DETERMINANTS OF NON-INTEREST INCOME IN MALAYSIAN BANKING INDUSTRY: A COMPARATIVE ANALYSIS ON CIMB BANK AND RHB BANK

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ABSTRACT

We have analysed the determinants of non-interest income among banking industry in Malaysia. A comparative analysis between CIMB Bank and RHB Bank has been conducted from the period of 2004 till 2015.

The main objective of this study is to identify the relationship between non-interest income of CIMB Bank and RHB Bank with factors such as bank size, total loan, total equity, net interest margin and inflation in the short run and long run. This study employs time series analysis techniques such as Vector Error Correction Model (VECM), Johanssen Co-Integration Analysis and Forecast Error Variance Decomposition (FEVD) Analysis to identify the relationship among variables in the short run and long run. Based on our analysis bank size, total equity capital, net interest margin and inflation are the significant factors determine non-interest income of CIMB Bank whereas only bank size and net interest margin are the significant factor determines non-interest income of RHB Bank in the long run. According to FEVD analysis in the short run, total loan is the only significant factor in determining the non-interest income of CIMB Bank whereas bank size and inflation are the significant factor determining the non-interest income of RHB Bank. This study finds that each bank has their unique determinants of non-interest income. Both in the long run and short run the determinants of non-interest income differ between CIMB Bank and RHB Bank. The determinants of non-interest income differ between the banks may be due to policy of the banks towards non-interest business or the types of non-interest products the banks involved in. The findings are consistent with the industry expert opinion where banks are increasing their share of non-interest income in the areas which they have additional strength and competitive advantage

Keywords: Non-Interest Income, Total Equity Capital, Net Interest Margin (NIM), Vector Error Correction Model (VECM), Forecast Error Variance Decomposition (FEVD)

ABSTRAK

Kita telah menjalankan kajian tentang faktor-faktor yang menentukan pendapatan bukan faedah bagi industry perbankan di Malaysia. Kajian perbandingan telah dijalankan di antara CIMB Bank dan RHB Bank daripada tahun 2004 hingga 2015.

Objektif utama kajian ini adalah untuk mengenalpasti hubungan di antara pendapatan bukan faedah CIMB Bank dan RHB Bank dengan faktor seperti saiz bank, jumlah pinjaman, jumlah ekuiti, *net interest margin* dan inflasi. Kajian ini mengunakan teknik siri masa seperti VECM, FEVD dan Analisis Integrasi Johansen untuk mengenal pasti hubungan di antara pembolehubah pada jangka waktu pendek dan jangka waktu panjang. Mengikut analisis yang dijalankan saiz bank, jumlah ekuiti, *net interest margin* dan inflasi adalah faktor yang menentukan pendapatan bukan faedah CIMB Bank pada jangka waktu panjang manakala saiz bank dan *net interest margin* adalah factor yang menentukan pendapatan bukan faedah RHB Bank pada jangka waktu panjang. Mengikut analisis FEVD, pada jangka waktu pendek jumlah pinjaman adalah satu-satunya factor yang menentukan pendapatan bukan faedah bagi CIMB Bank manakala saiz bank and inflasi adalah faktor yang menentukan pendapatan bukan faedah bagi RHB Bank. Kajian ini mendapati setiap bank mempunyai factor-faktor unik yang menentukan pendapatan bukan faedah. Faktor-faktor yang menentukan pendapatan bukan faedah agak berbeza bagi CIMB Bank dan RHB Bank pada jangka waktu pendek and jangka waktu panjang. Faktor-faktor in berbeza bagi setiap bank mungkin disebabkan oleh polisi yang diamalkan oleh bank berkenaan untuk pendapatan bukan faedah atau jenis produk pendapatan bukan faedah yang dijalank oleh bank. Hasil kajian ini selari dengan pendapat daripada pakar industry perbankan bahawa bank akan meningkatkan pendapatan bukan faedah di bidang yang mereka mempunyai kelebihan.

Kata Kunci : Pendapatan Bukan Faedah, Jumlah Ekuiti, *Net Interest Margin*, *Vector Error Correction Model (VECM), Forecast Error Variance Decomposition (FEVD)*

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LIST OF ABBREVIATIONS

NII	Non-Interest Income
BNM	Bank Negara Malaysia
IB	Investment Banks
ICT	Information and Communication Technology
NIM	Net Interest Margin
CAR	Capital Adequacy Ratio
FEVD	Forecast Error Variance Decomposition Analysis
VECM	Vector Error Correction Model
OECD	Organisation for Economic Co-operation and Development
OBS	Off Balance Sheet
GDP	Gross Domestic Products
BLR	Base Lending Rate
OPR	Overnight Policy Rate
CPI	Consumer Price Index
NIITR	Non-Interest Income Over Total Revenue
LNBS	Bank Size
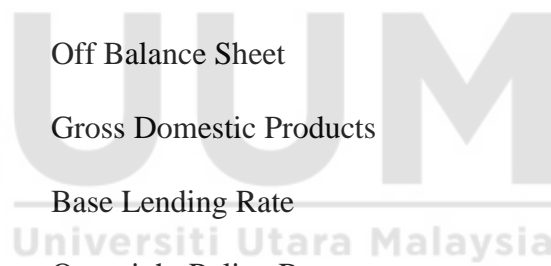
CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Commercial banks source of income are basically from interest income and non-interest income. These two components are the main sources of income for banks in all the countries. Banks earn interest income from loan disbursed by them and non-interest incomes are derived from fees and charges from offering various types of financial services and products (Kwast, 1989). Traditional source of income for banks are interest income and are derived from all types of lending which are offered by financial institutions. Lending to corporate includes business loans, working capital loan, term loan, venture capital lending, syndication etc. Whereas lending to retails include real estate loan, hire purchase loan for vehicles, personal loan for various purpose, education loan etc.

Due to globalization, competition and global economic environment, banks need to diversify their operations to earn other than interest income. Theoretically, diversification is preferred by banks because fee based products are not related to traditional banking operations. Therefore revenue diversification gives banks additional income stream other than interest based income. So, banks start to venture into other operations such as insurance, unit trust, brokerage service, trade finance service, foreign exchange, advisory service, fiduciary or private banking etc. All these services give revenue to the bank in the form of fee or service charges which are classified as non-interest income. The contribution of non-interest income to banks

revenue is becoming more important and visible. This diversification of banking operations is evidenced worldwide and it is found that it increase profitability and bank's value (Kevin J, Stiroh, 2006).

For example, the non-interest income in USA as of 1980 consists of 20% of operating income and it gradually increases to 32% in 1990 and 42% in 2004 (Kevin J, Stiroh, 2006). The latest statistics show that non-interest income consist 45% of operating income in 2015 among all the US banks (Source: FDIC). US banks earns non-interest income by providing service such as trust and investment management, retail brokerage, custody and merchant processing. According to the Figure 1.1 below, it is obvious that non-interest income contributes consistent revenue to the banks on top of the traditional income which is interest income.

Figure 1.1
Quarterly Non-Interest Incomes For Banks in USA
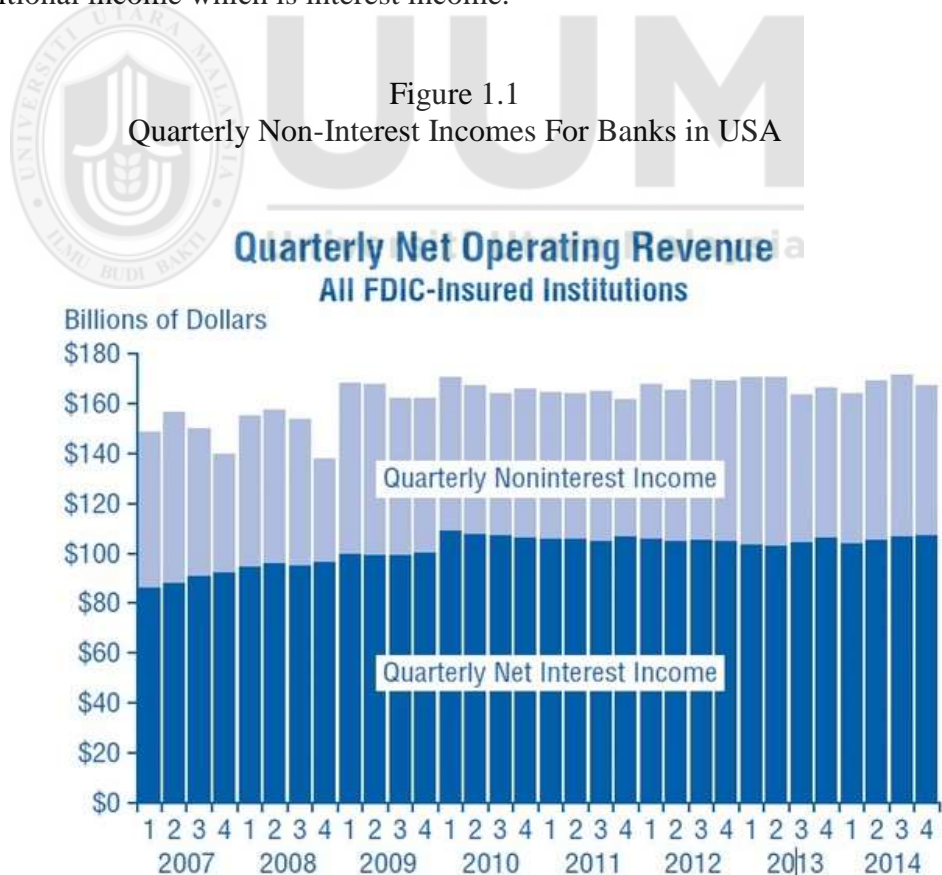
Source : FDIC

Reports by Banking Supervision Committee of European Central Bank in year 2000 stated that increase of non-interest income among European banks has changed the banks income structure. Furthermore the reports also said that non-interest income is the most dynamic component in the European banks income structure and it has positive effect on the banks profitability. In addition, it is less volatile than interest income among European banks. The change of structure of European banks is confirmed by the data on non-interest income as a percentage of gross income from 1989 till 1998 where it increases from 26% in 1989 to 42% in 1998 (Source: European Central bank). The increasing trend of non-interest income shows that banks are shifting their business from traditional lending to other business offering services. This is supported by research done among European banks by Mercieca (2007). According to Mercieca non-interest among banks in Europe consist on average of 40% from the total banking revenue as of 2005.

Above we have discussed trend of non-interest income in developed countries such as America and Europe. Now let us look into other Asian countries or developing nations. As of 2014, non-interest income contributes more than 30% to the total income of banking industry in Singapore and Thailand respectively (Source: World Bank). For these both countries non-interest income share has been increasing gradually and it stood at 30% of the total industry income currently.

Here we will look into the detailed statistics of non-interest income among commercial banks in Malaysia. As evidenced in Figure 1.2, non-interest income gives consistent return to the banking industry as a whole. For example non-interest income for the commercial banks in Malaysia is RM 9,653.4 million in 2005 and this figure has increased to RM 20,122.20 million in 2015 which is an increase of 108% in 10 years period. So, non-interest income of commercial banks in Malaysia increased at

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average rate of 10% per year. However, the interest based products or loan growth for Malaysian banking industry in 2015 is 7.9% (Source: Bank Negara Malaysia). So, the average growth of loan and non-interest income is almost at the same level. This shows the importance of non-interest income based products where it is competing with the core products of banking which in interest based products. Hence, it is obvious that non-interest income is important factor contributing to the revenue of Malaysian banking industry.

Figure 1.2
Total Non-Interest Income of Malaysian Commercial Bank (in RM millions)
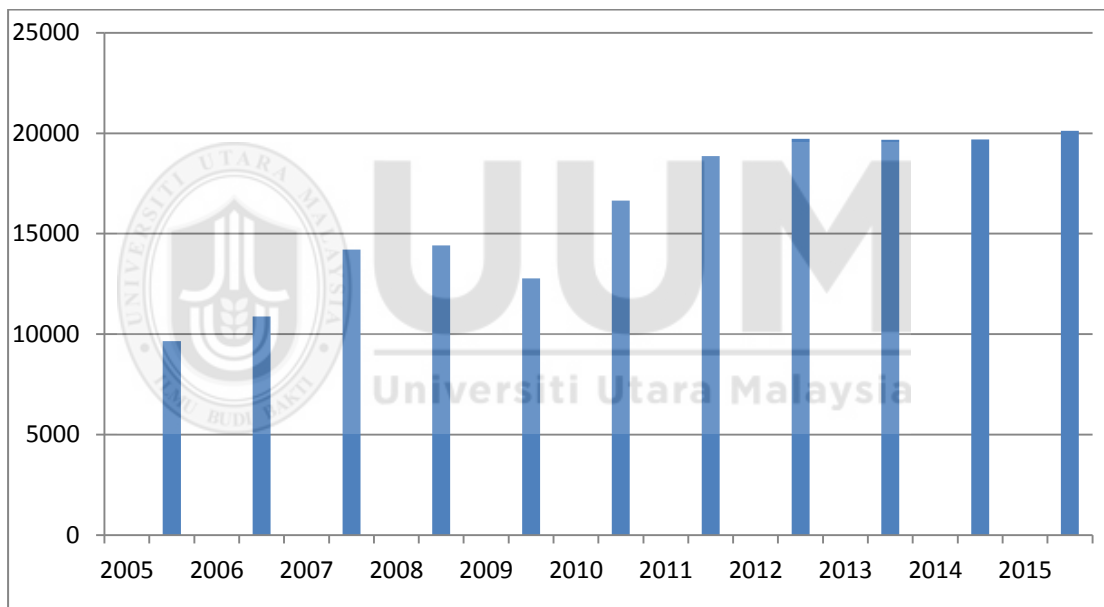
Source: Bank Negara Malaysia

From Table 1.1 below, on average non-interest income contributes 20% of the total revenue of the Malaysian commercial banks. For developed countries such as USA or Europe, non-interest income contributes more than 40% of their total revenue. For Malaysia, the level of non-interest income still has a huge potential as a results of competition, global economic environment, lower net interest margin and introduction of Basel III which will compress the interest based products. Banks in Malaysia will

step up fee based business as a result of compressed net interest margin (NIM) and

introduction of Basel III. (May 9, 2016, The Star Online)

Table 1.1
Non-Interest Incomes As Percentage of Total Income for Malaysian Commercial Banks

Year	Non- Interest Income (RM million)	Interest Income (RM million)	Total Income (in RM million)	Non-Interest Income as % of Total Income
2005	9,653.40	43,659.60	53,313.00	18.1%
2006	10,882.90	52,134.50	63,017.40	17.3%
2007	14,208.80	59,789.90	73,998.70	19.2%
2008	14,419.60	63,146.90	77,566.50	18.6%
2009	12,767.30	56,364.50	69,131.80	18.5%
2010	16,651.30	65,681.90	82,333.20	20.2%
2011	18,861.40	73,681.00	92,542.40	20.4%
2012	19,730.40	83,760.10	103,490.50	19.1%
2013	19,672.10	83,079.30	102,751.40	19.1%
2014	19,696.30	89,416.70	109,113.00	18.1%
2015	20,122.20	96,797.40	116,919.60	17.2%

Source: Bank Negara Malaysia

In summary non-interest income in USA and Europe range around 40% from their

total banking income whereas in Asia such as Thailand and Singapore the non-interest

income figure consist in the range of 30% from their total banking revenue. In

Malaysia based on the above statistics currently non-interest income consists of less

than 20% from the total banking industry revenue. Furthermore according to the

industry expert opinion, non-interest income figure may go up to 30% to 35% of the

Malaysian banking system's gross income (Aug 27, 2011,The Star). Looking at this

scenario of Malaysian banking industry, non-interest income has a very good potential

for growth in the future.

