THE RELATIONSHIP BETWEEN RISKS AND EFFICIENCY OF ISLAMIC BANKS IN MALAYSIA

By

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ABSTRACT

Malaysia is a country known as the Islamic financial hub which plays an important role in its economic growth. Given the situation and the development of positive economic growth in Malaysia, Islamic banking needs to improve their performance in terms of efficiency in order to follow the current circumstances. However, Islamic banking is not spared from dealing with certain risks which will impact on their efficiency. Thus, the main objective of this study was to examine the efficiency level of Islamic banks in Malaysia and their relation to credit risk, liquidity risk and operational risk from the period of 2008 to 2013. Twelve Islamic banks were chosen as samples for this study which were taken by the availability of data, through each banks' annual report from 2008 to 2013. This study was conducted by applying the Data Envelopment Analysis (DEA) and Multiple Regression Analysis to achieve its objectives. The finding shows that Islamic banks in Malaysia exhibited a total of 77.1% of overall efficiency of technical (OTE), 83.1% of Pure Technical Efficiency (PTE) and 92.6% of Scale Efficiency (SE). Despite the global financial crisis that occured during the middle year of 2007 to the end of 2009 which slightly affected Asian countries such as Malaysia, nevertheless, Islamic banks seem to be more robust during the crisis than conventional banks. This is because of its basic nature which prohibited interest payments (riba) in all transactions. This study shows that credit risk has a negative significant relationship with efficiency of Islamic banks, while liquidity was found to be positive related to efficiency of Islamic banks. This study also found that the size of the bank has positive significant relationship to efficiency. Finding from this study give contribution to the policy makers and regulators as well as to the managers of Islamic banks by providing empirical evidence on the performance of the Islamic banks in Malaysia towards the efficiency level and risks relationship.

Keywords: Efficiency, credit risk, liquidity risk, operational risk, Islamic banks.

ABSTRAK

Malaysia merupakan negara yang terkenal sebagai hab kewangan Islam dan memainkan peranan penting bagi pertumbuhan ekonomi negara. Prestasi sistem perbankan Islam perlu ditingkatkan dari segi kecekapan memandangkan situasi pembangunan dan pertumbuhan ekonomi yang positif di Malaysia. Walau bagaimanapun, Perbankan Islam tidak terlepas daripada berhadapan dengan risiko-risiko tertentu yang akan memberi kesan terhadap tahap kecekapan sistem ini. Justeru itu, tujuan utama kajian ini dijalankan adalah untuk mengukur tahap kecekapan bank-bank Islam di Malaysia dan hubungannya dengan risiko kredit, risiko kecairan dan risiko operasi bagi tempoh 2008 hingga 2013. Sampel kajian terdiri daripada 12 buah bank Islam di Malaysia yang diambil berdasarkan kesahihan data dan juga kebolehdapatan data melalui laporan tahunan bagi setiap bank dari tahun 2008 sehingga 2013. Secara khususnya, kajian ini mengguna pakai Data Envelopment Analysis (DEA) dan Analisis Regresi Pelbagai (Multiple Regression Analysis) bagi mencapai objektif kajian. Dapatan kajian menunjukkan bahawa bank-bank Islam di Malaysia mencapai sebanyak 77.1% kecekapan teknikal keseluruhan (OTE), 83.1% daripada kecekapan teknikal tulen (PTE) dan 92.6% daripada Kecekapan Skala (SE). Walaupun krisis kewangan global yang melanda dunia pada pertengahan tahun 2007 hingga akhir tahun 2009 menjejaskan sedikit negara-negara Asia seperti Malaysia, tetapi bank-bank Islam kelihatan lebih kukuh untuk pulih dalam krisis kewangan berbanding dengan bank-bank konvensional kerana sifat semulajadinya yang melarang bayaran faedah (riba) dalam semua transaksi. Hasil dapatan kajian telah menunjukkan bahawa risiko kredit mempunyai hubungan negatif yang signifikan terhadap kecekapan bank-bank Islam, sementara risiko kecairan mempunyai hubungan positif yang signifikan terhadap kecekapan bank-bank Islam. Selain itu, kajian juga mendapati saiz bank mempunyai hubungan positif yang signifikan terhadap kecekapan. Dapatan kajian ini dapat memberi sumbangan kepada pembuat dasar dan pengawal selia dan juga kepada pengurus bank-bank Islam dengan menyediakan bukti empirikal mengenai prestasi bank-bank Islam di Malaysia dari segi tahap kecekapan dan hubungannya dengan risiko-risiko.

***Kata Kunci**: Kecekapan, risiko kredit, risiko kecairan, risiko operasi, Bank-bank Islam.*

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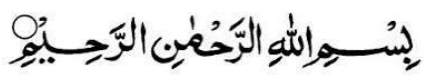

In the name of Allah, the Most Gracious, the Most Merciful.

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machines
BIMB	Bank Islam Malaysia Berhad
BMMB	Bank Muamalat Malaysia Berhad
BNM	Bank Negara Malaysia
CRS	Constant Return to Scale
DEA	Data Envelopment Analysis
DFA	Distribution Free Approach
DMU	Decision Making Unit
DRS	Decreasing Return to Scale
IBA	Islamic Banking Act
IRS	Increasing Return to Scale
MENA	Middle Eastern and North African
OBS	Off-Balance Sheet
OTE	Overall Technical Efficiency
PLS	Profit and Loss Sharing
PTE	Pure Technical Efficiency
RM	Malaysian Ringgit
SE	Scale Efficiency
SFA	Stochastic Frontier Approach
TFA	Thick Frontier Approach
VIF	Variance Inflation Factors
VRS	Variable Return to Scale

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The banking industry is the backbone and major component of the financial system. Thus, it will give impact to the stability of an economy. Any problems and interference that happen in the banking system will give implications for the economic conditions of a country (Akkizidis & Khandelwal, 2008). It means the good economic conditions are resulted from good strategies and good management in handling and controlling any problems that occur around the country.

According to Ayub (2007), the word 'bank' is derived from an Italian word 'banco' which means shelf or bench. It is used to display coins and for trading money. Therefore, a bank is an institution authorized to take deposits from customers for their financial purposes in expanding their short term and long term finance facilities. He also described that the role of a bank is to keep money which is received from ordinary people, organizations, state or surplus units which is in circulation of economy in a country. Then, the bank will use this pooled money for making advances to others to get a return. The return can be in the form of interests, dividends or others.

Since bank is a very important component between surplus and deficit units in the economy, it needs to maintain and perform their services efficiently. Banks with efficient performance can attract many customers in order to maintain economic condition in our country.

This chapter briefly gives the overview of the study. This section will specifically highlight the background of the study, problem statements, research questions, research objectives, significance and scope of the study and the organisation of this study. A conclusion will end the chapter of this study.

1.1 Background of the Study

In Malaysia, there are two types of banking system namely Islamic banking and conventional banking. Under the Islamic banking system, two types of banks are operating in parallel with each other, namely Islamic windows and full-fledge. Islamic windows is where conventional banking institutions, like the commercial banks, also offer Islamic banking services apart from conventional service. The ownership of Islamic banks in Malaysia are conceive of ten local banks and six foreign banks. Currently, there are two domestic or local banks that operate full-fledged. They are Bank Islam Malaysia Berhad (BIMB) and Bank Muamalat Malaysia Berhad (BMMB). BIMB was the first Islamic bank established, that is in 1983, while BMMB as the second Islamic bank in Malaysia was established in the year of 1999.

With respect to growth of development and advancement of Islamic banking in Malaysia, the central bank which is known as Bank Negara Malaysia (BNM) plays an important role to control, monitor and provides a framework to Islamic banking industries. Mokhtar, Abdullah and Alhabshi (2008) concluded that the process of development of Islamic banking in Malaysia can be divided into three phases. The first phase was from the year of 1983 to 1992, the second phase started from 1993 to 2003, and the third phase from 2004 onwards.

The first phase period is when Islamic Banking Act (IBA) was enacted and the establishment of the first Islamic bank, BIMB which was enshrined with Syariah principles (is also known as Islamic Law). In the second phase, the conventional banking is permitted to offer Islamic windows services in order to create a healthy competition within the banks industries. It was during this phase that BMMB was established. Moving forward, during the third phase, the country's central bank or BNM issued licenses to foreign Islamic banks to operate in Malaysia in order to create more competition. Kuwait Finance House is the first full-fledged foreign Islamic Bank that was granted a licence under BNM to operate in Malaysia (Mokhtar et al., 2008).

Recently, according to the list of Licensed Banking Institutions by BNM, there are 16 registered Islamic banks operating in Malaysia that have been given license. It is shown in Table 1.1 as follows:

Table 1.1

List of Islamic Banks in Malaysia

No	Name of Islamic Banks	Ownership
1	Affin Islamic Bank Berhad	Local
2	Al Rajhi Banking & Investment Corporation (Malaysia) Berhad	Foreign
3	Alliance Islamic Bank Berhad	Local
4	AmIslamic Bank Berhad	Local
5	Asian Finance Bank Berhad	Foreign
6	Bank Islam Malaysia Berhad	Local
7	Bank Muamalat Malaysia Berhad	Local
8	CIMB Islamic Bank Berhad	Local
9	HSBC Amanah Malaysia Berhad	Foreign
10	Hong Leong Islamic Bank Berhad	Local
11	Kuwait Finance House (Malaysia) Berhad	Foreign
12	Maybank Islamic Berhad	Local
13	OCBC Al-Amin Bank Berhad	Foreign
14	Public Islamic Bank Berhad	Local
15	RHB Islamic Bank Berhad	Local
16	Standard Chartered Saadiq Berhad	Foreign

Source: BNM, 2009 retrieved on 03 November 2014.

Table 1.1 above indicates that there are ten local banks and six foreign Islamic banks, totally sixteen Islamic banks operating in Malaysia. As said before, Bank Islam Malaysia Berhad (BIMB) is the first Islamic bank in Malaysia which was established in 1983. Since its inception, it has emerged as the symbol of Islamic banking in Malaysia.

The Islamic banks in Malaysia consist of Affin Islamic Bank Berhad, Al Rajhi Banking & Investment Corporation (Malaysia) Berhad, Alliance Islamic Bank Berhad, AmIslamic Bank Berhad, Asian Finance Bank Berhad, Bank Islam Malaysia Berhad, Bank Muamalat Malaysia Berhad, CIMB Islamic Bank Berhad, HSBC Amanah Malaysia Berhad, Hong Leong Islamic Bank Berhad, Kuwait Finance House (Malaysia) Berhad, Maybank Islamic Berhad, OCBC Al-Amin Bank Berhad, Public Islamic Bank Berhad, RHB Islamic Bank Berhad and lastly Standard Chartered Saadiq Berhad.

According to Zainol, Shaari and Ali (2008), Islamic banking is more established today due to globalisation and rapid growth of awareness among people and society. They are more alert about the practice of Islam and its way of life. That is one of the reason why there are more Islamic banks nowadays. This is also the case of finance and banking sector as the services in operating based on Islamic fundamentals is important. However, Islamic banks not just provide their services for Muslim only but to non-Muslim customers as well. It means that, Islamic banking is ideal for all levels of society regardless of race. Islamic banking also particed the more equitable distribution among the poor and rich, known as justice principle.

In Islamic banking products and services, the key difference between Islamic banking and conventional banking is known as Shariah. Shariah is a guideline to conduct the Muslim life. Shariah covers the material and matters or aspects of Muslim life like moral, worship and human relationship that relate with economic

aspects including financial transactions. Hence, Islamic banking refers to a banking institution that complies and addresses the concept of Shariah based (Bakar & Engku Ali, 2008). In order to get blessing from Allah SWT, the concept of Shariah must be followed by all Muslim.

Besides, Akkizidis and Khandelwal (2008) specified that there are some differences that can be identified between Islamic banking and conventional banking institutions. For instance, in terms of their business operations and social as well as ethical responsibility. In Islamic banks, their functions and operating modes is based on the rules of Shariah or Islamic law where there is a restriction to acceptable deals which involves *haram* matters such as pork, alcohol and gambling (Ismail, 2010). Besides that, in the conventional banking facilities and services, the relationship between the bank and its customers is based on lender and borrower relationship. However, in Islamic banking services the relationship between the bank and its customers is that of partners which is either between the seller and buyer, lessor and lessee and the financier and entrepreneur. Although profit is their aim, social responsibilities, welfare, justice and equality are also being focused in Islamic banking institutions whilst avoiding any exploitation in their operations and services.

In line with Shariah rules, the basic concept and principles of Islamic banking is that it has to be riba free. Riba is prohibited in Islam. Riba refers to an additional, expanded, interests or extra amount from the principal amount of a loan basis (Akkizidis & Khandelwal, 2008; Shanmugam, Perumal & Ridzwa, 2004). In Islam,

the economic and trading activity is permissible but they must avoid any elements of riba. For instance, the parties who involved in transaction must avoid from taking and giving riba. Thus, any economic and trading activities that involve in collection of riba is prohibited by Allah SWT in any form and for any reason. Riba will impair and give negative impact to the society as well as to the financial system. This is the feature that distinguishes the practice of Islamic economic banking and operations which is different from conventional banking. The prohibition of practice and collection of riba is stated in the Qur'an , in surah al-Baqarah, verse 275:

ٱلَّذِينَ يَأْكُلُونَ ٱلرِّبَوٰاْ لَا يَقُومُونَ إِلَّا كَمَا يَقُومُ ٱلَّذِى يَتَخَبَّطُهُ ٱلشَّيْطَـٰنُ
مِنَ ٱلْمَسِّ ۚ ذَٰلِكَ بِأَنَّهُمْ قَالُوٓاْ إِنَّمَا ٱلْبَيْعُ مِثْلُ ٱلرِّبَوٰاْ ۗ وَأَحَلَّ ٱللَّهُ ٱلْبَيْعَ
وَحَرَّمَ ٱلرِّبَوٰاْ ۚ فَمَن جَآءَهُۥ مَوْعِظَةٌ مِّن رَّبِّهِۦ فَٱنتَهَىٰ فَلَهُۥ مَا سَلَفَ وَأَمْرُهُۥٓ
إِلَى ٱللَّهِ ۖ وَمَنْ عَادَ فَأُوْلَـٰٓئِكَ أَصْحَـٰبُ ٱلنَّارِ ۖ هُمْ فِيهَا خَـٰلِدُونَ ﴿٢٧٥﴾

"Those who devour usury will not stand except as stand one whom the Evil one by his touch Hath driven to madness. That is because they say: "Trade is like usury," but Allah hath permitted trade and forbidden usury. Those who after receiving direction from their Lord, desist, shall be pardoned for the past; their case is for Allah (to judge); but those who repeat (the offence) are companions of the Fire: They will abide therein (forever)".

