THE IMPACT OF CREDIT AND OPERATIONAL RISK ON ISLAMIC AND CONVENTIONAL BANK EFFICIENCY IN MALAYSIA

HADI GHAFOORIAN YAVARPANAH

UniversitiTeknologi Malaysia

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CONVENTIONAL BANK EFFICIENCY IN MALAYSIA

HADI GHAFOORIAN YAVAR PANAH

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This thesis is dedicated to

My divine parents who support throughout my life

&

My lovely wife Shahrzad and gorgeous children

Tahoura and Taravat

Who have always stood by me and dealt with all of my absence from many family occasions with a smile

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ABSTRACT

In banking sector, evaluation of performance and productivity are among fundamental concepts in management to achieve firm's goals. High levels of efficiency through performance and continuous efforts of managers are needed in order to be successful in the competitive markets. Institutions need to know their relative success according to performance in comparison with similar institutions and their performance for the past years. In this study, the economic efficiency was analyzed and compared in terms of risk factors for Islamic and conventional banks in Malaysia for the period of 2008 to 2012. The study was conducted on the banks certified by Central Bank of Malaysia (Bank Negara) which includes both Islamic and conventional branches. Data was collected from annual financial reports such as balance sheets and income statements. Data envelopment analysis (DEA) was implemented to determine and analyze the economic efficiency. Based on the intermediation approach, three inputs and two outputs were selected. Basel 2 was used to define the credit and operational risks on efficiency. In addition, DEA network model was proposed to estimate the overall efficiency (with regard to credit and operational risk) of banks and to specify the difference between Islamic and conventional banks in terms of efficiency using the nonparametric test such as Mann-Whitney and Wilcoxon. The result indicates that the credit and operational risk have significant impact on efficiency for both Islamic and conventional banking system. The non-performing loan has negative impact on efficiency in both Islamic and conventional banks which leads to undesirable output of banking system. In contrast, return on equity and return on assets show positive impact on efficiency of banks in Malaysia. The results also reveal that the efficiency of Islamic banks in Malaysia is higher than conventional and the differences are statistically significant. In addition, the efficiency is higher than the overall efficiency (efficiency with regard to credit and operational risk) of banks in Malaysia. The finding also indicates that there is no difference between overall efficiency of Islamic and conventional banks in Malaysia.

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ABSTRAK

Dalam sektor perbankan, penilaian prestasi dan produktiviti adalah antara konsep asas dalam pengurusan bagi mencapai matlamat firma. Tahap kecekapan yang tinggi melalui prestasi dan usaha berterusan oleh pengurus adalah diperlukan untuk berjaya dalam pasaran yang kompetitif. Sesebuah institusi perlu tahu kejayaan relatif prestasi mereka berdasarkan perbandingan prestasi dengan institusi yang sama dan prestasi mereka bagi tahun-tahun sebelumnya. Dalam kajian ini, kecekapan ekonomi dianalisis dan dibandingkan dari segi faktor risiko untuk bank Islam dan bank konvensional di Malaysia bagi tempoh 2008 hingga 2012. Kajian ini dijalankan ke atas bank-bank yang diperakui oleh Bank Pusat Malaysia (Bank Negara) yang merangkumi kedua-dua cawangan bank Islam dan bank konvensional. Data diperoleh daripada laporan kewangan tahunan seperti kunci kira-kira dan penyata pendapatan. Analisis pengumpulan data (DEA) dijalankan bagi menentukan dan menganalisis kecekapan ekonomi. Berdasarkan pendekatan perantaraan bersandar, tiga input dan dua output telah dipilih. Basel 2 telah digunakan bagi menerangkan risiko kredit dan risiko operasi ke atas kecekapan. Tambahan lagi, model rangkaian DEA telah dicadangkan untuk menganggar kecekapan keseluruhan (merujuk kepada risiko kredit dan risiko operasi) bagi bank dan untuk menentukan perbezaan antara bank Islam dan bank konvensional dari segi kecekapan dengan menggunakan ujian bukan-parametrik seperti Mann-Whitney dan Wilcoxon. Keputusan menunjukkan risiko kredit dan operasi mempunyai kesan signifikan ke atas kecekapan untuk kedua-dua sistem perbankan Islam dan konvensional. Pinjaman tidak berbayar mempunyai kesan negatif ke atas kecekapan kedua-dua bank Islam dan konvensional yang membawa kepada pengeluaran yang tidak diingini daripada sistem perbankan. Sebaliknya, pulangan atas ekuiti dan pulangan atas aset menunjukkan kesan positif ke atas kecekapan bank di Malaysia. Keputusan juga menunjukkan bahawa kecekapan bank Islam di Malaysia lebih tinggi daripada bank konvensional dan perbezaan ini secara statistiknya adalah signifikan. Seterusnya, kecekapan adalah lebih tinggi daripada kecekapan keseluruhan (kecekapan berdasarkan risiko kredit dan operasi) bagi bank di Malaysia. Penemuan ini juga menunjukkan bahawa tiada perbezaan antara kecekapan keseluruhan bagi bank Islam dan bank konvensional di Malaysia.

