EXAMINING THE RELATIONSHIP BETWEEN OPERATIONAL RISK, CREDIT RISK AND LIQUIDITY RISK WITH PERFORMANCE OF MALAYSIA BANKS

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Thesis Submitted to

Othman Yeop Abdullah Graduate School of Business

Universiti Utara Malaysia

In Fulfillment of the Requirement for the Degree of Master of Science (Banking)

DECLARATION

I declare that the substance of this project paper has never been submitted for any degree or postgraduate program and qualifications.

I certify that all the support and assistance received in preparing this project paper and the entire source abstracted have been acknowledged in this stated project paper.

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ABSTRAK

Kajian ini mengkaji kesan pengurusan risiko kepada prestasi bank di Malaysia. Data kajian ini diambil daripada Datastream dan laporan tahunan bagi semua bank-bank konvensional di negara ini. Sampel kajian terdiri daripada 27 bank perdagangan konvensional di Malaysia dan tempoh pengajian adalah terhad kepada 2005-2013; menghasilkan 208 pemerhatian. Pembolehubah bersandar kajian ini adalah prestasi bank dan diwakili oleh ROA dan ROE, manakala pengurusan risiko adalah pembolehubah bebas dan diwakili oleh risiko operasi, risiko kredit dan risiko kecairan. Analisis regresi dengan GLS anggaran dijalankan untuk menguji hipotesis kajian dan keputusan menunjukkan bahawa risiko operasi, risiko kredit dan risiko kecairan mempunyai pengaruh yang signifikan ke atas ROE. Walau bagaimanapun, keputusan regresi menunjukkan bahawa hanya risiko operasi dan risiko kredit adalah signifikan kepada ROA manakala risiko mudah tunai didapati tidak mempunyai hubungan yang signifikan dengan ROA. Oleh itu, hipotesis tentang hubungan yang signifikan di antara risiko operasi dan risiko kredit dengan prestasi bank disokong manakala hipotesis tentang hubungan yang signifikan risiko mudah tunai dan prestasi bank tidak disokong.

Kata Kunci: risiko operasi, risiko kredit, risiko kecairan, ROA, ROE.

ABSTRACT

This study examines the impact of risk management on bank performance in Malaysia. The data of this study are retrieved from DataStream and annual reports of all conventional banks in the country. The sample of the study comprises of 27 conventional commercial banks in Malaysia and the period of study is confined to 2005-2013; making up to 208 observations. The dependent variable of this study is bank performance and is proxy by ROA and ROE, while risk management is the independent variable and is proxy by operational risk, credit risk, and liquidity risk. A regression analysis with GLS estimation is run to test the hypotheses of the study and the results show that operational risk, credit risk and liquidity risk have significant influence on ROE. However, the regression results show that only operational risk and credit risk are significant to ROA while liquidity risk is found to have insignificant relationship with ROA. Hence, the hypotheses of the significant relationship of operational risk and credit risk with bank performance are supported while the hypothesis of significant relationship of liquidity risk and bank performance is not supported.

Keywords: Operational risk, Credit risk, Liquidity risk, ROA, ROE.

ACKNOWLEDGEMENT

This thesis has been packaged with the help of Allah (S.W.T) and the support of many people. Firstly, I give thanks to Allah the lord of the universe, who in His infinite mercy and grace set my affairs right and made the completion of this thesis a reality. I wish to express my profound gratitude to my reliable supervisor, Dr. Nora Azureen Abdul Rahman for her inspiration and motivation in ensuring that a standard was accomplished for this thesis. Her inspiration, tolerance, advises, understanding and encouragement cannot be quantified. This indeed made my work a great learning experience; surely you will remain in my memory.

I am also grateful to my family members especially my wife for her inspiration, endurance and understanding during the course of this project, then to my siblings for their encouragements and support towards the achievement of this thesis. I pray that Allah protect and guide them through all their endeavours.

I also use this medium to appreciate the support and advice of all my friends who have contributed in one way or the other towards the success of this study. I pray that Allah reward them abundantly.

Maytham Hussein Saeed

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CHAPTER ONE

BACKGROUND OF THE STUDY

1.0 INTRODUCTION

This chapter begins with the introduction to the study. Section 1.1 deals with the definition of risk in real term. Section 1.2 deliberates on the definition of risk management practices in banking sector. Definitions and explanations of the risk factors used for this study are stated in section 1.3, 1.4, and 1.5. Meanwhile, the problem statement of this study is explained in section 1.6. The research questions of this study are highlighted in section 1.7; followed by the research objectives in section 1.8. The significance of this study is revealed in section 1.9. Meanwhile, scope of this study is expressed in section 1.10. Finally, organization of the study is highlighted in section 1.11.

1.1 DEFINITION OF RISK

Risk can be regarded as the possibility of something occurring and the level of losing, which happens from an activity or situation (Partnerships BC, 2005). Losses can occur directly or indirectly. An instance is when an earthquake causes direct loss of buildings; meanwhile, indirect losses occur when there is reputation loss, loss of customers' confidence, and increase in operational costs in the time of recovery. The possibility of something to occur will influence achieving objectives (News Straits Times, 2004). According to the State Bank of Pakistan (2003), "Risks are usually defined by the adverse impact on profitability of several distinct sources of uncertainty". Meanwhile,

the degree and types of organization risks can be uncovered due to certain factors which include volume, business activities complexity, size volume, and so on. (State Bank of Pakistan, 2003). Systematic and unsystematic risks are the two classifications of risk (Al-Tamimi & Al-Mazrooei, 2007). Systematic risk is regarded as risk that is intrinsic to entire market or system. At times it is regarded as systemic risk, market risk or un-diversification risk which cannot be evaded due to diversification. Meanwhile, unsystematic risk is regarded as risk that is related to specific assets and therefore can be evaded by diversification. It is also referred as diversifiable risk, residual risk or specific risk (Al-Tamimi & Al-Mazrooei, 2007).

1.2 RISK MANAGEMENT

There are many ways to define risk management. According to Anderson and Terp (2006), risk management can be defined as a procedure that ought to seek the elimination, reduction and control of risks, improve advantages, and evade losses from the speculative exposures. Maximization of possible success and minimization of possible future losses are the aims of risk management. A problematic risk could have an impact on firm costs, time, system and quality performance (Anderson & Terp, 2006).

The Committee of Sponsoring Organizations (2004) stated that risk management is a process that is affected by the management, directors, and other company personnel used for strategy setting, intended to recognize possible events which could affect the firm,

and managing of risk so as to be within the firm risk desire, to provide sensible assurance concerning the accomplishment of the firm objectives.

According to Partnerships BC (2005), risk management is a procedure for managing possible risks through recognizing, analyzing and solving them. This procedure can assist in reducing the negative influence and emergent prospects that the finding may facilitate in alleviating the possibility of risk occurring and the adverse influence after it occurs. Furthermore, State Bank of Pakistan (2003) proposes risk management to include recognizing, evaluating, observing, as well as controlling risks, and it is vital for the company to make sure that the procedure is obviously understood by employees in order to achieve the business strategy and objectives.

It is imperative to take the issue of risk management very essential in the modern day banking, not only for their survival and performance, but also for economic growth and development (Ariffin & Kassim, 2011). The emergence of financial crisis in 1997 and 2008 intensify the need for strong risk performance in banking system because the crisis serves as a wakeup call for the banks that any financial transactions they undergo lead to risk exposures which may go further than the normal capital charges, insignificant transaction values as well as other actions thought suitable for preventing unforeseen losses (Grody, Hughes & Toms, 2011).

In addition, weak risk management practices can be linked to poor performance, which will lead to financial crisis and unexpected collapse of big banks and corporations all over the world. Edwards (2004) noted that failure to follow a proper risk management process based on segregation of responsibilities was the core cause of the Barings Bank collapse. Barings Bank PLC which is the oldest UK merchant bank went into a bankruptcy in 1995 when it lost £827 million due to weak speculative investments, mainly from futures contracts (Tafri, Rahman & Omar, 2011; Edwards, 2004). Furthermore, other bank distress or crisis which are caused by poor risk management are such as Lehman Brothers Holdings, Inc. filed for liquidation in the USA in 2008 due to excessive risk-taking (Ng, Chong, & Ismail, 2013) ; Orange County California lost on interest rate derivatives worth $1.5 billion in 1994; DM1.8 billion was lost by Metallgesellschaft AG on oil futures in 1994, $2.6 billion was lost by Sumitomo Corporation on copper derivatives in 2011, and Allied Irish Bank lost $750 million because of unauthorized trading in 2002. All these can be traced to weak and poor risk management practiced by the various financial institutions (Ascarelli, 2002; Bacha, 2001).

