VAASAN AMMATTIKORKEAKOULU
VASA YRKESHÖGSKOLA
UNIVERSITY OF APPLIED SCIENCES

Cao Duong Hien

INTEREST RATE RISK MANAGEMENT: PRACTICES AND SOLUTIONS IN A VIETNAMESE JOINT STOCK COMMERCIAL BANK.

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Vaasa, March 07, 2013.

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VAASAN AMMATTIKKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES
Degree Program of International Business

ABSTRACT

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Regards to the nature of commercial banks' business, the revenues certainly comes from net interest income that is the difference between various assets and liabilities in balance sheet. The banks' income and value can be altered as interest rates fluctuate. In fact, during the interest rate volatility period recent years, Vietnamese commercial banks have been facing difficulties in establishing strong interest rate management policies in order to overcome challenges of the market, maximize profit as well as gain competitive advantages.

The purpose of this study was to introduce a case commercial bank's asset and liability committee with its duty of managing the bank's interest rate risk and the effectiveness of the risk management practice through benchmark with international standards. Another aim was to indicate the facts about Vietnamese interest rate market and regulatory interest rate polices. Both qualitative and quantitative research methods were used in this thesis. The in-depth interviews were conducted via Skype with two senior managers and the questionnaire was sent through email to five employees. Significantly, the research could not obtain success without the crucial contribution of necessary data from the State bank of Vietnam as well as the bank's policies and reports.

The research results indicated that the efficiency of the investigated bank's interest rate risk management was in average level, which posed a lack of methods in measuring, simulating and hedging the risk and information technologies employed in collecting and evaluating data. Besides, some problems in banking operation were reviewed and improved such as the staff training's quality, decision making process, and balance sheet positioning. In fact, these research findings contributed dramatically to the bank's improvements as well as provided helpful recommendations for further researches.

Keywords Banking risk, Interest Rate Risk, Interest Rate Risk Management

VAASAN AMMATTIKORKEAKOULU
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Liikepankeille on ominaista, että niiden tulot muodostuvat pääasiallisesti nettokorkotuloista, jotka on mahdollista johtaa taseessa olevien omaisuuserien ja velkojen erotuksesta. Tämän yhteyden takia pankin tuotto saattaa vaihdella korkotason vaihtelun seurauksena. Viime vuosina kasvaneen korkotason volatiliteetin vuoksi vietnamilaiset liikepankit ovat kohdanneet vaikeuksia koettaessaan luoda vahvoja korkohallintaohjelmia, joiden avulla olisi mahdollista suoriutua markkinoiden haasteista, maksimoida liikevoitto sekä saavuttaa kilpailullista etua.

Tämän tutkielman tarkoituksena on esitellä esimerkkiliikepankin vara- ja velkakomitean tehokkuus pankkien korkotason hallinnassa, ja komitean velvollisuudet riskinhallinnassa benchmarkingin kansainvälisten standardien mukaan. Lisäksi tarkoituksena on tuoda esille vietnamilaisten korkomarkkinoiden ja säännöstelyjen menettelytapoja. Tutkimusta tehtäessä on käytetty sekä laadullisia että määrällisiä tutkimusmenetelmiä, joiden lisäksi perusteelliset haastattelutilanteet on tehty Skype-palvelun avulla. Haastattelut saatiin kahdelta ylemmältä johtajalta ja haastattelujen lisäksi viidelle työntekijälle lähetettiin kysely sähköpostitse. Lisäksi tutkimusta ei olisi ollut mahdollista tehdä ilman tietoja Vietnamin valtionpankilta, jotka olivat välttämättömiä tutkimuksen onnistumisen kannalta. Lisäksi tärkeiksi lähteiksi nousivat myös pankin menettelytavat sekä raportit.

Tulokset osoittavat, että tutkimuksen kohteena olleiden pankkien korkojen riskienhallinta on keskinkertaisella tasolla, mikä viestii mittausmenetelmien, riskien simuloinnin ja suojaamisen sekä tietojen keräämiseen ja arvioimiseen käytetyn informaatioteknologian puutteellisuudesta. Lisäksi joitakin pankkien operationaalisia ongelmia käsiteltiin ja parannettiin. Tällaisia ongelmia olivat muun muassa henkilöstön koulutuksen laatu, päätöksentekoprosessit sekä taseen asemointi. Kaiken kaikkiaan tutkimustulokset edesauttoivat merkittävästi pankkia toimintojen parannuksissa sekä tarjosivat hyödyllisiä suosituksia tulevaisuuden tutkimuksia varten.

Avainsanat Pankkitoimintariski, korkoriski, korkoriskin hallinta

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

ALCO – Asset and liability committee

ALM – Asset and liability management

IRR – Interest rate risk

JSCB – Joint-stock commercial bank

NII – Net interest income

NPV – Net present value

SBV – The State Bank of Vietnam

RSA – Rate sensitive asset

RSL – Rate sensitive liability

1 INTRODUCTION

The stabilization of interest rate policies and actions of Vietnamese Central Bank for a long period before 2007 had created the neglect in interest rate risk management of the Vietnamese banking institutions. Due to the global economics recession, at the beginning 2008, the Vietnamese macro-economic situation appeared adverse elements caused by the increase in two-digit inflation number and government monetary tightening policy, which pushed the banking institutions into a liquidity crisis. Consequently, banking institutions joined the race of mobilizing fund. Almost all banks used interest rate as a strategic weapon in winning the market shares. However, the high interest rate was not a good strategy because it might cause so many risks for banks. Besides, due to the lack of knowledge and experience in risk management, many Vietnamese firms could hardly avoid revealing their weakness in risk management, especially in interest rate risk management (Tran & Le 2008).

Compared to credit risk, interest rate risk is also one of the important elements creating the failure in banks whose assets and liabilities are apparently affected by changes in interest rate. In general, the impact of interest rate fluctuation is not equal. It can create some problems in a bank's current assets and liabilities. For instance, in the Asian financial crisis in the late 1990s, the interest rate in Indonesia increased by 30% (Trading Economics 2012) and then a great number of banks went bankrupt. This example indicates the importance of IRR management in many organizations, which is properly related to almost all Vietnamese banks.

These days, globalization is no longer a strange trend in any country. Instead, it is an objectively inevitable development tendency with the country's economy. Being a part of the World Trade Organization and other regional associations, Vietnam in general and its bank systems in specific are step by step trying to improve themselves and making a difference. As known, the joint-stock commercial bank system was assessed to be a creative system in the process to become an international economy.

However, until now, Vietnam has only been in the first period of the integration process with other economies in the world (Tran 2008).

Certainly, in order to exist and have a sustainable development in such a difficult competition, many JSCBs have to try their best to improve their competitive ability in all factors. With this problem, a question has been raised to them that whether the current interest rate risk management system is adequate and which needed to be improved according to the international standards.

1.1 Research Problem and Objectives

With the indicated issue assumed by Vietnamese commercial banks, **the analysis and evaluation of IRR management process in a Vietnamese banking institution and its implementation in reducing the risk of interest rate in banking business** will be the focus of this thesis in order to examine the effectiveness in the current risk management and hopefully it will indicate the improvement in management of IRR experienced from the international standards for IRR management in the banking industry.

During the process of building this thesis, the author aims to solve these objectives. Firstly, it will introduce to the readers the common interest rate risk that a commercial bank is affected by in its business. Secondly, the structure of Asset and Liabilities Committee responsible for IRR management, the methods used by a commercial bank in measuring, simulating and hedging the risk are presented. Finally, it will come up to the third objective to analyze the process of managing IRR as well as related to the policies of the case study bank and discuss the results. In addition, some suggestions are indicated with the purpose of improvement.

In order to obtain further understanding, a list of research questions will be presented to indicate how the objectives of this study are achieved.

1. What kinds of interest rate risk is the bank generally facing in financial markets?
2. What are the case study bank's practical methods and/ or solutions to deal with IRR?
3. How are these implementations used by the bank in practice and are they effective?

1.2 Structure of the Study

This section is aimed to introduce the readers the structure of this thesis (see Figure 1). The main content of the thesis is about interest rate risk management and the evaluation of the risk management performance, which are primarily supported by the theoretical and empirical parts.

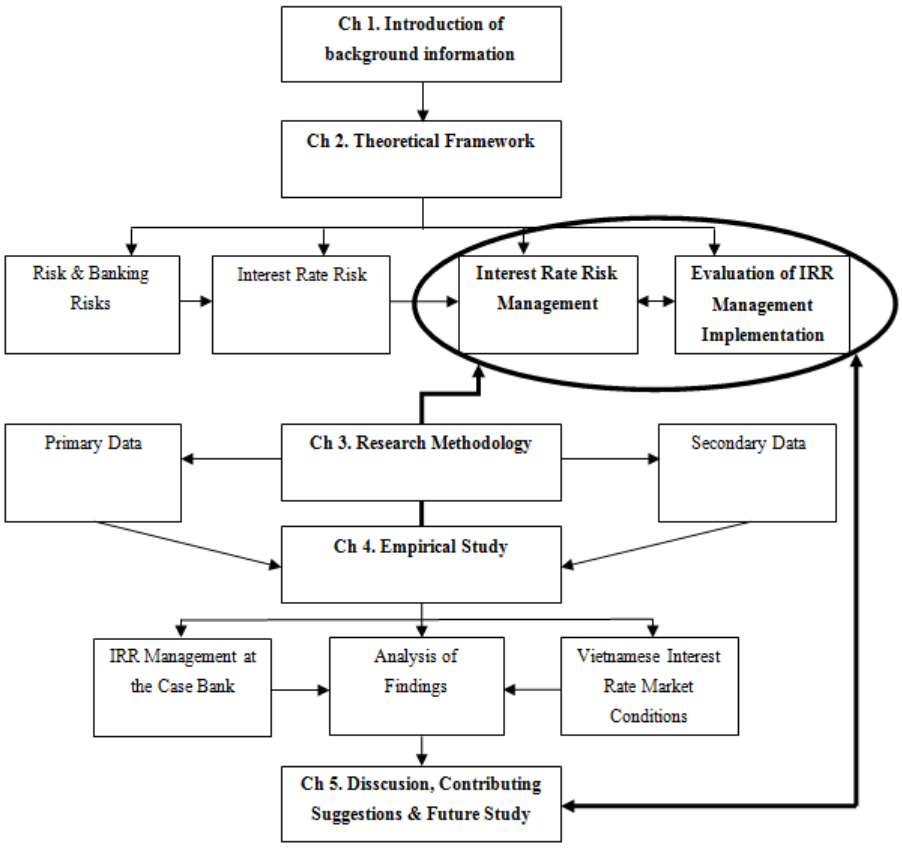


Figure 1. Structure of the Study.

At the beginning, background information that contains the research problem, objectives, and the thesis's structure is presented. Next the second chapter mentions the theories used to conduct the thesis. The risks and banking risks generally indicate before continuing to identify the main content of the thesis - interest rate risk definition, the risk management, and the evaluation of its management. After introducing the theoretical framework, the research methodology is clearly identified in Chapter 3. In this part, research methods and implemented data are described with the purpose of serving for the empirical study in the fourth chapter. Chapter 4 will conduct the evaluation of interest rate risk management process, procedure and policies of a commercial bank. It begins with the overview of the interest rate in the market. The case bank's background information is then reviewed. In the following, the bank's interest rate risk management practices are analyzed based on the benchmark with four criteria offered by the World Bank. Finally, Chapter 5 will conclude the research study with the evaluation on the bank's interest rate risk management performance and contributive suggestions for the case bank as well as further research.

2 THEORETICAL FRAMEWORK

This section is going to explain some interrelated concepts of risk and risk management as well as their relationship. Firstly, the definition of risk in general and the different kinds of financial risks assumed by banks will be introduced. Secondly, the reader will get familiar with interest rate risk definition and its impact. Finally, the interest rate risk management will be described before mentioning to the most important of the thesis - the evaluation of implementation of interest rate risk management.

2.1 Risk in General

Risk is all about something happening unexpectedly in the future, which may be occurring in normal life, indoor and outdoor activities, trading activities, working activities, as well as businesses. Apparently, some people think that risks will cause negative results, while others consider risks as the probability of hazard that can result in two ways: opportunity and threat. According to Oxford dictionary (2012), risks are potential losses caused by actions may lead to undesirable outcome. In order to affirm that risk is abominable, other dictionaries like Business dictionary (2012) also define risk as "a probability or threat of a damage, injury, liability, loss, or other negative occurrence that is caused by external or internal vulnerabilities; particularly in finance, risk is the probability that an actual return on an investment will be lower than the expected".

In general, risks must be understood as potential unpredicted consequences, which give positive or negative effects to their recipients. It plays a role in trade-off theory which deals with finding the balance between gains and losses.

2.2 Banking Risks

Pyle (1997) indicated that banking risks include four major sources: Market risk (including interest rate, exchange rate, and equity and commodity prices), Credit risk,

Operational risk, Performance risk. The classification seems to be adequate, but it still doesn't have the existence of environmental risks which combine national laws, legal structure and the differences concerning the laws between two countries.

Another classification is from Greuning & Bratanovic (2009), which is more adequate and comprehensive than the first conception. According to the authors, banking business these days has to face three main crucial issues: financial, operational, and environmental risks (see Table 1).

Table 1. Categories of Banking Risks. (Greuning & Bratanovic 2009, 3-4).

Financial Risks	**Operational Risks**	**Environmental Risks**
Balance sheet structure	Internal fraud	Country and political risks
Earning and income statement structure	External fraud	Macroeconomic policy
Capital adequacy	Employments practices and workplace safety	Financial infrastructure
Credit	Clients, products, and business services	Legal infrastructure
Liquidity	Damage to physical assets	Banking crisis and contagion
Market	Business disruption and system failures (technological risks)	
Interest rate		
Currency		

As can be seen, a bank is facing a large number of different kinds of risks due to the complexity of economy. The banking risks can damage banks' operations, and banking systems or even the whole economy. Significantly, they are drastically increasing; in both quantity and complex degrees and their devastating level is different over the periods depending on their individual characteristics. As aforementioned, the thesis is writing about the interest rate risks so that this kind of risk and its relationship will be discussed thoroughly in the next chapters.