Based on the annual reports of the commercial banks in Malaysia, generally non-

interest income components comprise of commissions, fees on loan / advance /

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financing, portfolio management fees, service charges and fees, corporate advisory fees, guarantee fees, other fee income, investment income and investment banking income, forex income, and placement fee and underwriting commissions. Figure 1.3 below shows the itemized non-interest income for all the local commercial banks in Malaysia which gives us an idea on the types of non-interest income that banks earned. Fee based income is the largest component of non-interest income among Malaysian commercial banks and this includes advisory fee, brokerage fee and other fees. This is the reason why sometimes non-interest income is known as fee based income.

Figure 1.3
Non-Interest Income Breakdown for Malaysian Banks
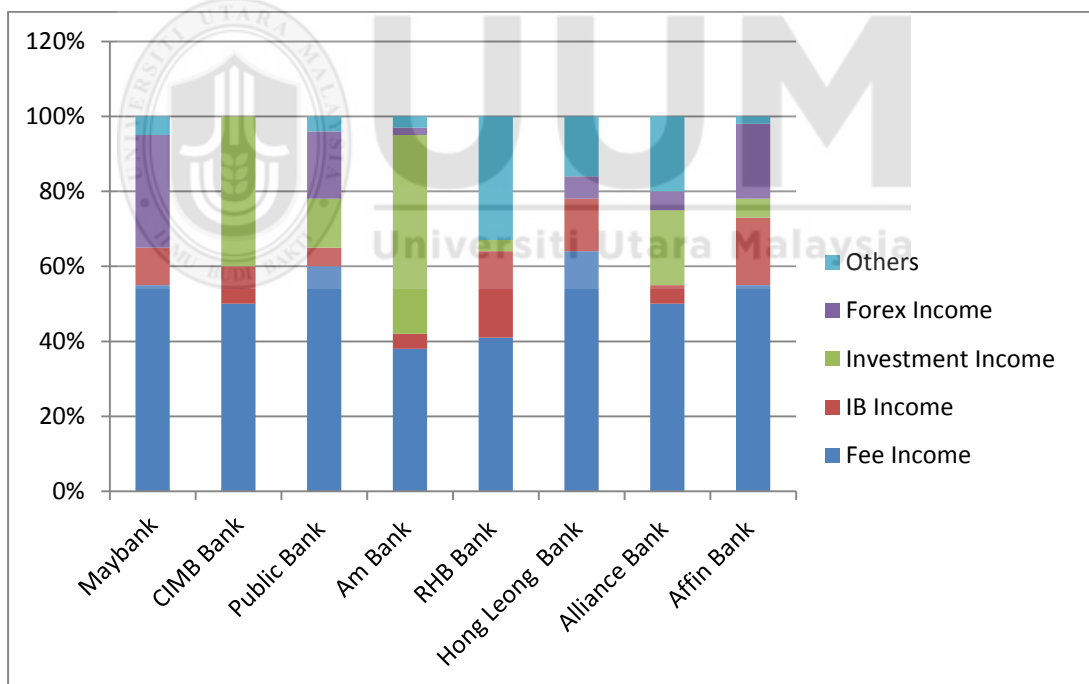
Source: Alliance DBS, DBS Bank (Dec 2015)

1.2 Problem Statement

Looking at the global economic environment, competition among banking institutions, stricter regulation via Central Bank and globalisation, there is high probability for banks to venture more into non-interest income based products where it gives additional revenue to the banks (Josephat Mboya, 2012). Therefore, financial institutions can diversify their business to fee based products and non-interest income is considered as an important source of diversification for banks (Huang & Chen, 2006). Financial institutions have been focussing more on innovation of new products and services that are expected to attract more clients. From traditional activity of banking which offers only loans to client, banks have now offer   other services such as foreign exchange services, selling insurances and unit trust, brokerage services, financial planning service, investment products, Islamic financial products, enhanced ICT based services etc. Furthermore, according to Robert De Young and Rice (2004) that non-interest income based activities gives huge return to the banks in the short run. According to his research banking industry has become more cost efficient where non-interest expenses currently consume \$0.59 of every S 1 of operating income generated by commercial banks down drastically from \$0.69 in 1986.

According to Bank Negara Malaysia(BNM) report, as of 2015 non-interest income contributes only 17% from the total income of commercial banks in Malaysia. This figure is much lower if we compare to non-interest income among investment banks in Malaysia and among commercial banks in Asian region. Non-interest income contributes more than 55% from total income among investment banks in Malaysia as of 2015 (Financial Stability and Payment Systems Reports 2015, BNM). As of 2014, the non-interest income of Thailand and Singapore consist of 30% of total commercial banking industry's revenue (Source: World Bank, 2015) whereas in Malaysia it is

only 17% as of 2015.As per industry experts many factors such declining of net interest margin, current economic environment and globalisation has made banks to focus more on the fee based business (June 6, 2016, The Star). Therefore, there is huge potential for growth of non-interest income segment among commercial banks in Malaysia.

Commercial banks in Malaysia will step up the non-interest income businesses as interest base business facing many challenges (May 9, 2016 The Star). There are several factors for upward trend in non-interest income among domestic banks in Malaysia such as decline of net interest margin and decline of growth for selective loan segment. Furthermore there is still untapped market for non-interest income such as banc assurance and asset management businesses (July 30, 2012, The Edge).

This study seeks to identify the variables that are significant in determining non-interest income of two commercial banks in Malaysia. The two banks selected are CIMB Bank and RHB Bank. The selections of the two banks are based on the asset size. For instance Maybank's asset size is almost double then the next largest bank in Malaysia which is CIMB Bank. Public Bank is not selected because some of quarterly data is not available in DataStream content provider. So, this is the reason for present study to focus on CIMB Bank and RHB Bank. Furthermore we want to study the banks within the same range of assets size so that we can have accurate and representative results for same type of banks in term of assets sizes. The determinants vary from banks characteristics determinants to macro level determinants. It is very important to identify the determinants which have significant relationship with the non-interest income so that banks can formulate strategy to increase share of non-interest income.

1.3 Research Questions

The main focus of this research is to identify and address the following questions:

i) What is the relationship between internal factors or banking parameters of bank size, total loan, total equity or capital adequacy ratio (CAR) and net interest margin (NIM) with the ratio of non-interest income of CIMB Bank and RHB Bank in the long run?

ii) What is the relationship between internal factors or banking parameters of bank size, total loan, total equity or capital adequacy ratio (CAR) and net interest margin (NIM) with the ratio of non-interest income of CIMB Bank and RHB Bank in the short run?

iii) What is the relationship between macro-economic factor of inflation with the ratio of non-interest income of CIMB Bank and RHB Bank in the long run and short run?

1.4 Research Objectives

The broad objective of this research is to identify the factors that influence the ratio of non-interest income of commercial banks in Malaysia specifically in CIMB Bank and RHB Bank.The specific objectives of this research are as follows :

i) To examine the relationship between internal factors of bank size, total loan, total equity or capital adequacy ratio (CAR) and net interest margin (NIM) with the ratio of non-interest income of CIMB Bank and RHB Bank in the long run.

ii) To examine the relationship between internal factors of bank size, total loan, total equity or capital adequacy ratio (CAR) and net interest margin (NIM) with the ratio of non-interest income of CIMB Bank and RHB Bank in the short run.

iii) Toinvestigate the relationship between external factor inflation with the ratio of non-interest income of CIMB Bank and RHB Bank in the short run and long run.

iv) To measure the influence of each variable (bank size, total loan, total equity capital, net interest margin and inflation) to the non-interest income of CIMB Bank and RHB Bank.

1.5 Significance of the Study

Research on this topic can provide overall idea and view on the importance of non-interest income of banks. It gives clearer picture on how banking industry landscape is changing from interest income based products to non-interest income based operation. It seeks to identify the determinants on non-interest income. This study has focused on two of the major banks in Malaysia which are CIMB Bank and RHB Bank. We will study whether internal factors of bank size, total loan, total equity or capital adequacy ratio (CAR) and net interest margin (NIM) and external factor inflation will have impact on their non-interest income revenue.

This study can help the bank to monitor the determinants of non-interest income to increase the bank's share of non-interest income. This research may further assist the management of the banks to formulate the strategy in dealing with all these factors in order to improve the non-interest income level in the revenue portfolio of the banks.Furthermore this study will assist other academician, bankers, industry practitioners and general public in understanding the non-interest income within Malaysian banking industry.

1.6 Scope and Limitation of Study

The scope of this study is to analyse whether there is any relationship between the variables (bank size, total loan, total equity or capital adequacy ratio, net interest margin and inflation) with non-interest income of CIMB Bank and RHB Bank. The period covered for this study is from first quarter of 2004 till fourth quarter of 2015. The discussion of this research is focused on the determinants selected to obtain better understanding of the variables and non-interest income.

However there are several limitations for this study. Here are the limitations:

i) We are unable to obtain data earlier than 2004 because it was presented under different format. If this data is taken into consideration, it may not give accurate results. As such we have limited the data collection from 2004 only.

ii) This research will not analyse the components of non-interest income. The reason is each component of non-interest income has their own determinants because of the nature of the products itself. Furthermore there are some constraints on data availability issue if we narrow down to the components of non-interest income.

iii) This study focuses on only on 2 of the major commercial banks in Malaysia and therefore it is hoped that we can provide recommendations that can be extended to the banking industry.

1.7 Organisation of the Thesis

This research has been constructed into few chapters which explain the topic studied in few areas as follows.

Chapter 1 : Introduction

This chapter briefly discusses the development of non-interest income trend worldwide and then narrows down to Malaysian banking environment. We have further discussed the component of non-interest income and how significant is non-interest income to the revenue of the banks in Malaysia.Then this chapter also specify the problem statement or the necessity to conduct research in this area. After this we discuss the research question, research objective, significance of this study and the limitation of the study.

Chapter 2: Literature Review

This chapter starts with theoretical underpinning which is divided into traditional theory of banking and modern theory of banking. Then this chapter discuss all the findings of the existing literature on non-interest income.

Chapter 3: Research Methodology

This chapter presents research framework and then hypothesis have been developed for all the selected variables based on the research questions and research objectives. The definitions of all the selected variables and the measurement are also highlighted in this chapter. The chapter explains on the methodology of Vector Error Correction Model (VECM) that is employed in the analysis.

Chapter 4 : Results and Discussions

This chapter discusses the finding of this research and interpret the results which gives us empirical understanding on the achievement of research objectives. Results include the trend analysis, descriptive analysis, unit root analysis correlation analysis, variance decomposition analysis and co-integration analysis.

Chapter 5: Conclusions and Recommendation

This is the last chapter of the research and it concludes the topic of determinants of non-interest income based on the research findings.The policy implication and recommendations based on the findings of this study will also be discussed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the existing literature on non-interest income of the banks. Many studies have been conducted involving non-interest income of the banks. There are various studies on non-interest income such as the impact of non-interest income to the bank's profitability, benefits of non-interest income, non-interest income as income diversification, comparative study on non-interest income among different type of banks and volatility of non-interest income. Our present study focuses on factor that determines the non-interest income of CIMB Bank and RHB Bank.This chapter starts with the theoretical underpinning on non-interest income. Then follows with what is non-interest income, why it has become so important among banking institutions and how it impacts banking performance? Next we focus on the factors that determine the non-interest income of the banks. These factors can be categorised into two broad areas which are internal factors or bank characteristics and external factors or macro-economic conditions.

2.2 Theoretical Underpinning

2.2.1   Traditional Theories of Banking Intermediaries

Traditionally, banking institutions function as a financial intermediation where the banks act as intermediary transferring the funds from surplus unit to deficit units. This theory was developed based on the transaction cost and information asymmetric. In other word, banks attract deposits (indebting itself towards depositors) and grant loans

(creating debt in relation to their client- the fund users).   This is the traditional functions of banking institutions.

According to the research conducted in 2005 by *Banco Bilbao Vizcaya Argentaria(BBVA)*, a Spanish banking group , net interest income which is the traditional income method of banks is diminishing and continues to be under pressure for some years given on-going low interest rate environment in developed economies. Therefore, traditional function of banking institution that taking deposit and granting loans seems to diminish. The declining function of traditional banking can be seen with the increased of fee based income in many countries. According to BBVA Research (2015), fee based income for banks ranges from 30%-40% in Nordic banks and 33% in France and Italy. According to the same research, fee income consist almost 60% of total banking income in Spain in 2003. This means that, despite the decline in the interest based income, banking institutions have managed to prosper and are still very important to the economic growth of the country. In other words banking institutions has shifted from its traditional way of doing business to focusing on new products which are fee based or non-interest income products such as unit trust, mutual funds, insurance, transaction service, investment etc. This implies that, the traditional theory of banking is gradually shifting to modern theory of banking which promotes diversification by banking institutions. This will further discussed in the next section.

2.2.2 Modern Theory of Banking (Diversification)

Banking institutions have started to diversify their operations from traditional activities of lending (interest income based operations) to non-traditional activities (non-interest income based activities) (Robert De Young & Rice, 2004). Non-interest income is considered an important source of diversification for banks (Huang& Chen, 2006). This is very common in many industries where each organisation try to diversify their business to survive in this global competitive business environment. The diversification of banking industry into non-interest income based products can be linked to portfolio model or Markowitz portfolio theory.

Generally banks engage in two types of activities to generate return which is traditional lending activities which generate interest income and other activities such as investment banking, securities, forex,etc. which generate non-interest income. Markowitz portfolio theory explains how banks internally managed its portfolio such as interest income and non-interest income. Portfolio theory explains the relationship between return and risk in a given set of portfolio. Generally different portfolio composition contains different level of risk and expected return. Standard portfolio theory suggests that bank's total expected return depends on the size of each activity that generates interest income and non-interest income and the volatility of this activity. According to this model, portfolio return of the banks depends on relative shares of each activity, variance of return on each activity and also covariance between activities. This model of revenue portfolio has been presented by Kevin J, Stiroh (2006). In a nutshell according to this theory, banks will optimize their profits by having efficient portfolio (interest income and non-interest income) after considering risk and return of the interest based products and non-interest based products and volatility of this activities.

According to the above model, volatility of income has great implication on the banking industry. All institutions expect very stable income and for banking institution, they have two types of incomes which are interest based income and non-interest based income. Non-interest income generating activities are relatively more volatile than return from activities that generate net interest income among banks in USA and it does not seem to have higher average return (Kevin J. Stiroh, 2006).

2.3 Non-Interest Income

The traditional activity of mobilizing deposits and lending out funds has been in declining trend and banks started to venture into many other fields such as trade finance, foreign exchange, unit trust, advisory service, investment banking, insurance, fiduciary etc (Tortusa-Ausina,2003). All this activities give income to the bank in the form of fee, commission or handling fee. All these income is called non-interest income. In other words, whatever income banks obtained other than interest is called non-interest income. Fee based income is becoming one of the main sources of income for the banks (Smith & Wood, 2003).

Almost half of the operating incomes in the US commercial banks are generated from non-interest income (Robert De Young, 2004). He found that banks with higher ROE expand more slowly into non-interest activities and another important finding is non-interest income is co-existing with interest income rather than replacing it. The reason could be bank offered the new products and services bundled together with the loan based products. He is in the opinion that bank's core function is still interest income intermediation activities. Smaller banks in Ghana are more involved in fee based activities compared to larger banks (Basil Senyo, Olivia & Albert 2014).

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It is clear that banking institutions are diversifying their business model so that they can compete with other banks in the market. In recent modern banking environment, banks need to be more proactive and innovative in offering more products and services to their clients in order to capture higher market share. The banking institutions have more source of revenue when they diversify their activities and many bankers and shareholders continued to believe that this non-interest income will be additional income for the banks. Furthermore banks can increase shareholders value by shifting their focus from traditional income sources to non-interest income sources (Gurbuz, Yanik & Ayturk, 2013).

