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**THE IMPACT OF HOUSING LOAN/FINANCING ON RISK
PERFORMANCES IN A DUAL BANKING SYSTEM**

BY

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**Thesis Submitted to
Othman Yeop Abdullah Graduate School of Business,
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In Partial Fulfilment of the Requirement for the
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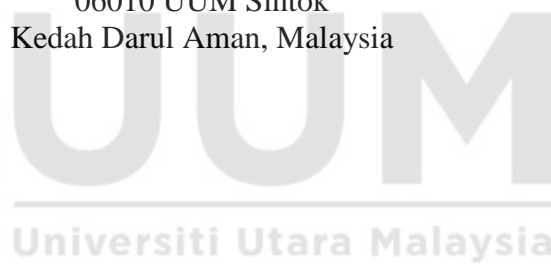
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ABSTRAK

Pinjaman/pembiayaan perumahan adalah produk penting kepada bank. Salah satu sumbangan utama kepada keuntungan bank. Kajian ini mengkaji kesan pinjaman / pembiayaan perumahan dan pembolehubah lain dengan prestasi risiko bank di Malaysia. Pemboleh ubah bersandar yang digunakan dalam kajian ini adalah Pinjaman Tidak Berbayar (NPL) dan Peruntukan Kerugian Pinjaman (LLP). Kajian ini menggunakan enam (6) pembolehubah bebas yang dibahagikan kepada dua bahagian; pembolehubah khusus bank dan makro-ekonomi. Pembolehubah khusus bank melibatkan pembolehubah yang dikawal dalam pengurusan bank dan ini termasuk perbelanjaan (TEXPTI), jumlah pinjaman (TLTA), pendapatan (INCTL) dan pinjaman/pembiayaan perumahan (LPRO). Pembolehubah makroekonomi merujuk kepada pemboleh ubah faktor luaran dan kajian ini menggunakan Indeks Keluaran Dalam Negara Kasar (GDP) dan Indeks Harga Pengguna (CPI) sebagai proksi pembolehubah makroekonomi. Data ini terhad kepada bank perdagangan dan bank Islam di Malaysia dalam tempoh 2002-2016. Hasil daripada model Rawak dan Tetap menunjukkan bahawa pinjaman/pembiayaan perumahan mempunyai kesan yang signifikan dan negatif terhadap bank (NPL). Bagi pemboleh ubah bergantung lain, pinjaman/pembiayaan perumahan juga menunjukkan hubungan yang signifikan dengan bank (LLP). Dari analisis, dapat disimpulkan bahawa walaupun bank komersial menguasai pasar pinjaman/pembiayaan perumahan, namun bank Islam mampu bersaing dengan bank komersial dalam jenis pembiayaan tertentu ini. Selain daripada itu pinjaman/pembiayaan perumahan sangat penting bagi bank. Ini kerana hasil menunjukkan pinjaman/pembiayaan perumahan adalah portfolio risiko rendah dalam pelaburan bank.

Kata kunci: Prestasi Risiko Bank, Perbankan Komersial, Perbankan Islam, NPL, LLP

ABSTRACT

The housing loan/financing are important product to the bank due to its the major contribution to the bank profit. This study investigates the impact of housing loan/financing and other variables with bank risk performance of dual banking system in Malaysia. The dependent variable used in this study is Non-Performing Loan (NPL) and Loan Loss Provision (LLP). This study uses six (6) independent variables which are divided into two parts; bank specific and macro-economic variables. Bank specific variables involve variables which are controllable within bank management and these include expenses (TEXPTI), total loan (TLTA), income (INCTL) and housing loan/financing (LPRO). Macroeconomic variables refer to the external factor variable and this study uses Gross Domestic Product (GDP) and Consumer Price Index (CPI) as proxies of macroeconomic variables. The data is restricted to commercial and Islamic banks in Malaysia within the period of 2002-2016. The results from Random and Fixed Effect models show that housing loan/financing has significant and negative impact on banks (NPL). As for other dependent variable, housing loan/financing also show significant relationship with banks (LLP). From the analysis, it can be concluded that even though commercial banks seem to dominate housing loan/financing market, but Islamic banks are capable to compete with commercial bank in this specific type of financing. Furthermore, housing loan/financing are very importance to the bank. It's because the result show housing loan/financing are low risk portfolio in bank investment. As nature, the housing loan/financing will be backed by the mortgage and it will mitigate the risk in investment.

Keyword: Risk Bank Performance, Commercial Bank, Islamic Bank, Non-Performing Loan (NPL) and Loan Loss Provision (LLP).

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On a more personal level, I want to thank my family for their unconditional love, understanding and support. My father and mother raised me to believe that I could achieve anything i set my mind to. My brothers and sisters have been an endless source of great joy, love and assistance. I want to thank them all for their interest and assurance that the journey does have an end at times when it seems like no end was insight.

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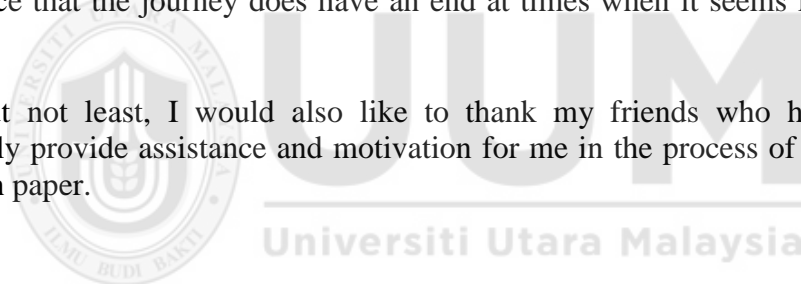


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LIST OF ABBREVIATIONS

ARDL	Autoregressive Distributed Lag
BBA	<i>Bay Bithaman Ajil</i>
BNM	Bank Negara Malaysia
CPI	Consumer Price Index
FEVD	Forecast Error Variance Decomposition
GDP	Gros Domestic Product
INCTL	Income divide Total Loan
IRF	Impulse Response Function
LLP	Loan Loss Provision
LLPTA	Loan Loss Provision over Total Loan
LPRO	Natural Log Housing Financing
NPL	Non-Performing Loan
ROA	Return on Asset
ROE	Return on Equity
RRI	Islamic Rental Rate
TEXPTI	Total Expenses Divide Income
TLTA	Total Loan Divide Total Loan
VIF	Variance Inflation Factor

CHAPTER 1

INTRODUCTION

1.1 Introduction

House is a basic need for every human being. Beside as a protection, it serves as a place to spend time with the family and a place where family members gather together to celebrate special occasion. Even though house plays an important role in our life, buying a house needs a long-term commitment and large financial obligation. With the rise of house prices, it is difficult for people to buy house. Most people today cannot afford to own a house and they have to apply housing financing from financial institutions such as commercial banks and Islamic banks. It is common for commercial banks to offer loan with interest for customers that intent to buy house. In contrast with Islamic banks, they offer housing financing that is based on Shariah principles where element of interest is being eliminated from the contract (Iqbal and Mirakhor, 2007; Khir, Gupta, and Shanmugam, 2007; Haron, 2005; Haron and Shanmugam, 2001).

Housing loan/financing refers to a long-term financing facility provided by financial institutions for purchasing house and Bank Negara Malaysia (BNM) has set a maximum period of repayment of 35 years for this type of financing (Ahmad, 2003). There are two types of housing loan/financing plans in Malaysia, namely fixed and flexible housing loan plans. The fixed housing loan plan is a loan which instalment payable on a monthly basis is fixed until the end of instalment period. As for a flexible housing loan, it gives the borrower option to reduce the instalment at any time by paying more than the instalment or paying in lump sum at any one time. With this

type of housing loan/financing, the borrower will be able to save money during lower interest rates and even the instalment period can be shortened.

Noorul Hafizah (2007) states that the amount of housing loan in Malaysia has increased significantly from year to year and housing loans contribute to the largest portion of bank total loans. For this reason, Malaysian banks are relying on housing loan as part of their loan portfolio and this will give impact not only to their return but also to their risks especially credit risk. Credit risk refers to a risk arising from the possibility of a customer unable to settle its financial liability with the bank (Haron, 2005). It may occur if the borrower cannot afford to pay the housing loan instalment and the bank has a right to liquidate the house in order to cover the cost of the loan.

The relationship between housing loan/financing and bank risk is unique due to the significant contribution of housing loan/financing to the bank performances. At the same time there are not many researches that analyse the relationship between housing loan/financing and bank performances. Previous researches usually focus on the impact of total loan and bank performance and studies on housing loan/financing are scarce. Therefore, it is timely to conduct study on housing financing and its impact on bank performances.

1.2 Problem Statement

Malaysia has a unique banking system which is known as a dual banking system. This system provides an alternative to customers whether to choose commercial or Islamic banking products. Housing loan/financing is among the banking products that are available in both banks. Even though both products have similar goal of helping customers to own a house but housing loan in commercial bank has different structure with housing financing in Islamic banks. In commercial bank, housing loan is structured based on a creditor-debtor relationship where it provides borrower with payment schedule which consist of interest and principal (Tse, 1997).



Figure 1.1
The Performance of Housing Financing in Malaysia
Sources Housing watch website

The performance of housing loan/financing is increasing every year due to growing demand on house as shown in Figure 1.3. Total outstanding housing loans granted by financial institutions increased by 8.8% (on an annual basis) and amounted to

RM507.8 billion for year 2017. In addition, annual report of banks also shows that 23% of total financing is channelled to housing financing.

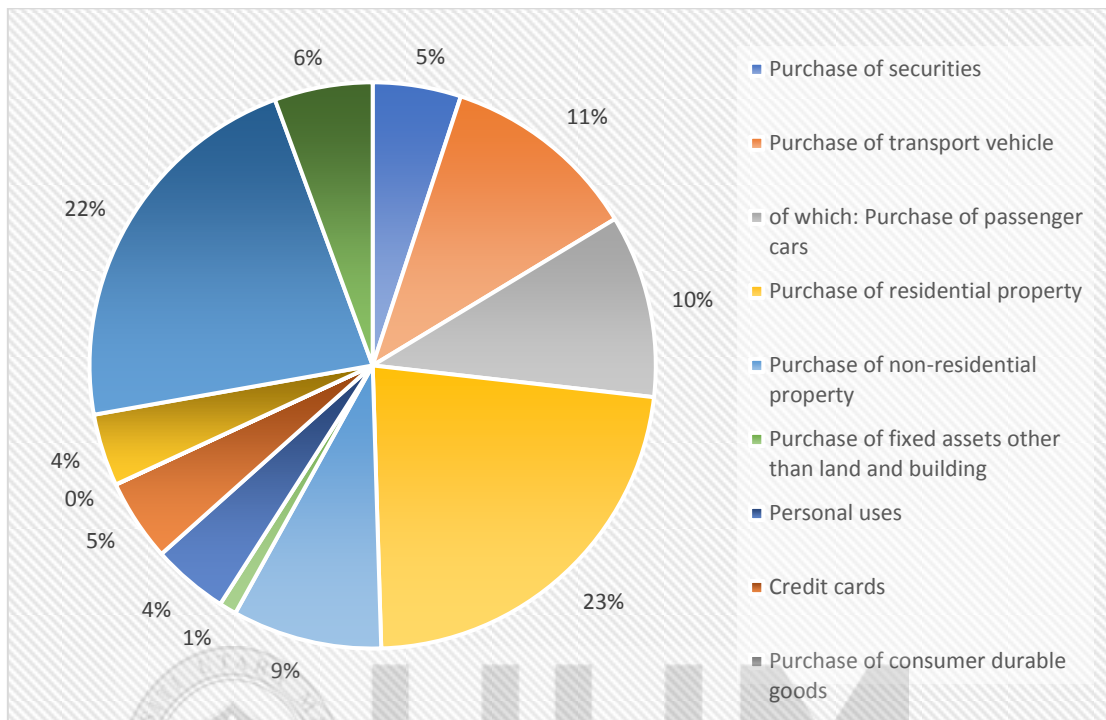


Figure 1.2
The Percentage of Financing by Purpose 2016
Sources: Monthly statistic BNM

The existence of empirical research that study on the relationship between internal and external factor and bank risks are many (Gezu, 2014; Khan, and Ahmad, 2017; Messai, and Jouini, 2013; Muratbek, 2017 Tanasković, and Jandrić, 2015; Tsumake, 2016; Tona 2017; Tehulu and Olana, 2014; Jabir and Terye, 2016; Al-abadallat, 2016). Most of these studies are conducted in a country that practices commercial banking system. This study is unique because the focus of our sample is for commercial banks and Islamic banks. In addition, previous study also concentrates on total loan as their loan variable, but this study give focus on the specific type of loan which is housing loan.