(al-Qur'an, 2: 275).

The prohibition towards riba also mentioned in surah Ar-Ruum, verse 39:

وَمَآ ءَاتَيۡتُم مِّن رِّبٗا لِّيَرۡبُوَاْ فِيٓ أَمۡوَٰلِ ٱلنَّاسِ فَلَا يَرۡبُواْ عِندَ ٱللَّهِۖ
وَمَآ ءَاتَيۡتُم مِّن زَكَوٰةٖ تُرِيدُونَ وَجۡهَ ٱللَّهِ فَأُوْلَٰٓئِكَ هُمُ ٱلۡمُضۡعِفُونَ
٣٩

"That which ye lay out for increase through the property of (other) people, will have no increase with Allah. But that which ye lay out for charity, seeking the Countenance of Allah, (will increase): it is these who will get a recompense multiplied".

(al-Qur'an, 30: 39)

Another principle of Islamic banking is the profit and loss sharing. According to Ismail (2010), the main mechanism and unique operation in the Islamic banking system is based on Profit And Loss Sharing (PLS) business model. For instance, in mudarabah (profit sharing) and musharakah (partnership) contract, which are the joint venture of two forms of contract which practice the principles of profit and loss sharing based. In this practice, profits and losses are shared in a pre-decided ratio. Besides, in PLS practice, banks will become an active partner and participate in customers' project and not just only lending money or providing funds for their customers. In addition, PLS is an incentive to the bank because it provides equity based funding compared to debt funding, which is more expensive.

Gharar is another negative element which is prohibited in Islamic finance. Gharar means uncertainty, where another party is hiding something that they want to hide from another party. This circumstance can lead to a sense of injustice and persecution to the other side of the party. In Islamic banking, the contract should be clear and nothing should hidden. Thus, if the element of gharar exists in any financial contracts, the contract is not permissible in Islam, as it would allow one of the parties to trick and exploit another party. The prohibition on participation in ghahar is clearly stated in surah An-Nisaa', verse 29:

يَٰٓأَيُّهَا ٱلَّذِينَ ءَامَنُواْ لَا تَأۡكُلُوٓاْ أَمۡوَٰلَكُم بَيۡنَكُم بِٱلۡبَٰطِلِ إِلَّآ أَن
تَكُونَ تِجَٰرَةً عَن تَرَاضٖ مِّنكُمۡۚ وَلَا تَقۡتُلُوٓاْ أَنفُسَكُمۡۚ إِنَّ ٱللَّهَ كَانَ بِكُمۡ
رَحِيمٗا ٢٩

"O ye who believe! Eat not up your property among yourselves in vanities: But let there be amongst you Traffic and trade by mutual good-will: Nor kill (or destroy) yourselves: for verily Allah hath been to you Most Merciful!".

(al-Qur'an, 4: 29)

It is clear, in the above verse, that Allah has given the direction to mankind to avoid uncertainty activities in order to ensure harmony among mankind**.**

Through the explanation above, it is clear that Shariah laws are the tenets of Islamic banking. In order to provide and carry out services to consumers Islamic banks will be exposed to various risks. Risks will always exists and be a part of daily life and in economic activities. The success of a financial organization relies on the efficiency on how the financial organisation manage their risks well.

Risk is a vital part in banking institutions. In running their services and financial activities, Islamic banks are also expose to risks. Risk is one of the factors that will affect efficiency of the bank. In addition, bank also faces with several risks in their operation such as credit risk, liquidity risk and operational risk. All these risks will affect the efficiency of Islamic banking. According to Hussain and Al-Ajmi (2012), the most important risks facing by both Islamic and conventional banks are credit risk, liquidity risk and operational risk.

Berger and Humphrey (1997) concluded that since early 1990s, the study about the efficiency of financial institutions become a crucial component of the banking literature. One of the reason is because efficiency is the good measurement to measure the bank's success. Islamic banks with good track record and efficient services also become crucial components in order to attract customers to use the bank services. This is because nowadays, the competition among the banks itself has become increasingly intense.

On the other hand, efficiency can be defined as how the company manage and use its resources to maximize the production of the goods and services of the company. In addition, the good production and services is important to banks. Besides that, efficiency is the relationship between the input and output in a company. It means, how the input resources in a company are used to produce output using the inputs (Farrell, 1957). For instance, the efficiency of a company depends on company efficient management in input resources such as labour costs and capital in order to produce good output for that company.

Berger and Humphrey (1997) also emphasized the importance of measuring efficiency in the banking sector. Some information obtained from efficiency studies are useful and important to related parties such as the central bank. Bank Negara Malaysia or BNM can measure the informing government policy with respect to the effects of deregulation. Apart from that, researcher also can address the research issues on the efficiency of an Islamic banking industry. Besides that, the bank itself will know more detail about their operational activities in terms of improving managerial efficiency by identifying the 'best practices' and 'worst practices'. The best practices in bank operations will therefore influence the bank's success.

1.2 Problem Statement

Interestingly, Islamic banking has become more reality and a good alternative to the conventional system with the total number of sixteen Islamic banks is in operations in Malaysia today (BNM, 2014). According to Ernst and Young's World Islamic Banking Competitiveness Report (2013), Islamic banking assets has grown from US$1.3 trillion in 2011 to US$1.8 trillion in 2013 globally. This asset growth shows the up-trend for the respective years. Meanwhile, the Ministry of Finance (2013) stated that the total Islamic banking assets has reached 20.6 percent to RM469.5 billion as end July 2012, which represented 24.2 percent of the assets of the country's banking system in Malaysia. This statistic shows that Islamic banking industries is moving in the right direction in order to become established in offering a wide range of products and services and expands in all parts of the world.

Nevertheless, with this development and expansion of Islamic banking industries, risks may become an important element in Islamic banking institutions. The survival and success of a financial organization such as banking industries depends on the efficiency in term of how banks manage their risks. Risk management is one of the critical factors in providing better returns. It is necessary for the stability of the overall financial system. The element of risk also brings opportunities. However, to gain from these opportunities, the risks are required to be managed efficiently and systematically. Otherwise, it will give negative effect to the banks if not managed very well.

Consequently, efficiency is one of the vexing issues of the economic problems, whether in relations to organization, company or country. For instance, efficiency evaluation is an important instrument for assessing and measuring the success of the banking industry. This is because efficiency is the best measurement to evaluate and investigate a bank's success as well as its potential.

Efficiency will also affect the bank's performance. This is because efficiency is the key dominant factor of bank success. As stated by Berger and Humphrey (1997), the study that focused on the efficiency of financial institutions have become an important component in banking literature.

Risks and efficiency have their own relationship. They indicate how the banks manage their risks. The good management of risk will influence the efficiency to the bank. Risk management involves four steps, namely risks identification, followed by risks measurement, risks monitoring and lastly, risks controlling.

Some scenario such as lack of skilled personnel of people, lack of knowledge about the system and lack of expertise in banking operations will affect the bank's efficiency. Thus, it will expose a higher operational risk threat to the bank which consequently will cause and resulted in the bank's operational losses. Because of that, banks need to manage any risks arose effectively in order to maintain their efficiency as well as to maintain their profits (Akkizidis & Khandelwal, 2008). This

scenario had been experienced by Affin Bank, as stated by Affin Bank (2014), on 27 September 2014 when six of the automated teller machines (ATMs) belonging to Affin Bank Berhad and Affin Islamic Bank Berhad had been tampered with.

Another important type of risk is credit risk. Khan (2003) identified that credit risk is the most important source of banking instability and capital is widely recognized as effective safeguard against the insolvency of banks. Since Islamic banking offers a wide range of products with different modes of finance, credit risks was noted to be higher. For instance, default payment by customer in mudarabah financing contract will exposed bank to the credit risk. Thus, this scenario can give impact to the bank expected returns. The return of bank will decrease if default payment cases happen made by customers. Usually, bank will target high returns to get more profit from time to time in order to generate and support their operations.

Besides that, the sufficient cash is very important to the current development of Islamic banks. If they have sufficient cash, banks can roll their income and generate profits with good and efficient management in liquidity. Bank liquidity is important to banks to meet the short term obligation and make them more flexible in managing their liquidity schedule as well as their efficiency (Bakar & Engku Ali, 2008). In addition, Islamic banks need to solve their liquidity in order to gain competitiveness in the market.

Based on observation and previous study, efficiency study has been undertaken widely. However, there are limited study regarding the risk and efficiency of Islamic banks especially in Malaysia. This is supported by Chan et al. (2014) that "many of the most detailed studies in the area of bank efficiency and risk positioning are Europe based". Given this scenario, this research paper aims to study about the relationship between risks and efficiency of Islamic banking industries in Malaysia. In order to improve efficiency and to tackle the above issue in Islamic banking systems, the relationship between risks and efficiency of Islamic banks in Malaysia is necessary to examine. It is important to improve the Islamic banking performance in order to become more efficient and has good performance in the future. Hence, the study about the relationship between risks and efficiency of Islamic banks in Malaysia are deem important.

1.3 Research Questions

Based on the discussion above, this research aims to answer and analyse the following questions:

i) To what extent the efficiency of Islamic banking in Malaysia?

ii) What is the relationship between risks and efficiency of Islamic banking in Malaysia?

1.4 Research Objectives

Based on the research questions above, this research will try to reach these objectives, which are:

i) To examine the level of efficiency of Islamic banking in Malaysia.

ii) To analyse the relationship between risks and efficiency of Islamic banking in Malaysia.

1.5 Significance of the Study

Estimating the risk and efficiency of Islamic banks in Malaysia in this study may reflect the competitiveness among the Islamic banks, especially in this era of globalization and liberalization of the competition. This is because, nowadays the banking institutions is one of the needs to generate economic activity in our country. Because of that, a good and efficient financial system is very important. The ability of banks to compete also can be seen from the aspect of relationship between the risks and efficiency. Thus, efficiency will indicate the bank's success.

Besides, it also provides valuable information as well as guidance for banking institutions to improve their position of services in the future. The good services provided by banks will give positive impact to the bank. Therefore, the study will serve as an input to banks in Malaysia. In addition, this types of research will provide

better understanding and valuable information to the banks in order to become more competitive and acceptable by relevant parties such as customers and investors.

In addition, this study also will give benefits for investors and depositors as well as customers. The study will serve as an input to depositors and investors alike in terms of making decision to act. For instance, a good and efficient bank management will attract customers as they normally like to do their transactions with banks that have good and efficient service performance. Customers and investors usually will look at the position and the bank's performance before they make any decision to deal with the bank.

Furthermore, this study can contribute current information and opportunities especially to the policy maker. Based on the result of this study, policy makers can build new rules and regulations to improve the banking area in Malaysia from time to time in line with the current situation. It will also provide valuable information to help Islamic banks such as improving and upgrading their efficiencies in terms of their offering of products and services to the customers.

As there is no latest evidence shows that studies on this particular topic, which are risks and efficiency between Islamic banks and risks, have been carried out this study makes attempts to expose how efficient the Islamic banks performed. Besides that, hopefully this study would give useful source information because there is no

research in Malaysia regarding the issues are known. This will also be useful to future researchers who are interested in conducting the same type of research like in this field of study.

1.6 Scope of the Study

The scope of the study aims to review the relationship between risks and efficiency of Islamic banks in Malaysia. The discussion in this study will focus on Islamic banks operating in Malaysia which registered and given license by the Central Bank of Malaysia (Bank Negara Malaysia, BNM) as case studies. Therefore, it will use the data of 12 Islamic banks in Malaysia due to the availability of data. Based on the availability of data, the period of analysis in this study is limited from the period of 2008 to 2013 only.

There are few types of risks in banking industries, but this study is limited to credit risk, liquidity risk and operational risk towards efficiency of Islamic banks. The choice of all types of risks as independent variables is supported by Hussain and Al-Ajmi (2012), which stated that these three types of risks are the most important risks facing by both Islamic and conventional banks in banking industries.

1.7 Organization of the Study

This study will be divided into five chapters. In chapter one of this study will focus on introduction, background of the study, problem statement, research questions, research objectives, significance of the study, scope of the study and the study limitation that are faced during the process of this study. The following chapter will review related studies which explained previous researches related to this study. Followed by chapter three that explains the methodology that will be used in this study. This chapter will discuss about the outline of research design, data collection, sources of data and data analysis that will be used in this study. Chapter four discusses the result from this study and finally, chapter five offers some conclusion, suggestion and some recommendations regarding the relationship between risk and efficiency of Islamic bank.

1.8 Conclusion

This chapter presented a general view about the outline and direction of the research execution. The next chapter will discuss about the literature review in previous study related to risks and efficiency.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews and summarizes previous studies in order to support the objectives of this study. It is also used to gain a better understanding on the subject. Therefore, some of the literatures that relevant to this study have been explored. In addition, a literature review can build the knowledge and idea related to the topic of study towards researcher. Hence, this section will discuss the reviews on efficiency and risks of previous studies that related to this study.

2.1 Definition and Review on Efficiency

Efficiency can be used as an indicator to measure bank's progress, its accomplishment and success. It can be used as the indicator towards the bank's performance. In general, efficiency refers to "how well" or "how effective" the decision making unit in that organization using the given inputs to produce a maximum outputs (Graham, 2004). In addition, efficiency is the relationship between input resources that banks used to produce the output with minimal cost and maximum of profits. In general, if that organization can minimize their capability to use input with maximum level of output, that organization will be considered to have a high level of efficiency in their management (Farrell, 1957; Mokhtar et al., 2008).

Besides, this definition of efficiency is in line with Kumbhakar and Lovell (2000) who stated, "efficiency represents the degree of success which producers achieve in allocating the available inputs and the outputs they produce, in order to achieve their goals".

Porcelli (2009) stated that there are several measurements which can be utilized to examine the efficiency of the bank. Essentially, there are two techniques for measurement of efficiency, namely the non-parametric approach and the parametric approach. According to Berger and Humphrey (1997), the most commonly used of parametric approaches are the Stochastic Frontier Approach (SFA), Distribution Free Approach (DFA) and the Thick Frontier Approach (TFA). Notwithstanding, according to Porcelli (2009), usually the non-parametric approach in evaluating efficiency goes under the descriptive title of Data Envelopment Analysis (DEA). DEA is known as a linear programming technique.