2.3 Interest Rate Risk

In this chapter, we move farther to the object of the thesis by discussing what interest rate risk is and then explaining the key reasons that cause the interest rate risk. From that, the readers have a thorough grasp of interest rate and its risks before moving further to processes and strategies in interest rate risks management in the next chapter.

2.3.1 Defining Interest Rate Risk

An interest rate risk is considered as one of the most significant risks of a bank (Schawel 2011). Bair (2011) - the chairman of the US Federal Deposit Insurance Corporation, said that "I do worry that credit quality …needs to be fixed, but the next issue is likely to be interest rate risk". The article of Schawel (2011) also indicated banks fail in employing short-term deposit to invest long-term fixed rate asset, or even short-term asset, for instance. As can be seen, IRR is considered as important as credit risk. Hence, IRR needs to be defined clearly.

According to Oxford Dictionary of Economics, interest rate is defined as "The charge made for the loan of financial capital expressed as a proportion of the loan". In other words, interest rate is the fee that is paid to the lender of the money by a borrower for using that loan. This is considered as the basic method of business in which a

commercial bank earns profit by lending money to customers. In contrast, customers can also gain profit by deposit money to a bank. Therefore, IRR can be basically understood as unfavorable fluctuation of interest rate or changes of other factors related to interest rate such as inflation rate, default-risk premium, etc. which cause unexpected changes in interest received by lender. (cf. Keown & Martin 2006, 60.)

More formally, Basel Committee on Banking Supervison (2004. Ref 11) indicated that "*Interest rate risk is the exposure of a bank's financial condition to adverse movements in interest rate. […] Changes in interest rates affect a bank's earnings by changing its net interest income and the level of other interest sensitive income and operating expenses. Changes in interest rates also affect the underlying value of the bank's assets, liabilities and off-balance sheet instruments because the present value of future cash flows (and in some cases, the cash flows themselves) changes when interest rates change*".

In other way, Williamson (2008, 14) described that interest rate risk arises when there are mismatches between maturity of bank's assets and liabilities. In a bank where long-term liabilities are used to fund short term assets, interest rate risk exposes itself as a reinvested risk due to assets mature before liabilities. If the interest rate falls, the reinvestment of those assets will be at a lower rate than the existing rate payments on liabilities. Obviously, the bank will earn profit from the risk as the interest rate increases. In other case, short-term liabilities are a source for long-term assets, which requires rollover of liabilities until the mature of the assets to repay the liabilities. Thus, the interest rate risk will occur as a rise of the interest rate because the rate of the rollover of liabilities is greater than the rate earned on assets. Obviously, in case of decrease of interest rate, the bank will obtain profits from the risk. (Williamson 2008, 14.)

The above case of bank's assets and liabilities can profoundly be explained by an example that banks usually apply different kinds of yields during the process of borrowing and lending fund. In the case, a bank mobilizes the capital (liabilities)

from the publics with a fixed interest rate, then lending and investing (assets) with a floating interest rate. As the interest rate goes down, the bank has to suffer from the risk of interest rate due to the interest income is lower than interest expense. On the contrary, as the bank mobilizes the capital from the public with a floating interest rate and then lends and invests with a fixed interest rate. The risk will occur in the increase of the interest rate. Consequently, the bank will get losses as the interest expense is bigger than the interest income.

In banking activities, interest rate risk is normally accepted because of the nature of risk that brings both opportunity and threat. It may be considered as the important source of profitability for banks and their shareholder's value. In addition, if the risk is uncontrollable, there will be a significant threat to the bank's value.

2.3.2 Effects of Interest Rate Risk

The effect of IRR, as normal understanding, gives the impact earnings of commercial banks due to their nature of business based on investing, lending, and borrowing financial assets. However, IRR also cause adverse effects to banks' economic value. As claimed by Basel Committee on Banking Supervision (2004), IRR not only impacts on banks' earnings, but also affects its economic value.

Earnings are generally known as one of the final objectives of institution, and particularly commercial banks. The earnings directly affect the bank's financial stability and credit ability. A fall in earning caused by the unpredictable interest rate fluctuation can threaten the capital adequacy and market confidence. Traditionally, bank's earnings are regarded as net interest income (NII) which is the difference between total interest income and total interest expense. The NII, as its name, shows the relationship with the interest rate, as well as, impacts from the interest rate. (Basel Committee on Banking Supervison 2004, 6.)

A bank's economic value is the worth of the bank as determined by the market. It is evaluated via the present value of current and future net cash flow which a bank

actually has money in hand so that it can be invested and obtain its interest in return. Thus, cash flow is considered to be sensitive to market interest rate, or in other words the worth of bank is impacted by fluctuation in the interest rate. The report of Basel Committee on Banking Supervision (2004, 6) pointed out that changes of interest rate and the present value of net cash flow have a long-term relationship of which the worth of bank is affected by interest rate in long-term period in comparison with the earning perspective where bank's earnings is in short-term impact.

2.3.3 Forms of Interest Rate Risk

As preceding discussion, interest rate risk affects the bank's earnings and economic value directly and indirectly in short-term and long-term periods. IRR exposes itself in many ways, for example, the mismatch of bank's asset and liabilities maturity, in which IRR undertaken by bank is assumed in the form of reinvested risk in which the earned interests are lower than the interests to be paid. In each case, banks encounter interest rate risks as different forms that the Basel Committee on Banking Supervision (2004, 5-6) are divided into four main types (see Figure 2)

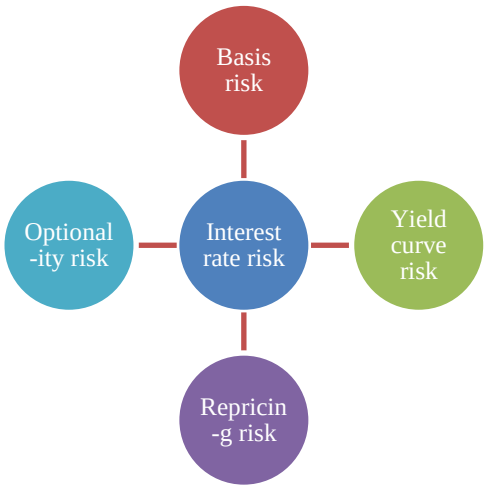


Figure 2. The forms of Interest Rate Risk. (Basel Committee on Banking Supervision 2004).

The Basic Risk occurs when there is imperfect correlation of bases, such as U.S Treasury Bill rate and London Interbank Offered Rate, on which earnings on assets and costs on liabilities are based. Because the bank's asset and liabilities are dependent on different bases, if there is a move on each base in different directions, the bank will suffer unexpected changes in revenues and expenses. (Basel Committee on Banking Supervision 2004, 5.)

The Yield Curve Risk is caused by the changes in the slope and the shape of yield curve, which refers to the relationship between short-term and long-term interest rates gained by bank. (Basel Committee on Banking Supervision 2004, 5.)

The Re-pricing risk, as well as the reinvested risk, presents a possibility of mismatching of assets and liabilities at different times (maturity) and rates (floating rate). (Basel Committee on Banking Supervision 2004, 5.)

The Optionality Risk, as its name, is the risk caused by options that are embedded in bank's assets and liabilities. Unless adequately managed implications, the products with optionality features can be a source for signification risk for the banks offering them. (Basel Committee on Banking Supervision 2004, 6.)

2.3.4 Conclusion

It is obvious that the interest rate changes affect the profitability and economic values of bank in various forms and different sources which are the components conducting the interest rates offered by lenders such as inflation and default (credit) risk premium, maturity and liquidity premium (Keown & Martin 2006). In addition, the interest rate risk significantly relates to environmental risks such as changes in monetary, fiscal and economic policies of Governments or Central Bank with the aim of managing the national financial market. The Central Bank, for instance, announces an increase reserve ratio; after that the lending rates are also adjusted to compensate for the increase in costs caused by changes of reserve requirement. Hence, interest rate risk management is a rising crucial issue that every bank under its

distinct financial situation, national economy, economic policies and etc. would have its efficient strategies and process in order to minimize the risk and maximize the profit and organizational value. In the next chapter interest rate risk management will be discussed.

2.4 Interest Rate Risk Management

Apparently, banking sector is exactly known to be the risky sector in the world economy due to their business's nature relating to money. They play a role as intermediaries who distribute cash flow between parties in the financial market or even as parties who are considered as investors. Accepting risk is a normal business principle of banking and interest rate risk does not stay out of the line. It seems to be an important source of profitability and economics value for commercial banks; meanwhile it can also be a source of significant threats if the level of yield is excessive. Accordingly, keeping interest rate at a prudent level is necessary to retain the safety and soundness of banking institutions which pose to the efficient management of interest rate. (cf. Trading and Capital-Markets Activities manual 1998.)

IRR management is a set of policies and procedures implemented by banking institutions with the purpose of identifying, measuring and monitoring the movement of interest rate to restrain and avoid the unfavorable risk's impacts and may be making use of fluctuation of yield curve to obtain new opportunities (Raghavan 2003, 842). In order to see how IRR is managed, this chapter will describe the organization of IRR management unit, the interest rate policies where decision-making is based on and the methods which interest rates are measured, simulated and controlled.

Under the distinguishing economic factors of different countries where commercial banks have their business, the methods in which interest rates are controlled in order to maintain its IRR's exposure within authorized level are varied. These methods are depending upon the complexity and the nature of its structures and activities, and IRR

exposure (Trading and Capital-Markets Activities manual 1998). However, it seems to be difficult to assess the management of interest rate risk without the general standards. The sound IRR management conducted by Basel Committee on Banking Supervision –the principles for the Management and Supervision of Interest Rate Risk can be a response and a reliable source on which analysts may rely to evaluate the activities of bank's managing risk of interest rate (Basel Committee on Banking Supervision 2004). In the guideline, the committee offers four basic elements embedded into the management of IRR (see Figure 3).

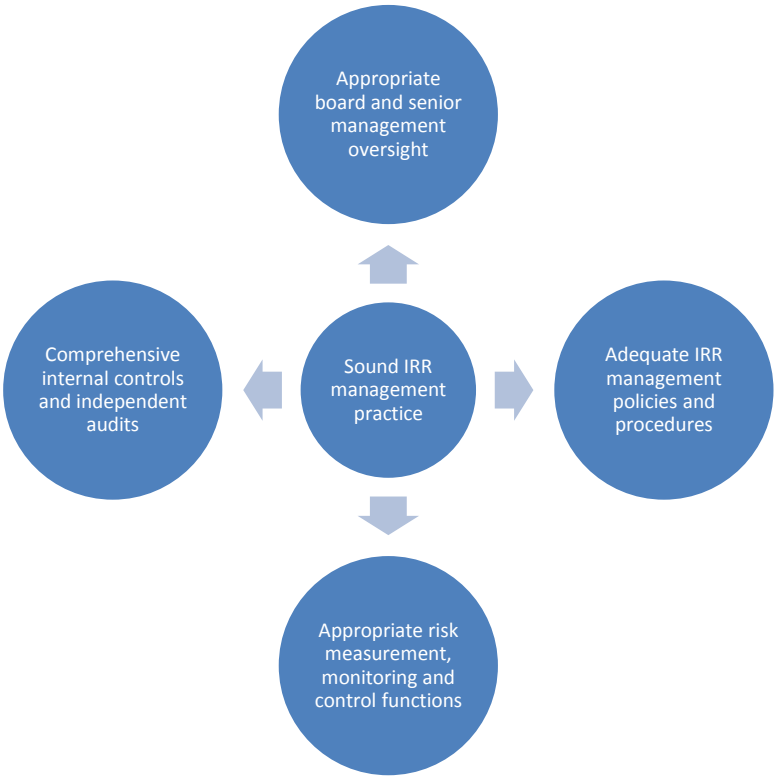


Figure 3. Sound IRR management practice. (Basel Committee on Banking Supervison 2004, 11).

In order to adapt the approaches and standards for an efficient IRR management suggested by Basel Committee, it is required for banks to rely on an internal committee which is in charge of the duty of managing interest rate risk (Greuning & Bratanovic 2009, 277; Bessis 2002, 131). The asset and liability committee (ALCO)

is responsible for its mentioned duty. It is engaged in restructuring balance sheet – adjusting component accounts in assets and liabilities. It helps to maintain stabilization and maximizes the interest merge of the interest paid to mobilized fund in bank's liabilities and interest income on its asset, simultaneously to comply the liquidity required by central bank (Greuning & Bratanovic 2009, 278). In the following, ALCO will present its structure (including its decision making process, broad of senior managers, reporting), internal and external policies, and its function containing IRR measuring, simulating, and hedging.

2.4.1 Organization of Asset and Liability Committee

Asset and liability committee (ALCO) is an internal committee that has responsibility for liquidity and interest rate risk management. In a big company, ALCO is a separate unit similar to other central units such as risk, portfolio and credit risk department (see Appendix 1). ALCO is usually operated by CEO or CFO appointed by the board of directors. The source of information used to conduct the policies and managing strategies is collected from various internal bank departments and external factors in association with the bank's activities. In addition, the organization of the ALCO based on the business line of each bank reflects from the limited balance sheet of reducing IRR structure to a more profit and hedging function structures. (Bessis 2002, 70.)

However, due to the complicated economy and the variety in banking services, the limited balance sheet structure seems inadequate. The balance sheet should be structured with extendedly integrated functions in adapting the requirement of banking business itself and creating advantages in competing with competitor institutions. The extended functions should include managing changes in maturities and type of bank assets and liabilities (sensitive or non-sensitive), finding opportunities and limit risk by reviews monetary and fiscal policies, etc. Figure 4 depicts the extended integration which may be considered adequate and comprehensive. (Williamson 2008, 31.)