1.3 Research Questions

- What are the trends of commercial bank housing loan and Islamic bank house financing in Malaysia?
- What is the relationship between housing loan/financing and Malaysian bank risk performances?
- Is there any different between the impact of commercial bank housing loans and the impact of Islamic bank house financing on bank risk performance?

1.4 Research Objectives

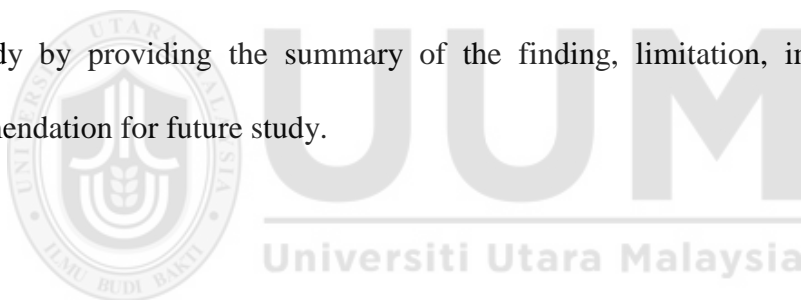
- To analyse the trends of commercial bank housing loans and Islamic bank house financing in Malaysia
- To investigate the impact of housing loan/financing, bank specific variables and macroeconomic variables on bank risk performances.
- To distinguish the impacts of commercial bank housing loan and Islamic bank house financing on bank risk performances

1.5 Significant of Studies

Even though, there are many studies investigating bank risk performances but only few studies were focusing on the impact of housing loan/financing to the bank risk performances. This study not only examines the commercial banks, but it is also evaluating Islamic bank performances. Therefore, the finding of this study will be useful as a reference for the future studies regarding the relationship between housing financing and bank risk. In addition, this study is also beneficial for the banking regulator and bank management especially in constructing rules and regulation regarding housing financing and housing demand in Malaysian market.

1.6 Organization of The Thesis

This thesis is divided into five chapters. Chapter one provides the background of the study, problem statement, research question, research objectives, scope and limitation and the thesis outline. Chapter two reviews literature from previous studies and the theories that are related to this study. The chapter is followed by Chapter three which describes the research methodology employed in this study. It includes research design, research and conceptual framework, hypotheses development, sampling, data collection, methods of data analysis and measurement of the variables. Next, Chapter four presents the results and discussion of this study findings based on the research questions and the research objectives. Finally, Chapter five contains the conclusion of the study by providing the summary of the finding, limitation, implications and recommendation for future study.



CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter highlights on the previous literature on bank loan specifically on housing loan/financing and bank risk performances discussion.

2.2 Theoretical Review

The theory of financial intermediaries relates financial institutions as intermediaries that link players among players in the financial industry (Diamond, 1984). According to Scholtens and Van Wensveen (2000), this theory exists in imperfect economic conditions where access to information is limited. The difficulty in getting information justify the need of an institution as an intermediary between market players. Financial intermediary is able to stimulate economic growth through its role in savings, evaluating projects and providing transaction facilities (Schumpeter, 1911).

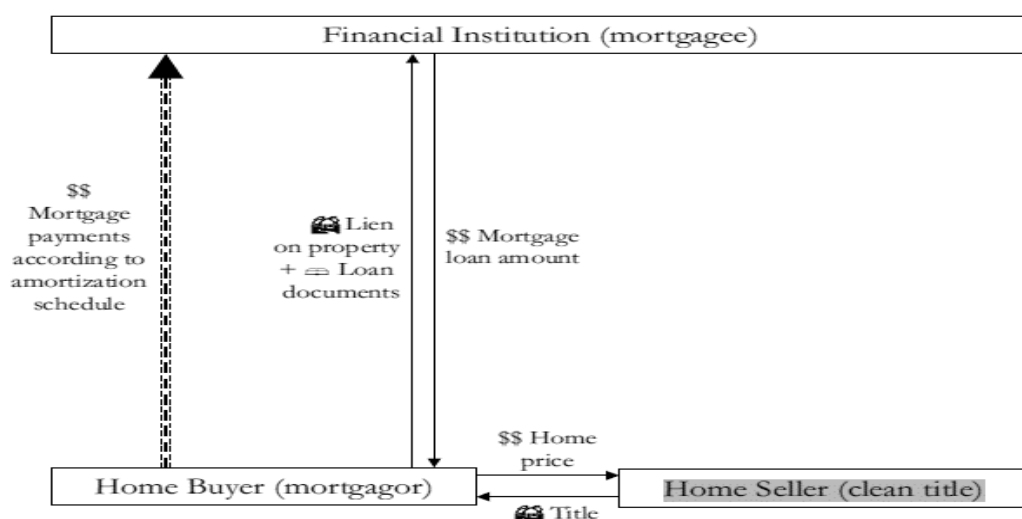


Figure 2.1
Operation of a Typical Commercial Housing Loan
Sources: El-Gamal (2006).

In the retail banking business, housing loan/financing is one of the popular products offered by banks. In Islamic banks term house financing is used to reflect the contract applied in the banking product while in the commercial banking term housing loan is used to reflect the nature of debtor-creditor relationship. Figure 2.1 shows the operation of a typical commercial housing loan.

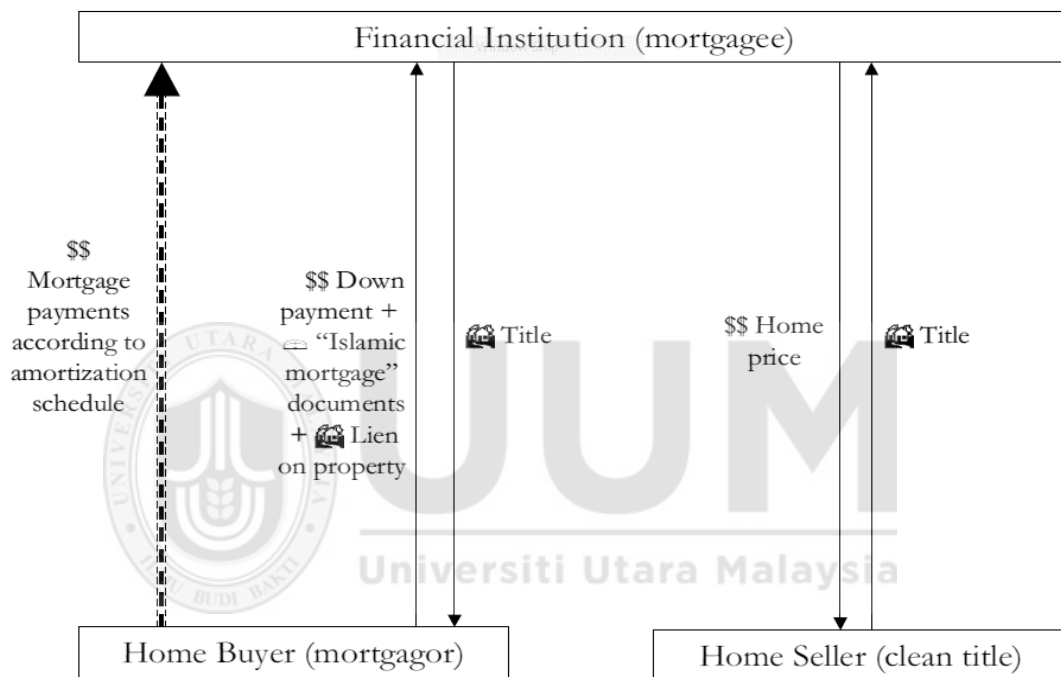


Figure 2.2
Bay Bithaman Ajil (BBA) Housing Financing Contract
 Sources: El-Gamal (2006).

In Malaysian Islamic banks, the contract for housing financing was dominated by *Bay Bithaman Ajil* (BBA) since its establishment. Even though there are several other contracts such as *Musyarakah Mutanaqisah* (Diminishing Partnership) but BBA still dominated the market. BBA is a deferred sale contract where Islamic banks receive profit from this transaction. Figure 2.2 illustrates the housing financing based on BBA contract.

Risk in Arabic word is *Mukhatir* or *Mukhatarah* or *Khatr* and it refers to the damage and nuance or near danger of destruction (Ibn Manzur, 1955). It also refers to the probability of occurrence of undesirable things According to the *Jumhur* ulama, *Khatr* has various purposes such as gambling (*Maysir*), uncertainty (*Gharar*) or damages (Al-Alawanah, 2009). Islam recognizes risk and Allah SWT mentioned risk management in surah *Yusuf* verse 67:

And he said, "O my sons, do not enter from one gate but enter from different gates; and I cannot avail you against [the decree of] Allah at all. The decision is only for Allah; upon Him I have relied, and upon Him let those who would rely [indeed] rely."

Based on the understanding of the above verse, it shows that Islam recognizes the risks and drives people to manage risks. In addition, this concept is also supported by the hadith of Prophet SAW:

The Prophet (SAW) once asked a Bedouin who left his camel without bonding, 'Why did not you tie your camel?'. The Bedouin then replied, 'I put my trust in God'. The Prophet (peace and blessings be upon him) then said, 'Bind your camels first then put your trust in Allah.'

At-Tirmidhi

In addition, the risk management practice that Islam is found in discussion of *Maqasid Shariah* which it becomes of the element in five basic *Maqasid*: to guard the property. Islamic financial institutions nowadays use the Risk Management Practice Framework as being practiced in commercial banks to preserve property (in the form of savings or investments) and avoid the risk of loss to the depositors or shareholders.

2.3 Empirical Review

A study on the criteria in the selection of Islamic housing financing among bank customers in Malaysia has been conducted by Amin (2008). The study uses a qualitative study using questionnaires which were distributed to 150 bank customers in Labuan. The results show that there are several important criteria in selecting the Islamic housing financing including; Shariah principle, lower monthly payment, transparency practice and interest-free practice.

