required by Islamic banks to cover displaced commercial risk using DCR$_{VaR}$. It indicates that the potential losses resulting from the

displaced commercial risk based on Central Bank of Malaysia capital adequacy guidelines are higher compared with the Value at risk approaches.

However, the relationship of DCRα and DCR$_{VaR}$ are strong and close to perfectly correlated. Figure 4.4 illustrates relationship of DCRα and DCR$_{VaR}$ in Islamic bank using the scatter plot. Figure 4.4 shows that the higher DCRα, the higher DCR$_{VaR}$. This implies that, increase the capital charge needed to DCRα would also increase the amount of capital required to cover DCR$_{VaR}$, but the amount of capital required to cover displaced commercial risk between DCRα and DCR$_{VaR}$ is different.
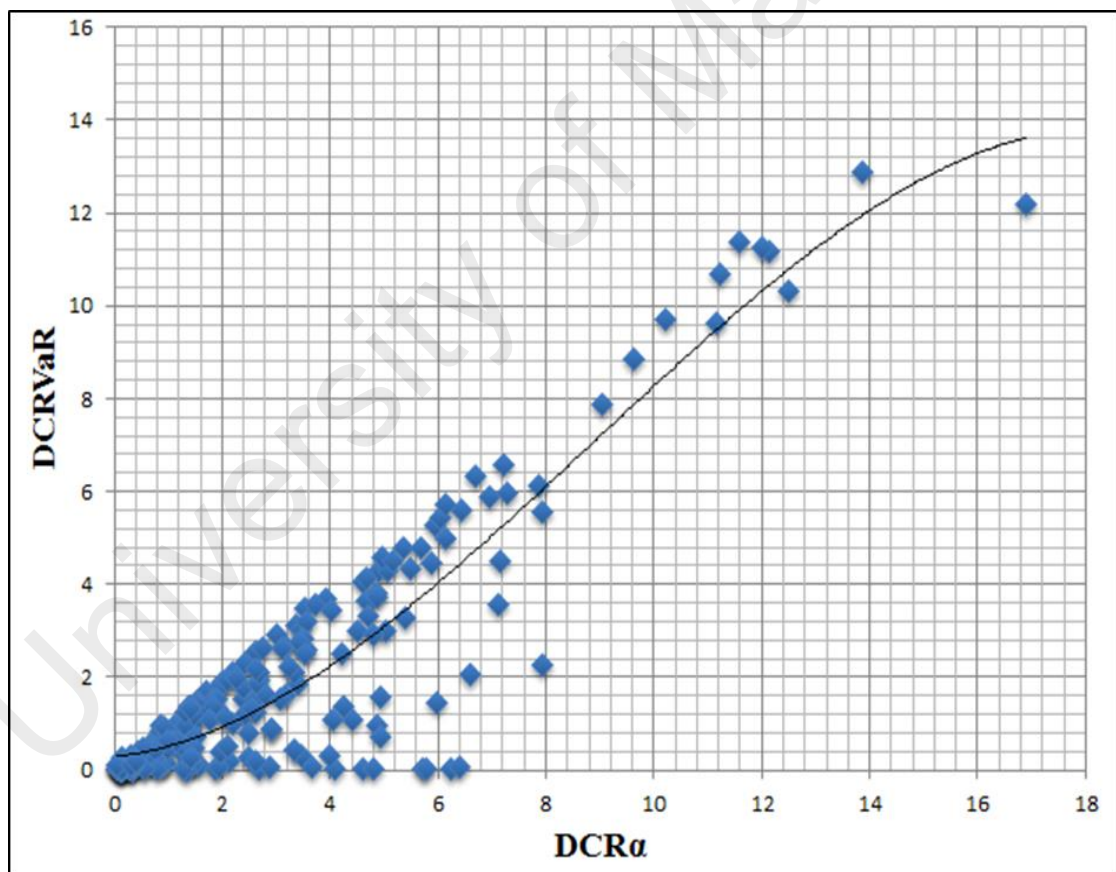
Figure 4.4: Relationship of DCRα and DCR$_{VaR}$ in Islamic bank (%).

While, Figure 4.5 illustrates the differences average amount of capital needed to cover DCR. We compare the average capital charge needed for displaced commercial risk

based on BNM guidelines and the Value at Risk (VaR) approach, and find that both methods have consistent patterns in term of the curve. However, the different method leads to different results. Based on the VaR approach, the additional capital charge required effectively for displaced commercial risk is more reflects on the actual losses (DCR) borne by Islamic banks.
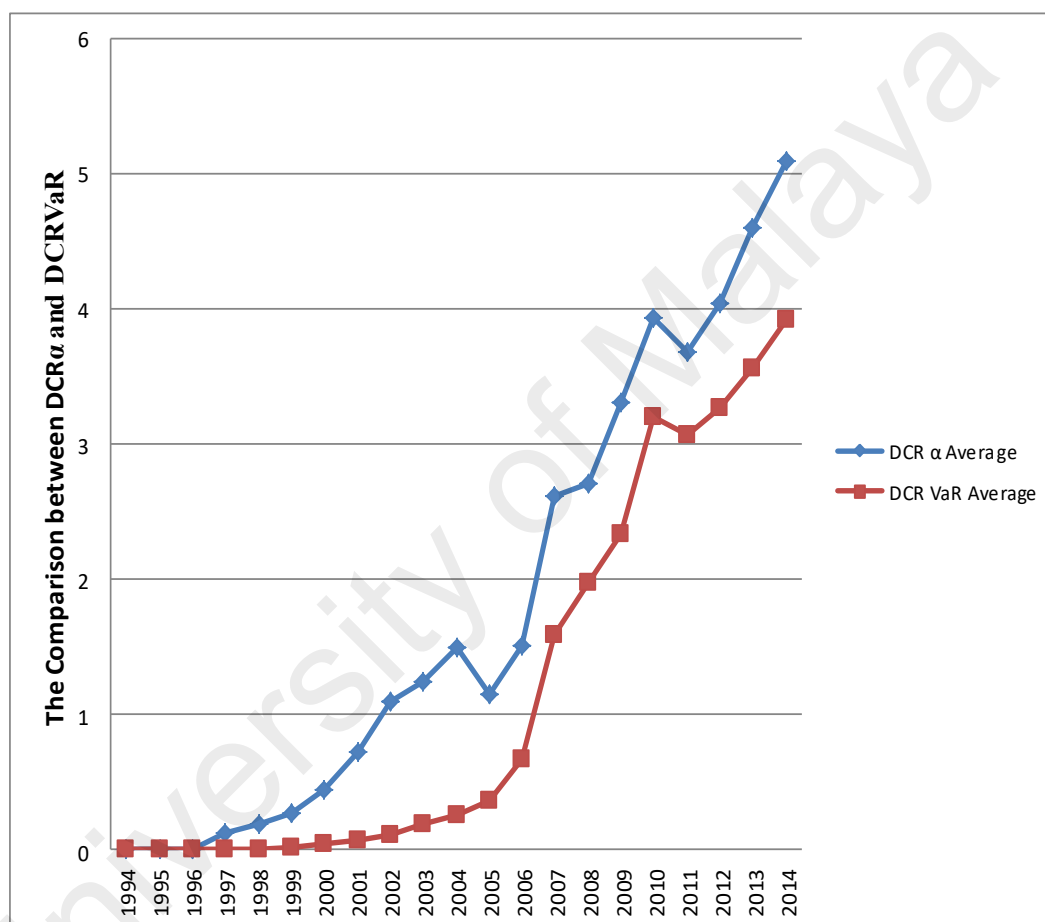
Figure 4.5: The Percentage of Capital Required to Cover DCR

Additionally, the amount of capital required to cover displaced commercial risk also difference between these two approaches because of DCRα approach has examined the displaced commercial risk in the situation of full risk transfer to shareholders implying the maximum value of DCR, whereas the minimum capital to cover DCR should be quantified based on the value at risk approach.

The Islamic banks can use the minimum standard approach by using the Value at Risk approach to ensure that a standardized limit on the levels of capital requirements to cover displaced commercial risk can be provided to the bank with a high probability, bank were able to use the capital to generate significant profits on the investment, and bank also can minimize the opportunity cost of capital at the lower displaced commercial risk.

The supervisory discretion approach proposed by IFSB (2005) is subject to many weaknesses since the IFSB recommend to all banks in the same jurisdiction, the same proportion of risk weighted assets funded by investment accounts without taking into account the actual returns smoothing peculiar to each bank.

The issue arises of when we are to apply these standards to Islamic banks, as they differ from conventional counterparts. As such, the deposits placed in Islamic banks are exposed to risks that are not faced by those in conventional banks. At the same time, the assets of Islamic banks are utilized in a different way from the assets of conventional banks. Moreover, the unique nature of risks faced by the Islamic banks involves different challenges for compliance with Risk Weighted Capital Ratio (RWCR) requirements.

With regards to the dual banking system, the computation of RWCR need varies from Islamic banks to another. In practice, alpha is the same within a jurisdiction, but varies considerably across banks because the supervisory assessment of profit sharing investment accounts is different. For example, it can be an investment or deposit products or in between both. This can affect the estimation of DCR_α respectively.

Consequently, the variability of alpha coupled with the different approaches to calculating the DCR is causing significant variations of the RWCR under IFSB formula. This may lead to a problem because different banks with the same characteristics may have different RWCR due to alpha variation.

Thus, due to these structural differences between Islamic and conventional banks, the capital to cover DCR under the IFSB approach should be amended in order to take these differences into account. Therefore, the VaR model we proposed would be an alternative method to measure the additional capital charge required to cover the displaced commercial risk. As we proposed, the assessment of the displaced commercial risk should be based on actual returns smoothing guidelines of each Islamic bank. Our approach produces more relevant estimates as it considers key factors and structural relations affecting DCR.

4.3   DCR AND BANK PERFORMANCE

This study covered 17 Islamic banks in Malaysia. More importantly, this section presents the results separately for sub-samples of large Islamic banks (those with total assets of more than RM 3.5 million) and small Islamic banks (all others). We segregate our results according to bank size in order to examine the impact of bank size on bank's DCR and also to assess the robustness of the result with respect to the selected sample. About 30 per cent of the Islamic banks are small bank category and about 70 per cent of the Islamic banks fall into the large bank category. The same method has been used in previous research by Mercieca et al. (2007), Cihak and Hesse (2010) and Ibrahim (2015).