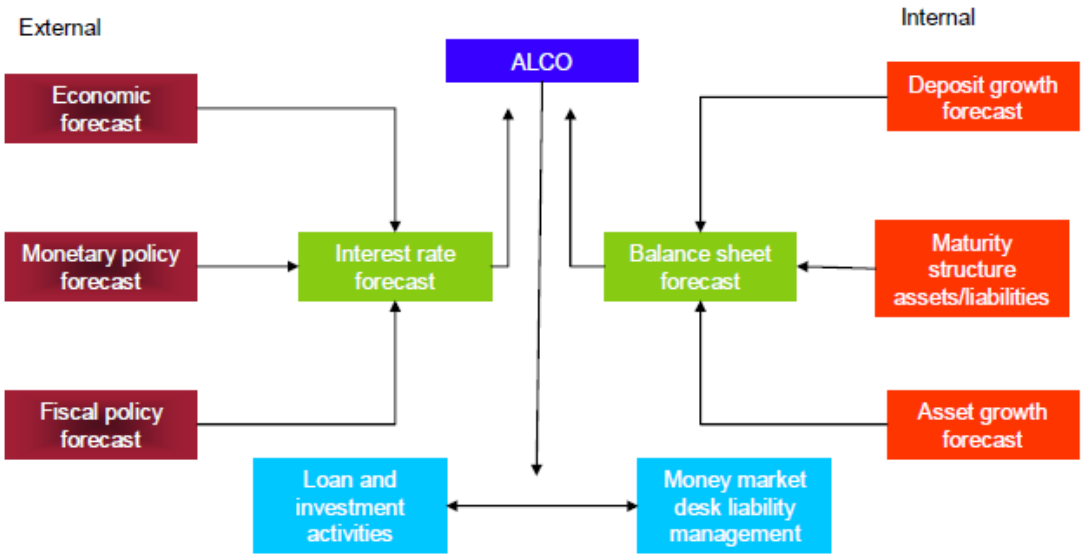


Figure 4. The integrated ALCO. (Williamson 2008, 31)

In the next, ALCO decision-making process will be presented, which is based on the integrated structure of ALCO.

2.4.1.1 ALCO Decision-Making Process

As indicated, the balance sheet management is different among banking institutions based on the complexity of business line, thus the decision-making process of the ALCO also diversifies. In addition, the complication of this process is affected by the various relevant departments in which it is incorporated. Greuning & Bratanovic (2009, 280) stated the ALCO decision-making process may be described as the bank's future-looking profit engine where the currency, interest rate and maturity characteristics of bank's liabilities and assets are well-adjusted.

In this thesis, the decision-making process of the integrated ALCO is described because it is considered as a standard for an efficient IRR management model (see Figure 5).

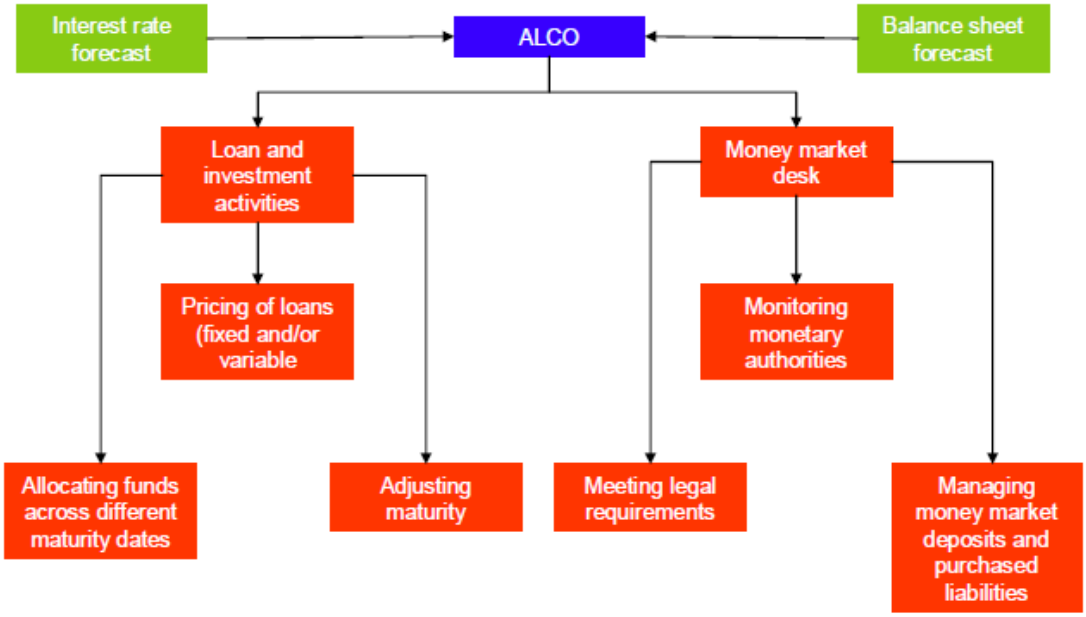


Figure 5. The asset and liability committee decision of making process. (Williamson 2008, 32)

According to Figure 5, the decision-making process of ALCO initiates after collecting and analyzing the information and data of business environment from the two parts – interest rate forecast and balance sheet forecast, in combining with the internal policies regulated by the board of director. Ultimately the strategies and the final decision will be implicated by the product department to ensure the bank's services and products meet the approved requirement. As can be seen from Figure 4, the data of interest rate forecast are generated from the prediction of external factors reviewing current and past economic, fiscal and monetary policies, and domestic and international economic situations. On the other hand, the balance sheet forecast is predictably based on the banks' business activities such as deposit and lending growth expectation, maturity structure of assets and liabilities based on estimated figures.

2.4.1.2 Board of Senior Managers

The board of senior managers has the responsibility for setting and implementing the asset and liability management policies based on the external and internal data, the business's goal and risk limits. Although the compositions of the committee vary in most banks, the senior members of the committee generally comprise the head of business line and indispensably the financial manager. An ALCO basically comprises the chief executive officer or the chief financial officer assigned as a chairman; the head of money market and financial department who takes responsibility for interest rate and balance sheet forecast respectively; in addition the senior managers of commercial and retail banking also take account to the unit in order to adapt new policies and deliver customers' opinion and behavior. No matter what the scope of ALCO is, at a minimum, the senior managers as their role should meet the below requirements (see Table 2). (Choudhry 2011, 224.)

Table 2. ALCO's required missions. (Choudhry 2011, 225)

ALCO Agenda	
1	Formulate ALM strategies from yield curve analysis and money market trading status, prevailing forms of IRR, and bank's IRR limit (where IRR exposure does not exceed)
2	Develop IRR policies and offer IRR program and ensure it will be implemented properly
3	Establish adequate systems, methods and standards for measuring risk
4	Conduct comprehensive IRR report and monitoring process
5	Scenario planning and stress test
6	Ensure individuals involving interest rate risk management understand the policies and procedure of the process
7	Ensure effective internal control, review process and report comprehensively at least quarterly

Besides, Greuning & Bratanovic (2009, 281) recognized that along with dynamics of markets, the innovation of banking should be developed. To the case of IRR management, bank should have a designated and independent unit under the control of ALCO to design and direct the balance sheet management. It may create competitive advantages in identifying new risks relating to products or services or even new ones and ensure they are properly considered in the assessment and management process. (Greuning & Bratanovic 2009.)

In order to assist the managers fulfill their roles, the information and data is necessarily supported in adequate and accurate terms, which is presented through reports. The next section will introduce the content of the IRR management reporting.

2.4.1.3 Interest Rate Risk Management Reporting

Reporting is considered an important action needed to be conducted periodically, as recommended it should be done quarterly (Trading and Capital-Markets Activities manual 1998, 9). The reports should be designed to contain the information and data explicitly, concisely and coherently so that with their assistant the senior managers of ALCO and the board of directors can evaluate the level of bank's aggregate IRR exposure and its trend. In addition, ALCO has information to assess the results of current hedging implications that have been taken and the predicted consequence of future hedging applications. Besides, the report also presents stress scenarios applied for various implications and capital sufficiency for the levels of risk assumed by bank. Along with the indicated data, IRR report has to verify compliance with all policies and limits during the previous period. Moreover, it also reviews suitability and accuracy of implemented IRR policies, procedures, and the IRR measurement systems. (Choudhry 2011, 227-232.)

2.4.2 ALCO's Policies

As the matter of fact, almost all banking institutions have their own policies and can determine their criteria concerning the techniques to deal with unfavorable occurrences. However, banks are still under strictly control of Central Bank regulators. This is because banks play a crucial role in economy with its ability to control the monetary systems of any country. The interest rate is basically a tool used to determine major income of a commercial bank; it is also an instrument of the government to manage the financial market. Hence, IRR management policies of a commercial bank need to comply with its objectives, strategies of managers as well as the regulations of Central Bank. (Pibeam 2010.)

With the regulated policies established by the central bank, banking institutions have obligation to follow with full liability. The regulations may vary in each country, but basically their interest rates are determined by such regulations in Table 3.

Table 3. The Central Bank's regulation. (Pibeam 2010, 72-90)

Central Bank's Regulation	Description
Monetary, Fiscal, and Economic policies	Comply with effective policies issued by central bank strictly
Fund mobilization and lending	Mobilizing and lending interest rate must be under regulation offered by central bank
Reserve requirement	The reserves that the bank keeps to deal with rushed fund withdrawal and potential losses from loan making activity

Meanwhile the regulated policies of Central Bank aim to reduce the interest rate risk caused by the nature business activities of banking institutions and their competition

in the money market, bank's policies are issued with the purpose of hedging unpredicted change of interest rate in the money market to minimize losses and maximize returns. The internal policies of bank should contain the following fundamental points in Table 4. (Pibeam 2010; Choudhry 2011.)

Table 4. The fundamental content of bank's IRR management internal policies of bank. (Choudhry 2011, 224-227)

The fundamental content of bank's IRR management internal policies of bank	
1	Responsibilities and duties of each ALCO members and relevant unit such as credit and liquidity department, and etc
2	The suitably frequency and method for measuring and monitoring interest rate risk
3	Decide acceptable level of risk exposure for bank, existing risk limits and use of hedging instrument
4	Interest rate flooring or ceiling limits for certain types of instruments, portfolios, and activities
5	Loan pricing and limits for each single client, related group, and economic sector

In the following chapter, the functions of ALCO are introduced with the tasks of implemented dedicated method in measuring, simulating and hedging the interest rate risk.

2.4.3 Functions of ALCO – Interest Rate Risk Measuring, Simulating and Hedging

ALCO is mentioned as a unit in risk department of a bank, where IRR is managed via the adjustment of the balance sheet's structure (Greuning & Bratanovic2009, 278-279; Choudhry 2011, 224). This part will discuss how IRR can be managed with the three risk-management steps including measurement, simulation and hedging.

2.4.3.1 Interest Rate Risk Measurement

The IRR measurement is the first step in the process where the risk is analyzed, and the measurement methods are chosen properly to quantify the IRR exposure, plan solving tactics, diminish risk and ensure the targeted income of banking institutions or even obtain new opportunities (Trading and Capital-Markets Activities manual 1998, 6-7). For measuring IRR, banks use a variety of methods such as maturity structure analysis, income gap analysis, duration gap analysis, balance sheet and net interest income projection, risk-return analysis, ratio analysis. Each method has its sophistication and complexity aiming to the similar purpose of quantifying bank's IRR profile, which is suitable to each banking institution. (Williamson (2008, 23.)

As mainly mentioned by many authors in professional literature displays, the income and duration gap analysis are considered the most commonly used IRR measurement tool implicated by banks (Greuning & Bratanovic 2009, 282-286; Choudhry 2011, 186; Bank of Jamaica 2005, 9-10; Williamson 2008, 87-96).

Income gap analysis is a measuring model which analyzes re-pricing gap of cash flow between the interest revenues earned on assets and interest expenses paid on liability in a particular period of time (Greuning & Bratanovic 2009, 282). If the interest return of asset and interest expense of liability re-prices as there is any change in rate, they will be respectively considered as asset or liability sensitive to the interest rate (Choudhry 2011, 186). In addition, in gap model, the rate sensitive asset (RSA) and rate sensitive liability (RSL) are usually defined to re-price in specific periods such as 0 – 30 days, 31 – 90 days, 91 – 181 days and etc (Williamson 2008, 89). In order to recognize a bank of RSA or RSL styles, the interest sensitive ratio in equation 1 (see Appendix 2) will indicate, in which if the ratio is larger than 1 the bank will be considered as RSA bank and vice versa (Oracle Finance 2008, 4).

The gap, as its name, represents the imbalance between the rate sensitive asset and liability, which directly affects the net interest income (NII) of the bank. With any

maturity time of bank's assets and liabilities, it is able to protect its earning and economics value against the unfavorable changes of the interest rate by maintaining the balance of rate sensitive asset and liability, which means RSA is equal to RSL. However, there are many reasons that make the balance hardly appear accidentally, thus the gap is created. Equations 2 and 3 (see Appendix 2) will present the relationship between the balance of rate sensitive asset and liability to bank's NII (see Table 5). (Williamson 2008, 87-89.)

Table 5. The alternative consequence of gap, interest rate changes and net interest income.