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AE	-	Allocative efficiency
ANN	-	Artificial neural network
APE	-	Alternative profit efficiency
CAMEL	-	Five key financial ratios (CAMEL)Financial ratios include capital adequacy, asset quality, management, earning and liquidity
CEEB	-	The Central and Eastern Eurobarometer
CRS	-	Constant returns to scale
DEA	-	Data envelopment analysis: DEA
DFA	-	Deterministic Frontier Analysis
DMUs	-	Decision-making units
ECU	-	European Currency Unit (former monetary unit)
EDF	-	Expected default frequency
EQASS	-	Total book value of shareholders equity over total assets
GCC	-	Gulf Cooperation Council
LA	-	Liquid assets
LLP/TL	-	Loan loss provisions over total loans
LNDEPO	-	Natural logarithm of total deposits
LNGDP	-	Natural logarithm of gross domestic products
LNTA	-	Natural logarithm of total assets
LOANS/TA	-	Total loans over total assets
MPI	-	Malmquist productivity index
NIE/TA	-	Non-interest expense over total assets
NII/TA	-	Non-interest income over total assets
NPL	-	Non-performing loan
NPL	-	Non-performing loan
OBS	-	Off-balance-sheet
OEA	-	Other earning assets

PC	-	Price of capital
PF	-	Price of funds
PLL	-	Provisions for loan losses
PTE	-	Pure technical efficiency
ROE	-	Return on equity
RON	-	Return on assets
RST	-	Rough set theory
SE	-	Scale efficiency
SFA	-	Stochastic Frontier Analysis
SPE	-	The standard profit efficiency
SR	-	Stock return
TD	-	Total deposits
TE	-	Technical efficiency
TFA	-	Thick Frontier Approach
TL	-	Total loans
VRS	-	Variable returns to scale

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CHAPTER 1

INTRODUCTION

1.1 General Overview

Evaluation of the performance and productivity are among fundamental concepts in management. In order to achieve the firm's goals, organizations need to evaluate their performance (Benner and Tushman, 2003). Banks, financial and credit institutions are among the most important organizations in economic activities of every economic system (Ataullah and Le, 2006), because each activity which entails asset acquisition and financial resources, undoubtedly requires mediation of banks and financial organizations (Ren, 2005).

One of the important stages of the performance appraisal is to evaluate the organization efficiency (Barr et al., 2002, Fethi and Pasiouras, 2010). Banking industry, like any other economic activities, has become a competitive field (Bikker and Haaf, 2002). Experiences proved that in competitive situations, probably, only strong institution performs activities in an efficient and effective manner will survive. Success in competitive markets requires high levels of efficiency through performance and continuous learning (Cornett et al., 2009). Managers ought to know what their relative success to their performance is. In other words, managers must be aware of their success in comparison with other similar institutions and their performance in the past years.

During the four past decades, a new competitor with an impressive growing pace known as Islamic banking has emerged in the banking industry which operates according to the Sharia law (Alexakis and Tsikouras, 2009). Islamic finance is the provision of financial services based on the principles and rules of Islamic commercial jurisprudence (fiqh al mu'amalat), a branch of Islamic Sharia jurisprudence (Archer and Abdel Karim, 2002). Money has no intrinsic value in this system; therefore, the prohibition of the receipt and payment of Riba (Riba is excess of the amount paid at the maturity date (Aziz, 2007) is of particular importance in the Islamic financial system. Speculative behavior is discouraged and investments can only be performed in Sharia-approved activities. Ethical and social aspects are also of particular importance in Islamic finance. One of the considerable principles of Islamic finance is based on the partnership and the risk sharing which has distinguished the Islamic banks from conventional banking system. In theory, there are some differences in Islamic and conventional banking and the majority of studies have theoretical views in this field.

1.2   Background of Study

Performance appraisal of banks in disciplines such as management, economy and accounting are always under investigations and considerations through different methods (Smith, 2005). Due to the importance of banks efficiency, banks management always modify and improve their banking services (Beck et al., 2007), marketing (Olteanu, 2005), budgeting and innovation in their service delivery to compete with other banks. There has been reported many studies in recent years (Isik, 2008; Hon et al., 2011; Sufian, 2011) which they present different approaches and various methods to compute the efficiency. In this regard, some researchers are focusing mainly on developing the methods to estimate the efficiency while others are trying to find the factors which are related to the efficiency.

Financial ratios method is used to analays the prodactivity of banks in many reserches (Kwaning, 2014; Said, 2011; Aebi, 2012). But the resulte is not sufficient to understand the real situation of bank's productivity. Because the traditional models for estimation of bank efficiency are insufficient as these models are unable to consider other factors (Laeven, 1999; Sun and Chang, 2011). Forexample, the performance of conventional banks in Malaysia is measured by return on average assets (ROAA) and return on average equity (ROAE) by Said and Tumin (2011).

In contrast of financial ratios method, the DEA is a useful method to assess the efficiency of different industries such as private/public sectors and banks which is a non-parametric approach for appraising relative efficiency of "decision making units" (DMUs) which have multiple inputs and outputs (Cooper et al., 2006; Botti et al., 2009, Das et al., 2009, Gutiérrez- Nieto et al., 2007; Hua et al., 2007; Kao and Hung, 2008; Kastaniotis et al., 2011, Paradi et al., 2011, Wu et al., 2009, Yu and Lin, 2008). According to Thomas and Barr (1997), DEA outperforms the other methods to appraise the level of efficiency and the possibility of integrating the other factors like risk factor to obtain the level of efficiency in this method is feasible (Cooper et al., 2006). Since the level of efficiency is affected by different inputs and outputs; thus, selecting the appropriate inputs and outputs for DEA model is important (Drake et al., 2009). Different approaches are exist to provide an accurate understanding of selecting the inputs and outputs for banks in DEA model which include intermediation, production and value added approaches.