Table 4.9: List of Islamic banks (All, Large & Small)

All	Large	Small
1. Affin Islamic Bank Bhd	1. Affin Islamic Bank Bhd (L)	1. Alliance Islamic Bank Malaysia Bhd (L)
2. Alliance Islamic Bank Malaysia Bhd	2. Al Rajhi Banking & Investment (F)	2. EONCAP Islamic Bank Bhd (L)
3. Al Rajhi Banking & Investment Corporation (Malaysia) Bhd	3. AmIslamic Bank Bhd (L)	3. HSBC Amanah Malaysia Bhd (F)
4. AmIslamic Bank Bhd	4. Asian Finance Bank Bhd (F)	4. OCBC Al Amin Bank (Malaysia) Bhd (F)
5. Asian Finance Bank Bhd	5. Bank Islam Malaysia Bhd (L)	5. Standard Chartered Saadiq Bhd (F)
6. Bank Islam Malaysia Bhd	6. Bank Muamalat Malaysia Bhd (L)	
7. Bank Muamalat Malaysia Bhd	7. CIMB Islamic Bank Bhd (L)	
8. CIMB Islamic Bank Bhd	8. Hong Leong Islamic Bank Bhd (L)	
9. EONCAP Islamic Bank Bhd	9. Kuwait Finance House (Malaysia) Bhd (F)	
10. Hong Leong Islamic Bank Bhd	10. Malayan Islamic Banking Bhd (L)	
11. HSBC Amanah Malaysia Bhd	11. Public Islamic Bank Berhad (L)	
12. Kuwait Finance House (Malaysia) Bhd	12. RHB Islamic Bank Bhd (L)	
13. Malayan Islamic Banking Bhd		
14. OCBC Al Amin Bank (Malaysia) Bhd		
15. Public Islamic Bank Berhad		
16. RHB Islamic Bank Bhd		
17. Standard Chartered Saadiq Bhd		

Note: (L) for Local Islamic bank
(F) for Foreign Islamic bank

Table 4.10 shows the overview of the input data being used in this study. For the Islamic banks, we split the input data into all banks, large banks and small banks. For seventeen Islamic banks, there were 357 observations. In terms of categories of bank, there are twelve large Islamic banks and five small Islamic banks with 252 and 105 observations respectively.

Table 4.10: Overview of the Input Data

All banks	Islamic banks
Number of banks	17
Number of observations	357
Large banks	
Number of banks	12
Number of observations	252
Small banks	
Number of banks	5
Number of observations	105

4.3.1 The Impact of DCR on Bank Stability

In this section, we are investigating the impact of DCR on bank stability and bank profitability. Z-score is used as a proxy for bank stability (Altman, 2002; Stiroh, 2004; Yeyati and Micco, 2007; Vasquez and Federico, 2012; Schaeck et al., 2012; Lepetit and Strobel, 2013; and Klomp and De Haan, 2014). Meanwhile, bank profitability is measured using ROA, following the study by Samad (2004), Athanasoglou et al. (2006), Gilbert and Wheelock (2007), Siddiqui and Shoaib (2011), and Ongore (2013).

In order to examine whether there is variation in the levels of financial stability between Large Islamic Banks and Small Islamic Banks, the annual data of Islamic banks in Malaysia are collected from the year 1994 to 2014 using the Z-score measurement.

The finding from Figure 4.6 demonstrates that the comparative results for average of Z-score, which is consistent with previous studies. In this sample, the result of average Z-score for the Small Islamic banks are on average higher (0.92) than those of Large Islamic banks at 0.79 (indicating higher stability for small Islamic banks than large Islamic banks). These findings comply with the approach by Cihak and Hesse (2008). Cihak and Hesse (2008) provide a graphical comparison of average Z-scores, where small Islamic banks have the highest level of financial stability and large Islamic banks having the lowest level of financial stability.

	All	Large	Small
Z-score	0.8236	0.7903	0.9197
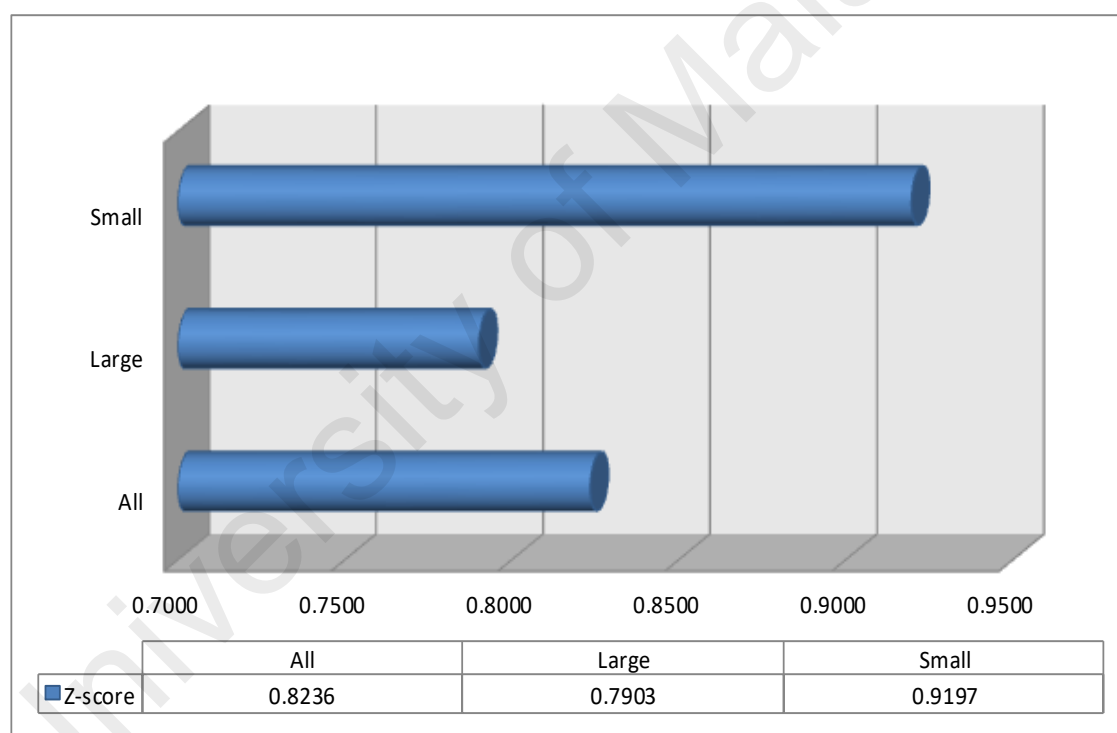
Figure 4.6: Comparison of Average Among Z-Score

For displaced commercial risk analysis, we employ the Z-score measure which is used as a stability indicator. We also follow Altunbas et al. (2011) and Demirguc-Kunt and Huizinga (2010) in measuring bank stability using the Z-score. According to Altunbas et al. (2011) and Demirguc-Kunt and Huizinga (2010), the larger banks be more likely to engage in more risky off-balance sheet activities such as securitization than small

banks. Because these activities require little or low regulatory capital, they can employ a higher financial leverage than small banks. This is consistent with the general observation that larger banks usually tend to hold less capital and are more leveraged than small banks. In other word, the Z-score of small banks is significantly higher than of large banks, portraying that the small banks are more stable than large banks.

The finding in Table 4.11 provides the descriptive statistics. We can see that the small Islamic banks group recorded the highest average value in the data distribution with mean 7.99, while the large Islamic banks group shows the lowest average value of 0.61. A larger value of the Z-score is associated with a more stable bank.

Besides that, other statistical characteristics of the variables that include the standard deviation, skewness, kurtosis (the height) and Jarque Berra (the variation of the distributions) are being analysed.

The standard deviation is used in determining the variation of the data. The small Islamic banks group has the lower standard deviation value of 0.44. The variability shows that the small Islamic banks a more stable trend. Large data dispersion exists for the large Islamic banks group with a standard deviation of 0.50.

In measuring skewness, it is found that all Islamic bank categories, which consist of all banks, large banks and small banks, have a negative scattering data. Skewness indicator used in distribution analysis as a sign of asymmetry and deviation from a normal distribution.

Next, kurtosis tests were carried out to observe the normality of the data distribution. The small banks group kurtosis's value is a normally distributed data. However, for another group (All and large Islamic banks) are almost normal distribution.

Jarque-Bera test is then used to confirm the extent of the data normality distribution. From this result in Table 4.11 demonstrate that all variables are significant at 1 per cent. This shows that all data are not normally distributed.

Table 4.11: The Descriptive Statistics of Z-score

	All	Large Islamic banks	Small Islamic banks
Mean	0.6664	0.6112	0.7990
Median	0.8236	0.7903	0.9197
Std. Dev.	0.4897	0.4975	0.4456
Skewness	-0.2679	-0.0634	-0.8024
Kurtosis	1.8508	1.7815	2.6171
Jarque-Bera	21.6376***	14.2572***	10.7738***

Note:
*** *Significant at 1 percent level*

4.3.1.1   Estimation Bank Stability Model

There are two models estimated. The first model examines the impact of DCR on bank stability. Other factors such as bank specifics are included as control variables. While the second model included the macroeconomic factors as a control variable to capture macroeconomic developments that are likely to affect the Islamic bank stability in Malaysia, in addition to bank specific characteristics.

The discussion will be divided into two parts. The first part will illustrate the descriptive statistical analysis of variables used in the two estimation models. Mean, median, standard deviation, skewness, kurtosis, and value of the Jarque-Bera will determine the

statistical behaviour of variables. The second part is the estimation results from the model built.

Hence, the specific estimation model can be specified:

<u>Model 1 for Bank Stability</u>

$$
\begin{aligned}
BS1_{i,t} = {}& \vartheta_{0i} + \vartheta_1 ROA_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t} \\
& + \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t}
\end{aligned}
$$

(13)

And

<u>Model 2 for Bank Stability</u>

$$
\begin{aligned}
BS2_{i,t} = {}& \gamma_{0i} + \gamma_1 ROA_{i,t} + \gamma_2 AST_{i,t} + \gamma_3 OWN_{i,t} + \gamma_4 LOAST_{i,t} + \gamma_5 LPLO_{i,t} + \gamma_6 DIV_{i,t} + \gamma_7 COST_{i,t} \\
& + \gamma_8 EXCH_{i,t} + \gamma_9 INFL_{i,t} + \gamma_{10} GDP_{i,t} + \gamma_{11} INT_{i,t} + \gamma_{12} DCR_{i,t} + \gamma_{13} HERFIN_{i,t} + \mu_{2i,t}
\end{aligned}
$$

(14)

Where;

BS is used as a proxy to measure banking stability; *ROA* is return on assets as a proxy of profitability; *AST* is the total assets of a bank as a proxy of size; *OWN* is the ownership as a proxy of dummy variable. Assume the value of (1) if the bank is a local Islamic bank and (0) is a foreign Islamic bank in Malaysia. The dummy variable (OWN) is comprised to detect whether there are efficiency differences between local Islamic bank and a foreign Islamic bank operating in Malaysia; *LOAST* is the ratio of loans to total assets; *LPLO* is the ratio of loan loss provisions for total loans is incorporated as an independent variable in the regression analysis as a proxy of credit risk; *DIV* is the Income Diversity proxies by a measure of diversification across different sources of

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income; *COST* is cost to income ratios as a proxy of cost efficiency; *EXCH* is the exchange rates; *INFL* is the inflation rate; *GDP* Gross domestic product; *INT* is the interest rate ratios; *DCR* is displaced commercial risk; and *HERFIN* is the Herfindahl index, defined as the sum of squared market shares (in terms of total assets) of all Islamic banks in the Malaysia and μ is an error term for banks.