Many financial institutions, including banks in East Asia were also seriously distress with the 1997 financial meltdown due to poor risk management practiced (Gup & Kolari, 2005; Tafri *et al.,* 2011). The crisis engulfed about RM45,304 million fall in total assets, loss in deposits of RM2,132 million, and contraction in loans and advances worth RM7,443 million (Bank Negara Malaysia, 1999).

In Malaysia, the reported loss of RM450 million by Bank Islam Malaysia Berhad (BIMB) in 2005 was really shocking, which was the first time ever the bank was in the red due to building up of non- performing loans (NPL) from the 1998 financial crisis (News Straits Times, 2005). The financial crisis emphasized the weakness relating to fragmented financial systems as well as the negligence of banks in disregarding essential risk management which has drastic negative effects on the economy worldwide (Tafri *et al.,* 2011).

For financial institutions, risk management practice is utmost important (Rose & Hudgins, 2013). Banks being the major sources of finance play the key role as the heart of a nation's economy. Thus, their wellbeing directly affects the wellbeing of the economy. By sourcing their financing largely from deposit received from the public, banks' ability or inability to avoid bad loans can indirectly affect the economy (Hamzah, 2014).

Numerous studies have been conducted on the risk management practice within the banking and corporate sector and found that risk management is a usual practice of modern banks nowadays (Shafiq & Nasr, 2010). It is found that risk management practice was one of the factors which affect returns on banks'stocks (Cooper, Speh, & Downey, 2011). However, the current increase in global trend on banks collapse and financial crises raises questions as to the effectiveness of the practice of risk management in the banking sector. In fact, it is found that risk management failure was among the reasons for global financial meltdown (Abu Hussain & Al-Ajmi, 2012).

A worldwide study conducted by the Economist Intelligence Unit (2010) examines how the financial institutions worldwide intensified their risk management capacities in response to the global crisis. The results reported that the financial institution had showed, or projected to show, a methodical renovation of their system of risk management, which include data quality improvement and accessibility, strengthening of risk governance, running to a firm-wide method to hazard management and profound risk incorporation within the consistency of occupation. The survey also found that 40 percent of the financial institutions surveyed stated that the significance of managing risk is extensively showed all over their societies.

This and the other studies discussed in the foregoing paragraph signify there is a lot to be done in embedding a strong risk management culture in the financial sectors (Abu Hussain & Al-Ajmi, 2012). Risk management had been an existing and continuing process which directly depends on modifications of both the internal and the external surroundings of banks (Abu Hussain & Al-Ajmi, 2012). These modifications need stable concentration for identification of risk and its control. Tafri *et al.* (2011) noted that effective and efficient management is essential for the sustainability of business growth and continuous profitability and performance of banks. Based on today's tasking economic and financial environment, adoption of a stable risk-return profile is vital in achieving continuous shareholders' value (Tafri *et al.*, 2011). Since the failure and near failure of subprime mortgage crisis is caused by funding risk, liquidity risk, high leverage, or credit risk; thus, judicious risk management must be put in place to avoid reoccurrence (Brown & Davis, 2008).

Abu Hussain and Al-Ajmi (2012) noted that there is still a lot more to be put in place in the processing of embedding a strong risk management culture in the financial institutions. According to the authors, there has been a consensus among regulators, practitioners and academics that effective and efficient risk management must be a priority to bank management since bank as the main source of finance plays a key role to an economy. Banking operation is exposed to a lot of risk and numerous risk factors such as market, operational, liquidity and credit risks which have been known as the most important factors which affect banks' performance (Ariffin & Kassim, 2011). Therefore, it is obvious that the adoption of an effective and efficient risk management practice in the banking industry will apparently mitigate the industry against the risk of failure.

Since risk management is regarded as an advanced procedure that involves making of decision on a continuing basis (Meor Ayub, 2006), Basel Committee on Banking Supervision (BCBS) (2001) defines financial risk management as classification of four procedures. This classification of procedures include: (i) identifying events into one or several comprehensive categories of operational, credit, market and other several risks (and later into particular sub-categories); (ii) risk assessments by applying data as well as a risk model; (iii) identifying and monitoring risk assessment on a consistent basis; (iv) and the control of risks by the top management. From the definition, it can be deduced that the general risk management framework consists of four main components of risk management: identification of risk, measurement of risk, mitigation of risk, and reporting and monitoring of risk. Generally, there exists three categories of banking risks namely: financial risks, non-financial risks and pure risk (or hazard risks). Financial risk consists

of market risk, liquidity risk, credit risk, interest rate risk, market risk, solvency and capital adequacy risk, and foreign exchange risk, while operational risk is the major non-financial risks (Tafri *et al.,* 2011). Pure risks refer to risks incur through speculations (speculative risk). Hence, Tafri *et al* (2011) further noted that among the risks operational risk, liquidity risk, and credit risk are the most vital risk in banking and indicate that more importance should be laid on the management of these risks.

1.3 OPERATIONAL RISK

Operational risk is regarded by the Basel Committee (2003) to mean: "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events". This definition focused on four event causes of operational risk which are external events, systems, processes and people. Moreover, according to Jarrow (2008) operational risk can be divided into two types. The first type is related to a risk of loss caused by the company's operating system (i.e., a failure in an investment or transaction) either caused by legal considerations or caused by an error in production (or in the back office).

The second type is related to the risk of loss caused by incentives, which include both mismanagement and fraud; this represents an agency cost that occurs because of the separation of a company's management and ownership. These two types of operational risk losses transpire with recurrent regularity, and they might be minor or disastrous. Huge disastrous instances include the bankers trust and Procter and Gamble debacle, the

Barings bank failure, and the Orange County case (Tafri *et al*., 2011; Edwards, 2004; Bacha, 2001). Therefore, managing operational risk encompasses an array of approaches and methods that fundamentally work for two purposes, which are prevention of catastrophic losses and reducing average losses (Chapelle *et al.*, 2008).

Operational risk is quite different from other risks encountered by banks because it is asymmetric, reducing banks performance mostly through provision of loss, as well as having a negative mean due to losses experienced through insufficient or poor internal processes, systems, and people, or by external environment of the bank (Cummins, Lewis & Wei, 2006). In this regards, it seem sensible for banks to create expenditures on the management of operational risk to the barest minimum, where the marginal expenditure and the marginal decrease in projected losses acquired through operational events will equal (Cummins *et al*., 2006).

In other words, by managing operational risk, future projected cash flows can be maximized by banks through reduction of the projected costs of operational loss events. Since banks customers have more sensitivity to insolvency risk that could be exacerbated by huge operational losses, banks are highly motivated to efficiently manage operational losses (Froot, 2007).

1.4 CREDIT RISK

Credit risk is viewed to be the extent of value variations that occur in the debt instruments as well as in derivatives because of the variations in debtors and counterparties credit quality (Lopez & Saidenberg, 2000). This risk is the very vital risk source for the capital adequacy of banking institutions (IFRI-CRO, 2007). However, the net worth and profitability are not only determined by default risk of assets but also on off balance sheet items, re-pricing characteristics, liabilities, and overall credit quality (Drehmann, Sorensen & Stringa, 2008).

Part of the main elements of the 2007-2009 financial crisis is the ways by which credit risk is transferred by banks in the financial system (Nijskens & Wagner, 2011). As it is traditionally practiced, only a few risks are shed from the balance sheets of banks, which are through credit guarantees or loan sales. This is only restricted to credit facilities that are less complex such as the consumer credit (Nijskens & Wagner, 2011). After the crisis, banks have intensely increased the way they transfer credit risk. According to Newton (2008), banks are no longer interested in buying derivatives and holding them either to charge-off or to maturity, they are increasingly interested in transacting them with counter party whereby the exposure of credit-risk is shifted along with the reduction in total risk of the principal lender. Banks now use credit derivatives like the Credit-Default-Swaps (CDS) in transferring the credit risk.

However, Instefjord (2005) found that credit derivatives transaction is a potential threat to the stability of bank despite hedging credit exposures, especially when operating in extremely elastic credit market sectors (Nijskens & Wagner, 2011). Hence, The management of credit risk deem very imperative to banks because it is a vital part of loan process, maximizes the risk of the bank to increase their performance, adjust the risk rate of return through protecting the bank from the negative influence of credit risk (Musyoki & Kadubo, 2012).

