IMPACT OF HOME FINANCING ON LIQUIDITY RISK IN MALAYSIAN BANKS

BY

AIUOB ALI ABDULQADER ABDO

MASTER OF ISLAMIC FINANCE AND BANKING
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ABSTRACT

Liquidity risk in banks is a major issue following the 2008 Global Financial Crisis. Liquidity risk as one of the main risks faced by the bank and cannot be ignored anymore in the banks. liquidity risk refers to the inability of banks in meeting the due date obligation. The main objectives of this study to investigate the impact of home financing and other factors on the liquidity risk of Islamic and conventional banks in Malaysia. The total numbers of 12 Islamic and 12 conventional banks are used as sample of the study for the period of 2004-2018 to be regressed using Fixed Effect Model (FEM). The results of the study show that home financing has positive relationship with Islamic and commercial bank liquidity risk in Malaysia and bank size has negative and significant relation with the liquidity risk. Expense to net income has significant relationship with the conventional banks and it is insignificant for Islamic banks. For conventional banks only inflation has significant impact on the liquidity risk of Malaysian banks. The limitation of the study only considering home financing and selected Islamic and commercial banks in Malaysia. therefore, it is recommended, to consider studying other types of loan and all the Islamic and commercial banks in Malaysia. Future studies should also consider examining the impact of the two new ratios suggested by the Basel Committee on liquidity risk in Malaysian Islamic and commercial banks.

Keywords: liquidity risk, home financing, Islamic banks, conventional banks, Panel Data Analysis

ABSTRAK

Risiko kecairan di sektor perbankan merupakan antara isu utama terutama semasa krisis Kewangan Global 2018. Ia merupakan risiko utama yang dihadapi oleh bank dan tidak boleh diabaikan lagi. Risiko kecairan merujuk kepada ketidakupayaan bank dalam memenuhi obligasi kewangan ketika sampai tempohnya. Objektif utama kajian ini adalah untuk mengkaji kesan pembiayaan rumah dan faktor-faktor lain terhadap risiko kecairan bank Islam dan bank konvensional di Malaysia di mana sebanyak 12 buah bank Islam dan 12 buah bank konvensional digunakan sebagai sampel kajian bagi tempoh 2004-2018. Kajian ini menggunakan Model Kesan Tetap (Fixed Effect Model) dan dapatan kajian menunjukkan pembiayaan rumah mempunyai hubungan positif dengan risiko kecairan bank Islam dan bank konvensional di Malaysia. Di samping itu saiz bank menunjukkan hubungan negatif dan signifikan dengan risiko kecairan. Perbelanjaan juga menunjukkan hubungan yang signifikan dengan risiko kecairan bank konvensional dan tidak bagi bank Islam. Bagi bank konvensional, inflasi menunjukkan hubungan yang signifikan dengan risiko kecairan. Limitasi kajian hanya menilai pembiayaan rumah bagi bank islam dan bank konvensional di Malaysia. Adalah disyorkan, kajian hadapan perlu mengkaji kesan nisbah yang disyorkan oleh Jawatankuasa Basel ke atas risiko kecairan.

Kata kunci: risiko kecairan, pembiayaan rumah, bank Islam, bank konvensional, analisis panel data

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LR   Liquidity risk

IB   Islamic bank

CB   Conventional bank

NIM   Net interest margin

INF   Inflation

GDP   Gross Domestic Product

BLR   Based Lending Rate

TA   Total Assets

HF   Home financing

NPL   Non-Performing loan

EXPPAT   Expense to net income

TLTD   Total Loan to Total deposit

LTA   Loan to Total assets

ALM   Assets Liabilities Management

LNTA   Logarithm Total assets

LHF   Logarithm home financing

RE   Random effect

FE   Fixed effect

IV   Independent variables

DV   Dependent variables

CHAPTER ONE:

INTRODUCTION

1.1 Introduction

The study aims to investigate the impact of home financing and other variables on liquidity risk in Malaysian Islamic and conventional banks. This chapter covers the background of the study, development of the Islamic and conventional banks in Malaysia. Moreover, discusses the objectives of the research, problem statement, scope, limitation and significant of the study.

1.2 Study Background

Banking institution plays important roles in the economic system of any country. The main objective of the bank is to facilitate the economics activities as transferring the surplus units to the deficit units and promote greater efficiency in meeting the investment and liquidity needs of the economic agents in the financial system (Ghajar & Korea, 2011). As well bank services represent the main brick and edifice of the economics. Banks considered an important tool to measure its effectiveness and its applications support its objectives in the society and contribute to building the economic reality in the country.

On this basis, banks provide funds to customers and one of the usages of funds is by channelling them to loans and advances. One type of loan offered by banks is home financing and it contributes to the large portion of bank where more than 40% of the total loan are channelled to this type of loans (Drehmann & Nikolaou, 2013).

Since, home financing is one of the main contributors to banks, then it is important for banks to manage the loan in the most effective way, starting from the evaluation of the borrowers to the last step of the loan. Another issue for home financing is that, it is a long-term loan with an average period of 15 to 20 years tenure. Therefore, this type of loan is vulnerable to default in payment. The default payment and mismatch of assets and liabilities are some of the factors that contribute to banks' liquidity risk (Scannella, 2016). Liquidity risk is one of the main risks faced by the bank, where the bank is unable to meet the due date obligation. Risk management is an important the bank management because it can be the main reasons of the crisis or bank failure. Therefore, it is important that banks should plan have an efficient plan or risk management tools to mitigate banking risk (Drehmann & Nikolaou, 2013).

1.3 Development of Conventional Banks in Malaysia

The beginning of commercial banks in Malaysia started back to more than 130 years ago when the Mercantile Bank of India, London and China in 1859 was established. Among the activities offered during that time are trade financing, working capital and foreign exchange remittance. Then with the proposal from Work Bank to establish the central bank, Bank Negara Malaysia (BNM) was established under the Central Bank of Malaysia Ordinance in 1958. The main objective of BNM is to issue currency notes and supervise commercial banks activities. Additionally, with the amendment of Insurance Act 1963 and the Banking Act 1973, the BNM empowered to manage all the financial institutions in Malaysia including financing companies, banks, money market operation and insurance companies (Md. Isa, Ahmad, & Yik Wan, 1996). Currently there are

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26 local and foreign commercial banks granted the licences to operate by in Malaysia by Bank Negara Malaysia (refer to the Appendix 1). As in the appendix, Malayan Banking Berhad is the largest commercial bank in Malaysia by total assets, followed by CIMB Bank, Public Bank and OCBC bank. The smallest bank by total assets is Indian International Bank followed by Bank of Nova Scotia and J.P. Morgan Chase Bank.

1.4 Development of Islamic Banks in Malaysia

In Malaysia, the Islamic bank development started in 1963, where the first financial institution known as Lembaga Urusan dan Tabung Haji was established with the purpose to save money for *hajj* and investment. Followed by the establishment of Bank Islam Malaysia Berhad (BIMB) in 1983 where it became the first full-fledged Islamic bank offered products and services according to Islamic law. Later in 1993, the conventional banks are granted licences to offer Islamic banking products and services which was known as "Islamic windows". Then in 1999, Bank Muamalat Berhad was established as the second full-fledged Islamic bank in Malaysia, For now, there are 16 local and international Islamic banks in Malaysia granted licences to provide Islamic products and services in Malaysia (refer to the Appendix 2). Appendix 7.2 shows that Maybank Islamic is the largest Islamic bank in Malaysia, followed by RHB bank, CIMB Islamic and BIMB. In the other side, Standard Chartered Saadiq is the smallest Islamic bank in Malaysia, followed by Al Rajhi Banking & Investment Corporation and Kuwait Finance House Malaysia.

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1.5 Problem statement

Liquidity risk is considered one of the main risks involved in banks and during the Global Financial Crisis 2008 banks experienced liquidity risk issue (Umar & Sun, 2016). The main issue of the liquidity risk in both commercial and Islamic banks is that banks involved in short term borrowing and long term lending, this explained as mismatch funding theory (Sahyouni & Wang, 2019).

One of the issues of liquidity mismatch theory is liability mismatch, where liability items are considered to be a source of funds like deposits. However, banks tend to use short term liabilities to financing long-term loans (Islahi, 2009). This issue again led to mismatch of liabilities and assets means borrowing for short term and lending for the long term, therefore in the banking system both assets and liabilities should be matched. And this issue of mismatch results in the liquidity issues.

Banks borrow for short term and lend for the long term and one of the long-term loans is home financing. It becomes one of the largest loan sizes provided by the bank. However, in the Global Financial Crisis in 2008, home financing was the main reasons for the crisis. Whereby banks give housing loans with no proper credit risk rating. And less supervision of from the bank. This result the customers are unable to pay the loan amount, therefore, this issue of mismatch and income anticipated appeared much in this case (Mohammed, 2015).

The problem of assets and liability mismatch is in managing the assets liability (ALM). It is an important department to manage risk management in banking. Therefore, it is difficult for the ALM to draw an outline of the risk management and liability and assets.

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Home financing is long term loan granted by banks, where it causes the issues of mismatch assets and liability and result to liquidity risk Thiongo, Matata, & Simiyu, (2016) stated, the loan has a huge impact to the bank's performance, and it can cause the crisis to the bank. Home financing was the main cause of the crisis mention that, the first factors of the global financial crisis in 2008 were home financing, the loan is given without credit quality and assessment in the banks, and this led to the liquidity risk and credit crunch (Bernanke, 2018). Thiongo & et al. (2016) study the relationship between liquidity risk and loan in the banking during the financial crisis of 2008 evidence is from USA credit register. The result shows, there is a significant impact of the loan to the liquidity risk.

Based on the important of liquidity risk management and the influence of home financing to the bank loan portfolio, this study aims to investigate the impact of home financing to the liquidity risk in Islamic and commercial banks in Malaysia,

1.6 Research Question

The study seeks to answer the following questions:

RQ1: What is the trends of home financing and liquidity risk in the Malaysian market?

RQ2: What is the impact of home financing and other factors on liquidity risk of conventional banks in Malaysia?

RQ3: What is the impact of home financing and other factors on liquidity risk of Islamic banks in Malaysia?

1.7 Research Objectives

The main objective of the research is to examine the impact of home financing and other independent variables on liquidity risk of Islamic and conventional banks. The objectives can be categorized into:

RO1: To study the trend of home financing and liquidly risk in the Malaysian banks.

RO2: To investigate the impact of home financing and other factors on liquidity risk of conventional bank in Malaysia.

RO3: To investigate the impact of home financing and other factors on liquidity risk of Islamic banks in Malaysia.

1.8 Scope of the study

The scope of study is to examine the impact of home financing on liquidity risk of Malaysian banks. It focuses on both Islamic and conventional banks and there are 12 commercial bank and 12 Islamic banks in Malaysia selected for this study. The study used secondary data from the yearly audited annual report; whereby the study covered from year 2004 to year 2018.

1.9 Significant of the study

Many studies conducted on risk management of many countries. However, the extent of this research is very limited where only a few studies focused on Islamic bank liquidity risk. Hence, the research will fill the gap by studying liquidity risk for Islamic banks and study its relationship with home financing which became major component of loan in Malaysia banks. This study also signifies to policy maker where policy maker will be in a better position to formulate efficient

liquidity management guidelines and enhance the supervisory roles in the banking system.

Also, the government and regulatory authorities in various countries will find useful information on the effects of macroeconomic variables on liquidity and liquidity risk of Islamic banks. The information expected from this study will provide necessary support for policy makers to formulate policies that accentuate the significance of liquidity risk in Islamic bank management and enhance the supervisory roles on Islamic banks and commercial bank related to the Basel I,II and Basel III.