4.3.1.2   Descriptive Statistic Analysis

Table 4.12 illustrates the summary of basic descriptive statistics of the variables involved in the model developed, based on two main indicators, namely the indication of bank specification and macroeconomic factors.

According to Table 4.12, we can see that Herfindahl index and interest rate ratios have a higher mean values among the other variables for its mean of 7.52 and 4.08, respectively. The higher the Herfindahl index generally indicate less competition among banks and more of market power. According to Alaro and Hakeem (2011), higher Herfindahl index of Islamic banks indicate to stability. Meanwhile a high value of interest rate gives significantly affect in Islamic banks. The table 4.12 also shows that the DCR also has a high mean of 2.41. This provides evidence that displaced commercial risk is a threat to Islamic banks in Malaysia.

Table 4.12: Descriptive Statistic Variables

Variables	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Z	0.6664	0.8236	0.4897	-0.2679	1.8508	21.6376*
ROA	0.0149	0.0142	0.0133	0.9050	4.7920	87.3101*
AST	0.3824	0.1046	0.8141	3.4953	16.3708	3063.7550*
OWN	0.6471	1.0000	0.4786	-0.6155	1.3788	55.7643*
LOAST	0.3578	0.3913	0.2847	0.0278	1.6804	23.4783*
LPLO	0.0240	0.0162	0.0274	1.1523	3.3198	72.8515*

DIV	0.3979	0.3319	0.3506	0.3721	2.2487	15.0521*
COST	0.6263	0.0000	3.9118	-0.7313	11.2019	934.1464*
EXCH	0.0661	0.0159	0.1066	2.3222	8.1410	646.0145*
INFL	2.7253	2.7300	1.3055	0.4082	2.4659	12.8094*
GDP	0.0934	0.1106	0.0667	-0.9825	3.1517	52.2744*
INT	4.0847	3.2000	1.8131	1.2713	3.2412	87.7949*
DCR	2.4100	0.6148	2.7979	0.7038	1.9915	40.3536*
HERFIN	7.5224	9.3151	4.8324	-0.6091	2.0863	31.2036*

*Note: * Significant at 1%, ** 5% and*** 10%.*

Next, standard deviation is used in determining the variation of the data. The COST variable has higher risk based on the standard deviation of 3.91 against only 0.01 for ROA and 0.02 for LPLO. This shows that the cost to income ratios has the highest volatility as compared to return on asset and the ratio of loan loss provisions to total loans.

In measuring skewness, it is found that the bank characteristic variables, which consist of cost to income ratios (COST) and the Herfindahl index (HERFIN), have a negative scattering data. In contrast, the ratio of loan loss provisions to total loans (LPLO), total assets of a bank (AST) and displaced commercial risk (DCR) were positively scattered. Then, macroeconomic variable such as growth of Gross Domestic Product (GDP) recorded negative scattering data, while the data on the exchange rates (EXCH), inflation rate (INFL) and the interest rate ratios (INT) variables are positively scattered.

While, kurtosis tests were carried out to observe the normality of the data distribution. The inflation rate (INFL), Income Diversity (DIV) and the Herfindahl index (HERFIN) kurtosis' values are approaching two, meeting the criteria for a normally distributed data.

Jarque-Bera test is then used to confirm the extent of the data normality distribution. From this test, results in Table 4.12 demonstrate that all variables are significant. This shows that all data are not normally distributed. Therefore, ordinary least square (OLS) estimation is not compatible with the research data. Hence, the Generalized Least Square (GLS) method is more appropriate and expected to yield a much better result.

4.3.1.3 Correlation Matrix

Before interpreting the estimation results, it is interesting to study the problem of multicollinearity between explanatory variables, which can lead to biased results. To detect multicollinearity, it is possible to use the correlation matrix. According to Kennedy (1992), there is a serious problem of multicollinearity if the correlation coefficient is above 80% for each pair of variables. According to Table 4.13, several variables are correlated, but not beyond the critical threshold of multicollinearity.

A widely used method to test the existence of multicollinearity between independent variables is by calculating Variance Inflation Factor (VIF) for each independent variable. VIF can be calculated through the equation;

$$VIF = \frac{1}{(1 - R^2)}$$

Table 4.13 shows the output use Variance Inflation Factors method. Interpretation: If a VIF is in excess of 20, or a tolerance (1/VIF) is 0.05 or less, there might be a problem of multicollinearity. In this case, multicollinearity has no significant effect on the variables and no multicollinearity is evident in the model.

Table 4.13: Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
INT	3.33	0.3002
HERFIN	3.10	0.3231
LOAST	2.36	0.4245
DCR	2.35	0.4263
EXCH	2.02	0.4946
DIV	1.90	0.5264
ROA	1.67	0.5986
INFL	1.43	0.6991
LPLO	1.43	0.7017
OWN	1.19	0.8407
AST	1.16	0.8595
COST	1.14	0.8758
GDP	1.10	0.9051
Mean VIF	1.86	

Another method to test the existence of multicollinearity is by checking the Pearson correlation between the independent variables. Correlation analysis is also a simple method to detect the existence of collinearity in a multi-variable data based on the variables' correlation matrix (Anderson et al., 2008). It can test and measure the degree of strength (absolute value) of the relationship between a dependent variable (Z-scores model) and the dependent variables (bank specifications and macroeconomic factors). Correlation analysis can also be used to determine the type of relationship or the direction of the figure, whether it is moving from left to right or vice versa. Thus, a relatively high correlation value between the two independent variables indicates the possibility of a multicollinearity happening.

Table 4.14 shows the correlation matrix for the independent variables. Based on the correlation table, it seems that all independent variables have a significant affect with stability variables except the (GDP), (DIV), (OWN), and (COST) variables. Variable (INFL) and (INT) have significantly strong negative values with stability indicating that

the greater amount of the inflation and interest rate the economic have, the lesser their amount of stability.

Most of the variables are correlated, but not beyond the critical threshold of multicollinearity. All correlation results are below 0.6 for each pair of variables, which indicates that multicollinearity is not a potential problem.

The connections DCR and bank stability also presented. Applying the statistical model, we obtain the result of bank stability and the amount of capital charge required to cover the DCR. A negative relationship exists between DCR and bank stability. It can be said that, the lower (higher) amount of capital charge required to cover the DCR, the bank became more (less) stable. In this vein, Cihak and Hesse (2010) and Toumi et.al (2011) point out that the greater the exposure of bank to high risk, bank stability would be lower. When the Islamic banks absorb more proportion of losses normally borne by investment account holders under commercial pressure, the Islamic banks became less stable.

In addition, this finding shows positive relationship between the real gross domestic products (GDP) and bank stability of Islamic banks. Looking at the macroeconomics perspectives for the Islamic banks, the positive relationship implies that higher real GDP leads to higher Z-score and a more stable Islamic bank (Bekaert et al., 2007; Agusman et. al., 2008; Hassan and Kayed, 2010; and Shayegani and Arani, 2012).

Efficiency element is measured by cost to income ratio (COST). The ratio gives us a clear view of how efficiently the bank is being run; the lower it is, the more stable the bank will be. The result shows that cost to income ratios is negatively related to Z-

scores. Previous studies claim that less efficient banks may tempt to take on additional risk to increase their financial performance, the similar finding is also reported by (Eisenbeis and Kwan, 1997).

Table 4.14: Pearson's Correlations

Correlation	Z	ROA	AST	OWN	LOAST	LPLO	DIV	COST	EXCH	INFL	GDP	INT	DCR	HERFIN
Z	1.0000													
ROA	0.4560**	1.0000												
AST	0.2857**	0.0064	1.0000											
OWN	0.0287	0.1410**	-0.0068	1.0000										
LOAST	-0.6635**	0.5387**	0.0361	0.2590**	1.0000									
LPLO	-0.4032**	0.3938**	0.1009**	0.2575**	0.4478***	1.0000								
DIV	0.5106	0.4265**	0.0739*	0.0550	0.4855**	0.3274**	1.0000							
COST	-0.0451	0.0427	0.2273***	0.0035	-0.0232	0.1166***	0.1524**	1.0000						
EXCH	0.1015**	0.1407***	0.1162***	0.0000	0.1320***	-0.0040	0.0585	-0.0045	1.0000					
INFL	-0.1677**	0.0020	-0.0078	0.0000	-0.0471	-0.0921*	-0.0663	0.0226	0.2798**	1.0000				
GDP	0.0292	-0.0028	-0.0359	0.0000	0.0615	0.0161	0.0658	-0.0064	-0.0673	0.1938**	1.0000			
INT	-0.4449***	-0.1837***	-0.0060	0.0000	-0.3294***	-0.2678***	-0.3261**	-0.0686	0.5293**	0.4504**	0.0721*	1.0000		
DCR	-0.5417***	0.4186***	0.0080	0.0314	0.5620***	0.2751**	0.5258*	0.1544***	0.0902*	0.0299	-0.0526	-0.4666***	1.0000	
HERFIN	0.7332*	0.5483*	0.1859*	0.2245*	0.6671*	0.4266*	0.6435*	0.0695	0.0685	-0.1028*	0.0619	-0.4456*	0.5709*	1.0000

*Note: *** Correlation is significant at the 0.01 level (2-tailed).*
*** Correlation is significant at 0.05 level (2-tailed).*
** Correlation is significant at the 0.1 level (2-tailed).*