Gap		**Change in interest rates**	**Change in net interest income**
Positive	RSA > RSL	Increase	Increase
Positive	RSA > RSL	Decrease	Decrease
Negative	RSA < RSL	Increase	Decrease
Negative	RSA < RSL	Decrease	Increase
Zero	RSA = RSL	Increase	No change
Zero	RSA = RSL	Decrease	No change

The equation 3 reveals the effect of Gap on the interest income of a bank. They are assumed to exist in the three cases. Firstly, in the zero gap, the rate sensitive asset and liability are equal; therefore, the NII will not affect the increase or decrease of the interest rate. Secondly, when the gap is positive, the rate sensitive asset is larger than the rate sensitive liability, so the interest income will be larger than the interest expense as a rise of interest rate and vice versa. Finally, when the gap is negative, the RSA will be lower than the RSL. If the interest rate increases, the bank will suffer a

loss as the interest expense is larger than the interest income and vice versa. These can be summarized in Table 5 that shows the relationship between the gaps and the changes in interest rate and net interest income. (cf. Oracle Finance 2008, 4.)

Theoretically, if a bank can predict the fluctuation of IRR, and then recognize the balance sheet re-pricing (asset or liability sensitive to interest rate), it will restructure the balance sheet in a way based on the positive or negative gaps to obtain the advantage of rise in NII. However, practically the probability of predicting the correct interest rate fluctuation is low. Hence, the gap analysis is implemented to protect bank's earning form loss rather than to gain opportunities. As a result, banking institutions prefer to restructure balance sheet to produce the zero gap as banking analysts are not sure of the future of interest rate which aims to isolate the effects from interest rate volatility. However, this will cause a low level of interest margins. (Greuning & Bratanovic 2009, 283.)

From the advantages of the method, Greuning & Bratanovic (2009, 284) stated that the gap analysis method would give a single numeric result on which managers could rely to produce straightforward target for hedging IRR. However, this method also supposes to some disadvantages. Firstly, it focuses on the current interest sensitivity of asset and liability which ignore the mismatch of asset and liability in medium and long term position. Secondly, the method overlooks the time position of asset and liability in a range of maturity. They are assumed to mature or re-price at the same time although almost liabilities re-price at the end of period while assets may re-price at the beginning. In addition, the income gap cannot show changes in the market value of bank's net worth because its calculation is based on the interest income and cost. Due to the mentioned limitations of gap analysis, the duration gap analysis will be described to fill the limits in the next part. (Greuning & Bratanovic 2009, 284; Bank of Jamaica 2005, 9-10.)

The duration gap is known as the mismatch of asset and liability's timing, so duration gap analysis is a method of measuring the changes of market value of banking

institutions' net worth (cash flow of asset and liability) due to the fluctuation of interest rates. It is defined as a measurement of average lifetime of asset and liability in time periods when assets are mature to be returned and liabilities to be paid. (Greuning & Bratanovic 2009, 286-287.) In order to calculate the duration gap, it initially computes the average duration of each asset and liability which is respectively the average time to recover the invested capital and the average time needed to repay the mobilized fund (Oracle Finance 2008, 4). The equations expressing the duration gap and the relationship between duration gap and the net worth of bank are mentioned in Appendix 3.

In order to manage IRR, banking institution can base on equation 4 to adjust the balance sheet position to make the duration gap nearly equal zero so that any change of interest rate has no impact on the value of bank's equity, or in other words the bank becomes immunized against IRR. However, in practice, banks have obligation to ensure the liquidity to sudden fund withdrawal and maintain a specific of level of fund reservation so that assets always have greater value than liabilities. A result is derived from equation 4 in order to attain zero duration gap, and the average duration of liability has to be larger than that of asset. (Oracle Finance 2008, 4.)

The duration gap, along with interest rate fluctuation, directly conducts the gain and loss of bank's net worth. According to equation 5, the net worth movement due to the changes in duration gap and interest rate will be displayed in Table 6.

Although measuring the duration gap is more complicated than the income gap model because more numbers and complex calculation process and some of asset and liability have a specific pattern which may not be well-defined, the method provides a comprehensive measure of interest rate risk for the total portfolio rather than individual account measurement as income gap method. In addition, the duration gap analysis method also indicates the time value of money (Greuning & Bratanovic 2009, 287; Oracle finance 2008, 5).

Table 6. The relationship of net worth, duration gap and interest rate.

Duration gap	Change in interest rate	Change in net worth
Positive	Increase	Decrease
Positive	Decrease	Increase
Negative	Increase	Increase
Negative	Decrease	Decrease
Zero	Increase	No change
Zero	Decrease	No change

Both the method income and duration gap analysis are assumed to have problems that meet the customer's default risk. Besides, to the duration gap analysis, the interest rate for all maturities are pretended to be similar, so the yield curve is considered to be flat. However, the yield curves are not flat in practice because they are volatile. Therefore, the duration gap works well with the small changes in interest rate. With the great change, banking managers should observe the slope of the yield curve as the changes in the rate and then take the information into account when measuring the risk. (Greuning & Bratanovic 2009; Oracle finance 2008.)

However, these mentioned limitations of the income gap and duration gap analysis do not prevent ALCO senior managers from implementation because they provide simple frameworks for the first assessment of interest rate risk. Depending on the scope of banking institutions and their business activities and specific time, ALCO senior managers can use only the income gap or duration gap analysis, or reach the more sophisticated approaches of IRR measurement such as risk-return analysis. (Williamson 2008, 92.)

2.4.3.2 Interest Rate Risk Simulation

Simulation is definitely considered as the process to modify the balance sheet under various interest rate scenarios to overcome any risk as well as to obtain expected target variables, interest income and the market value of the balance sheet at market rates (Bessis 2002, 193). Bessis (2002) also indicated that the practice of simulation was to predict the future profitability and risk by extrapolating from the previous and current information in order to prepare necessary hedging procedures. Figure 6 defines a model of simulation process in ALCO.

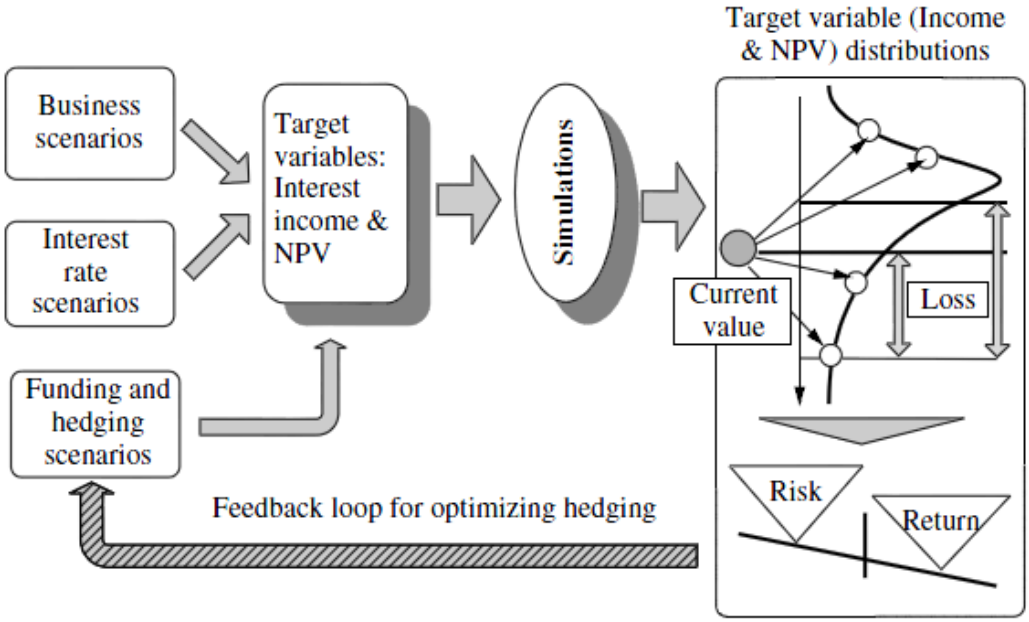


Figure 6. A model of ALCO simulation process. (Bessis 2002, 195)

The first step in this process is to target future variables such as interest income and balance sheet net present value (NPV). In the next, depending on the market trend and prediction of Central Bank actions, the future interest rate and business scenarios are forecast and defined. Thirdly, projecting the future balance sheet based on the defined scenarios in a particular time point is taking into account. After that the balance sheet projections and targeted variables are simulated to consider optimal

risk. In the following, these steps are combined with different hedging methods to find out feasible risk and return combinations. Finally, the best optimizing hedging policy is selected to obtain the best risk-return profile. (Bessis 2002, 195.)

Simulations alter the limitations of gap analysis in various ways. As known, gap analysis is used to calculate the current balance sheet values without respecting the market value which much relates to business risks. Simulations allow the gap analysis to deal with uncertainties value of the future assets and liabilities in various business scenarios. In addition, the targeted variables are calculated directly instead of relying on gap analysis which only computes new margin values when the interest rates change. (Bessis 2002.)

After deriving the results from simulation step, various hedging methods are combined to generate the best risk-return profile. In the next part, different methods of IRR hedging will be defined.

2.4.3.3 Interest Rate Risk Hedging

In this part, IRR hedging method will be mentioned. Before going to the main topic, it should be known that the hedging risk in the financial market is a zero sum game where, for example, the amount money of a bank loss due to risks is the gain of other financial parties who raise their risk exposure to obtain more profit or hedging their own risks. The IRR hedging is the ultimate process of IRR management in which ALCO decides to use either on – balance sheet instrument relating to restructuring the portfolio of asset and liability to eliminate or even take advantages from changes in the yield, or off – balance sheet instrument which apply the use of modern hedging methods such as derivative instruments. (Williamson 2008, 36-37.)

On-balance sheet adjustment

On-balance sheet adjustment, as it name, is the method which adjusts the volume asset and liability of balance sheet in order to eliminate the impact of changes in

interest rate or take advantage of the interest rate fluctuation. In accordance with the result of IRR measurement and simulating, there are some strategies used to alter the structure of balance sheet (Williamson 2008, 38-42). They will be described in the following

Strategies based on income gap measurement consequence

The volume and pricing strategies are firstly taken into account. By purchasing and selling the required amount of fund or adjust the price quoted to borrowers and lenders, banks can adjust the volume or mix the asset and liability with different maturity on the balance sheet in order to obtain target NII in the term of short or long period. (Williamson 2008, 38-42.)

Besides, with the result of income gap bank it can be understood that the position of rate sensitive asset or liability may cause the scenario of rising or falling of NII due to fluctuation of interest rate. Consequently, banks are able to base on their current position and forecast interest rate changes in positive or negative way so that the maturity of asset and liability can be lengthened or shortened to maximize the return of interest income. (cf. Williamson 2008.)

Another strategy is to conduct an ideal portfolio, which banks alter the balance sheet by purchasing or selling fixed or floating interest rate financial instruments. For example, if banks assume a falling interest rate environment occurring, the best way is to make banks become liability sensitive, which requires setting short liabilities maturity with floating rates and long assets maturity with fixed rates. In contrast, in the scenario of rising interest rate environment, balance sheet should compose the long liability maturity with fixed rates and the short asset maturity with floating rates. (cf. Williamson 2008.)

Strategies based on duration gap measurement consequence

The main contain of this strategy is to protect the value of bank's equity against the fluctuation of interest rate by trying to rise average duration of liability in order to attain zero duration gap. Moreover if banks ensure the shape of yield curve in the future, they can alter their assets and liabilities in balance sheet to remain or enhance the net worth. However, it should be aware that the increase of interest rate will depreciate the fixed rate assets and liabilities; and the more the duration the asset or liability has, the more value is lessened as an increase in interest rate. (Williamson 2008, 38-42.)

The implementation of on-balance sheet adjustment might be very costly and complicated in calculation. Fortunately, with recently developed financial instruments, the toolkits aiming to hedging interest rate risk are more variable with the supports of derivative instruments such as financial future, options, forward contract and interest rate swap. With these toolkits, an interest rate risk manager can manage the risk without requiring them to restructure their balance sheet. They will be discussed in the next part. (Bessis 2002; Williamson 2008.)

Off-balance sheet adjustment

Off-balance sheet adjustment is seen as a new method developing since the complexity of financial market (Williamson 2008, 46). This method contains the application of derivative instruments to overcome IRR. Currently, this method is mainly used by banks in developed economies. However, in some developing countries such as Vietnam, this method is not popular and even new to some banks (The State Bank of Viet Nam annual report, 2011). There are many derivative instruments used in IRR hedging, but only popular ones are introduced such as future, forward and option contracts, and interest rate swap (Bessis 2002, 181-182).

Using interest rate futures to hedge income gap position

Apparently, the interest rate has a close relationship with net interest margin that any fluctuating in the market interest rate will be affected immediately to the margin. In other words, the increasing interest rate will certainly lead to the high net interest margin and vice versa. In the positive income gap, to solve this problem, it is necessary for banks to buy one or more Treasury bills contracts for future delivery. In the falling interest rate, the following decrease in net interest margin will be offset by the gain on the long hedge in future market In the negative income gap, along with long hedge, short hedge is also being used to reduce IRR in the negative dollar gap. As the interest rate rise, the un-hedged bank can suffer the decline in its net interest margin. With the help of short hedge, the bank would benefit from future hedge that can be used to compensate for the loss in net interest margin. (Bessis 2002, 187.)

Using forward contract

As definition, forward contract is the agreement between two parties, which regards financial instruments and currencies (Bessis 2002, 183). The author defines that forward contracts differ from future contracts in the following ways:

- Less standardize
- Traded over OTC (Over The Counter)
- Not marked to market daily

By using this kind of contract, investors can circumvent interest rate risk on its asset. However, it is proved to be difficult to finish the agreement early due to the need to negotiate with the original counterparty. (Bessis 2002, 183.)

Using option contract

One more technique to deal with IRR is using optional contract. In the positive income gap, investors can buy call option to protect themselves from interest rate risk. From buying that option, buyers can have ability to obtain underlying instrument

at a specific price, and sellers obligate to sell these instruments at the same price. If the interest rate falls, the banks will apparently lose their cash. But the gain from its option position can help partly or completely to offset that loss. If the interest rate rises, the gain in net interest income will only be partially offset by the option. (Bessis 2002, 186.)