Thomas and Barr (1997) used DEA method to measure the relative efficiency of American banks, in which the inputs included payment cost, building and equipment, and various cash costs. They did not used ACC and SFA methods due to inherent limitations of these two methods. In addition, the ACC and SFA are not able to consider multi inputs and outputs (Thompson *et al.*, 1997). Fukuyama (1993) also used the non-parametric method (DEA) to evaluate Japanese commercial banks technical efficiency. Resti (1997) has utilized DEA method to assess Italian banking system cost efficiency.

Pasiouras (2008) assessed the efficiency of the commercial Greek banks over the period 2000- 2004. He applied DEA for comparing two approaches: the intermediation and profit- oriented approach. Three models for the intermediation approach and two models for profit- oriented approach including several inputs and outputs were designed. The results of his study revealed that loan activity, higher capitalization and market power will increase the efficiency of bank. In addition, it was found that the number of branches has a positive and significant impact on efficiency. The result of previous studies has instructed there are many factors have impact on bank's efficiency. As a result, estimation of efficiency in banking industry should be under taken every time to understand the real situation of bank act.

In addition to intense competition in banking industry, the financial crisis has harmed the efficiency of banking industry worldwide in past two decades which indicates that the failures may be caused by a mess in the risk information due to different risk assessments from different perspectives (Ernst and Young, 2009, Mccuaig, 2010). Therefore, the assessment, mitigation and reporting of risk is also very important and necessary in banking industry efficiency computation. Accordingly, the banks managements need to understand that the attentions to evaluate the efficiency in banking industry without considering the risk are impossible (Sun and Chang, 2011).

Risk assessment in financial industry is a controversial issue which falls into the identification, evaluation and estimation of the levels of risks involved in a situation, their comparison against benchmarks or standards, and determination of an acceptable level of risk (Svatá, 2005). Basel Committee (2004) has defined three important risks for bank industry which are operational, credit and market risks. Operational risk is the risk of loss resulting from the inadequate or failed internal processes, people and systems. Credit risk is the risk of loss resulting from the decline in value of assets due to the forecasted return. While, market risk is the risk of loss due to the changes in market indicators.

Some of researchers have attempted to estimate the efficiency with consideration of risk. Chang (1999) considered the risk factors such as allowance for

loan losses, non – performing loans, and risky assets to estimate the efficiency. His findings supported the idea that the risk factors have significant impact in the level of efficiency in bank. Altunbas et al. (2000) investigated the role of the risk factors in Japanese conventional banks. Altunbas et al. (2000) revealed that the size of bank has smaller role while the financial capital has the major impact on the efficiency when risk factors are included. They have compared risk and performance where they evaluate the influence of ownership models on large European counters. The result shows that government-owned banks and mutual banks have a lower profitability than privately-owned banks. They also found that the loan quality is better and asset risk is lower in mutual banks than other types of banks. In contrast, the loan quality is poorer and insolvency is higher in public sector (Iannotta et al., 2007).

Islamic banking system is different with conventional banking, at least in concepts (Chong and Liu, 2009). Fundamental concepts of Islam influence the methods, styles and systems of banking. For example, interdiction of transactions including derivatives, interest and short selling are basic principles of Islamic banks which come from Shari'ah and these are exactly strange for conventional banks (Szczepanowicz, 2012). Despite these differences, over the last forty years Islamic banks are integral part of the world economy. (Mansour et al., 2010). Nowadays, services of Islamic banks are not only for Muslim countries or religion peoples but also have expanded worldwide. For example, the value of Islamic finance activity is estimated more than $150 billon in the USA (Hasan and Dridi, 2010). Partnership and the risk sharing are among the most considerable principles of Islamic finance. As a result, customers trust to investment and volume of turnover in the world are increased and this leads Islamic banks to be more confidence (Amin and Isa, 2008, Hoq et al., 2011). Therefore, the Islamic banking is growing and increasing the number of branches (Dar and Presley, 2000).

Shahooth and Battall (2006) measured the cost efficiency of 24 Islamic banks using DEA method. The result showed that most of the Islamic banks are efficient. The findings also emphasize that other inefficient Islamic banks are moving towards the improvement and efficiency (Shahooth and Battall, 2006). Sufian (2007)

investigated the operation efficiency of domestic and foreign banks in Malaysia. The finding of study showed that the efficiency of Islamic banks in Malaysia decreased in 2002 and slightly improved in 2003 and 2004. In addition, the result indicated that domestic banks were more efficient than the foreign banks in Malaysia. Sufian (2007) utilized the DEA method which includes two outputs: total loans and income, three inputs: total deposit, income, and fixed assets.

Scholars in the finance field have studied the role of the Islamic banking in the world (Ariss, 2010, Beck et al., 2013, Farook et al., 2012, Parashar, 2010, Pepinsky, 2013, Saad et al., 2010, Sufian, 2010) in different dimensions. Although there are many researches in this field, the literature of comparative studies between Islamic and conventional is not rich. There is general view that the Islamic banking is successful than conventional because the Islamic banks finance their product structure that is essentially asset-backed. Furthermore, the financial crisis has showed that the conventional banks have more influence than the Islamic banks (Parashar, 2010, Szczepanowicz, 2012).