However, the simplest means for analysing statistical data is to plot and visually study the information. The relationships of DCR_{VaR} and bank stability are correlated. To better understand a correlation between DCR_{VaR} and bank stability, scatter chart is plotted. Figure 4.7 illustrates relationship of DCR_{VaR} and bank stability in Islamic bank (Arshad et al., 2015a). Figure 4.7 depicts an inverse relation between DCR_{VaR} and bank stability. An increase the DCR_{VaR} output will cause a decrease in bank stability unit. This implies that, the more a bank forgoes a proportion of its income from assets funded by profit sharing to mitigate potential withdrawal of funds by depositors, the less stable the bank.
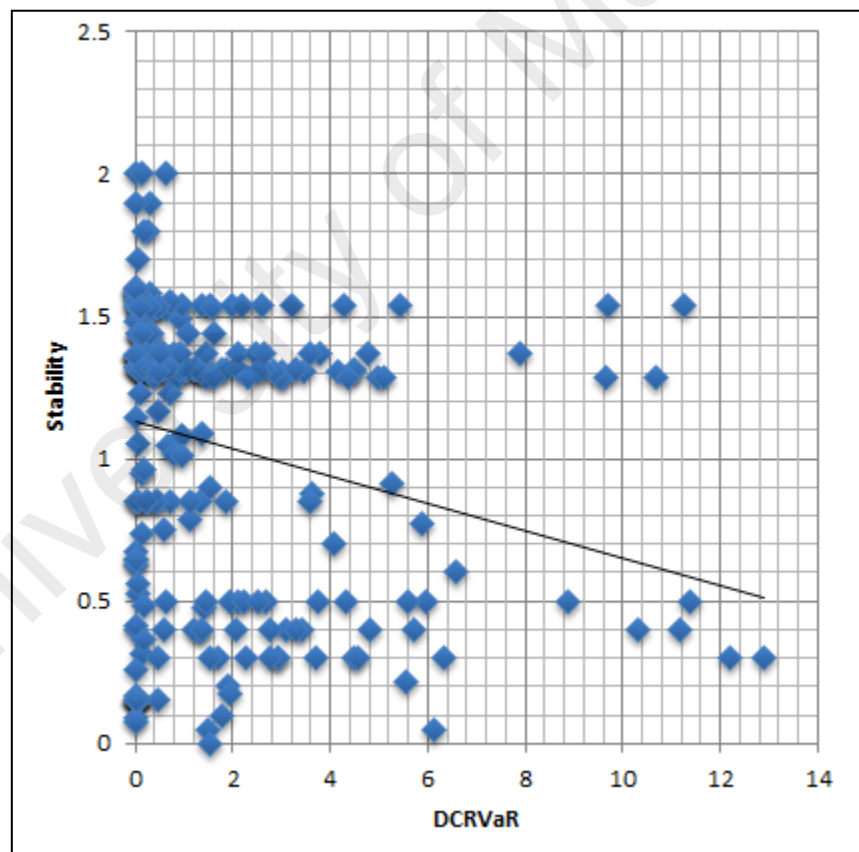
Figure 4.7: Scatter diagram of DCR_{VaR} and bank stability in Islamic bank (%).

4.3.1.4   Analysis of Bank Stability Models

We have divided the estimation of bank stability into two ways. The first model, examine the impact of DCR on bank stability, with bank specifics variables as the control factors (i.e. bank profitability, bank characteristics, and market power). The second model extends the first model by including the macroeconomic factors as control variables to capture macroeconomic developments that are likely to affect the Islamic bank stability in Malaysia.

From the descriptive statistics analysis output in section 4.3.1.2, it shows that the Generalized Least Square (GLS) technique is more appropriate and expected to yield a much better result. For comparison, we report the three different estimations. It has to include GLS with non-effects estimation, GLS with fixed effects estimation and GLS with random effects estimation[35].

Table 4.15 shows the finding on GLS Estimation in Bank Stability for Model 1 and Model 2. Based on the Breusch-Pagan Lagrange Multiplier (LM) test which is run on the GLS with non-effects and random effect model, with the large chi-squared of 3.56 (All Banks-Model 2), 1.43 (Large Banks-Model 2), and 0.77 (Small Banks-Model 2), we reject the null hypothesis in favor of the random group effect model ($p < 0.0000$). This is the evidence of significant differences across variables, therefore we can run a simple random effects regression.

Table 4.15 also points the result of the Hausman test run on the fixed and random effect model. The Hausman coefficients model 2 for All and Large Banks yields are 15.79 and

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[35] Appendix 2 shows the results of the GLS estimation in bank stability.

13.32. The results are insignificant P-value, Prob>chi squares larger than 0.05. Then, it is safe to not use random effects which are to reject the null hypothesis at significance level 0.05. This means that the fixed effects are chosen. However, converse with the Small banks outputs. The output of probability of small banks is 0.0090. Based on these results we would not reject the null hypothesis and a random effect approach will be preferred. The outcome of the regressions fit the theory well.

However, the results of White's Test, the Chi square rejects the null hypothesis that there is no problem of heteroskedasticity or homoskedasticity assumption prevails. This suggests that the error variance is not constant over time. Therefore, 'White's Heteroskedasticity Correction' in the statistical and econometric software is used to overcome the problem. The situation also justifies the use of the GLS estimation method (Gujarati and Porter, 2010).

Using Prais-Winsten and Cochrane-Orcutt regression the test on Autocorrelation is carried out. Table 4.15 shows the estimation results of Durbin-Watson test. We fail to reject the null because the Durbin–Watson statistic for all banks categories is 2 (the expected value under the null hypothesis of no serial correlation) at 5%. It is good to note that all these models do not suffer from problems of autocorrelations. Upper and lower bounds for the d statistic can be found in most econometrics texts (Greene, 2008).

The F-value of the Regression Specification Error Test (Ramsey RESET) as shown in Table 4.15 affirms that the models are not miss specified as per model 1 and 2 by accepting the null hypothesis, H0: Model has not been misspecified. As such the diagnostic tests confirm that there are no omitted variables, no incorrect function and correlation between independents.

Table 4.15: GLS Estimation Result in Bank Stability

	GLS with Fixed Effects				GLS with Random Effects	
	ALL BANKS		LARGE BANKS		SMALL BANKS	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
C	0.0414	0.3439	-0.0137	0.2389	0.2584	0.8105
	0.0327	0.0763 **	0.0363	0.0834**	0.0781**	0.1724**
ROA	2.3482	1.8437	7.9750	6.9817	2.3725	1.7904
	1.6921*	1.6691	2.4619***	2.4401***	2.3111	2.4041
AST	0.1036	0.1016	0.1005	0.1106	0.0981	0.0653
	0.0215*	0.0212**	0.0276*	0.0272**	0.0349**	0.0336**
OWN	n.a	n.a	n.a	n.a	0.1722	0.1836
	n.a	n.a	n.a	n.a	0.0644*	0.0598**
LOAST	-0.5888	-0.5463	-0.6820	-0.7085	-0.4708	-0.4372
	0.0973**	0.0960***	0.1190**	0.1203***	0.1827**	0.1721***
LPLO	-0.9822	-0.5737	-0.4688	-0.0652	-3.4197	-2.4532
	0.7198*	0.7082	0.7742	0.7655	1.6880**	1.6766*
DIV	0.0135	0.0109	0.0838	0.0643	0.1631	0.1732
	0.0706	0.0688	0.0884	0.0865	0.1091*	0.1054*
COST	-0.0052	-0.0045	-0.0057	-0.0036	-0.0013	-0.0004
	0.0043	0.0042	0.0063	0.0062	0.0061	0.0058
EXCH		0.6084		0.1830		1.6551
		0.2079***		0.2367		0.4091***
INFL		-0.0259		-0.0339		-0.0041
		0.0140**		0.0164**		0.0270
GDP		0.1711		0.0183		0.4498
		0.2406		0.2765		0.4443
INT		-0.0492		-0.0305		-0.1090
		0.0157***		0.0175*		0.0325***
DCR	-0.0197	-0.0109	-0.0210	-0.0170	-0.0245	-0.0069
	0.0080***	0.0086	0.0093***	0.0099*	0.0159*	0.0172
HERFIN	0.0462	0.0397	0.0479	0.0423	0.0389	0.0250
	0.0059**	0.0060**	0.0074**	0.0075**	0.0105**	0.0105**
R^2	0.6342	0.6601	0.7129	0.7312	0.6043	0.6760
Hausman Test (Test the Random vs Fixed effects)	12.08	15.79	10.36	13.32	2.60	2.21
Prob	0.1479	0.2011	0.2409	0.3876	0.0071	0.0090
Accept / Reject H0 (null)	Reject	Reject	Reject	Reject	Accept	Accept
Breusch-P Test (Test None vs Random effects)	1.91	3.56	0.72	1.43	0.69	0.77
Prob	0.1664	0.0592	0.5733	0.8202	0.4443	0.3798
Accept / Reject H0 (null)	Reject	Reject	Reject	Reject	Reject	Reject

Table 4.15: GLS Estimation Result in Bank Stability, continued

White's Test (Heteroskedasticity test)	163.77	198.64	138.37	193.42	79.83	95.00
Prob	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Accept / Reject H0 (null)	Reject	Reject	Reject	Reject	Reject	Reject
Durbin-Watson test (Autocorrelation test)	2.0534	2.0256	2.0535	2.0124	2.0302	1.9999
Ramsey RESET Test (Test of specification error)	8.1848	1.6218*	1.3167	2.9281*	9.4161	5.4538**

Note:
Figures in parentheses denote 'Standard Error' values of the regressions coefficients.
*** Significant at 1 percent level.
** Significant at 5 percent levels.
* Significant at 10 percent levels.

The relationship between DCR and bank stability shows a negative sign. It means that the Islamic banks become less stable the more it is exposed to displaced commercial risk. This result supports the findings of Ali (2012), Ali and Zaheer (2012), Babatunde and Olaitan (2013), Tabash and Dhankar (2014). They show that in a country where both Islamic and conventional banks exist side by side, Islamic banks may be exposed to displaced commercial risk, which is especially relevant where they are competing with conventional banks. Hence, too much competition can cause banking instability.

In addition, Babatunde and Olaitan (2013), Tabash and Dhankar (2014) states that the negative impact of displaced commercial risk on bank stability also due to differences in the expected and actual rate of returns passed on to investment account holders. By design, Islamic banks should be kept a portion of their assets in equity investment to avoid the affected bank stability.

This result also similar to the output research conducted by Srairi (2013), the displaced commercial risk was found to affect the stability of the Islamic banks if the banks

cannot offer competitive rates, a customer would be inclined to switch to the other banks that would give higher returns. Customers that desire higher returns can simply switch their funds to the other banks that provide higher returns. Hence, displaced commercial risk can lead to a significant stability problem.

The table 4.15 also shows that the local Islamic banks are relatively stronger than foreign Islamic banks with the dummy variable (OWN) is a consistently positive sign in the random effects regression under small Islamic banks group. In particular, banks with higher loan to asset ratios (LOAST) tend to have lower stability. This slope coefficient is consistently negative and significant within all banks group.