Turning into the case of negative income gap, investors can buy interest rate put option to deal with the risk. A put option gives buyers the right to sell a specified underlying security at the price stipulated in the contract and obligates the seller to buy the underlying security. Obviously, the buyers will earn profit from put option and can use it to compensate for the interest income loss from the negative dollar gap. (Bessis 2002, 186.)

Using interest rate swap

One more useful method to manage the problems related to interest rate risk is to use interest rate swap. This practice can contribute to tailor the interest rate risk characteristic of investment toward which is desired, thus it is a mechanism to reduce interest rate risk. In addition, the principal purpose of an interest rate swap is to reduce the degree of interest rate risk by more closely synchronizing the interest sensitivity of cash inflows and outflows. Swaps may be customized to meet the exact needs of the bank with reasons. Firstly, swaps are negotiated contracts, the terms of maturity and other dimensions of the swap can be tailored to the needs of the bank. Secondly, the swap can be established for a long- term arrangement, most swaps have maturities of three or ten years. However, the cost to close out a swap contract has a prior maturity to other contracts such as future or forward. (Bessis 2002, 182-183.)

2.4.3.4 Conclusion

As seen, an efficient IRR management is basically based on managing process, policies of ALCO in measuring simulating, and hedging the risk. Firstly the risk exposure should be measured so that banks can pre-act in order to ensure proficient

risk management. Next the risk simulation is taken into account to forecast various interest rate scenarios so that the business policies and hedging programs can be set. Ultimately ALCO may depend on the consequences from risk measurement and simulation to identify the suitable hedging instrument such as on – balance sheet and off – balance sheet techniques. In addition, the other factors also affect IRR management, which includes internal control, reporting and etc.

2.4.4 Evaluation of Interest Rate Risk Management Implementation

In the previous chapters, the readers have been leading through the foundation knowledge about banking financial risks in general to IRR particularly and interest rate risk management. The main objective of this research is to evaluate the effectiveness in interest rate risk management of a commercial bank and then some suggestions for improvement will be presented. In practice, the theories of IRR management partly contribute to the effectiveness of the managing process, and the remaining relying on other factors such as national monetary policy, the bank's ability and its risk managers' capacity, financial market participators, and etc.

The thesis is based on the examination standards conducted by Basel Committee on Banking on interest rate risk management to offer a set of benchmarks for assessment. This section will summarize the benchmarks that are implemented to analyze and assess the process of interest rate risk management of the case study firm in empirical part. The following list is going to present the benchmarks and assessment tool classified into four groups which are based upon the sound interest rate risk management practices (Basel Committee on Banking 2004, 8).

Group 1: Appropriate board and senior management oversight

1. What is the structure of the bank's ALCO?
2. Where are the sources of information used in making decisions by ALCO senior managers?

3. How often are the interest rate risk policies and procedures reviewed by ALCO? At least annually
4. How often does ALCO assess the effectiveness of each risk – management program? At least quarterly
5. How often does ALCO assess internal control process? At least annually

Group 2: Appropriate risk management policies and procedures

1. What are the interest rate risk policies and procedures of the bank?
2. Does the bank's IRR policy follow the national monetary policies and others key details in section 2.4.2?
3. How do the ALCO members communicate with the policies and concerning information and their opinion relating to the issue?

Group 3: Appropriate risk measurement, monitor and hedging

1. How does the bank measure, simulate and hedge IRR risk? How efficient its practices are?
2. How much are the net interest income and bank's net worth in recent years? Which methods are used in order to increase them?
3. Does the bank use derivative instruments in hedging?

Group 4: Comprehensive internal controls and independent audits

1. What is the internal control process of the case bank's ALCO?
2. What are risk limits for interest rate risk profile? How often do ALCO senior managers review them?
3. Is there any forecast of potential loss and stress test taken into account?
4. What is included in the content of risk report? Is there adequate information for assessment as requirement in section 2.4.1.3?

3 RESEARCH METHODOLOGY

Importantly, the clearly defined problem and research objectives are the prerequisites that decide the most success of the research topic. In this thesis, the problem of the practice of interest rate risk management in a commercial bank and its implementation in reducing the risk of interest rate in banking business has been thoroughly identified at the beginning. The following steps are to develop the research approach as well as the research design, which are concentrated on what kind of data could be used and the method how to collect necessary information. The final steps are also crucial parts that the author has to interpret and study the data based on theoretical knowledge as well as present the report.

3.1 Research Data

As the matter of fact, the evidence used in analyzing the research topic can be classified into two types: primary and secondary data. Both of them will be utilized in managing the research. The meaning of those phrases will be explained in the details below.

3.1.1 Secondary Data

Secondary data are the data collected by others rather than the researcher himself. The information is collected for the purpose other than that of the researcher- in sense that the researcher becomes the secondary user of the data (Finn, White & Walton 2000, 41). According to Saunders, Lewis and Thornhill (2009), the secondary data can be categorized into documentary such as books, reports, articles, voice and video recordings, etc.; survey-based data, and multiple sources (documentary combined with survey-based data). On the other hand, as regards to Ghauri & Gronhaug (2010), internal and external sources are used to classify this kind of data. Whatever kinds of sources it takes, the secondary data is really necessary in many first steps in any research design and should always come before primary data. A great deal of time,

effort and money can therefore be saved if the researchers are aware of available data, and where to look for them (Finn, White & Walton 2000, 41).

It can be said that the secondary data take an extremely important role in this thesis's process. First of all, the knowledge from books and articles is the main sources to create theoretical literature part on which the researchers can easily design the research methods: how to collect the primary data as well as appoint the appropriate way to analyze the information obtained. Furthermore, in order to get success from this thesis, it is unacceptable to omit the support of the information provided by the bank in published annual reports, news and presenting regulation documents.

3.1.2 Primary Data

Ghauri & Gronhaug (2010) mentioned that primary data are facts and figures collected and chosen by the researcher with the purpose of supporting their research topic. Collecting primary evidence is frequently costly, takes time and significantly depends on the willingness, honesty and competence of the respondents (Ghauri & Gronhaug 2010, 99-100). However, taking part in collecting information for research purpose is truly helpful for students that the knowledge studied can be applied in reality and surely be remembered deeper.

The mission of this thesis is to find solutions for better IRR management, so the primary data are particularly crucial in order to get specific assessments based on the surveys of staff's activities as well as ALCO's IRR management operation. Many methods used for designing research questions will be discussed in another section.

3.2 Data Collection Method

Research methods are techniques that can be used to collect research information. They include qualitative and quantitative methods which researchers can choose to conduct their research. The evaluation of the two methods to select the most suitable method for research topic depends virtually on the research problem what the

researchers have or in other words, which kinds of information he/she requires to obtain. Basically, qualitative research results in non-quantification data are often used for exploratory purposes. On the other hand, the quantitative research gives numerical analysis of the issues and rather used for testing hypotheses. (Saunders, Lewis & Thornhill 2009.)

Both the above research methods actually have the same level of effect on the success of the research papers. However, when both of them can be utilized in the same project, the consequences can be multiplied. The appearance of two qualitative and quantitative methods in one research project will be called mixed research method. As regard to Saunders, Lewis & Thornhill (2009, 153), mixed approach method is really advantageous in presenting different objectives of a study, minimizing the method effect, generating various outcomes and finally making the conclusions more valid and reliable.

Qualitative research methods can be used when there is a need to obtain the respondents' point of views and refection of the topic. One of the biggest gaps that distinguish qualitative from quantitative research methods is that it cannot gather large quantities of data for the statistical purposes, but focus on the qualitative answers from the interviewees which are thought to be important for the research objectives. (Saunders, Lewis & Thornhill 2009.)

There are a number of qualitative research methods that have been developed from time to time, such as in-depth interviews, focus groups and observations. Apparently, in-depth or face-to-face interview is a major method carrying out the qualitative research. In order to undertake this kind of method, questions usually have to be prepared carefully beforehand, but common sense is also fairly important in the interview situation. That is to say, the researcher should try to motivate the respondent and create a relaxed atmosphere, provide enough information related to research problem as well as gain understanding in them. (Finn, White & Walton 2000, 71-72.)

As a qualitative research method, in-depth interview was chosen for this thesis. The researcher prepared 16 questions (see Appendix 7); which aimed to seek the detailed answers related to the practices of the investigated bank. In-depth interview is the most appropriate method, which is made with the two senior managers from Treasury and Finance department – members of the bank's ALCO. On average, each interview lasting one hour and about 16 questions were fully answered. Some small extra questions were added if necessary in order to gain more information associating with the problem investigated.

Unlike the qualitative methods in which the researcher applies non-quantification method to clarify the collected data, the quantitative methods mean that the analysis of the research data is based on a series of mathematical and statistical calculations. (Ghauri & Gronhaug 2010, 109.)

This thesis uses questionnaire to gain understanding that concerns the employees' skill and behavior toward bank's policies. Questionnaire is a series of questions that give respondents a number of fixed-response alternatives to choose for their answers. Basically, the quantitative method using questionnaire is an efficient way to conduct the research that saves money and time. Unlike face-to-face interview that the researcher can only handle one respondent one time, the questionnaire can be sent to a large number of people to fill at the same time. (Finn, White & Walton 2000, 94-95.)

The questionnaire (see Appendix 8) was sent to five employees concerning to the topic via email. After, the phone calls were made to ensure them to respond the questionnaire. It consists of 14 questions in a logical order. The first four questions aim at getting basic information about the interviewees. The remains try to examine their influences toward the bank's policies as well as the relationship between their job and IRR management. Importantly, the questionnaires were sent directly to the respondents so that the response rate was considerably ensured.

3.3 Validity and Reliability

Validity and reliability significantly seem to be two main elements that determine the value and success of this research in practical working life. Reliability addresses how accurate the research methods and techniques produce data. Meanwhile, validity examines whether the research measures or explains what the researcher wants to explain or measure at the beginning. That is to say, the research will be validity if the accordance between the proposed research questions and the research finding could be achieved. (Bordens & Abbott 2011, 130-133.)

Apparently, this thesis is proved to be fairly reliable and valid. The content of the in-depth interview questions and the questionnaire has been designed and checked so that it is consistent with the research's purposes. Crucially, any sensitive questions that involve business secrets are avoided. The interviews were always conducted at the weekends, so that they could make the interviewees feel relax and comfortable for answering the research's questions. In addition, the respondents were voluntarily willing to participate in the study, so individual bias could be eliminated. Truly, the whole interviews were carried out in the most convenient atmosphere, each question was explained carefully, and guidance was added if possible in case of any misunderstanding.

On the researcher's side, the analysis and interpretation of the collected data is closely based on the theory which was demonstrated beforehand in the research theoretical part. Beside the primary data which were gathered throughout the interviews, the secondary data such as annual reports, policies and business results were also taken into consideration and contribute significantly to the analyzing step of this study. Furthermore, the benefit of using both quantitative and qualitative data should be mentioned that it strengthens and emphasizes the consequences of the validity and reliability.

3.4 Limitations of the Research

During the research about the thesis topic, there are some limitations that reduce the perfection of the study. Firstly, due to the data secrecy in the Vietnamese financial market, the researcher found difficult to collect all data relating the market interest rate and other relevant information needed for the evaluation.

Besides, some information of the bank is confidential. Hence it is forbidden to use as research data, so it would influence to the result. In addition, the interviews were only conducted with two senior managers of the bank's ALCO. The author had tried to contact with the head of the bank's ALCO. However, due to some personal reasons, he could not participate in the research.

Finally, the analysis skills and knowledge of the researcher associated with this topic are limited. Therefore, limitations are avoidable.

4 EMPIRICAL STUDY

After reviewing the literature regarding the interest rate risk management in the second chapter and collected research data in the third chapter, the practical application of that literature and analysis of research findings will be presented in this part in order to fulfill the purpose of solving the research problem introduced in the first section.

The case bank's practical analysis will be conducted within a five - year period from start of volatility interest rate period in 2007 to the end of 2011. Due to the limited data and information about interest rate, the analysis of interest rate risk management of the case bank in 2012 will not be mentioned.

This empirical part generally begins with an overview of the interest rate fluctuation in the volatility period. Following is a description of the case bank. Then the main content of this research will be conducted as an insight presentation of interest rate risk management of the investigated bank and evaluation of its practice depending on the Basel standards (Basel Committee on Banking 2004).

4.1 Overview of the Interest Rate Movement in Vietnamese Financial Market during Volatility Period

According to economic analysts, the volatility period begun at the end of 2006 (see Figure 8). During this period, Vietnamese financial market was a victim of the global recession from 2008, high rate of inflation, liquidity crisis in banking industry, unreasonable economic growth policies of the government. These factors leading to bankruptcy of a large number of enterprises and banks were not an exception. In the following, these factors will be discussed as the reasons creating interest rate risk assumed by commercial banks. (Chu 2011.)

Firstly, the global crisis factor can be considered as a detonator for the collapse of the Vietnamese banking system. Vietnam had a high rate of import compared to export

and the price of imported goods increased sharply in the first half of 2008 (Economy Watch, 2012). Therefore, it created the pressure of rising goods as the cost for input was increasing. This made the purchasing power in public go down. Consequently, the amount of bad debt assumed by banks increased because the firms' returns could not compensate for their costs. At the same time, in order to reduce the inflation rate, SBV used contractionary monetary policy which caused a rise in interest rates. They accidentally made the situation much worse. (cf.Chu 2010.)