1.5 LIQUIDIITY RISK

Liquidity risk is regarded as the reliable tracker that leads to any austere market crisis; it is the ultimate fuse that carries the spark that explodes both credit and market risks and is the catalyst that often transmutes inaccessible loss measures to systemic contagious failures (Acerbi & Scandolo, 2008). Nikolaou (2009) noted that liquidity risk is the incapability of transacting at a reasonable price with proximity; it is regarded as the non-diversifiable systematic liquidity risk component. Furthermore, International Monetary Fund (IMF) (2008) contented that funding liquidity risk encompasses the incapability of a financial intermediary in servicing its liabilities when they due. It is regarded as the risk that occurs when the bank failed to immediately settle its liabilities at their due date (Drehmann & Nikolaou, 2013).

Banks liquidity risk is commonly created when banks involve in investing long-term asset with short-term debt because a bank that is unable to overturn maturing debt may fail in spite of being solvent (Ratnovski, 2013). Rise in uncertainty over banks' solvency leads to major modern bank liquidity problem in some developed economies, which also played out a primary role in the general funding markets (Huang & Ratnovski, 2011; Goldsmith-Pinkham & Yorulmazer, 2010; Shin, 2009; Gatev & Strahan, 2006). This prompts the objective of the renewed Basel III in using the Net-Stable-Funding-Ratio (a limitation on maturity disparity restricting refinancing volume falling due each date) and Liquidity Coverage Ratio (requirement of liquidity) to solve the issue of liquidity risk in banks (Basel Committee, 2010).

Meanwhile, early liquidity risk studies such as Chari and Jagannathan (1988) and Diamond and Dybvig (1983) assumed that the inadequate information on banks refinancing with valuable assets affect bank liquidity risk. In this view, Ratnovski (2013) provides a benchmark for refinancing for solvent banks in the active interbank markets, which implies that for better description of current banks liquidity risk, it is essential for models to show how the market based refinancing of solvent banks, may be restricted by market failures. This market failure can be traced to informational frictions (Rochet & Vives, 2004; Freixas *et al*., 2004; Huang & Ratnovski, 2011), and increase in moral hazard (Farhi & Tirole, 2012).

Valuable activities are performed by the banks on the two sides of the balance sheets. On the assets side, banks lend loans in order to support borrowers, thus improving credit flow in the economy. While on the side of liability, liquidity is provided on demand to customers (Rose & Hudgins, 2013). Furthermore, liquidity risk from the asset part of the balance sheet of banks has been the focus of recent empirical and theoretical studies. Berger and Bouwman (2005) stressed that the importance and role of banks in liquidity production has grown sharply overtime; while Paravisini, (2004); Loutskina (2005); Khwaja and Mian (2005); and Loutskina and Strahan (2006) proved that liquidity crises to banks has impact on supply of loan. Banks that have made pledges of lending to their customers will face the risk of unforeseen liquidity demands from their borrowers (Gatev, Schuermann & Strahan, 2009).

Gatev *et al*., (2009) further stressed that this unforeseen liquidity risk exposure can only be reduced through transactions deposits. Banks that have high degree of deposits transaction may not experience high risk despite their exposure on the asset side to un-drawn their loan payments, while banks that have loan-liquidity risk exposure will experience high risk without high degree of deposits transaction. During tight markets periods, when funds move into banks from the securities markets the deposit-lending hedge becomes specifically powerful.

The different functions engaged in by banks really exposed them to liquidity risk which may occur if they could not meet their expected commitments (Jenkinson, 2008), since the depositors might ask for their respective funds at any time, leading to intensity assets sales (Diamond & Rajan, 2001), which will negatively affect bank profitability (Chaplin *et al.*, 2000). Liquidity risk influences the reputation and performance of the bank (Jenkinson, 2008). The confidence of the customers will be affected if there is no timely provision of funds, leading to bad reputation to the bank. Moreover, having a poor liquidity position could also lead to regulator penalties or finings. Thus, it is vital for banks to attain a satisfactory liquidity arrangement.

1.6 PROBLEM STATEMENT

The focus of banking studies has long been the financial institutions profitability (Musyoki & Kadubo, 2012; Suna & Changb, 2010). Previous findings have clear effects on bank management in which to enhance performance and also for decision and policy makers that are concerned with bank soundness, bank safety, and bank competitiveness (Suna & Changb, 2010). Numerous studies on the association between various kinds of risk and performance have been done on developed countries but very limited have been done on emerging countries; this creates research gap in the study of bank performance as differences in the characteristics of developing countries (i.e. political environment, culture, economy) limit the applicability of the findings of developed countries to the developing countries (Aebi, Sabato & Schmid, 2012; Suna & Chang, 2010).

Although there are a lot of studies on risk management and performance but the results are inconsistent. Thus, the inconsistent results of previous studies creates gap in the study of bank performance and there is a need for more studies in order to minimize the inconsistency of the results (Allen *et al*, 2004). In addition, most studies on risk management and performance focused on listed companies and very few were done on banking institutions (Suna & Changb, 2010). Therefore, there is need for more studies on risk management to focus on banking institutions due to the vast growth and importance of banking institutions in the economy. Hence, this study tries to minimize the gap by investigating the relationship between three kinds of risk to the performance of banks, particularly Malaysia conventional banks. The three kinds of risks namely operational risk, liquidity risk, and credit risk are the most important risks in banking (Tandelilin, Kaaro, Mahadwartha & Supriyatna, 2007).

1.7 RESEARCH QUESTIONS

The following research questions have been investigated in order to achieve the aim of this study. They are as follows:

1. Does operational risk has a significant impact on bank performance?
2. Does credit risk has a significant impact on bank performance?
3. Does liquidity risk has a significant impact on bank performance?

1.8 RESEARCH OBJECTIVES

The following research questions have been investigated in order to achieve the aim of this study. They are as follows:

1. To evaluate the significant impact of operational risk on performance of Malaysia banks
2. To evaluate the significant impact of credit risk on performance of Malaysia banks.
3. To evaluate the significant impact of liquidity risk on performance of Malaysia banks.

1.9 SIGNIFICANT OF THE STUDY

This study will be of importance to other researchers, policy makers, and practitioners. This study will be useful to researchers because it contributes to the body of knowledge of banking studies, especially on the association between risk management and bank performance. This study is of importance to policy-makers because it helps in facilitating the formulation of policies regarding risk management in banking, and also to promote effective risk culture through enforcing the implementation of an effective risk management on banks for creation of measures and prevention against any possible threat of financial distress in the economy. Furthermore, it is of importance to practitioners by showing the value of effective risk management on bank performance, and enables them to improve their risk management practice.

1.10 SCOPE AND LIMITATION OF THE STUDY

The data used for this study are limited and applicable to conventional commercial banks in Malaysia. However, the results and the recommendations are useful for both financial and non-financial firms, governments, financial analysts, researchers, managers, accountants and stakeholders and all other interested users.

1.11 ORGANIZATION OF THE STUDY

Chapter one contains introduction of the study. Chapter two deals with reviewing of literatures on this study. Chapter three discusses the methodology. Meanwhile, chapter four deals with the analyses of the data used for this study and chapter five entails conclusion and recommendation of this study.

1.12 SUMMARY OF CHAPTER

Insights to the association between operational risk, liquidity risk, and credit risk with bank performance have been given by this chapter. This will serve as an introduction into the topic of discussion. The problem statement of this study is also clearly elaborated, coupled with the research questions of this study and its objectives. The significance of the study was explained based on the usefulness to researchers, policy-makers, and practitioners. The study scope and its limitation are also expressed in this chapter, while organization of all chapters of the study is also vividly elucidated in this chapter. However, previous studies on these relationships will be clearly discussed in the next chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter provides an overview of the findings of previous researches on risk management and influence on bank performance. The purpose is to develop the expected relation between selected risk factors and also frame out the probable impact on performance of banks. Section 2.1 of this chapter provides a synopsis of risk in banking sector. Section 2.2 deals with the importance of financial risk management in banking. Section 2.3 provides findings on the influence of risk management on bank performance. Section 2.4 elucidates on the previous researches on the influence of operational risk on the performance of bank. Section 2.5 expatiates on the past studies on impact of liquidity risk on bank performance. Finally, section 2.6 focuses on the prior studies on the influence of credit risk on bank performance.