1.10 Organisation of the study

The study consists of five chapters. The first chapter in this study will focus on the study background, development of Islamic and commercial Malaysian banks. Followed by problem statement, research question, research objectives, the scope of the study and the limitation of the study. The second chapter focuses on the theory of the liquidity and the literature review of each dependent and independent variable of the study. Chapter Three highlights on the methodology of the research, data collection and sampling, research framework, research model, hypothesis testing and panel regression. In Chapter Four, it addresses descriptive result, panel regression of Islamic and commercial banks, and summary of hypothesis testing. Chapter Five highlights the conclusion of the research and recommendation of any future research. The studies end with references and any appendix for the study.

CHAPTER TWO:

LITERATURE AND THEORETICAL REVIEW

2.0 Introduction

This chapter provides reviews of previous studies related to the variables of the research. It discusses the liquidity in the banking system, liquidity risk, causes of liquidity risk and measurement of liquidity. The chapter also reviews past studies related to the independent variables such as home financing, bank size, net interest margin (NIM), non-performing loan (NPL), expenses, inflation, gross domestic product (GDP) and interest rate.

2.1 Theoretical review

Theoretical review is the explanation of some relevant theories to the study and liquidity risk in the banking industry. The relevant theories are financial intermediation theory, Shiftability Theory and income anticipated theory.

2.1.1 Financial Intermediation Theory

Financial intermediation theory is the process of transfer the surplus unit to deficit unit using financial intermediaries. The objective of financial intermediation theory is to create liquidity during the hard-economic time or distress in the economic condition (Cuza, 2009). This theory was developed by Gurley and Shaw (1960) and it is based on information asymmetry theory and agency theory. Information asymmetry is the imbalance of information between two parties in the financial market and this can lead to inefficient of the financial market. Similarly, to agency theory where the financial intermediaries act as an agent of the seller or investors, where this led to the conflict of interest among the principal and the agent and can lead to inefficient of the financial market (Mitchell, 2012).

The existence of banks is explained is by the existence of the following categories of factors: the high cost of the transaction, lack of complete information in useful time; and the method of regulation. Therefore, the theory explains between the following functions of financial intermediaries: first one reducing the transaction costs; minimizing liquidity risk; information, dent renegotiation. The above is mainly to solve the issue of asymmetry theory and the agency theory and increase the efficiency of the financial market (Mitchell, 2012).

2.1.2 Shiftability Theory

Shiftability theory was invented by H. G. Moulton in 1918, where he defined the ability to sell or shift the loan from one bank to another bank rather in the repayment of the loan themselves. In the shiftability theory approach, banks tried to meet the liquidity requirement and shift the risk to another bank. However, the theory is not applicable if banks could not sell the loan or find a buyer of the loans. Despite the use of the shiftability theory in the banking system, it is limited to liquidity management. However, many banks want to sell their assets, but these assets are no longer easy to be sold (less liquid).

In conclusion, the shiftability theory is defensible bank liquidity risk and it encourages the bank to hold some liquid assets to meet unexpected situation (Press, 2017). The bank always holds liquid assets to meet due to date obligation and avoid borrowing which is costly to the bank (Brunnermeier, Krishnamurthy, Markus, Gary, & Arvind, 2015).

2.1.3 The Anticipated Income Theory

The theory was invented by H.V. Prochanow in 1944 and it proposed that bank liquidity can be acquired through loan repayments. According to this theory, loan

repayments (and liquidity requirements at the same time) should be matched with the expected loan income. This theory acknowledges that the loan in the banks is a source of bank liquidity. It is not fair to totally ignore the theory, because it is considered as useful tools for understanding the liquidity management and how the liquidity generated from the income. Another, useful tool of the theory, identifies the source of the liquidity such as loan repayment from the borrowers. Additionally, the theory considered as good and helpful to manage the mismatch liquidity risk not the source of liquidity needed to manage contingent liquidity risk, (Spencer & Spencer, 2011).

The anticipated income theory has some limitation. Bank should not depend on the anticipated income, because the borrowers make the payment and it comes from another source. The theory helps to identify the source of liquidity for the whole banking system, and it can help the banking system to reduce the liquidity risk banks (Gupta, 1978).

2.2 Liquidity in Financial Institution

The liquidity concept is crucial to financial institutions and it is hard to be ignored in the banking system (Muttalib, 2015). Liquidity refers to the ability to change the wealth to goods and services or any other assets (Drehmann & Nikolaou, 2013). Thus, an asset is considered as liquid asset when it can be easily converted to cash or it is equivalent (Ali, 2013). Similarly, Bankscope defines liquidity as a loan with three months to run to maturity or government bond and cash (Alman & Oehler, 2010). In economics, liquidity is defined as one asset that can be converted into another within a short time (Sanghani, 2014; Vasigh, Fleming &, Kenneth, 2014). Based on the definition, assets such as car, house, gold are

considered as less liquid assets, while cash, stock inventory considered as liquid assets. (Abdulrehman & Nyamute, 2018).

There is always a trade-off between profit (from lending or investment) and liquidity in the bank's business. Banks need to have balance between profit and liquidity and the survival of the banks entirely based on the ability to provide liquidity and mitigate the risk of liquidity. The objective of the liquidity in banks, is to guarantee to meet the cash obligation without affecting their performance.

In Malaysia, Bank Negara Malaysia has come up with a liquidity framework to create awareness among Malaysian banks to meet all short-term debt and to provide better measurement for the bank to know it is liquidity position. It is the responsibility of the Asset-Liability Management Committee (ALCO) to ensure the bank have enough cash or liquid assets to meet all the short-term obligation.

Sekoni (2015) defines liquidity risk as to the banks' ability to meets up its obligations without any loss in their capital and earnings.it is an obligation without any loss using their capital and earning. Another study defined liquidity risk as possible of loss due to the inability to meet the cash needed in the bank (Scannella, 2016). Liquidity risk is inversely related to liquidity, this means when the liquidity increase the liquidity risk is decreased and the other way around (Kumar & Yadav, 2013).

There are two types of liquidity risk in the banking, funding risk and trade risk, funding risk is when the bank is unable to cope with unexpected and expected obligation, funding risk could be caused by the failure of loan repayment by the borrowers and future event make the bank unable to cope with the situation. Trade

risk is the price movement in the market will significantly affect the bank liquidity and disturb the cash outflow or inflow (Scannella, 2016)

It is vital to the bank to manage the risk that causes disruption it is operation. Kumar & Yadav (2013) identify the following causes of liquidity risks, such as sudden large deposit withdrawal, sudden due unexpected obligation and other issue cause counterparties to not trade or lend to the bank. also, one sector which the bank depends on, suffering from the loss of liquidity such as other Banks.

In addition, Mohammad and Shahwan (2013) explain the causes of liquidity risk is a gap in the maturity dates of assets and liabilities, This is also known as mismatch problem. Mismatch is happen between the assets and liabilities because the bank borrows for the short term and lend for long term. According to the study another major cause of liquidity risk is in Islamic banks is limited access to Shari'ah- compliant money and interbank markets.

Furthermore, less supervision and regulatory increase the cause of liquidity risk. It is essential to have strong supervision and regulation to manage liquidity risk, by enforcing the requirement for the bank to reserve some amount of cash to meet the due date obligation (Chen, Shen, Kao, & Yeh, 2018). Thus, if the liquidity risk is not managed properly, there is a risk to the bank becoming insolvent and this leads to bad publicity and reputational damage. Also, liquidity risk has a direct effect on other risks, hence it is more important to manage it effectively.

2.3 Empirical Literature Review

This section provides empirical studies related to the dependent variable and independent variables of the research and it is finding. Mainly to enhance and provide enhance and support the result of the study.

2.3.1 Liquidity measurement

This section explains both the dependent variable of the study and the evidence of a previous empirical study used the same method in the methodology.

2.3.1.1 Loan to Total Assets

Loan to total assets shows the proportion of total of loan to the total assets of the bank. If this ratio is high which means the most likely bank will observe liquidity risk. Therefore, the bank must maintain a minimum ratio in mitigating liquidity risk of the bank. The formula of the ratio as below

Total loan to total assets = Total loan/ Total assets

Many previous researches used total loan to total assets in measuring the liquidity risk of banks. For instance, El-chaarani (2019) examined the determinant of liquidity risk in the Middle East region for 183 banks. loan to total assets used as a proxy as for liquidity risk Along with other variables such as size, capital, inflation and GDP, the result shows that there was a significant relationship between the liquidity risk and size, capital and inflation. In the same context Vodová (2013) studied the determinant of the liquidity risk in the commercial banking sector of the Czech Republic. The author used loan to total assets as liquidity risk measurement.

2.3.1.2 Total loan to total Deposit

Loan to total deposit refers to the total loan over total deposit of the bank at a specific period. High ratio means the bank likely to face liquidity risk because the bank is giving more loan and the bank may unable to meet all the due date obligations. The formula is as follow

Total loan to Deposit = Total loan/ Total deposit

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Many empirical studies used this ratio as dependent variables. For instance Muthumoni & Raj (2017) studies effect of liquidity risk on profitability where loan to total deposit is used as a proxy for liquidity risk. The result shows a positive relationship between the liquidity risk and profitability measured by ROA and Non-interest margin. Similar study El-chaarani (2019) used the total loan to total deposit as a the proxy for liquidity risk in the middle east regain.

Ika & Abdullah (2011) compared liquidity risk of Islamic and conventional banks in Indonesia from 2000 to 2007. The study used loan to deposit ratio to measure the liquidity risk and the result shows Islamic banks are less risky than commercial banks. Chowdhury, Zaman, & Chowdhury (2018) studied the impact of liquidity risk on performance of Islamic banks in Bangladesh. They used loan to deposit ratio as liquidity risk measurement to find the significant level between the liquidity risk and bank performance for the period from 2012 to 2016. The authors conclude there is a positive and significant impact of liquidity risk on bank profitability in Bangladesh.

2.3.2 Factors influence liquidity risk of commercial and Islamic bank

2.3.2.1 Bank Size

Some scholar argues that bank size may have impact on the liquidity of the bank and some scholar said there was no impact of bank size on liquidity risk of the banks. Shamas, Zainol, & Zainol, (2018) investigate the impact of bank size on liquidity risk in Bahrain for the period of 2007-2011. The result shows that, there was negative relationship between the size of banks and liquidity. Amin, Mohamad, & Shah, (2017) study the effect of the bank size on the liquidity risk. The research sample is Islamic banks and conventional banks in 16 of The

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Organisation of Islamic Cooperation (OIC) countries from 1999 to 2013. DEA approach and GMM model are used in the study and result shows that size has significant impact on bank liquidity risk. In other word, big size bank has less possibility to face liquidity risk and small size bank has more chance of facing liquidity risk. Another research by Terraza (2015) examines the liquidity risk and bank size for 127 European banks during 2005-2012. The result shows that bank liquidity depends on the bank size where bigger banks have less liquidity risk compare to smaller banks. On the researcher view bank size has negative relationship is the result with some of the sense, and it is in line with the concept too big to fail, big bank size will have more access to the funds and has more assets therefore it is difficult to meet the liquidity risk in the big banks.

Lastuvkova, (2016) studied the relationship between bank liquidity and variables such a total asset, gross volume of loans and client's deposits. The result shows that there is significant relationship between all the above factors and liquidity. Another study by Alzoubi (2017) investigates 42 Islamic banks for the period of 2007 to 2014. Using panel data analysis, the results show that bank size has negative relationship with liquidity risk.