Malaysia as one of the attractive Muslim countries for financial investment has provided a competitive environment for banking industry with different systems such as Islamic and conventional and each of them includes domestic and foreign. Perbadanan Wang Simpanan Bakal-Bakal Haji (PWSBH) was constituted in 1963 which was as an institution to save Hajj (pilgrimage to Mecca) expenses for Muslims that guided to begin Islamic banking in Malaysia. Although, in 1993, merchant banks, finance companies and commercial banks offered Islamic banking products and services under the Islamic Banking Scheme (IBS), the Islamic bank has been instituted in 1983 in Malaysia. Therefore, the Islamic banking in Malaysia has a strong history for all investors all around the world.

As discussed earlier, the efficiency of the Islamic (Sufian, 2009; Azadeh, 2011, Akhtar, 2010; Mothtar et al., 2008) and conventional (Drake and Hall, 2003; Chambers and Cifter; 2006) banking industry has been evaluated by previous researchers in many aspects. a comprehensive view of literature shows several facts. Firstly, the majority of study focused on efficiency as nature. secondly, there are new

factors of competitive market which effect on efficiency during the time. therefore, measure efficiency over time is a constant necessity. Thirdly, the banking crises 2008 shows that efficient banks exposes harm if could not considered risk factors efficiently. Therefore, despite of many studies in this area, new opportunities such as analyzing the level of efficiency, the effects of risk factors (credit and operational risk) on efficiency and the differences between conventional and Islamic bank still need to be explored. Due to the competitive environment and the variety of banking system in Malaysia, this study is concentrated on banking industry in Malaysia, especially on their efficiency.

Therefore, in this study the DEA method is utilized to estimate the efficiency of banks and DEA is promoted to network DEA model which is able to get the overall level of efficiency based on the risk factors involvement. It should be noted, in order to construct the DEA model, this study also has categorized the conducted studies based on their different approaches which lead a framework to provide appropriate input and output variables for estimation the level of the banks efficiency. In addition, risk factors have decomposed to credit and operational and their effect on efficiency of banks is investigated. Moreover, Significant differences between Islamic banking and conventional is examined.

There are currently less efforts to examine the impact of risk on efficiency in developed countries (Iannotta et al., 2007), particularly in terms of credit and operational risk (Sun and Chang, 2011). Therefore, this study has investigated the role of credit and operational risk on efficiency in Malaysian banking industry as emerge country.

1.3   Problem Statement

Based on theory of the firm, managers should try to act efficiently in the competitive environment to maximize the profit to raise the wealth of the shareholders (Isik and Kabir Hassan, 2003). The financial markets, especially banks, led towards integration and merge to enhance efficiency on the wake of financial crises during the three previous decades. Liberalization, deregulation and technological changes are the three forces contributing towards the growing process of merger leading to increase the competitive environment (Denizer et al., 2007, Grifell-Tatjé and Lovell, 1996, Hao *et al.*, 2001, Leightner and Lovell, 1998b). As a result, this process highly emphasizes on improving efficiency in banking system implying that the banks are forced to act as close to the best practice or efficient production function as possible (Chang, 1999, Fiordelisi et al., 2011).

Liberalization programs have implemented in order to increase efficiency in the last three decades (Ahmed, 2013). Financial liberalization policies such as the elimination of credit and interest rate controls, the elimination of entry barriers in the banking sectors, the removal of restrictions on capital flows, and security market liberalization tend to have an impact on prices, transaction costs, returns on assets, and quantitative limits of ownerships and investments (Sompornserm, 2010). The findings suggest that efficiency of banks is declined as result of implemented liberalization programs (Denizer *et al.*, 2007) thereby banks are being forced to move toward the integration (Fiordelisi *et al.*, 2011).

In addition, an important aspect of deregulation is its impact upon the efficiency of the financial system, as a key objective of deregulation to improve efficiency (Berger and Humphrey, 1997). Deregulation has generally followed by a decline in cost productivity, and this decline is being attributed to depositors gaining from deregulation via higher deposit interest rates   (Berger *et al.*, 2000). Deregulation of the financial system has occurred in a number of nations. Studies of its impact upon efficiency came up with mixed results. Improvements in efficiency

have been reported for Taiwan (Shyu, 1998), Korea (Gilbert and Wilson, 1998, Hao *et al.*, 2001), Turkey (Zaim, 1995), Portugal (Canhoto and Dermine, 2003) and Thailand (Leightner and Lovell, 1998a) , Spain (Kumbhakar *et al.*, 2001). In the case of Spain deregulation has a negative impact upon efficiency (Sturm and Williams, 2004).

Banking industry of Malaysia has provided the competitive financial environment due to liberalization and deregulation policy (Hon et al., 2011). Thereby, banks in Malaysia merged in order to obtain high level of efficiency (Ahmad et al., 2007). Therefore, the efficiency in banking system is one of the most significant issues which should be explored and estimated in Malaysia.

In one hand, an increasingly competitive environment leads the bank to take risk (probably excessive risk) since the market power decreases as competition increases which leads to decrease in charter value. As a result, banks are encouraged to be more risk taking (Fiordelisi *et al.*, 2011). Accordingly, evaluating efficiency with respect to risk factors in banking system is of high importance. On the other hand, the previous studies do not consider risk factors in evaluating the efficiency except for few studies (Sun and Chang, 2011). Thus, there is lack in literature of efficiency and risk.Therefore, more emphasize on recognizing the role of risk need to be noted for estimating the efficiency (Fiordelisi et al., 2011, Goddard and Wilson, 2009, Salas and Saurina, 2003). However, to the best researcher's knowledge, there is no study about analyzing the influence of risk on efficiency in bank of Malaysia. Thus, the study not only has estimated the efficiency of banks in Malaysia with respect risk factors but also the influence of risk on efficiency has been investigated.