2.1 RISK IN THE BANKING SECTOR

Banking is the only sector in the economy where many risks are jointly managed (Cebenoyan & Strahan, 2004). The very nature of banks is managing numerous and seemingly opposing needs. They always provide liquidity to their depositors when they demand for by checking account, and they also extend credit and liquidity to borrowers by credit lines (Kashyap *et al.*, 2002). Due to these crucial roles played by banks, they are

exposed and always concerned with liquidity and solvency. By tradition, capital is held by banks to serve as a safety measure in the case of insolvency, as well as held liquid assets (i.e. securities and cash) as a safety measures against unforeseen depositors withdrawals or borrowers draw down (Cebenoyan & Strahan, 2004).

Maximizing shareholders' value is the major objective of the management of banks, and this can be done through a good risk management (Dima & Orzea, 2012). It is costly for the financial sector to be bankrupt; the effect will be on the banks debt and equity holders as well as the taxpayers (Dima & Orzea, 2012). Hence, in order to avoid from constantly under pressured and assume high risks, banks need to manage their risk effectively so as to avoid or minimize losses (Dima & Orzea, 2012).

However, the competition that occurs in the banking sector can lead to financial stability. This notion can be traced to when deposits are intensely competed for by banks, this will make interest rates to fall and the value of the franchise will be negatively affected. Banks will not lose anything from default and they will increase their incentives on risk. Banking regulation all over the world has been importantly shaped by this argument, especially based on merger policies and competition. This view has been challenged by the study of Nicoló (2005). Nicolo (2005) argues that what should be the key to bank stability future models is the lending market. Though, lending channel analysis was extended by Wagner (2010).

Nicolo (2005) argues that borrowers are assumed implicitly based on their impact on the firms' risk, so as to have total control on the bank risks. Meanwhile, Wagner (2010) maintains that as the riskiness of firms is determined by borrower, banks determine the amount of risk they wish to take. The stability influence of competition in the lending market could be revised when banks control their risk-taking. This is due to the optimal risk level necessary for the banks to hold, so they will prefer offsetting the influence innocuous borrowers on the balance sheet through attracting more risk because the loan market is competitive and affect the values of the bank's franchise.

Researchers and bank regulators have for long search for how to determine risk taking in banks. Some modern empirical and theoretical research by Yin, Wu and Chen (2002); Yasuda (2003); Daniels and Ramirez (2008); Lee and Kwok (2000); and Jensen (2004) suggest that some factors influence risk-taking by banks, which include regulatory actions, risk preferences, ownership structure, leverage, agency problems amid shareholders and management, and threat caused by deposit insurance mispricing. However, empirical evidence and predictions yield by this work are mostly conflicting. An instance is the suggestion of moral threat of deposit insurance that when capital declines banks increases their positions of risk; practically, this risk-shifting activities is not normally observed by all banks, or thrifts (Hughes *et al.,* 2000; Altunbas *et al.,* 2007).

Fiordelisi *et al.,* (2011) and Berger and DeYoung (2001) offered another different view on the preference hypothesis of managerial risk, where they associate banking operational efficiency and risk-taking. Beginning from the findings of Kuritzkes *et al.,* (2003) and

Hauswald and Marquez (2006) where they make use of another methodology relating to the important relationship between efficiency and bank risk-taking, applying different combinations of financial leverage, interest risk, and credit risk in their model. According to these different views, in lending, vital role is played by information consideration (Daniels & Ramirez, 2008; Altman & Sabato, 2007; Yasuda, 2005; Hauswald & Marquez, 2006; Hauswald & Marquez, 2003; Almazan, 2002; Jeonk, 2001), and screening technologies or differential information amid mediators persuade specialization towards loaning (Altman & Hotchkiss, 2006).

2.2 THE IMPORTANCE OF FINANCIAL RISK MANAGEMENT IN BANKING

Frame and White (2002) regarded innovation as obviously a vital phenomenon for all segment of a contemporary economy. Risks and costs must be reduced by an effective financial innovation and improved services must be provided to different users. Although certain features of financial innovation might cause significant risks that should be considered. Furthermore, according to Mathews and Thompson (2008), that through opening access to different activities and products, banks also involve in new risks that are related to these activities and products. The fast rates of innovation happening in the financial industry call the need for evaluation of the effectiveness of risk management in financial institutions, and devise suitable regulatory reactions to the challenges posed by financial innovation.

It deems imperative that risk management practice must move with the pace of financial innovations. Greuning and Bratanovic (2003) stressed that risk and changes increases exponentially, but most bankers are very slow in adjusting their view of risk. Practically, this indicates that the ability of market to innovation mostly better than its capability to comprehend and appropriately put up the associated risk.

Dowd (2005) traces the development of risk management to be a discipline due to the factors as follows: (i) outstanding development in trading activity (ii) enormous rises in the kind of instruments transacted as well as trading volumes in the past decades; (ii) the enormous development of financial derivatives products and activity, and (iv) fast improvement in information technology.

The financial risks of banks are mostly related to managing the balance sheet of the banks; and they have been largely categorized as interest rate risk, credit risk, and liquidity risk. Due to the emergence of sophisticated activities and products like structured products and derivatives, banks have been gradually exposed to further similarly vital risk like operational risk and market risk. To react to this, risk management practices have been developing, and the current development can be viewed from the integration of numerous financial risks made to different management. Gallati (2003, p.5) stated that:

> "The concept of total risk management is the development and implementation of an enterprise-wide risk management system that spans markets, products and processes and requires the successful integration of analytics, management and technology"

Moles (2004) propose three logical procedures of risk management to be followed. They are: "(i) an awareness towards the risks being taken by the firm; (ii) measurement of the risks to determine their impact and materiality; and (iii) risk adjustment through the adoption of policies or a course of action to manage or reduce the risks". A key issue facing all framework of risk management is how to measure risk. As financial institution and products change, measuring of risk also becomes more complex. Accurate measure of risk is the vital first move towards competent and efficient risk management systems (Allen *et al.*, 2004).

Advantages of financing risk management should not be undervalued. Dowd (2005) emphasized this through his observations that: (i) increase in firm value is facilitated by the increase in firm value at the expense of cost of bankruptcy, since it renders unlikelihood of bankruptcy; (ii) the existence of informational asymmetries indicates external finance seems costlier than the internal finance, which lead to losing better investment prospects. Risk management assists in alleviating these difficulties through reduction of inconsistency in the cash flow; and (iii) risk management assists investors to achieve an improved risks allocation since the company would characteristically have improved capital markets accessibility.

2.3 RISK MANAGEMENT AND BANK PERFORMANCE

Increasing shareholders' return epitomizing bank performance is one major objective of bank management (Adeusi, Akeke, Adebisi & Oladunjoye, 2014). This goal always achieved with increasing risk (Tandelilin *et al.,* 2007). The risk faced by banks include insolvency risk, liquidity risk, country risk, foreign exchange risk, operational risk, off balance risk, credit risk, market risk, and interest risk; therefore, the motivation of banks towards risk management arises from only those risks that can result in bank under performance (Tandelilin *et al.,* 2007).

The problems of managing risk in banking industry have huge influence on both the bank, and the growth of the economy as well as general business development (Tandelilin *et al.,* 2007). Tai (2005) maintains that there are some empirical proofs that the previous return shocks that originated from banking industry have major influence on both foreign exchange volatilities and the aggregate of stock markets, and their prices; indicating that in the time of crisis, bank could be the main basis for contagion.

There are some advantages for banks that improved the implementation of risk management (Tandelilin *et al.,* 2007): (i) it is consistent with compliance function in favor of the rule; (ii) it improves their opportunity and reputation towards attracting more comprehensive customers in order to build their fund resources portfolio; (iii) it improves their profitability and efficiency. The study of Cebenoyan and Strahan (2004) stressed that banks with improved risk management have better availability of credit than those

with low risk management. The better availability of credit results into prospect of increasing bank's profitability and assets production.

Adeusi *et al.* (2014) who examine financial performance and risk management of banks in Nigeria found a significant association between risk management and performance of bank. The result hence highlighted the need for banks to have a judicious risk management in order to protect the interests of investors. Similarly, a study by Fernando and Nimal (2014) on Sri Lankan banks found that risk management improves the banks' performance.

2.4 OPERATIONAL RISK AND BANK PERFORMANCE

Blacker (2000) examines the alleviation of operational risk of British retailing banks. He found that mitigating operational risk embraces broad connection sequences amid people, technology, and process. The study indicates that accounting for alleviating of operational risk depends on the management of business unit, as limitations were rested on business unit that persuaded alleviating operational risk. Elliott *et al.* (2000) indicate that operational risk is an organizational construct in which the framework of operational risk is built. Cornalba and Giudici (2004) indicate that banks look out for qualitative and quantitative data requirements of improve measuring approach for measuring operational risk.