2.3.2.2 Net Interest margin

NIM measures the amount of interest income earning by the bank and the amount of interest paid to the depositor. Hamadi & Awdeh (2012) studied Lebanon commercial banks during 1996-2009 using panel data of 53 banks. The result shows a negative relationship between net interest margin and liquidity risk. If one increases the other one will decrease. Another study by Chen, Shen, Kao, & Yeh, (2018) investigate liquidity risk using net interest margin as independent variable along with other variables for the period 1994-2009 using two-stage least squares

(2SLS). The result shows that banks with higher liquidity risk will lead to an increase in the net interest margin. To my view, the result may have dome logic and increase in the net interest margin will lead to increase the risk in the banks. Therefore, an increase in the illiquid assets of the bank will lead to an increase in the net interest margin. Dovra (2013) examined the net interest margin determines and liquidity risk in Argentina. The result shows, there is a positive and significant relationship between both variables. Similar result was also reported by Hutapea & Kasri (2010). They compare the performance between both Islamic and conventional banks and the result shows that NIM has negative impact on the liquidity risk of Islamic bank and commercial bank. this indicate increase in the net interest margin will result to decrease in the liquidity risk of the bank.

2.3.2.3 Non-performing loan

A non-performing loan is a critical issue to banks. NPL refers to the amount of loan expected not to be paid or settled. Umar & Sun (2016) investigate the impact of NPL on liquidity risk of banks in China. The sample consists of 197 listed and unlisted Chinese banks, during the period 2005 to 2014. The finding shows that liquidity did not depend on the NPL. This means, there is no relationship between both and increase in NPL ratio will not impact the bank liquidity position.

Razak & Tazwar (2018) examine the relationships between the NPL and liquidity risk for the period of 2008 to 2017. The result shows, there is a direct relationship between liquidity and NPL. Any increase in the NPL there will be some increase in the liquidity risk.   . Addtioanlly, anohter study conducted by Riahi, (2019) examined the effect of NPL and liquidity risk. The result shows that the NPL gives impact on the liquidity risk in both Islamic and conventional banks. To the view of the researcher the result of the study may have some logic idea , because

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increase in the NPL will result to defult payment and bank acess to less cash. Therefore it will lead to the liquidity risk in the banking system. To conclude the research agree that NPL is one of the factors impacted the banks liquidity due to the logic relationshp between the varaibles and may this provde by parctial research.

2.3.2.4 Expenses to net income

Expenses to net income ratio provide the ratio of the percentage of the expenses of net income earned in a specific time. Almazari (2013), studied the relationship of cost to income ratio in Saudi banking system using liner regression model during 2007-2011. The result shows negative relationship between the cost-income ratio and profitability of the banking, which means increased in the cost ratio will decrease the bank profitability.

Mohammed (2015) studies the cost-income ratio to the liquidity and profitability for the sample of 29 banks in Bangladesh from 2009-2014. Using regression analysis, the result shows there is a significant relationship between cost-income ratios and liquidity risk. This means increase in one variable will lead to an increase in the other variable. Mathuva, (2009) studied the relationship of cost-income ratio in Kenya of commercial banks for the period of 1998 and 2007. Using regression analysis, the result shows an inverse relationship between the cost-income ratio and performance of the commercial bank in Kenya. This means an increase in cost-income ratio will decrease the performance of the company.

2.3.2.5 Inflation

Inflation refers to the movement in the of goods and services prices over a given duration and it can be referred also as the change in the money prices (Labonte,

2012). There are few studies with different results and views related to inflation and liquidity risk in the banking industry.

A study by Madhi (2017) related to the impact of the inflation to liquidity risk in the Albanian banking system over the period 2010-2014. The result shows there is absent of the impact of inflation to liquidity risk. A similar study was done by Hakimi (2017) in Tunisia and the result shows their relationship between inflation and liquidity is also insignificant.

Contrary to a study conducted by Singh & Sharma (2016) which investigated the relationship of inflation in Indian banking system over the period 2000-2013. The result shows significant impact of the inflation to the liquidity risk in the banking sector. Amin et al (2017) measured the impact of the inflation to the liquidity risk in the banking system which covered Islamic and conventional banks for the period from 1999 to 2013. The result shows that inflation has significant impact on the liquidity risk of both Islamic and commercial banks. Similar also for Horvath et al, (2014) which found a positive relationship between inflation and liquidity risk in the banking system. In the opinion of the researcher, inflation is positive relationship with the risk. Because, inflation increase the prices and customer will withdraw the money from the bank. The bank will face risk because the customer deposit withdrawal bank.

2.3.2.6 Gross Domestic Product

Gross domestic product is the total of all goods and services values produced in the country. However, all these goods and services must be produced in the country. GDP measures the economics condition and growth of the country in a specific time frame. Therefore, it is an important variable in measuring economic

performance. In the past, many studies are done to examine the relationship between liquidity risk of the banks and GDP.

Yaacob, Rahman, & Karim (2016) studied the determinant of liquidity risk in Malaysian banks from year 2000 until 2013. The result shows positive relationship between GDP and bank liquidity, which mean increase in the GDP will increase the liquidity in the banking system. A similar study conducted by Jaara, Jaara, Shamieh, & Fendi (2017) which test the correlation between liquidity risk and GDP for 204 banks in the Middle East and North Africa region, and South-Eastern Asian countries from year 2005 to 2012. The result shows significant relationship between both variables and Islamic banks have higher liquidity risk compare to the non-Islamic banks. in conclusion the relationship between GDP and liquidity risk seems to be positive because GDP will boost the economics of the country and increase the investment and the bank ability to meet the liquidity arise will arise because of the arise in the GDP.

2.3.2.7 Based lending rate

The interest rate or based lending rate is the cost of borrowing. The liquidity risk is inversely related to the interest rate. Any increase in the interest rate, it will increase the liquidity in the bank. Tran et al. (2019) studied the impact between the interest rate and the banking liquidity risk during the period 2010-2015 using OLS regression. The result revealed that interest rate has inverse relationship with the liquidity risk of commercial banks. Tabash (2018) examined the interest rate and the liquidity risk relationship for Italian banks during 2009 and 2017. The result shows positive relationship between the interest rate risk and the liquidity

risk in the banking sector. Not only liquidity risk but also the profitability of the bank will be changed with the change in the interest rate.

Beutler, Bichsel, Bruhin, & Danton's (2017) investigated the impact of interest rate and bank lending for 297 banks using panel data. The result shows that interest rate has a positive relationship with the liquidity risk of the banks.

2.3.3 The influence of loan on liquidity risk

The loan is the core business of the banks, and it is the source of funding for firms and households. Firm and household are complaining about the access of the loan while banks, complaining about the loss from a loan. Therefore, loan is considered one of the challenge matters to the banks. Loan can affect the bank liquidity risk, bank performance and credit risk in the banking sector.

Hasan et al. (2012) examined the effects of retail loans on performances of 27 European banks. The variables of the study are the loans, deposits and equity values. The result shows that retails loan has a negative impact on bank performance. Ahmed & Malik (2015), studied the credit term and bank performance in Pakistan for 157 managers from credit departments of banks. The result showed, there is a positive impact on the credit term and bank performance in Pakistan. Similarly, Roman & Sargu (2015) studied the impact of loan to the liquidity in CEE countries (Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania), using the data between 2004-2011. The finding shows, negative impact between loan and liquidity, which mean loan contribute to the liquidity risk of the banks.

Empirical study conducted by Lebbe & Rauf (2016) in Sri Lanka on the impact of loan to the bank profitability from the period 2005 to 2014 of the selected banks,.

Result shows, there is positive significant result among the two variables which are bank loan and bank profitability, however, bad loan performance will lead to low profitability in the banks.

2.3.3.1 Home financing influence on liquidity risk

Home financing is one type of loans provided by banks and the objective of home financing is providing people basic needs of life. However, individuals do not have enough cash to buy a house therefore, one of the ways to own a house is by taking loans from the bank. Home financing considered one of the main operating activities of the bank and is one of the major revenue to the bank (Razak & Tazwar, 2018).

There are some studies conducted related to mortgage financing and liquidity risk in banks. Bernanke (2018) studied the cause of financial crisis 2008 and the main factor of the GFC 2008 was home financing, due to the loan given without credit quality control. This led to liquidity risk and credit crunch. Therefore, the above study shows there is a connection between home financing and liquidity risk in the banking sectors. However, it is important to have a good credit rating before giving the loan, to avoid liquidity risk and financial crisis.

Liquidity and loan cannot be separated at any event where each one is connecting to other. Study done by Thiongo, Matata, & Simiyu (2016) on liquidity and loan in the US banking sector during the Global Financial Crisis in 2008. The result shows there positive impact of the loan to the liquidity risk. A similar study conducted by Abdulrehman & Nyamute (2018) examined the effect of mortgage financing to the bank performance and liquidity in Kenyan commercial banks for the period 2007-2016. The finding shows there is a significant relationship

between both mortgage financing and bank liquidity and bank performance. To conclude, an increase in the mortgage will lead to an increase in the performance of the bank due to the interest received from the borrowers. Due to the limited studies related to home financing and bank liquidity risk, this study aims to investigate of home financing effect on liquidity risk of Malaysian Islamic and commercial banks.

2.4 Summary of the chapter

Chapter two provides information related to liquidity risk. It explains the importance of liquidity risk and causes of the risk to the banking industry. It also explains some liquidity theory related to study and variables used in explaining the relationship with bank liquidity risk

CHAPTER THREE:

DATA AND METHODOLOGY

3.1 Introduction

This chapter discusses the research data and methodology. The discussion starts with the data collection and sampling, research framework, research model, hypothesis testing, followed by panel regression and diagnostic tests.

3.2 Data collection

This study is a quantitative study with unbalanced panel data which covered period of 15 years between year 2004 to 2018. Data on bank specific variables are collected from the yearly audited bank's financial statements. While macroeconomic data are downloaded from the Bank Negara Malaysia (BNM), intentional monitory funds (IMF) and World Bank website. There is a total of 24 banks selected to conduct the study which is a combination of 12 Islamic and 12 commercial banks used in this study. The bank selection is based on operation period data availability and housing loan availability of the banks.