2.4 Non-Interest Income and Financial Performance

Is non- interest income is stable income for the banks? This view is not supported by many analyst and researcher. According to research done by Kevin J, Stiroh (2006) and Robert De Young & Roland (2001), non-interest income only increases the volatility of bank's earning. Roland and De Young have given some fundamental reasons why non-interest income is not a stable income for the banks. First, is the loans held under bank's portfolio are actually relationship based. This traditional banking activity gives stable interest income because under loan based relationship, it is a long term relationship with the banks and it opens for some negotiation in terms of pricing. Furthermore on loan products the customer will face high cost of switching in case they move to another bank. This makes the interest income from loan are more stable. Whereas fee based income is the income generated for each and every transactions and demand for this product will fluctuate depending on many factors such as competition, pricing, can switch easily to other banks etc. So, fee generated from this service fluctuates accordingly. Second reason is when a bank shifts from interest based products to non-interest based products, it tends to increase its degree of

operating leverage (Robert De Young & Roland, 2001). This means in the lending activity, increasing amount of loan will only increase the variable cost which is interest expenses whereas increase in non-interest income products will increase the fixed cost of the banks such as labour, information technology etc. The implication is variable cost for non-interest income fluctuates and it impacts the net non-interest income. This is one of the reasons of volatility of non-interest income and it is not considered as stable income. So, volatility of non-interest income is very dangerous and banks cannot depend on this type of income alone. This is the reason why non-interest income is known as a supplementary income to the banks along with stable interest income. According to the study by Robert De Young, 2004 interest income is still the core income for the banks but non-interest income will be co-existing with interest income rather than replacing it.

Chiorrazzo et al (2008) conducted a study on non-interest income and its impact on profitability among Italian banks from 1993 to 2003. He found that diversification of banking activities only increase the volatility of bank earnings. The same results were obtained in study among US banks by Kevin J, Stiroh (2006) and also a study on 15 different European countries by Smith Staikouras and Wood (2003) where non-interest income increased the profits of the banks but at the same time increases the volatility of its earning.

Whereas a study conducted in Germany banking sector from period of 1995 to 2007 gives different results. Busch (2009) found that earnings of banks in Germany are positively correlated with the higher fee based activities. Another study conducted by Shrene A. Bailey (2010) at Jamaica shows that an increase of non-interest income not only improves the bank's profitability but it increased volatility in performance. Another interesting issue found by Sherene A. Bailey is non-traditional activity is

correlated with economic performance of the country. He found that during economic instability, the non-interest income is in declining trend and vice-versa. Joon Ho Hahm (2008), has conducted a study on determinants and consequences on non-interest income diversification of commercial banks in OECD countries. He has taken sample of 662 large commercial banks in 29 OECD countries and finds that positive impact of non-interest income on bank's profitability is becoming weaker under the consideration of macroeconomic factors and adverse impact on the profit remain robust.

Another study was conducted by Karim and Gee (2007), among local banks in Malaysia. They analyse how off balance sheet activities (OBS) affect the bank's performance in Malaysia. They found that only market risk is significantly related to off balance activities. According to them this may be due to the fact that OBS activities are not the main source of revenue as non-interest income generating activities was still in its emerging phase. There is no significant relationship between other variables such as return on equity, leverage and liquidity ratio with OBS activities.

There are mixed views on the non-interest income contribution to the bank performance or bank revenue. So, the impact of non-interest income to the profitability of the banks differs from country to country. This may due to the nature of the products itself, economy growth of the country, technology impact, regulation of the central banks etc.

2.5 Bank Size and Non-Interest Income

According to past researches, bank size plays very important and significant role in determining the size of non-interest income. Most of the studies have used assets size to determine the size of the banks. In most of the studies, bank size is positively related with non-interest income.

Pennathur and Subrah (2012) have studied the impact of bank's ownership structure and size of non-interest income. They have analysed 172 banks in India and they found that bigger banks are enjoying bigger non-interest income while smaller banks are getting only smaller portion of non-interest income. Furthermore his study reveals that foreign banks in India reported higher fee income whereas public banks in India reported lower fee income. Furthermore, extensive analysis done by Joon-Ho Hahm (2008) on 662 commercial banks in 29 OECD countries found that, banks with larger assets tend to have higher non-interest income shares. According to his extensive research, bank size plays a very significant factor determining the non-interest income of the banks.

Study done by Roger and Sinkey (1999) on Non-Traditional Activities at US Commercial Banks found that firm size is the one of the most important factor that contributes to the non-interest income of the banks. He finds that bank size is significant and positively related to non-interest income activities of the bank. Furthermore he opines that larger banks manage to optimize their technology advances to save their cost and improve their efficiency. According to Robert De Young (2004) size of the bank is significant and positively correlated with the non-interest income in USA. It means mega banks are getting higher portion of non-interest income compared to smaller banks. In his study, Robert De Young finds very strong and positive link between large banks and size of non-interest income. Latest

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research conducted by Swiss Institute of Banking and Finance in 2014, found the same results (Anthony Saunders, Markus Schmid& Ingo Walter,2014). So, in USA itself, studies have been conducted in 1999, 2004 and 2014 shown consistent result where bank size has significant impact on non-interest income and they are positively related.

Abdelaziz Hakimi, Hamdi and Djelassi (2012) find that bank size has positive and significant impact on non-interest income among the Tunisian banks. Analysis on the Mexican banks, found that size of the bank is significant factor determining non-interest income. (Rodolfo 2015)

Interestingly, some research found size of non-interest income getting smaller as size of banks increase. Craigwell and Maxwell (2006) on their analysis of commercial banks in Barbados and Basil Senyo Damankah and Olivia (2014) on their analysis of non-interest income of commercial banks in Ghana conclude that smaller banks generates more non-interest income relative to the bigger banks in their country respectively.

So, generally we can summarize that size of the bank have significant impact on the performance of non-traditional activities of the banks. From the research conducted in developed or developing countries such as India, USA and OECD countries shown that the bigger is the bank, the larger is their non-interest income and both of these variables contain positive relationship. Whereas research conducted in third world countries or much smaller economy such as Barbados(Craigwell & Maxwell,2006) and Ghana (Basil Senyo & Olivia,2014) shows negative relationship between size of the banks and non-interest income.

2.6 Total Loan and Non-Interest Income

Another important factor determining the non-interest income is the total loan of the banks. Loan gives revenue to the banks in the form of interest and this is the traditional way bank do their business. If total loan have significant impact on the non-interest income and it is correlated negatively, it means that bank emphasis more on the loan products and thus it will increase the interest income and at the same time this will reduce bank's non-interest income. If total loan has significant impact and it is correlated positively, it means whenever interest income increase it will increase non-interest income of the bank as well and it shows bank's interest based products and non-interest based products are inter-related or both of these products are bundled together.

Robert De Young and Tara Rice (2004), has analysed 4,712 commercial banks in U.S from 1989 till 2001. They found that the total loan ratio has significant impact on the non-interest income and it is negatively correlated. Robert De Young & Rice (2004),further analysed the impact of several types of loan on the non-interest income such as real estate loans and commercial and industrial loans. They found that real estate loan is a significant factor determining the non-interest income and it is correlated negatively whereas commercial and industrial loan is not affecting the non-interest income. Joon Ho Hahm (2008) finds that the loan ratio has significant impact on the non-interest income of the banks and it is negatively related. These findings are consistent with US banks analysis done by Rogers and Sinkey (1999) and Robert De Young (2004) which concludes that total loan and non-interest income is negatively correlated.

Analysis among European banks found a negative correlation between interest income (obtained from loans) and non-interest income (Smith, 2003). This finding has been

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obtained from a detailed research of 2,655 banks in all the European countries. This can be concluded that interest based products offered by banks is negatively correlated with non-interest income. It means if banks focus more on lending their non-interest income will diminish and vice versa.

Sherene Bailey (2010) finds that the total loan ratio is significant and negatively related to non-interest income in his study among commercial banks in Jamaica. Furthermore there are interesting results regarding the impact of respective loan category on the non-interest income. For example higher consumer loans will lead to higher fee income (non-interest income)   whereas higher private sector loan is associated with lower non-interest income. This is very interesting finding where it is reflecting that the banks in Jamaica is offering consumer loan with other non-interest income products whereas private sector loan not attracting much fees based products.

In the case of Ghana, where a study on 20 commercial banks from 2002 till 2011 by Sherene Bailey (2010) revealed that non-interest income and interest income generated from loans showing significant and positive relationship. The positive relationship of total loan (interest based products) and non-interest income showing that most of the lending products in Ghana is bundled together with fee based products. This means banks are selling loans with other product such as credit card, unit trust, investment account, insurance etc.Furthermore analysis done among Tunisian bank found that there is positive and significant relation between total loan and non-interest income. (Abdelaziz Hakimi, Hamdi & Djelassi, 2012)

In summary we can conclude that banks in USA, Europe and OECD countries which have higher loan based products will lead to lower non-interest income and vice versa. However different results are found in Ghana and Tunisia where interest income and

non-interest income is positively related. The different findings could be because of many reasons such as economic development of respective countries, the products, the marketing of the products, cultural differences, regulator etc. which need further study.

2.7 Capital Adequacy Ratio (CAR) and Non-Interest Income

Capital adequacy ratio is the ratio of bank's capital to cover its liability or its risk of any losses from various types of loans which bank disbursed. Furthermore there is statutory capital requirement for banks to keep minimum capital as per Basel requirement. Basel is a set of international banking regulation introduced by Basel Committee on minimum capital requirement for financial institutions. These sets of rules have been introduced to minimize the risk of the banks. Currently we have Basel I, II and III which provide some recommendation on banking regulation pertaining to credit risk, market risk and operational risk. The purpose of all these regulations is to ensure that all the financial institutions are equipped with enough capital to meet their obligations in case of any unexpected losses. According to Roger and Sinkey (1999), banks with larger capital amount have better capacity to absorb any losses from the loan that bank have disbursed.

According to Joon Ho Hahm (2008) for commercial banks in OECD countries, equity asset ratio as a measure of capital adequacy is a significant factor and negatively correlated with non-interest income. This research involves more than 600 banks in 29 countries for the period of 14 years. The finding of this research reveals that capital bank holding has a significant impact to the non-interest income of the banks. Another analysis on Mexican Banking industry finds that total equity bank kept as a reserve is a significant factor that impacts the non-interest income of the banks in Mexico and it is correlated positively. (Rodolfo Guerrero, 2015).

A research done by Roger and Sinkey (1999), for US commercial banks shows that capital ratio is one of the significant factors that determines the non-interest income of banks. He finds that both of these variables are positively correlated. It means that a bank with higher non-interest income has higher capital as well. This finding is consistent with the study of Merton and Bodie (1992) which suggest that financial institutions need capital assurance to enter non-traditional activities

2.8 Net Interest Margin and Non-Interest Income

Net interest margin (NIM) is defined as the differences between interest income bank earned and interest paid out to their lender. In other words, net interest margin is known as spread between loan interest rate and deposit interest rate. Theoretically when the net interest margin shrinks, bank's interest income will shrinks as well and this will make the bank diversify to the non-interest income based products. So, both variables are negatively correlated. According to Roger and Sinkey (1999), in some circumstances NIM and Non-interest income can be positively related as well. In some situation where NIM is very low, bank tends to increase the volume of the loan as it can offer lower interest rate to their clients. So, in this situation declining NIM has been offset by increase in the volume of loans. When this situation exists, bank will push more traditional products and this will reduce the non-interest income of the banks. Thus a, decrease in NIM decreases the non-interest income.

Rogers and Sinkey (1999), has measured non-traditional activities with non-interest income to total bank income for commercial banks in USA from 1989 till 1993. They find NIM is a significant factor that contributes to the non-traditional activities of US commercial banks and it is found to be negatively correlated. This result shows that banks with higher non-interest income tend to have lower net interest margin and vice versa. This result further suggests that whenever banks have lower NIM, they tend to

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diversify their activities into non-interest income products. In addition, Roger and Sinkey (1999) find that when big banks operate in a challenging environment in terms of stiff competition and smaller NIM, these banks tend to venture into non-traditional activities to rapidly increase their profits.

By employing data for 662 large commercial banks covering the period of 1992 till 2006 in OECD countries, Joon Ho Hahm (2008) finds that non-interest income ratio vary widely across the various countries from developed countries to emerging countries. Joon Ho Hahm's study finds developed countries with established financial system such as America, United Kingdom, France, Canada and Switzerland reflecting relatively high non-interest income ratio on average whereas relatively small countries and emerging market such as Spain, Poland, Denmark, Japan, Mexico, Korea and Portugal showing relatively low non-interest income on average. Joon Ho Hahm in his study found out that NIM is a significant factor in determining the non-interest income and it is correlated negatively. This finding is consistent with US banks finding by Roger and Sinkey in 1999.

Abdelaziz Hakimi, Hamdi and Djelassi (2012), analysed the determinants of non-determinants income by taking 10 Tunisian banks as sample from period of 1998 till 2009. The researcher has taken this topic to be analysed because of rapid growth in non-interest income among banks in Tunisia. From 1998 till 2009, non-interest income has increased more than 100%. Within 10 years an increase of more than 100% is exorbitant and it shows the trend of banking industry in Tunisia which is shifting from traditional banking to modern banking environment. Abdelaziz Hakimi finds that NIM is a significant factor determining the non-interest income in Tunisian banking system. Furthermore it has negative relationship with non-interest income.

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2.9 Inflation and Non-Interest Income

Macro-economic factors also play important role in determining non-interest income of the financial institutions. There are many macro-economic variables that have been used in previous studies such as inflation rate, gross domestic product (GDP), base lending rate (BLR), stock market index and exchange rate volatility. Among all the macro-economic variables here we will discuss how inflation rate is affecting the non-interest income of banks in various countries. As shown in Table 2-1, existing studies indicate the most of the significant macro-economic factors for non-interest income are inflation rate and stock market index. That is the reason for us to only both of these factors in our present study. However in the present study, we have excluded stock market index because of multicollinearity. Stock market index has very correlation with bank size and if this variable is included in the present study it will distort the findings. So, our research focus on only one macro-economic factor which is inflation rate.

Inflation or continuous increase in prices of goods will affect the business and also the bank's profitability (Mishkin 2007). As the general prices of the goods increase, this will increase the operational cost of the banks and thus it will reduce the profitability of the banks. As a result, banks need to diversify its business to substitute its increase in operational cost. There is significant relationship between inflation rate and banking sector development (Boyd, 2001). Fluctuation in the inflation rate is impacting the performance of the banks and hence banks may diversify their business into non-interest based income generating activities (Kunt, 2010). Inflation rate is a significant factor in determining non-interest income of banks in OECD countries and it is correlated negatively (Jo-Ho Hahm, 2008). Furthermore according Jo-Ho Hahm's finding, a stable inflation scenario contributes better to non-interest income ratio for

the financial institutions. According to Abdelaziz Hakimi, Hamdi and Djelasso (2012), rate of inflation have significant effect on the non-interest income of commercial banks in Tunisia. These findings seen to augur well with the study by Craigwell & Maxwell (2006) and Sanya & Wolfe (2010).

2.10 Summary of Literature Review

The variables of this study have been selected based on my review on the past researches. I have summarized all the significant variables for the determinants of non-interest income in various countries in different time period. Determinants of non-interest income has been categorised into internal factor or bank specific variables and macro- economic variables. According to the Table 2.1 below, for this study we have selected bank specific variable which are bank size, total loan, capital adequacy ratio (CAR) and net interest margin (NIM) which scored the highest significant number among the past studies. Then for macro-economic variables I have selected stock market index and inflation rate (inf rate) as the variables for our present study. Then due to multicollinearity issue, we have removed the stock market index variable from our present study. So, we have chosen bank size, total loan, capital adequacy ratio (CAR), net interest margin (NIM) and inflation rate as the variables that may affect non-interest income of CIMB Bank and RHB Bank.