Based on previous research by Berger and Humphrey (1997), investigation towards efficiency in the banking sector is necessary and become an important part in order to get the needed information such as to know the impact of government policy and the market structure on banks efficiency. For instance, with this information, the policy makers and regulators can take action to improve the economic growth of the country such as developing a suitable and conducive framework in financial system.

2.2 Review on Efficiency and Islamic Banks

Studies on the relationship between efficiency of Islamic banks is important since there are rapid growth and expansion in Islamic finance industries. Nowadays, Islamic banking needs to face with challenges that keep increasing followed by the current global environment. Furthermore, Islamic banking acts as an important intermediaries between deficit units and surplus units. Besides that, the stability of Islamic banking industries will give impact to the economic condition of a country. Because of that, it becomes crucial to have more studies in this particular area. This is also important to the Islamic banks to maintain their efficiency in order to sustain the economic development. An efficient performance of Islamic banks will lead the good economy performance as well as the economic development.

Yudistira (2004) investigated the efficiency of Islamic banking, and the empirical analysis of 18 banks' technical and scale efficiencies. This study covered the period from 1997 to 2000 towards 12 countries. The result proved that there are diseconomies of scales for small to medium Islamic banks. Because of that, the merger and acquisition was suggested. Applying Data Envelopment Analysis (DEA), the study shows that bank size in one of the contributing factor to scale inefficiency. Researcher also found that among these Islamic banks, profitability not have significant effect towards the overall technical efficiency (OTE).

Meanwhile, Sufian (2007) analysed the relative efficiency of Islamic banking industry in Malaysia between foreign and domestic banks. The methodology used in this study to measure the efficiency is Data Envelopment Analysis (DEA) which suggests that the efficiency of Malaysia's Islamic banks were declined in year 2002 in order to improve slightly in 2003 and 2004. In short, the findings from this study indicated that the domestic Islamic banks is more efficient compared to the foreign Islamic banks although a little. Among the reason of inefficiency of Malaysian Islamic banks in general because of Malaysia's Islamic banks operate in the wrong scale of operations. It also further suggests that the foreign and domestic banks are drawn from the same population, as most of the test results could not reject the null hypothesis at the 0.05 levels of significance. The results from the correlation coefficients have further confirmed the dominance of scale in determining the technical efficiency of Malaysian Islamic banks. Besides that, this study also proposes that profitability is significantly and positively correlated to all efficiency measures.

Using the same method of evaluation, Sufian and Abdul Majid (2007) investigated the performance of Malaysian Islamic banking sector. This study found that from 2001 to 2005, scale inefficiency dominates pure technical inefficiency in the Malaysian Islamic banking sector. This study also found that foreign banks have higher technical efficiency compared to its domestic peers. The empirical finding suggests that technical efficiency is significantly and positively relevant banks size, indicate that larger banks are more efficient. Other than that, this study also indicate positive associated relevance to banks profitability, that more efficient banks are

more profitable. They also found that technically more efficient banks are larger, have greater loans intensity, and on average have less non-performing loans.

Mokhtar et al. (2008) also conducted a study regarding to efficiency and competition of Islamic banking. One contribution of this study is estimating the efficiency of the full-fledge Islamic banks and Islamic windows in Malaysia. This study implements the non-parametric frontier method which is Data Envelopment Analysis (DEA). Under this study, the empirical findings show that on average, from year 1997 to 2003 the efficiency of Islamic banking has increased. This study also found that the full-fledge Islamic banks more efficient compared to Islamic windows, but still less efficient compared to conventional banks. Lastly, this study also shows Islamic windows of foreign banks is more efficient than the Islamic windows of domestic banks. This result shows that Islamic banks are become more efficient from time to time.

Tahir, Bakar and Haron (2011) on the other hand analysed the efficiency of Islamic banks in Africa, Far East and Central Asia, Europe and the Middle East in 2003 to 2008. In order to achieve the aim of this study, the technical and scale efficiencies of Islamic banks, the DEA (non parametric approach) was used. The result suggests that mean efficiency have declined over period 2003 to 2008 and pure inefficiency has largely resulted in the overall inefficiency for Islamic banks. Overall, they found that the larger the banks size, the more efficient the banks will be compared to medium

and small sized banks. Hence, this result findings supported by Sufian and Abdul Majid (2007) where they stated that sizes of Islamic banks reflect their efficiency.

Said (2012) studied the efficiency of Islamic banks during economic troubles of 2006-2009 using the non-parametric Data Envelopment Analysis (DEA) method. This study suggests that during 2006 to 2008, large Islamic banks showed an increase in efficiency. However, their performance decline in 2009. Besides that, small to medium Islamic bank sample started at a lower level of efficiency. In addition, the results showed that the number of Islamic banks operate in the Middle Eastern and non-Middle Eastern counties have increased during an economic crisis in terms of efficiency. This study also look at the correlation between size and efficiency of Islamic banks. From this study, the result suggests that the medium and small size of Islamic banks has a better level of efficiency than larger size of Islamic banks during the financial crisis which happened from 2006 to 2009.

Ab-Rahim, Md-Nor, Ramlee and Ubaidillah (2012) studied about the cost efficiency in Malaysian banking by utilising Data Envelopment Analysis (DEA) method between 1995 and 2010. They interpret the results as indicated that population density, government ownership, demand density and market concentration are positively related with several measures of efficiency. However, other factors such as the year merger takes place, macroeconomic condition, capitalization, credit risk, asset quality and management quality have negative relationship with various measures of efficiency. In addition, the banking variables consist of size enters the

regression model in log transformation. The size of banks is found to have mixed sign positive coefficient with technical and pure technical efficiency while the negative relationship with scale efficiency, cost and allocative efficiency.

Next, Abdul Rahman and Rosman (2013) conducted a study to examine the efficiency of selected Islamic banks in Middle Eastern and North African (MENA), including Gulf Cooperation Countries, or GCC and Asian countries. A total of 63 Islamic banks were chosen as sample while the period of their performance was from 2006 to 2009. The study indicates that among the Islamic banks, the main source of technical inefficiency is the scale of their operations. In general, the Islamic banks reached a high score for pure technical efficiency which means that their management able to manage and control costs with efficiently in terms of using the given input to maximize the outputs regardless of scale effect. On average, the study finds that Islamic banks from Asian countries relatively more efficient than the MENA Countries while the most efficient Islamic banks were from the GCC. In this study, Abdul Rahman and Rosman (2013) had noticed that the main determinant of Islamic banks efficiency is economic condition of a country. Based on the findings of this study, it has proven that the economic condition of a country is an important element to maintain the bank's efficiency performance. In order to find the determinants of Islamic banks' efficiency, this study also used the common determinants variables, namely bank profitability and bank size.

Using the same method, Rosman, Abdul Wahab and Zainol (2013) examined the efficiency of Islamic banks during the financial crisis in Middle Eastern Asian countries during the period of 2007 to 2010. This study comprised 79 Islamic banks across a number of countries. According to this study, the findings have shown results that Islamic banks able to continue and sustain their operations through the crisis. However, Rosman et al. (2013) also found that majority of Islamic banks were scale inefficient. Most of the scale inefficient banks were operating at decreasing returns to scale. This study also indicate that the profitability and capitalisation are the main determinants to the Islamic banks' efficiency.

Finally, Ab-Rahim, Kadri and Ismail (2013) evaluated the efficiency performance of the full-fledged Islamic banks in Malaysia. This study covered the period from year of 2006 to 2011. The Malaysian Islamic banking industry has grown during the times of this study, for example an increasing trend in Malaysia's Islamic bank assets aside from deposits and total financing. To measure the cost efficiency as well as the technical efficiency, Data Envelopment Analysis (DEA) is employed in this study. The finding indicates that on average, the main contributor of cost efficiency for Islamic domestic and foreign banks in Malaysia is allocative efficiency. Nevertheless, another finding in this study shows that Islamic foreign banks are more efficient than domestic banks regarding to pure technical efficiency and allocative efficiency.

2.3 Definition and Review on Risks

The banking operations will exposed banks to the risks. Understanding the banking risk plays an important role in order to engage with effective management and supervision especially in Islamic banking industries. Likewise, risks also known and defined as the probability of loss. This losses depends on three elements which are hazard, exposure and vulnerability in banking operations itself. Besides, based upon research towards risk, it can be concluded as the actual exposure of something of human value to a hazard and is often considered as the combination of probability and loss (Akkizidis & Khandelwal, 2008; Bessis, 2002; Crichton, 1999; and Smith, 1996). In addition, risk can be concluded as the condition in where variability of unexpected outcome in the organization exists.

Several studies have focused on risk management in banking institutions. Bessis (2002) and Dima and Orzea (n.d.) defined banking risks as adverse as well as giving bad impacts where they will impact the profitability of different sources of uncertainty and unpredictability situation. Risk measurement is necessary to banks in order for them to understand, see and forward in capturing the source of uncertainty of its potential adverse effect on profitability. According to Bessis (2002) and Dima and Orzea (n.d.), they stated that the main risks faced by banks are as shown in the following figure.

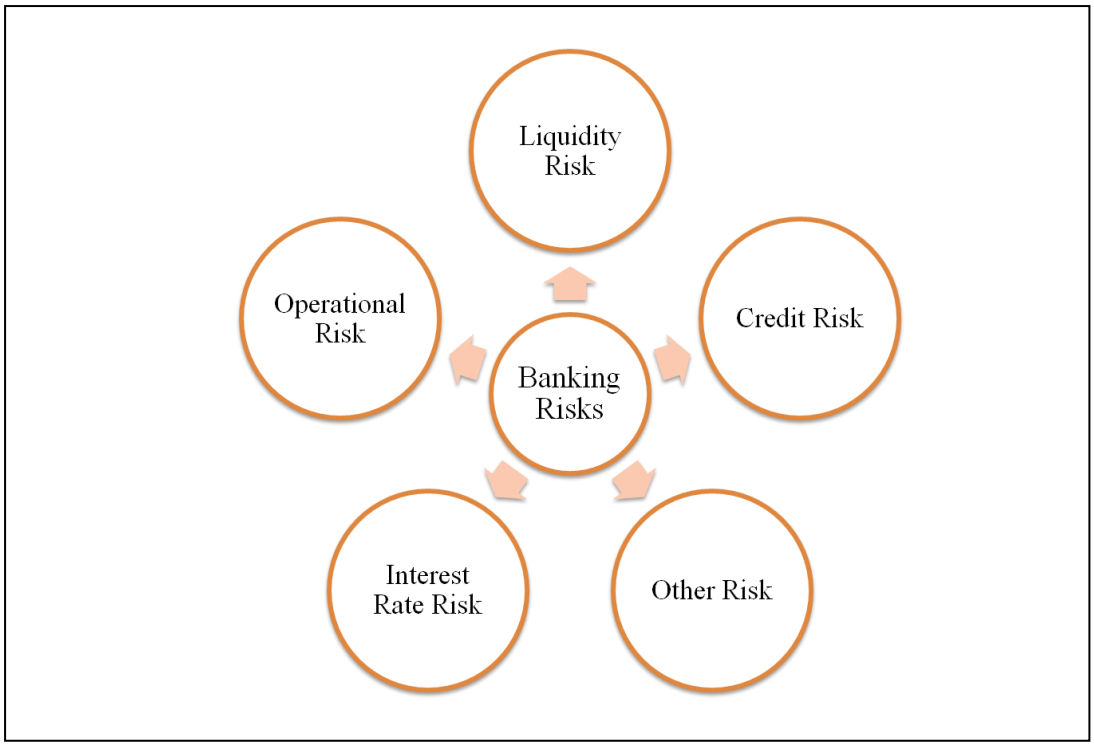

Figure 2.1
Main bank risks faced by banks
Sources: Bessis (2002) and Dima and Orzea (n.d.)

Figure 2.1 shows a group of risks that need to be faced by every organization. There are liquidity risk, credit risk, operational risk, interest rate risk and other risk that involved in the banking operation like country risk and settlement risk. Thus, every type of risks will link and give effect to the operation of Islamic banks. The efficient management of risks will portray efficient performance by banks.

However, this study will focuses on credit risk, liquidity risk and operational risk that related to the economic changes of the environment as well as to the efficiency in Islamic bank institutions in Malaysia. This is supported by Hussain and Al-Ajmi (2012) which stated that credit risk, liquidity risk and operational risk are the most important categories of risks facing by both Islamic and conventional banks

compared to other risks. In addition, Said (2013) also conducted a study which focused only on this three main types of risks in Middle Eastern and North African (MENA) region.

Since Islamic banks offer a wide range of products, banks will be exposed with different modes of risks. According to Khan (2003), credit risk is the most important source of banking instability. Hence, credit risk was the cause of 80% cases of failure. These indicate a high percentage of credit risk exposed to the Islamic banks compared to another risks. This has also proved that the credit risk is one of the main risks that seriously affect banks' future growth viability. If credit risk is so high, banks will suffer and need to face with other problems like settlement and clearance in the operation and transaction.

According to McNeil, Frey and Embrechts (2005), credit risk happen when the borrowers di not fulfil their repayments and having default in their payment. This view is also supported by IFSB (2005) and Astrom (2013) discovery where credit risk arise when the counterparty, known as third party, fails to meet their obligation to make payment in agreed time. It means that when the borrowers do not perform their promise and breach the contract, it will expose and improve the potential of credit risk to the bank itself. This situation is not good to the bank's condition and consequently will affect the bank's efficiency. In addition, the bad management of costs in the organization will expose the organization towards credit risk (Berger &

Humphrey, 1997). For instance, in the case of non-performing assets in the organization will cause the credit risk and will affect the bank's performance.

Besides, if banks do not have sufficient cash as well as the borrowing capacity to meet customers' withdrawals, loan demand and other cash demand by bank depositors and publics, they will face problems like liquidity risk. In general, bank also needs to give attention towards the unsafety condition. Faced with liquidity risk, a financial institution may be forced to borrow emergency funds at excessive cost to meet its financial obligations (IFSB, 2005; Rose & Hudgins, 2013). Sufficient cash is very important to the banks to make sure that they can perform their operations and obligations by giving effective services to their customers.

Therefore, liquidity can be considered as "oxygen for a healthy market". Human need oxygen to survive but most of the time human do not aware of its presence. Nevertheless, without oxygen human is unable to survive and go on with their living (McNeil et al., 2005). This situation is similar in concept with bank and its liquidity scenario. For instance, Islamic banking industries unable to meet its obligations as the important institution among deficit unit and surplus unit in economy circle without the liquidity. Specially, with suffient and good management towards banks liquidity, banks will able to fulfil its short term obligations. In order to become more competitive, Islamic banks should be aware of this liquidity issues in order to get better returns and strongly performance.