3.3 Research framework

IV   **DV**
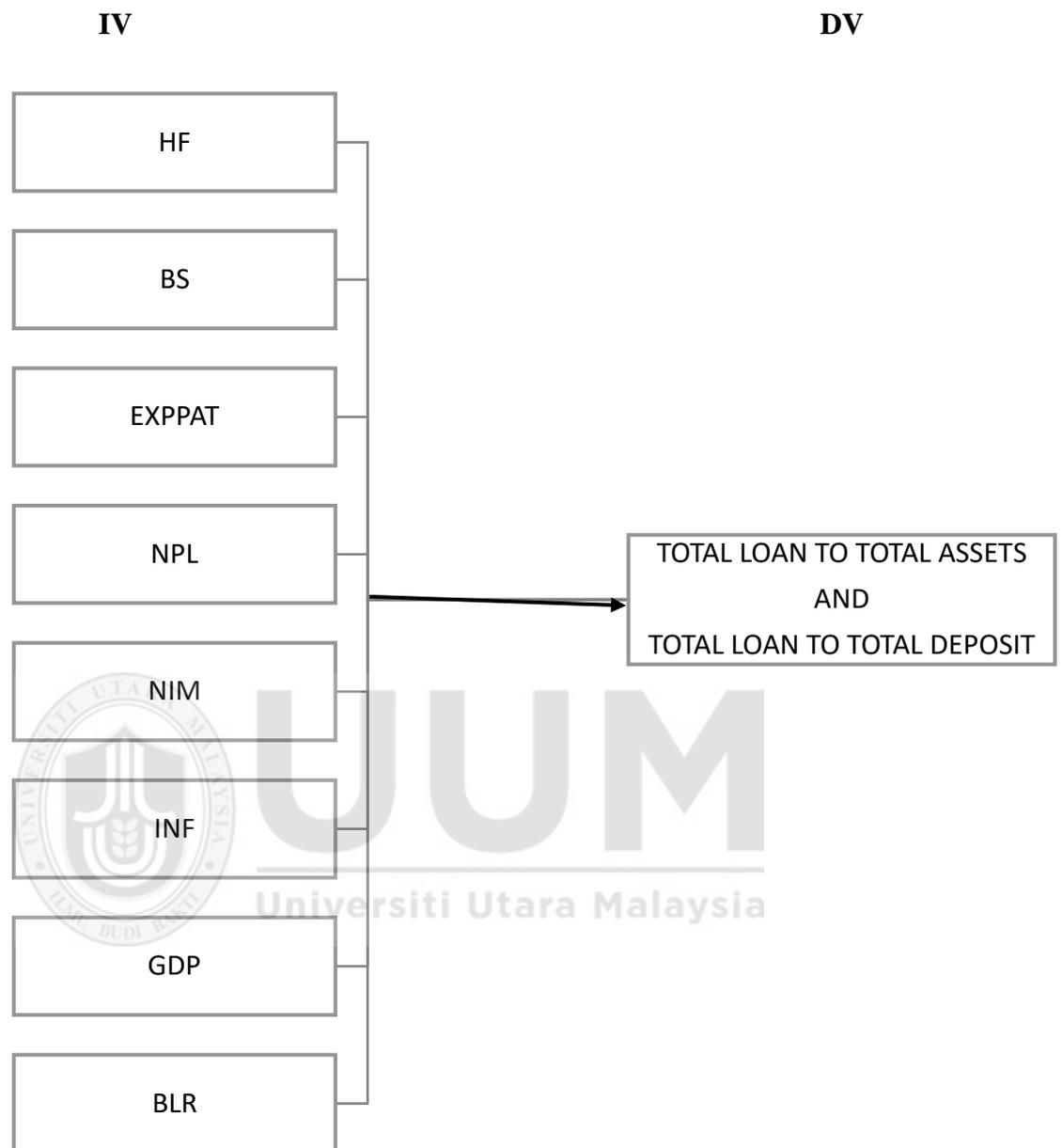
Note: HF= home financing, BS=bank size, EXPPAT = expense to net income ratio, NPL = Non-performing loan, NIM= net interest margin, INF= inflation, GDP gross domestic product, BLR, based lending rate.

Figure 3. 1 Conceptual Framework of the Study

This section explains the modelling of variables that determine the liquidity risk. This study examines the impact of home financing and other variables on liquidity risk of commercial and Islamic banks in Malaysia. Two dependant variables are used as proxy in measuring liquidity risk which are loan to total assets and loan to total deposit. Seven independent variables are classified into two groups where the first group is an internal factor which includes home financing, size of the bank, capital and return on equity. The second group is external factors which consist of inflation and GDP.

Summary of the independent variables

Name of Independent Variables	Definition
Housing Financing (HF)	Housing financing is the amount of money borrowed from the bank for the purpose of the construction and buying house.
Bank size (Size)	The size of the bank is defined as log of total assets.
Non-performing loan (NPL)	The amount of money borrowed and defaulted for certain periods (3 months/6months).
Expenses to net income ratio (EXPPAT)	It refers to expense over the income generated during that period of time.
Net interest margin (NIM)	This ratio measures the amount of profit gained from the investing activities and amount paid to the depositors.

Inflation rate (IFR)	Inflation means the increased and changes in the price of goods and services in the country. .
Gross domestic product (GDP)	It is an amount of goods and services value produced in the country. It measures the economics growth of the country in specific time frame
Based lending rate (BLR)	It is the lending rate and shows how much the cost of bank financing.

Table 3.3 Lists of Independent variables

3.4 Research Model

A panel regression model is applied to test the relationship between the DV and IV variables. The equation is shown below:

$$Y_1, Y_2 = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_1 X_1 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$$

whereby:

Y_1 = First DV of liquidity risk Total loan to total assets

Y_2 = Second DV of liquidity Total Loan to Total Deposit

α = Constant term- The Y intercept

β_i, = Regression coefficient variable which indicates the responsiveness of the dependent variable to the changes in i.

X_1 = Size of the bank measured by total assets.

X_2 = Net interest margin

X_3 = Non-performing loan

X_4 = Expense to net income ratio

X_5 = Home financing

X_6 = Inflation

X_7 = GDP

X_8 = BLR

3.5 Hypotheses development

The objective of this study is to measure the impact of selected variables on liquidity banks. Hypotheses testing show relationships between two or more variables expressed in the form of testable statements' (Sekaran & Bougie, 2013). Therefore, the following are general hypotheses related to the objectives of this study that need to be explored, which are:

H1 There is a significant positive relationship between home financing and liquidity risk in Malaysian Banks

H2 There is a significant positive relationship between the size of the bank and Liquidity risk in Malaysian banks

H3 There is a significant positive relationship between Non-performing loan and Liquidity risk in Malaysian Banks

H4 There is a significant positive relationship between Net interest margin and liquidity risk in Malaysian banks

H 5 There is a significant positive relationship between Expenses to profit after tax to Liquidity risk in Malaysian banks

H 6 There is a significant positive relationship between inflation and liquidity risk in Malaysian banks

H 7 There is a significant positive relationship between Gross domestic product and liquidity risk in Malaysian banks

H 8 There is a significant positive relationship between the based lending rate and liquidity risk in Malaysian banks.

3.6 Panel Regression

Panel data is multi-dimensional data involving measurements over time. One of the advantages of panel data in the analysis and according to Yaffee (2003) panel data measures the effect of some variables which cannot be tested by cross-sectional data and it allows the complicated model to be tested unlike other methods. The second advantage is the panel data is more accurate, more degree of freedom and more sample variability than cross-sectional (Hsiao, 2007).

Figure 3.2 explains the flow chart of the Panel data analysis is depicted. Panel data can be analysed through two models which are fixed effect and random effect. This method used in analysing the banking operation by many researchers (Asbeig and Kassim, 2015; Siaw, 2013; Cucinelli, 2013, Jedidia and Hamzah, 2015).
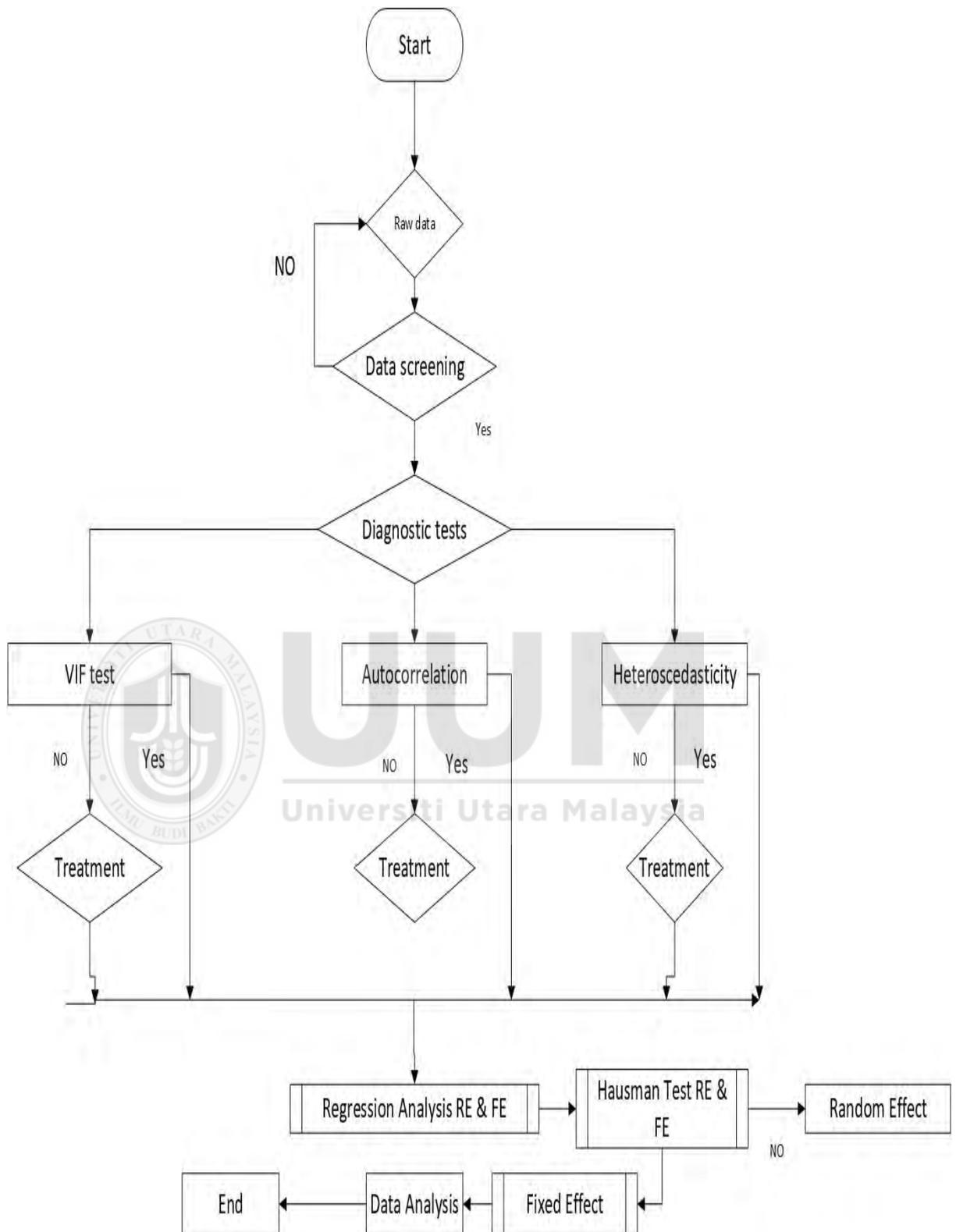
Figure 3. 2 data flow chart

The flow chart shows the process of data screening, validation and diagnostic

tests. The study also use Hauman test in deciding whether RE or FE is suitable

model. In this study, FE was preferred, and the analysis was further corrected for heteroscedasticity and autocorrelation with vce (robust) option.

3.7 Diagnostic test

This study tests for several diagnostic tests such as auto-correlation test and homoscedasticity test. These tests are necessary to achieve Best Linear Unbiased Estimator (BLUE) if there is minimum variance and the expected value is a true value (Gujarati, 2004).

3.7.1 Auto-correlation test

Auto-correlation refers to the correlation between the data over time. This applies to both time series and cross-section data. This test is important to study whether there is no auto-correlation problem in the model. If the result of the test is significant, the null hypothesis of autocorrelation will be rejected, and the problem of autocorrelation is presence (Hazra & Gogtay, 2017).

3.7.2 Heteroscedasticity test

A fundamental regression model requires that the error term in the regression function is homoscedastic or equal variance over all periods and locations. There is a homoscedastic problem if the variance is not equal or constant. If the result of the test is significant, the null hypothesis of homoscedasticity will be rejected, and the problem of heteroscedasticity is presence (Hazra & Gogtay, 2017).