Table 2.1

Summary of Significant Variables for Some of the Past Studies on the Determinants of Non-Interest Income

	Author (Year)	Bank Size	CAR	ROA	Loan Ratio	NIM	GDP	Inf. Rate	Stock Market	Credit Card	Interest Income	Client Deposit	BLR	Job Growth
1	JoonHoHahm 2008	×		×		×	×	×	×					
2	Rogers and Sinkey 1999	×			×	×								
3	De Young and Hunter 2003	×			×	×								
4	De Young et al 2004	×			×	×								
5	Kunt 2010	×	×					×						
6	Stiroh 2004		×						×					
7	De Young 2001		×											
8	Baele 2007								×					
9	AbdelazizHakimi 2012	×				×		×		×				
10	Basil SenyoDamankah 2014	×									×	×	×	
11	Rodolfo Guerrero 2015	×	×							×				×
12	Robert De Young & Tara Rice 2003	×		×	×					×				×
13	Sheren A. Bailey Tapper 2010			×	×							×	×	
	Total	**9**	**5**	3	**6**	**5**	1	**3**	**3**	3	1	2	2	2

Table 2.2 below have summarized the some of the important literature on the topic
studied. The table has reflected the methodology used by the researcher and empirical
findings on non-interest income and its determinants.

Table 2.2
Summary of Past Studies on the Determinants of Non-Interest Income

No	Author	Methodology	Findings
1	ShereneA.Bailey (2010)	a) Sample : Commercial Banks In Jamaica b) Period : March 1999 till September 2010 c) Method : Panel Data by applying SUR model (seemingly unrelated regression estimation method)	a) ATM technology, loan ratio and loan quality are significant microeconomic factor which impacting non-interest among commercial banks in Jamaica. b) Significant macroeconomic factors that contribute to the non-interest income in Jamaica are interest rate and foreign exchange rate volatility.
2.	AbdelazizHakimi HelmiHamdi MouldiDjelassi (2012)	a) Sample : 10 Tunisian Banks b) Period : 1998 till 2009 c) Method : Panel Data with applying Hausman Test	a) Net interest margin, bank size, credit quality, banking strategy or total loan and inflation are the significant factors contribute to the non-interest income in Tunisian banking industry. b) Another factor is advance in information technology (ATM and Cards) contribute to expansion of non-interest income in Jamaican bank.
3.	Joon-Ho-Hahm (2008)	a) Sample : 662 commercial banks in OECD countries b) Period : 1992 till 2006 c) Method : OLS method and random effect panel estimation method	a) Bank size, net interest margin, impaired loan ratio effecting the non-interest income b) As for macro-economic factor economic growth, inflation and stock marker are the significant factor in determining non-interest income.

4.	Basil SenyoDamanakah Olivia AnkuTsede Albert Amankwaa (2014)	a) Sample : 20 Commercial Banks in Ghana b) Period : 2002 till 2011 c) Method : Panel Dataset	a) Bank size, interest income (total loan) , bank 's liquidity and exposure to risk (non-performing loan) are the significant factor determining the fee based business in Ghana.
5.	Robert De Young Tara Rice (2003)	a) Sample : 4,712 US commercial banks b) Period : 1989 till 2001 c) Method : Panel using generalized least squares (GLS) method	a) Bank size, loan ratio, well managed bank and technological advance are the significant factor in determining the non-interest income.
6.	Rodolfo Gierrero Mora (2015)	a) Sample : Mexican Commercial Banks b) Period : 2000 till 2015 c) Method : Panel Data using least square technique estimation method	a) Bank size, equity and technology are the significant factor for non-interest income in Mexican banks b) Macro-economic factor job growth determines the non-interest income in Mexican banking industry.
7.	Anthony Saunders Markus Schmid Ingo Walter (2014)	a) Sample : 10,341 US banks b) Period : 2002 till 2013 c) Method : Panel Data with Pearson Correlation and Fixed Effect Regression	a) Diversification to non-interest income enhanced the bank's profitability and reduced the risk b) Found out that bank's with higher ROE obtained higher non-interest income.
8.	Stiroh, Kevin J (2002)	a) Sample : 14,523 US banks b) Period: 1984 till 2001	a) Found out that non-interest income is more volatile than interest income b) Non-interest income is very much correlated with the interest income from loans
9.	Robert Webb KumbiraiMabwe KalsoomJaffar (2014)	a) Sample : 5 major British Banks b) Period : 1986 till 2012	a) Found out that larger banks are able to obtained higher non-interest income. b) Interest income is stable while non-interest income is volatile c) There is positive correlation between interest income from loan and non-interest income.

10.	Aisha Ismail RahilaHanif SadafChoudhary Nisar Ahmad (2014)	a) Sample : 14 Commercial Banks in Pakistan b) Period : 2006 till 2013 c) Method : Panel Data using Pooled Ordinary Least Square estimation technique	a) Diversification to non-interest income gives positive impact to bank's performance in Pakistan b) Larger bank have better chances to increase their performance by diversifying their income.

Shifting of banking business from interest based to non-interest income based is very rapid and it very obvious in many countries as discussed above. The reasons for these phenomena could be competition among banks, increased pressure on net interest margin and diversification of banks in order to capture the market share. Based on the review above, we find that non-interest income determinants vary across countries depending on the methodology employed and period of analysis. Furthermore the determinants on non-interest income are unique in each country and it differs from country to country. This scenario may due to central bank regulation, economic progress of the country, the product itself, the cultural differences, technology impact, the marketing of these products and so on. Against this backdrop, this present study seek to investigate the link between non-interest income, bank size, total loan, capital adequacy ratio (CAR), net interest margin (NIM) and inflation by analysing the bank specific variables and macro variables for CIMB Bank and RHB Bank.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the research methods which have been used to analyse the problem statement and research question of this study. This research methodology has been developed to identify the relationship between non-interest income of CIMB Bank & RHB Bank with its bank size, total loan, total equity or capital adequacy ratio, net interest margin and inflation rate respectively. We will analyse how each of this variables will impact the non-interest income of their banks. Generally this chapter discusses on the research method and procedures that has been undertaken to obtain a comprehensive findings on the topic studied.

3.2 Research Framework

This research framework has been designed based on the literature review which we have discussed in the previous chapter. The dependent variable for this study is the amount of non-interest income over total income of the banks. So, the dependent variable in our study is the ratio of non-interest income. We have used this measurement for dependent variable which is based on the method used by Roger and Sinkey (1999) for US Commercial Banks and Joon-HoHahm (2008) for OECD countries. Then the independent variables are categorised into two broad categories which are internal factors or bank characteristics and external factor or macro-economic environment. There are four independent variables under internal factors which are bank size, total loan, total equity or capital adequacy ratio (CAR) and net interest margin. We have selected only one independent variable under macro-economic variable which is inflation. This research framework has been shown below in Figure 3.1.

Figure 3.1
Research Framework
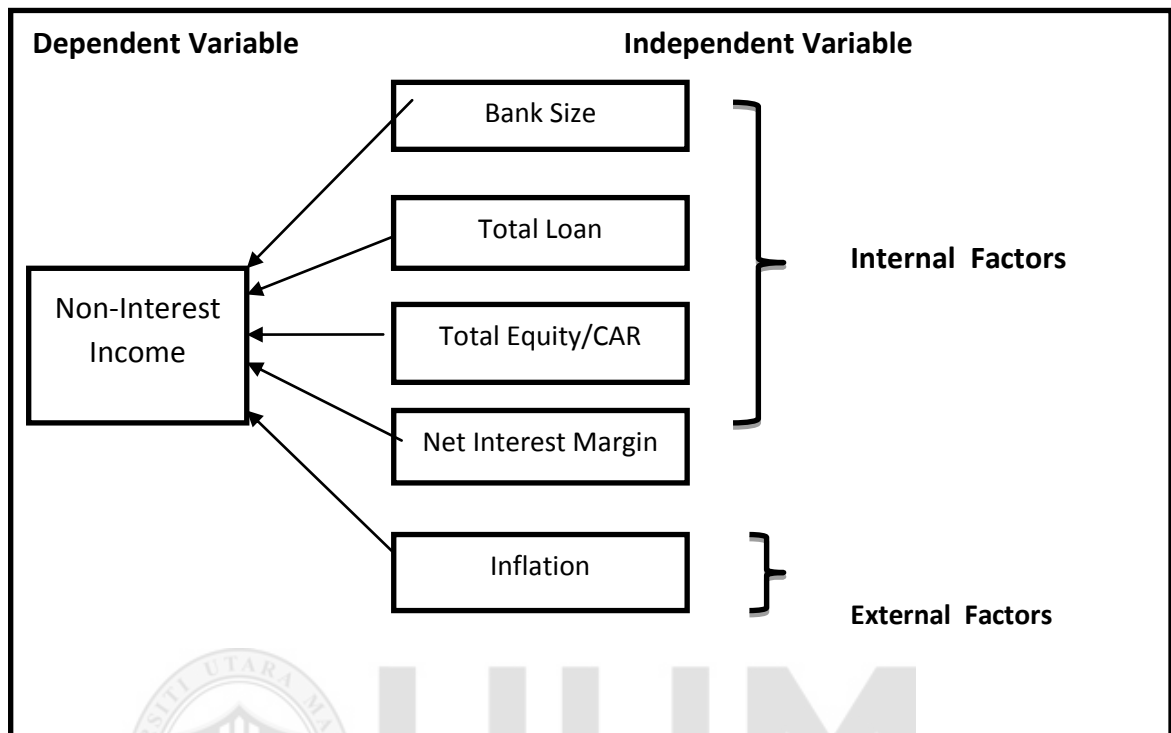
3.3 Hypotheses Development

Based on research objective and research question developed earlier, this study will try to test several hypotheses pertaining to the relationship of non-interest income and its determinants mentioned above. The following explains each hypotheses and its basis.

3.3.1 Bank Size and Non-Interest Income

Non-interest income and bank size are expected to have a positive relationship. Bigger bank is expected to have more non-interest income revenue. The justification given in the literature review is those bigger banks manage to optimize their technology to minimize their cost and their efficiency to increases their non-interest revenue. Most of the findings in the literature review affirmed that bank size is positively correlated with non-interest income. However the finding differs in some

of the smaller countries or economies, where bank size is correlated negatively. So in Malaysian banks this variable can be either positive or negative. Thus this study developed hypotheses as follows:

H1: There is significant relationship between bank size and non-interest income

3.3.2 Total Loan and Non-Interest Income

Traditional products of banks is lending and it comprises of few types of lending such as corporate loan, commercial or industrial loan, small and medium enterprise (SME) loan, and consumer or retail loan such as mortgage loan, hire purchase loan etc. All this lending products contribute revenue to banks in the form of interest income. So, theoretically when bank focusing more on the lending products the interest income will increase and non-interest income will diminish. So, we are expecting a negative relationship between total loan and non-interest income and this is supported by findings of Robert De Young & Rice (2004), Joon Ho-Hahm (2008) and Sherene Bailey (2010). But based on the literature review mentioned in previous chapter, in some smaller countries such as Ghana (Basil Senyo, 2014) and Tunisia (Abdelziz Hakimi, 2012) these variables are correlated positively. The justification given is in these countries lending products are marketed and bundled together with fee based products (Basil Senyo, 2014). In this kind of scenario bank's interest income and non-interest income will increase. This explains the reason of positive relationship between total loan and non-interest income. Thus this study developed hypotheses as follows:

H2: There is significant relationship between total loan and non-interest income

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3.3.3 Total Equity Capital or Capital Adequacy Ratio (CAR) and Non-Interest Income

Total equity or capital adequacy ratio is the funds kept by the banks to cover its liabilities or risk in traditional activities of the banks. Capital adequacy ratio should be sufficient to protect the financial institution in times of crisis. This is the reason we have international financial organisation introducing Basel I, II and III to guide the banks to strengthen banks capital requirement by increasing bank's liquidity and decreasing bank's leverage. Kunt (2010) used CAR as proxy of bank risk. When bank have lower CAR it represent higher risk for the banks. Theoretically when bank is facing high risk they will they are expected to diversify their business to non-interest income based products to reduce the risk level of banking institutions. So, the level of capital kept by the banks will affect non-interest income businesses. Thus this study developed hypotheses as follows:

H3: There is significant relationship between total equity capital and non-interest income

3.3.4 Net Interest Margin (NIM) and Non-Interest Income

Net interest margin (NIM) generally refers to the spread between interest income generated by banks via loans and amount of interest paid out for fixed deposits. NIM of the bank can be compressed or shrink in two ways either interest rate for deposits goes up or interest rate for loan goes down and this subsequently influenced by base lending rate (BLR) or known as base rate (BR) currently. When NIM is compressed, banks profit margin from loan goes down and this scenario will make the banks to step up the fee based business. So, whenever the NIM is affected the bank will try to diversify their business to other than loan products which are fee based businesses. Thus this study developed hypotheses as follows:

H4: There is significant relationship between net interest margin and non-interest income

3.3.5 Inflation and Non-Interest Income

Beside internal characteristics of banking institution, macro-economic factors also will have significant impact on the banking strategy of the banks. Here we have taken inflation as one of factor affecting the non-interest income of the banks. Kunt (2010) in his research has found out that inflation rate is one of the significant macro-economic factor that effecting the bank performance and may influence bank's decision to diversify their operations into fee based businesses. So, inflation rate of Malaysia could impact bank's strategy to get into fee based business. Thus this study developed hypotheses as follows:

H5: There is significant relationship between inflation rate and non-interest income

3.4 Research Design

Quantitative research method has been used to analyse the determinants of non-interest income since all the variables are measurable. To be more specific this study uses time series analysis because this research aims to describe quantitatively the relationship of internal factors (bank size, total loan, total equity capital/CAR, net interest margin) and external factor (inflations) towards non-interest income of the banks. We have taken 2 major banks CIMB Bank and RHB Bank and we will analyse how all this variables will impact non-interest income of this two banks. The period covered for this analysis is from   Quarter 1 of 2004 up to Quarter 4 of 2015 which gives total of 48 observations.

3.5 Operational Definitions of Variables

3.5.1 Non-Interest Income

Banks revenue is usually categorised into interest income and non-interest income. Interest income is generated via loan based products whereas non-interest income is the revenue bank generated from other than loan based products. Non –interest income is the income bank earned from all the non-interest based activities such as trade finance, insurance, unit trust, fiduciary, forex, corporate advisory etc. All the income earned from these activities is known as fees, commissions, service charges, handling fee, transaction fee, professional fee, corporate advisory fee etc. In our study non-interest income is classified as dependent variable whereas all the internal factors and external factor is classified as independent variable which may impact the non-interest income of the banks.

3.5.2 Bank Size

Bank size is one of the most important independent variables for non-interest income which is widely discussed in many of the studies. Usually bank size is determined by various types of investments and loans. The larger is the asset, the bigger is the bank. So, in Malaysia 4 largest banks by assets size is Maybank, CIMB Bank, Public Bank and followed by RHB Bank. Maybank assets size is very huge compare to the other 3 banks almost doubled then next largest bank which is CIMB. Then Public Bank is not selected in the present study because some quarterly data is not available in the DataStream content provider. As such in the present study we have taken RHB Bank and CIMB Bank to analyse their non-interest income and its determinants.