Meanwhile, based on previous research by Hossain (2003) and McNeil et al. (2005), they have reviewed that operational risk is the risk of losses resulting from insufficient or failed people and systems, internal processes or from external events, internal procedures designed and reporting systems. If operational risk is not managed and controlled properly, it will cause the banks to have losses.

Operational risk may be arises due to lacking of trained to the banks' staff. For instance, staffs need the latest training to make sure they can give a good service to their customers. Apart from that, internal process could create system risks when obtaining, developing and using information technology. This risk may happen when banks need to update their computer software to ensure that their system is available and up to date. In addition, as the intermediary institutions, Islamic banks hardware and system problems have to be up to date in order to satisfy depositors and the public when they deal with bank services. Ultimately, due to lack of market transparency, Islamic banks need to avoid cases of fraud in their operations. And in order to be more competitive and efficient, Islamic banks need to be more alert with their surrounding area.

2.4 Review on Risks and Islamic Banking

There are few studies discuss about the risks and Islamic banking. There are also several papers that have outlined the specific risks inherent in Islamic banking. Risks are a part of Islamic banking operations. The changing banking environment

will present risks in their activities and because of that, it is important to recognize, monitor and control the risks that is inherent in Islamic banks. In order to survive, banks need to manage the risks well. Islamic products like Musharakah, Mudarabah, Ijarah and others that are being offered in Islamic banking industries also exposed to the various types of risks (Akkizidis & Khandelwal, 2008).

A study done by Abedifar, Molyneux and Tarazi (2012) has pointed out the risk and stability features of Islamic banking. By using a sample of 553 banks from 24 countries revising on year 1999 to 2009, the results showed that small Islamic banks that are based in countries with predominantly Muslim populations (more than 90%) indicate a lower credit risk than conventional banks. The credit risk relates to loan quality in banks' operations. With the insolvency risk, the results indicate that small Islamic banks also appear to be more stable. In terms of Shariah compliant financial products, this study found little evidence that they charge rents to their customers. They also found that loan quality of Islamic banks is less react to domestic interest rates compared to conventional banks.

Addressing a different dimension, Sufian and Abdul Majid (2011) focussing on issues pertaining to the impact of economic freedom on Islamic banks performance in MENA banking sector during the period of 2000 to 2008. They found a negative result impact between credit risk and preference behaviour in MENA banking sector.

Another author, Boumediene (2011), also investigate credit risk issue, which is to see whether credit risk in Islamic banks is really higher than conventional banking.

This study covered five years, from 2005 to 2009 that was performed on nine samples from conventional banking and another nine were Islamic banks in Egypt, Kuwait, United Arab Emirates, Bangladesh, Bahrain, Pakistan and Qatar. According to Boumediene (2011), credit risk exists in both banking types and a matter that distinguish both banking types is investment tools. For instance in Islamic banks, they practiced the PLS principles. However, these principles are not in practice in conventional banks. In this article, the result shows that Islamic banking has lower credit risk than conventional banking. Even though Islamic banks indicate lower risk, but as mentioned before, credit risk management can cause bank's insolvency. The bad management of credit risk will affect the bank's failure. Based on this study, the problem of management of this risk by Islamic banks is not due to shortage of risk management tools but the dilemma is how Islamic banks manage this risk like conventional banks. In reality, this is not consistent because both types of banks have different nature like the terms in contracts. The solution is in the strict applicability of Islamic contracts and a deep knowledge of their mechanisms as well as the options they offer.

According to Abdullah, Shamimi and Ismail (2013), the discussion on operational risk in Islamic banks industries is still in its infancy stage. Izhar (2010) stated that operational risk is now as a type of risk which can give significant losses in all financial institutions. Abdullah et al. (2013) examine the issues of operational risk in Islamic banks in Malaysia's case and suggesting that the discussion on operational risk in Islamic banks is significant and becoming more complicated compared with

conventional banking. This is because of the unique features in Islamic banking which have unique contractual features and general legal environment.

A study that focuses on the factors associated with credit risk of Islamic banks in the GCC countries was done by Al-wesabi and Ahmad (2013) who discusses on the credit risk. The study was done using website data covering 25 Islamic banks from the year 2006 to 2010. From this study, they found that the banks' income is significantly negatively related to credit risk. Besides that, some firm specific variables such as leverage and liquidity are also relevant variables for credit risk. Credit risk is also broadly affected by both macro and firm specific factors as found in other regions. Inflation and interest rates do not appear to be relevant towards credit risk in a Islamic banks sample in this study.

The Al-wesabi and Ahmad (2013) study is in line with Ahmad and Ahmad (2004), which focussing on the issue of key factors influencing credit risk of Islamic bank. However, Ahmad and Ahmad (2004) were only focused on Malaysia's case. Thus, this paper examines the factors affecting credit risk, being the main risk faced by banking institutions, the Islamic and conventional banking. The key factors influencing credit risk formation in Islamic banking operations in Malaysia also being discussed in this paper. The findings show that management efficiency, size of total assets and risk-weighted assets have significant influence on credit risk of Islamic banking, while conventional banking credit risk are significantly affected by loan demolition to risky sectors, risk-weighted assets, loan loss provision and

regulatory capital. While both observe similar effects of leverage, funding cost, risk-weighted on credit risk, Islamic banking experiences different impact of management efficiency, regulatory capital and loan loss provisions on their credit risk. It indicates that, Islamic banking in Malaysia are being affected by different set of factors compared to conventional banking.

The study by Shafique, Faheem and Abdullah (2012) examines the liquidity and risk analysis of Islamic banking system during global financial crises 2008. During this time, many banks in the world were moving towards the bankruptcy situation. According to researchers the main cause of this scenario is because all these banks have less liquidity type of nature. However, based on the observation, Islamic banks were not really affected during this crisis because the nature of Islamic bank itself, which is having more liquidity. Therefore the purpose of this study which is to analysis liquidity of Islamic banks has already proved that Islamic banks' highly liquid type in nature.

Additionally, Hassan (2009) investigated the risk management practices of Islamic banks in Brunei Darussalam. The result of the study presents the most important types of risks faced by Islamic Banks in that country, there are foreign exchange risk, credit risk and operational risk. Besides, the study also viewed are somewhat reasonably efficient in managing risk. As in July 31, 2006, Brunei has only three Islamic banks which is a small amount. Thus, based on this study shows that Islamic

banks in Brunei Darussalam are facing the most important types of risks in their establishment.

2.5 Review on Risks and Banks Efficiency

From the explanation above, can be concluded that there are many previous studies that assess bank efficiency such as Abdul Rahman and Rosman (2013), Ab-Rahim et al. (2013), Ab-Rahim et al. (2012), Mokhtar et al. (2008), Rosman et al. (2013), Said (2012), Sufian (2007), Sufian and Abdul Majid (2007), Tahir at al. (2011) and Yudistira (2004). There are also studies done in previous literature about the risks inherent in Islamic banking industries such as the studies done by Abdullah et al. (2013), Abedifar et al. (2012), Ahmad and Ahmad (2004), Al-wesabi and Ahmad (2013), Boumediene (2011), Hassan (2009), Izhar (2010), Shafique et al. (2012), and Sufian and Abdul Majid (2011). This positively shows that the relationship between risks and efficiency towards Islamic banking industries is very important especially in variations that occur in Islamic banking industries. For instance, Islamic banks will expose towards the risks in their operations in term of their products. Despite this reality, risks will influence the banks efficiency.

If banks have a problem in managing and regulating their internal cost, the may be facing problems in the valuation of their credit risk. This verdict has been shown by a study done by Berger and De Young (1997) that relate risks and efficiency. According to them, the bad management of costs will cause and goes together with

more credit risk. This means that inefficient banks will happen when they do not manage their internal cost very well.

Moreover, Alam (2012) also conducted a study about the risk and efficiency from dual banking system. This study utilizes a large data set of 165 commercial banks and 70 Islamic banks from 11 emerging markets (Malaysia, Bahrain, Bangladesh, Egypt, Kuwait, Indonesia, Turkey, Pakistan, Saudi Arabia, Qatar and UAE) from 2000 to 2010. The study also analyses the relationship between risk and efficiency within the two banking systems. According to Alam (2012), empirical evidence shows that bank inefficiency and risk are positively related for conventional banks and inversely related for Islamic banks which clearly highlight the inherent difference between risk-efficiency relationships among these two distinct bank types. The mean cost efficiency scores for the conventional banking industry is higher than Islamic banking sector while, Islamic banks profit efficiency scores have outperformed conventional banks profit efficiency scores. Furthermore, evidence from this study shows that environmental factors can considerably affect the banking efficiency scores. While inefficient Islamic banks still maintain their lower risk level compared to the conventional banks because of cost resistance weakness which limit the ability of inefficient Islamic banks to take on more risks.

Said (2013) measured the correlation between risks and efficiency within Islamic banks in the MENA region for the period of study from 2006 to 2009. Three stages of analyses were used in this study. Firstly, by employing the non-parametric

technique known as DEA, efficiency of those banks were measured. Secondly, credit risks, operational risks and liquidity risks were measured in order to analyse the risks by using financial ratios. Lastly, by employing the Pearson Correlation Coefficients, the study examine the correlation between credit, operational, liquidity risks to efficiency. The result of the study presents that credit risk has negative relationship to efficiency, while operational risk has found to be negatively correlated to efficiency too. Besides, it is found that liquidity risk showed insignificant correlation to efficiency in Islamic banks in MENA area.

In another study, Fan and Shaffer (2004) concluded the risk versus efficiency in large domestic US banks. They used the profit efficiency of a sample of large US commercial banks. Researchers explore on how this performance fluctuate with selected measures of bank risk describe aspects of credit risk, liquidity risk, and insolvency risk in this study. The result indicates that profit efficiency is sensitive to credit risk and insolvency risk. However, profit efficiency is not sensitive to liquidity risk or to the mix of loan banks products. This study highlight that these three kind of risks serve as indicators related to profit efficiency in US commercial banks case.

Meanwhile, Sun and Chang (2011) investigated the role of risk in determining the cost efficiency of international banks in eight emerging Asian countries by using heteroscedastic stochastic frontier model. This study not only focuses on credit risk but also in operational risk and market risk under a total of eight risk measures. The

results reported that the risk measures represent significant effects on both the level and variability of bank efficiency. The empirical results from this study also indicate that these effects vary over time and across countries.

The study by Eken and Kale (2013) evaluated the efficiency of Turkish banks, a risk and profitability approach. This study aims to benchmark performance of banks in comparison to risk taking preferences by using the DEA. This study found that profitability of banks does not necessarily parallel with their risk taking preferences. Besides, banks with low risk efficiency should look back towards their business style for improvement in the future. This is important for banks to gain a better performance in order to achieve the good efficiency level in the future. It means that, the good business style as well as the good management must be practice by banks, as well as to perform the efficient performance and services to their customers.

Fiordelisi, Marques-Ibanez and Molyneux (2011) presented an inter-temporal relationships between bank efficiency, capital and risk for the European commercial banking industry by using the Granger-causality methodology. This study suggests that lower bank efficiency with respect to costs and revenues Granger-causes higher bank risk and that increases in bank capital precede cost efficiency improvements. Based on this study, researchers found that more efficient banks are more capitalized in European commercial banking industries. While the higher capital levels of banks will give good and positive effect towards the bank efficiency levels. This study indicates that the higher capital level of banks are, the more efficient they will

perform. Besides, it is very important to give attention and emphasize on the long term efficiency and not only focus on short term efficiency in order to support banks financial stability.

More recently, Chan, Karim, Burton and Aktan (2014) focus on the study of the efficiency and risk in commercial banking in East Asian countries, namely China, Hong Kong, Japan, Korea, Macau, Mongolia and Taiwan. This paper analysed the effects of off-balance sheet (OBS) activities and various types of risks on the cost and profit efficiencies of banks between 2001 and 2008. By using the data envelopment analysis approach, cost and profit efficiency scores are estimated. Tobit regression models that explored the effect of OBS activities and risk exposures on cost and profit efficiencies indicate that OBS activities and risk factors give effect to the East Asian banks cost and profit efficiency levels in a number of substantive and identifiable ways. The findings are consistent and supported by previous studies such as by Berger and De Young (1997) and Fiordelisi et al. (2011).

2.6 Conclusion

This chapter has covered a review of relevant literature regarding to the topic for this study. The common approaches used to measure the efficiency in banking industries also has been discussed in this chapter. From the previous studies that have been reviewed, there are interests to study about risk and efficiency since it has important contribution to Islamic banking industries in Malaysia. Hence, this study aims to know to what extent the relationship between risks and efficiency of Islamic banks in Malaysia. The next chapter will discuss about the methodology used in this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses about the research methodology employed in this study. In this chapter researcher describes about the methodology adopted to analyse the relationship between risks and efficiency in the Islamic banking industries in Malaysia. The arrangement of this chapter begin with framework development, hypothesis development, research design which focused on data collection technique, sources of data and population as well as the sample used in this study. Followed by data analysis technique and measurement of variables which employed for this study. The sources of data is explained more detail in this chapter.