3.7.3 Multicollinearity Test

Multicollinearity test measures variables to confirm the absence or existence of the multicollinearity problem. The tolerance levels between variables variance-inflation factor (VIF) need to be calculated. The tolerance value must be below the 0.10. VIF value on the other hand is the opposite of the tolerance value. When

VIF value is above 10 and it indicates the presence of multicollinearity problem (Pallant, 2007). Tabachnic and Fidell (2007) contend that the variance inflation factor (VIF) which is used to examine multicollinearity should not exceed 9.

CHAPTER FOUR:

FINDING AND DISCUSSION

4.1. Introduction

This chapter highlights results and discussion of the study. The first part discusses

the descriptive analysis of some variables that have impacts on liquidity risk of

Malaysian banks. The next section explains the regression result of panel data.

4.2. Descriptive analyses

Table 4.1 and 4.2 explain the descriptive analyses of selected variables of the

study.

Variables	Observation	Mean	Min	Max
LTA	174	0.5830	0.0116	0.9100
TLTD	174	0.994	0.0511	20.75
NIM	150	2.04	-6.18	4.57
NPL	172	2.23	0.10	24.92
HF	174	6,546,753	35,485	83,159,772
TA	174	22,227,489	838,956	225,215,061
EXPPAT	174	1.45	-5.598	12.281

Table 4. 1 Descriptive Statistics of Islamic banks

The liquidity risk which is measured by LTA shows average of 58% of the total

assets for Islamic banks. The average home financing for Islamic banks was

RM6.5 billion which the lowest was recorded by Citibank with RM35.4 million

and the highest was RM83 millions by Maybank Islamic. This also suggests that

there was a wide gap in the home financing base of Islamic banks being studied.

In addition, the size of Islamic banks was measured by their total assets and the

average size of Islamic banks was RM22,227,489, and with the minimum was

RM838,956 recorded by Affin Bank and the maximum was RM225,215,061 by

Maybank Islamic. Meanwhile expenses to net income ratio show an average of

1.45 with the minimum ratio was -5.59 and the maximum was 12.28. This indicates the wide gap of expenses to the net income ratio of Islamic banks.

Variables	Observation	Mean	Min	Max
LTA	170	0.70	0	7.36
TLTD	170	0.84	0	2.14
NIM	170	2.09	.83	7.05
NPL	166	2.27	.44	13.75
HF	165	22,386,668	3,248,631	89,027,872
TA	170	111,742,868	7,949,599	509,666,821
EXPPAT	170	0.87	-0.48	2.33

Table 4. 2 Descriptive statistics of conventional banks

The liquidity risk of the conventional banks shows an average of 0.70 and this shows the excess of deposit that bank can channel to customers as loans. The NPL has an overage of 2.27 and the minimum NPL was 0.44 and the maximum was 13.75. Meanwhile home financing shows an average of RM22,386,668 with the variation was between RM3,248,631 for Affin Bank and RM89,027,872 for Public Bank. This suggests that there was a wide gap in the home financing of conventional banks. The size of commercial banks show an average of RM111,742,868 and minimum size was RM7,949,599 by OCBC Bank and maximum of RM509,666,821 by Maybank. For expenses to net income ratio, the statistics show an average of 0.870 with the minimum of -0.487 and maximum of 2.33.

4.3 Trend Analysis

4.3.1 Total loan to total assets
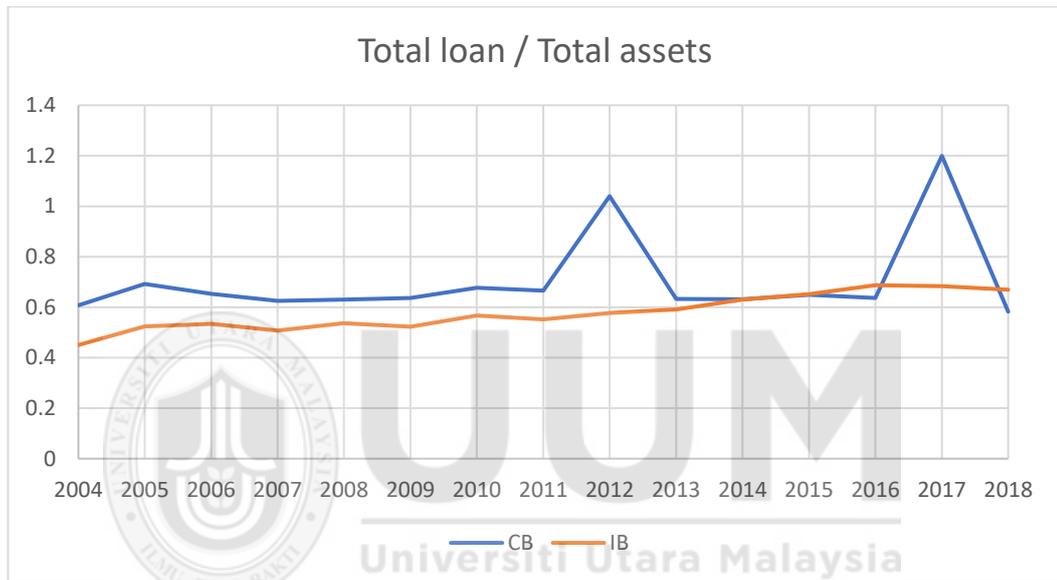
Figure 4. 1 Total loan to total assets

Figure 4.1 shows the ratio of total loan total assets and it can be seen that the conventional banks experienced higher ratio than Islamic banks in most of the years. For conventional banks there were a decreased in 2007 by 0.50 and an increased in 2018 by 0.53. This was due to the changes in the loan amount during the financial crisis 2009 and loan was the main cause of the crisis as mentioned by the analyst.

4.3.2 Total loan to total deposit
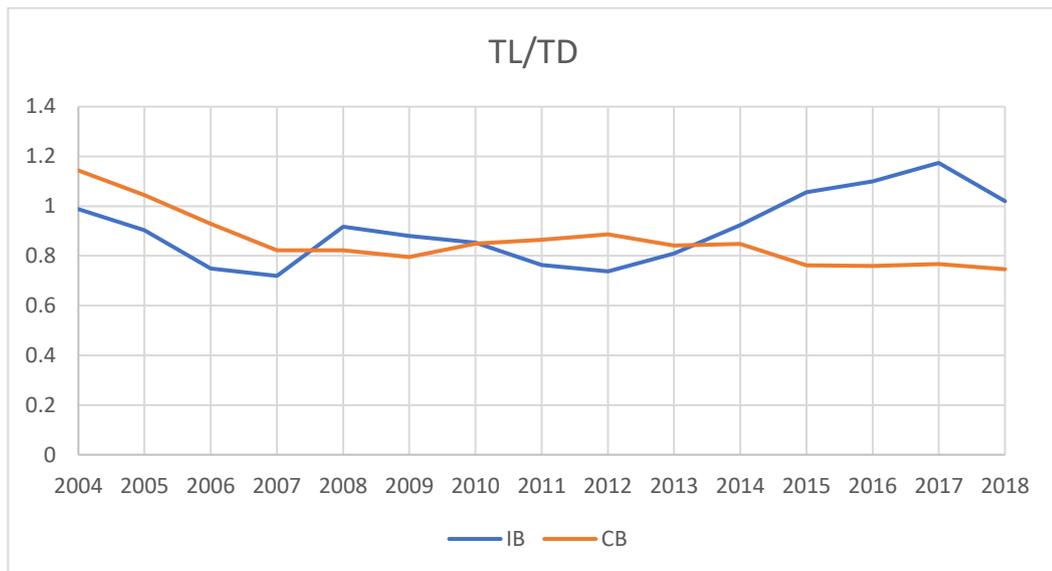
Figure 4. 2 total loan to total deposit

The above graph shows the trend of the ratio total loan to total deposit of commercial and Islamic banks in Malaysia for year 2004-2018. Commercial banks recorded high ratio compared to the Islamic banks for period of 2004-2008. During financial crisis from 2008 to 2010, Islamic banks recorded a higher ratio and this shows the Islamic bank's survival compare to the commercial banks during the crisis. After that period, commercial banks recovered from the crisis and maintained a higher ratio.

4.3.3 Home financing
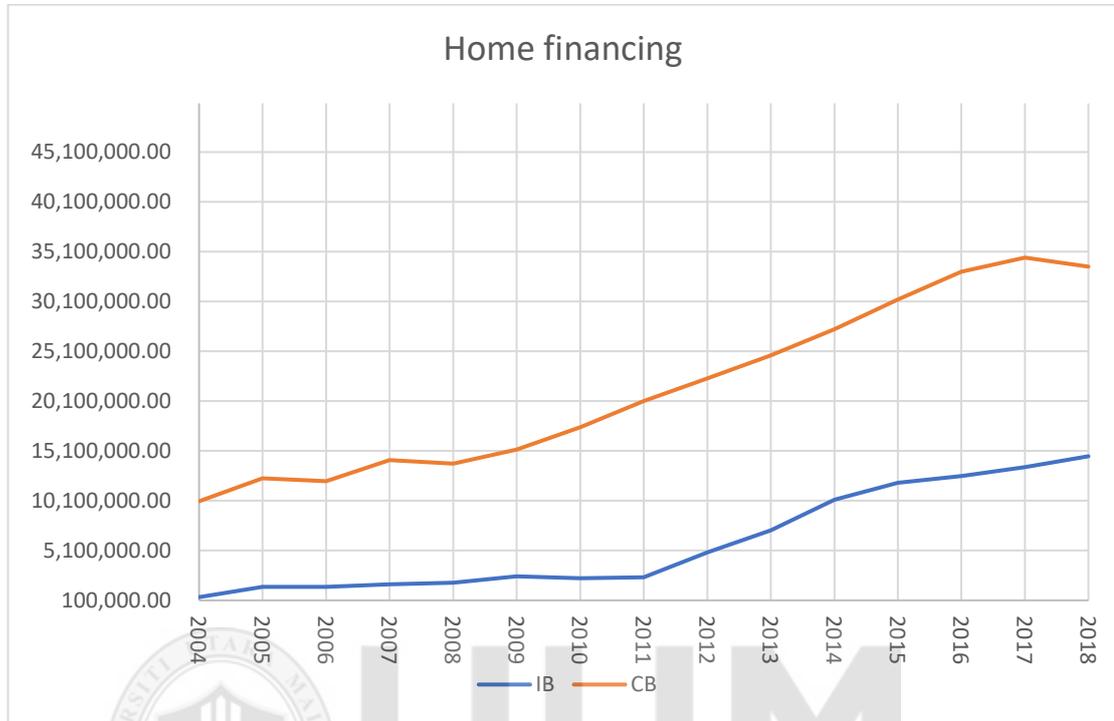
Figure 4. 3 Home Financing of Conventional and Islamic Banks

Figure 4.3 shows the total home financing of conventional and Islamic banks in Malaysia. It can be seen that conventional banks have higher home financing for all periods. For Islamic banks there was a decline in financing in 2011 and for conventional banks the decline was in 2008 due to the global financial crisis.

4.4. Diagnostic Tests

Diagnostic tests are tests for accuracy measurement of the data and this study applies Variance Inflation Factor (VIF), Wald Test for Heteroscedasticity and autocorrelation test.

4.4.1. Variance Inflation Factor (VIF).

Since the study separated the analysis of the result of different banks, two separated results of VIF were shown in the following tables. The result of VIF for

commercial banks was 1.70 and this indicates that is no serious multicollinearity

problem in the variables of the study.