The challenges and paradox of operational risk was portrayed by Power (2005) as being a way of widens "enforced self-regulation" into banking operations. It was established by the study that the banking regulations of Basel II has productively established kinds of pressure and operational risk in three main areas which include definitional issues, levels of quantification, and data collection. All these signify the significance of operational risk. Moreover, the application of informational system and the condensed capability of taking up fresh methods, policies as well as scheme for operational risk were emphasized by Flores, Ponte and Rodrıguez (2006). Laviada (2007) stressed that well-organized operational risk management structure will reinforce internal controls of an organization which resulted in a better performance of the organization.

On the study of banking institutions, previous studies such as Ashraf, Altunbas and Goddar (2007); Dinger (2009); Akhtar, Ali and Sadaqat (2011) found a significant association between operational risk and performance of banks.

2.5 CREDIT RISK AND BANK PERFORMANCE

Athanasoglou *et al.* (2005) suggested that bank risk taking has pervasive effects on bank profits and safety. Bobakovia (2003) asserts that the profitability of a bank depends on its ability to foresee, avoid and monitor risk, possible to cover losses brought by risk and it also has the net effect of increasing the ratio of substandard credits in the bank's credit portfolio and decreasing the bank's profitability. Sanusi (2002) indicates that the increased number of banks over-stretched their existing human resources capacity which

resulted into many problems such as poor credit appraisal system, financial crimes, accumulation of poor asset quality among others and this led to increase in the number of distressed banks. Other factors identified are bad management, adverse ownership influences and other forms of insider abuses coupled with political considerations and prolonged court process especially as regards debt recovery.

According to Umoh (2002) few banks are able to withstand a persistent run, even in the presence of a good lender of last resort as depositors take out their funds, the bank hemorrhages and in the absence of liquidity support, the bank is forced eventually to close its doors. Thus, the risks faced by banks are endogenous, associated with the nature of banking business itself, whilst others are exogenous to the banking system.

Owojori *et al.* (2011) highlighted that available statistics from the liquidated banks clearly showed that inability to collect loans and advances extended to customers and directors or companies related to directors/managers was a major contributor to the distress of the liquidated banks.

Abiola and Olausi (2014) study the impact of credit risk management on the commercial banks performance in Nigeria. Their findings revealed that credit risk management has a significant impact on the profitability of commercial banks. Cooper *et al.,* (2003) found that changes in credit risks may reflect changes in the health of a bank's loan portfolio which may in turns affect the bank's performance.

Sufian and Chong (2008) found that the variation in bank profitability are largely attributable to variations in credit risk, since increased exposure to credit risk is normally associated with decreased firm profitability. Further research by Pasiouras (2008) found that there is a negative relationship between the credit risk and bank profitability, meaning that the more the banks were exposed to high-risks loans, the higher the accumulation of unpaid loans and, therefore, the lower the profitability.

Brewer *et al.* (2001) investigated the adoption of credit risk management best practices in the United States and reported that over 90% of banks in that country have adopted the best practices. Effective credit risk management has gained an increased focus in recent years, largely due to the fact that inadequate credit risk policies are still the main source of serious problems within the banking industry. The chief goal of an effective credit risk management policy must be to maximize a bank's risk adjusted rate of return by maintaining credit exposure within acceptable limits. Moreover, banks need to manage credit risk in the entire portfolio as well as the risk in individual credits transactions.

Furthermore, Musyoki and Kadubo (2012) in their study of the impact of credit risk management on the financial performance of Banks in Kenya revealed that all risk management parameters have an inverse impact on banks' financial performance; however the default rate has the greatest impact on bank financial performance.

2.6 LIQUIDITY RISK AND BANK PERFORMANCE

Liquidity issues may have effect on the earnings of a bank as well as its capital; and in some dangerous situations may lead to a solvent bank collapse (Central Bank of Barbados, 2008). This may cause banks to involve in borrowing from the financial market even under and extreme high cost in the time of liquidity crisis. This ultimately leads to a drop in the earnings of banks. In addition, additional borrowing by banks in order to meet the demand of depositors may put the capital of the bank at risk. Therefore, the debt-to-equity ratio will increase, which then affect the effort of the bank in maintaining an optimum capital structure.

Liquidity risk can lead to a fire sale of bank assets that could spill over to weakening of capital base of the bank (Falconer, 2001; Diamond & Rajan, 2001). If circumstances rises for financial institutions to sell a huge amount of their illiquid assets in order for the funding requirements, (so as to lessen the leverage based on the capital adequacy requirement), there may be need for fire sale risk. This situation might result in offering price discount for buyers' attraction. This circumstance will have influence on other institutions balance sheets because they will be indulged to mark their assets based on the price of fire sale (Goddard et al., 2009).

Diamond and Rajan (2001) stated that banks can refuse to borrow, even to a prospective entrepreneur, if they feel that the bank has high liquidity need. This serves as an opportunity loss to the bank. When a bank cannot meet demand deposits requirements, a bank run can arise (Diamond & Rajan, 2005). In no circumstances will a bank involve in

investing all its assets in the long-term investments. Numerous funding resources are only invested in the short-term liquid investments. This offers a buffer over shock of liquidity (Holmstrom & Tirole, 2000). Meanwhile, Diamond and Rajan (2005) stressed that a discrepancy in production of resources and depositors demand obliged a bank to achieve the resources at an increased cost.

Liquidity has more influence on the portfolios and tradeable securities. Generally, it is the loss that emerges through liquidation of a certain position (Zheng & Shen, 2008). It deems vital for a bank to have knowledge of the position of its liquidity from the perspective of marketing. It assists in expanding customer loans in terms of attracting market prospects (Falconer, 2001). A bank that has issues of liquidity loses some amount of business prospects. This will make a bank to be in a competitive disadvantage than competitors.

Due to this, liquidity risk is considered as an important internal determinant of bank profitability because it can be a source of bank failures; and it arises from the possible inability of a bank to accommodate decreases in liabilities or to fund increases on the assets' side of the balance sheet (Athanasoglou *et al.*, 2006). To avoid insolvency, banks often hold liquid assets that can be easily converted into cash. However, liquid assets are usually associated with lower rate of return; therefore, the higher liquidity would be associated with lower profitability. This is supported by Goddard *et al.* (2004) who prove that there is a weak negative relationship between the level of liquidity and the bank

profitability. However, Kosmidou *et al.* (2005) found that there is a strong and positive relationship between them.

Altunbas *et al.* (2000) applied internal risk factors to measure bank efficiency such as quality and liquidity risk. NPL ratio and the liquidity ratio were taken to measure the quality and liquidity risk, respectively. They found that small and largest banks are scale inefficient when the risk and quality factors are controlled (Altunbas *et al.*, 2000). This is because the large banks would have not reached to the optimal size to achieve the optimal scale efficiency. Their cost is higher than the required and other banks should grow to achieve the optimal scale efficiency (Altunbas *et al.*, 2000). It also found that if the risk and quality factors are not concerned the scale efficiency has overstated.

Arif and Anees (2012) examine liquidity risk and performance of banking system in Pakistan. The results of multiple regressions show that liquidity risk affects bank profitability significantly, with liquidity gap and non-performing as the two factors exacerbating the liquidity risk. They both have negative relationships with profitability.

2.7 SUMMARY OF CHAPTER

This chapter has been able to elucidate vividly on risk management in banking sector, the importance of financial risk management in banking, the previous studies on the relationship between risk management and bank performance, then, the previous findings on the relationship between each of the risk management factors used for this study (operational, liquidity, and credit risk) and bank performance.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

The methods applied to conduct this study are explained in this chapter. The theoretical framework of the study is depicted in section 3.1 and is based on previous studies on risk management and bank performance. Variable definitions and measurement of this study are presented in section 3.2. The sources of data are explained in section 3.3. Population and data collection are elaborated in section 3.4. Meanwhile, section 3.5 focuses on the development of hypotheses and the regression model is depicted in section 3.6. Furthermore, the diagnostic tests are explained in section 3.7. Finally, the summary of the chapter is presented in section 3.8.

3.1 THEORETICAL FRAMEWORK

The research framework of this study concentrates on the influence of risk management on the performance of conventional banks in Malaysia. The dependent variable is banks performance; proxy by ROA and ROE. Meanwhile, risk management in banking is about managing various types of risk such as operational risk, liquidity risk, credit risk, and interest risk. So, this study examines operational risk, liquidity risk and credit risk as the independent variable. The theoretical framework of the study is shown in figure 3.1.