Amin et. al (2017) has conducted empirical studies on the impact of service quality, product selection and Islamic debt base on customer attitude in the housing sector in Malaysia. With the support of 350 questionnaires, the study found that the Islamic credit policy, the quality of service and the product choice have significant relationship with consumer attitudes in choosing Islamic house financing.

Study by Fauziah, Ramayah and Abdul Razak (2008) used the theory of reasoned action as a guiding principle in studying the acceptance level of Islamic bank customers in house financing. The results show that the behaviour and social pressure have positive relationship with the acceptance of house financing.

Donkor-Hyiaman and Owusu-Manu (2016) proposed retirement fund as mechanism to support house financing where they used present value technique in assessing the effectiveness of the pension fund as the source of house financing.

A study on house financing in Pakistan by Hamid and Masood (2011) found that the terms and conditions of product flexibility, shariah principles, reputational banks, pricing, and fast and efficient services are a key factor in choosing house financing.

In addition, in a quantitative study by Yusof and Usman (2015) aims to determine the dynamic relationship between gross domestic product, house prices, stock prices, and interest rate with house financing offered by Islamic banking in Malaysia. This study employed autoregressive distributed lag (ARDL), cointegration approach, impulse response function (IRF), and forecast error variance decomposition (FEVD) in investigating the long-term and short-term relationships between variable and house financing from 2007 to 2014. The results show that GDP, house prices and interest rates have significant relationship with house financing in the long run.

Mohd Yusof Bahlous and Haniffa (2016) used Islamic Rental Rate (RRI) to replace mortgage rates in short-term and long-term dynamics analysis. The study shows that no short or long run dynamics interconnection between the rental rate and any form of interest rates. In addition, RRI affects Gross Domestic Product (GDP) while the RPI for UK market shows a significant impact on Gross Domestic Product (GDP), real effective exchange rates and interest rate measures. The results also found that interest rates had a significant impact on house financing in the long term for Islamic and commercial banking. Islamic bank financing shows strong linkages with macroeconomics rather than commercial banking in long term or short-term relationships.

2.3.1 Bank risk

An effective risk management system is a core discipline that must be maintained by all banking institutions to ensure the continued growth while creating a healthy financial environment. For examples study by Ahmad and Ahmad (2004) examined factors affecting credit risk, being the main risk faced by Islamic banking institutions. The results show that management efficiency, risk-weighted assets and size of total assets have significant influence on credit risk of Islamic banking, while commercial banking credit risk are significantly affected by loan exposure to risky sectors, regulatory capital, loan loss provision and risk-weighted assets.

Adzobu, Agbloyor, and Aboagye (2017) examined the effect of loan portfolio diversification on the profitability and the risk of banks using both static and dynamic estimation techniques. Using ROA and ROE as proxies for bank profitability and NPL and LLP as proxies for bank credit risk, the results show that loan portfolio diversification significantly reduces banks' profitability and increases banks' risk.

Haddadi and Hassan (2016) investigated the relationship between credit risk and factor affecting credit risk in Iranian bank using DEMATEL method from year 2011 to 2015. The results show that there is a significant relationship between credit risk of customers and liquidity ratios, Leverage ratios may have inverse relationship with credit risk and profitability ratios.

Haq (2010) investigated factors affecting bank risk of European bank from 1996 until 2005. The data covers 84 financial institutions across 15 countries (Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway,

Spain, Sweden, Switzerland and the United Kingdom). The results reveal that bank value is positively correlated with total risk and idiosyncratic risk. Uninsured deposits are negatively correlated with systematic risk, suggesting market disciplining effects. Finally, in general researcher found a non-linear relationship between bank capital and bank risk.

Manab, Theng and Md-Rus (2015) studied the impact of earning management on credit risk for 30 Malaysia companies from 2006 to 2012. The results show that there is significant relationship between liquidity ration and credit risk after and before the earning management adjustment.

Safari (2014) analysed factors influencing credit risk of 53 companies from 2010 to 2011 and risk weighted assets are used to measure the credit risk. Only two variables are significant to the credit risk which is Net Loans to Total Asset and Cost to Income Ratio.

Duong, and Huong (2016) examined factors that influence bank credit risk for 20 banks in Vietnam from 2006 to 2014. With NPL as a dependent variable the results show that GDP has positive relationship with credit risk.

Mwaura (2013) examined the effects of internal and external factor on credit risk in 20 commercial banks in Kenya for period 2003 to 2012. The results report the significant relationship between GDP, inflation, interest rates, unemployment and stock performance with credit risk as measured by bank NPL.

Seaw *et. al* (2015) examined the impact of economic and bank specific variables on Malaysian banks credit risk for the period of 1998 to 2013. The research uses ordinary least square to measure the relationship between dependent and independent variable. The results show that gross domestic product, inflation, bank performance and reserve requirement are significant to credit risk.

Study by Tona (2017) proved that LLP may also be used to measure credit risk in banks where this study used data for six banks from 2001 so that 2015. The results show that economic growth, inflation, bad debt and income have significant relationship with LLP.

In addition, Tehulu and Olana (2014) studied on the relationship between bank specific variable and credit risk. for 10 banks in Ethiopin from 2007 and 2011 and analyzed using random effects GLS regression. The results revealed that credit growth, bank size, operating inefficiency and ownership have statistically significant impact on credit risk.

Al-Abedallat (2016) examined the factor affecting the bank credit risk in Jordanian Commercial Banks. Using primary data, 220 questioners have been replied by the customers in Jordanian banks. The results show that efficiency of workers, Central Bank instruction and the credit policy of the bank have significant impact on bank credit risk.

2.4 Chapter Summary

A comprehensive explanation of the literature review of previous studies is provided in this chapter. Review on housing loan/financing provides the overall concept of the focus of the study. The gaps highlighted from the reviews on external and internal factors from the past studies show evidences of the established relationships between housing loan/financing and bank risk performance.



CHAPTER 3

DATA AND METHODOLOGY

3.1 Introduction and Data Sample

This study uses secondary data which have been extracted from the statement of financial position, statement of comprehensive income and account notes of sample banks' annual reports. Meanwhile the macroeconomic data are downloaded from the BNM website. The nature of data is unbalanced data which mainly involves 24 Malaysian banks (12 commercial banks and 12 Islamic banks) for the study period covers from 2002 to 2016 (15 years). The list of sample banks is shown in Table 3.1.

Table 3.1
List of Commercial Banks and Islamic Banks

	Commercial bank	Islamic bank
1	Affin Bank Berhad	Affin Islamic Bank Berhad
2	Alliance Bank Malaysia Berhad	Alliance Islamic Bank Berhad
3	CIMB Bank Berhad	Bank Islam Malaysia Berhad
4	Citibank Berhad	Bank Muamalat Malaysia Berhad
5	Hong Leong Bank Berhad	CIMB Islamic Bank Berhad
6	HSBC Bank Malaysia Berhad	HSBC Amanah Malaysia Berhad
7	Malayan Banking Berhad	Hong Leong Islamic Bank Berhad
8	OCBC Bank (Malaysia) Berhad	Maybank Islamic Berhad
9	Public Bank Berhad	Public Islamic Bank Berhad
10	RHB Bank Berhad	Citibank Islamic Berhad
11	Standard Chartered Bank Berhad	Standard Chartered Saadiq Berhad
12	United Overseas Bank (Malaysia) Bhd.	RHB Islamic Bank Berhad

3.2 Theoretical Framework

The theoretical framework is important in conducting research where it defines the methods and procedures for collecting and analysing the required information (Zikmund, Babin, Carr and Griffin, 2013). The framework of this research focuses on the impact of housing loan/financing and other independent variables on the risk performance of commercial banks and Islamic banks in Malaysia. The theoretical framework for this study is shown in Figure 3.1.

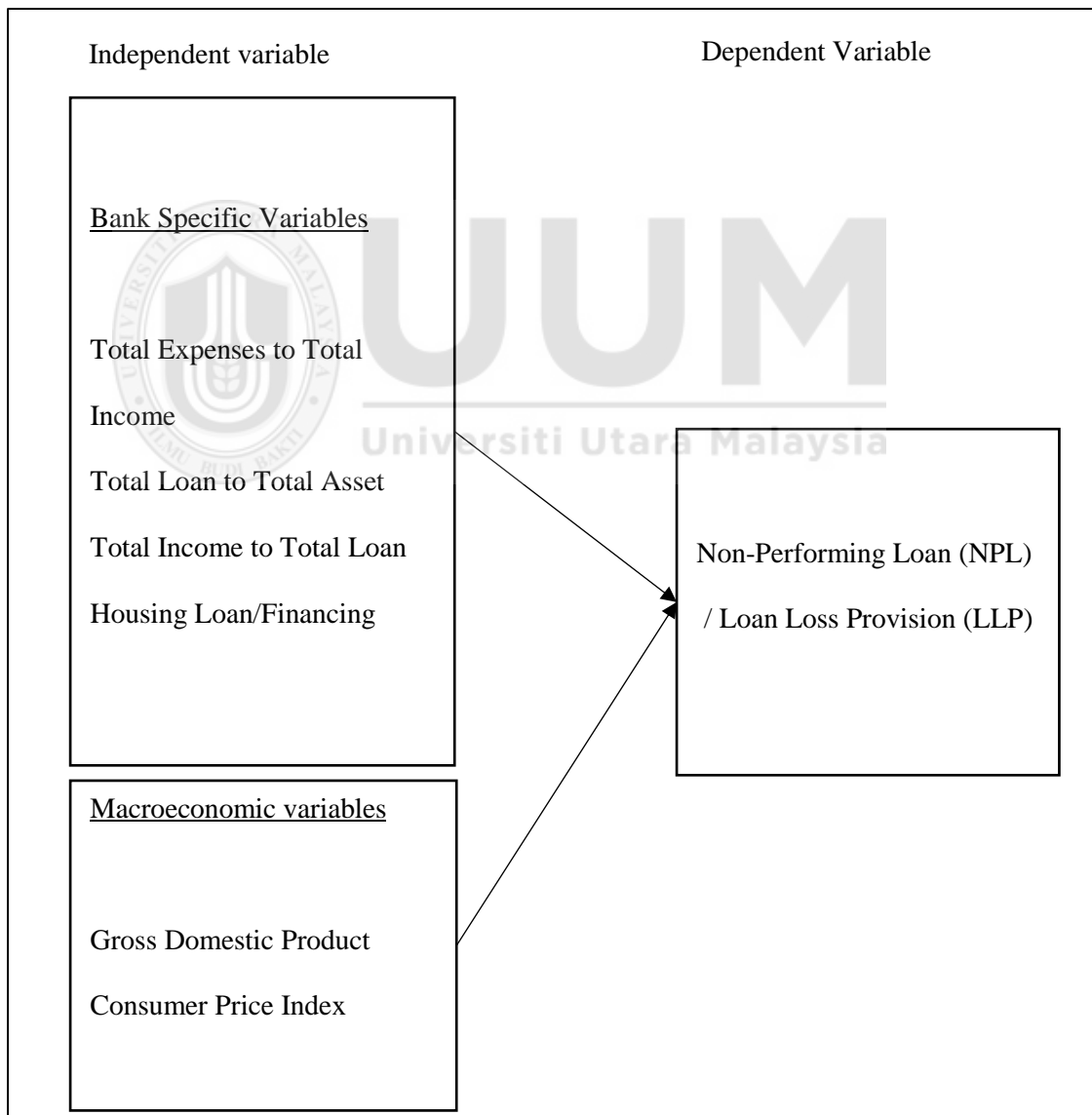


Figure 3.1
Theoretical Framework for NPL and LLP Model

This study uses 6 independent variables which are divided into two parts; bank specific and macro-economic variables. Bank specific variables involve variables which are controllable within bank management and these include expenses, total loan, income and housing loan/financing.