Moreover, risk is a controversial issue especially in banking system. The majority of studies have focused on credit risk in this filed. Berger and Humphrey (1997) have focused on bad loans as risk factor (credit risk) to investigate the relationship between efficiency and risk. Their result indicated that, there is a negative relationship between risk and efficiency in failed banks. In addition, Sun and Chang (2011) have indicated that the credit risk influences positively on the

inefficiency. Based on Basel Committee, risk has decomposed to credit, operational and market risk. In order to have comprehensive view of risk, it is notable to consider credit and operational risk factors. Arunkumar and Kotreshwar (2005) claimed that share of credit risk is 70% of overall banking risk, while only 30% are shared between the market and operational risk.

Credit risk is defined as the portfolio change because of unforeseen variances in the credit quality of the issuer or trading partner (McNeil et al., 2005). Moreover, Khan (2003) indicated that the important instability factor in banking system is the credit risk. Risk of loss resulting from the decline in value of assets due to the forecasted return is defined by the Basel committee. Therefore, decreasing the value of assets led to a decline of sources of banks which is significant to act towards banks efficiently. This study, invstigate the impact of credit risk on efficiency.

In addition, one of the substantial impediments to measuring operational risk is the lack of a comprehensive definition. Operational risk is divided into different types (Brealy and myers, 2006). Risk of loss arising from the company's operating system such as trade and investment failed, and errors made due to legal considerations or in the back office as first type, while incentives which include both mismanagement and fraud is the second. Jarrow (2008) has argued that dual classification of operational risks can be classified in other ways. Nevertheless, Basel Committee has presented clear definition of operational risk which refers that the risk of loss resulting from the inadequate or failed internal processes, people and systems or from external events. This study thus explored the impact of operational risk on efficiency in banks of Malaysia.

Moreover, market risk is defended by Basel committee. The possibility to experience losses due to factors that affect the overall performance of the markets is called market risk (Sun and Chang, 2011). The results of privous study indicate that the important factors which are affectivenees on market risk are economic macro variable (Bhat and Rayan, 2015). As mentioned, the role of risk factors in evaluating efficiency of banks in Malaysia is considered in this staudy. Since economic macro variables affect market risk and this study has focused on Malaysia, market risk is

not considered due to the fact that it is assumed constant for all banks. Accordingly, to prove the influence of risk on efficiency, credit and operational risk have to be considered. Therefore, the study has investigated the impact of risk factors on efficiency of banks in Malaysia with respect to credit and operational risk factors.

In this increasingly competitive environment beside conventional banks, the Islamic banks have successfully provided the financial services to the customers. One of the most important principles of the Islamic banking is sharing the risk between the bank and the customer (Abdullah et al., 2011, Chazi and Syed, 2010). Abedifar et al. (2012) have focused on risk and stability in Islamic finance. They found that, regarding insolvency risk, small Islamic banks seemed to be more stable, and their loan quality is less sensitive to the domestic interest rates compared to conventional banks. Martiana and et al. (2011) indicated that although operational risk is important in Islamic banks, compared with conventional banks, it is complicated because of specific contractual features and the general legal environment.

On the other hand, Srairi (2009) stated that conventional banks have less risk than Islamic banks due to their familiarity and have more experience with all the financial tools that can help them provide more capital to handle this degree of risk. Alam (2012) has examined the relationship between risk and efficiency in both banking systems. He stated that inefficiency and bank risk are positively correlated for Islamic banks, which clearly shows the difference in nature of the risk-return relationship between these two distinct types of banks.

With regard to the risk taking banks and the customer's increasing attention to the Islamic banking system, it seems that the conventional banks transfer the risk to the customers. It means that the Islamic banks consider risk in a more intelligent way as compared to the conventional banks. Studies have shown that the Islamic banks have been more successful than the conventional banks to cope with the financial crises of the last three decades (e.g. Beck et al., 2012, Chapra, 2008, Hasan and Dridi, 2011, Parashar, 2010). Based on these different concepts between Islamic and conventional banking; therefore, this study has provided the empirical evidence

to examine these differences between the conventional and Islamic banks, particularly of banks in Malaysia.

According to these defined gaps, it is required to modify the efficiency evaluation model based on the risk factors because in one hand, scholars believe the risk is a vital component in efficiency and evaluation of efficiency in banking industry without considering risk are impossible (Sun and Chang, 2011). On the other hand, the literature in this area is poor. Therefore, this study attempts to develop literature of efficiency and risk with the several factors representing the bank's risks. Moreover, the extent to which the operational and credit risk play their role in efficiency is also required to be investigated and analyzed. Here, a comprehensive study on the efficiency differences between the Islamic banks and the conventional ones is investigated. The role of risk factors including operational and credit risks as the internal factors of banking are also discussed. To achieve this purpose, the inputs and outputs in the previous studies are explored by reviewing the relevant literature and studies.

1.4   Aims of Study

Due to the importance of the efficiency concepts and risk as well as the importance of efficiency evaluation especially in banking industry, the present study focuses on the four following aims:

1.   Selecting suitable inputs and outputs in evaluating the efficiency plays an important role to evaluate the bank's efficiency. Therefore, this study firstly aims to identify the most appropriate input and output variables which are used in determining the efficiency of banks.