3.1 Theoretical Framework

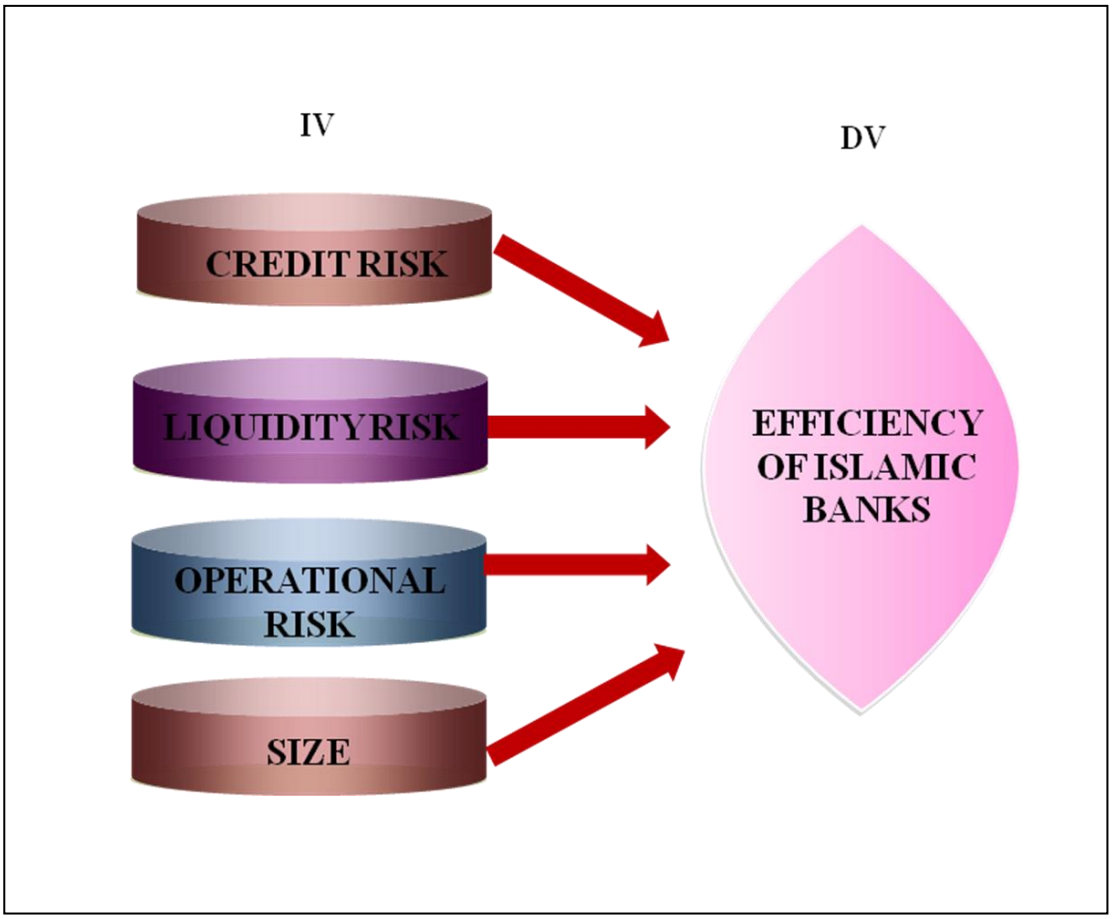

Figure 3.1
Theoretical Framework
Source: Author's own.

A theoretical framework is needed in order to recognize the relationship among each variables applied in this study. Theoretical framework is the 'foundation of hypothetical-deductive research as it is the basis of the hypothesis that will develop' (Sekaran & Bougie, 2013). Therefore, based on this study, there are two types of variable used in this theoretical framework, which are dependent variable (DV) and independent variables (IV).

Researcher has identified the risks that can influence the level of efficiency in Islamic banking institutions especially in Malaysia. In this theoretical framework, efficiency is selected as dependent variable (DV) and independent variables (IV) in determining factors that influence the efficiency, namely credit risk, liquidity risk and operational risk. In addition, according to Sufian (2007), the size is needed in order to complement the result of the efficiency in this study.

Therefore, based on the theoretical framework as shown in Figure 3.1, this study is design to recognize the dimensions such as credit risk, liquidity risk, operational risk, and bank size relationship towards efficiency in Islamic banking in Malaysia.

3.2 Hypotheses Development

Hypotheses can be defined as 'logically conjectured relationships between two or more variables expressed is the form of testable statements' (Sekaran & Bougie, 2013). Therefore, the following are three general hypotheses related to the objectives of this study that need to be explored, which are:

i) $H1_0$: There is no relationship between efficiency and credit risk in Islamic Banking in Malaysia.

   $H1_a$: There is a relationship between efficiency and credit risk in Islamic Banking in Malaysia.

ii) $H2_0$: There is no relationship between efficiency and liquidity risk in Islamic Banking in Malaysia.

$H2_a$: There is a relationship between efficiency and liquidity risk in Islamic Banking in Malaysia.

iii) $H3_0$: There is no relationship between efficiency and operational risk in Islamic Banking in Malaysia.

$H3_a$: There is a relationship between efficiency and operational risk in Islamic Banking in Malaysia.

3.3 Research Design

The quantitative analysis was chosen in this study. The aim of this study is to examine the level of efficiency and to analyse the relationship between risks and efficiency. This study employs secondary data using financial data of Islamic banks in Malaysia banking industries from year 2008 to 2013 which covers six years' time line.

3.3.1 Data Collection

As mentioned before, a quantitative design was chosen for this study. This study uses the secondary data in data collection method. A secondary source is the information gathered from existing and publishes sources. Data is extracted from the

published annual report in order to measure and construct all the variables for the empirical analysis of each Islamic banks. In order to study about the risks and efficiency of Islamic banks, this study employed Data Envelopment Analysis (DEA). Next, the results of DEA is utilized as dependent variables in Multiple Regression Analysis.

3.3.2 Sources of Data

As stated in the first chapter, there are totally 16 Islamic banks operated in Malaysia. However, based on the availability of data, only 12 Islamic banks operate in Malaysia will be examined in this study. This study also consists the data from 2008 to 2013. The data for this study is extracted from the end-of-year balance sheet and income statement from 2008 to 2013, which are made available and valid by the Islamic banks in Malaysia. The balance sheet and income statement is found in the annual report for each of Islamic banks. This annual report has been downloaded from each Islamic banks website.

Besides that, the researcher also gain the information from journals, articles, thesis report and conference and others. Furthermore, the secondary data source also provides the relevant and useful information regarding to the topic of the study. It gathered a specific reference of research and used to support this study.

3.3.3 Population and Sample

According to Sekaran and Bougie (2013), the meaning of population is where the population refers to the entire group of people, events or things of interest that the researcher wishes to investigate. The population in this study refers to the all Islamic banks that operated in Malaysia. While, the sample is a subset of the population, it comprises some numbers selected from the population. This study used twelve out of sixteen of Islamic banks operating in Malaysia. Table 3.1 shows the list of Islamic banks used in this study:

Table 3.1

List of sample Islamic banks used in this study

No	Name of Islamic Banks	Ownership
1	Affin Islamic Bank Berhad	Local
2	Alliance Islamic Bank Berhad	Local
3	AmIslamic Bank Berhad	Local
4	Asian Finance Bank Berhad	Foreign
5	Bank Islam Malaysia Berhad	Local
6	Bank Muamalat Malaysia Berhad	Local
7	HSBC Amanah Malaysia Berhad	Foreign
8	Kuwait Finance House (Malaysia) Berhad	Foreign
9	OCBC Al-Amin Bank Berhad	Foreign
10	Public Islamic Bank Berhad	Local
11	RHB Islamic Bank Berhad	Local
12	Standard Chartered Saadiq Berhad	Foreign

Source: BNM, 2009 retrieved on 03 November 2014.

Table 3.1 above shows the list of sample used in this study. Due to incomplete and unavailability of data provided by these sources of data, not all Islamic banks in Malaysia is included in the study. Hence, only twelve samples were used from sixteen populations of Islamic banks that operate in Malaysia.

3.4 Data Analysis Technique

This section discusses about the measurement among variable implements in this study. This section begins with the measurement that employs to measure the efficiency as the dependent variables and forward measurement employed to measures the credit risk, liquidity risk, operational risk and size as the independent variables that used in this study.

3.4.1 Data Envelopment Analysis (DEA)

There are two main methods or approaches that can be used by the researches in order to examine the performance of Islamic banks, parametric and non-parametric approaches (Berger and Humphrey, 1997). What distinguishes between these two approaches is where in parametric approach, description and detail of the functions of production, profit and also costs as well as assumptions that relate with the error are needed.

However, in the non-parametric approach, this approach is contrary with parametric approach. In non-parametric approach, it does not require any earlier assumptions regarding the functional form of error or description and detail for production. The DEA analysis (non-parametric approach), is widely used in past studies by researchers in order to conduct the efficiency analysis (Abdul Rahman & Rosman, 2013; Ab-Rahim et al., 2013; Ab-Rahim et al., 2012; Mokhtar et al., 2008; Rosman et al., 2013; Said, 2012; Sufian, 2007; Sufian and Abdul Majid, 2007; Tahir et al., 2011; and Yudistira, 2004). Therefore, this study employed the non-parametric approach to measure the efficiency of Islamic banks in Malaysia.

Data Envelopment Analysis (DEA) was introduced by Farrell (1957) and extended by Charnes, Cooper and Rhodes (1978) and thereafter modified by Banker, Charnes and Cooper (1984). According to Farrell (1957), DEA is a linear programming for frontier analysis. DEA used multiple inputs and multiple outputs in the programme. DEA will differentiate each producer unit with the optimal producer unit to measure and to know the inefficiency level of each producer. This producer unit call as Decision Making Unit (DMU). After that, each of DMU has a capacity of switch a set of inputs into a set of outputs. In general, there are two main approaches used in input-output specification which have been widely used, namely production approach and intermediation approach (Sealey and Lindley, 1977).

Under the production approach, the banks or also known as financial institution is defined as a producer that produces some of the services for customers like for their depositors and account holders. As a producer in this scenario, bank will present and process the transaction on deposits account and perform the documents on behalf of their customers such as customer loan. Because of that, based on this approach the output is considered as the number of accounts or related transaction that bank process. Hence, the input is the number of employee and physical capital (Sufian, 2007).

Under the intermediation approach, bank is assume as the intermediary, which act between the savers and the borrowers of funds as well as between the supplier and its customers. In addition, it posits total loans and securities as outputs, while deposits along with labour and physical capital are defined as inputs (Sufian, 2007). Besides, according to Yusditira (2004), the intermediation approach is in line with Islamic financial system. This is because in Islamic banks, they practices the equity based financing. Hence, bank will participate in the enterprise or business. Therefore, in this study intermediation approach is used to examine efficiency of Islamic banking industries in Malaysia.

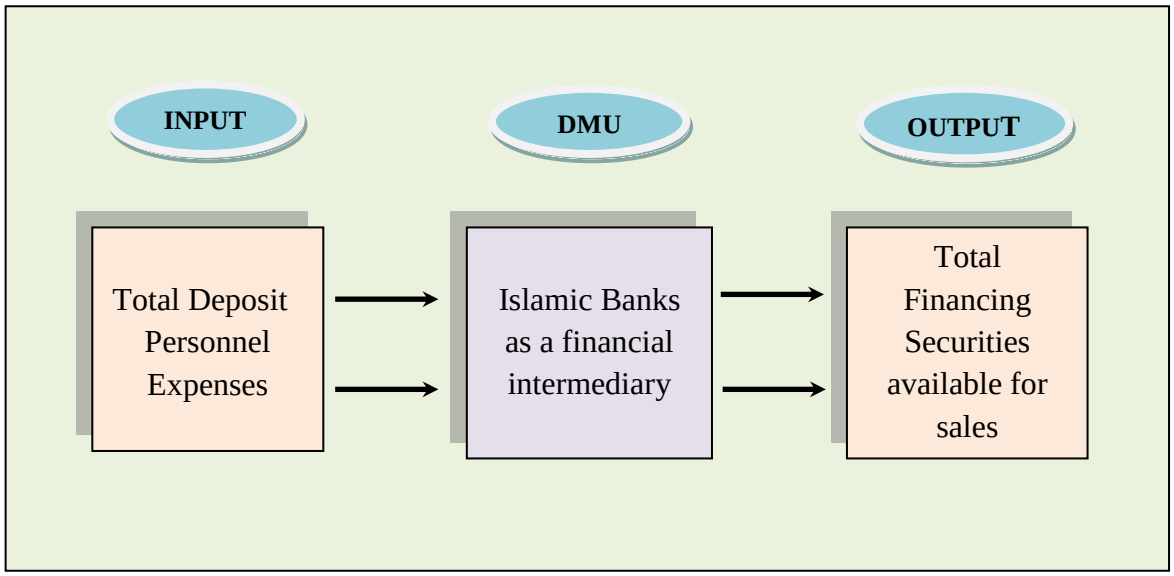

Figure 3.2
Input-output relationship in Islamic Banking (Intermediation Approach)
Source: Author's own.

Based on Figure 3.2, there are three elements involved in intermediation approach, namely input, Decision Making Unit (DMU) and output. In this study, DMU refers to the bank. Under the intermediation approach, we examining how efficient the DMUs transforming their input in order to generate the maximum level of output.

After the study of Farrell (1957), Charnes et al. (1978) develop the DEA model based on constant return to scale (CRS), which referred the CCR model as a method of benchmarking and to measure the performance as well as the efficiency of each Decision Making Unit (DMU). Under the CRS model, it is assumed that all scale of scores for each DMU is constant and same. The result offer Overall Technical Efficiency (OTE) which does not look at the different scale for each DMU.

Later Banker et al. (1984) developed a Variable Returns to Scale (VRS) and subsequently extended the CCR model, namely BCC model. Banker. et al., (1984) develop the BCC model which extending the CCR model (Charnes et al., 1978) with the intent to resolving problems with VRS. The efficiency measures obtained from the BCC model are known as pure technical efficiency (PTE) scores and of scale efficiency (SE) effects. PTE represent the result from the management of DMU and SE represents the result from the scale of DMU.

The CCR and BCC model has the same formulation except the added convexity condition in dual form. Both the CCR and BCC models applied either input orientation or output orientation. However, according to Charnes et al. (1978), the CCR model is considered as CRS and only suitable when all Decision Making Unit (DMU) are operating at optimal scale.

The linear programming problem is specified in order to represent the input-oriented in the DEA model with VRS technologies as below:

$$
\begin{aligned}
&\textit{min } \varphi, \lambda, \varphi \\
&\text{subject to } -\varphi y\, i, + Y\lambda, \geq 0 \\
&xi - X\lambda \geq 0 \\
&N1' \lambda = 1 \\
&\text{and } \lambda \geq 0
\end{aligned} \qquad (1)
$$

where λ is an N× 1 intensity vector of constants and φ is a scalar ($1 \geq \varphi \leq \infty$). $N1$ is an $N \times 1$ vector of ones. For N number of firms, *yi* and *xi* are the $M \times N$ and $K \times N$ output and input vectors, respectively. *Y* comprises the data for all N firms. Given a fixed level of inputs for the *i*th firm, the proportional increase in outputs to be reached the firm indicated by $\varphi - 1$. Note that without the convexity constraint $N1' \lambda = 1$, equation (1) becomes a DEA model with CRS technology. The convexity constraint implies that an inefficient firm is benchmarked against firms of a similar size and therefore the projected point of that firm on the DEA frontier will be a convex combination of observed firms. In other words, each firm would produce on or to the right of the convex production possibility frontier.