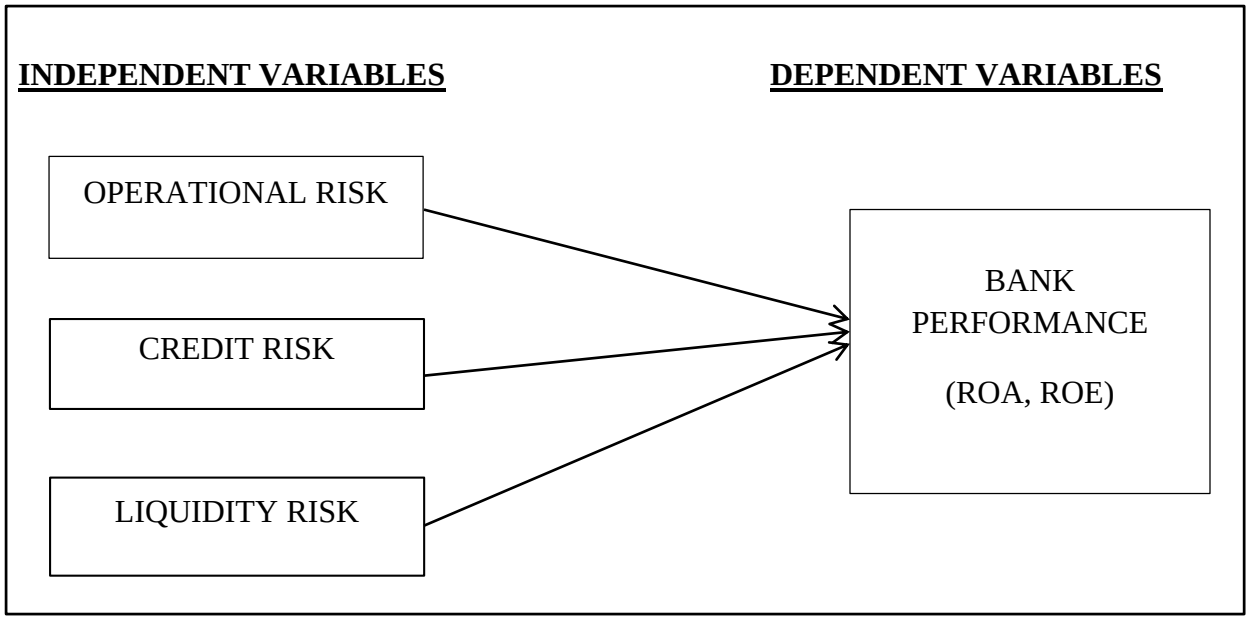

Figure 3.1: Theoretical Framework

3.2 MEASUREMENT OF VARIABLES

3.2.1 Dependent Variables

This study measures bank performance as the dependent variable, using ROA and ROE. ROA and ROE are the most important and popular measures of bank performance and have been extensively used by other researchers such as Rosly and Bakar (2003), Kumbirai and Webb (2010), Vong and Chan (2009), Alam (2013), Malhotra, Poteau and Singh (2011), Alkhatib and Harasheh, (2012), Ally (2013), Jha and Hui (2012), Choon, Thim and Kyzy (2012), Tarawneh (2006), Ongore and Kusa (2013), Alrabei (2013), Haque (2014) and Almumani (2013).

ROA is computed by dividing the net income of banks with their total assets. ROA measures bank efficiency in converting bank assets into earnings. In general, higher ROA indicates better performance of banks, provided it is not the result of excessive risk-taking (Rose & Hudgins, 2013). Banks will typically have a relatively low ROA in comparison to industrial organizations mainly because banks are highly leveraged (Malhotra *et al.*, 2011).

ROE is computed by dividing the net income of banks with their shareholders' equity. It measures returns earnings of shareholders on their investments. In a typical bank, shareholders' equity is usually small in comparison to other sources of funds that are used to fund a bank's assets. ROE is usually much higher than ROA. If the ROE is very high relative to ROA, it indicates that the bank is highly leveraged and may have limited access to more borrowings (Malhotra *et al.*, 2011). Due to the likelihood of lower return on assets by financial intermediaries, numerous banks make use of huge financial leverage so as to increase ROE to the level of competition (Hassan & Bashir 2003).Therefore, higher ROE indicates better managerial performance of the banks (Rose & Hudgins, 2013).

3.2.2 Independent Variables

The independent variables for this study are operational risk, credit risk, and liquidity risk. Operational risk is defined as: "*the risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events"* (BCBS, 2001). The dimensions of operational risk are risk mitigation and damage control (Van den Brink, 2002). Financial damage usually happens shortly or directly after a severe risk is perceived and has a direct visible influence on the bank's profit and loss account. Higher operational risk indicates that a bank is suffering from a huge operational loss caused by internal processes, systems, and people, or through external events. Operational risk is measured by dividing earnings before interest and tax with total assets. This ratio provides a system on how better an organization is applying its assets for achieving earnings. This measurement is also used as a proxy for operational risk by Ali, Akhtar and Sadaqat (2011) and Isshaq and Bokpin (2009).

This study uses debt-to-asset ratio as a measure for credit risk, as by Athanasoglou *et al.* (2008). The ratio defines the level of firm dependence on debt for financing assets, and measured by debt capital over total assets. Barnhill *et al.* (2002) applied debt for valuing ratio as basis for conveying credit ratings. According to Bauer and Ryser (2004), debt ratio is a significant edge that reinforces hedging options of banks. Their study also suggests that banks applying strategy of risk dropping to achieve high asset volatility, liquidation cost, and high initial debt ratio.

The liquidity risk of this study is measured by net-loans over deposits and short-term funding. The measurement has been widely used in banking studies such as Spathis, Koasmidou and Doumpos (2002), Al-Tamimi (2005), and Said and Tumin (2011) in measuring liquidity risk.

The measurements of dependent variable and independent variables of this study are as the following Table:

Table 3.1

Summary of Variable and Measurement

Variable	**Measure**	**Notation**	**Sources**
Dependent Variables			
Return on Assets	Net Income/Total Assets	ROA	Rosly & Abu Bakar (2003), Kosmidou (2008), Abbasoglu *et al.* (2007), and Bennaceur & Goaied (2008),
Return on Equity	Net Income/Total Equity	ROE	Hassan & Bashir (2003), Malhotra *et al.* (2011)
Independent Variables			
Operational risk	EBIT/Total Assets	OR	Isshaq & Bokpin (2009), and Ali *et al.* (2011)

Credit risk	Total Debt/Total Assets	CR	Barnhill *et al.* (2002), Bauer & Ryser (2004), Athanasoglou *et al.* (2008),
Liquidity risk	Net Loans/ Deposits and Short-term funding	LQ	Spathis *et al* (2002), Said & Tumin (2011), and Al-Tamimi (2005).

3.3 DATA SOURCES

The data used for this study are retrieved from the DataStream of the Universiti Utara Malaysia and the annual reports of the banks under reviewed.

3.4 POPULATION AND DATA COLLECTION

The sample comprises of 27 commercial conventional banks in Malaysia. These consist of 8 domestic banks and 19 foreign banks. The data used for domestic banks are retrieved from the DataStream while data used for foreign banks are retrieved from the annual reports. The data are confined to the period of 2005-2013. The list of commercial conventional banks used for this study is available in Appendix 1.

3.5 HYPOTHESES DEVELOPMENT

The hypotheses of this study are built on the framework of risk management. In regards to operational risk, Cummins *et al.* (2006) stressed that it seems sensible for banks to create expenditures on the management of operational risk to the barest minimum, where the marginal expenditure and the marginal reduction in expected losses from operational events will equal. Froot (2007) argued that by managing operational risk, future projected cash flows can be maximized by banks through reduction of the projected costs of operational loss events and thus will increase the bank performance.

In addition, since bank customers have more sensitivity to insolvency risk that could be exacerbated by huge operational losses, banks are highly motivated to efficiently manage operational losses in order to reduce insolvency risk and increase bank performance. Some previous studies found a significant association between operational risk and the performance of banks (Isshaq & Bokpin, 2009; Ali *et al.*, 2011; Akhtar, Ali, & Sadaqat, 2011; Dinger, 2009; Ashraf, Altunbas & Goddard, 2007; Demirovic & Thomas, 2007; Jacobson, Linde & Roszbach, 2006; How, Karim & Verhoeven, 2005). Therefore, this study hypothesized the relationship between operational risk and bank performance as follows;

Hypothesis 1

H1: There is a significant relationship between operational risk and bank performance.