2.   The impact of credit and operational risk on efficiency in Islamic and conventional banks in Malaysia are examined.

3. The traditional DEA model is improved by considering the operational and credit risk variables to analyze the overall bank's efficiency in Malaysian bank industry (this study has extend network DEA model)

4. A comparative study between Islamic and the conventional banking system is conducted.

1.5 Research Objectives

According to the problem statement and in order to achieve the aims of study, the research objectives of the study are classified as follows:

1. To investigate the impact of risk factors on efficiency.

2. To calculate the score efficiency and overall efficiency of banks in Malaysia.
3. To compare the efficiency between Islamic and conventional banks in Malaysia.

1.6 Research Questions

According to the problem statement and research adjectives, the research questions of this study are classified as follows:

1. To investigate the impact of risk factors on bank efficiency in Malaysia.

    1.1. Is there an impact of credit risk on efficiency in banks of Malaysia?

    1.2. Is there an impact of credit risk on efficiency in Islamic banks of Malaysia?

    1.3. Is there an impact of credit risk on efficiency in conventional banks of Malaysia?

    1.4. Is there impact of operational risk on efficiency in banks of Malaysia?

    1.5. Is there impact of operational risk on efficiency in Islamic banks of Malaysia?

    1.6. Is there impact of operational risk on efficiency in conventional banks of Malaysia?

    1.7. Is there impact of credit and operational risk simultaneously on efficiency in banks of Malaysia?

    1.8. Is there impact of credit and operational risk simultaneously on efficiency in Islamic banks of Malaysia?

    1.9. Is there impact of credit and operational risk simultaneously on efficiency in conventional banks of Malaysia?

2. To calculate the score of banks efficiency in Malaysia.

    2.1. What is the score of banks efficiency in Malaysia (primary model)?

    2.2. What is the score of credit and operational risk efficiency of banks in Malaysia?

    2.3. What is the score of banks overall efficiency in Malaysia (network DEA model)?

3. To compare the efficiency between Islamic and conventional banks in Malaysia.

    3.1. Is there a significant difference between efficiency and overall efficiency in banks of Malaysia?

    3.2. Is there a significant difference between efficiency and overall efficiency in conventional banks of Malaysia?

3.3. Is there a significant difference between efficiency and overall efficiency in Islamic banks of Malaysia?

3.4. Is there a significant difference between efficiency of Islamic banks and conventional banks in Malaysia?

3.5. Is there a significant difference between overall efficiency of Islamic banks and conventional banks in Malaysia?

1.7   Scope of Study

Productivity and performance measurement are the most important concepts in the financial management. Major topics discussed in this study are in the field of financial management and banking; specifically, issues and theories of bank efficiency; clarifying banks input and output by means of three approaches (intermediation, production and value added) to calculate bank efficiency. In recent decades, Islamic banking industry has been emerged beside the conventional one. Risk sharing is one of the fundamental principles of Islamic finance which has distinguished Islamic banking from conventional one. The previous studies have considered estimation of bank efficiency regardless of risk factor. In this study, efficiency of banks and credit and operational risks has been taken into consideration.

Data envelopment analysis method (DEA) and Network DEA as non-parametric methods are applied in this study to estimate the efficiency and overall efficiency of banks certified by Bank Negara in Malaysia. Malaysia is among the successfully emerging countries in the world and could manage to overcome the financial crises of 1997. Malaysia has surmounted the crises by refusing to implement the World Bank policies and taking strict measures to prevent from capital exit from this country. Moreover, the process of merging banks gathered momentum in Malaysia as suggested by the Malaysia Central Bank, leading toward

the merging of 54 small banks into 10 big financial institutions (Ahmad et al., 2007). Besides developing the conventional banking system, Malaysia has paved the way for Islamic banking. As a result, the total assets in Malaysian Islamic banking system has raised from RM1.2 billion in 1991 to RM157.1 billion in 2007 and this trend continues to RM494.6 billion in 2012 in Malaysia. The market share of Malaysia's Islamic banking system comprises 14% of the total deposits and financing of the banking sector in this country (Sufian, 2010). This share is predicted to rise to 20 percent in 2020 due to the increasing efficiency of the Islamic banking. In order to Islamic banks play important role in banking industry of Malaysia, this study makes opportunity to Islamic banks be compared with conventional ones. Therefore, 12 Islamic banks and 19 conventional banks of Malaysia (N=31) have been taken into account.

Due to the fact that a certain period of time is considered in financial and economic studies to prevent from the effect of various factors in the course of time, this study considered the 5-years period of 2008-2012. This period of time is considered because the data for this period was available and moreover, according to Daud (2009), the firms rarely keep their strategy constant for long time. The data is collected from the annual report financial statement of each bank in Malaysia.

1.8   Significance of Study

The recent financial crises and the competitive environment have made the banks to emphasize on efficiency enhancement as a vital index to attend the competitive market (Ariss, 2010, Bikker and Haaf, 2002). Studying efficiency and risk is theoretically and practically of high importance. The present study focuses on applying DEA and considering risk factors to evaluate efficiency. In this way, this study contributes towards developing theoretical knowledge in the field of efficiency evaluation and confirms to the banking industry owners that the traditional efficiency evaluation model might lose its efficiency in the competitive period.

The present study's comprehensive aims; firstly, categorizing the previous studies on the selection of inputs and outputs in banking system to clarify the relevant theories. Secondly, it gives theoretically clear direction to the scholars and researchers for selecting inputs and outputs of banks to estimate the efficiency.

Another important aspect of the present study is to develop the network DEA model which is able to provide an opportunity for estimating overall efficiency concerning credit and operational risks. In addition, the DEA results are compared with the network DEA results in both Islamic and conventional banks. In addition, the results of this comparative study are useful for the managers, shareholders and customers of banks.