The coefficient of the LPLO variable in the regression models is a negative sign. It means that, the greater the exposure of banks to high risk loans, the higher would be the accumulation of unpaid loans and makes bank profitability would be lower. It is supported by Rubio and Jose (2014) who states that higher the ratio of loan loss provisions for total loans associated with a rise in identified credit losses, therefore lowers the stability of the bank.

With a strongly positive coefficient, greater income diversity (DIV) tends to increase stability in all, large and small Islamic banks group. The finding shows that a move from lending-based operation to other sources of income might improve stability in those Islamic banks. Similarly, higher cost-to-income ratios (COST) have a consistently negative link to the bank stability; the sign is consistently significant for all, large and small banks.

In terms of the macroeconomic variables, depreciation tends to lead to significantly higher banking risk, which also makes sense since banks' balance sheet positions that are denominated in foreign currency will be eroded with a depreciating domestic currency (EXCH). The Inflation (INFL) and interest rates (INT) leads to Islamic banking instability as shown by its negative coefficient at a significant level.

The economic theory suggests that the effect of interest rate changes on Islamic bank stability depends on banks handle the reflection changes to depositors' expectation. As a dual banking system, the increasing trend of interest rate brings Islamic banks, especially in Malaysia into a problem. First, it is because several empirical researchers found that the change in interest rates may affect not only the deposits in conventional banks but also the deposits reserved in Islamic banks. Such empirical studies referring to a negative correlation between the size of Islamic deposits and the conventional interest rate include Sukmana and Kassim (2010), Zainol and Kassim (2010). Most of these studies recall that if interest rates influenced Islamic banking deposits, this means that the positive impact of interest-free banking upon financial stability is restricted. Second, it is because the rational depositors expect to receive a higher return from Islamic banks. If Islamic banks cannot afford such expectation, it may lead to a severe displaced commercial risk.

The use of the GDP as variable is intended to capture the effect of macroeconomic conditions on bank stability. As expected, GDP growth is positive for all categories Islamic banks group in Malaysia. This finding complies with that of Yagoub (2014) who examined the dynamic interactions between Islamic banking and economic growth of Malaysia. They found that due to high GDP growth, Islamic bank's assets grow due to bank stability.

The impact of the Herfindahl index (HERFIN) is significantly positive. This is in line with the part of the literature on banking sector concentration and stability that finds higher concentration to be associated with higher stability. This finding complies with that of Altaee et al. (2013) who indicate that the higher Herfindahl index of Islamic banks leads to stability[36].

4.3.2 The Impact of DCR on Bank Profitability

The other measure of bank performance is using Return on Assets (ROA). This approach is chosen to measure bank profitability because it is focused on the analysis of other data showing the banking structure. ROA is an indicator of how profitable a bank is relative to its total assets. ROA also gives an idea as to how efficient management is at using its assets to generate earnings.

Firstly, we want to examine whether there is variation in the levels of bank profits between Large Islamic Banks and Small Islamic Banks, as measured by the ROA. The comparative findings show in Figure 4.8. We found that, the small Islamic banks followed by large Islamic banks are the most profitable. Large Islamic banks are the least bank profits. In the sample, small Islamic banks' ROA is on average higher (0.02) than those of large Islamic banks at 0.01 (indicating higher profitability for small banks than large Islamic banks).

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[36] In other words, if this index has a negative sign, this means that the banking system suffer a weak competition, which in turn reflects on the stability (Less competitive can be perceived to be more stable).

	All Banks	Large Banks	Small Banks
■ROA	0.0149	0.0134	0.0185
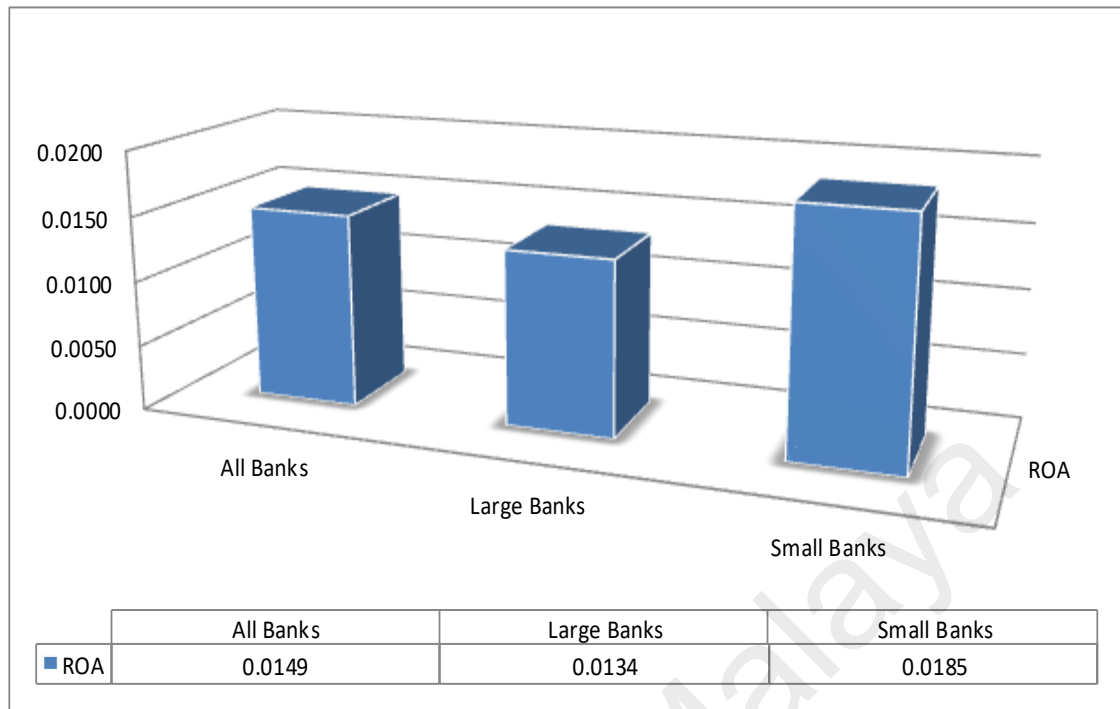
Figure 4.8: Comparison of Average Among ROA

While, Table 4.16 below describes the variable used in this research through their means, standard deviations, skewness, kurtosis and Jarque-Bera. The findings show that the small Islamic banks group recorded the highest average value in the data distribution with mean 0.02, while the large Islamic banks group shows the lowest average value of 0.01. A greater value of the ROA is associated with a more profit bank.

Besides that, other statistical characteristics of the variables that include the standard deviation, skewness, kurtosis (the height) and Jarque Berra (the variation of the distributions) are being analysed.

The standard deviation is used in determining the variation of the data. The small Islamic banks group has the highest standard deviation value of 0.01. This finding shows that the small Islamic banks involved in the research do not consistently profits.

Small data dispersion exists for the large Islamic banks with a standard deviation of 0.01.

In measuring skewness, it is found that all Islamic bank categories, which consist of all banks, large banks and small banks, have a positive scattering data. Skewness indicator used in distribution analysis as a sign of asymmetry and deviation from a normal distribution.

Next, kurtosis tests were carried out to observe the normality of the data distribution. The result shows that, all categories kurtosis' value (All, Large and Small banks) is not a normally distributed data.

Jarque-Bera test is then used to confirm the extent of the data normality distribution. The statistical findings in Table 4.16 demonstrate that all variables are significant at 1 per cent. This shows that all data are not normally distributed.

Table 4.16: The Descriptive Statistics of ROA

	All	**Large Islamic banks**	**Small Islamic banks**
Mean	0.0149	0.0134	0.0185
Median	0.0142	0.0127	0.0159
Std. Dev.	0.0133	0.0126	0.0144
Skewness	0.9050	0.6410	1.2567
Kurtosis	4.7920	3.2820	6.2196
Jarque-Bera	87.3086***	16.3676***	66.0371***

Note: *** Significant at 1 percent level

4.3.2.1   Estimation Bank Profitability Model

The discussion will be divided into two parts. The first part will illustrate the statistical analysis of variables using the two models have been determined (equation 16 and

equation 17) from the previous chapter. Mean, median, standard deviation, skewness, kurtosis, and value of Jarque-Bera will determine the statistical behaviour of variables. The second part is the results of the estimation technique from the model built.

The first model examines the impact of bank profitability to the bank specifics (i.e. bank stability, bank characteristics, DCR and market power). While the second model included the macroeconomic factors as a control variable to capture macroeconomic developments that are likely to affect the quality of Islamic bank profitability in Malaysia.

Hence, the specific estimation model can be specified:

Model 1 for Bank Profitability

$$BP1_{i,t} = \vartheta_{0i} + \vartheta_1 Z_{i,t} + \vartheta_2 AST_{i,t} + \vartheta_3 OWN_{i,t} + \vartheta_4 LOAST_{i,t} + \vartheta_5 LPLO_{i,t} + \vartheta_6 DIV_{i,t} + \vartheta_7 COST_{i,t} + \vartheta_8 DCR_{i,t} + \vartheta_9 HERFIN_{i,t} + \mu_{1i,t}$$

$$(16)$$

Where;

BP is used as a proxy measure of the banking profitability (ROA); *Z* is Z-score as a proxy of stability; *AST* is the total assets of a bank as a proxy of size; *OWN* is the ownership as a proxy of dummy variable. Assume the value of (1) if the bank is a local Islamic bank and (0) is a foreign Islamic bank in Malaysia. The dummy variable (OWN) is comprised to detect whether there are efficiency differences between local Islamic bank and a foreign Islamic bank operating in Malaysia; *LOAST* is ratio of loans to total assets; *LPLO* is the ratio of loan loss provisions to total loans is incorporated as an independent variable in the regression analysis as a proxy for credit risk; *DIV* is the Income Diversity proxies by a measure of diversification across different sources of

income; *COST* is cost to income ratios as a proxy of cost efficiency; *DCR* is displaced commercial risk; and *HERFIN* is the Herfindahl index, defined as the sum of squared market shares (in terms of total assets) of all Islamic banks in the Malaysia.

Model 2 for Bank Profitability

$$BP2_{i,t} = \gamma_{0i} + \gamma_1 Z_{i,t} + \gamma_2 AST_{i,t} + \gamma_3 OWN_{i,t} + \gamma_4 LOAST_{i,t} + \gamma_5 LPLO_{i,t} + \gamma_6 DIV_{i,t} + \gamma_7 COST_{i,t}$$
$$+\gamma_8 EXCH_{i,t} + \gamma_9 INFL_{i,t} + \gamma_{10} GDP_{i,t} + \gamma_{11} INT_{i,t} + \gamma_{12} DCR_{i,t} + \gamma_{13} HERFIN_{i,t} + \mu_{2i,t}$$

(17)

Where;

EXCH is the exchange rates; *INFL* is the inflation rate; *GDP* Gross domestic product; *INT* is the interest rate ratios; and μ is an error term for bank.