3.5.3 Total Loan

Total loan is all the loan products disbursed by the banks. Examples of loans are housing loan, hire purchase loan, personal loan, term loan, syndicated loan, revolving credits, factoring loans, trust receipt loan, share margin financing, bills receivables and other loan. All this loans can be offered to various type of clients such as corporates or small and medium enterprise (sme), foreign entities, government bodies, financial institutions (interbank loans), stock broking companies and also individuals. Economic purpose for this loan could be for personal use, purchase of consumer goods, purchase of residential property, purchase of non-residential property such as land and building, purchase of fixed assets, purchase of vehicles for personal use or commercial use, working capital for the companies etc. For all this products bank charge interest rate which are fixed interest rate or variable rate depending on the type of loan, purpose of the loan and type of clients.

3.5.4 Total Equity Capital or Capital Adequacy Ratio (CAR)

Capital adequacy ratio is the regulatory capital requirement which set by central bank in each country to ensure that financial institutions are backed by quality capital to absorb any losses if any. Malaysian central bank usually followed capital requirement set by Bank of International Settlement (BIS) known as Basel requirement. This is to ensure the continuity and stability of financial institutions and to maintain the confidence of depositors, creditors and stake holders on the financial system of the country. According to latest Bank Negara Malaysia (BNM) capital adequacy framework issued on 13th October 2015, any financial institutions must maintain minimum total capital of 8% and this will be computed based on risk weighted assets.

3.5.5 Net Interest Margin (NIM)

Net interest margin is the difference between interests incomes banks obtained from their loans and interest paid out to their depositors. This is the spread between loan interest rate and deposit interest rate. NIM is the revenue or gross profit of the bank from all the loan based products. NIM is very important component in banks as it determines the bank's profitability and growth. The interest rate determination very much depending on each bank's cost involved and the central bank's OPR or overnight policy rate which will be reviewed regularly. With the recent OPR cut of 25 basis points to 3% by BNM on July 13 2016, it has compressed the NIM of the banks in Malaysia which are already facing intense competition (July 13, 2016, The Star).

3.5.6 Inflation

One of the macro economic factors discussed in the present study is inflation. Inflation is the rate of increase of general prices of goods and services over a period of time. In this analysis we have taken quarterly inflation rate. So it measures the increase of general prices of goods for every 3 months period and it is known as Consumer Price Index (CPI). So, CPI measures price increase of a basket of goods and services that will be consume by majority of the people. According to Malaysian Department of Statistics, Malaysia's CPI has been calculated based on 12 groups or basket of goods which consist of 460 itemized goods and services. Each of this group has been assigned different weightage. So, this is how inflation rate has been determined in Malaysia.

All the above operational definitions has been summarized in the below Table 3.1 for a better understanding.

Table 3.1
Table of Definitions

Variables	Definitions
Non-Interest Income	Non–interest income is the income bank earned from all the non-interest based activities such as trade finance, insurance, unit trust, fiduciary, forex, corporate advisory etc. The income earned from these activities is known as fees, commissions, service charges, handling fee, transaction fee, professional fee, corporate advisory fee etc.
Bank Size	Bank size is determined by the asset size of each bank. The asset usually refers to the cash balance, due from banks, various types of investments and loans.
Total Loan	Various types of loan products disbursed by the banks such as housing loan, hire purchase loan, personal loan, term loan, syndicated loan, revolving credits, factoring loans, trust receipt loan, share margin financing, bills receivables and other loan. Each of these loans has its own economic purpose such as personal use, purchase of property, fixed assets, land, building etc, working capital for companies etc.
Total Equity Capital or Capital Adequacy Ratio	Capital adequacy ratio is the regulatory capital requirement which set by central bank in each country to ensure that financial institutions are backed by quality capital to absorb any losses if any. According to latest Bank Negara Malaysia (BNM) capital adequacy framework issued on 13th October 2015, any financial institutions must maintain minimum total capital of 8% and this will be computed based on risk weighted assets.
Net Interest Margin (NIM)	Net interest margin is the difference between interest income banks obtained from their loans and interest paid out to their depositors. This is the spread between loan interest rate and deposit interest rate.
Inflation	Inflation is the rate of increase of general prices of goods and services over a period of time. Consumer Price Index (CPI) measures price increase of a basket of goods and services that will be consume by majority of the people.

3.6 Measurement of Variables

The dependent variable in this study is ratio of non-interest income and it is calculated as a percentage of the total revenue. We have obtained this ratio from DataStream content provider by Thomson Reuters. Same goes to the other independent variable where all the ratios have been obtained from DataStream content provider. The ratios

need not be calculated manually since it is clearly stated in DataStream database. However for our clear understanding, Table 3.2 provides us the summary of how all this ratios have been calculated and what this ratio reflects or measures.

Table 3.2
Measurement of Variables

Variables	Variable Measurement	Period	Measures
Non-Interest Income	Amount of non-interest income over total revenue of the banks (Non-Interest Income / Total Revenue)	1Q 2004 till 4Q 2015	Portion of Non-Interest Income Over Revenue (In Percentage)
Bank Size	Amount of Total Assets (Natural Log)	1Q 2004 till 4Q 2015	Size of the banks in terms assets size (in value)
Total Loan	Total Loan Value Over Total Assets of The Bank (Total Loan/Total Assets)	1Q 2004 till 4Q 2015	Portion of Total Loan Value Over The Total Assets (In Percentage)
Total Equity Capital or Capital Adequacy Ratio (CAR)	Value of Total Shareholder's Equity Over Total Assets (Equity / Total Assets)	1Q 2004 till 4Q 2015	Portion of Capital to Asset Ratio (In Percentage)
Net Interest Margin (NIM)	Interest Income – Interest Paid Out to Depositor/Investor (Interest Expenses)	1Q 2004 till 4Q 2015	Reflects the efficiency pricing policy of interest based products (In Percentage)
Inflation	Quarterly Inflation as published	1Q 2004 till 4Q 2015	Reflects general price level every 3 months

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3.7 Data Collection

3.7.1 Sampling

As explained in the literature review, each region or each country has their unique determinants of non-interest income. So, population of this research is all the commercial banks in Malaysia. There are eight commercial banks in Malaysia and in the present study we will analyse determinants of non-interest income for 2 major banks in Malaysia which is RHB Bank and CIMB Bank. Asset size of all the commercial banks have been shown in the Figure 3.2 below.

Figure 3.2
Assets Size of Commercial Banks in Malaysia as of 2015
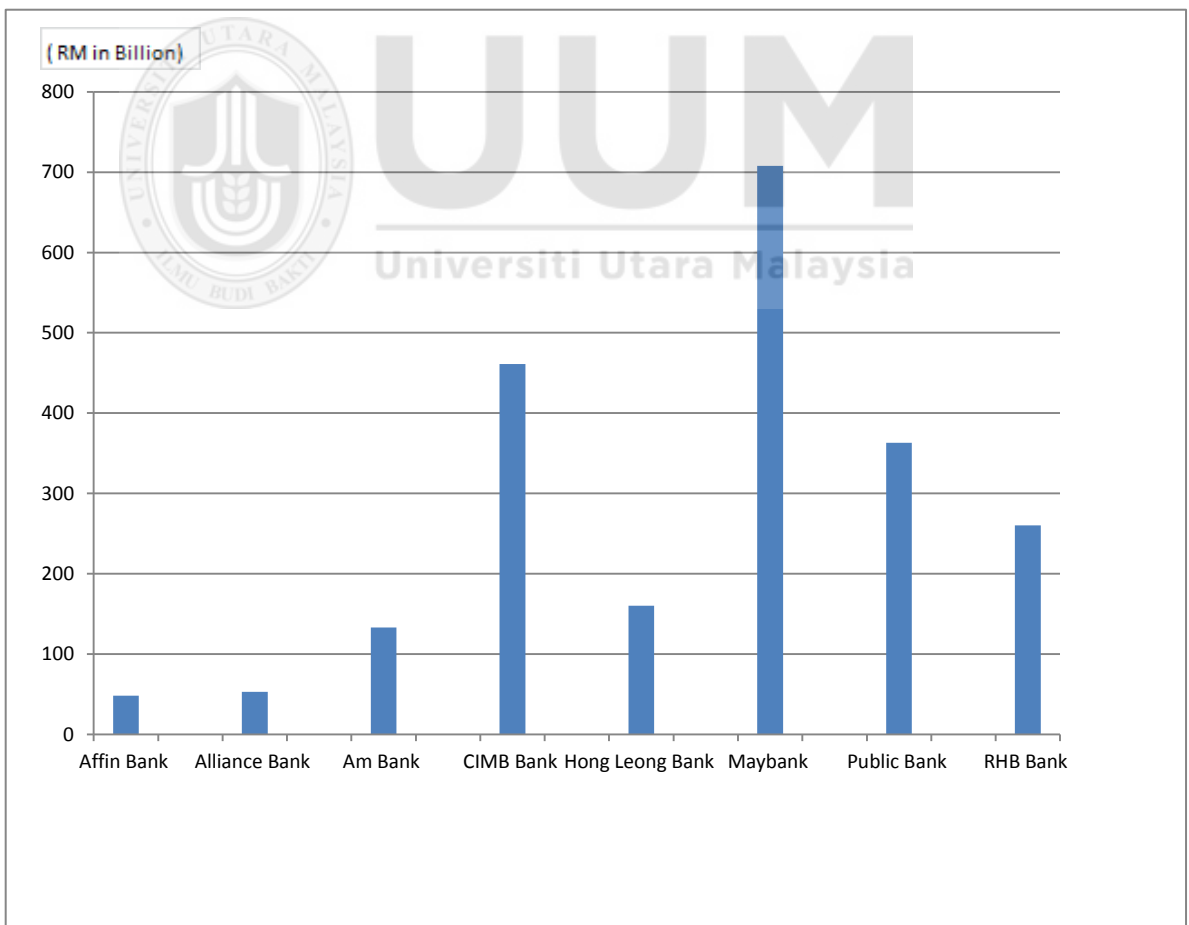
The selections of the two banks are based on the asset size. For instance Maybank's asset size is almost double compared to the next largest bank in Malaysia which is CIMB Bank. Public Bank is not selected because some of quarterly data is not available in the DataStream content provider. So, the present study focuses on CIMB Bank and RHB Bank. Furthermore we want to study the banks within the same range of assets size so that we can have accurate and representative results for same type of banks in term of assets sizes.

3.7.2 Data Collection Procedure

This study has been conducted based on secondary data which is obtained from DataStream content provider by Thomson Reuters. Quarterly data for the dependent variable and all the independent variables (internal factors) have been obtained from the bank's interim financial reports which are published on quarterly basis available in DataStream. Since the selected banks are a public listed companies, they have to publish the quarterly interim reports as per requirement by Kuala Lumpur Stock Exchange (KLSE) which need to go through stringent requirements. Furthermore the banks are under the regulation of Bank Negara Malaysia (BNM). As such the validity of the data is reliable. External factor data which is inflation rate has been obtained from DataStream directly.

We have selected the quarterly data so that we can have more observation to conduct robust analysis on the topic studied. The quarterly data has been taken from Quarter 1, 2004 till Quarter 4, 2015 which consist of 48 observations. This is a time series analysis and it is expressed on quarterly basis from 2004 till 2015. We are unable to obtained data earlier than 2004 because it is not available in the format required by this study. So, this is one of the limitations of this research.

3.8 Technique of Data Analysis

3.8.1 Model Specification

Our main objective of this research is to identify the factors influence the non-interest income of the bank at the bank level. Furthermore it can be influenced by the macro-economic factors as well. Following is the equation used to analyse the relationship between non-interest income and its internal factors and external factors:

$$NIITR = \propto + \beta_1 \text{Bank Size} + \beta_2 \text{ Total Loan} + \beta_3 \text{ Total Equity}$$
$$+ \beta_4 \text{ Net Interest Margin} + \beta_5 \text{Inflation}$$

NIITR, the dependent variables denote percentage of non-interest income over total income of the banks. Measurement ratio of non-interest income over total income has been used by Kevin J, Stiroh (2006) and Robert De Young (2001). The independent variable of bank size, total equity or capital adequacy ratio and net interest margin have been used by Roger and Sinkey (1999) in his model explaining level of non-interest income among commercial banks in USA. The loan ratio included in our model above is used by Robert De Young and Rice (2004). De Young and Rice has further analysed the loan into real estate loan and commercial or industrial loan. In our model, total loan is included as breakdown of the loan is not available in DataStream database. This will not have impact on the present studies. As for macroeconomic factors, inflation rate has been used in many countries as per my literature studies.

3.8.2 Method of Data Analysis

The data collected in this study has been analysed by using statistical software called EViews (Econometric Views). In this section, we discuss the method used to answer research question and research objective. The methods used are trend analysis, descriptive statistics, unit root test, correlation analysis, Co-integration Analysis and Variance Decomposition analysis.

Trend Analysis has been conducted on the non-interest income of CIMB Bank and RHB Bank for 12 years from 2004 till 2015. This analysis will focus on the overall trend for last 12 years and will analyse average year on year or quarter to quarter growth. This will give us overall picture on the growth of non-interest income and its potential in the future of Malaysian banking environment.

Descriptive analysis has been done to understand and interpret the data in proper manner. It summarizes the entire data and gives us a representation to the population. This analysis will indicate clearly the mean, median, minimum, maximum and standard deviation for each variable. This purpose of this analysis is to identify whether the data in distributed normally or otherwise.

In unit root analysis, we will test whether all the variables are stationary and do not possess a unit roots. Testing a non-stationary variable in the regression model can give inaccurate results about the relationship among the variables. So to obtained better result, we need to do unit root test to identify whether the variable is stationary at level I(O) or stationary at first difference I(I). If the test indicates the unit root exists then it reflects that the variables are not stationary and we need to perform differencing to identify the level the variables are stationary. To test the unit root

presence in this variable, this study use Augmented Dickey-Fuller (ADF) and Philips Perron (PP) test.

Correlation analysis has been done in this study to analyse how all the independent variable are correlated with one another. Pearson Correlation method has been used for correlation analysis in this study. The purpose of this analysis is to identify if there is any high correlation among independent variables which may create multicollinearity problem which may give us inaccurate results.

Then we have employed Vector Error Correction Model (VECM) which is a general framework used to describe the dynamic interrelationship among stationary variables. So, the first step in time series analysis is to determine the levels of the data are stationary. This will be done in unit root analysis as mentioned above. Usually if the levels of time series data are not stationary, the first differences will be. So, VECM is the model fit to the first differences of the non-stationary variables. Then error correction model is theoretically driven approach for estimating both short term and long term effects of particular time series data. The term error correction relates to the last period deviations from long run equilibrium, the error influence its short run dynamics. So, error correction model estimates the speed at which a dependent variable returns to equilibrium after a change in other variables. So, here we have employed VECM using Johansen method to identify the co-integration among the variables.

Co-integration analysis has been undertaken to identify how significant is each independent variable in the long run.To test this relationship we have used the Johannsen Co-Integration Analysis. According to the Johansen procedures, pre-testing is not necessary, there can be numerous co-integrating relationship, all variables are

treated as endogenous and test relating to long run parameters are possible. This analysis will reflect to us clearly the significant level of internal factors and external factors towards non-interest income of the banks selected in our study.

Next variance decomposition analysis has been done to identify the relationship of the variables in the short run. In this analysis we will try to identify how strong each independent variable contributes to the dependent variable in the short run.

For easier understanding, I have summarized all the analysis and the purpose of each analysis in the below table 3.3.