- Expenses are the cost of services and goods used in the process of earning revenue. It measures the efficiency the bank performance.
- Total loan is the amount of the loan offer by the bank to the customer. For Islamic banks, they give financing to customer rather than loans due to the prohibition of interest in the banking operation.
- Income is an amount of money received through the bank financing activity.
- Housing loan/financing is the financing offer by the bank for purchasing house.

Macroeconomic variables refer to the external factor variable and this study uses Gross Domestic Product (GDP) and Consumer Price Index (CPI) as proxies of macroeconomic variables.

- GDP measures the economic development of a country and it is calculated based on the total market value of goods and services produced in a country at a specific time.
- CPI is the method used to measure or determine the inflation rate. The CPI measures the average price of goods and services normally used by households at the designated time.

3.3 Model Specification

Based on the literature and theoretical framework, this study develops two models in investigating the impact of housing financing and other independent variables on bank risk. Using NPL and LLP as proxies of bank risks, the following models are developed.

$$\text{NPL}_{it} / \text{LLPTA}_{it} = \alpha_0 + \beta_1 \text{TEXPTI}_{it} + \beta_2 \text{TLTA}_{it} + \beta_3 \text{INCTL}_{it} + \beta_4 \text{LPRO}_{it} + \beta_5 \text{GDP}_{it} + \beta_6 \text{CPI}_{it} + \varepsilon_{it}$$

α	= constant
i	= bank
t	= time period
ε_{it}	= Error term of bank i on time t
LLPTA3	= Loan Loss Provision divide Total Loan
NPL	= Non-Performing Loan
TEXPTI	= Total Expenses divide Income
TLTA	= Total Loan Divide Total Loan
INCTL	= Income divide Total Loan
LPRO	= Nature log Housing Financing
GDP	= Gros Domestic Product
CPI	= Consumer Price Index

This study uses two panel regression models which are Fixed Effect Model (FEM) and Random Effect Model (REM):

3.3.1 Fixed Effects Model

Fixed effect model considers the specific effect of the bank correlates with independent variable. According to Baltagi (2001), pronunciation error ε_{it} for

estimate of fixed effect model is $\epsilon_{it} = \mu_{it} + \nu_{it}$, where $\nu_{it} = 0$ shows the individual effect assumed fixed.

3.3.2 Random Effects Model

Random effects are the specific effects of banks that are not correlated with regressors variables and allow time-invariant variables to play the role of an underlying variable in the model. On the other hand, in the random effects model, it is stochastic and distributed, ie the individual effect is not correlated with the mention of error but correlates with regressors.

3.4 Measurement of Variables

3.4.1 Dependent variable

This study uses Non-Performing Loan (NPL) and Loan Loss Provision (LLP) to measure bank risks where both variables are often used by researchers in their study as proxies of bank risks Adzobu, Agbloyor, and Aboagye (2017), Al-Abedallat (2016), Seaw *et. al* (2015), Thiagarajan, (2013), Al-Wesabi and Ahmad (2013) and Aver (2008). NPL is one of indicator of bank asset quality where it becomes a measure of bank credit risk. It is also contributed directly to the severity of other bank risks (Thiagarajan, 2013). Meanwhile LLP is one of the quantitative indicator that can be used to describe the quality of the loan (Mohd Isa et al., 2018). This provision covers expected and unexpected loan/financing in accordance with accounting standards in the reporting of bank financial statements. For Islamic banks, NPL will be replaced with Non-Performing Financing (NPF) due to the prohibition of interest on loan in Islamic teaching.

3.4.2 Independent variables

3.4.2.1 Expenses

Expenses comprise the economic cost of a business undertaken through its operations to generate revenue. Expenses are also intended to expand and resume a business. The increased expenses without producing any revenue also can affect the risk of the bank. A study by Tehulu and Olana (2014), states that spending has a positive impact on credit risk. Hence, hypothesis between expenses and NPL/LLP is stated as;

H₁: There is a positive relationship between expenses and NPL/LLP

3.4.2.2 Total Loan/Financing

Total loan/financing covers all types of loan/financing granted to customers and it may influence the risk of the bank as there are customers who cannot afford to repay the loan. A study by Jabir and Terye (2016) proves that loan has a positive relationship with bank risk. This study hypothesized the relationship between total loan and credit risk as follows;

H₂: There is a significant relationship between total loan and NPL/LLP.

3.4.2.3 Income

Income refers to the revenue for banks and it is mainly derive from loan/financing. therefore, potentially affect the risk of bank financing. the higher the income from the financing shows the good performance of the bank. based on previous studies show different decisions on the relationship between income and bank risk. Tona (2017)

addresses a significant relationship of income and bank performances. This study hypothesized the relationship between income and credit risk as follows;

H₃: There is a significant relationship between income and NPL/LLP.

3.4.2.4 Housing Loan/Financing

Housing loans/financing are the largest loans in a bank. as much as 40 percent of the total loans. This situation allows housing financing to be able to affect the risk of the bank. But according to a survey conducted by Azra Armyza (2015) stated that financing by the contract did not have a significant relationship to the risk of the bank. This study hypothesized the relationship between housing loan/financing and credit risk as follows;

H₄: There is a significant relationship between housing loan/financing and NPL/LLP.

3.4.2.5 Gross Domestic Product (GDP)

GDP means the total market value of the final goods and services produced in a given country at a given time. It aims to measure economic growth in a country. This study assumes that economic growth will reduce the risk in the bank. It is evident that the study by Al-Wesabi and Ahmad (2013) shows a negative significance relationship but studies by Azraa (2015) show positive relationships. This study hypothesized the relationship between GDP and credit risk as follows;

H₅: There is a significant relationship between GDP and NPL/LLP.

3.4.2.6 Consumer Price Index (CPI)

CPI is a method used to measure or determine the inflation rate. The CPI measures the average price of goods and services normally used by households over a specified period. The CPI is measured by comparing the average price of goods and services in the base year with the average price of goods in the current year. This study expected that increasing in CPI will increase the credit of bank. A study by Azraa Armyza (2015) supports the above statement on which the relationship between CPI and credit risk is positive.

H₆: There is a significant relationship between consumer price index and NPL/LLP.

Table 3.2 summarizes the dependent and independent variables used in this study.

Table 3.2
List of Variables

Variable	Measurement	Notation	Sources
Dependent variable			
Non-Performing Loan (NPL)	NPL / Total Loan	NPL	Thiagarajan, (2013) Al-Wesabi and Ahmad (2013) Navamoney (2009)
Loan loss provision (LLP)	LLP / Total Asset	LLPTA	Tona (2017) Tehulu and Olana (2014) Jabir and Terye (2016)
Independent variable			
Expanses	Total expanses / total income	TEXPTI	Tehulu and Olana (2014).
Leverage	Total loan / total asset	TLTA	Jabir and Terye (2016) Azraa (2015).
Income	Income / total loan	INCTL	Tona, E. (2017).
Housing financing	Natural Log Total Housing Loan/Financing	LPRO	Bandopadhyay and Saha (2009)
Gross Demotic Product	Percentage of Growth in Gross Domestic Product	GDP	Al-Wesabi and Ahmad (2013). Azraa. (2015).
Consumer Price Index	Annual CPI	CPI	Azraa (2015).

3.5 Econometric Tests

3.5.1 Multicollinearity Test

This test is conducted to analyse the relationship between independent variables. to overcome the multicollinearity problem. The problem can be detected through the correlation matrix table. the presence of two independent variables that have a high degree of collation ($r > 0.5$) can invoke multicollinearity problems. The multicollinearity problem also can be identified by referring to Variance Inflation Factor (VIF) test where according to Hair et. al., (2010) the value VIF exceeding 10 indicates a multicollinearity problem.

3.5.2 Hausman Test

Hausman test is important to identify the best model between fixed effects and random effects models in panel regression. If the estimation result for Hausman test is significant, where p value is smaller than five percent, then hypothesis null (random effect) can be rejected (Baltagi, 2005). Therefore, fixed-effects models are chosen as the best model.

3.5.3 Heteroscedasticity Test

Heteroscedasticity problem can be detect using the Modified Wald test for groupwise heteroskedasticity method (Lenka, and Sharma, 2015). The existence problem of heteroscedasticity when the variance is not equal or constant. Moreover, the significant results of the test will reject the homoscedasticity test and identified the heteroscedasticity problem.

3.5.4 Autocorrelation Test

In panel data analysis, the Wooldridge test is one way to identify the presence of autocorrelation in the data panel. This test involves the examination of the importance of the null hypothesis that there is no idiosyncratic error of the linear panel data model. The important value of F-indicates the existence of autocorrelation in the model. This problem can be solved by using a random effects model or fixed effect model as the model always provides consistent estimates (Wooldridge, 2003).

3.6 Chapter Summary

This chapter discusses the research design, hypothesis development, data collection and data analysis technique. The data to be used in this research is financial ratios from annual reports of the banks in Malaysia. The period of the study is 15 years from 2002 to 2016. The independent variables consist of two external factors (GDP and CPI) and four internal factors (TEXPTI, TLTA, INCTL and LPRO). The dependent variable is NPL and LLP. The method used are Fixed and Random Effects models.

CHAPTER 4

FINDING AND ANALYSIS

4.1 Introduction

This chapter discusses findings based on the 15 years unbalanced panel data of 24 banks in Malaysia (12 commercial banks and 12 Islamic banks). This study focuses to examine the effect of housing financing on Malaysian bank risk performances. The study also examines the relationship between a set of independent variables namely as housing financing (PRO), total asset (TA), total loan (TL), interest income (INC), total expenses (TEXP), profit after tax (PAT), gross domestic product (GDP) and consumer price index (CPI) on non-performing loan (NPL) and loan loss provision (LLP) as proxies of bank risk.

4.2 Descriptive Analysis

Descriptive statistics are used to summarize the results in the form of mean, standard deviation, minimum and maximum values as well as the number of observations in the study period (2002-2016). Some descriptive statistics are presented in Table 4.1.

The mean for housing loan/financing was RM 16,178,161 where the highest was for Public Bank with total housing loan of RM 146,261,128 on 2016. The lowest was for Citibank Islamic with RM 14,310 on 2006. The highest value of LLP was reported by Maybank in 2014 with RM 224,094 while the lowest LLP was reported by Bank Islam Malaysia Berhad on 2006 with total LLP of RM -1,325,478. The mean LLP for all banks was RM -155,617. As for NPL, the mean NPL was 2.52 over the study period. In addition, Public Bank recorded the minimum value of NPL of 0.06 while

the highest NPL was recorded by Affin Islamic Bank with NPL value of 24.92 in 2005.