4.3.2.2 Correlation Matrix

Before interpreting the estimation results, it is interesting to study the problem of multicollinearity between explanatory variables, which can lead to biased results. To detect multicollinearity, it is possible to use the correlation matrix. According to Kennedy (1992), there is a serious problem of multicollinearity if the correlation coefficient is above 80% for each pair of variables. According to Table 4.17, several variables are correlated, but not beyond the critical threshold of multicollinearity.

Table 4.17 shows the output use Variance Inflation Factors method. Interpretation: If a VIF is in excess of 20, or a tolerance (1/VIF) is 0.05 or less, there might be a problem of multicollinearity. In this case, multicollinearity has no significant effect on the variables and no multicollinearity is evident in the model.

Table 4.17: Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
HERFIN	3.38	0.2957
INT	3.38	0.2961
Z	3.17	0.3152
LOAST	2.56	0.3899
DCR	2.34	0.4272
EXCH	2.06	0.4847
DIV	1.89	0.5281
INFL	1.45	0.6914
LPLO	1.39	0.7184
AST	1.27	0.7894
OWN	1.26	0.7932
COST	1.15	0.8716
GDP	1.10	0.9094
Mean VIF	2.03	

Another method to test the existence of multicollinearity is by checking the Pearson correlation between the independent variables. Correlation analysis is also a simple method to detect the existence of collinearity in a multi-variable data based on the variables' correlation matrix (Anderson et al., 2008). It can test and measure the degree of strength (absolute value) of the relationship between a dependent variable (ROA model) and the dependent variables (bank specifications and macroeconomic factors). Correlation analysis can also be used to determine the type of relationship or the direction of the figure, whether it is moving from left to right or vice versa. Thus, a relatively high correlation value between the two independent variables indicates the possibility of a multicollinearity happening.

Table 4.18 shows the correlation matrix for the independent variables. Based on the correlation table, the statistical findings show that all independent variables have significant correlate with profitability variables except the (AST), (COST), (INFL) and (GDP) variables. Variable (INT) has significantly strong negative values with

profitability indicating that the greater amount of the interest rate the economic have, the lesser their amount of profitability.

Most of the variables are correlated, but not beyond the critical threshold of multicollinearity. All correlation results are below 0.6 for each pair of variables, which indicates that multicollinearity is not a potential problem (Colin and Paul, 2012).

The connections DCR and bank profitability also presented. Applying the statistical model, we obtain the result of bank profitability and the amount of capital charge required to cover the DCR. A negative relationship exists between DCR and bank profitability.

This negative sign means if the lower (higher) amount of capital charge required to cover the DCR, the higher (lower) bank profitable their capital. In this vein, Cihak and Hesse (2010) and Toumi et.al (2011) point out that the greater the exposure of bank to high risk, bank profitability would be lower. The Islamic banks became less profitable when the Islamic banks more absorb a proportion of losses normally borne by investment account holders under commercial pressure.

The finding also found a positive relationship between income diversification (DIV) and bank profitability. It is supported by Baele et al. (2007), Busch and Kick (2009) and Elsas et al. (2010) who states that a positive relationship between income diversification and the market's anticipation of future bank profits. They also stated that income diversification could increase risk-adjusted returns of banks and this relationship was stronger at larger banks.

This research also we include the ratio of loan loss provisions to total loans (LPLO) has negative impacts on bank profitability. This variable as a proxy for credit risk. This finding complies with that of Miller and Noulas (1997) and Ramlall (2009) who indicate that a negative relationship between credit risk and profitability. It shows that whenever there is a negative relationship between them, then it signifies that the greater risk linked with loans, higher the level of loan loss supplies which thereby and create a trouble at the profit-maximizing strength of a bank.

Table 4.18: Pearson's Correlations

| Correlation	ROA	Z	AST	OWN	LOAST	LPLO	DIV	COST	EXCH	INFL	GDP	INT	DCR	HERFIN
ROA	1.0000													
Z	0.4560***	1.0000												
AST	0.0064	0.2857***	1.0000											
OWN	0.1410*	0.0287	-0.0068	1.0000										
LOAST	-0.5387**	0.6635**	0.0361	0.2590**	1.0000									
LPLO	-0.3938**	0.4032**	0.1009**	0.2575**	0.4478***	1.0000								
DIV	0.5106*	0.4265**	0.0739*	0.0550	0.4855**	0.3274**	1.0000							
COST	0.0427	0.0451	0.2273***	0.0035	-0.0232	0.1166***	0.1524**	1.0000						
EXCH	0.1407**	0.1015**	0.1162***	0.0000	0.1320***	-0.0040	0.0585	-0.0045	1.0000					
INFL	0.0020	-0.1677***	-0.0078	0.0000	-0.0471	-0.0921*	-0.0663	0.0226	0.2798***	1.0000				
GDP	0.0028	0.0292	-0.0359	0.0000	0.0615	0.0161	0.0658	-0.0064	-0.0673	0.1938***	1.0000			
INT	-0.1837**	-0.4449***	-0.0060	0.0000	-0.3294***	-0.2678***	-0.3261**	-0.0686	0.5293***	0.4504***	0.0721*	1.0000		
DCR	-0.4186***	-0.5417***	0.0080	0.0314	0.5620***	0.2751***	0.5258**	0.1544***	0.0902*	0.0299	0.0526	0.4666***	1.0000	
HERFIN	0.5483**	0.7332**	0.1859**	0.2245**	0.6671**	0.4266**	0.6435**	0.0695	0.0685	-0.1028**	0.0619	-0.4456**	0.5709**	1.0000

*Note: *** Correlation is significant at the 0.01 level (2-tailed).*
*** Correlation is significant at the 0.05 level (2-tailed).*
** Correlation is significant at the 0.1 level (2-tailed).*

However, the simplest means for analysing statistical data is to plot and visually study the information. The relationships of DCR_{VaR} and bank profitability are correlated (Arshad et al., 2015b). To better understand a correlation between DCR_{VaR} and bank profitability, scatter chart is plotted. Figure 4.9 illustrates relationship of DCR_{VaR} and bank profitability in Islamic bank. Figure 4.9 depicts an inverse relation between DCR_{VaR} and bank profitability. An increase the DCR_{VaR} output will cause a decrease in bank profitability unit. This implies that, as more the Islamic bank faces additional deposit withdrawal because they share profit and loss on deposits, thereby leading to less profitable banks. On the other hand, depositors more sensitive to the rate of return on their deposits and bank pays lower return or passes some losses to these depositors, more withdrawal their deposits, hence bank become less profitable.
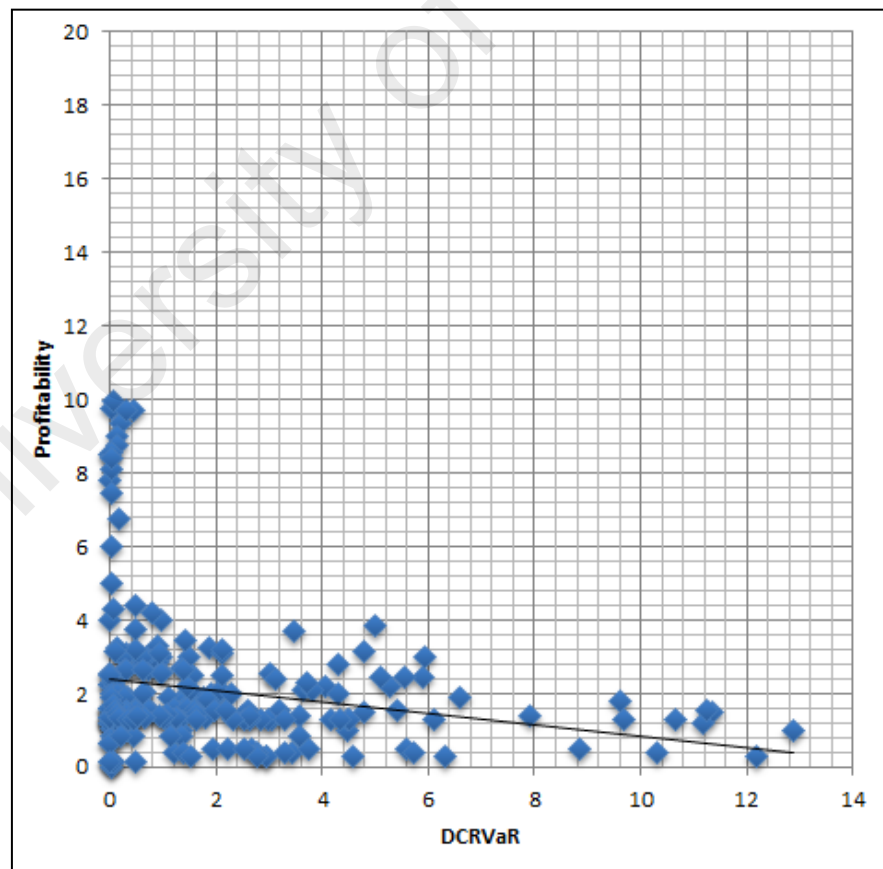
Figure 4.9: Scatter diagram of DCR_{VaR} and bank profitability in Islamic bank (%).

4.3.2.3 Analysis of Bank Profitability Models

Table 4.19 shows the finding on GLS Estimation in Bank Profitability for Model 1 and Model 2. Based on the result of the Breusch-Pagan Lagrange Multiplier (LM) test run on the GLS with non-effects and random effect model. which the large chi-squared of 1.68 (All Banks-Model 2), 32.67 (Large Banks-Model 2), and 11.10 (Small Banks-Model 2), we reject the null hypothesis in favor of the random group effect model (p <0.0000). This is the evidence of significant differences across variables, therefore we can run a simple random effects regression.

Table 4.19 also show the result of the Hausman test run on the fixed and random effect model. The Hausman coefficients model 2 for All Banks and Large Banks yields are 92.48 and 59.12. The results are insignificant P-value, Prob>chi squares larger than 0.05. Then, it is safe to use fixed effects which are to reject the null hypothesis at significance level 0.05. This means that the fixed effects are chosen. However, converse with the Small banks outputs. The output of probability of small banks is 0.0041. Based on these results we would not to reject the null hypothesis and a random effect approach will be preferred. The outcome of the regressions fit the theory well[37].