If TE scores for a particular firm with or without the convexity constraint imposed are the same, then the firm is operating under CRS. If these scores are different, the firm operate under VRS technology. However, in such a case, it would be necessary to identify whether the firm or the DMU operates with IRS or DRS. To do this, assumption of non-increasing returns to scale (NIRS) is imposed in (1) and the convexity constraint $N1' \lambda = 1$ is substituted with $N1' \leq 1$. This is given as follows:

$$
\begin{aligned}
&\min \varphi, \lambda, \varphi \\
&\text{subject to } -y_i + Y\lambda \geq 0 \\
&\varphi x_i - X\lambda \geq 0 \\
&N1' \lambda \leq 1 \\
&\text{and } \lambda \geq 0
\end{aligned} \qquad (2)
$$

Solution of the equation (2) reveals the nature of scale efficiencies. IRS exists if TE score obtained with NIRS technology differs from the TE estimates with VRS technology. If both of these efficiency scores are equal, then the corresponding firm operates with DRS.

Amongst the advantages and strengths of using DEA to measure efficiency is that, it can works with small sample size, which means DEA can run with less data demanding. Besides, according to Farrell (1957), technical efficiency (TE) can be defined as the ability of firms to produces and obtain a maximums output from a set of given inputs. Meanwhile, the Scale efficiency (SE) shows the capability and potential of firms in term of their work at its optimal scale. Besides that, the pure technical efficiency (PTE) refers to the ability of firms to produce a maximums output by avoid wastage in their operations.

However, DEA also have weaknesses in order to measure the efficiency. For instance, DEA assumes data are free from measurement errors. Furthermore, since efficiency is measured in a relative way, its analysis is limited only to the sample set used. As said with limited, means that researcher cannot be compared the result of efficient DMU found in the analysis with other DMUs outside of the sample.

Regarding the all explanation above about DEA, this study will employs the DEA approach to measure the risk and efficiency of Islamic banks in Malaysia. This study

conduct the efficiency analysis by using DEA computing software, namely DEAP version 2.1. The selection of this approach because of some reasons widely used by past researchers regards this technique to measure the efficiency of Islamic banks. Rather than that, according to Hassan (2013), DEA is a suitable approach for measure the efficiency assessment as it measures the relative efficiency of each production unit. Regard to the efficient frontier that is build from the real data.

3.4.1.1 Input-Output Specification

In term the definition and measurement of input and output specification in the banking function, there are still conflict issue among the researchers. In this study, two inputs and two outputs are selected in order to evaluate the efficiency of Islamic banks in Malaysia. The selection of inputs and outputs in this study is based on previous studies which have been widely used. Hence, financing and securities available for sale represent as outputs, while the total deposits and personnel expenses represent as the inputs in this study (see Table 3.2).

Table 3.2

The outputs and inputs used in this study

OUTPUT	INPUT
Total Financing	Total Deposits
Securities Available for Sales	Personnel Expenses

Based on Table 3.2, each term has a definition by itself. The followings describe each output and input definition been employed in this study.

a) Outputs

i. Total Financing

Total financing consist of mostly Islamic transactions (Yusdistira, 2004). Financing is an agreement between bank and borrower or customers. It can be in written letter or oral form. It used as temporary transfer property with promises to pay back in a specific time. In the context of Islamic banking, total financing included the financing to customers and other financial institutions like Murabaha, Mudarabah and Ijarah financing.

ii. Securities Available for Sales

According to Sufian and Abdul Majid (2007), investment securities held for trading, investment securities available for sale and investment securities held to maturity include in investments as output to the bank. Securities available for sales is equity or debt security that is not classified as a held for trading or held to maturity security. As reported by Islamic banks in the statements of financial position, under securities available for sale are Cagamas bonds, Islamic private debt securities and others.

b) Input

i. Total Deposits

Total deposits which include deposits from customers and other banks (Sufian and Abdul Majid, 2007). A total deposit is a total amount of deposits from customers and also deposits and placements of banks and other financial institutions. Here, customers and others financial institutions placed their money into Islamic banking institution for purposes of safekeeping. They has the right to withdraw any deposited funds, followed in the terms and conditions stated in the account.

ii. Personnel Expenses

Personal expenses considered as expenses that banks pay for human physical and mental (labor) effort such as for the staff cost (Yusdistira, 2004). For instance in term of their salaries and wages and also the allowances and bonuses for staffs are consider as the personal expenses to the banks.

3.4.2 Multiple Regression Analysis

The relationship between dependent variables and independent variables cannot determinant by only used the correlations analysis. Because of that, Multiple Regressions is a method that frequently used in a data analysis to analyse the data that involve several independent variables with one dependent variable. The purpose of regression analysis is to investigate which one among the independent variables mostly contributed as well as influence to the dependent variables. In Multiple Regressions, the contribution percentages of R square is computed.

In this study, the independent variables and dependent variables will be tested using SPSS software. The standard regression has been used. The final result from this regression analysis will indicate and shows the result where which variable is more influence to the efficiency variable. Besides that, the multiple regression analysis was used to test the hypothesis and it will determine.

The following equation represents the Multiple Linear Regression analysis used this study:

$$\gamma = \alpha + \beta i\ Xi + e$$

Where;

γ = Efficiency of Islamic banks

α = Intercepts (constant value)

β = Unstandardized beta coefficient

Xi = {Credit risk, Liquidity risk, Operational risk , Size}

e = Error term

3.4.2.1 Financial Ratios

The financial ratios are employed in order to calculating the liquidity, credit and operational risks and size in this study. The result from Data Envelopment Analysis (DEA) and financial ratios will used in the Multiple Regression Analysis to examine the level of efficiency of Islamic banks in Malaysia. Therefore, the risks would be measured as follows:

Table 3.3

The proxies used for Independent variables (IV) in this study.

Independent Variables	**Proxies**	**Expected Sign**
Credit Risk	Ratio of Non Performing Financing to Total Financing (Non Performing Financing / Total Financing)	-ve
Liquidity Risk	Capital to Total Assets (Equity / Total Assets)	-ve
Operational Risk	Return on Total Asset (EBIT/ Net Total Assets)	-ve
Size	Log of Total Assets	+ve

Note: EBIT- Earning before interest and tax

The selection of the independent variables and each proxies used in this study is replicated from the previous studies. For credit risks, the proxy used is replicated from Ahmad and Ahmad (2004) while the proxy for liquidity risk is replicated from Said (2013) and Rosman et al. (2013). Lastly, operational risk proxies is replicated from Said (2013).

Other than that, according to Sufian (2007), he noticed that in order to complement the results of the efficiency measures, the relationship between various accounting measures of bank performance with various efficiency scores is considered important determinant of bank efficiency. Hence, a new variable, namely bank size is included to examine its effect on efficiency. Although some banks have increase their size, its

impact on efficiency and performance is still ambiguous. Hence, following (Rosman et al., 2013; Sufian, 2007; Sufian & Abdul Majid, 2007; Tahir et al., 2011; Yudistira, 2004), we use log of totals assets as a proxy for banks size. The log of totals assets variable is included in the regression model as a proxy for measure of size.

Bank loans are expected to be the main source of revenue and expected to impact profits positively to the Islamic banking (Sufian & Abdul Majid, 2007). However, in term of credit risk, Ahmad and Ahmad (2004) mentioned that credit risk in banking is commonly defined as the probability of a borrower defaulting his loan commitments. Hence, the coefficient of ratio of non performing financing to total financing is expected to be negative relationship with the efficiency in this study. This is because the bad loans will reduce the Islamic banks profitability and efficiency.

Besides that, it is expected that liquidity risk have a negative relationship with the efficiency of Islamic banks. This is because, liquidity risk arises from the difficulty of selling an asset quickly without incurring large losses. For a banking industries, liquidity risk includes both the risk of being unable to fund portfolio of assets at appropriate maturities and rates and the risk of being unable to liquidate a position in a timely manner at reasonable prices. Therefore, the liquidity risk will affect the efficiency level of Islamic banks.

Besides that, operational risk will also affect the bank's performance. For instance, operational risk may arises in Islamic banking operation due to uncontrolled and managed properly in internal or external events of Islamic banks. Subsequently, it will affect the level of efficiency in Islamic banks itself. Next, as suggested by Ab-Rahim et al. (2012), Sufian (2007) and Sufian and Abdul Majid (2007) banks size lead to positively related to bank efficiency. The larger banks size indicate a more efficient of Islamic banks. Because of that, size is expected have a positive ralationship toward Islamic banks eficiency level score.

3.4.2.2 Assumption Testing

According to Coakes and Ong (2011), there are several assumptions underpin the use of regression. The first assumption is ratio of cases to independent variables. Under this assumption, the number of cases needed should ideally depends on the type of regression model used. Thus, for standard regression, the number of cases needed should ideally have 20 times more cases than predictors, whereas even more cases are required for stepwise regression. Whilst, the minimum requirement is to have at least 5 time more cases than independent variables. Hence, according to this study, there are have seventy-two of cases than four of independent variables that employed.

The next assumption is outliers or influential cases. Under this assumption, extreme cases have considerable impact on the regression solution and should be deleted or modified to cut their influence. In addition, under the multivariate analysis technique, the outliers can be detected using statistical methods such as Mahalanobis distance and graphical methods like residual scatterplots. This can help in indicating outliers in the data.

For the purpose of this study, outliers were examined using Mahalanobis distance and scatter plots. For instance, in scatterplots and box plot, it is showing the pattern of distribution also expose the actual cases of outliers for each of the variables understudy. Thus, based on the observation, all the outliers were mapped out according to the corresponding observations in the data set for possible errors. A number of them displayed distinct values, either too low or too high, compared to the normal value. However, for some the cases the outliers were not deleted, with the conviction that it represents true data or the originality of data that has been collected (refer Appendix C).

Subsequently, another assumption applied in the Regression Analysis are Multicollinearity and singularity. Multicollinearity refers to high correlations among independent variables, while singularity happens when perfect correlations among independent variables exist. These problems effect on how to interpret any relationships between the predictors (IVs) and dependent variables. They can be

detected by applied the most common measurement such as squared multiple regression and tolerances.

In addition, in this study, tolerance statistics and variance inflation factor (VIF) was also examined. VIF is actually the inverse of tolerance. The tolerance value is the amount of a variable unexplained by other independent variables. Thus, a small tolerance value (a correspondingly large VIF value) denotes high collinearity. The common benchmark is a tolerance value of 0.10 and above (Hair et al., 2006). The tolerance and VIF value of the four independent variables in this study is illustrated in table regression linear analysis (refer Appendix C). The tolerance statistic fell between 0.503 and 0.735 and correspondingly the VIF value fell between 1.361 and 1.987. Hence, based on these results it can be concluded that there is no problem of multicollinearity identified between the independent variables.

Another assumptions employed in Regression Analysis are normality, linearity, homoscedasticity and independent of residuals. Normal distribution of data serves as the benchmark for many statistical techniques because normality is required to use the F and t statistics. Therefore, a normality test has been conducted in order to make sure the normality of the distribution and checking for outliers. Through normality test, the outliers were removed from the analysis. After removed the outliers, the normality result can be accessed by using graphical analysis and statistical test for normality.

Accordingly, by using graphical analysis, the line in normal Q-Q Plot will forms a stright diagonal line if the distribution of data are normal. Based on Appendix C almost all the data distribution are plotted closely follows the diagonal in the normal Q-Q Plot. Next, the empirical statistics of skewness and kurtosis of the variables were examined. According to Hair et al. (2010) when both the values of skewness and kurtosis are equal to zero, the distribution of the data is normal. (refer Appendix C).

3.5 Conclusion

This chapter explains and clarifies more details about the approaches adopted in this study. All details from collecting data and tools used in this study were discussed. The researcher select the data sample based on the availability of data. The process of data collection is based on financial analysis. A detailed results will be described in the next chapter.

CHAPTER FOUR

ANALYSIS AND FINDINGS

4.0 Introduction

This chapter discusses the empirical result, interpretation as per the objectives of the study and analysis obtained from the analysis using the technique that already mentioned in Chapter Three. It will begin with the descriptive statistics of inputs and outputs by employing Data Envelopment Analysis (DEA) and ends with the result of relationship by employing Multiple Regression Analysis. The outcome from the analysis shows the relationship between dependent variable and independent variables that used in this study, the risks and efficiency for the selected period from 2008 to 2013.

4.1 Descriptive Statistics of Inputs and Outputs

Data expressed in descriptive statistics obtained from balance sheet and income statement are found in Islamic banks annual report obtained from each banks. All variables are measured in millions of Malaysian Ringgit (RM). In this study, two inputs and two outputs have been selected in order to answer the first research objective which is to examine the level of efficiency of Islamic banks in Malaysia during the study period from 2008 to 2013.

Accordingly, this study used the Total Financing (y1) and Securities Available for Sales (y2) as output, while the Total Deposits (x1) which derived of deposits from customers and also deposits and placements of banks and other financial institutions and meanwhile Personnel Expenses (x2) were used as inputs in this study. Table 4.1 below show the descriptive statistics of inputs and outputs used.

Table 4.1 represents the descriptive statistics of input and outputs variables utilized in the Data Envelopment Analysis (DEA) method in this study from 2008 to 2013 for Islamic banks in Malaysia. Over the six year period, the average of total financing (y1) result from year 2008 to 2013 indicates an increasing trend of output. This is followed by average total deposits (x1), which also indicate an increasing trend of input during the study period.