*Table 4.1
Descriptive Statistics of Dependent and Independent Variables*

Variable	Obs	Mean	Std.Dev	Min	Max
PRO	269	16,178,161	23,457,021	14,310	146,261,128
NPL	269	2.52	2.55	0.06	24.92
LLP	269	-155,617	208,107	-1,325,478	224,094
TA	269	67,627,564	85,517,314	960,647	496,062,610
TL	269	44,817,229	58,255,917	183,547	32,3,719,559
INC	269	20,66,875	2,373,619	10,240	11,550,018
TEXP	269	811,439	992,265	840	5,629,901
PAT	269	755,150	1,062,501	-1,307,963	6,422,644
GDP	269	5.1	1.3	1.5	7.4
CPI	269	2.4	1.1	0.5	5.4

PRO: housing financing, NPL: Non-performing loan, LLP: Loan loss provision, TA: total asset, INC: interest income, TEXP: total expenses, PAT: profit after tax, TL: Total Loan GDP: nature log of gross domestic product, CPI: consumer price indexes,

The mean of Total Asset (TA) for all the banks are RM 67,627,564 with the highest value of RM 496,062,610 and the lowest values of RM 960,647. As for interest income, it recorded the mean value of RM 20,66,875 with the highest value was RM 11,550,018 for Public Bank on 2016, The lowest income was recorded by Citibank Islamic on 2007 with the value of RM 10,240. Meanwhile, mean for profit after tax (PAT) was RM 755,150. BIMB recorded negative return in 2006 with the losses of RM 13,07,963 due to the its financing problem. The highest PAT was RM 6,422,644 recorded by Maybank on 2016. The mean Total Expenses (TEXP) for the study

period was RM 811,440 with the minimum value of TEXP was RM840 and the maximum was RM 56,29,901.

As for macroeconomic data, the mean value of GDP for the period of 2002-2016 was 5.16%. and the maximum GDP was 7.4% in years 2010. The mean for CPI was 2.48% for the same period where the maximum CPI was 5.44% in years 2008 and the minimum CPI was 0.58% in 2008.

4.3 Econometric Test

Table 4.2 shows the value of VIF (variance inflation factor) are less than 10 percent and according to Hair, et. al., (2010) there is no multicollinearity problem among the modifier in the data panel. This is supported by correlation results in Table 4.3 where there is no high correlation between variables due to results of coefficient that are less than 0.5. The highest correlation is between GDP and CPI of 0.2298 and this indicates that the model is less affected with multicollinearity problem

*Table 4.2
Variance Inflation Factor Test*

Variable	VIF	1/VIF
TEXPTI	1.08	0.926844
CPI	1.08	0.928092
GDP	1.07	0.931175
LPRO	1.07	0.938873
INCTL	1.06	0.946474
TLTA	1.05	0.947934
Mean VIF	1.07	

Table 4.3
Correlation Test

	<i>TEXPTI</i>	<i>TLTA</i>	<i>INCTL</i>	<i>LPRO</i>	<i>GDP</i>	<i>CPI</i>
<i>TEXPTI</i>	1.0000					
<i>TLTA</i>	-0.1149	1.0000				
<i>INCTL</i>	-0.1051	-0.1292	1.0000			
<i>LPRO</i>	0.1925	0.1047	-0.0050	1.0000		
<i>GDP</i>	-0.0123	-0.0012	0.1001	-0.0493	1.0000	
<i>CPI</i>	0.0514	-0.0326	-0.0834	-0.0703	0.2298	1.0000

4.4 Trends of Housing Loan/Financing in Malaysia

Figure 4.1 shows the trends of housing loan/financing for Malaysian banks. For the period of 2002-2004, the growth of housing loan/financing is low. However, the trend of credit card financing increased in year 2005 onwards.

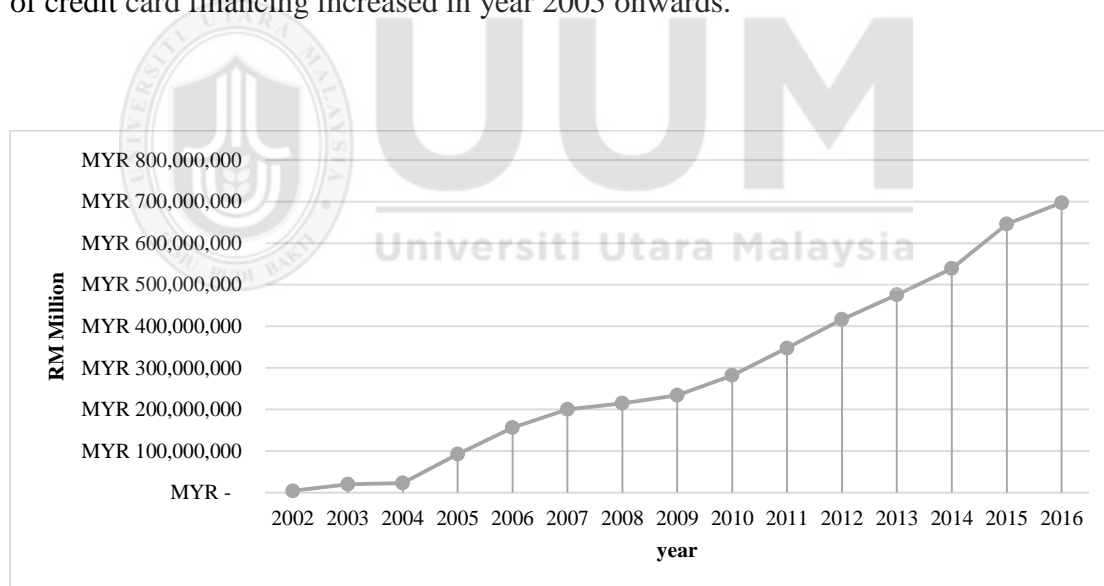


Figure 4.1
Trends of Housing Loan/Financing in Malaysia
Sources: Financial Reports for Malaysian banks

Figure 4.2 shows the trends of housing loan/financing for both commercial and Islamic banks. The blue line represents the commercial bank while grey line represents Islamic bank. Islamic banks also compete with commercial banks in introducing housing financing to their customer. Islamic banks show consistent

growth similar with commercial banks for the period of study. However, commercial housing loan remains the higher in term of value compared to housing financing.

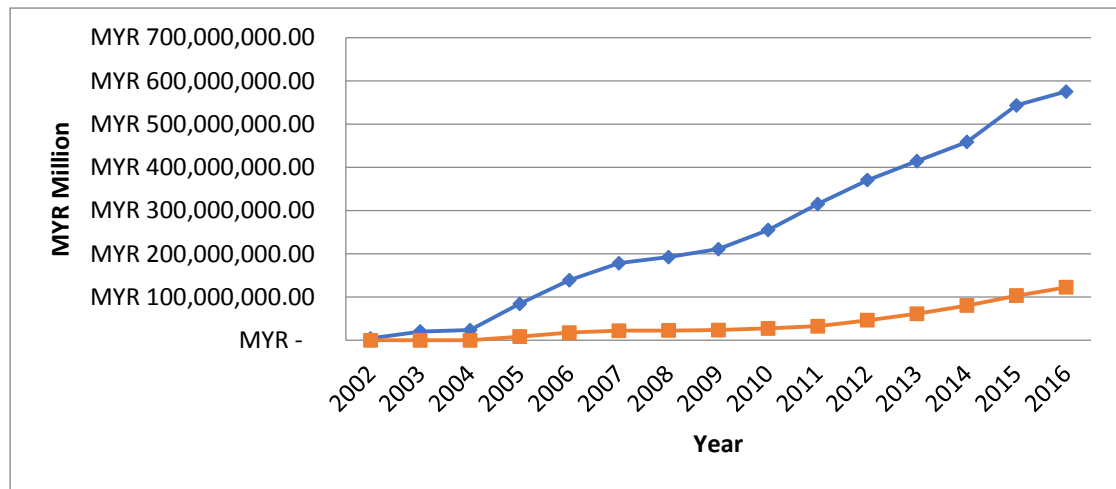


Figure 4.2
Trends of Housing Loan/Financing on Commercial and Islamic Banks in Malaysia
Sources: Financial Report for Commercial and Islamic banks in Malaysia

4.5 Trends of Risk Performances for Malaysian Banks

NPL refers to percentage of non-performing loan over total loan face by the banks. Figure 4.3 shows NPL for all banks from 2005 until 2016. From the graph, it shows that the highest NPL was recorded on 2005 while the lowest was on 2016. The impact of US financial crisis in 2008 might have impact on Malaysian banks because during the crisis Malaysia banks have tighten their loan to customer. This then reflects their non-performing loan and this might be the reason of slight decrease in the graph line in year 2008-2010. However, the housing loan/financing show the increased trends in year 2010 to 2012 before it decreased for the subsequent years.

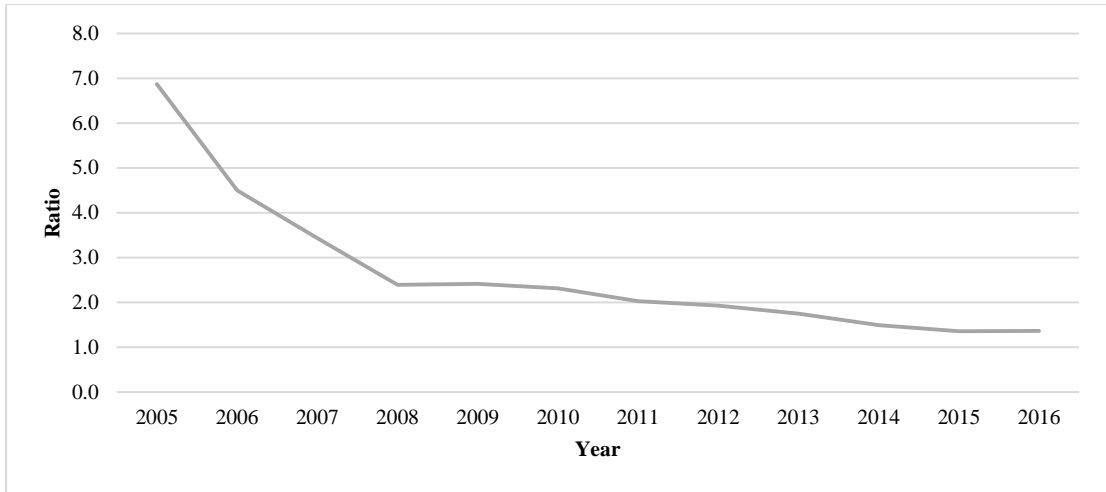


Figure 4.3
Trends of NPL for All banks
Sources: Financial Reports of Malaysian Banks

Figure 4.4 shows the trends for commercial bank NPL and NPF for Islamic bank. The highest NPL for commercial was recorded in 2010 with ratio of 2.17%, while the lowest was 1.38 in 2014. On other hand, NPF for Islamic banks was at peak in 2009 and the lowest was in 2016 with 1.26%. BNM implemented strict guidelines during the study period to control for the NPL/NPF movement. This includes the implementation of the Market Risk Capital Adequacy Framework (MRCFAF) with the aims to control the loan supply in Malaysian banking system.