As for credit risk, Bobakovia (2003) noted that ability of banks to foresee, prevent and monitor risk, and the possibility to cover losses that are caused by risk arisen determines the profitability of the banks. This also have an impact on the increasing insufficient credits ratio in the banks' credit portfolio, and reducing the profitability. This shows that credit risk influences bank performance. Among studies that found a significant association between credit risk and performance of banks are such as How, Karim and Verhoeven (2005); Jacobson *et al.* (2006); Demirovic and Thomas (2007); Ashraf *et al.* (2007); Dinger, 2009; Akhtar *et al.* (2011); Ali *et al.* (2011). Therefore, this study hypothesized the relationship between credit risk and bank performance as follows;

Hypothesis 2

H2: There is a significant relationship between credit risk and bank performance.

Athanasoglou *et al*. (2006) indicate that liquidity risk is a vital internal bank profitability determinant due to its ability to become a source of bank failures; and it occurs from the probable incapability of a bank in accommodating reductions in liabilities or to fund rises on the assets' side of the balance sheet. Meanwhile, some studies found a significant influence of liquidity risk on bank performance (Shen *et al.*, 2009; Pana *et al.*, 2010; and Distinguin *et al.*, 2012). Therefore, this study hypothesized the relationship between liquidity risk and bank performance as follow;

Hypothesis 3

H3: There is a significant relationship between liquidity risk and bank performance.

3.6 REGRESSION MODELS

In order to test the proposed hypotheses, a model was analyzed. The following model was estimated for the hypotheses:

$$Performance_{it} = \beta_o + \beta_1 OR_{i,t} + \beta_2 CR_{i,t} + \beta_3 LQ_{i,t} + \varepsilon_i$$

Where:

Performance = ROA & ROE

OR= Operational Risk

CR= Credit Risk

LQ= Liquidity Risk

ϵ = Error Term

3.7 DIAGNOSTIC TESTS

This section deals with the data analysis techniques employed to solve the research question of this study. Descriptive statistics, normality, heteroscedasticity, auto-correlation analysis and regression analysis are employed in this study.

3.7.1 Normality

Normality test is a scale in where the sample data distribution corresponds with a normal distribution. The most important assumption in multivariate analysis is normality test. Statistical test is used to check the normality test of the data by using Doornik-Hansen or Lilliefors test.

3.7.2 Heteroscedasticity

Breusch-Pagan-Godfrey test is used in this study in detecting the presence of heteroscedasticity problem in the model. It was noted by Gujarati (2003) that Breusch-Pagan-Godfrey is suitable for large sample test and is not subtle based on the assumption that the μi distributions are not distributed normally.

3.7.3 Auto-correlation

Auto-correlation regards to the correlation amid members of the observation series ordered in space or time (Gujarati, 2003). To detect the existence of auto-correlation in this model, this study apply Large Multiple test. It was indicated by Gujarati (2003) and Hayashi (2000) that Largrange Multiple test is the suitable test to detect auto-correlation issue in large and small sample.

3.7.4 Regression Analysis

This regression analysis of this study is run by using (General Least Square) GLS method. GLS method is a more suitable because it assists in reducing normality issue in a model. GLS is a transformed of Ordinary Least Square (OLS) and it is suitable than OLS when there is non-normal data (Gujarati, 2003). Whites General Hetersocedasticity and AR (1) are applied for hetersocedasticity and auto-correlation issues respectively. Furthermore, Hausman test is run to choose the most appropriate model for the study.

3.8 SUMMARY OF CHAPTER

This chapter explains and describes vividly the variables used for this study; depict the theoretical framework and the measurements for the variables. This chapter also explains the specification of model and method used in this study. It finally expatiates on the hypotheses of the study.

CHAPTER FOUR

ANALYSIS AND FINDINGS

4.0 INTRODUCTION

This chapter deals with analysis and findings on the impact of risk management on bank performance in Malaysia. Section 4.1 focuses on the data and summary statistics of the study. Section 4.2 deals with the normality test while section 4.3 expresses the result of the regression analysis. Finally, section 4.4 deals with the discussion of the findings on the impact of risk management on bank performance in Malaysia.

4.1 DESCRIPTIVES STATISTICS OF VARIABLES

The analysis of this study started with the summary of the descriptive statistics. The descriptive statistics of ROA, ROE, operational risk, credit risk, and liquidity risk are depicted in Table 4.1.

Table 4.1:

Summary of Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
ROA	208	-0.0086	0.048185	0.02136	0.011616	0.0001
ROE	208	-0.11583	1.0843	0.231963	0.191406	0.037
OR	208	-0.00711	0.09965	0.036623	0.019003	0.0003
CR	208	0.038848	0.964445	0.600236	0.358937	0.129

LQ	208	0.0000	4.48522	0.830349	0.600218	0.36

Table 4.1 shows the descriptive statistics for the dependent variables and independent variables of the study. It is found from the table that ROA, which is one of the measures for bank performance has a mean value of 2.14 percent (0.02136); indicating a low conversion of assets into earnings of conventional banks. Hawkins and Mihaljek (2001) indicate that ROA that less than 20 % is considered as low. Furthermore, the table shows that the mean value of ROE for the study is 23.20 percent (0.23196); implying a high returns to shareholders of conventional banks.

As for the independent variables, the mean value of liquidity risk is found to be the highest among the three risk variables. The mean value of liquidity risk is 83 percent (0.830349); indicating a high exposure of bank to liquidity problem. Next, the table shows that the mean value of credit risk is 60 percent (0.6002); implying a high dependence of conventional banks in Malaysia on debt to finance their assets. However, the mean value of operational risk shows a different percentage than the two variables. The mean value of operational risk is much lower than the two variables; which is 3.66 percent (0.036623). The result of operational risk suggests that conventional banks in Malaysia have low exposure to operational loss.

4.2 NORMALITY TEST

The result of the normality test using Doornik- Hansen and Lilliefors test is depicted in table 4.2.

Table 4.2:

Normality Test Result

	Doornik-Hansen		Lilliefors test		Skewness	kurtosis
	Statistic	P-Value	Statistic	P-Value		
Standardized Residual of ROA	17.3411	0.00017	0.1177	0.000	0.4276	-0.5512
Standardized Residual of ROE	155.459	1.75E-34	0.2091	0.000	1.5572	2.3467

The significant results of Liliefors test of ROA and ROE suggesting a violation of normality assumption of the data. However, the violation of normality assumption is not so important in the case of this study since the sample size of this study is regarded as large (N=208). According to Pallant (2007), violating normality assumption should not lead to any difficulty in a large sample because most of the general and regression analysis result will not be affected by normality assumption. Meanwhile, large sample size is defined by Hair *et al.*, (2006) and Pallant (2007) as when observations are above 100, while Tabachnik and Fidell (2007) assume large sample to be above 200 observations. Thus, the sample size of 208 observations used for this study is regarded as large and thus violation of normality assumption is not significant.

4.3 CORRELATION

Table 4.3 depicts the correlation matrix of the variables. This is showing the correlation between the variables used for this study.

Table 4.3:

Correlation Matrix

	ROA	ROE	OR	CR	LQ
ROA	1.0000				
ROE	0.721424	1.0000			
OR	0.92481	0.710087	1.0000		
CR	0.720222	0.538713	0.821283	1.0000	
LQ	-0.16766	-0.10307	-0.0246*	-0.10796	1.0000

Note: * indicate significant at 5% respectively.

Table 4.4:

Variance Inflation Factors (VIF) for Multicollinearity test

OR	3.112
CR	3.147
LQ	1.025

Table 4.3 shows the correlations that exist among the variables. Correlation coefficient is used for measuring the degree of linear correlation that is between two or more variables. A formal test was applied to establish that multicollinearity is not present in this analysis by using variance inflation factor (VIF) that is depicted in Table 4.4 for each independent variable in the models. The largest VIF is 3.147 (CR), approving that multicollinearity

does not exist in the sample since all the independent variables has VIF that is less than 10 (Hair *et al.,* 2006).