Variance Inflation Factor		
Variables	VIF	1/VIF
BLR	2.83	0.3528
HF	2.29	0.4359
NPL	1.65	0.6394
INF	1.52	0.6565
GDP	1.47	0.6782
EXPAT	1.40	0.7130
TA	1.39	0.7177
NIM	1.08	0.9258
Mean VIF	1.70	

Table 4. 3 Result of VIF for commercial banks

Table 4.3 shows the VIF for the Islamic banks where the mean of VIF is 1.57 and

this indicates no serious multicollinearity problem for variables used in the study.

Variance Inflation Factor		
Variables	VIF	1/VIF
BL	2.54	0.3933
HF	1.98	0.5059
NPL	1.73	0.5788
INF	1.61	0.6221
GDP	1.33	0.7513
EXPAT	1.18	0.8442
TA	1.11	0.9040
NIM	1.07	0.9366
Mean VIF	1.57	

Table 4. 4 Result of VIF for Islamic Banks

4.4.2. Wald Test for Heteroscedasticity

The tests for heteroscedasticity were conducted for both conventional and Islamic

banks. The results of the Islamic banks were $X^2 = 404.85$ and P-value $X^2 = 0.0000$.

This indicates the presence of heteroscedasticity problem for Islamic banks. The

same conclusion also can be deduced from the conventional banks ($X^2 = 306.80$ and P-value $X^2 = 0.0000$).

4.4.3 Autocorrelation test

The autocorrelation test is referring to the correlation of the value with the same value. The autocorrelation test conducted for both Islamic and conventional banks. The result of autocorrelation for conventional bank are F = 40.136 and P > 0.0001. As for Islamic banks the results are F = 37.277 and P > 0.0001. Both results indicate the presence of autocorrelation problems.

	INTA	INHF	NPL	NIM	EXPPAT	INF	GDP	BLR
INTA	1.0000							
INHF	0 .3703	1.0000						
EXPAT	0.3967	0.1350	1.0000					
NPL	-0.3065	-0.4417	-0.4077	1.0000				
NIM	0.1863	-0.1765	-0.0235	0.0261	1.0000			
INF	-0.0471	-0.0091	0.0457	0.0703	-0.0376	1.0000		
GDP	-0.0206	0.0524	0.0652	0.1445	0.0152	0.3416	1.0000	
BLR	0.2075	0.5663	0.0935	-0.1316	-0.1880	0.4733	0.4720	1.0000

Table 4. 5 Result of autocorrelation for Islamic banks

As above the problem of autocorrelation and heteroscedasticity need to be solved, therefore, to solve both autocorrelation and heteroscedasticity problem we used a robust method to solve both.

	INTA	INHF	NPL	NIM	EXPPAT	INF	GDP	BLR
INTA	1.0000							
INHF	0.4721	1.0000						
EXPAT	0.0709	0.1717	1.0000					
NPL	0.0002	-0.2885	0.0150	1.0000				
NIM	0.0499	0.0756	0.0754	-0.1537	1.0000			
INF	-0.0613	-0.1577	-0.1449	0.0011	-0.1815	1.0000		
GDP	0.0348	0.0755	-0.1154	0.0148	0.0631	0.3905	1.0000	
BLR	0.2162	0.4027	-0.0670	-0.1829	-0.0775	0.5013	0.5602	1.0000

Table 4. 6 Result of autocorrelation for commercial Banks

4.5. Fixed and Random test model

For the purpose of study, two panel data models which are Fixed Effect Model (FEM) and Random Effect Model (REM) have been applied. Based on the results in the Appendices (Appendix 9 and Appendix 10). In the study According the Haussman test of the study. it shows that Fixed effect model (FEM) is more prominent than Random effect model (REM).

4.6. Regression panel

This section highlighted the result of the panel regression of the home financing and other variables to liquidity risk on Malaysian Islamic and commercial banks.

4.6.1 Regression result: Commercial Banks

There are eight selected independent variables in the study. Five of the variables are specific or internal bank variable and the rest are external or macroeconomics variables. The table below provides the result of the panel regression of Commercial bank for the first dependent variable Total loan to Total Assets and total loan to total deposit

	CB	
	TLTA	TLTD
Con	8.5736	3.4607
	(0.149)	(0.142)
Bank Specific		
INTA	-1.999***	0.1218**
	(0.001)	(0.035)
HF	1.693**	-0.2800
	(0.017)	(0.100)
EXPPAT	0.5143	0.2684**
	(0.101)	(0.026)
NPL	-.0317	0.0115
	(0.514)	(0.362)
NIM	-0.1194	-.0410
	(0.317)	(0.178)
Macro-level		
INF	-0.0360	-0.0052
	(0.143)	(0.454)

GDP	-0.0001	.0152*
	0.9931	(0.056)
BLR	0.0369	-0.0618
	(0.702)	(0.271)
obs	160	160
R Squared	0.1340	0.0196
Prob F	0.0248	0.0087
Model	FE	FE
Heteroskedasticity	(0.0000)	(0.0000)
Autocorrelation	(0.0001)	(0.0000)

CB: conventional banks, TLTA total loan to total assets, TLTD total loan to total deposit INTA lagged log total asset, HF lagged log home financing, EXPPAT expense to net income, NPL non-performing loan, NIM net interest margin, INF inflation, GDP gross domestic product, BLR based lending rate P values are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p < 0.1$.

Table 4. 7 regression result commercial Bank

Table 4.7 presents the regression results of several independent variables which are home loan measures, bank-specific variables and macroeconomic variables on total loan to total assets and total loan to total deposit in commercial banks The results of F statistics in Table 4.7 are significant at 10% level of confidence in all models and these indicate the existence of relationship between the set of independent variables and on total loan to total assets and total loan to total deposit. R squared is important measure which indicate the variance in the dependent variable is counited by the offered predicator in the model. The R squared is 0.1340 which means that 13.4% of the variance explained by the combination of the dependent variables therefore it is acceptable result to the study.

 The result of total loan to total assets and total loan to total deposit with independent variables regression shows both are not significant in both models. The table also reports on the impact of bank-specific variables and macroeconomic variables on TLTA and TLTD.

The first DV shows that home financing is significant with the total loan to total assets with the coefficient value of 1.693. The positive result indicates home

financing affects the liquidity risk in commercial banks. Home financing however is not significant with the total loan to the total deposit.

Other variables size of the banks has a negative significant result to total loan to total assets at the coefficient value of -1.999. This means a larger bank tend to experience lower liquidity risk. The size of the bank with total loan total deposit has positive significant relation at level 5%, which means the larger bank expose to more liquidity risk compare to small size banks. which are similar to the conclusions made by (Amin, Mohamad, & Shah, 2017) and (Terraza, 2015).

On the other hand, NPL, NML, EXPPAT, tend not to have a relation with total loan to total assets and total loan to the total deposit. Only EXPPAT has a positive relationship with the loan to total deposit at the level of 10%. This similar to the conclusion made by (Umar & Sun, 2016), (Mathuva, 2009)and contradict with studies (Dovran, 2013), (Razak & Tazwar, 2018), (Amin et al., 2017)

Macroeconomics variables inflation and based lending rate tend to not have a relationship with both Independent variables, while GDP tends not to have a relationship with the first dependent variable and have positive and significant at level 10% with the second DV. This means an increase in inflation will increase liquidity risk in commercial banks. The study supported by (Singh & Sharma, 2016), (Amin et al., 2017) and conflict with the studies (Madhi, 2017) and (Tran et al., 2019). While the other Macroeconomics variables GPD and BLR have an insignificant relationship to liquidity risk in an Islamic bank, the result of the study supported by (Berger & Sedunov, 2016), (Beutler et al., 2017) and (Trenca et al.,2015)

4.6.2 Regression Result: Islamic banks

This section explains the home financing and other factors' impact on liquidity risk of Islamic banks in Malaysia The below table shows the relationship between the home financing and others variables on liquidity risk measured by total loan to total assets and total loan to the total deposit.

	IB	
	TLTA	TLTD
con	0.2342	-0.6461
	(0.661)	(0.603)
Bank Specific		
INTA	-0.0907*	-0.1006
	(0.079)	(0.411)
HF	0.1181***	0.1961
	(0.005)	(0.100)
EXPPAT	0.0103	0.0631
	(0.206)	(0.125)
NPL	0.0004	0.0163
	(0.901)	(0.146)
NIM	-0.0026	0.0215
	(0.883)	(0.628)
Macro-level		
INF	0.0085*	0.0515*
	(0.081)	(0.066)
GDP	0.0011	-0.0190
	(0.685)	(0.192)
obs	150	150
R Squared	0.0553	0.0706
Prob F	0.0000	0.0002
Model	FE	FE
Heteroskedasticity	(0.0000)	(0.0000)
Autocorrelation	(0.0001)	(0.0224)

IB: Islamic banks, TLTA total loan to total assets, TLTD total loan to total deposit INTA lagged log total asset, HF lagged log home financing, EXPPAT expense to net income, NPL non-performing loan, NIM net interest margin, INF inflation, GDP gross domestic product, P values are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p < 0.1$

Table 4. 8 regression result of Islamic Bank

Table 4.8 show the regression analysis of the Islamic bank related to total loan total assets and total loan to the total deposit. The bank-specific and macroeconomic variables, the result is similar to table 4.7 Table 4.8. The results

of F statistics in Table 4.8 are significant at 10% level of confidence in all models and these indicate the existence of the relationship between the set of independent variables and on total loan to total assets and total loan to the total deposit. The result of total loan to total assets and total loan to total deposit with independent variables regression shows both are not significant in the models, which mean no effect on each other R squared is important measure which indicate the variance in the dependent variable is counited by the offered predicator in the model. The R squared is 0.0553which means that 5.5% of the variance explained by the combination of the dependent variables therefore it is acceptable result to the study.

The relationship between the home financing and liquidity risk measured by total loan to total assets is positive and significant at the level of 1%. This shows an increase in home financing will tend to increase in the liquidity risk of Islamic banks. This result supported by (Berger & Sedunov, 2016), (Beutler et al., 2017) and (Trenca et al.,2015). While home financing to the liquidity risk measured by total loan to total deposit has an insignificant relation on Islamic banks.

Size of the bank measured by the natural logarithm of total assets. The bank size has a negative significant at level 10% with the liquidity risk of Islamic bank, which mean both variables go inversely to each other the large bank exposed to less liquidity risk and this result is in line with (Amin, Mohamad, & Shah, 2017) and (Terraza, 2015). On the other hand, the study contradicts the study (Shamas, Zainol, & Zainol, 2018).

As for NPL, NIM and EXPPAT there are insignificant relationship with the liquidity risk measured by total loan to total assets and total loan to total deposit.

This is supported views of (Umar & Sun, 2016), (Mathuva, 2009) and contradict with studies of (Dovran, 2013), (Razak & Tazwar, 2018) and (Amin et al., 2017).

In addition, inflation tends to have positive and significant impact on the liquidity risk in Islamic banks at level 10%. This indicates the increase in inflation will increase the risk in Islamic banks. The study is in line with the views of (Singh & Sharma, 2016), (Amin et al., 2017) and conflict with the studies of (Madhi, 2017) and (Tran et al., 2019).

CHAPTER FIVE:

CONCLUSION AND RECOMMENDATION

5.1 Introduction

The focus of this study is to examine the impact of home financing and other variables on liquidity risk of the banking industry in Malaysia. This chapter presents the main finding and the contribution of the study to the managerial level, policymaker, and other relevant organization. Additionally, the limitation of the study and future research recommendations also will be highlighted.

5.2 Summary of the findings

Despite the differences between the Islamic and conventional bank operations, but not much difference was reported in the finding. The objective of this study is to analyze the impact of home financing and other factors on the liquidity risk of both Islamic and commercial banks. The result shows that home financing influence positively liquidity risk in both Islamic and commercial banks in Malaysia. The result supported by relevant theories and literatures.