Table 3.3
Summary of the Analysis Undertaken For This Study

Analysis	Method Used	Purpose
Trend Analysis	Overall growth and average growth year on year basis	To view overall trend of non –interest income
Descriptive Analysis	Not Applicable	To reflect the distribution of data
Unit Root Analysis	Augmented Dickey-Fuller (ADF) and Philips Perron (PP)	Data is stationary at level or at difference
Correlation Analysis	Pearson Correlation Method	To detect if there is any multicollinearity problem
Co-Integration Analysis	Johansen Co-Integration Analysis (VECM Analysis)	Long Term Analysis on the significant of each independent variable
Variance Decomposition Analysis	Forecast Error Variance Decomposition Analysis (FEVD)	Short term analysis on contribution of each independent variable towards dependent variable

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter provides results and empirical analysis on the factors that influence non-interest income of CIMB Bank and RHB Bank based on the quarterly data collected and analysed from 2004 till 2015. The findings are categorised into six sections. In the first section we have discussed the trend of non-interest income among Malaysian commercial banks. In this section we can have an idea on banking sector diversification in Malaysia. The second section we will conduct descriptive analysis of the data for all the variables under study. Then the third section will be unit root analysis. In this section we will analyse the stationarity of the sample in the quarterly data. The fourth section will discuss the correlation analysis between dependent and independent variables. . In the fifth section we will present the Co-Integration analysis to find out the factors contribute to non-interest income of CIMB Bank and RHB in the long run. In this section we will also discuss the consistency of our findings with other research done in other part of the world. Next section we will run the variance decomposition analysis to find out what are the factors contribute to non-interest income in the short run.

4.2 Trend Analysis

To have a better picture on the importance of non-interest income among banks in Malaysia we have done trend analysis for overall commercial banking sector in Malaysia. Trend analysis will provide us the idea or insight on whether the banking sector in Malaysia is diversifying towards non-interest income based products or are we still very much depending on the interest based products. As discussed in Chapter 1, total non-interest income consist of almost more than 40% of the total banking

income in USA and in Europe. For Singapore and Thailand non-interest income consist of more than 30% of total income of banking industry. Whereas, in Malaysia currently the total non-interest income consist around 20% from the entire income of commercial banks in Malaysia. This statistics shows us that current Malaysian banking industry still very much depending on the interest income. On the positive side we can view that non-interest income among Malaysian commercial banks are still in the beginning stage and there are still very high potential in the future of Malaysian banking industry to follows what has happened in USA, Europe, Singapore or Thailand.

Table 4.1
Growth of Interest Income and Non-Interest Income of Commercial Banks in Malaysia (values in RM million)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Non-Interest Income	9653	10882	14208	14419	12767	16651	18861	19730	19672	19696	20122
Interest Income	43659	52134	59789	63146	56364	65681	73681	83760	83079	89417	96797
Total Income	53313	63017	73998	77566	69131	82333	92542	103491	102751	109113	116919
Non-Interest Income as % of Total Income	18.1	17.3	19.2	18.6	18.5	20.2	20.4	19.1	19.1	18.1	17.2
% Growth of Non-Interest Income		12.7	30.6	1.5	-11.5	30.4	13.3	4.6	-0.3	0.1	2.2
% Growth of Interest Income		19.4	14.7	5.6	-10.7	16.5	12.2	13.7	-0.8	7.6	8.3

(Source: Bank Negara Malaysia)

Table 4.1 above is showing the growth of interest income and non-interest income among commercial banks in Malaysia. The figure of non-interest income in the above Table 4.1 is the sum of fee based income and other income of commercial banks in Malaysia. Since fee based in the main component in the non-interest income, it has been shown separately in Bank Negara Malaysia website. In our study non-interest income is defined as all the income bank earned other than interest income as explained in the first chapter. For more accurate analysis on the non-interest income trend, I have sum up fee based income and other income earned by the commercial banks in Malaysia as shown in Bank Negara Malaysia website. Looking at the overall amount of non-interest income it increases from RM 9,653.4 million in 2005 to RM 20,122.20 million in 2015. It is increase of 108% for 10 years and average growth of non-interest income is 10% on yearly basis. But if we look at the detailed statistics on yearly basis, the above table showsthe percentage growth of non-interest income and interest income on year to year to basis. The actual average growth per year for non-interest income of Malaysian commercial banks is 7.6% per annum whereas average growth per year for interest income is 7.9% per annum from 2005 till 2015. So, we can conclude that growth of interest income and non-interest income for commercial banks are almost in the same pace which is around 7% to 8% per annum. Therefore the growth of non-interest income is equally important with the interest income among commercial banks in Malaysia.

Figure 4.1 below is showing the non-interest income earned by all the commercial banks from 2001 till 2013. From the chart below we can see clearly that generally the non-interest incomes for all commercial banks are moving in upward trend from 2001 till 2013. According to the chart, the major portion of non-interest income are captured by Maybank and followed by CIMB Bank. These are the two of the largest

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bank in Malaysia in terms of asset size which is discussed in Chapter 3. We can thus interpret that bank size plays an important role in capturing the non-interest income in Malaysia banking system.

Figure 4.1
Non-Interest Income of Each Malaysian Commercial Banks
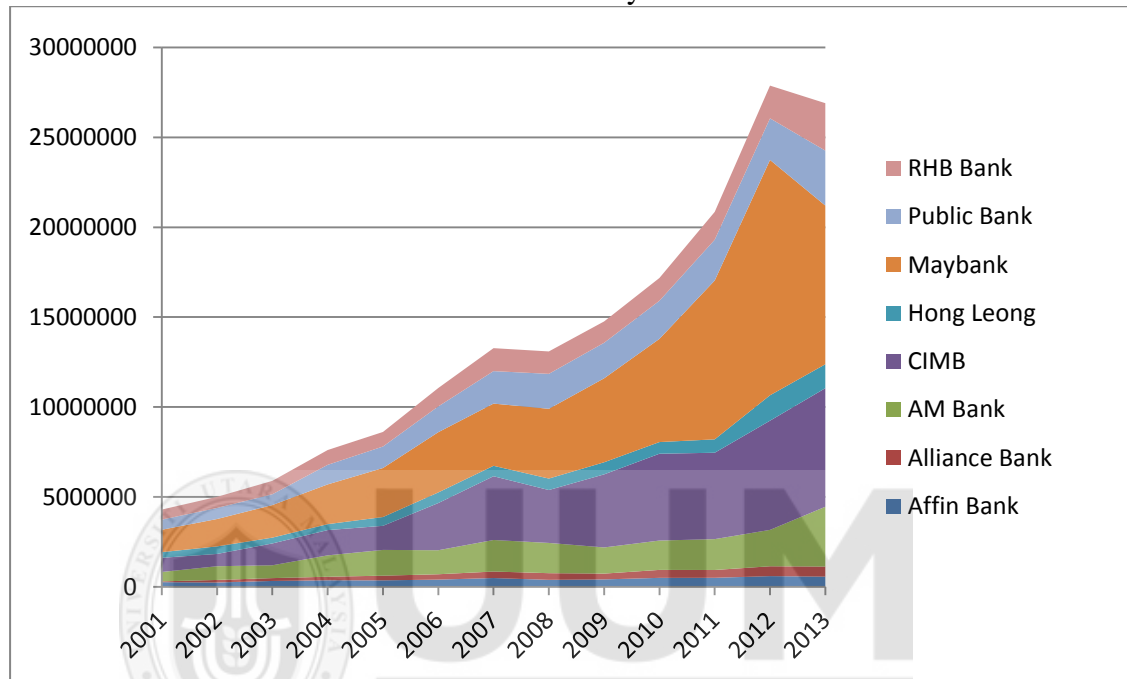
(Source: DataStream)

From the above analysis we can conclude that the growth of non-interest income and interest based income is almost equal based on the average growth per year calculated on year to year basis. However if we look the contribution of non-interest income to the entire commercial banking system it consist of only less than 20%. This figure looks very low compared to other countries such as USA, Europe, Singapore and Thailand. Currently 80% of our commercial banking incomes are contributed by interest based products. So, we are still very much dependent on the traditional banking products. Interestingly the average growth of interest based products and non-interest based products are almost equal for the period of 2005 till 2015 is evidencing that fee based income has very good prospect in the future. The same

growth for interest based products and non-interest income based products shows that banks started to diversify their operations from traditional banking operations to non-interest income based operations.

4.3 Descriptive Analysis

Descriptive statistics are used to summarize and examine the important features in the quantitative data collected in the study (Coakes and Steed, 2007). Table 4.2 and 4.3 below present descriptive data analysis for CIMB Bank and RHB Bank respectively which includes mean, median, maximum, minimum, standard deviation, skewness and kurtosis. The summary of descriptive data below is very useful for the management of the banks to decide on their strategy. Summary of descriptive statistics is excellent input for the policy maker (Agung, 2004). This is because statistics such as mean, median, standard deviation etc for the various variables can give indication to the management on the strategy to adopt to increase the bank's profit. Furthermore these analyses enable the bank to compare its performance with the performance of another bank pertaining to a particular variable. It will be useful for comparison purpose as well.

Table 4.2
Descriptive Analysis for CIMB Bank (For Data from 2004 till 2015)

	NIITR	LNBS	TL	TE	NIM	INF
Mean	25.75292	12.34335	62.00396	8.482292	0.495833	3.454167
Median	26.16000	12.39953	62.87000	8.555000	0.495000	3.450000
Maximum	40.97000	13.06641	69.57000	9.430000	0.630000	5.800000
Minimum	6.780000	11.52008	53.41000	6.910000	0.400000	1.900000
Std. Dev.	5.808722	0.465470	3.561754	0.518041	0.054337	0.783597
Skewness	-0.356902	-0.237490	-0.380485	-0.520784	0.215791	0.883881
Kurtosis	4.500640	1.855559	2.603276	3.614328	2.551346	4.545042
Jarque-Bera	5.522874	3.070702	1.472932	2.924526	0.775108	11.02428
Probability	0.063201	0.215380	0.478803	0.231711	0.678715	0.004037
Sum	1236.140	592.4809	2976.190	407.1500	23.80000	165.8000
Sum Sq. Dev.	1585.839	10.18313	596.2463	12.61325	0.138767	28.85917
Observations	48	48	48	48	48	48

Based on the above Table 4.2, mean and median figure for each variable shown above is very closeand this reflects that the data are distributed very evenly or in the normal bell shaped curve. All the variables showing reasonable standard deviation with the highest standard deviation will be the dependent variable non-interest income ratio at 5.808722. So, it means all the variables are not highly dispersed from the mean. So, we can summarize that the data for CIMB is distributed efficiently. For example based on the above data, average loan asset (TL) obtained by CIMB is 62% while the maximum loan is 69.57% and minimum loan asset is 53.41% from 2004 till 2015. Then kurtosis measures the shape of distribution of data. It measures the peakness or flatness of data distributed. Positive value of kurtosis means distribution of data is peaked whereas negative value shows flatter distribution of data. For the above data, "Kurtosis" shows positive value for all the variables and it indicates that all the above variables for CIMB Bank are relatively under peaked distribution. Kurtosis value less than 3 but more than 0 reflecting normal distribution of data of each variable.

However kurtosis value showing more than 3 for non-interest income value, total equity and inflation for CIMB Bank showing that it has more peak and fatter tails than normal distribution or the data for all these variables are concentrated heavily around the mean value for each variable.

Table 4.3
Descriptive Analysis for RHB Bank (For Data from 2004 till 2015)

	NIITR	LNBS	TL	TE	NIM	INF
Mean	22.19021	11.76799	61.23875	7.093125	0.375833	3.454167
Median	22.24500	11.65029	62.53000	7.605000	0.380000	3.450000
Maximum	29.97000	12.34846	75.41000	10.01000	0.620000	5.800000
Minimum	0.870000	11.24665	46.32000	4.540000	0.020000	1.900000
Std. Dev.	4.648290	0.340371	6.459546	1.531487	0.084118	0.783597
Skewness	-1.760859	0.312186	-0.284114	-0.369794	-1.047520	0.883881
Kurtosis	10.38312	1.788851	3.530006	1.846653	8.877675	4.545042
Jarque-Bera	133.8260	3.713447	1.207578	3.754402	77.87252	11.02428
Probability	0.000000	0.156184	0.546736	0.153018	0.000000	0.004037
Sum	1065.130	564.8635	2939.460	340.4700	18.04000	165.8000
Sum Sq. Dev.	1015.510	5.445071	1961.110	110.2362	0.332567	28.85917
Observations	48	48	48	48	48	48

Referring to the Table 4.3 above, all the variables for RHB Bank showing very close numbers between mean and median and this reflects that the distribution of data is normal or "bell curve". The variables above are not highly deviated from the average figure which can be noticed in standard deviation number. Generally standard deviation for all the variables are at acceptable level with the highest is total loan (TL) at 6.459546. So, we can generalize that the data for RHB Bank from 2004 till 2015 are under normal distribution. For example based on the above data for RHB, average total loan assets (TL) is at 61% with the maximum loan assets at 75% and minimum loan assets at 46% from 2004 till 2015. So, it is clear that average loan asset is almost same for CIMB Bank and RHB Bank but the maximum and minimum loan between

2004 till 2015 differ quite substantially between this two banks. The results of this can be seen as highest standard deviation for loan asset (TL) for RHB Bank. It means loan asset fluctuate higher in RHB Bank compare to CIMB for the period under study. For the above data, "Kurtosis" shows positive value for all the variables and it indicates that all the variables for RHB Bank are relatively under peaked distribution. Kurtosis value showing value more than 3 for non-interest income, total loan, net interest margin and inflation reflecting that data for all these variables are concentrated heavily around the mean value.

4.4 Unit Root Analysis

Time series data need to be tested for stationary in order to obtain meaningful results (Engle and Granger, 1987). Analysis of data without testing for stationarity may not give accurate result because the raw data could have been influences by many factors. Generally stationary time series do not follow random walk process and movements are predictable in the stationary time series. However if the data series contain at least one unit root, it is known as non-stationary and it follows random walk process (Stock and Watson, 2011). Since most of the research on time series analysis shows that macro-economic time series contains unit root and non-stationary data may not give accurate empirical results. Economic series data do not need to be differenced more than 2 times (Walter Enders, 1996). Usually most of economic time series data are not stationary but the differencing often yields a stationary result. So, a test of stationary is important to set up the specification and estimation of the correct model (Engle and Granger, 1987). Therefore it is preliminary condition to test for unit root before we proceed with other econometric analysis. All the variables under this study will be tested for unit root separately.

In our study we test the unit root with two common and famous methods which are Augmented Dickey Fuller (ADF) and Philips Perron (PP) respectively for CIMB Bank and RHB Bank variables. The analysis has been categorized into two parts at level and at first differentiation which are studied at intercept and intercept &trend.

Table 4.4
Summary of Unit Root Test (ADF and PP) for CIMB Variables

Variable	At Level (ADF)		At Level (PP)		First Difference (ADF)		First Difference (PP)	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intecept& Trend
NIITR	-4.77***	-4.83***	-4.75***	-4.85***	-9.99***	-6.00***	-21.42***	-23.86***
LNBS	-1.07***	-2.47***	-2.24***	-2.34***	-6.97***	-6.99***	-7.89***	-11.04***
TL	-1.48***	-2.18***	-4.66***	-6.04***	-4.12***	-4.08***	-22.09***	-23.88***
TE	-3.72***	-4.84***	-3.72***	-4.61***	-8.45***	-8.35***	-16.80***	-16.41***
NIM	0.11	-5.00***	-2.21***	-5.02***	-7.37***	-7.57***	-22.52***	-24.98***
INF	-2.80***	-3.24***	-2.74***	-3.29***	-7.63***	-7.54***	-8.72***	-8.564***

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Table 4.4 above present unit root test results for CIMB Bank model under both ADF and PP methods which are analysed at intercept and intercept & trend. For ADF method at 10% significant level "NIM" or net interest margin is not stationary at level I (0) and it contains unit root. As per Stock and Watson, 2011 if the model under study contain at least one unit root the data is considered not stationary. Therefore we conclude the model for CIMB Bank under ADF method contains unit root at level. So, ADF test on first difference was conducted and we found out that all variables are stationary at first difference at 1% significant level. Therefore based on the above

table, we can conclude that under ADF and PP method all the variables for CIMB Bank are stationary in the first difference and it is integrated of order one I (1). So, Johansen co-integration test can be performed for the series that are integrated of the same order.