4.4 REGRESSION ANALYSIS

The regression results of operational risk, credit risk and liquidity risk on bank performance (using ROA as measurement) are shown as below:

Table 4.5:

Regression Analysis of the independent variables on ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007207	0.001637	4.402928	0.0000
OR	0.567342	0.026242	21.61991	0.0000***
CR	-0.005707	0.001736	-3.287031	0.0011**
LQ	-0.002003	0.001089	-1.839482	0.0662
AR(1)	0.846374	0.047946	17.65259	0.0000

R-squared	0.955880
Adjusted R-squared	0.955486
F-statistic	2426.555
Sig (F-statistic)	0.000000***
Durbin-Watson stat	2.063493
N	208

Note: ***,** significant at 0.01 and 0.05 respectively

Based on Table 4.5, it is found that F-statistic of the model is significant; indicating a relationship between the sets of independent variables and ROA. The adjusted R^2 value, implies that the regression model which consists of operational risk, credit risk, and liquidity risk explain 96 percent (0.955486) variations in ROA. Further, the table shows that only operational risk and credit risk are significant to ROA while liquidity risk is not significant. Among the two significant variables, it is found that operational risk has the highest beta coefficient value (0.567342); indicating the strongest contribution in explaining the dependent variable. However, it is found that operational risk has a positive relationship with ROA while credit risk has a negative relationship with ROA.

The relationship between operational risk, credit risk and liquidity risk with ROE is shown as follows;

Table 4.6:

Regression Analysis of the independent variables on ROE

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.071982	0.026531	2.713083	0.0068
OR	3.601810	0.379728	9.485234	0.0000***
CR	0.053374	0.027201	1.962192	0.0500**
LQ	-0.025073	0.012708	-1.973112	0.0488**
AR(1)	0.823289	0.043882	18.76152	0.0000

R-squared	0.934243
Adjusted R-squared	0.933656
F-statistic	1591.236
Sig (F-statistics)	0.0000***

Durbin-Watson stat	2.037732
N	208

Note: **, * indicates significant at 0.01, 0.05 respectively

It is observed from Table 4.6, that F-statistic, which explains the overall significance of the model is significant. The results indicate a relationship between the independent variables with ROE. The adjusted R^2 value shows that the regression model could explain 93 percent (0.933656) variations in ROE. Different than results presented in Table 4.5, it is found that all risk variables namely operational risk, credit risk and liquidity risk have significant impact on ROE. Among the three variables, operational risk has the highest beta coefficient (3.601810) while liquidity has the lowest (0.025073). However, both operational risk and credit risk have a positive relationship with ROE; and liquidity risk has a negative relationship.

4.5 DISCUSSION OF FINDINGS

4.5.1 Operational risk and Bank Performance

Operational risk has positive significant relationship with both ROA and ROE. The results indicate that the higher the operational risk, the higher is the bank's performance. The plausible reasons for the relationship are high confidence and loyalty of the banks customers towards Malaysia banks. Although the banks are exposed to operational risk such as failure of internal process, people or system but, that does not affect the trust, confidence and loyalty of the customers, and they continue to support the banks by

depositing money, lending and investing in the banks' securities. This finding is consistent with other studies such as Isshaq and Bokpin, (2009), Ali *et al.* (2011), Karim and Verhoeven (2005), Jacobson *et al*. (2006), Demirovic and Thomas (2007), Ashraf *et al.* (2007), Dinger (2009), and Akhtar *et al*. (2011). Thus, the hypothesis that which that there is a significant relationship between operational risk and bank performance is accepted.

4.5.2 Credit risk and bank performance

Credit risk is also found significant to both ROA and ROE. The positive results of credit risk towards ROE suggest that the higher the credit risk, the higher is the banks performance. Meanwhile, the negative relationship for ROA implies that the higher the credit risk the lower is the bank performance. The plausible reason for the positive relationship between credit risk and ROE is due to excessive risk taking which increases bank performance. Meanwhile, the plausible reason for the negative relationship between credit risk and ROA is because of increase in non-performing loan of the banks, which reduces the bank performance. The results support the hypothesis of significant relationship between credit risk and bank performance. However, the directions of the relationship (i.e; positive or negative) between credit risk and bank performance cannot be concluded.

4.5.3 Liquidity risk and bank performance

Liquidity risk is found insignificant with ROA and significant with ROE. The positive results of liquidity risk towards ROE suggest that the higher the credit risk, the higher is the banks performance. Meanwhile, the negative relationship implies that the higher the liquidity risk, the lower is the bank performance. The plausible reason for the negative relationship between liquidity risk and ROE is due to inability to hold high liquid asset which reduces bank performance. Meanwhile, the plausible reason for the insignificant relationship between liquidity risk and ROA is because of increase in banks liabilities and liquidity gap which reduces bank performance. Hence, the hypothesis of a significant relationship between liquidity risk and bank performance is not supported.

Table 4.7 below summarizes the hypotheses testing results of operational risk, credit risk and liquidity risk on bank performance.

Table 4.7:

Summary of the Hypotheses Testing Results

HYPOTHESES	ROA	ROE
H1: There is a significant relationship between operational risk and bank performance.	Hypothesis is supported	Hypothesis is supported
H2: There is a significant relationship between credit risk and bank performance.	Hypothesis is supported	Hypothesis is supported

H3: There is a significant relationship between liquidity risk and bank performance.	Hypothesis is not supported	Hypothesis is supported

4.6 SUMMARY OF THE CHAPTER

This chapter explains the findings of this study. It explains the result of the descriptive statistics of the variables, the normality test, correlation matrix, panel data analysis, and the regression analysis. Further, this chapter vividly interprets the results of the regression by discussing the findings.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 INTRODUCTION

This chapter provides an overall conclusion of the study on the relationship between operational risk, credit risk and liquidity risk on bank performance. The chapter begins with research overview and followed by contribution of the study to various parties concerned. Finally, limitations are explained and suggestions for future research are discussed.

5.1 RESEARCH OVERVIEW

This study examines the impact of risk management on bank performance in Malaysia. The data for this study is retrieved from the DataStream and annual reports of banks. The sample comprises of 27 conventional commercial banks in Malaysia. The period of study is from 2005-2013, making up to 208 observations. This study found that the relationship between operational risk and bank performance is positively significant under both ROA and ROE as a measure of bank performance. This finding indicates that the higher the operational risk, the higher is the bank performance for these periods under review. This positive relationship can be traced to high confidence and loyalty of the bank customers towards Malaysia conventional banks.

Credit risk has negative significant relationship with ROA and positive significant with ROE. This shows that credit risk fairly influences bank performance in these periods under review. This positive relationship could be due to excessive risk taking that increases bank performance, while the negative relationship could be due to increase in non-performing loan which reduces bank performance. Liquidity risk has negative significant relationship with ROE. This shows that liquidity risk negatively affect bank performance in these periods under review. This negative relationship could be due to inability of bank to hold high liquid asset which reduces bank performance, while the insignificant relationship can be traced to increase in banks liabilities and liquidity gap which reduces bank performance.

5.2 CONTRIBUTION

5.2.1 Body of Knowledge

The finding of this study is of importance to other scholars. It is useful because of its contribution to body of knowledge specifically on the relationship between risk management and bank performance. This study also provides evidence of the relationship between operational risk, credit risk and liquidity risk with performance of Malaysia conventional banks.

5.2.2 Policy Implications

The result of this study is of importance to policy makers because it will facilitate the formulation of policies regarding risk management in banking, through enforcing the implementation of an effective risk management on banks for creation of measures and prevention against any possible threat of financial crisis on the economy. It is imperative for banks regulators and policy makers in Malaysia to continue to enforce and promote the implementation of an effective risk management system by banks that will ensure and prevent possible threat of bankruptcy, liquidation and financial meltdown.

5.2.3 Practical Implications

It is of importance to practitioners by showing the value of effective risk management on bank performance, and enables them to improve their risk management practice. Malaysia conventional banks must always formulate forward looking risk measurement systems and sound practices for managing risks, particularly in times of rapid growth in new products or markets. If banks fail to adhere to basic risk management principles, it may affect them in evaluating risk of new products in the market, which will hinder their increase in market share.

5.3 LIMITATIONS OF THE STUDY

This study is limited to the impact of risk management on performance of conventional banks in Malaysia only, and for the periods of 2005-2013. However, some banks do not have complete data due to their year of establishment in Malaysia. These banks include: BNP Paribas Bank, Bank of China, India International bank, Mizuho bank, National bank of Abu Dhabi, and Sumitomo Mitsui Banking Corporation.

5.4 SUGGESTIONS FOR FUTURE RESEARCH

Future research on risk management should try to look at influence of risk management on the performance of other types of banks such as investment banks and Islamic banks. Further, future studies can focus on other risk factors such as interest rate risk, market risk, foreign exchange risk and so on. In addition, future studies can also consider risk in other countries such as Thailand, Indonesia, and Philippines in order to provide a more robust result of the relationship between risk management and bank performance of developing countries.

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