The results of White's Test result of the Chi square rejects the null hypothesis that there is no problem of heteroskedasticity or homoskedasticity assumption prevails. This suggests that the error variance is not constant over time. Therefore, 'White's Heteroskedasticity Correction' in the statistical and econometric software is used to overcome the problem. The situation also justifies the use of the GLS estimation method (Gujarati and Porter, 2010).

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[37] Appendix 3 shows the results of the GLS estimation in bank profitability.

Table 4.19: GLS Estimation Result in Bank Profitability

	GLS with Fixed Effects				GLS with Random Effects	
	ALL BANKS		LARGE BANKS		SMALL BANKS	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
C	0.0040	0.0015	0.0021	0.0021	0.0080	-0.0022
	0.0011**	0.0027	0.0010**	0.0024	0.0038**	0.0090
Z	0.0027	0.0022	0.0060	0.0055	0.0052	0.0038
	0.0020*	0.0020	0.0019***	0.0019***	0.0050	0.0051
AST	-0.0015	-0.0018	-0.0020	-0.0021	0.0011	0.0018
	0.0008**	0.0008**	0.0008**	0.0008**	0.0017*	0.0016*
OWN	n.a	n.a	n.a	n.a	0.0014	0.0016
	n.a	n.a	n.a	n.a	0.0031	0.0029
LOAST	0.0097	0.0085	0.0151	0.0153	0.0043	0.0085
	0.0035**	0.0035**	0.0034**	0.0035**	0.0088*	0.0082*
LPLO	0.0541	0.0613	0.0388	0.0403	0.0840	0.1692
	0.0244**	0.0245***	0.0211**	0.0214**	0.0801*	0.0759**
DIV	0.0013	0.0013	0.0012	0.0014	0.0029	0.0078
	0.0024	0.0024	0.0024	0.0024	0.0051	0.0049*
COST	-0.0001	-0.0001	-0.0003	-0.0003	-0.0042	-0.0035
	0.0001	0.0001	0.0002**	0.0002**	0.0003*	0.0003*
EXCH		0.0073		-0.0030		0.0212
		0.0073		0.0067		0.0205
INFL		-0.0007		-0.0008		-0.0029
		0.0005		0.0005**		0.0012***
GDP		0.0099		0.0131		-0.0071
		0.0084		0.0077*		0.0206
INT		-0.0006		-0.0002		-0.0035
		0.0006		0.0005		0.0016***
DCR	-0.0005	-0.0006	-0.0009	-0.0008	-0.0009	-0.0007
	0.0003**	0.0003***	0.0003**	0.0003***	0.0008*	0.0008*
HERFIN	0.1900	0.1100	0.1800	0.1800	0.1700	0.1900
	0.1200**	0.1200**	0.1200**	0.1200**	0.1500*	0.1500**
R^2	0.3715	0.3880	0.5756	0.5876	0.3121	0.3391
Hausman Test (Test the Random vs Fixed effects)	78.40	92.48	37.45	59.12	17.89	23.79
Prob	0.2449	0.3061	0.3401	0.4576	0.0039	0.0041
Accept / Reject H0 (null)	Reject	Reject	Reject	Reject	Accept	Accept
Breusch-P Test (Test None vs Random effects)	0.88	1.68	33.68	32.67	3.51	11.10
Prob	0.3474	0.1946	0.1010	0.1002	0.0611	0.0519
Accept / Reject H0 (null)	Reject	Reject	Reject	Reject	Reject	Reject

Table 4.19: GLS Estimation Result in Bank Profitability, continued

White's Test (Heteroskedasticity test)	130.03	181.86	91.52	131.05	75.89	95.00
Prob	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Accept / Reject H0 (null)	Reject	Reject	Reject	Reject	Reject	Reject
Durbin-Watson test (Autocorrelation test)	1.9769	2.0022	1.9957	2.0111	1.9784	1.9838
Ramsey RESET Test (Test of specification error)	3.3765	3.6780**	0.2479	2.7120*	3.2899	1.2572**

Note:
Figures in parentheses denote 'Standard Error' values of the regressions coefficients.
*** Significant at 1 percent level.
** Significant at 5 percent levels.
* Significant at 10 percent levels.

However, the estimation results of Durbin-Watson test, we fail to reject the null because the Durbin–Watson statistic for all banks categories is 2 (the expected value under the null hypothesis of no serial correlation) at 5 per cent. It is good to note that all these models do not suffer from problems of autocorrelations. Upper and lower bounds for the d statistic can be found in most econometrics texts (Greene, 2008).

The F-value of the Regression Specification Error Test (Ramsey RESET) as shown in Table 4.19 affirms that the models are not miss specified as per model 1 and 2 by accepting the null hypothesis, H0: Model has not been misspecified. As such the diagnostic tests confirm that there are no omitted variables, no incorrect function and correlation between independents.

In terms of the DCR variables, the result shows that the negative effects between DCR with bank profitability of the Islamic banking sector. This result supports that the findings of Ahmed and Luo (2010). Using the relationship between the rates of return

and the level of deposit in the bank, the more Islamic banks have to pay to ensure competitive rate of return to the depositors, the Islamic banks become less profitable.

The result shown is not different from the previous output. The ROA (profitability) was positively related to Z-score (stability). In principle, capital is seen as the main source to cover loan losses. Well capitalised banks increase banks' creditworthiness reducing costs of funding and also have more capability to develop business. It is, therefore, expected that there will be a positive association with profitability and stability.

Conversely, the AST variable, our results find that the larger banks are more likely to perform poorly (negative sign). However, smaller banks have a positive relationship with profitability. A similar result was obtained by Staikouras and Wood (2004), Wheelock and Wilson (2012), Miles et al. (2013), Lee and Kim (2013), and Chronopoulos et al. (2015), who split their sample into large and small banks. Among small banks, size was positively related to profitability. Among large banks, the relationship was negative. This was taken as evidence for diseconomies of scale from a certain size upwards.

The local Islamic banks are relatively stronger than foreign Islamic banks with the dummy variable (OWN) is a consistently positive sign in the regression explaining bank stability for all, large and small Islamic banks group.

In particular, to analyse whether the way in which the assets side of a bank's balance sheet is structured affects its profitability, we use the loans to total assets ratio (LOAST). This liquidity ratio indicates what percentage of the total assets of the bank are tied up in loans. The higher the value of this ratio, the less liquid the bank. Our result shown the

positive relation between LOAST with bank profitability. It means that, the higher value also predicts higher profitability. It is supported by Alper and Anbar (2011) who states that the loans to total assets ratio affect bank profitability positively unless bank takes on unacceptable level of risk. This ratio is one of the important measures of asset quality. But, the coefficient of this ratio is also expected to be negative because bad loans are expected to reduce profitability.

The coefficient of the LPLO variable in the regression models is a positive sign. It means that, the greater credit quality, a better on bank profitability. There appears to be a consensus that bank profitability is directly related to the quality of the assets on its balance sheet. This relationship exists because an increase in the doubtful assets, which do not accrue income, requires a bank to allocate a significant portion of its gross margin to provisions to cover expected credit losses; thus, profitability will be lower. With a strongly positive coefficient, greater income diversity (DIV) tends to increase stability in all, large and small Islamic banks group. We are suggesting that a move from lending-based operation to other sources of income might improve stability in those Islamic banks.

COST which is stated that more efficient banks are more profitable, we use the cost to income ratio (COST) as a proxy. This ratio measures the bank's overhead or running costs (the largest proportion of which is normally incomes) as a percentage of income generated before provisions. The higher cost to income ratios has a consistently positive link to the bank profitability; the sign is consistently significant for all, large and small banks.

The economic growth (GDP) and bank profitability will be positive. It is because, when GDP growth up and usually during economy booms, there will an increase in credit quality which will lead to a decrease in defaults, thus rising profits. According to Demirguc-Kunt and Huizinga (1999), Naceur (2003) and Scott and Arias (2011), the GDP per capita growth is a positive impact on the bank's performance. They show that rapid economic growth, increase profitability for a large number of countries.

The result also shown the positive sign between exchange rate (EXCH) and bank profitability due to increase in the real GDP, the net exports amount becomes positive, this reduces foreign debt burden and local currency becomes stronger.

However, the result shows that changes in interest rates (INT) have a statistically significant negative effect on bank profitability. An environment of low interest rates coupled with fierce competition among banks could limit the possibilities of banks to establish appropriate prices for their loans and deposits. It may put pressure on the operating margin and negatively affecting banks' profitability.

Our result confirm a positive relationship between inflation (INFL) and bank profitability. This situation happens because the inflation rate is fully anticipated by the bank's management. So, the conventional bank can adjust interest rates appropriately to increase revenues faster than costs, which should have a positive impact on profitability. In other word, the inflation affects bank profitability when this is defined in terms of ROA, implying that managers anticipate inflation expectations and adjust interest rates to achieve higher profits.

4.4   CONCLUSION

We can conclude that, basically the Displaced Commercial Risk problem should not occur in the Islamic banking system if their account holders choose Islamic banks due to the religious obligatory factor. However, the empirical data proved the existence of DCR in Islamic banking system in Malaysia due to profit motivated or often referred to as a floating client.

In this section, we examine two approaches to find the capital requirement for displaced commercial risk using $DCR\alpha$ and DCR_{VaR}. We find that the capital requirement to displaced commercial risk as proposed under the simple risk weight supervisory discretion approach of IFSB (2005) is different than the capital requirement that results from our Value at Risk model. The capital required by Islamic banks to cover displaced commercial risk using $DCR\alpha$ is higher than the capital required by Islamic banks to cover displaced commercial risk using DCR_{VaR}. The VaR model we proposed would be an alternative method to measure the additional capital charge required to cover the displaced commercial risk, especially that the IFSB (2005) capital framework and the capital requirements directive allow for an internal model approach.

With regards to the impact of DCR on both bank stability and profitability, the finding shows that there was a negative relationship between DCR and bank performances (bank stability and profitability). In light of this output, Islamic banks should take into consideration the impact of interest rate on the Islamic banks as well as the Islamic bank instrument such as a profit equalization reserve to mitigate the negative effect of displaced commercial risk and to maintain its stability and profitability. It is because the profit equalization reserve can sustain a certain level of rate of return for depositor.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1   INTRODUCTION

The present chapter aims to discuss the findings and results in this study. This chapter consists of four sections. Section one outlines the introduction. Section two provides a concise summary of the research which the objectives and rationale of the study are further discussed. Section three discusses the practicable recommendations and implications that could be obtained from the findings. Section four discusses the contributions and limitations of the study as well as suggestions for future studies, respectively.