The real estate bubble exploded in 2008 is the second reason. Many banks lost their liquidity ability because their investment was freezing and other borrowers failed to fulfill the payment obligations. As the result, in order to recover liquidity, interest rates were used as a tool to raise the bank capital. However, banks should notice that if they mobilized fund with high interest, it could be extremely difficult to offer loan with high rates in the current down-turn market. The interest rate race officially started in 2007 with average rate of 7.5%, in which there were some banks that were raising their fund with 10.08%. In the middle of February 2008, the race exploded with mobilized rate of 12%, after a week the rate reached 14% and at its peak 19.9% in June. Yet, an emergency meeting between SBV and other banks was held to pull the rate back to 9% at the end of the year. Although under pressure from the financial market, the yield curve was nearly flat with the average rate of 7.9% during 2009. In the following year, the interest rate race returned with the rate of about 11% in the first half of the year and then 12% as an agreement between banks. However, some banks implicitly hedged the fence with mobilized rate at 15%, 17% and 18%. The increment of interest rate continued in 2011, which was marked by applying the proof of 14% for the rate in the regulation of the SBV 02/2011/TT-NHNN. In spite of strengthening inspection practice, banks avoided the rule as implementing "investment service on behalf of customers" with the rate to 18%. It can be seen that in this period, fund was mobilized uncontrollably and inefficiently which led to some purchased banks such as Sacombank, Habubank, SaiGon Bank, De Nhat Bank, and Trust Bank due to the loss in interest rate race. (Vneconomy, 2012.)

To correspond with the high deposit rate, the lending rate was also required by banks at high levels. For instance, the rate at some banks in 2008 and 2011 sometimes reached up to more than 20% (Vneconomy 2012). Although those offered rates were illegal, due to non-transparency of the market, this issue has been continuing. However, most banks met difficulties in finding customers who could accept that high rates. Thus in order to reduce losses, banks offered the lower rates compared to the inflation rates in 2008 and 2011. Figure 7 indicates that the real rates (the difference between nominal lending rate and inflation rate) were negative in those two years with – 5.2% and – 3.2% respectively. Besides, from Figure 7, it can be noticed that despite obtaining positive real rates in the remaining year, but they were still much lower than the interest paid to depositors. Therefore, almost banks actually suffered losses during the period, while some of them showed profitability in their financial reports.

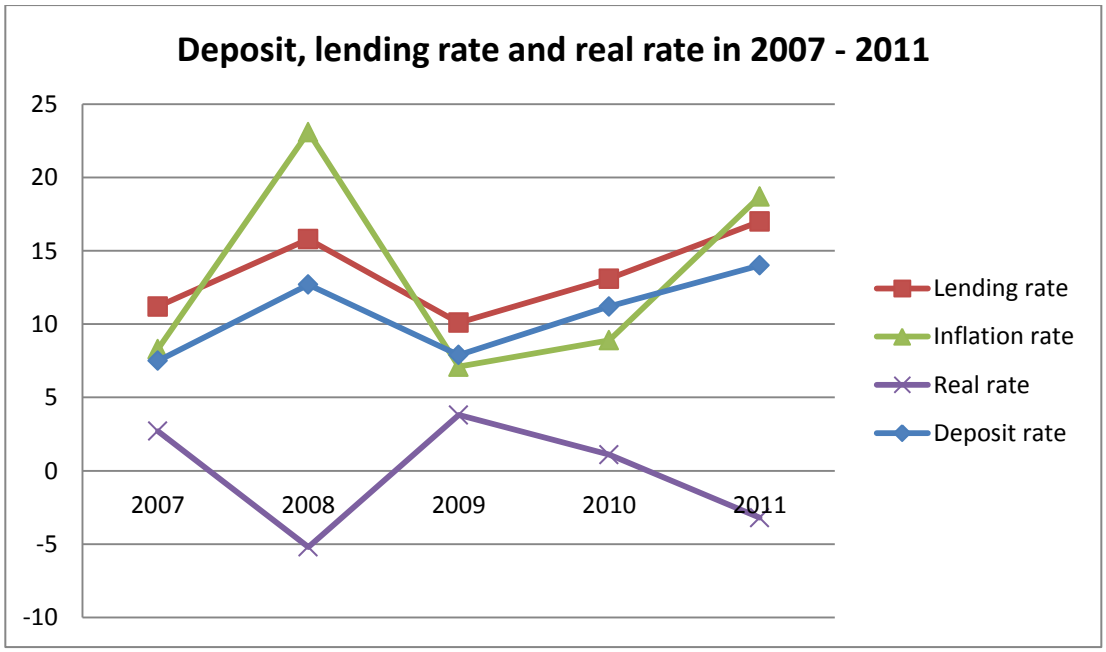


Figure 7. The deposit, lending rate and real rate in Vietnamese financial market in the period 2007 – 2011. (World Bank 2012)

Another factor which caused risk to banks was a long-term interest rate evaluation not based on any criteria. In addition, the depositors' worries about the market would affect banks' structure of the balance sheet that their short-term interest rate mobilized fund was used to support for long-term interest rate loans. (Vneconomy 2012). The long-term interest rate was moving unpredictably which is illustrated in Figure 8. The graph indicates the yield volatility of the 2-year and 10–year VND bond, in which the higher volatility is, the less probability of accuracy the prediction of bond yield is. After 2006, the line in the graph below fluctuated more, in other words, banking analysts could not predict properly the daily rates of long-term VND bonds' fluctuation. The year 2008 was the peak, later the line fell down sharply and suddenly increased again at the end of 2008, 2009 and in the middle of 2011. Consequently, banks easily suffered losses as the interest returns were lower than the expenses. (Chu 2011.)

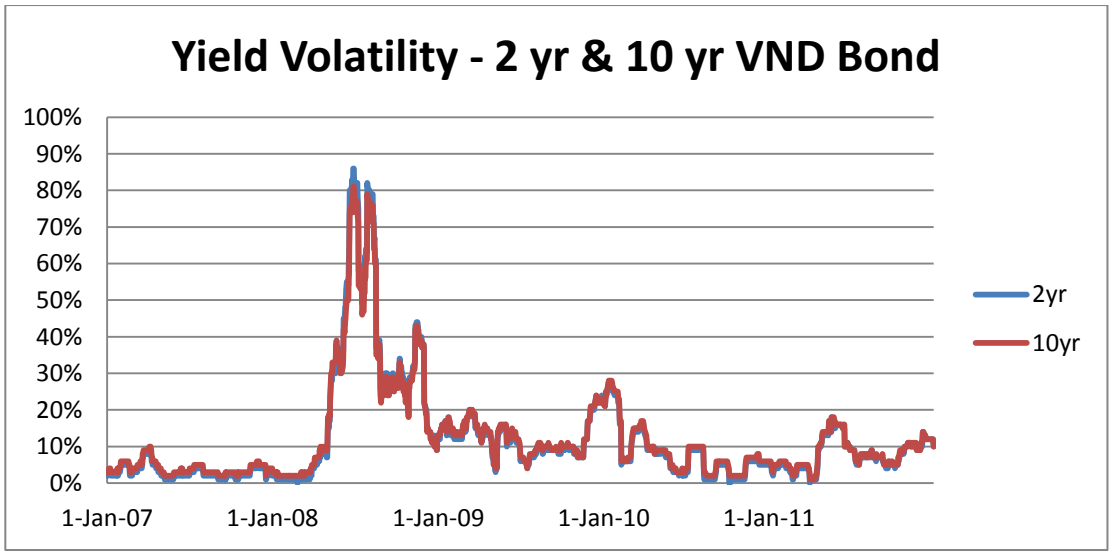


Figure 8. Yield Volatility – 2-year &10-year VND Bond. (Asian Bond Online 2012)

The final discussed factor is the lack of coordination between fiscal and monetary policy. For instance, at the beginning of 2008, under the case of high inflation a tightened monetary policy was established, the SBV sold bonds into the market to increase state budget to compensate for state companies' losses. Simultaneously, the

expansionary fiscal policy was applied, which those funds generated from bonds was used to invest for state corporations and project inefficiently. Bond establishment attracted lazy fund in public that are used to secure Vietnamese companies and cash of banks .Therefore, occasionally the SBV gave a hand for liquidity crisis in banking industry and economic recession. At the end of 2008, because of the economic recession, the Government offered an expansionary fiscal policy with monetary supply increase 20.7% compared to 2007. As a result, the supply of money increased and decreased suddenly in the same year, which created a shock for the Vietnamese financial market. (Vneconomy 2012.)

In conclusion, the Vietnamese financial market was in unpredictable change due to inefficiency in management practice of SBV, banks' structure of balance sheet, high inflation rate and global economic recession. These factors resulted in an unstableness of the interest rate movement which created the losses for banks.

4.1 Overview of the Case Bank

According to Decision No. 140/CT President of Council of Ministers, Eximbank was established in 24 May 1989 with the first name of Vietnam Export and Import Bank. On 6 April 1992, the governor of the State Bank of Vietnam signed the license 11/NH – GP which decided the operating period of 50 years with the authorized capital of 50 billion Vietnam Dong (VND) equivalent to 12.5 million US Dollar; and changed the name to Vietnam Export Import Commercial Joint – Stock Bank. Currently, Eximbank has 39 branches, and 183 transaction points through the country. Its headquarter is located in Ho Chi Minh city. (Eximbank 2012.)

At the end of 2011, the bank's charter capital increased by 12,355 billion VND, approximately 4 times higher than the figure in 2007 with 2,800 billion VND. Despite the challenge from the domestic economic recession, and liquidity crisis in the banking sector since 2008, just–in–time strategies could not only be implemented

to help the bank overcome the dark period, but also increase in the scope of bank's activities. (Eximbank 2007-2011.)

Since 2008, with the objective of becoming the top 3 of leading joint–stock commercial banks in Vietnam, the bank has been promoting the implementation of modern banking technologies in developing commercial banking activities in which support for export and import enterprises and retail banking are core. Besides, the bank cooperated with foreign banks in exchange experience in banking management in order to integrate into international environment in which risk management based on international standards is required. (Eximbank 2008.)

4.2 Asset and Liability Committee of the Investigated Bank

As the interviews with the two senior managers showed, the case bank does not have Asset and Liability Committee (ALCO) in itself, which is separated from other units. The IRR is managed by a sub–committee of the bank called risk management department under the control of the chief executive officer. The department was established in August 2007 after the reform of the bank's structure that was applied at the beginning of the year. There are two separate parts accounting into the unit based on risk types - credit and non–credit risk. The interest rate and liquidity risk management were classified into non – credit risk management part whose responsibility is to manage the other financial risks, operational and environmental risks. The board of managers decided to establish a small team to manage the risks, which is called Asset and liability management (ALM) unit. (Dao 2012; Tran 2012.)

When reviewing the structure of the ALM unit of the case bank, a document was found which officially indicated the establishment of the ALM unit is Decision No. 20- 2007/QD – HDQT. According to the document, the organizational structure of the unit is represented in Figure 9.

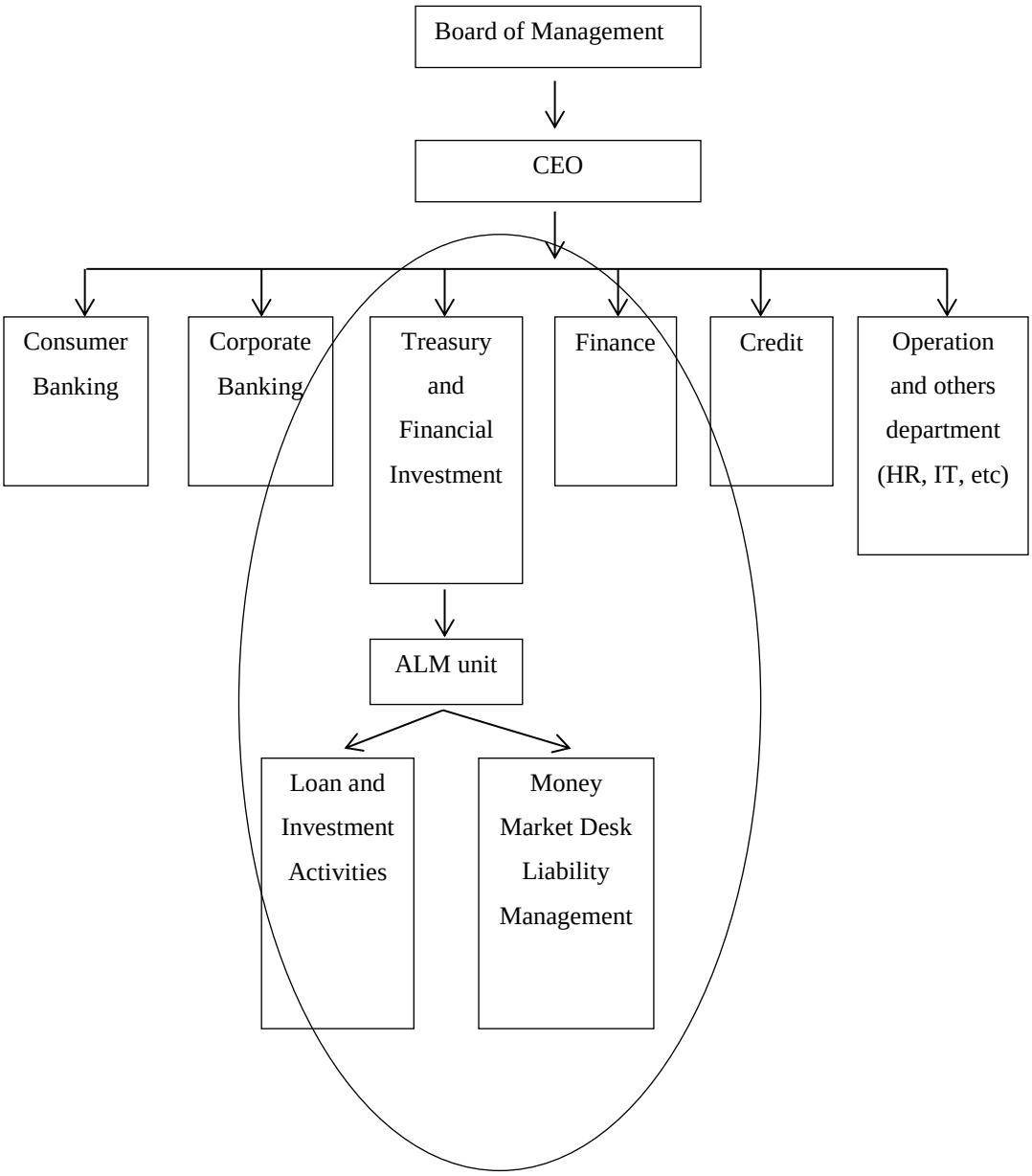


Figure 9. The organizational structure of the ALM unit. (Eximbank 2007)

The top managers play a crucial role in ALM in general and particularly in interest rate risk management. They evaluate the strategies discussed in the ALM meetings held monthly in a way that meets the requirement of regulatory policies. The case bank's the ALM unit includes 9 members. They are the CEO, head of Treasury, Finance, Credit, Consumer and Corporate Banking department and some employees from Treasury and Finance department who have mission of gathering data and conducting IRR reports. As indicated from the interviews, the responsibility of ALM is mainly relied on the Treasury and Financial department. Particularly, the Treasury department which manages cash supporting to current and future activities will offer external forecast regarding economic, monetary, fiscal policies and relevant information in financial market. Along with interest rate market analysis, the internal forecast conducted from observation of growth and maturity of asset and liability in the bank's balance sheet by Finance department is placed in the ALM meeting. Besides, the report contained updated information of internal credit rating system from Credit department also contributes to interest rate policies (see chapter 4.3.2.3). Based on these forecasts, observation, policies, reports and trend review of competitors' activities report of Corporate and Consumer Banking department, the ALM unit's senior members will discuss and decide ultimate strategies and actions of adjusting maturity of asset and liability, allocating funds across all adjusted maturity dates, and managing money market deposit and purchase. Then those ones will be transmitted to credit and Consumer and Corporate Banking department to implement in the products of individual and corporate banking. (Dao 2012; Tran 2012.)