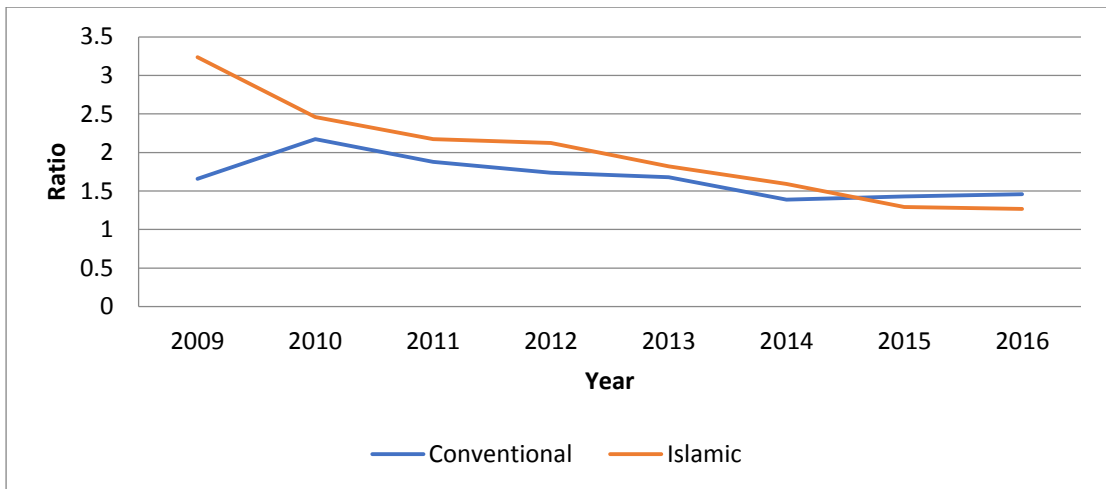


Figure 4.4
Trends of NPL/NPF for Commercial Banks and Islamic Banks
Sources: Financial Report of Sample Banks

Loan loss provision is the amount charged to the earning assets to prepare the reserve used by the bank as a predicted absorbed loan loss. In general, the higher the lending, the higher would be the bank LLP. Figure 4.5 shows the NIM for both commercial and Islamic banks. Banks with low LLP tend to attract more customers to invest in their banks and also give them high expectation to earn income. The highest NIM was recorded on 2012 with average of MYR (96,502.38) while the lowest was in 2006 with MYR (306,839.28). However, from 2006 to 2016 the graph shows positive movement event though there is fluctuant trend due to the unstable of economy on 2008 and 2012 which will reflect the LLP of the bank.

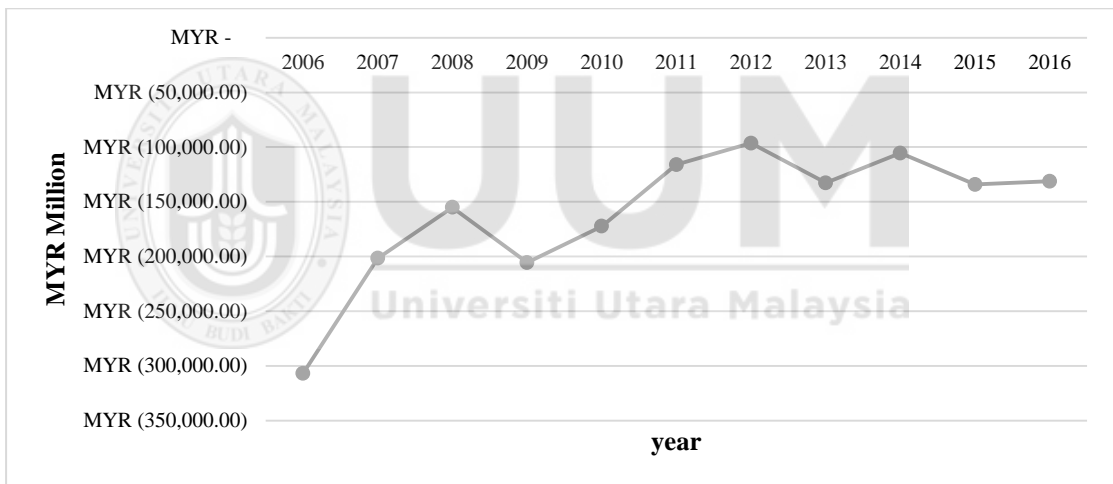


Figure 4.5
Trends of LLP for All Banks
Sources: Financial Report for all banks in Malaysia

Figure 4.6 highlights the trends of LLP for commercial banks and NPM for Islamic banks where blue line represents the commercial bank LLP and the grey line represents Islamic bank NPM. LLP for commercial banks seems to show up and down trend where the highest LLP was recorded in year 2012 with LLP value of MYR (1,155,336.00). Compare to LLP for Islamic bank, the highest LLP was recorded in year 2008 with LLP value of MYR (465,215.00).

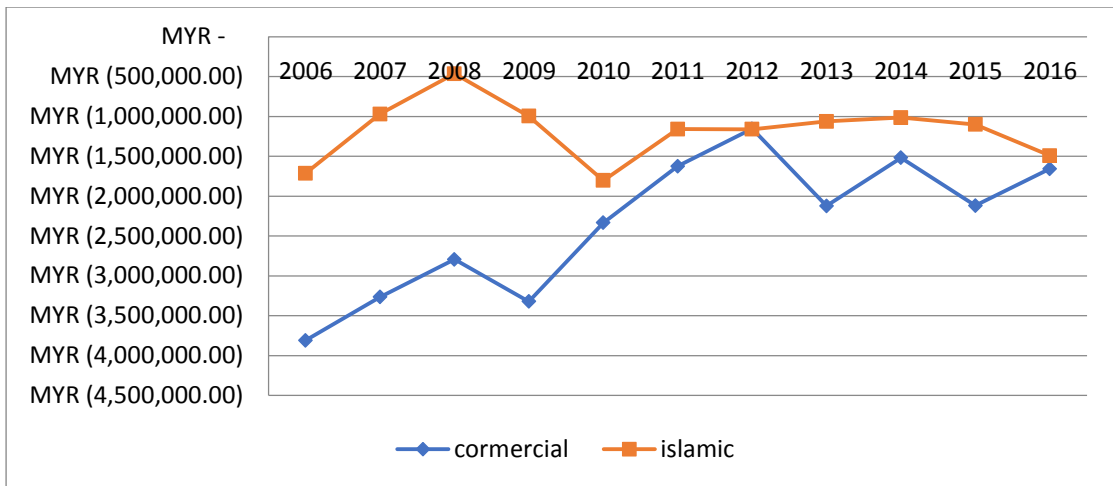


Figure 4.6
Trends of LLP for Commercial Banks and Islamic Banks
Sources: Financial Report for Commercial and Islamic Banks in Malaysia

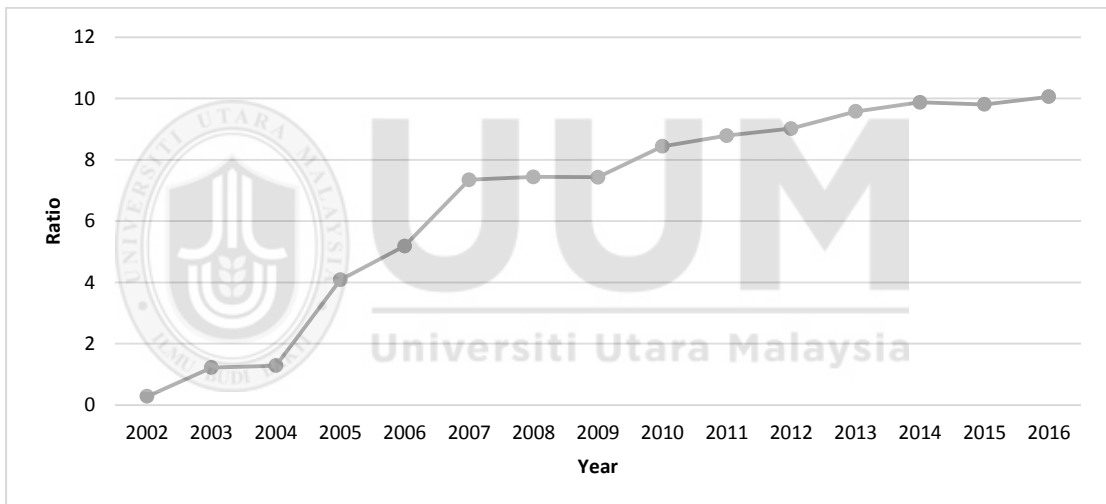


Figure 4.7
Housing Loan/Financing Over Total Loan Ratio
Sources: Financial Report for All Banks in Malaysia

The above ratio shows the amount of housing loan/financing compare to total loan/financing. Figure 4.7 shows housing loan/financing become an important loan to the bank and the amount increased year by year for the last 16 years. Even there was slow increased in 2006 to 2009 due to the crisis, but the ratio is considered high compare to the previous 5 years. The steadily growth of housing loan/financing in 2005 until 2016 were contributed due to the implementation of the Market Risk Capital Adequacy Framework (MRCAF) by BNM. This is an important shift towards

providing explicit regulatory capital for losses that may arise from activities that exposed banking institutions to market risk.

4.6 Regression Results

This section reports on the regression results based on the models mentioned in the previous chapter. The first model is regressed based on NPL while the second model is based on LLP where the results are reported in Table 4.4 and Table 4.5

Table 4.4
Regression Results for NPL

	All	CB	IB
	FEM	REM	FEM
Constant	24.2881 (0.006)	33.8256 (0.000)	16.3737 (0.063)
Bank specific			
LPRO	-1.3654 (0.007) ***	-1.8209 (0.000) ***	-0.8358 (0.013) **
TEXPTI	0.0756 (0.951)	0.1416 (0.156)	-0.0111 (0.994)
TLTA	0.1025 (0.800)	-17.6419 (0.310)	0.2449 (0.903)
INCTL	-17.3676 (0.425)	-2.5867 (0.115)	-38.2658 (0.104)
Macroeconomic			
GDP	0.1042 (0.079) *	0.1995 (0.003) ***	0.0678 (0.486)
CPI	-0.0224 (0.753)	0.0400 (0.686)	-0.1103 (0.451)
R ²	0.0328	0.0858	0.0099
Observation	269	140	129
Hausman	0.0031	0.0000	0.0000
Heteroskedasticity	0.0000	0.0000	0.0000
Autocorrelation	0.0000	0.0000	0.0000

ALL: all bank, CB: commercial bank, IB: islamic banks, texpti: total expenses/total income, tlta: total loan/total asset, inclt: income/total loan, lpro: nature log property gdp: gross domestic product, cpi: consumer price indexes, P value are in parentheses
*** p<0.01 p<0.05 p<0.1

Table 4.4 reports on the impact of housing loan/financing and other variables on NPL for 24 Malaysian banks (12 Islamic banks and 12 commercial banks). The regression is divided into three models; a) Model A for all sample banks (Islamic banks and

commercial banks) which involves 269 observation, b) Model B for commercial banks which involves 140 observation and c) Model C for Islamic banks (129 observation). All three models were regressed with Random Effect Model (REM) and Fixed Effect Model (FEM) and Hausman tests have been conducted to identify the best fit models. Therefore, the results report based on the Hausman test with robust standard errors with the assumption of the presence of heteroscedasticity and autocorrelation problems in the models.