Table 4.5
Summary of Unit Root Test (ADF and PP) for RHB Bank Variables

Variable	At Level (ADF)		At Level (PP)		First Different (ADF)		First Different (PP)	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intecept & Trend
NIITR	-3.97***	-6.02***	-3.98***	-6.02***	-6.24***	-6.18***	-37.04***	-39.88***
LNBS	0.12	-1.54***	0.18	-1.56***	-7.65***	-7.61***	-7.604***	-7.57***
TL	-0.63***	-1.54***	-4.33***	-5.58***	-14.1***	-13.93***	-18.92***	-18.55***
TE	0.004***	-2.02***	-0.02***	-2.21***	-5.83***	-5.81***	-5.83***	-5.81***
NIM	-0.25***	-5.08***	-4.43***	-4.57***	-5.00***	-5.89***	-10.41***	-12.23***
INF	-2.80***	-3.24***	-2.74***	-3.29***	-7.63***	-7.54***	-8.72***	-8.56***

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Table 4.5 above present unit root test results for RHB Bank model under both ADF and PP methods which are analysed at intercept and intercept and trend. For ADF and PP method at 10% significant level "LNBS" or bank size is not stationary at level I (0) and it contains unit root. Therefore we conclude the model for RHB Bank under ADF and PP method contains unit root at level. So, ADF and PP test on first difference was conducted and we found out that all variables are stationary at first difference at 1% significant level. Therefore based on the above table, we can

conclude that under ADF and PP method all the variables for RHB Bank are stationary in the first difference and it is integrated of order one I (1). So, Johansen co-integration test can be performed for the series that are integrated of the same order.

4.5 Correlation Analysis

As a preliminary analysis, we will undertake correlation analysis which will reflect the linear relationship between any two variables. Here we will analyse the relationship between the dependent variable and each of independent variable and relationship among the independent variables. Correlation analysis undertaken here is called "Pearson r "also known as linear correlation. Another reason of conducting this correlation analysis is to identify whether there is any multicollinearity problem. Multicollinearity is an issue when independent variables show very high significant correlation with each other. The existence of multicollinearity will cause problem in our regression model that makes difficult to identify the effect of each independent variable in our model. So, we perform correlation test to investigate whether there is any perfect or exact linear relationship among the variables in our model. According to Baltagi (2012),multicollinearlity issue will arise when there is very high or exact linear relationship among the variables. In our Pearson correlation test we found out that one of the external or macro independent variable "KLSE" which is Kuala Lumpur Stock Exchange Index have very high relationship with"bank size".This scenario occurred for both CIMB Bank and RHB Bank where it shows value of more than 0.9 for "KLSE" and "bank size". This indicates that there is very high relationship between "KLSE" and "bank size" for CIMB Bank and RHB Bank. If we include these variables in our study, it will distort the findings and lead to false results

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(Baltagi 2012). As such we have excluded this variable from our regression model. Table 4.6 below showing correlation matrix for CIMB Bank after excluding the "KLSE" variable.

Table 4.6
Pearson Correlation Matric For CIMB Bank

	NIITR	LNBS	TL	TE	NIM	INF
NIITR	1.000000	0.240049	0.186064	0.171741	-0.028536	-0.019280
LNBS	0.240049	1.000000	0.592243	0.515730	-0.759559	0.439672
TL	0.186064	0.592243	1.000000	0.339281	-0.523808	0.289906
TE	0.171741	0.515730	0.339281	1.000000	-0.307517	0.106716
NIM	-0.028536	-0.759559	-0.523808	-0.307517	1.000000	-0.369867
INF	-0.019280	0.439672	0.289906	0.106716	-0.369867	1.000000

From the above Table 4.6, we found that net interest margin and inflation are correlated negatively with non-interest income of CIMB Bank but the coefficient is very low for both of these factors. Bank size, total loan and total equity capital are positively correlated with non-interest income of CIMB Bank. Based on the "Pearson r" correlation analysis, the highest coefficient correlation is bank size showing 24% and it means as the size of the bank increase it will increase their share of non-interest income for CIMB Bank. The next 2 important factors determine non-interest income of CIMB Bank are total loan and total equity capital or capital adequacy ratio which is at coefficient correlation of 18% and 17% respectively. For CIMB Bank, according to "Pearson r" analysis size of the bank plays an important role in determining their share of non-interest income.

Table 4.7
Pearson Correlation Matric For RHB Bank

	NIITR	LNBS	TL	TE	NIM	INF
NIITR	1.000000	0.600313	0.382608	0.652375	-0.534113	0.083570
LNBS	0.600313	1.000000	0.460697	0.847073	-0.284962	0.379810
TL	0.382608	0.460697	1.000000	0.595784	-0.094132	0.177177
TE	0.652375	0.847073	0.595784	1.000000	-0.149662	0.414602
NIM	-0.534113	-0.284962	-0.094132	-0.149662	1.000000	0.176512
INF	0.083570	0.379810	0.177177	0.414602	0.176512	1.000000

As a preliminary finding, Table 4.7 above showing Pearson correlation matrix results for RHB Bank. Only net interest margin is correlated negatively with non-interest income of RHB Bank. All other factors are correlated positively with the non-interest income of RHB Bank. The highest coefficient correlation is total equity capital or capital adequacy ratio which is at 65% and next followed by bank size with 60%. So, based on the "Pearson r" correlation analysis, capital adequacy ratio is very significant factor in determining RHB Bank share of non-interest income and followed by the bank size. So, RHB Bank is holding higher amount of capital in order to enter the non-interest income businesses. The third important factor in determining RHB Bank non-interest income is net interest margin which coefficient correlation is showing at 53% and it is correlated negatively. This means if RHB Bank's profit margin from interest based products is compressed then the bank will move towards fee based products.

Based on the Pearson correlation results we can summarize few issues on non-interest income of RHB Bank and CIMB Bank. For both banks inflation is not very important factor in determining their non-interest income share. Size matters for both banks in determining their non-interest income share but it matters more for RHB Bank than CIMB Bank. This is consistent with the study of Robert De Young & Tara Rice, 2004 where they finds that large bank generate more non-interest income among US

commercial banks. There is completely different strategy implemented by the banks in terms of their total equity to non-interest income. RHB Bank is holding very high capital to enter into non-interest income businesses whereas CIMB Bank capital buffer is not very important for their non-interest income share. So, it very obvious that RHB Bank wants to keep good additional buffer before entering into non-interest income business whereas CIMB Bank is not that particular on the additional buffer. This is maybe due to the type of fee based activity both banks venture in which require further research. This is consistent with the findings of Rogers and Sinkey (1999) where he finds that total equity capital is one of the significant factors determining the non-interest income US commercial banks. Then loan based products are very much inter related with fee based products for RHB Bank compare to CIMB Bank. In other words RHB Bank may bundle their loan products with fee based products which increase their non-interest income. This is very obvious with coefficient correlation of 38% for RHB Bank compare to 18% for CIMB Bank. So, both of these banks have completely different strategy when comes to the revenue of non-interest income but both loan ratio and non-interest income are correlated positively. This finding is very interesting because it differs with the existing studies of Joon Ho-Hahm (2008) and Sherene Bailey (2010) where they finds that loan ratio is correlated negatively with non-interest income. So, in Malaysia (based on CIMB Bank and RHB Bank only) interest based products and non-interest based products has positive relationship whereas studies in OECD countries (Joon Ho Hahm, 2008) finds that loan ratio and non-interest income has negative relationship. So, this findings indicates that Malaysian banking industry still very much focusing on interest based products and non-interest based products can't replace interest based products but it will co-exist with interest based products.

4.6 Co-Integration Analysis

Co-integration analysis refers to long run relationship between variables. This is important because two or more variable may wander away from each other in the short run but it moves along in the long run (Walter Enders, 1996). One of the main and powerful tools for co-integration analysis is Johansen's co-integration test. While performing Johansen analysis, the variables need to be integrated of the same order. In our research here all the variables of non-interest income for CIMB Bank and RHB Bank has been tested for unit root and we found out that all the variables for CIMB Bank and RHB Bank are stationary at first difference. Since all the variables are stationary at first difference or integrated of the same order we proceed with Johansen's co-integration test. Johansen proposed two methods to test the significant level which are trace test and maximum Eigen value test. This test is important as we can analyse whether any variable in our model has long run relationship with the dependent variable which is non-interest income.

Table 4.8
CIMB Bank Johansen Co-Integration Result

Normalized Co-Integrating Coefficients						
NIITR	LNBS	TL	TE	NIM	INF	@Trend (04Q2)
1.000000	163.0773 (64.4620)	1.440342 (1.12597)	49.62554 (8.57222)	-765.4029 (118.761)	15.47514 (3.91765)	-9.331019 (2.44797)

Table 4.8 above is showing results of Johansen co-integration analysis for CIMB Bank. The variable showing "t" statistics value more than 2 is considered significant. So, based on the above table, bank size (lnbs), total equity capital (TE), net interest margin (NIM) and inflation (INF) are the significant factor in determining the non-interest income of CIMB Bank in the long run.

Our findings of long run analysis for CIMB Bank have been summarized in the below Table 4.9. Based on the Johansen co-integration test we fail to reject hypotheses H1, H3, H4 and H5 because all these variables bank size, total equity capital, net interest margin and inflation are significant factor in determining non-interest income of CIMB Bank whereas we reject H2 because total loan is not significant factor in determining non-interest income of CIMB Bank.

Table 4.9
Hypotheses and Findings of the Study for CIMB Bank

Hypotheses	Long Run Analysis
H1: There is significant relationship between bank size and non-interest income.	Fail to Reject H1
H2: There is significant relationship between total loan and non-interest income.	Reject H2
H3: There is significant relationship between total equity capital and non-interest income.	Fail to Reject H3
H4: There is significant relationship between net interest margin and non-interest income.	Fail to Reject H4
H5: There is significant relationship between inflation rate and non-interest income	Fail to Reject H5

Table 4.10 below is showing results of Johansen co-integration analysis for RHB Bank. The variable showing "t" statistics value more than 2 is considered significant. So, based on the below table, only bank size (lnbs) and net interest margin (NIM) are the significant factor in determining the non-interest income of RHB Bank in the long run whereas all other variables such as total loan (TL), total equity capital (TE) and inflation (INF) are not relevant in the long run.

Table 4.10
RHB Bank Johansen Co-Integration Result

Normalized Co-Integrating Coefficients						
NIITR	LNBS	TL	TE	NIM	INF	@Trend (04Q2)
1.000000	57.05610 (11.9920)	1.079176 (0.11750)	-0.433948 (1.43530)	40.41378 (7.49407)	4.022901 (0.74478)	-1.840069 (0.41320)

Our findings of long run analysis for RHB Bank have been summarized in the below Table 4.11. Based on the Johansen co-integration test we fail to reject hypotheses H1 and H4 because bank size and net interest margin are significant factor in determining non-interest income of RHB Bank whereas we reject hypotheses H2, H3 and H5 because total loan, total equity capital and inflation are not relevant in the long run.

Table 4.11
Hypotheses and Findings of the Study for RHB Bank

Hypotheses	Long Run Analysis
H1: There is significant relationship between bank size and non-interest income.	Fail to Reject H1
H2: There is significant relationship between total loan and non-interest income.	Reject H2
H3: There is significant relationship between total equity capital and non-interest income.	Reject H3
H4: There is significant relationship between net interest margin and non-interest income.	Fail to Reject H4
H5: There is significant relationship between inflation rate and non-interest income	Reject H5

So, in both cases (CIMB Bank and RHB Bank), bank size shows the highest coefficient and it is the most significant factor determining the non-interest income for RHB Bank and CIMB Bank in the long run and it has positive relationship. This result is consistent with Rogers and Sinkey (1999) and Robert De Young and Tara (2004) where they found that bank size show strong and positive link with non-interest income in US Commercial Banks. Furthermore this result is consistent with research conducted by Joon Ho Hahm (2008) among banks in OECD countries. So, same phenomena occur in Malaysia where larger banks tend to be more involved in fee based activities. So, the bigger the bank the larger non-interest income they earned. This may happened due to various reasons such as bigger banks may have better technology and innovative ideas to increase their non-interest income or bigger bank may have better reputation so that they can obtain higher value of fee based business.

The next common significant factor in determining non-interest income of CIMB Bank and RHB Bank is net interest margin. So, profit margin from the interest based products has significant impact to their non-interest income based business. This is consistent with research conducted by Roger and Sinkey (1999) and Joon Ho Hahm (2008). The surprising results here is net interest margin of CIMB Bank has negative relationship with the non-interest income whereas RHB Bank has positive relationship. Previous researches by Joon Ho Hahm (2008) and Rogers & Sinkey (1999) find that net interest margin and non-interest income has negative relationship. In other words if profit from interest based products is compressed usually bank will diversify their operations to fee based business. But the result for RHB Bank is quite unique where it has significant relationship with non-interest income but it has positive relationship. It means if profit from interest based products increase, RHB Bank's non-interest income increase as well. The only logical reason for these

phenomena is interest based product and non-interest income based products of RHB Bank is very closely related and marketed as a bundled products and this could be the reason why both are moving in the same direction. To identify the actual reason for these phenomena we need to identify the type of non-interest income and fee based products RHB Bank involved. This is not covered in our study and as such we are unable to point out the actual reasons.

Another significant factor for CIMB Bank is total equity capital or capital adequacy ratio. This factor is only significant for CIMB Bank but not relevant for RHB Bank in the long run. It means CIMB Bank's capital buffer is affecting the non-interest income of the bank and it has positive relationship. So, CIMB Bank need to hold higher reserve in order to obtained higher non-interest income. This result is consistent with the finding of Roger and Sinkey (1999) in American banks and Rodolfo Guerrero (2015) in Mexican banks.

Inflation is significant factor for CIMB Bank in determining the non-interest income but it is not relevant for RHB Bank in the long run. These results suggest that inflation environment or cost of living is influencing the fee based income of CIMB Bank. This is consistent with findings of Joon Ho Hahm (2008) among OECD countries and Hakimi ,Hamdi and Djelassi (2012) among Tunisian Banks. These results suggest that higher inflation environment will give higher non-interest income for CIMB Bank whereas it does not have any impact on the RHB Bank in the long run. Furthermore according to Kunt (2010), fluctuation in the inflation rate is impacting the performance of the banks and hence banks may diversify their business into non-interest based income generating activities.

Table 4.12

Hypotheses and Findings of the Study for CIMB Bank and RHB Bank (Long Run Analysis – Based on the Johansen Co-Integration Results)

Hypotheses	CIMB Bank	RHB Bank
H1: There is significant relationship between bank size and non-interest income.	Fail to Reject H1	Fail to Reject H1
H2: There is significant relationship between total loan and non-interest income.	Reject H2	Reject H2
H3: There is significant relationship between total equity capital and non-interest income.	Fail to Reject H3	Reject H3
H4: There is significant relationship between net interest margin and non-interest income.	Fail to Reject H4	Fail to Reject H4
H5: There is significant relationship between inflation rate and non-interest income.	Fail to Reject H5	Reject H5

In our analysis above as per Table 4.12 above, bank size, total equity capital, net interest margin and inflation are the significant factor in determining non-interest income for CIMB Bank in the long run. It differs with RHB Bank where bank size and net interest margin are the only significant factor in determining their non-interest income in the long run. Hence we can summarize that in the long run each bank have their unique determinants for their non-interest income.

4.7 Forecast Error Variance Decomposition Analysis (FEVD)

The forecast error various decomposition (FEVD) has been developed by Sims (1980), analyses the impact of changes in one variable on the variance of other variable in the short run. To determine what proportion of the variance in the model was due to its own shock and other identified shocks, forecast error variance decomposition technique allocates weight to each identified shocks in the model at every forecast horizon for a particular variable was used (Odour,2008). In the initial period the own shocks dominates the variance forecast and shock to other variable may gain importance as the periods lengthen. In this section, we will analyse what are

the important variables that affecting the non-interest income of CIMB Bank and RHB Bank in the short run.