In practice, the ALM unit meeting is held monthly with the content on reviewing the reports from Treasury and Finance department in order to generate final report (usually conducted by Treasury department) about the interest rate exposure limit level, the risk status, the process of using hedging methods and their effectiveness, revenue situation on interest and competitors analysis. However, the monthly meeting is not adequate to adapt the change of the market, because the purpose of the ALM unit meeting is to offer up–dated strategies and actions for long–term objectives.

Therefore, to review the interest rate change every day, the CEO receives the reports from the Head of Treasury and Finance department via email through the bank's intranet system in case there are some changes in the interbank interest rate, other banks' rate, and other factors affecting to the rate changes. From these, the CEO has the right solutions to treat the market. Besides, in the ALM unit meeting every quarter, the internal control process is assessed. The assessment program contains the evaluation of quality of information source from the Treasury and Finance department, review policies, the procedure of risk identify, measurement, simulation and hedging methodical effectiveness. Further information will be mentioned in section 4.4. In order to make the decision making process of the ALM unit more comprehensive and clear, it will be summarized in Figure 10. (Dao 2012; Tran 2012.)

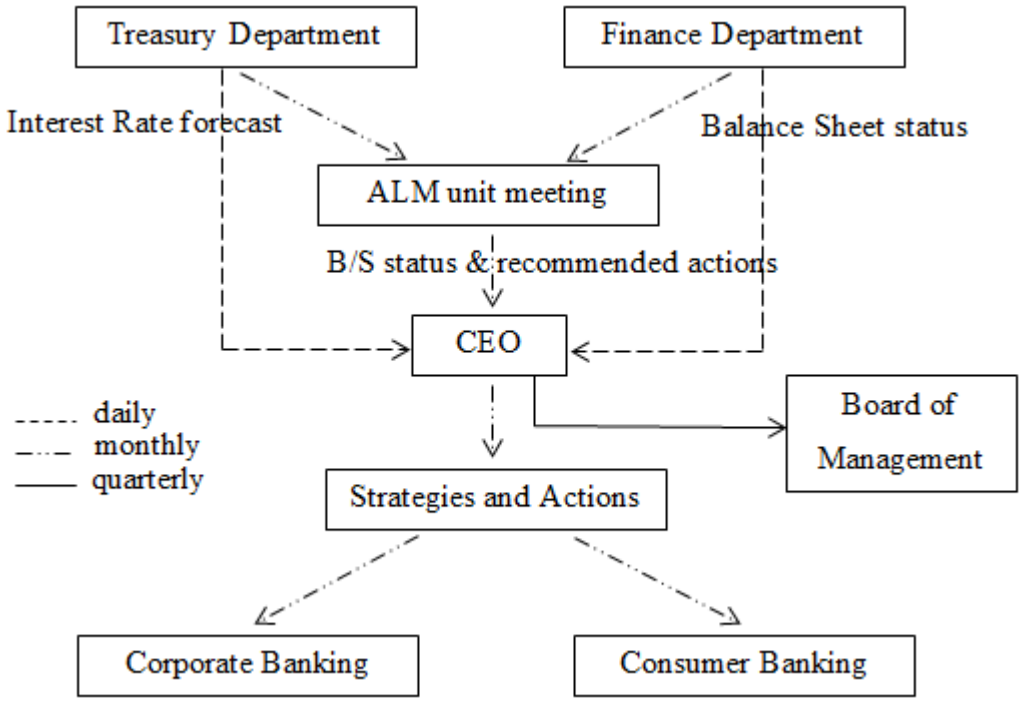


Figure 10. The decision-making process of the ALM unit of the case bank. (Eximbank 2008)

During the interviews about the risk management with the two senior managers from Treasury and Finance department, there were some points to be remarked in comparing with international standards mentioned in theoretical part. Firstly, the managing information technology system has not contributed to making reports supporting to IRR management. The employees have had to collect and calculate data for the reports by themselves without any aids from dedicated software. In addition, the yield curve for middle- and long-term loans or deposits has been conducted mainly based on the experience of senior managers and history data without any professional tool which computes probability of the yield-curve shape and etc. Besides, although structure and policies construction process is based on international standard, it can be seen that the amount of staff in this unit is merely a few, which is inadequate with the importance of interest rate risk. IRR analysis and reporting has been mainly depended on each individual member's experience and skill without a specific defined-process offered, as well as lack of required standards. (cf. Dao 2012; Tran 2012.)

Furthermore, the market trends in depositing money and borrowing fund as changes in interest rate generated from individual and corporate-banking consumers have not been paid attention properly. Rather, the managers cared about competitors' actions. Next, the case bank has never used derivative instruments to protect its earning and economics value because there were no documents or Decision from Board of management in eliminate IRR by implementing them. The reasons will be later explained in chapter 4.4.3.5. The following point is sometimes the interest rate policies have not been efficient and suitable to the status of the bank's balance sheet. For instance, it used short-term deposit to fund the long-term loan in up-ward interest rate period. Finally, the stress test has not been properly paid attention because the managers know that if the bank gets problem, it will be secured and supported by the SBV. (cf. Dao 2012; Tran 2012.)

4.3 Interest Rate Risk Management Policies

The policies, as known, are playing a crucial role in compelling any object following outlined plans. Under the Vietnam legal system, the SBV is allowed to issue Circular, Decisions, Directive, and Guideline from that each individual bank can issue its own policies (The SBV 2012). In this section the policies will be introduced in two parts. Firstly, regulatory policies issued by SBV are presented with information about interest rate policies, reserve ratio, the discount and base rate regulation. Secondly, the policies are issued by the case bank itself.

4.3.1 Regulatory Policies

In the stable period of interest rate from 2001 to 2006, the objective of Vietnam was to focus on the economic growth, which led to the expansionary monetary policies. This was exposed in the increase of average 20% money supply each year, while interest rate was kept unchanged during the period (Bao moi 2012). However this was the reason for increasing of inflation rate. The situation changed after that, for example the interest rate was put to a high level in order to reduce the inflation (see Figure 7). In the following, the interest rate policies of SBV will be reviewed during the period from 2007 to 2011.

4.3.1.1 Regulated Interest Rate Policies

On 16 May 2008, the SBV issued Decision No. 6/2008/QD-NHNN which regulated the operating provisions of the base rate in VND as the required standard for credit institutions to set their interest rate in mobilizing and lending activities (The SBV 2012). In the Decision, it said that:

- Credit institutions were not allowed to set interest rate for their financial instrument (mobilizing and lending rate) over 150% of the base rate announced by the SBV to be applied for a particular period.

- The SBV would announce the basic interest rate monthly. In the case of emergency situation, the SBV has the right to announce new base rate any time.

On 26 February 2010, the SBV issued Circular No. 07/2010/TT-NHNN about the regulation of lending on VND with negotiated interest rate. The Circular regulated credit institutions operating in Vietnam have a right to offer loan with the negotiated interest rates for the following customers in the scale of regulation about lending activities, the supply and demand of fund in the market, the level of customer's credit, ensuring safety for the national financial system and appropriating with the institution's capacity itself. (The SBV 2012.)

- Middle- and long-term loans for enterprises with the demanding fund for business purposes such as manufactures, investments, etc.
- Short-, middle- and long-term loans for customers with private purposes such as purchasing house, repairing house which are credited by borrowers' salary, purchasing vehicle, studying, illness treatment, serving for activities relating to sport, tourism, culture, etc.

Besides, according to this Circular, credit institutions must inform their negotiated interest rate on VND for different business activities to the SBV monthly (The SBV 2012).

On 3 March 2011, the SBV issued Circular No. 02/2011/TT-NHNN which legally informed the mobilizing interest rates on VND. According to the Circular, the SBV set a ceiling interest rate 14% for mobilized activities on VND of credit institution. It can be explained more deeply that credit institutions which set interest rates for mobilizing instrument including deposit money, all kinds of bills, and bonds were not allowed over the limit of 14% per year. This policy would be implemented for the method of interest payment at maturity. (The SBV 2012)

On 28 June 2011, the Circular No. 30/2011/TT-NHNN was sent to credit institution operating in Vietnam, which mentioned the regulation of ceiling mobilized fund interest rate on VND (The SBV, 2012).

- The maximum interest rate applied for term and non-term deposits with maturity under 1 month was 6%
- The maximum interest rate applied for term deposits with maturity more than 1 month was 14%

The deposits mentioned in the above regulation are defined as term and non-term deposits, saving deposits, bills, bonds, and other kind of deposits. In addition, the mentioned maximum interest rate is applied for the method of interest payment at maturity. (The SBV, 2012.)

4.3.1.2 Reserve Ratio

Reserve ratio is used by the SBV as a tool of monetary policy to control the inflation rate in the national economy, which indirectly affects market interest rate. Commercial banks in Vietnam have been required to keep a part of deposit amount in order to ensure liquidity of the bank as customers withdraw their money. The change of reserve ratio has made an effect to lending activities of banking institution or even the total financial system. In this period, the SBV increased and decreased reserve ratio with specific purpose. In order to ensure interest margin, banks have to increase interest rate of loans. On the other hand, if the SBV wants to promote economic growth, it will issue the Decision of reducing reserve ratio. Therefore, banks can extend their credit activities, so the interest rate will decrease as a result. (The SBV, 2012.)

From Appendix 4, it can be stated that the ratio required by the SBV to commercial banks is illustrated in line graph quite similar to the shape of 10 year bond yield. At the beginning of 2007, the SBV used tightened monetary policies to force the commercial bank to reduce their credit growth and the interest rate increase. Next, the

SBV once again announced an increment 1% to each kind of offered products due to the high inflation rate. However, until the middle of the same year, the SBV recognized that the interest rates increased highly suddenly, which led to the national economic recession. As a result, the SBV decided to reduce reserve ratio to nearly a half compared to the beginning of the year for commercial banks to develop their credit growth. This regulation was valid until the end of the same year as the ratio came back with high levels: 10% and 4% to deposit in VND for non-term & below 12 months and up to 12 months.

Those ratios lasted 4 months until 24 February 2009 when the SBV announced to apply a new reserve requirement ratio for deposit in VND with 3%, 1% respectively. After that, the SBV kept those ratios in low levels in the following years until the end of 2011 with average 3%, 1% for deposit in VND with non-term & below 12 months and up to 12 months.

It can be summarized that the monetary policies of the SBV in the period made pains to the national financial market as the ratio was increasing and decreasing sharply during the year 2008. Then to face the economics recession, the announcement of reserve ratio decrease was the response to rescue the national banking system and the economy. In the following, the discount rate base interest rates are presented as a policy for the commercial banks to determine their interest rates.

4.3.1.3 The Discount Rate

The discount rate, also called rediscount rate, is the interest rate indicated by the central bank for commercial bank as they are lack of liquidity (Britannica Encyclopedia 2012). In the Vietnamese financial market, the discount rate charged by the SBV is the interest for supplied money in cash or other relatively for commercial banks and other financial institutions in the form of direct loans from reserve fund. The discount rate is also applied for refinancing banking institutions based on their

immature valuable papers when banks meet issues relating to liquidity ability. (The SBV, 2012.)

Commercial banks borrow money from the SBV to meet their short-term liquidity needs. Therefore, the SBV can indirectly influence to market lending rate. The rising or lowering discount rates will alter the borrowing cost that commercial banks have to pay. On the other hand, commercial banks will, of course, increase or decrease the lending rate offering for loans to compensate the cost they paid. In practice, the discount rate is able to fulfill its role as tools to affect the market lending rate without real fund for loans. This can be explained that after announcing rising discount rate, for example, commercial banks will automatically increase their reserve in order to prevent borrowing reserve fund from the SBV with high cost. Hence, the lending rate will also be rising as the result. In contrast, in the case of lowering the rate, the reserve of banking institution will be down so that the lending rate will decrease in response. (Pibeam 2010.)