From the results, it is found that only the one bank specific variables are significant in Model A. Housing loan/financing is significant at 1% level of confidence with the coefficient value of -1.3654. The negative sign indicates that 1 unit change in housing loan/financing will reflect the 0.0338 changes in the NPL. With the significant relationship between housing loan/financing and NPL, the bank needs to monitor their level of financing due to its significant contribution to the bank risk. This negative relationship is also supported by Bandopadhyay and Saha (2009) where they found negative effects of loan on the bank risk. As for the macroeconomic variables, Gross Domestic Products (GDP) shows positive and significant relationship with NPL with coefficient equals to 0.1042. This indicates that a one unit increase in the GDP variable will lead to a 0.1042 unit increase in NPL.

Interestingly, Model B also shows that the same results where housing loan/financing have negative relationship with NPL with coefficient value of -1.8209. The negative sign indicates that every one unit increase in LPRO leads to -1.8209 decrease in bank NPL. For macroeconomic variable, GDP shows significant and positive relationship with bank NPL with coefficient value of 0.1995. As for Model C, Islamic bank

regression shows that housing loan/financing is significant at 5% level of confident with coefficient value of -0.8358. This indicates that 1 unit increase in housing loan/financing leads to the 0.8358 unit decrease in NPL.

Table 4.5
Regression Results for LLP

	All	CB	IB
	FEM	REM	FEM
Constant	0.0513 (0.002)	-0.0186 (0.000)	0.0209 (0.253)
Bank specific			
LPRO	-0.0027 (0.003) ***	0.0011 (0.000) ***	-0.0020 (0.031) **
TEXPTI	-0.0052 (0.035) **	-0.0013 (0.453)	-0.0033 (0.114)
TLTA	0.0006 (0.701)	0.0002 (0.218)	0.0197 (0.312)
INCTL	-0.0502 (0.525)	-0.0551 (0.131)	0.0086 (0.930)
Macro variable			
GDP	0.0000 (0.846)	0.0000 (0.874)	0.0002 (0.316)
CPI	-0.0000 (0.976)	-0.0000 (0.704)	-0.0001 (0.755)
R ²	0.0251	0.1635	0.0496
Ob	269	140	129
Hausman	0.0000	0.6181	0.0065
heteroskedasticity	0.0000	0.0000	0.0000
autocorrelation	0.0709	0.0485	0.2222

ALL: all bank, CB: commercial bank, IB: islamic banks, texpti: total expenses/total income, tlta: total loan/total asset, inctl: income/total loan, lpro: nature log property gdp: gross domestic product, cpi: consumer price indexes, P value are in parentheses
*** p<0.01 p<0.05 p<0.1

Table 4.7 presents the regression results of several models of housing loan/financing and other variables on the loan loss provision (LLP). According to Radivojevic and Jovovic (2017), LLP is commonly used as an indicator in measuring the bank risk because it represents the expenses allocate for the bank loss due to loan/financing activity. For Model A, the results show that housing loan/financing (LPRO) and total expense over total income (TEXPTI are significant in influencing bank LLP.

The result of LPRO is significant at 1% level of confidence with coefficient of -0.0027. The negative sign indicates that one unit decrease of LPRO will lead to -0.0027 increases of LLP. The second bank specific variable that has significant relationship is total expenses over total income (TEXPI). This variable has negative relationship with LLP with coefficient of 0.0052 in all banks model. This indicates that one unit decrease in TEXPI will lead to 0.0052 increase in bank LLP.

For commercial bank model as reported in Model B, the results show that only one variables which housing loan/financing (LPRO) are significant with bank LLP. LPRO shows significant relationship with bank LLP with coefficient value of 0.0011 and this positive sign indicates that ne unit decrease in LPRO leads to 0.0011 decrease in bank LLP.

In contrast with commercial bank, Islamic bank show different results where housing loan/financing (LPRO) variable has negative relationship with bank LLP with -0.0020 coefficient values. The result shows that one unit decrease in LPRO leads to 0.0020 increase in Islamic banks NPM.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This thesis aims to investigate the impact of housing loan/financing and other control variable on the bank risk and the trend of housing loan/financing in Malaysian commercial banks and Islamic banks for the period of 2002 to 2016. Two dependent variables (NPL and LLP) are selected as proxies for bank risk and they are regressed using panel data REM and FEM models.

5.2 Summary of Findings

The first objective of this study is to identify the trends of housing loan/financing for commercial bank and Islamic bank in Malaysia. Based on the finding in Chapter Four, housing loan/financing seem to show increases trends especially from year 2004 onwards. Although, commercial banks are found to dominate housing loan market, but Islamic banks are capable to compete with commercial bank in this specific type of financing.

The second objective is to investigate the impact of housing loan/financing on the bank risk in Malaysia banking system. The results show that housing loan/financing has significant and negative impact on banks NPL. As for other dependent variable, LPRO also show significant relationship with banks LLP.

For the third objective, this study investigates the differences of housing loan/financing impacts on return performances of commercial banks and Islamic

banks. The results show that commercial bank housing loan has significant impact on NPL and LLP. Similar result is also reported on house financing where significant relationship is found between them and Islamic bank risk.

5.3 Implication of Findings

The findings of this study have several implications not only in theory but also in practical point of view.

5.3.1 Theoretical Implication

This study provides some empirical supports to the theoretical studies on the relationship between housing loan/financing and bank risk performances. In general, previous studies show that bank loans have significant relationship with bank risk performances. They support this view by proposing that the higher the bank loans the higher could be the bank returns and risk. But there are not many studies focus on the impact of specific type of loan such as housing loans/financing on bank risk performances.

This study contributes to the existing banking literature on bank risk by including housing loan/financing as the focus variable. On top of that this study also investigates the impact of housing financing which are unique for Islamic banks. The results for both commercial banks and Islamic banks show that the relationship between housing loan/financing is negative related with bank risk which support the views of Bandopadhyay and Saha (2009).

5.3.2 Practical Implication.

Housing loan/financing is popular among the banking institutions due to its nature that the necessity to own a house for human life compares to the other type of loans. With the higher demand of housing loan/financing and increasing population, it is expected to impact the banks' NPL and LLP.

With the negative relationship between housing loan/financing and bank returns, the results propose that banks can rely on housing loan/financing to increase their returns with minimum risk. The minimum risk is because the housing loan/financing usually will be backed by mortgage. Bank management should give attention to housing loan/financing facility by providing better services and greater benefits to the customers.

In addition, from the analysis it can be seen that the commercial bank dominates the market in housing loan/financing. Islamic banks should use this opportunity to expand their market because their market share for housing loan/financing is smaller compared to commercial banks. With an increase in demand for houses and growth in population, Islamic banks should grab this opportunity to offer more benefits and attractive packages to new housing loan/financing customers.

Lastly, it is important for the practitioners to understand the risk of housing loan/financing that affects the performance of the bank and its risk management practice. Malaysian banks must always be aware with the changes of the product will reflect the risk management.

5.4 Limitation of Study

There are two limitations for this study are highlighted as follows:

1. Based on the previous study there are not many researches that focus on housing loan/financing and bank risk. Previous researches mostly concentrate on total loan/financing as their variable in investigating loan impact on bank performances. Therefore, argument and discussion on impact of housing loan/financing and bank performance is very limited.
2. Not all financial institution offers housing loan/financing facility to their customer and this contributes to the lower data frequency. As a result, the data for housing loan/financing is limited and with this limitation, this study investigates the impact of housing loan/financing on bank risk. This is more obvious for Islamic banks where their market share is smaller compare to commercial banks. Therefore, Islamic banks data especially on housing loan/financing is also small

5.5 Recommendation for Future Research

The following recommendations are proposed:

1. The study of bank performances is not limited on bank risk, but it also can be expanded to bank return. It is interesting to have study that assesses the impact of housing loan/financing on both bank risk and return.

2. Panel data is not limited to REM and FEM, but it also has more advance techniques such as GMM and many others. Future research may use this advance technique to analyze the impact of housing loan/financing on bank performances which makes the finding is more meaningful.

5.6 Conclusion

This study investigates the impact of housing loan/financing and other variables with bank risk performance of dual banking system in Malaysia. The data is restricted to commercial and Islamic banks in Malaysia within the period of 2002-2016.

The results from Random and Fixed Effect models show that housing loan/financing has significant and negative impact on banks NPL. As for other dependent variable, housing loan/financing also show significant relationship with banks LLP.

From the analysis, it can be concluded that housing loan/financing are very importance to the bank. It's because the result show housing loan/financing are low risk portfolio in bank investment. As nature, the housing loan/financing will be backed by the mortgage and it will mitigate the risk in investment. Besides that, even though commercial banks seem to dominate housing loan/financing market, but Islamic banks are capable to compete with commercial bank in this specific type of financing.

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APPENDICES

LLP All Bank Random Effect

Random-effects GLS regression	Number of obs	=	269
Group variable: code	Number of groups	=	24
R-sq:	Obs per group:		
within = 0.0182	min =		7
between = 0.3930	avg =		11.2
overall = 0.0596	max =		15
corr(u _i , X)	= 0 (assumed)	Wald chi2(6)	= 16.61
		Prob > chi2	= 0.0108

llpta9	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
texpti	.0019552	.001746	1.12	0.263	-.0014669	.0053772
tlta	.0018939	.0011083	1.71	0.087	-.0002783	.0040661
inctl	.0668092	.0340085	1.96	0.049	.0001537	.1334647
lpro	-.0010275	.0002985	-3.44	0.001	-.0016125	-.0004424
gdp	2.61e-06	.0003223	0.01	0.994	-.0006291	.0006343
cpi	.0001208	.0003703	0.33	0.744	-.0006049	.0008466
_cons	.0142727	.0052518	2.72	0.007	.0039794	.0245661
<hr/>						
sigma_u	0					
sigma_e	.00662478					
rho	0	(fraction of variance due to u _i)				

LLP All Bank Fixed Effect

Fixed-effects (within) regression	Number of obs	=	269
Group variable: code	Number of groups	=	24
R-sq:	Obs per group:		
within = 0.0810	min =		7
between = 0.0387	avg =		11.2
overall = 0.0251	max =		15
corr(u _i , X _b)	= -0.7549	F(6,239)	= 3.51
		Prob > F	= 0.0024

llpta9	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
texpti	-.0052829	.002445	-2.16	0.032	-.0100994	-.0004664
tlta	.0006272	.0011899	0.53	0.599	-.0017168	.0029712
inctl	-.0502454	.0494833	-1.02	0.311	-.1477246	.0472338
lpro	-.0027665	.0006782	-4.08	0.000	-.0041025	-.0014305
gdp	.0000235	.0003152	0.07	0.941	-.0005973	.0006444
cpi	-.0000102	.0003637	-0.03	0.978	-.0007266	.0007063
_cons	.0513139	.0117678	4.36	0.000	.028132	.0744958
<hr/>						
sigma_u	.00444852					
sigma_e	.00662478					
rho	.31077656	(fraction of variance due to u _i)				

F test that all u_i=0: F(23, 239) = 1.82

Prob > F = 0.0145

LLP Commercial Bank Random Effect

Random-effects GLS regression
 Group variable: code

Number of obs = 140
 Number of groups = 12

R-sq:
 within = 0.2256
 between = 0.2369
 overall = 0.1635

Obs per group:
 min = 7
 avg = 11.7
 max = 15

corr(u_i, X) = 0 (assumed)