5.2   REFLECTING ON THE FINDINGS OF THE RESEARCH

The banking business is covered with various types of risks. Among the significant risks faced by the Islamic banks, the displaced commercial risk (DCR) is the unique risks which focused by the investment account holders, regulators and industry players. The major challenge of Islamic banks are functioning together with the conventional banks in the dual banking system in which the conventional banks can provide a fixed rate of return which cannot apply in Islamic banks.

Furthermore, the Islamic banks are motivated to imply in the profit and loss sharing type of investment with investment account holders. Consequently, the investment account holders are getting the return based on the benefits of the investments, rather than a fixed rate of return. Therefore, a rational investment account holders might make a decisions to withdraw the deposits if the rate of return in Islamic banks is lower than

the conventional banks. This deposit withdrawal phenomena can lead to an unstable environment for Islamic banking and it could threaten Islamic banks' profitability.

This study is meaningful in the case of Malaysia given that Malaysia allows dual banking practices. However, up to date, the study about displaced commercial risk could be a threat to the Islamic banks in Malaysia are yet to be established. Hence, the present study is undertaken to fill up the gap by estimating the displaced commercial risk and examining the effect of DCR on Islamic bank's performance.

5.2.1   The Displaced Commercial Risk Measure

This study computed the displaced commercial risk for Malaysian Islamic banks. Based on this investigation, we can conclude that the displaced commercial risk problem basically should not happen in the Islamic banking system if their account holders choose Islamic banks according to the religious obligatory element. However, the statistical result from the previous study has showed that the customer profit oriented behavior (floating client) resulted the existing of displaced commercial risk in Malaysia Islamic banking system.

In this research, we also examine two approaches to find the capital requirement for displaced commercial risk by using $DCR\alpha$ and DCR_{VaR}. We revealed that the capital need to displaced commercial risk as offered under the simple risk weight supervisory discretion approach of IFSB (2005) is different than the capital need as proposed by our investigation by using Value at Risk model. The capital need by Islamic banks to protect displaced commercial risk using $DCR\alpha$ is higher than the capital need by Islamic banks to protect displaced commercial risk using DCR_{VaR}.

According to our calculation, the Islamic banks need to set a minimum capital requirement using the Value at Risk approach to protect against the displaced commercial risk in banking due to three reasons. First, the minimum amounts are desired to ensure that a standardised limit on the levels of capital requirements to cover DCR can be provided to the bank with a high probability. Therefore, DCR_{VaR} can provide a consistent measure of displaced commercial risk across banks and across variables. Thus, it is important to recognise the VaR can be used effectively as a strategic tool to estimate displaced commercial risk for Islamic banks.

Second, bank is able to use the capital to generate significant profits on the investment with the minimum standard of displaced commercial risk. In Islamic banks, profit and loss sharing financing instruments could develop the role of Islamic banks in providing funds to skilled mudarib in an effort to encourage economic growth.

Third, the Islamic banks also can minimise the opportunity cost of capital at the lower displaced commercial risk. The Islamic banks are more vulnerable to the displaced commercial risk if the capital of the bank is not strong enough and this can have financial distress costs as well as require for some additional funding. Thus, for that reason, this study offers significant insight into why the banks themselves may choose the minimum standard of displaced commercial risk by using the Value at Risk approach.

In addition, this study also demonstrated the weaknesses of DCRα approach and significant efforts need to be made to design a more suitable capital guideline for Islamic banks. This can be seen after the IFSB (2005) prescribe to all Islamic banks in

the same authority and the same proportion of risk weighted assets funded by PSIA without taking into account the actual returns smoothing unusual to each Islamic bank.

Likewise, there has been a contradiction in defining the restricted investment deposits. According to the International Accounting Standard established by the Accounting and Auditing Organisation for Islamic Financial Institutions (2008), PSIA deposits should not be reflected on the bank statement of financial position and cannot be identified as liabilities of Islamic banks as the depositors are highly involved in investment decisions. Thus, it can be argued that PSIA financed assets should be excluded from the risk weighted assets in the denominator of the RWCR.

5.2.2 Discussion the Impact of Displaced Commercial Risk on Islamic Bank Performance

As regards to the impact of displaced commercial risk on bank performance, the result suggested that the displaced commercial risk in Malaysia have adverse effects on Islamic banks' stability as well as banks' profitability. In light of this output, Islamic banks should take into consideration for the impact of interest rate on the Islamic banks as well as the Islamic bank instrument such as a profit equalisation reserve to reduce the negative effect of displaced commercial risk and to sustain its stability and profitability as profit equalisation reserve can maintain a certain degree of rate of return for depositors.

Based on bank performances (stability and profitability), most of the independent variables have a significant affect with stability variables. Variable (INFL) and (INT)

have significantly strong negative values with stability is inversely proportional of the inflation value and the economic interest rate.

Additionally, the displaced commercial risk was found to affect the stability of the Islamic banks because banks cannot offer competitive rates, customer would be inclined to switch to the other banks which offer a higher returns. Customers that desire higher returns can simply switch their funds to the other banks that provide higher returns. Hence, displaced commercial risk can lead to a significant stability problem.

This study also presented the relationships between DCR and bank profitability. Based on the result (Section 4.3.2.8), this study revealed that a negative relationship exists between DCR and bank profitability. This negative sign show that the greater the exposure of a bank to high displaced commercial risk resulted with the lower bank profitability. The Islamic banks became less profitable when the Islamic banks more absorb a part of losses usually incurred by investment account holders under commercial pressure.

5.3 POLICY IMPLICATIONS OF THE FINDINGS

As mentioned in the Chapter 1, this research driven by a belief where a gap is appear in between the theoretical side of displaced commercial risk and the practical indication of the users of the Islamic banking facilities. Therefore, the findings and results of this research give positive implications and suggestions for various parties in pursuing the desired ultimate goals of the Islamic banking system. Additionally, this study also contributes to the existing academic research in the case of opening up new dimensions of study, in between, it also makes valuable input to industry practitioners for practice

related to the operational bank and improving current regulations focus on displaced commercial risk.

5.3.1 Implication for Central bank

In this study, a total three implications have been applied in order to contribute to the Central bank. One of the methods is the value at risk (VaR) method. The contribution is done by providing empirical evidences based on VaR method. We have proposed this method to quantify the displaced commercial risk based on returns smoothing strategies of the Islamic bank within the retention of different reserves. The model depends on several parameters: i) The proportion of mudarib shares of the bank as a fund manager; ii) The proportion of profit equalisation reserve that the Islamic bank maintain from the total revenue on asset; iii) The ratio of profits and losses sharing between investment account holders and the Islamic bank, and; iv) The proportion of the investment risk reserve.

VaR model is an alternative method to quantify the additional capital charge required to protect the displaced commercial risk. The allowing of using an internal model approach by the IFSB (2005) capital framework and the capital requirements directive enable propose of VaR model. There are several reasons that allow VaR can help measuring the displaced commercial risk for Islamic banks. Firstly, VaR is easy to understand as it just one number giving us an idea about the extent of the displaced commercial risk in the Islamic banks. Price unit (ringgit) or as percentage of transaction value is performed in VaR measurement and this enable VaR easy to interpret and analyse in future.

is measured in price units (ringgit) or as percentage of transaction value. This makes VaR very easy to interpret and to further use in analyses.

Secondly, there are three key elements of VaR method; i) A specified level of displaced commercial risk in value; ii) A time period for displaced commercial risk is assessed and; iii) A confidence interval. For instance, the capital required by Islamic Bank to cover the displaced commercial risk by using Value at Risk is RM 1 million of the total of investment accounts with 99 per cent confidence level and a holding period 1 year.

Lastly, while previous researches only seek the concept of displaced commercial risk in an Islamic bank, this investigation find of those factors influencing displaced commercial risk and the effect of bank performance. Now it is clear that the existence of displaced commercial risk in Islamic banks it is not a theory per se but also empirically proven.

5.3.2   Implications for Islamic Banks

In micro-scope, the displaced commercial risk related issues provide an important implications for the management of Islamic banks. Islamic banks' owners or management not only focus on the rate of return in Islamic banks but also have to observe the movements of conventional interest rates and other variables in determination of the Islamic bank's performance. Furthermore, Islamic banks are also needed to maintain and improve its performances continuously. For example, the performance growth of Islamic banks would be affected if the displaced commercial risk not well managing.

5.3.3 Implication for Clients

One of the reasons that displaced commercial risk problem arise is the customers' behavior (profit motivated or known as floating client). Banks need the loyal customer in order to overcome this issue. Therefore, education play an important role in overcome this displaced commercial risk issue by modify the syllabus which is an engaging of Islamic risk management into Islamic study modules. This modification modules should begin since secondary school level then follow by college or university level. At the end of this modification module, people involve will get to know the important of loyalty, the essence which need by majority of the Islamic banks' depositors and the best solution to overcome the displaced commercial risk issue. If it has to be successful, then the Islamic banks will profitable and stable.

5.4 LIMITATIONS AND SUGGESTIONS FOR THE FUTURE RESEARCH

5.4.1 Limitations

In the present study, there are total three limitations that need to be acknowledged and addressed. Firstly, the aspects of displaced commercial risk and the impact of regional cultural differences in the risk perception of respondents should be examined. Each region has its unique culture which shapes its risk management and therefore Islamic finance related studies should also endogenize the cultural and cultural-religious dimension of risk in considering risk and risk management practices. It is hoped that such a study could be conducted in the future, perhaps as part of post-doctoral studies.

Similarly, investigation of the impact of macroeconomic factors and business cycles should be performed on displaced commercial risk perceptions across different regions. Considering that each country has a particular dynamism related to macroeconomic with specific implication for various risk dimensions in that particular framework, such economic realities should be considered as part of risk management related studies.

There is still wide scope for improvement and for further research. This study investigates the displaced commercial risk only for the funding aspect of the Islamic bank. Therefore, the further study may expand the scope of the sample enlarging the coverage to include respondents from a different region or more countries and with more diversified backgrounds which to assess the value of displaced commercial risk. This would give a clearer understanding concerning of the displaced commercial risk.

5.4.2   Suggestion for Future Study

With regard to the limitations uncovered in this study, the future research would be proposed in the following manner.

First, future research is recommended to increase the sample size and to validate the models developed in this study. The similar research can be operated in different countries.

Second, more advanced method such as using the artificial neural network and system dynamic model are recommended in the future study. The artificial neural network, which is used to approximate or estimate functions that can rely on a huge number of inputs and are generally unknown. However, system dynamics models are used for

studying and managing problems in complex feedback systems. It is created to avoid such system resistance and identify high-leverage guidelines for sustained improvement.

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