Table 4.1

Descriptive Statistics of Outputs and Inputs of Islamic Banks in Malaysia, (2008 – 2013)

YEAR		2008	2009	2010	2011	2012	2013
OUTPUTS AND INPUTS (RM)		**RM**	**RM**	**RM**	**RM**	**RM**	**RM**
Total Financing (y1)	MEAN	25 600 861	61 612 588	66 565 914	85 845 960	132 809 691	148 649 271
Securties available for sales (y2)	MEAN	6 068 575	4 753 615	10 069 307	17 792 603	34 276 410	49 086 431
Total Deposits (x1)	MEAN	131 983 863	153 487 999	163 364 889	175 214 692	207 936 715	214 799 431
Personnel Expenses (x2)	MEAN	1 629 164	1 643 308	2 352 773	2 068 034	2 215 889	1 682 756
Total Financing (y1)	MIN	1 368 041	1 911 270	2 342 145	2 886 463	3 936 712	4 614 687
Securties available for sales (y2)	MIN	6 526	185 866	330 665	174 521	320 117	99 698
Total Deposits (x1)	MIN	1 798 849	2 695 445	3 413 970	5 053 747	5 839 433	6 190 112
Personnel Expenses (x2)	MIN	614	1 494	3 616	7 414	9 932	10 297

Total Financing (y1)	MAX	249 827 727	673 649 925	721 029 028	936 500 793	1 480 590 537	1 648 699 828
Securties available for sales (y2)		61 461 157	36 974 449	94 373 699	187 695 108	380 833 148	557 509 107
Total Deposits (x1)		1 492 747 191	1 730 589 200	1 837 335 463	1 950 277 423	2 329 477 859	2 383 758 521
Personnel Expenses (x2)		19 060 935	19 123 248	27 338 288	23 966 313	25 630 094	19 125 614
Total Financing (y1)	SD	70 687 772.69	192 780 056.04	206 148 759.01	267 937 263.24	424 486 444.39	472 452 043.37
Securties available for sales (y2)		17 475 373.67	10 414 565.36	26 768 340.49	53 585 707.54	109 194 304.77	160 147 652.31
Total Deposits (x1)		428 563 327.80	496 708 181.90	527 217 221.78	559 061 158.12	668 173 136.29	683 127 671.16
Personnel Expenses (x2)		5 489 969.85	5 505 107.66	7 869 248.57	6 896 763.85	7 374 300.22	5 494 384.83

Source: Author's calculation

Based on the table, the result recommends that the awareness among people and society during year 2008 until 2013 towards Islamic banking and finance products among Malaysian has been increased and more establish due to the growth in average total financing as well as average total deposits. This is supported by Zainol et al. (2008) who stated that Islamic banking industries is more thriving today due to growth of awareness among people today parallel with globalization erra today. Besides, typically Islamic banks engage with Shariah way of operations. However, this feature does not restrict Islamic banks to provide services only for Muslim, but for non-Muslims as well. Furthermore, the progress on the average of the Islamic banks financing between 2008 and 2013 in this study proved that Islamic banks are actually going up and acquiring as well as additional market shares. In addition, Islamic financing accounted for 20.2% of the total loans of the banking system at the end of July 2009 (Economy Report, 2009/2010). Hence, this finding provides an increasing level of trend result in financing and total deposit for Islamic banks from one year to another year.

Henceforth, an average personnel expenses (x2) for Islamic banks in Malaysia indicate a fluctuation trend even though they revolve from time to time. As an employer, banks need to spend money for their staff expenses like for paying for their salary. This may suggests that, Islamic banks are investing in human resources as well as new technology following their current need and situation.

In addition, concerning the average securities available for sales (y2), the result indicate a decreasing trend with RM 6,068,575 and RM 4,753,615 respectively in year 2008 to 2009. Nevertheless, it was slightly increased as much as RM 10,069,307 in 2010, RM 17,792,603 in 2011, RM 34,276,410 in 2012 and RM 49,086,431 in 2013 over the year period of study. This may suggest that Islamic banks rolling and obtained funds are through investment such as in Islamic private debt securities and Cagamas bonds as output to the bank. The fluctuation in current situation market may be one of the reason indicates the result scores by securities available for sales. However, regarding to this factor, it is still in control and can be adopted and handled by Islamic banks effectively. Other than that, Malaysia is also known as the first country which issue an international sukuk and a leader in the field of Islamic finance. Malaysia's sukuk market is the largest and covers over 60% of the worlds sukuk market (Economy Report, 2009/2010).

4.2 Efficiency of Islamic Banks in Malaysia

This section elucidates the efficiency result of Islamic banks in Malaysia from year 2008 until 2013 respectively in term of Overall Technical Efficiency (OTE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE). All the availability of data has been measured using Data Envelopment Analysis (DEA) to identify the level of efficiency of Islamic banks in Malaysia. The value of OTE, PTE and SE is explained in Table 4.2.

Table 4.2

The Result of Efficiency of Islamic Banks in Malaysia, (2008-2013)

YEAR	NUMBER OF ISLAMIC BANKS	OTE (MEAN)	PTE (MEAN)	SE (MEAN)
2008	12	0.792	0.959	0.832
2009	12	0.924	0.976	0.948
2010	12	0.912	0.962	0.949
2011	12	0.861	0.927	0.932
2012	12	0.931	0.957	0.973
2013	12	0.934	0.960	0.972
2008 - 2013	72	0.771	0.831	0.926

Notes: OTE : (Overall technical efficiency); PTE :(Pure technical efficiency);
SE: (Scale efficiency)

Table 4.2 shows the empirical result for the Overall Technical Efficiency (OTE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE) level of Islamic banks in Malaysia under study for the year 2008 until 2013.

Based on the table, the level mean of overall technical efficiency for the year 2008 for the total of 12 Islamic banks in Malaysia is 79.2%. It means that, all the sample in this study had reached a mean technical efficiency scores as much as 79.2% and the rest, 20.8% of the technical efficiency is being wasted by Islamic banks during this year. In terms of pure technical efficiency, the result indicates that the efficiency score of Islamic banks is as much as 95.9% while the scale efficiency score is 83.2%. Therefore, the results show that the source of inefficiency of Malaysian Islamic

banks in 2008 was scale inefficiency, suggesting that Malaysian Islamic banks have been operating at the wrong scale of operations in this year.

In the following year, Islamic banks exhibited a mean overall technical efficiency of 92.4%. This result recommends that the Islamic banks could have saved 7.6% of the inputs to produce the same amount of outputs that they produced during this year. On average, the pure technical efficiency and scale efficiency indicate a total of 97.6% and 94.8% respectively in 2009.

The efficiency score of overall technical efficiency of Islamic banks during the year 2010 is 91.2%. Hence, it shows that 8.8% of the technical efficiency is being wasted by Islamic banks in this year. This result recommends that the Islamic banks could have saved 8.8% of the inputs to produce the same amount of outputs that they produced. Besides that, it is also found that Islamic banks in Malaysia exhibited pure technical efficiency and scale efficiency average level score of 96.2% and 94.9% respectively during this year.

In 2011, the result shows that the average overall technical efficiency scores is 86.1%. It shows a declining trend of overall technical efficiency of the Islamic banks in Malaysia from 2010 to 2011. Therefore, this result recommends that the Islamic banks could have saved 13.9% of the inputs to produce the same amount of outputs that they produced during this year. Besides, as can be seen from Table 4.2, Islamic

banks in Malaysia perform better in term of scale efficiency compared to overall technical efficiency and pure technical efficiency (92.7%), which indicate the scale efficiency result score for the year 2011 is as much as 93.2%.

On the other hand, the average mean score overall technical efficiency for Islamic banks for 2012 shows an increasing level of scores from the previous year. The result shows that the overall technical efficiency of Islamic banks in 2011 is 86.1% before it rose up to 93.1% in 2012. Specifically, average scores for pure technical efficiency and scale efficiency Islamic banking has increased to 95.7% in pure technical efficiency as well as 97.3% in scale efficiency during this year.

The overall technical efficiency for year 2013 shows the highest level score of overall technical efficiency compared to other years, which is 93.4%. The result in 2013 shows that only 6.6% of input is being wasted by Islamic banks to produce the outputs in this year. Hence, this indicates that Islamic banks are more efficient during this year when it comes to the highest score level of mean overall technical efficiency compared to other years. Indeed, in term of average scores for pure technical efficiency and scale efficiency for Islamic banks the result provide as much as 96.0% and 97.2% respectively.

As we can see in the finding of the result, it shows a fluctuation trend on average overall technical efficiency in all periods under study. However, it can be concluded that Malaysia's Islamic banks are quite efficient. Overall, the results show that the highest score overall technical efficiency for Islamic banks in Malaysia in year 2013 is as much as 93.4% while in year 2008 shows the lowest score of overall technical efficiency that is 79.2%. The result in 2008 shows the lowest score because the impact of financial crisis but Islamic banks seem more robust recovery than conventional banks because of its basic nature like prohibited any interest payments (riba) in their transactions. Otherwise, the result in 2013 shows the highest score because of some reason like good economic condition during this time. Meanwhile, over the six period, which is start from 2008 until 2013, Islamic banks exhibit a total of 77.1% of the overall technical efficiency. This is suggesting that the mean input waste by Islamic banks are of 22.9%. In other words, the Islamic banks have produces the same amount of output by only using 77.1% of the amount of input it uses. Meanwhile, from 2008 to 2013 Islamic banks in Malaysia reaching a total of 83.1% for pure technical efficiency. The result also proved that, the scale efficiency result derived from the DEA model indicate as much as 92.6% for the year 2008 to 2013. As a whole, it shows that scale efficiency contributed more towards overall technical efficiency Islamic banks in Malaysia during the six years' time line compared to the pure technical efficiency.

The trend of efficiency score under overall technical efficiency (OTE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE) for Islamic banks in Malaysia from 2008 to 2013 can also be seen in Figure 4.1 below.

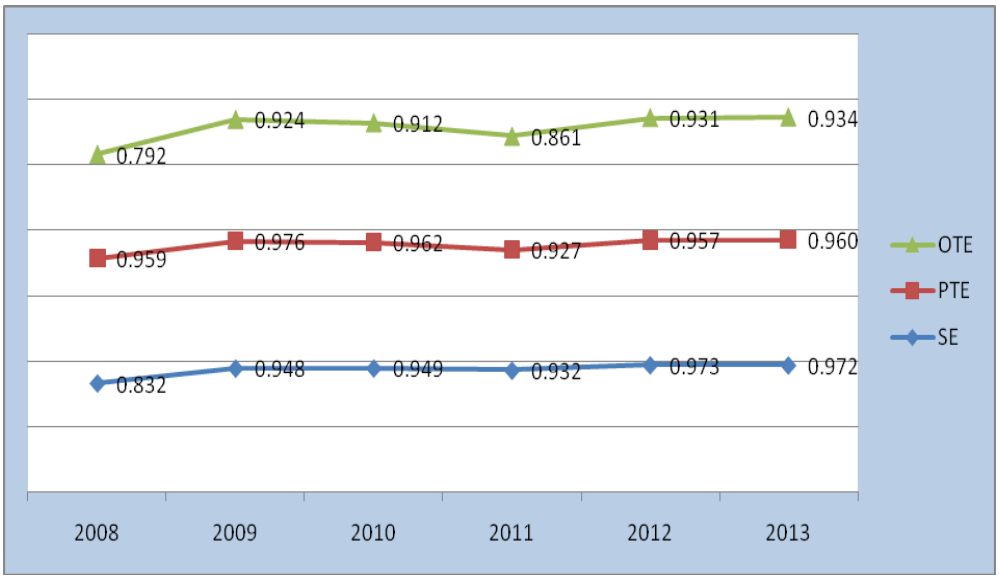

Figure 4.1
Trend of Overall Technical Efficiency (OTE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE) of Islamic banks, 2008 to 2013.
Source: Author's calculation

Figure 4.1 above presents the averages of efficiency scores, under the overall technical efficiency, pure technical efficiency and scale efficiency of Islamic banks sample in Malaysia during the period 2008 to 2013. The result shows that Islamic banks in Malaysia moved to reach a peak trend during year 2008 to 2009. With 79.2% and 92.4% of efficiency scores respectively, this result recommends that the Islamic banks could have saved 20.8% in 2007 and 7.6% in 2009 of the inputs to produce the same amount of outputs that they produced. However, the overall technical efficiency level of Islamic banks in Malaysia decreased consecutively from 2009 to 2010 and 2011 (that is a drop from 92.4% in 2009, 91.2% in 2010, and 86.1% in 2011). Thus, it shows the declining trend for those three years. Meanwhile, in overall technical efficiency, the efficiency scores slightly increased as much as 7% from 86.1% in 2011 to 93.1% in 2012. The result also shows that it has increased slightly to 93.4% in the following year.

In terms of pure technical efficiency, it increased from 2008 to 2009 and slightly declined in the years 2010 and 2011. Moreover, in 2012 the level score reached as much as 95.7% and 96.0% in 2013 respectively. Therefore, the highest score of pure technical efficiency is in 2009 as much as 97.6% and the lowest score of pure technical efficiency is in 2011 indicate by 92.7% of score. In terms of scale efficiency, it increased from 2008, 2009 and 2010 with score level 83.2%, 94.8% and 94.9% respectively. After that it slightly declined in 2011 to 93.2%, before increasing again in 2012 and a little bit declined in 2013 as much as 97.2%. The highest score of scale efficiency is at 2012 and the lowest score is at 2008.

4.3 Risks and Efficiency of Islamic banks in Malaysia

This section elucidates the relationship among risks and efficiency result. All the availability data has been measured by employing the Multiple Regression Analysis to analyze the relationship among risks and efficiency of Islamic banks in Malaysia from year 2008 to 2013. Multiple Regression Analysis was employed on four independent variables, namely, credit risk, liquidity risk, operational risk and banks size towards efficiency. The result is explained in the Table 4.3.

Table 4. 3

Result of Multiple Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.419	.464		-.904	.372
CREDIT_RISK	-3.162	1.395	-.372	-2.267**	.030
LIQUIDITY_RISK	2.805	1.129	.401	2.484**	.018
OPERATIONAL_RISK	-3.661	4.435	-.161	-.825	.415
BANKS SIZE	.154	.066	.376	2.324**	.026

Dependent Variable: = EFFICIENCY
**Significant at 5 percent levels.

F- value = 4.028
Significant value = 0.008
R-Square = 0.309

Table 4.3 presents the results of Multiple Regression Analysis employed in this study. In order to analyze the relationship between risks and efficiency, Multiple Regression is used to test the relationship between the determinants namely credit risk, liquidity risk, operational risk and size towards efficiency of Islamic banks in Malaysia from 2008 to 2013. The result shows that analysis of variance indicated that F statistic produced the result as much as 4.028, where it is found to be significant ($p = 0.008$) with R^2 (standardized R-Square) value is 0.309. This indicates that approximately 30.9% of the variance in efficiency was explained by independent variables entered into regression model which are credit risk, liquidity risk, operational risk and banks size. Thus, the result reveals that it is evident that credit risk has negative significant relationship on the efficiency of Islamic banks ($B = -3.162$, Sig. = 0.030). Thus, the null hypothesis for this analysis is rejected and the alternate hypothesis is accepted.