Mismatch theory is one of the supported theories of the result. The mismatch is between the asset and liabilities of the banks. Whereby banks offer long term housing loans and borrow for short term from the depositor. Therefore, unexpected withdrawal from depositors will cause a liquidity risk to the bank. Another theory which is shiftability theory, where banks are able to sell the loan to others bank to meet the requirement of the bank liquidity. This theory considers loan as long-term loan which take more than one year to repay the loan and loan is major cause of the liquidity risk.

Bernanke, (2018) opined that liquidity risk is the main cause of many financial crisesand home financing or mortgage financing was the main reason behind the liquidity risk of the 2008 Global Financial Crisis. Therefore, the above study shows there is a connection between home financing and liquidity risk in the banking sectors. However, it is important to have a good credit rating before giving the loan, to avoid liquidity risk and financial crisis. Abdulrehman & Nyamute (2018) examine the effect of mortgage financing to the bank performance and liquidity in Kenyan commercial banks, during the period 2007-2016. The study confirmed the impact of home financing to the liquidity risk in the banks.

Bank size tends to be one of the determinants of liquidity risk in Islamic and commercial banks in Malaysia. The negative relationship between bank size and liquidity risk, in line with the concept too big to fail, which mean larger bank have less chance of facing the liquidity risk and due to the huge among of deposit from the customer. Alzoubi (2017) stated in his study on 42 Islamic banks that bank size has a negative relationship with liquidity risk. Similar result is also found in Lastuvkova (2016) where significant relationship between bank size and liquidity risk is found in the bank. This proves the concept of too big to fail which means the bigger bank will not face liquidity risk.

The ratio of expense to net income is significant relationship with the second dependent variables conventional banks. A positive relationship means that the increase in expenses to net income ratio led to the increase in the liquidity risk of commercial banks. It is an acceptable concept due to the logic fact any increase in the expense will reduce the profit, therefore, the bank will face the liquidity risk Mohammed (2015) studies the cost-income ratio to the liquidity and profitability

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in Bangladeshi banks for the period of 2009-2014. Using regression analysis, the result show there is a significant relationship between cost-income ratios and liquidity risk. This means increase in one variable will lead to an increase in the other variable.

In addition, inflation shows positive and significant relations with Islamic banks. The result describes that increase in the inflation rate will increase the liquidity risk in Islamic Banks. This is because depositor tends to withdrawal money to meet the increases in the prices of the goods (Labonte, 2012). The study supported by Singh & Sharma (2016), where they found significant effect of inflation on the liquidity risk in the banking sector in India. In addition, Horvath et al. (2014) also found a positive relationship between inflation and liquidity risk in the banking system.

5.3 Contributions to the study

The study contributes to the body of knowledge on liquidity risk in the Malaysian banking system.

Theoretically, it provides a significant contribution of the loan (in this study home financing) to bank liquidity risk. It gives more attention to home financing from the bank or loan department. This is in line with the theory of mismatch assets and liabilities. It helps bank to implement a new strategy for home financing to prevent the mismatch problem and liquidity risk and try to suggest what mention by shiftability theory sell the loan to another bank on a cash basis to meet the liquidity requirement to the bank. In addition, it helps the bank to balance between the income or assets and short-term liabilities of the bank to avoid the risk occurrence. Lastly, bank should implement the theory which is applicable to the loan and

liquidity risk to minimize the risk in the bank such as mismatch, shiftability and intermediation theory, put all the mention theory into practice to avoid and prevent the liquidity risk in the bank which may cause the failure of the bank.

Empirically, this study investigates the impact of both internal and external factors on liquidity risk in a Malaysian bank. Loan to total assets (LTA) and loan to deposit ratio (LTD) are found to have a significant relationship with internal and external factors risk. Many empirical studies found some of the variables have a significant relation with the liquidity risk.

Home financing has significant relation with the liquidity risk in Islamic and commercial banks. Bernanke, (2018) studied the cause of financial crisis 2008 and the main factor of the GFC 2008 was home financing loans are given without credit quality control and this led to liquidity risk and credit crunch. Therefore, the above study shows there is a connection between home financing and liquidity risk in the banking sectors. Terraza, (2015) found that bank liquidity depends on the bank size which means a bigger bank is good liquidity sound compare to smaller banks.

Inflation shows positive and significant relationship with the Islamic banks. The result describes that increase in the inflation rate will increase the liquidity risk in Islamic banks. Inflation has a positive relationship with the liquidity risk measured by total loan to a total deposit of commercial banks. This is because depositor tends to withdrawal money to meet the increases in the prices of the goods.

Practically, this study provides information for Malaysian banks to manage the risk efficiently especially in the Asset and Liability Management (ALM). Banks need to balance between their assets and liabilities so that the objective of banks

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in maximizing return and minimizing risk can be achieved. Also, the policy-maker such as Central bank implements policy to avoid risk or implement a contingency funding plan (CFP) for the banks that faced the liquidity risk and provide them with the framework a strategy to overcome the risks in the bank and update and upgrade the policy that, guarantees the bank operation is powerful. For instance, Liquidity Coverage Ratio (LCR) control short term liquidity risk Liquidity outflows must be less than liquidity inflows to balance between the outflow's liquidity and the inflows during the short term. And play contingency measurement.

5.4 Limitation of the study

This study has some limitations which limit the scope and it's a contribution. Among them

1. Data limitation: in this study the data is limited data for Islamic banks and conventional banks. The total observation used for Islamic banks is about 150 and for commercial banks is about 160 observations. This due to the availability of bank statement and not in line with the study period. It is considered as sufficient but to make more efficient to increase the number of observation and data with more number of banks, but as mention earlier, only limited bank statement available and not in line with the study period.

2. Measurement of liquidity risk: it is hard to calculate liquidity risk due to the limitation of data available in the income statements and statement of financial position. Normally liquidity can be calculated by current assets divided by current liabilities, but banks financial statements are different from companies whereby bank

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does not have inventories and receivable, therefore it is hard to calculate the liquidity risk of banks. Therefore, it is limited to loan to assets and loan and deposits.

Therefore, it is recommended:

1. To do depth study by comparing different countries which are adopting the Islamic and conventional banks, to see more in-depth the causes of the liquidity risk in the banking system from different countries. It is also recommended to include all the banks in Malaysia both Islamic and conventional systems.

2. To expand research by using a combination of both primary and secondary data. This basically to finding between the practical things and number from annual reports in relation to the liquidity risk banking sector.

3. Further research needs to include more variables to the liquidity risk such as profitability, credit, and effect, to enhance the study knowledge and information provided to the users. This important, to know more about the liquidity risk and operation in the banking system.

4. To expand the research to other types of loans such as vehicle loans and credit cards; not only for home financing in order to measure the impact of different types of loans to the liquidity risk of the banking system in Malaysia.

5.5 Conclusion

In overall, the importance of liquidity risk management in Islamic banks can no longer be ignored. The emphasis being placed on it after the last financial crisis demonstrate its significance. This study contributes to the empirical evidence of the significance of liquidity risk in Malaysian banking system. It has also shown the evidence of link between liquidity risk and home financing in Malaysia banks.

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Appendixes

Appendix 1: List of Commercial banks in Malaysia

No	Bank Name	Total assets	Ownership
	Affin Bank Berhad	49,130,609	Local
	Alliance Bank Malaysia Berhad	42,816,618	Local
	AmBank (M) Berhad	11,000,480	Local
	BNP Paribas Malaysia Berhad	2,040,836	Foreign
	Bangkok Bank Berhad	5,480,894	Foreign
	Bank of America Malaysia Berhad	4,460,698	Foreign
	Bank of China (Malaysia) Berhad	13,269,852	Foreign
	CIMB Bank Berhad	321,935,304	Local
	China Construction Bank (Malaysia) Berhad	4,390,178	Foreign
	Citibank Berhad	38,556,867	Foreign
	Deutsche Bank (Malaysia) Berhad	9,354,785	Foreign
	HSBC Bank Malaysia Berhad	65,727,435	Foreign
	Hong Leong Bank Berhad	169,111,037	Local
	India International Bank (Malaysia) Berhad	462,131	Foreign
	Industrial and Commercial Bank of China (Malaysia) Berhad	4,829,695	Foreign
	J.P. Morgan Chase Bank Berhad	2,622,532	Foreign
	MUFG Bank (Malaysia) Berhad	28,619,585	Foreign
	Malayan Banking Berhad	456,613,298	Local
	Mizuho Bank (Malaysia) Berhad	8,300,030	Foreign
	OCBC Bank (Malaysia) Berhad	269,856,092	Foreign
	Public Bank Berhad	331,786,540	Local
	RHB Bank Berhad	181,043,287	Local
	Standard Chartered Bank Malaysia Berhad	40,451,289	Foreign
	Sumitomo Mitsui Banking Corporation Malaysia Berhad	17,109,395	Foreign
	The Bank of Nova Scotia Berhad	1,634,287	Foreign
	United Overseas Bank (Malaysia) Bhd.	112,982,714	Foreign

Appendix 2 List of Islamic Banks in Malaysia

No	Bank Name	Total assets as FY 2018 ,0000	Ownership
1.	Affin Islamic Bank Berhad	49,130,609	Local
2.	Alliance Islamic B ank Berhad	9,893.40	Local
3.	AmBank Islamic Berhad	36,536.40	Local
4.	Bank Islam Malaysia Berhad	63,938,893	Local
5.	Bank Muamalat Malaysia Berhad	23,946,561	Local
6.	CIMB Islamic Bank Berhad	97,513,968	Local
7.	Hong Leong Islamic Bank Berhad	31,421,540	Local
8.	Maybank Islamic Berhad	181,794.60	Local
9.	Public Islamic Bank Berhad	62,173,912	Local
10.	RHB Islamic Bank Berhad	181,043,287	Local
11.	Al Rajhi Banking & Investment Corporation (Malaysia) Berhad	7,578,502	Foreign
12.	HSBC Amanah Malaysia Berhad	20,349,355	Foreign
13.	Kuwait Finance House (Malaysia) Berhad	9,292,211	Foreign
14.	MBSB Bank Berhad	7,292,054	Foreign
15.	OCBC Al-Amin Bank Berhad	15,873,344	Foreign
16.	Standard Chartered Saadiq Berhad	7,859,855	Foreign

Appendix 3: List of Study selected banks.

Number	Islamic Bank name	Conventional bank Name
1.	Affin Islamic Bank Berhad	Affin Bank Berhad
2.	Alliance Islamic Bank Berhad	Alliance Bank Malaysia Berhad
3.	Bank Islam Malaysia Berhad	CIMB bank berhad

4.	Bank Muamalat Malaysia Berhad	Citibank Berhad
5.	Citi Bank Islamic Berhad	Hong Leong Bank Berhad
6.	Hong Leong Islamic Bank Berhad	HSBC Bank Malaysia Berhad
7.	HSBC Amanah Malaysia Berhad	Malayan Banking Berhad
8.	Maybank Islamic Berhad	OCBC Bank (Malaysia) Berhad
9.	OCBC Al-Amin Bank Berhad	Public Bank Berhad
10.	Public Islamic Bank Berhad	RHB Bank Berhad
11.	RHB Islamic Bank Berhad	Standard Chartered Bank Malaysia Berhad
12.	Standard Chartered Saadiq Berhad	United Overseas Bank (Malaysia) Bhd.