Table 4.13
Forecast Error of Variance Decomposition of Non-Interest Income (DNIITR) for CIMB Bank

Variance Decomposition of DNIITR: Period	S.E.	DNIITR	DLNBS	DTL	DNIM	DTE	DINF
1	8.315	100.000	0.000	0.000	0.000	0.000	0.000
2	9.213	82.734	0.032	15.860	0.921	0.022	0.420
3	9.998	82.379	0.215	13.476	2.414	0.369	1.145
4	10.544	81.142	0.556	12.599	2.540	0.639	2.521
5	11.386	81.286	0.479	13.071	2.178	0.671	2.311
6	11.871	80.872	0.637	13.001	2.112	1.240	2.134
7	12.381	81.332	0.653	12.521	2.038	1.326	2.127
8	12.808	81.751	0.610	12.452	1.904	1.267	2.013
9	13.362	81.936	0.564	12.513	1.866	1.225	1.892
10	13.763	82.281	0.532	12.367	1.802	1.172	1.842

Table 4.13 above shows results of forecast error variance decomposition of non-interest income for CIMB Bank. It shows clearly that in the short run total loan is the most important factor and the only factor determines the non-interest income of CIMB Bank. So, in the short run total loan (DTL) of CIMB Bank contribute around 12% to 15% to their non-interest income share. Other variables such as bank size (DLNBS), net interest margin (DNIM), total equity capital ratio (DTE) and inflation (INF) gives very minimum impact to non-interest income share of CIMB Bank in the short run. Each of these variables contributes less than 2% to the non-interest income of CIMB Bank. Furthermore bank size does not matter at all for their non-interest income share of CIMB Bank in the short run. So, in the short run total loan is the only significant factor contributes to non-interest income of CIMB Bank. This scenario occurred in CIMB Bank may due to their operations which bundle the non-interest income based products with their interest based products. This strategy may give increase CIMB's non-interest income in the short run. This finding is consistent

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with Basil Senyo (2014) among commercial banks in Ghana where their interest income is significant factor determining the non-interest income and he has concluded that non-interest income is co-existing with interest income.

Table 4.14
Forecast Error of Variance Decomposition of Non-Interest Income (DNIITR) for RHB Bank

Variance Decomposition of DNIITR: Period	S.E.	DNIITR	DLNBS	DTL	DTE	DNIM	DINF
1	4.975	100.000	0.000	0.000	0.000	0.000	0.000
2	5.389	86.080	0.119	2.990	0.137	0.443	10.22
3	6.178	79.907	7.445	2.424	0.169	0.968	9.083
4	6.602	78.376	8.312	3.193	0.675	1.471	7.970
5	7.163	73.533	8.279	3.674	2.529	1.361	10.623
6	7.608	72.787	7.402	3.448	4.454	2.411	9.496
7	8.085	73.497	6.635	3.422	4.609	2.732	9.102
8	8.301	71.821	6.727	3.622	4.405	2.760	10.663
9	8.678	73.624	6.165	3.577	4.066	2.770	9.795
10	8.947	74.194	5.872	3.633	3.826	2.679	9.792

Table 4.14 above shows results of forecast error variance decomposition of non-interest income for RHB Bank. Based on the results above, surprisingly the macro variable inflation is the highest contributor to non-interest income of RHB Bank in the short run. Inflation (INF) contributes around 10% to the non-interest income of RHB Bank in the short run. Theoretically, if the general prices of goods increase, this will increase the operational cost of the bank and will reduce the profitability of the bank. As results banks will diversify their business to increase the profits of the banks. Furthermore according to Boyd et al (2001), there is significant relationship between inflation and banking sector development. The second largest factor contribute to the non-interest income of RHB Bank in the short run is bank size (DLNBS). It contributes around 8% to the non-interest income in the short run. Other variables

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such as total loan (DTL), total equity capital (DTE) and net interest margin (DNIM) contributes very minimum to the non-interest income of RHB Bank. So in the short run, inflation and bank size are the only significant factors contribute to non-interest income of RHB Bank.

According to FEVD analysis, total loan is the only significant factor in determining the non-interest income of CIMB Bank in the short run whereas bank size and inflation are the significant factor determining the non-interest income of RHB Bank in the short run. This FEVD analysis can be used as a tool for forecasting. Hence bank can utilize the determinantsidentified to increase their non-interest income revenue. So, it very obvious that even in the short run determinants of non-interest income differ from bank to bank. The determinants are very unique and it depends on the bank characteristics and non-interest products they are involved in.
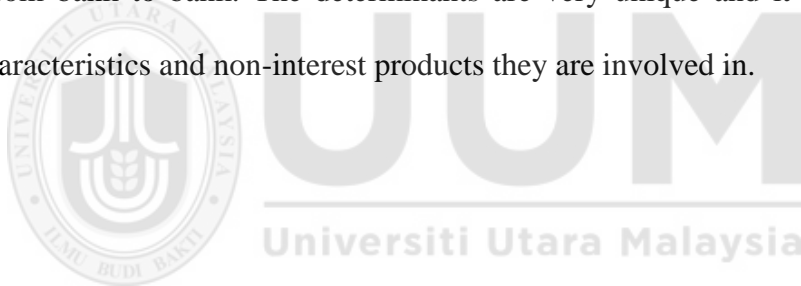
Chapter 5

Conclusion and Recommendation

5.1 Conclusion

Based on the results of our study for long run, non-interest income of CIMB Bank depends on the bank size, total equity capital, net interest margin and inflation whereas non-interest income of RHB Bank depends on the bank size and net interest margin. So, based on the 48 quarterly data for both banks we can conclude that each bank have their unique determinants and it could be because of various reason such as bank's direction or policy towards non-interest income based business, the type of non-interest income products banks are involved etc.

In general we can conclude that we had mixed results where some factors are consistent with the previous research but some factors are not. For example study in USA (Robert De Young & Rice, 2004) found out that loan ratio is the significant factor determines the non-interest income in USA and study in British (Robert Webb, Mabwe &Jaafar, 2014) found out that there is positive correlation between interest income and non-interest income among 5 major British banks. However in Malaysia based on the CIMB Bank and RHB Bank study, the finding is entirely different with scenario in USA and British where total loan or interest income is not significant at all in determining their non-interest income in the long run.As per our findings above, in the short run total loan is affecting the non-interest income of CIMB Bank but in the long run the impact disappears. So, it means even if the banks bundle up the non-interest income products with interest income products it helps to increase the non-interest income revenue only in the short run whereas in the long run it does not impact to the non-interest income revenue of the banks.   Another

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interesting finding is net interest margin is significant factor for CIMB Bank and RHB Bank but for CIMB it correlates negatively and RHB it correlates positively. In the most of the previous research net interest margin have negative relationship with the non-interest income but RHB Bank findings showing it has positive relationship. Theoretically when net interest margin is compressed bank will diversify to other business such as fee based and this has been mentioned by many analyst or industry experts. (The Star, 9th May 2016 and 6th June 2016).   So, the findings for RHB Bank for net interest margin showing totally different results from theory or industry expert's opinion. To identify the actual reason for this scenario, we need to study further on this area. It could be because of many reasons such as the correlation between net interest margin and non-interest income, the type of non-interest income products RHB Bank involved etc.

Based on the trend analysis above, non-interest income consists about 20% from the total income of the banking industry in Malaysia from 2005 till 2015. Non-interest income contributes nearly 20% to 25% of total income of Malaysian banks and for some larger Malaysian commercial banks this figure may go up to as high as 30% (The Star, 27th August 2011). Furthermore, lending activities will still be still the main engine for banking industry but the non-interest income can go up to 30% to 35% of the Malaysian banking system's gross income (The Star, 27th August 2011). So, looking at the industry expert opinion, the ratio of non-interest income of Malaysian banking system may go up from 20% currently to 35% in the future. So, the future anticipated scenario for Malaysian banking landscape is almost consistent with the current banking landscape in USA and Europe where their non-interest income ratio is almost 40% from the total banking income. Hence, banks need to focus more on their

non-interest income components and their determinants to increase their profit and revenue.

Furthermore average growth per year for interest income and non-interest income ranging from 7% to 8%. These figures are based on the data from 2005 till 2015.Seing the average growth of interest income and non-interest income is almost equal reflecting the diversification of traditional banking. Slower growth in net interest income, uncertain macroeconomic condition and tighten lending rules implemented by Bank Negara Malaysia has made all the local banks in Malaysia to focus on non-interest income revenue (The Edge, 30th July 2012). Malayan Banking Bhd recorded increased of non-interest income by 51.7%, CIMB Group Holding Bhd recorded increase 40%, RHB Capital recorded increase of 24% and surprisingly Public Bank recorded marginal increase of 4.8% in quarter ended 31st March 2012 compare to the same period a year ago for all the respective banks (The Edge, 30th July 2012). According to "The Edge" dated 31st March 2016, Maybank's and CIMB's non-interest income boosted because of their advisory fee and arrangers' Fee. For example CIMB Bank has been adviser for listing of Felda Global Ventures Holdings Bhd. In a report by Am Research, fee of listing of Felda Global Ventures could be 1% of the amount raised which is RM 33 million. Furthermore CIMB is also acting as principal adviser of RM6.4 billion listing of IHH Healthcare and listing of Astro All Asia Network. So, other smaller banks may not be able to compete with giant bank such as Maybank and CIMB Bank in the advisory sector, they have gone for other slices of pie. Alliance Bank is very strong in treasury management service and Public Bank is very strong in mutual funds (March 31, 2016, The Edge). According to the analyst, banks are increasing their ratio of non-interest income in the areas which they have additional strength and competitive advantage. Since each bank has its own

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specialised products or service to earn substantial share of non-interest income, definitely the determinants of non-interest income will differ from bank to bank according to the services or products they are offering. The analyst opinion on the non-interest income is consistent with our findings of this study where the determinants of non-interest income are unique and it differs from bank to bank.

Based on the literature review, determinants of non-interest income differ from country to country due to various reasons. From our present study the non-interest income determinants differ even from bank to bank and as such each bank need to have their own policy and strategy when it involves non-interest income revenue. This is very crucial based on the importance of non-interest income and probability for ratio of non-interest income to increase from around 20% to 35% from the total banking income in Malaysia in the near future (The Star, 27^{Th} Aug 2011). Probability of increase in non-interest income to almost more than 30% from total banking income in Malaysia signalling than banks in Malaysia must be cautious and attentive to non-interest income industry (RAM, 2011). Since non-interest income determinants are unique and it differs from bank to bank, it is up to individual banks to identify the determinants and implement the proper strategy to increase the bank's revenue. For example in our study based on Johansen Co-Integration, the most significant factor determines non-interest income for CIMB Bank is bank size (positively related) and net interest margin (negatively related).Both of these variables showing highest coefficient. Hence CIMB Bank needs to work out on increasing the asset size to optimize the revenue from non-interest income. CIMB Bank needs to shift its resources from interest based products to non-interest income based products whenever the net interest margin goes down. By doing this, CIMB Bank can optimize

their non-interest income revenue. We can conclude that each bank must have their own strategy based on the determinants to optimize their non-interest income revenue.

5.2 Implication of Study

This study reveals some important findings such as the scope of non-interest income and its potentials in the future. The main aim of this study is to identify the factors that determine the non-interest income of the selected banks. The finding of this study is very interesting where some areas the results is consistent with the previous research and in some areas the results differ from previous study. So, we can conclude that we have mixed findings with the previous research around the globe. The results of this study can be used as a reference by the selected bank itself, banking industry in general, regulators and academicians.

The management of the banks (CIMB Bank and RHB Bank) can use the findings of this research as a reference in the decision of diversification of the banking operations. For example the common variables affecting the non-interest income for both banks is bank size. So the most important question is which size bank optimizes its non-interest income. So, to increase the size banks have to come up with proper policy and procedures to achieve the desired bank size in order to maximize the share of non-interest income. This findings is consistent with existing study byRobert De Young (2004), Pennathur & Subrah (2012) and Abdelaziz Hakimi, Hamdi &Djelassi (2012). Another example is total equity capital or capital adequacy ratio is the significant factor determines the non-interest income share of CIMB Bank in the long run. So, CIMB Bank needs to find the way to increase their equity capital in order to increase the bank's non-interest income. This finding is consistent with existing study of Roger & Sinkey (1999). So, the findings of this study can be used by the

management of the bank to focus on the variables that are affecting their non-interest income to increase the bank's revenue and profits.

Since the growth of non-interest income based products is equal with the growth of interest based products and the chances of non-interest income ratio of banking industry could increase from 20% currently to 35% in future, the regulator Bank Negara Malaysia need to monitor closely the performance of the banks in these area. So, the regulator need to develop proper framework with the strong policy and procedures in managing the bank's non-interest income based activities. As found in this study, some of the bank's internal factors have strong relationship with non-interest income. So, regulator must manage this properly to avoid any financial crisis. According to existing studies by Markus, Gang & Darius (2010), non-interest income of banks is largely associated with the systemic risk. He finds that components of non-interest income such as trading income and investment banking and venture capital income is significantly related to systemic risk. So, systemic risk is higher for banks with larger non-interest income particularly trading income and investment banking income (Markus, Gang & Darius, 2010). Hence it is recommended that Bank Negara Malaysia to monitor closely the progress of non-interest income and its impact to the banking industry as a whole.

The academician can utilize the findings of this research to analyse further on the non-interest income issues among Malaysian commercial banks such as what are the strength or main contributor of non-interest income for each banks, volatility of these income stream, non-interest income of investment banks and commercial banks etc. Analysis on various dimension of non-interest income gives a comprehensive finding on non-interest income issues among commercial banks in Malaysia.

Apart from that, the importance of non-interest income among banking industry is very obvious where it recorded almost same growth with the growth net interest income in Malaysian banking industry. Net interest income is the engine of growth and revenue for banking industry recorded average growth of 8% in Malaysia which matches with the growth of non-interest income (Bank Negara Malaysia). Hence non-interest income became one of the crucial revenue for the banks. It is also one of the diversification strategy implemented by the banks. According to the Federal Bank of Minneapolis USA, non-interest income growth is exorbitant and the source of non-interest income has changed from services charges to fee based mainly due to technological advance and flexibility of the regulator.

5.3 Limitation of Research

There is several limitation of this research. First limitation is availability of data. This research has been conducted based on quarterly data from 2004 till 2015. If we could obtain data earlier than 2004 than our findings of this research will be more solid. We are unable to obtain data earlier than 2004 because there is some merger of banks and format of data presented in that particular period differ. All this factors may distort our findings if we include the data earlier than 2004.

Second limitation is we have analysed based on the total non-interest income without looking at the detailed breakdown of non-interest income. Breakdown of non-interest income is comprised of many items such as commission, service charges and fees, brokerage income, handling fee etc. Furthermore these breakdowns differ from bank to bank and it is difficult to make comparison among banks. If analysed using the detailed breakdown, the study should be focus only on one individual bank and actual determinants for each type of non-interest income can be obtained for the individual bank.

5.4 Recommendation for Future Research

Non-interest income contributes around 20% of overall income of banking industry in Malaysia and average growth of this non-interest income based business is equal to the growth of interest income. So, we cannot ignore the importance of non-interest income. Non-interest income is one of the important sources of revenue for the banking industry. There are many components of non-interest income and each non-interest income operates in different way because it is entirely different products such as advisory, treasury, stock trading, bank guarantees, unit trust, letter of credits etc. So, further research on the detailed breakdown of non-interest income is recommended for commercial banks in Malaysia.

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