Wald chi2(6) = 26.75
 Prob > chi2 = 0.0002

llpta9	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
texpti	-.0013721	.001593	-0.86	0.389	-.0044944	.0017502
tlta	.0002393	.0004988	0.48	0.631	-.0007383	.0012169
inctl	-.0551658	.0334218	-1.65	0.099	-.1206712	.0103396
lpro	.0011521	.0003272	3.52	0.000	.0005109	.0017933
gdp	.0000147	.0001808	0.08	0.935	-.0003396	.000369
cpi	-.0000585	.0002066	-0.28	0.777	-.0004634	.0003465
_cons	-.0186507	.0066723	-2.80	0.005	-.0317281	-.0055733
sigma_u	.00037219					
sigma_e	.00265713					
rho	.019243	(fraction of variance due to u _i)				

LLP Commercial Bank Fixed Effect

Fixed-effects (within) regression
 Group variable: code

Number of obs = 140
 Number of groups = 12

R-sq:
 within = 0.2430
 between = 0.2249
 overall = 0.1534

Obs per group:
 min = 7
 avg = 11.7
 max = 15

corr(u_i, X_b) = -0.7253

F(6,122) = 6.53
 Prob > F = 0.0000

llpta9	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
texpti	-.0015877	.0034771	-0.46	0.649	-.008471	.0052956
tlta	.0003978	.0004933	0.81	0.422	-.0005788	.0013744
inctl	-.0380264	.0406563	-0.94	0.351	-.1185097	.0424569
lpro	.0026087	.0005771	4.52	0.000	.0014662	.0037512
gdp	.0000345	.0001741	0.20	0.843	-.0003101	.0003791
cpi	.0000107	.0001989	0.05	0.957	-.0003829	.0004044
_cons	-.0441481	.0117462	-3.76	0.000	-.067401	-.0208953
sigma_u	.00182593					
sigma_e	.00265713					
rho	.32075221	(fraction of variance due to u _i)				

F test that all u_i=0: F(11, 122) = 2.40

Prob > F = 0.0100

LLP Islam Bank Random Effect

Random-effects GLS regression
 Group variable: code

Number of obs = 129
 Number of groups = 12

R-sq:
 within = 0.0836
 between = 0.2828
 overall = 0.1016

Obs per group:
 min = 7
 avg = 10.8
 max = 12

corr(u_i, X) = 0 (assumed)

Wald chi2(6) = 13.79
 Prob > chi2 = 0.0320

llpta9	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
texpti	.0037971	.0028324	1.34	0.180	-.0017543	.0093484
tlta	.0142888	.0041987	3.40	0.001	.0060595	.022518
inctl	.1163562	.0558277	2.08	0.037	.006936	.2257765
lpro	-.0020857	.0008309	-2.51	0.012	-.0037142	-.0004573
gdp	.0000239	.0006412	0.04	0.970	-.0012328	.0012806
cpi	-.0000303	.0007561	-0.04	0.968	-.0015123	.0014517
_cons	.0186101	.0116305	1.60	0.110	-.0041852	.0414055
sigma_u	0					
sigma_e	.00892422					
rho	0	(fraction of variance due to u_i)				

LLP Islamic Bank Fixed Effect

Fixed-effects (within) regression
 Group variable: code

Number of obs = 129
 Number of groups = 12

R-sq:
 within = 0.1398
 between = 0.0466
 overall = 0.0496

Obs per group:
 min = 7
 avg = 10.8
 max = 12

corr(u_i, Xb) = -0.4796

F(6,111) = 3.01
 Prob > F = 0.0093

llpta9	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
texpti	-.0033566	.00361	-0.93	0.354	-.0105102	.0037969
tlta	.0197818	.0067656	2.92	0.004	.0063754	.0331882
inctl	.0086489	.0936856	0.09	0.927	-.1769953	.1942931
lpro	-.0020691	.0011038	-1.87	0.063	-.0042564	.0001182
gdp	.0002942	.0006489	0.45	0.651	-.0009916	.00158
cpi	-.0001948	.000759	-0.26	0.798	-.0016987	.0013092
_cons	.0209728	.0194801	1.08	0.284	-.0176283	.0595739
sigma_u	.00468545					
sigma_e	.00892422					
rho	.21608735	(fraction of variance due to u_i)				

F test that all u_i=0: F(11, 111) = 1.75

Prob > F = 0.0722

NPL All Bank Random Effect

Random-effects GLS regression
 Group variable: code

Number of obs = 269
 Number of groups = 24

R-sq:
 within = 0.1139
 between = 0.0303
 overall = 0.0588

Obs per group:
 min = 7
 avg = 11.2
 max = 15

corr(u_i, X) = 0 (assumed)

Wald chi2(6) = 22.60
 Prob > chi2 = 0.0009

npl	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
texpti	1.252568	.7094229	1.77	0.077	-1.378751	2.643011
tlta	.2541111	.390104	0.65	0.515	-.5104788	1.018701
inctl	-4.690444	14.09792	-0.33	0.739	-32.32186	22.94097
lpro	-.6213077	.1473689	-4.22	0.000	-.9101453	-.33247
gdp	.1165245	.1065382	1.09	0.274	-.0922866	.3253355
cpi	.0338219	.1225399	0.28	0.783	-.2063519	.2739957
_cons	11.1069	2.5654	4.33	0.000	6.078811	16.135
sigma_u	.97437183					
sigma_e	2.1665932					
rho	.16822822	(fraction of variance due to u _i)				

NPL All Bank Fixed Effect

Fixed-effects (within) regression
 Group variable: code

Number of obs = 269
 Number of groups = 24

R-sq:
 within = 0.1474
 between = 0.0050
 overall = 0.0328

Obs per group:
 min = 7
 avg = 11.2
 max = 15

corr(u_i, X_b) = -0.7245

F(6,239) = 6.88
 Prob > F = 0.0000

npl	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
texpti	.0756033	.7996235	0.09	0.925	-1.499607	1.650813
tlta	.1025862	.3891499	0.26	0.792	-.6640156	.869188
inctl	-17.36765	16.18323	-1.07	0.284	-49.24763	14.51233
lpro	-1.365424	.2218056	-6.16	0.000	-1.802367	-.9284801
gdp	.1042853	.103072	1.01	0.313	-.0987604	.3073309
cpi	-.0224955	.1189477	-0.19	0.850	-.2568153	.2118243
_cons	24.28813	3.848593	6.31	0.000	16.70663	31.86962
sigma_u	2.1477076					
sigma_e	2.1665932					
rho	.49562264	(fraction of variance due to u _i)				

F test that all u_i=0: F(23, 239) = 4.55

Prob > F = 0.0000

NPL Commercial Bank Random Effect

Random-effects GLS regression
 Group variable: code

Number of obs = 140
 Number of groups = 12

R-sq:
 within = 0.4405
 between = 0.4526
 overall = 0.3683

Obs per group:
 min = 7
 avg = 11.7
 max = 15

corr(u_i, X) = 0 (assumed)

Wald chi2(6) = 80.52
 Prob > chi2 = 0.0000

npl	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
texpti	-2.586786	1.123417	-2.30	0.021	-4.788644 - .3849285	
tlta	.1416472	.290611	0.49	0.626	-.42794 .7112343	
inctl	-17.64196	20.63619	-0.85	0.393	-58.08816 22.80423	
lpro	-1.820917	.225729	-8.07	0.000	-2.263338 -1.378497	
gdp	.1995253	.103994	1.92	0.055	-.0042991 .4033498	
cpi	.0400695	.1189597	0.34	0.736	-.1930872 .2732261	
_cons	33.82561	4.564396	7.41	0.000	24.87956 42.77166	
sigma_u	.46156415					
sigma_e	1.4504073					
rho	.09195811	(fraction of variance due to u_i)				

NPL commercial Bank Fixed Effect

Fixed-effects (within) regression
 Group variable: code

Number of obs = 140
 Number of groups = 12

R-sq:
 within = 0.4515
 between = 0.4256
 overall = 0.3580

Obs per group:
 min = 7
 avg = 11.7
 max = 15

corr(u_i, Xb) = -0.6881

F(6,122) = 16.74
 Prob > F = 0.0000

npl	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
texpti	-3.045671	1.898001	-1.60	0.111	-6.802955 .7116122	
tlta	.1412449	.2692904	0.52	0.601	-.3918423 .6743321	
inctl	-20.40048	22.19248	-0.92	0.360	-64.33272 23.53176	
lpro	-2.720205	.3150287	-8.63	0.000	-3.343836 -2.096575	
gdp	.1871983	.0950214	1.97	0.051	-.000906 .3753026	
cpi	-.0136135	.1085494	-0.13	0.900	-.2284979 .2012709	
_cons	49.40972	6.41175	7.71	0.000	36.71702 62.10242	
sigma_u	1.4840087					
sigma_e	1.4504073					
rho	.51144929	(fraction of variance due to u_i)				

F test that all u_i=0: F(11, 122) = 6.14

Prob > F = 0.0000

NPL Islam Bank Random Effect

Random-effects GLS regression
Group variable: code

Number of obs = 129
Number of groups = 12

R-sq:
within = 0.0190
between = 0.4385
overall = 0.0858

Obs per group:
min = 7
avg = 10.8
max = 12

corr(u_i, X) = 0 (assumed)

Wald chi2(6) = 10.68
Prob > chi2 = 0.0989

npl	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
texpti	2.634616	.8939121	2.95	0.003	.8825807	4.386652
tlta	.7201402	1.325929	0.54	0.587	-1.878632	3.318913
inctl	-7.402329	17.75743	-0.42	0.677	-42.20626	27.4016
lpro	-.308037	.2612018	-1.18	0.238	-.8199831	.2039092
gdp	.0233022	.1996976	0.12	0.907	-.3680979	.4147023
cpi	-.0287599	.2354753	-0.12	0.903	-.490283	.4327633
_cons	5.968335	3.677447	1.62	0.105	-1.239329	13.176
sigma_u	.22411568					
sigma_e	2.65149					
rho	.0070937	(fraction of variance due to u_i)				

NPL Islamic Bank Fixed Effect

Fixed-effects (within) regression
Group variable: code

Number of obs = 129
Number of groups = 12

R-sq:
within = 0.0796
between = 0.0214
overall = 0.0099

Obs per group:
min = 7
avg = 10.8
max = 12

corr(u_i, Xb) = -0.4720

F(6,111) = 1.60
Prob > F = 0.1539

npl	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
texpti	-.0111033	1.072587	-0.01	0.992	-2.136505	2.114299
tlta	.2449327	2.010124	0.12	0.903	-3.738263	4.228128
inctl	-38.26581	27.83507	-1.37	0.172	-93.42286	16.89124
lpro	-.8358015	.3279582	-2.55	0.012	-1.485673	-.1859304
gdp	.0678507	.1927906	0.35	0.726	-.3141767	.4498781
cpi	-.1103131	.2254992	-0.49	0.626	-.5571548	.3365285
_cons	16.37371	5.787767	2.83	0.006	4.904861	27.84255
sigma_u	1.8028208					
sigma_e	2.65149					
rho	.31614641	(fraction of variance due to u_i)				

F test that all u_i=0: F(11, 111) = 3.04

Prob > F = 0.0014