More importantly, comparing the efficiency of the Islamic and conventional banks using the network DEA model provides the opportunity challenging the behind theories of two banking systems. Therefore, it is an important step towards the literature in the field of comparative study on the Islamic and conventional banking systems to investigate and analyze extent to which the credit and operational risk can affect the two systems.

Generally, this study is significant endeavor in identifying risk factors in banking industry and their impact on efficiency. In addition, the present study contributes to expanding the literature in the field of efficiency and risk in banking system, and the role of credit and operational risk have been highlited. Moreover, this study has provided recommendations on how to evaluate overall efficiency to clarifying function act in banking industry of Malaysia. Furthermore, this study has substantial effort to conduct a comparative and organized a study on the Islamic and conventional banking system. This study aims to construct bridge between theory and reality in the banking system in the competitive environment of banking industry of Malaysia.

1.9   Banking Industry in Malaysia

The historical development of the Malaysian banking sector dates back to the early 1900s during the era of the agricultural boom and speedy economic development, when huge margins were recorded from the sale of cash crops such as rubber and tin. That boom era led to the establishment of foreign bank branches and the establishment of the pioneer local bank – Kwong Yik (Selangor) Banking Corporation (now Malayan Banking Berhad) in 1913 (Ee *et al.*, 2012).

The industry has kept on progressive development since that period and has further witnessed expansive growth until finally when the need to set up a governing committee to manage the operations of the several banks in the nation. This resulted to set-up of the Central Bank (Bank Negara Malaysia), which serves as a statutory corporation wholly-owned by the central Government.

The Bank Negara derives its powers from the country's constitution which also sets the functions of the bank according to Central Bank of Malaysia Act 1958. The objectives of Central Bank of Malaysia are:

- Promote monetary stability and a sound financial system;
- Act as a banker and financial adviser to the Government;
- Issue currency and keep reserves safeguarding the value of the currency;
- Influence the credit situation to the advantage of the country;

As a result of the victorious reforms and consolidations of the Malaysian banking industry in the year 2003, subsequent moves have been made to grow the local financial architecture. The consolidation of the whole sector of the local banking institutions led 54 banking firms decreased to 10 local anchor banking groups such as: Affin Bank, Alliance Bank, AmBank, Bumiputra-Commerce Bank, EON Bank, Hong Leong Bank, Malayan Banking, Public Bank, RHB Bank, and Southern Bank. These banks have financing firms as branches (Ee *et al*., 2012).

Initial efforts to consolidate the Malaysian banking industry were made from the government side by imposing a minimum share capitalization requirement of 2billion ringgit for banks. The subsequent stage was from the year 2004 and beyond which involved further merging of individual banks, finance firms branches and also between the ten banking groups (Somoye, 2008).

As far back as the 19th century, when the early British traders settled in Singapore and Penang was the era of the pioneer banking activities commenced in Malaysia. That area was previously known as the Straits Settlement, a standalone British territory comprising Penang, Singapore and Melaka was set up in 1867. The strategic location of the area called Penang and port infrastructure speedily became a springboard for banks-Mercantile Bank (later a subsidiary of the Hong Kong Bank, and now HSBC) established a branch in Penang, Chartered Bank (now Standard Chartered) in 1875 followed by Hong Kong Bank in 1884 (Lee, 1990).

Penang was chosen as a strategic location due to its naturally favored geographic location as a commercial nerve centre for tin activities in Perak and Selangor. These locations were also flourishing due to other kinds of trading activities caused by the increase in the influx of immigrant from China into the peninsular. Rubber trees speedily became the main cash crop, by 1908, one quarter of a million acres of land were converted into rubber plantations. The key commercial activities were tin and rubber business and the chief motivator for development of both domestic and foreign banks in the initial periods of the 20th century. A number of the most iconic signs of the booming financial business arena of the early 20th century were the pioneer bank properties. Although some never lived beyond above many years, yet a few successful examples exist as Malaya bank. Similar ornate buildings were built in Ipoh, Klang, Sungai Petani and many more.

As time passed on and growth in civilization, the appearance, facade and the feel of the banks disappeared. Development in the banking sector operations and the urge for efficiency led to significant alteration in bank properties particularly after the Second World War. As recent architecture emanated around the cities, the ornate Victorian-era inspired facades went into oblivion.

The emergence of the Malaysian banking sector has resulted the traditional banking products and services, such as deposits and loans/hire purchase, very complicated. The advanced characteristics have been introduced such as telephone banking, phone-a-loan, auto pay, and auto debit, ATMs and online shopping and banking. These characteristics are due to advancement in technological growth which permit bank clients easier and simpler techniques and procedures to carry out daily banking activities (Ee *et al*., 2012). Additionally, increase in financial practices and techniques have resulted to the introduction of novel products and services like credit and debit cards, investment products (insurance and unit trusts), financing products and services (trade and share financing), trade and credit facilities, remittances, loans to priority areas and Islamic banking (Mokhlis *et al*., 2009).

Bank Negara Malaysia is responsible for fixing the base lending rate (BLR) which is obtained from the cost of capital and fluctuates according to the financial circumstances of the nation. Considering a flourishing financial environment, the BLR will be greater and conversely, if financial environment is poor, the BLR will be lesser.

All loans charged by commercial banks since the year 1983 except for specific loans or selected industries have made at a margin (often between 0.75percent and 2 percent) above the BLR. The margin is calculated by individual banks considering expenditure of each bank on capital and the borrower's reputation. Central Bank has recently established the BLR at 6 percent. Whereas this BLR is referred to as the base financing rate in Islamic banking (Mokhlis *et al*., 2009).