Nevertheless, liquidity risk is proved to have a positive significant relationship on the efficiency of Islamic banks (B = 2.805, Sig. = 0.018). Thus, based on the findings of the regression analysis, the null hypothesis for this analysis is rejected and the alternate hypothesis is accepted. On the other hand, operational risk did not prove to be a significant predictor on the efficiency of Islamic banks by the path model (B = -3.661, Sig. = 0.415). Therefore, this empirical result fail to prove the hypothesis, there is relationship between efficiency and operational risk in Islamic banking in Malaysia during the period of study. Thus, the null hypothesis for this analysis is failed to reject and the alternate hypothesis is failed to accepted. Moreover, the result also indicates that banks size also has a positive significant relationship with the efficiency of Islamic banks (B = 0.154, Sig. = 0.026).

The results of this study indicate that there is negative significant relationship between credit risk and efficiency of Islamic banks in Malaysia during the year 2008 to 2013. This result is consistent with previous studies (for example: Ab-Rahim et al., 2012; Barr et al. 2002; Sufian and Abdul Majid, 2007; Said, 2013) which found a negative relationship between credit risk and efficiency. Nevertheless, this finding is in contradiction to previous studies (Rosman et al., 2014) which found a positive relationship between credit risk and efficiency. This finding suggests that a higher credit risk will cause lower level of efficiency in Islamic banks efficiency. It indicates that if Islamic banks faced with high level of credit risk, banks will suffer and need to face with difficulties in order to run the activities like problems that occur in the banks operation and transactions. Accordingly, this will lead to Islamic banks inefficiency performance. Therefore, banks need to manage and regulating

their internal cost very well in order to avoid the credit risk problem (Berger and De Young, 1997) as well as to operate in a good performance.

With regards to liquidity risk, this study revealed that liquidity risk has a positive significant relationship with the efficiency of Islamic banks in Malaysia. Regarding liquidity relationship, it indicates that if Islamic banks maintained a high liquidity, they will not suffer and does not have to face with difficulties problems like not having sufficient cash by serving their customers. For instance, bank is the important financial institutions in economy circle and act as intermediaries among surplus unit and deficit unit. Because of that, the sufficient cash is very important in order for banks to perform their obligations such as for loan demand and meet customers withdrawals and others. Banks that have a good management towards liquidity will able to fulfill their functions and obligations.

However, banks cannot hold excessive liquid assets. This is because for reason like the returns in short term assets is lower compared to return comes from long term assets such as financing. For instance, in money market instruments which is a short term assets, their return accounted more lower to the banks while in long term assets, their return is more higher than short term assets.

With respect to this study, the positive significant relationship between liquidity risk and efficiency indicates that the higher liquidity risk, the better efficiency of Islamic banks in Malaysia. In this scenario, it means that when Islamic banks hold less liquid assets, it will expose them to liquidity risk. Islamic banks have a lower proportion of assets in short term assets and this means that Islamic banks have more proportion of assets in long term assets. Meanwhile, Islamic banks with more financing (long term assets) will be more efficient in terms of returns they will get. Hence, Islamic banks will become efficient and more competitive in the future as well as getting better returns. This finding is in contrast with Said (2013), who found that the insignificant correlation between liquidity risk and efficiency in MENA area.

Furthermore, this study depicted that, banks size and efficiency of Islamic banks in Malaysia have positive relationship among each other. It indicates that the bigger the bank's size indicate a more efficient Islamic banks compared to small banks size. In this study, banks size is measured by their total assets. In addition, the size of total asset for that company also indicate how efficient that company is. It is because total assets donate the total amount of assets for that company. For instance, if their total assets is higher, it will provide future benefit for the company because assets represent the value of ownership and it can convert into cash (Koh, Ser-Keng, Brigham & Ehrhardt, 2014). This empirical results is in conformity with the previous study (for example: Ab-Rahim et al., 2012; Sufian, 2007; Sufian and Abdul Majid, 2007; Tahir et al., 2011; Yudistira, 2004) who found that larger banks size indicate a more efficient level of efficiency of Islamic banks. Meanwhile, if anything could be delved from the results is that, larger Islamic banks tend to make more loans

and in the process Islamic banks have become more efficient. The positive sign suggests that as the banks get larger, it has resulted in higher efficiency of Islamic banks. Besides, the results imply that due to Islamic bank which has a larger banks size or total assets being more professionally managed with better-diversified asset portfolios.

4.4 Conclusion

This chapter has discussed as well as provided detail discussions on the findings as per the objectives of the study. The researcher had conducted the DEA analysis and Multiple Regression analysis in order to get a result for this study. Thus, the following chapter will be discussing on the conclusion and recommendations for future research.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter summarizes the findings of the study. As stated earlier, the objectives of this study are to examine the level of efficiency of Islamic banking in Malaysia during the period from 2008 to 2013 and to analyze the relationship between risks and efficiency. Subsequently, the study has performed a contribution of the study. Then, this chapter also presents the limitations of the present study. Based on the findings, this chapter also highlights the relevant recommendations and suggestions for the future research.

5.1 Summary of the Findings

This section discusses about the findings as well as analysis on the findings that have been done discuss and explained in the previous chapter. In this study, the researcher focuses on the efficiency as a dependent variable. Likewise, researcher also determines the influence factors of efficiency which are credit risk, liquidity risk, operational risk and banks size.

The result in this study exhibited a total of 77.1% of overall technical efficiency (OTE) accomplished by Islamic banks during the period of study. Hence, the findings found that on average the OTE for Islamic banks in Malaysia indicate the amount of 79.2%, 92.4%, 91.2%, 86.1%, 93.1% respectively from year 2008 while in year 2013 it shows the score of 93.4%. This reveals the fact that the overall efficiency results suggest that the efficiency across 12 Islamic banks in Malaysia is considerable as quite efficient even though in 2008 shows a quite lower level scores of overall technical efficiency but it is still consider in efficient level across sample period of this study, 2008 to 2013. Subsequently, in year 2013 the finding indicate a higher level scores of technical efficiency. It means that during the period of study which covered from 2008 to 2013, in year 2013 indicate higher scores of technical efficiency compared to another year. Indeed, it proved that Islamic banks in Malaysia were operating at the most productive level of technical efficiency by utilizing their input and output very well without much wastage of practice.

Meanwhile, the finding show that on average the PTE for Islamic banks in Malaysia indicate the result of 95.9%, 97.6%, 96.2%, 92.7%, 95.7% and 96.0% respectively from 2008 to 2013. Overall, the result shows that Islamic banks exhibited a total of 83.1% of PTE during the study period. However in term of SE, Islamic banks exhibited as much as 83.2%, 94.8%, 94.9%, 93.2%, 97.3% and 97.2% of SE respectively. Overall, the result shows that Islamic banks exhibited a total of 92.6% of SE during the study period. Therefore, these results show that the SE level score contributed more to OTE compared to PTE in Islamic banks.

Furthermore, there are some causes that may subscribe to the high efficiency level of Islamic banking in Malaysia. The technological advancement and managerial efficiency is the one of the factors that contribute to the efficiency of Islamic banks in Malaysia. Perhaps, Islamic banks nowadays is more sophisticated and advanced as well as up to date in terms of technology used compared to the previous times in order to provide the excellent performance. Furthermore, recognizing that technological advances, the management in Islamic banks is well organized in line with current situations with effective rules in order to follow the Islamic command.

Another element that subscribe to an efficient level of Islamic banks in Malaysia is the country's economic condition. A good economy condition will influence the performance of Islamic banks. For instance, the financial activity for Islamic banking is effected by demand from the customers as well and this demand is effected by the good condition of economy by customers like investors. The same cases happen during the financial crisis but amazingly Islamic banking industries is not really effected because of its special features compared to the conventional banking industries. In general, good economy condition tend to encourage the growth of Islamic banking industries to expand and societies will become wealthier.

Besides that, it is well known that a scene of the major financial crisis or Subprime crisis which happened in two years, 2008 and 2009, hit the conventional financial system in its entirety. Nevertheless, Islamic banks were not much threatened and effected as a result of this financial crisis (Ftiti, Nafti & Sreiri, 2013). Because of

that, the finding in this study show that Islamic banks are still to be considered efficient even during the crisis. This may suggest that Islamic banks are more efficient the impact does not really seen especially in terms of their overall technical efficiency (OTE) than their conventional counterparts during the financial crisis.

Islamic banks can continue their efficiency growth despite the subprime crisis because of many points. Firstly, the rules that adopted by conventional banks and Islamic banks are different. As such, Islamic banks operations is based on assets based (Bakar & Engku Ali, 2008). Regarding the outputs offered, Islamic banks are always backed by real assets and are not based on fictitious assets as do conventional banks. Secondly, the sector area where the Islamic banks operating are restricted compared to conventional banks, which does not allow them to take too much risks like speculative activity as well as in order to follow the Shariah tenets (Akkizidis & Khandelwal, 2008; Ftiti et al., 2013). Lastly, for the most part of the causes causative to financial crisis are not applicable to Islamic banks. This is because Islamic banks do not meet the alike criteria as conventional banks, as though legitimate that Islamic banks and the whole Islamic financial system are not affected by this kind of financial crisis (Ftiti et al., 2013). Because of that, parallel to the results obtained, it is not surprised to found that the financial crisis not effect Islamic banks in Malaysia.

Apart from that, Malaysia is globally recognized as the Islamic banking hubs. In order to be an Islamic banking hub, Islamic banks need to mantain their level of efficiency. Because of that, the efficiency level of Islamic banks in Malaysia is also affected by the establishment of Islam which emphasizes and promote the Shariah way of life regarding the financial perspective.

Moreover, Islamic finance systems is also supported by strong legal and regulatory framework across sample period. Therefore, BNM is the experienced regulatory body framework that control all the financial activities in this country. As mentioned earlier, there are totally 16 Islamic banks that operate in Malaysia today and was given license by BNM to commit in Islamic banking industries operations.

The second objective in this study is to analyze the relationship between risk and efficiency of Islamic banks in Malaysia from 2008 to 2013. Based on the findings from the Multiple Regression analysis, it is interesting to express that the credit risk, liquidity risk and banks size are significant predictor that influence the efficiency of Islamic banks in Malaysia.

In Islamic banking, risk management becomes more challenging because of the unique nature of the risk and the need for adherence to Shariah principles. Risk management infrastructure in Islamic financial institutions need to identify, dismantle, measure, control and monitor all risks specific to the transaction and

Islamic financial instruments. This is to ensure that systems and controls will be effective in the quantification and management of risks arising from the operation. Besides that, efficiency plays an important role in an organization, particularly in Islamic banks, as well as the importance of risk management, including credit risk, liquidity risk and banks size. From this study, there are clearly a significant relationship between all these risks as well as bank size with efficiency that is being practiced in this study exist. As such, Islamic banks need to understand the level of risk that they are facing as it can affect the bank's operation and efficiency whether in the short run or long run. This is because banks that operate more efficiently may adopt a strategy of internal and external organizations.

5.2 Contributions of the Study

From the findings we can notice that apparently, in recent years, Islamic banks are not really effected during the financial crisis towards banks efficiency and have several risks that significant to the bank's efficiency, credit risk (negative relationship), liquidity risk (positive relationship) and bank's size (positive relationship).

This study could be an initial effort to analyze the relationship between risks and efficiency of Islamic banks in Malaysia especially during and after the financial crisis performance by the banks. More significantly, it is the use of DEA to examine

the level of efficiency of the banking industry in Malaysia and employed the Multiple Regression analysis to look at the relationship between the risks and efficiency during the period of study. In addition, the findings of this study have significant contributions to several interested parties, such as in informing the policy makers like Bank Negara Malaysia (BNM) or the related ministries on the relative efficiency of Islamic banks. As banking institution, Islamic banks need to follow the rules and regulations that controlled and set by regulatory bodies.

This research also gives implication to the management of Islamic banks who will identify the type of risks that influence the level of efficiency in their bank's operations. It is essential to improve the bank's operations in managing the internal banks factors effectively and efficiently. Besides that, the manager of Islamic banks is driven to give greater emphasis on the risks that affect Islamic bank's efficiency which will influence the banking operations performance. Besides that, the manager can take action to make sure that any risks will not harm the bank's performance in order to become to be the most efficient financial institutions.

Regarding this finding, this study also helps Islamic banks to develop and build-up their own strategies from the operational and management point of view in order to perform the high level scores of performance efficiency by using their input to produce more level of output. In order to compete healthily with their competitors, like conventional banks, Islamic banks need to improve and strengthen their competitive edge. Besides that, the risk may occur in order to achieve efficient

performance parallel with Islamic aim strategies. Hence, in terms of developing good strategies, Islamic banks need to manage their risks as well. Likewise, the findings from this study can improve bank's understanding towards risks and efficiency relationship in their operations.

In addition, the contribution of this study is from the theoretical perspective. It was well aware that previous research studies conducted were mostly focused on efficiency. However, this study has extended the previous efficiency research by contributing more to the literature by presenting the relationship between risks and efficiency especially in the case of Malaysia from 2008 to 2013. Furthermore, this study has developed a theoretical framework that have an impact on risks and efficiency. Indeed, it is hope that more similar research can be conducted in the future researcher by employing the related topic.

5.3 Limitations and Recommendation for Future Research

Notwithstanding the contribution and valuable implications to related parties, it has also contributed to the literature of study. The sample used in this study was taken from twelve Islamic banks that are operating and is based on the availability of data that covered only the period of 2008 to 2013. Because of that, the outcome of this study does not represent all Islamic banks available in Malaysia since it focused on

selected banks based on the availability of data. Hence, any future research may extend the sample size of the study.

As mentioned earlier, Malaysia has two types of banking system operation, namely Islamic and conventional banks. However, this research study only focus on the relationship between risks and efficiency of Islamic banks. The two types of banking system serve the same community of customers regardless of religion. Hence, it is suggested that based on this limitation, any future studies can extend the study by utilizing any data from conventional banks as well. By doing so, the study will not only benefit the bank in the aspect of efficiency and risks but a comparison with conventional banking could be established. This is because in reality Islamic banks have to compete with conventional banks in order to perform their best of performance. Ultimately, the positive perception towards Islamic banks will affect the level of risk that the banks need to face.

5.4 Conclusion

Finally, this study was conducted to examine the risks and efficiency relationship in Islamic banks in Malaysia. Hence this study has came out with its own results from the analysis of secondary data using DEA analysis and Multiple Regression analysis. The results indicate that in general Islamic banks in Malaysia stand in quite efficient level of efficiency scores in 2008 to 2013 with negative relationship towards credit risk, positive relationship towards liquidity and banks size. Therefore, the findings of this study are expected to contribute significantly to the existing knowledge on the banks efficiency and its relationship towards risks in Islamic banking industry especially in Malaysia.

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