Appendix 4: Hausman test Islamic Banks.

```
hausman fe

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |      fe            .           Difference          S.E.
-------------+----------------------------------------------------------------
       lnta  |   -.0907375      .0284426        -.1191801        .0241183
      lnhfi  |    .118129       .0505148         .0676142        .0122892
     exppat  |    .0103354      .0072757         .0030597             .
        npl  |    .0004914      .0007263        -.000235              .
        nim  |   -.0026903      .0022884        -.0049787             .
        inf  |    .0085056      .0091186        -.000613              .
        gdp  |    .0011302      .0012704        -.0001402             .
        blr  |    .0119362      .0018852         .010051              .
-------------------------------------------------------------------------------
                    b = consistent under Ho and Ha; obtained from xtreg
         B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

                chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =        22.09
              Prob>chi2 =       0.0047
              (V_b-V_B is not positive definite)
```

Appendix 5: Hausman test Conventional Banks

```
hausman fe

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |      fe            .           Difference          S.E.
-------------+----------------------------------------------------------------
       lnta  |   -1.999077     -1.196484        -.8025929             .
       lhfi  |    1.693392      1.167874         .5255186             .
     exppat  |    .5143851      .5114825         .0029026             .
        npl  |   -.0317408     -.006866         -.0248748             .
        nim  |   -.1194799     -.1009103        -.0185695             .
        inf  |   -.0360169     -.0147756        -.0212413             .
        gdp  |   -.0000983      .0054378        -.005536              .
        blr  |    .0369144     -.0579538         .0948683             .
```

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```
--------------------------------------------------------------------------------
                        b = consistent under Ho and Ha; obtained from xtreg
             B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =    11271.46
               Prob>chi2 =      0.0000
               (V_b-V_B is not positive definite)
```

Appendix 6: Serial correlation Islamic banks

```
xtserial lta lnta lnhfi exppat npl nim inf gdp blr

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      11) =    37.277
           Prob > F =     0.0001
```

Appendix 7: Serial correlation Conventional Banks

```
. xtserial lta lnta lhfi exppat npl nim inf gdp blr

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      11) =    40.136
           Prob > F =     0.0001
```

Appendix 8: Heteroscedasticity Islamic banks

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (12) =    404.85
Prob>chi2 =      0.0000
```

Appendix 9: Heteroscedasticity Conventional banks

```
xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (12) =    306.80
Prob>chi2 =      0.0000
```

Appendix 10: Robust test Islamic Banks

```
xtreg lta lnta lnhfi exppat npl nim inf gdp blr, fe robust

Fixed-effects (within) regression          Number of obs     =       150
Group variable: code                       Number of groups  =        12
```

```
R-sq:  within  = 0.3470                          Obs per group: min =        10
       between = 0.4927                                         avg =      12.5
       overall = 0.0553                                         max =        13

                                                 F(8,11)             =      16.47
corr(u_i, Xb)  = -0.7133                          Prob > F            =     0.0000

                                      (Std. Err. adjusted for 12 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         lta |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lnta | -.0907375   .0467893    -1.94   0.079     -.19372     .012245
       lnhfi |   .118129   .0338901     3.49   0.005    .0435374    .1927206
      exppat |  .0103354     .00769     1.34   0.206   -.0065901    .0272609
         npl |  .0004914   .0038659     0.13   0.901   -.0080173    .0090001
         nim | -.0026903   .0178664    -0.15   0.883    -.042014    .0366334
         inf |  .0085056    .004434     1.92   0.081   -.0012537    .0182648
         gdp |  .0011302   .0027122     0.42   0.685   -.0048394    .0070998
         blr |  .0119362   .0336373     0.35   0.729    -.062099    .0859713
       _cons |  .2342274   .5200393     0.45   0.661   -.9103713    1.378826
-------------+----------------------------------------------------------------
     sigma_u |  .21168251
     sigma_e |  .09194132
         rho |  .84129218   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 11: Robust test Conventional Banks

```
. xtreg lta lnta lhfi exppat npl nim inf gdp blr, fe robust

Fixed-effects (within) regression               Number of obs      =       160
Group variable: code                            Number of groups   =        12

R-sq:  within  = 0.7035                          Obs per group: min =        11
       between = 0.0477                                         avg =      13.3
       overall = 0.1340                                         max =        15

                                                 F(8,11)             =       3.67
corr(u_i, Xb)  = -0.9131                          Prob > F            =     0.0248

                                      (Std. Err. adjusted for 12 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         lta |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lnta | -1.999077   .4446693    -4.50   0.001   -2.977788   -1.020366
        lhfi |  1.693392   .6026284     2.81   0.017    .3670162    3.019768
      exppat |  .5143851   .2878284     1.79   0.101   -.1191209    1.147891
         npl | -.0317408   .0470957    -0.67   0.514   -.1353977    .0719162
         nim | -.1194799   .1139565    -1.05   0.317   -.3702963    .1313366
         inf | -.0360169   .0228593    -1.58   0.143   -.0863298     .014296
         gdp | -.0000983   .0103571    -0.01   0.993    -.022894    .0226975
         blr |  .0369144    .094064     0.39   0.702   -.1701191     .243948
       _cons |  8.573688   5.522461     1.55   0.149   -3.581165    20.72854
-------------+----------------------------------------------------------------
     sigma_u |  1.3921767
     sigma_e |  .38992593
         rho |  .92725942   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 12: Fixed Effect model result of commercial banks
Total Loan to Total assets

```
xtreg lta lnta lhfi exppat npl nim inf gdp blr, fe

Fixed-effects (within) regression               Number of obs      =       160
Group variable: code                            Number of groups   =        12

R-sq:  within  = 0.7035                          Obs per group: min =        11
```

```
                    between = 0.0477                              avg =      13.3
                    overall = 0.1340                              max =        15

                                                   F(8,140)        =     41.53
corr(u_i, Xb)  = -0.9131                           Prob > F        =    0.0000

------------------------------------------------------------------------------
         lta |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lnta |  -1.999077   .1111538    -17.98   0.000    -2.218834   -1.77932
        lhfi |   1.693392    .171254      9.89   0.000     1.354814   2.031971
      exppat |   .5143851   .1500831      3.43   0.001     .2176627   .8111075
         npl |  -.0317408    .025205     -1.26   0.210    -.0815723   .0180908
         nim |  -.1194799   .0676287     -1.77   0.079    -.2531854   .0142257
         inf |  -.0360169   .0321084     -1.12   0.264     -.099497   .0274632
         gdp |  -.0000983   .0188669     -0.01   0.996    -.0373992   .0372026
         blr |   .0369144   .1465205      0.25   0.801    -.2527644   .3265933
       _cons |   8.573688   2.327648      3.68   0.000     3.971804   13.17557
-------------+----------------------------------------------------------------
     sigma_u |  1.3921767
     sigma_e |  .38992593
         rho |  .92725942   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(11, 140) =    26.77          Prob > F = 0.0000
```

Total loan to Total Deposit

```
xtreg ldep lnta lhfi exppat npl nim inf gdp blr, fe

Fixed-effects (within) regression              Number of obs      =       160
Group variable: code                           Number of groups   =        12

R-sq:  within  = 0.2926                         Obs per group: min =        11
       between = 0.0182                                        avg =      13.3
       overall = 0.0196                                        max =        15

                                                   F(8,140)        =      7.24
corr(u_i, Xb)  = -0.5867                           Prob > F        =    0.0000

------------------------------------------------------------------------------
        ldep |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lnta |   .1218276   .0468619      2.60   0.010     .0291792   .2144761
        lhfi |  -.2800174   .0721998     -3.88   0.000    -.4227603  -.1372744
      exppat |   .2684418   .0632743      4.24   0.000     .1433451   .3935385
         npl |   .0115351   .0106263      1.09   0.280    -.0094737   .0325438
         nim |  -.0410609   .0285119     -1.44   0.152    -.0974305   .0153087
         inf |  -.0052104   .0135368     -0.38   0.701    -.0319733   .0215525
         gdp |   .0152995   .0079542      1.92   0.056    -.0004263   .0310254
         blr |  -.0618979   .0617723     -1.00   0.318    -.1840251   .0602293
       _cons |   3.460527   .9813249      3.53   0.001     1.520395   5.400659
-------------+----------------------------------------------------------------
     sigma_u |  .25368093
     sigma_e |  .16439086
         rho |  .70425872   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(11, 140) =    18.59   Prob > F = 0.0000
```

Appendix 13: Fixed Effect Model of Islamic Banks

Total Loan to Total assets

```
xtreg lta lnta lnhfi exppat npl nim inf gdp blr, fe

Fixed-effects (within) regression              Number of obs      =       150
Group variable: code                           Number of groups   =        12

R-sq:  within  = 0.3470                         Obs per group: min =        10
       between = 0.4927                                        avg =      12.5
       overall = 0.0553                                        max =        13

                                                   F(8,130)        =      8.63
corr(u_i, Xb)  = -0.7133                           Prob > F        =    0.0000
```

```
--------------------------------------------------------------------------
        lta |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------
       lnta | -.0907375   .0321314    -2.82   0.005    -.1543056   -.0271694
       lnhfi |   .118129   .0216569     5.45   0.000     .0752834    .1609746
      exppat |  .0103354   .0059753     1.73   0.086    -.0014861    .0221568
         npl |  .0004914   .0033653     0.15   0.884    -.0061665    .0071492
         nim | -.0026903    .007581    -0.35   0.723    -.0176885    .0123078
         inf |  .0085056   .0083311     1.02   0.309    -.0079765    .0249876
         gdp |  .0011302    .004659     0.24   0.809     -.008087    .0103474
         blr |  .0119362    .034438     0.35   0.729    -.0561952    .0800676
       _cons |  .2342274   .3114629     0.75   0.453    -.3819648    .8504195
-------------+------------------------------------------------------------
     sigma_u |  .21168251
     sigma_e |  .09194132
         rho |  .84129218   (fraction of variance due to u_i)
--------------------------------------------------------------------------
F test that all u_i=0:     F(11, 130) =    16.93            Prob > F = 0.0000
```

Total loan to Total Deposit

```
xtreg ldep lnta lnhfi exppat npl nim inf gdp blr, fe

Fixed-effects (within) regression            Number of obs      =        150
Group variable: code                         Number of groups   =         12

R-sq:  within  = 0.2051                       Obs per group: min =         10
       between = 0.0086                                      avg =       12.5
       overall = 0.0706                                      max =         13

                                              F(8,130)           =       4.19
corr(u_i, Xb)  = -0.2748                       Prob > F           =     0.0002

--------------------------------------------------------------------------
        ldep |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------
       lnta |   -.10069   .1137716    -0.89   0.378    -.3257734    .1243935
       lnhfi |  .1961853   .0766833     2.56   0.012     .0444766     .347894
      exppat |  .0631268   .0211575     2.98   0.003     .0212693    .1049844
         npl |  .0163436   .0119159     1.37   0.173    -.0072306    .0399179
         nim |  .0215453   .0268431     0.80   0.424    -.0315605    .0746511
         inf |  .0515447   .0294989     1.75   0.083    -.0068154    .1099049
         gdp | -.0190428   .0164966    -1.15   0.250    -.0516794    .0135938
         blr |  .0162397   .1219388     0.13   0.894    -.2250015     .257481
       _cons | -.6461815   1.102835    -0.59   0.559    -2.828009    1.535646
-------------+------------------------------------------------------------
     sigma_u |  .29170306
     sigma_e |  .32554789
         rho |  .44533279   (fraction of variance due to u_i)
--------------------------------------------------------------------------
F test that all u_i=0:     F(11, 130) =     7.10            Prob > F = 0.000
```