Other rates charged by banks include many categories of deposits apart from the BLR, which covers loans. A few banks still provide mutual joint savings and current accounts which also yield margins. These charges are calculated by the banks and seem to differ depending on the financial growth of the nation. Hence, when businesses are booming, depositors do anticipate more deposit rates but, as a result, loan rates would also increase and vice versa.

On the last day of October 1989, the Financial and Banking Institutions Act came into being and caters for the licensing and regulation of organizations conducting banking, finance company, merchant banking, discount house and money-broking activities. It also caters for regulating institutions undertaking of programmed operations consisting non-bank areas of credit and finance, such as credit and charge card firms, building societies, factoring, leasing firms and development finance organizations.

1.9.1   Islamic Banking in Malaysia

The most popular subject of discussion in Muslim countries is Islamic banking. This concept was started in over 100 nations, with $300 billion in properties that are rising by 15 percent per annum as posited by the Asian Banker (2005) a financial-services consultancy firm. Over 60 percent of the population in Malaysia is Muslim, however, the two banking concept operate simultaneously. The pioneer Islamic bank in Malaysia, Bank Islam Malaysia Berhad (BIMB, 2004), was set up under Bank Act 1983. The Government of Malaysia has provided three licenses for global banks to conduct full-fledged Islamic banking in 2004. Currently, eleven Islamic banks exist under the Islamic Banking Act 1983 and eight dual-window banks operate under the Islamic Banking Scheme and do offer Islamic banking products and services in Malaysia. Adopting the dual-window banking structure, the Islamic banking structure operates simultaneously with the traditional banking structure (Bank Negara Malaysia, 2007).

There is a noticeable increase of 5 percent (RM117.393) in the assets of the Malaysian Islamic banking institutions according to figure published in June 2006, indicating 11.8 percent of the properties in the totality of the banking system. The market shares of Islamic deposits and financing stood at 15.6 and 11.6 percent as compared with 11.7 percent in 2005 (Bank Negara Malaysia, 2007). However, Bank Islam (BIMB) stated that between 70-80 percent of the bank's business and institutional funding are with non-Muslim customers (Ngui, 2004). Further support to this assertion came from Deloitte Touche Tohmatsu Malaysia stating that over 70

percent of Islamic banks funding in the country came from non-Muslim community. Deloitte Touche added that there is a gross inadequacy in the participation level of Islamic banking in Malaysia among the Muslim community (Saifuddin, 2003).

Hence, Islamic banking is not just about providing services to the Muslim community but obviously non-Muslim clients also perceive the advantages derivable from such a concept. The urge to attract and sustain customers from all religious leanings has been recognized considering the increasing competitive and liberalized universal financing sectors of today. The urge to pull and maintain Muslim and non-Muslim clientele is likely to skyrocket. Potentially, more international participants are expected to enter into Malaysian Islamic banking, hence motivating domestic institutions to be creative and compete more assertively in building products and services. Even though, there are slight variations between Islamic and traditional banks, they nonetheless face similar competitive environment in terms of providing corresponding products and services (Naser and Moutinho, 1997). For Islamic banks to compete favorably there is the need to come up with effective marketing techniques, improve their technological capabilities and expand their personnel capabilities. Specifically, there is an urge for them to build and maintain efficient service quality and customer satisfaction (Amin and Isa, 2008).

1.10   Definition of Key Words

Efficiency: Efficiency is the ratio of outputs to inputs in banks. In the first step, the level of efficiency estimates with inputs and outputs (primary model) that is called E. In addition, the efficiency of credit risk processes calculates in the second step that the level of credit risk efficiency is indicated by CRE. Furthermore, the efficiency of operational risk processes estimates in third step that the level of operational risk efficiency is shown by ORE. Moreover, the overall efficiency estimates using network DEA by considering credit risk and operational risk simultaneously. The level of overall efficiency is shown by OE.

Inputs: are the received factors by the banking system such as deposits, labors and capital.

Outputs: are the generated factors by the banking system as loans and investments.

Risk: Deviation of a value of any variable then expected value is called risk. This study includes credit and operational risks.

Credit risk: Credit risk is the probability that a borrower defaults on a commitment to repay debt or bank loans. Indicator of credit risk is non-performing loan (NPL).

Operational risk: The risk of loss resulting from inadequate or failed internal processes, people, and systems. Indicators of operational risk are return on assets (ROA), return on equity (ROE); net income over operational expenses (NIOE); rate of revenue (ROR).

Data envelopment analysis: DEA is a non-parametric method that uses linear programming to calculate the efficiency.

1.11   Organization of Chapters

This study is organized in six chapters. The first chapter provides an overview of study such as background of study, problem statement, research objectives; research questions; scope of study, research contributions. The concepts of bank and principles of Islamic banking are presented in chapter two. The critical overview of literature is discussed in the third chapter. The contents of chapter three include concepts and definitions, conventional and Islamic banking, the approaches

of selected inputs and outputs, inputs and outputs of banks in previous studies, the types of estimation models of efficiency, efficiency and risk relation and finally conceptual framework and research hypothesis. Fourth chapter includes research methodology which contains research design, population of study, census sampling technique, data collection technique, inputs and outputs selected variables of study, and data analysis methods and statistical tests. The fifth chapter includes data analysis and findings are discussed in the sixth chapter.

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