For a long time, the SBV promoted the national economic growth by increasing money supply and remaining the interest rates which led to the inflation from the end 2006 and it was very serious and needed to be solved priorly. The discount rate policy implemented at this time will be presented in the three periods – before 2009, 2009-2010, and 2011 (see Figure 11).

Before 2008, it was a time of high inflation explosion. Obviously, the SBV raised the discount rate, hoping that the lending rate would also increase in order to control the cash flow in the market. The rate started from 4.5% at the beginning of 2007 to 6% in February 2008, 11% in May and got to the peak 13% in June 2008. However, to help the banking industry decrease the liquidity crisis, the SBV decided to cool down the market by announcing 5 Decisions decreasing discount rate during the last quarter 2008 from 12% in October to 7.5% in December. (The SBV 2012.)

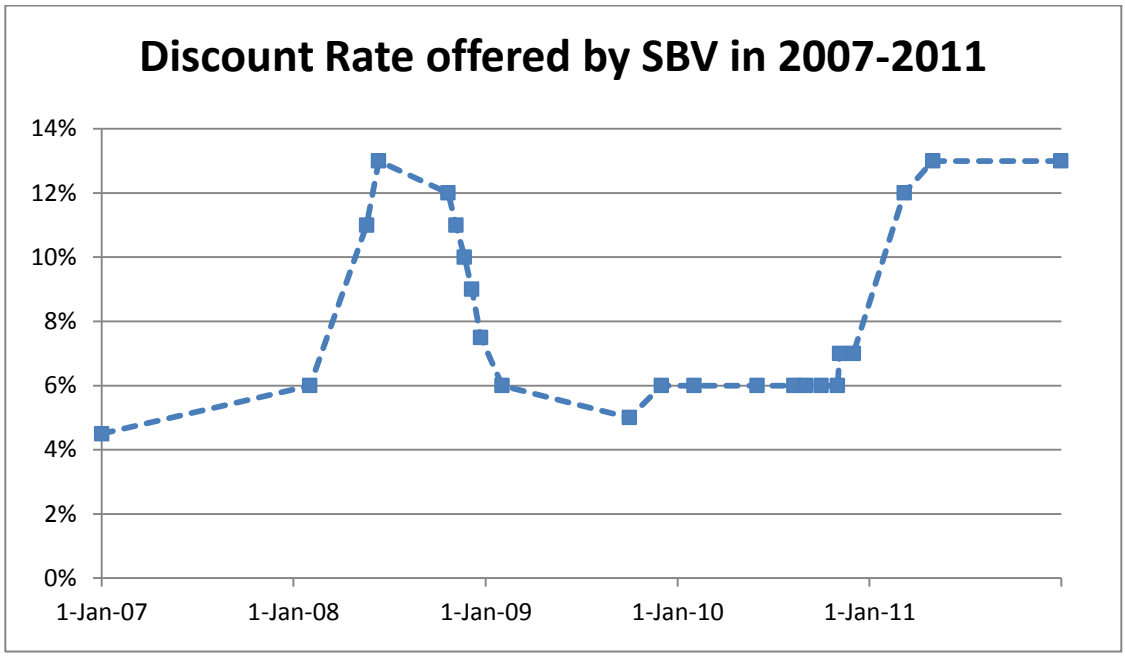


Figure 11. Discount rate offered by the SBV in 2007-2011. (The SBV 2012)

In the following period, the discount rate decreased to 6% in February 2009, and continued to be down to 5% in October at the same year. Nevertheless, the rate of 5% just lasted for 2 months as in December 2009 the rate came back with 6%. This level of discount rate was remaining by the six Decisions of the SBV until 5 November 2010 it increased a little to 7% to the end of the period. (The SBV 2012)

The final period of 2011 was a remark of increasing discount rate significantly from 7% to 12% by the Decision No. 379/QD-NHNN in March 2011. According to an economic analyst, this solution was offered by the SBV aiming to reduce inflation rate and interest rate, which posed a question why increase discount rate could cause a decrease in the interest rate. In order to answer this question, it is necessary to review the previous period as discount rate was kept at 6%. As the rate was low, the SBV could have created special favor to the state-owned investment projects rather than the private firm's investments. With this favor, many state-owned commercial banks were able to take advantages of the government bond to mortgage for lending fund in the SBV with low rate, and then used the fund for investment in the interbank

lending market rather than for the borrowing of the private enterprises. Whereas other small commercial banks which were lack of opportunity to access the low-cost capital from the SBV had to increase mobilized rates significantly to raise fund; otherwise, they had to borrow the fund with high rate in the interbank lending market. This action joined hand to boost the lending rate. Consequently, the supplying of money was rising up in 2009 – 2011 but businesses constantly cannot access loans offer by banks. Therefore, the increment of discount rate to 12% would make the financial market more balance and stable. However, this action may have effect in 2012. (Vneconomy 2012.)

4.3.1.4 The Base Interest Rate

Apart from the reserve ratio and discount rate - two tools in the monetary policy of the Vietnamese Central Bank, the base rate can be seen as the main tool in the monetary policy of the SBV. It is used to adjust the national economy in a short time at macro level. Therefore, the base rate is considered as the clearest signal about expanding or tightening the economic market policy and as a standard for commercial banks to decide their own lending and mobilizing rate, which was indicated in the Decision 6/2008/QD-NHNN. (The SBV 2012.)

With the base rate, a commercial bank can build an interest rate program, which is strongly suitable to the bank's condition of fund mobilizing and lending with different levels of rate for different maturity, risk, customer's credit, and etc (The SBV 2012). For instance, if the Central Bank sets base rate at 3%, a customer with high credit level can be offered 3% of interest rate by the bank, meanwhile another customer with low credit level has to pay 5% (premium 2%) for the same loan. It can be said that the base rate is considered as the basic figure for commercial bank to set their applied interest rate, as well as a signal to forecast the trend of monetary policy in short time (Economics Oxford Dictionary 2012). If the base rate increases, the lending rate in national financial market will increase or vice versa.

However, according to the Decision 6/2008/QD-NHNN, the mobilizing and lending rates in VND are not allowed to over 150% of base rate, the means and functions of the base rate in Vietnamese financial market would be limited. Firstly, commercial banks can only set their lending rate maximum 150% of base rate for customers with risks more than that number, whereas banking institutions were participating in interest rate race due to lack of liquidity. As a result, a question was rising where profit was as the mobilizing rate would be put to high level. Secondly, this regulation is actually a difficulty for enterprises wanting to borrow low-cost loan to overcome the economic crisis because the base rates were never low during the period, even in last half year of 2008 it was 14%. So the commercial banks were allowed to offer loans with 21% (see Figure 7). Practically, it was much more different. Many commercial banks in Vietnam understood that the lending rate (base rate plus its 150%) is the minimum rate to be offered. In this way, the Decision 6/2008/QD-NHNN of the SBV has made misunderstanding about the base rate in adjusting the national macro economy, which made the situation worse because the interest rate issue was maybe out of the control. (Vneconomy 2012.)

In the following, the base rate shape will be reviewed in order to see the policy in managing the national economy in common, particularly mobilizing and lending rates. According to Figure 12, the increase or decrease of the base rate was similar to the discount rate as expansionary and contractionary policies implemented at corresponding times. However, the base rate directly affects the mobilizing and lending rates in the market. During the period, the base rate was high with average from 8% to 9% in which the peak lasted 3 months in 2008 with 13-14% and the bottom was 7% in 2009. Although the commercial banks based on the base rate to set their interest rate, almost banks increased mobilizing rate to attract money in the market due to lack of liquidity in that period. However, they were tied with the Decision 6/2008/QD-NHNN. Consequently, their costs would greatly influence their profits, or even no profit at all, unless they found some tricks to break the regulation. (Vneconomy 2012.)

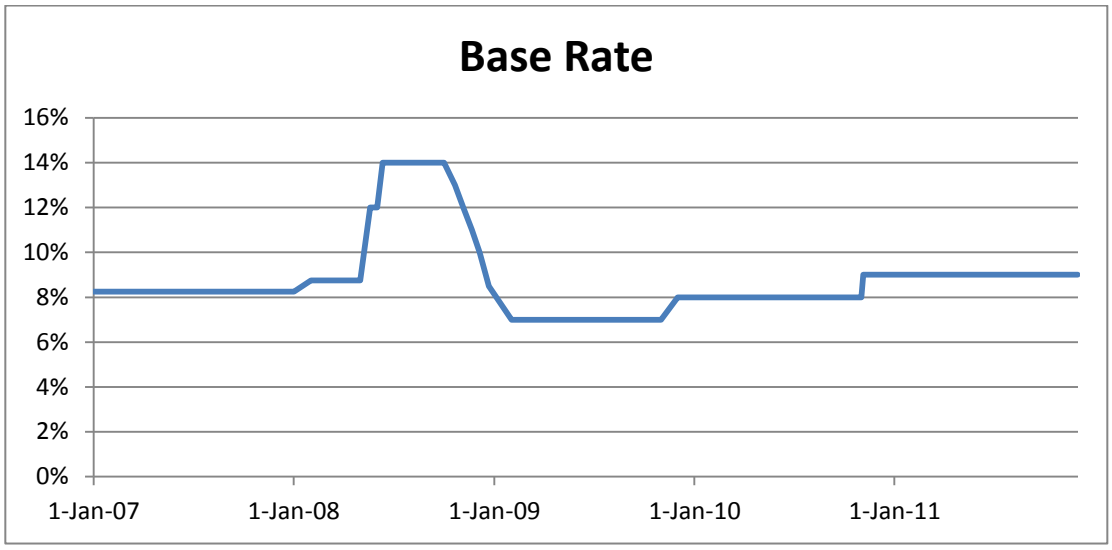


Figure 12. The base rate in Vietnam during the period. (The SBV, 2012)

The discount rate and reserve policies in this period had finished its function. However the corruption inside the SBV and state-owned commercial bank led to the increase in the discount rate in 2011, which created significantly negative influences to Joint-stock commercial banks and others. Besides, the base rate policies which aim to aid enterprises to borrow reasonable rate loan were quite confused and set many limitations on the rate's objective. Although, there have been numerous requests to change the policy, no one has been approved. (Vneconomy 2012.)

4.3.2 Internal Policies

Along with the regulated policies offered by authorities relating to interest rate, banks must have their own policies for the development and maintenance that are suitable to their business condition (Trading and Capital-Markets Activities manual 1998, 4). In the interview with the senior manager in Treasury department, he emphasized that IRR management policy should be changed in appropriate way to the business situation, market condition, as well as the SBV's policies in specific periods. Also, the bank's employees in reality must conform to the clauses indicated in those

documents properly. The bank's policies concerned the issues mentioned in many documents; hence, only important ones will be presented. (Dao 2012.)

4.3.2.1 General Policies for Mobilizing Interest Rate

The case bank issued the Decision No. 11/2007QD-HDQT which mobilizes the interest rate for different currencies, will be regulated and announced by the bank's CEO, based on the basis of a month (30 days) and a year (365 days). (Eximbank 2007.)

The investigated bank applies the interest return policies as the following (Eximbank 2007):

- Advanced interest payment: the amount of interest is paid to depositor at the time they deposit money.
- Monthly interest payment: interests will be paid to depositor once a month in an indicated date which is agreed by the bank and customer.
- Periodic interest payment: interests are paid after a certain period such as 3 months, 6 months or 1 year based on agreement between the bank and customer.

In the case, depositors want to withdraw their deposit before the maturity date mentioned in the contract between parties. The interest rate will be regulated as the following: (Eximbank 2007)

- If depositors withdraw their deposit in the case bank within the first month, the non-term rate will be implemented (the rate mentioned here is applied rate for the maturity indicated in contract)
- If customers withdraw their deposit in the case bank after the first month, the before-maturity withdrawal interests are implemented.

- The real deposit term is less than 1/3 the agreed term, the before-maturity withdrawal interest will be equal to 40% of the interest agreed in the contract.
- The real deposit term is equal and larger than 1/3 and less than ½ the agreed term, the before-maturity withdrawal interest will be equal to 60% of the interest agreed in the contract.
- The real deposit term equal and larger than 1/2 and less than 3/4 the agreed term, the before-maturity withdrawal interest will be equal to 80% of the interest agreed in the contract.
- The real deposit term equal and larger than 3/4, the before-maturity withdrawal interest will be equal to 90% of the interest agreed in the contract.
- If the before-maturity withdrawal interest is lower than the non-term interest rate for the same maturity, the non-term rate will be applied.

- To the deposit legally relating to advanced and monthly interest payment, the implemented rates remain unchanged, however the customers who want to withdraw their deposit have to return the differences they received in advance.
- To the deposit legally relating to periodical interest payment, if depositors do not contact the bank to receive their interest without any special requirement mentioned in the contract, the bank will add those interests to the principal and expand them to its new maturity. In case, that maturity is not available, those funds will be changed to shorter maturity with the prevailing interest rate regulated by the case bank at that time.

4.3.2.2 General Policies for Lending Interest Rate

According to Decision No. 11/2007QD-HDQT, the case bank regulated lending rate policies would be updated once a month to short-term loans (under 1 year), and 3 times quarterly to middle- and long-term loans (over 1 year). The general regulation implemented for lending interest rate is divided into groups: short-, middle- and long-term. (Eximbank 2007.)

For short-term lending interest rate: the implemented rate regulated in the agreement between customers and the case bank is the rate announced by the bank at the time fund is disbursed. After every month since contract is valid, the lending rate is changed to the prevailing rate announced by the case bank. (Eximbank 2007.)

For middle and long term interest rates: the policy for them is similar to the short-term policy. However, the case bank will change the implemented rate every three months since the contract is valid. The new lending rate in the contract is applied at the prevailing rate adjusted by the case bank. (Eximbank 2007.)

In the observed bank, the loans of customers are guaranteed by various properties such as house, real estates, valuable papers, etc or credit (however credit loans were not popular during the period). Managers will decided a lending interest rate based on calculating the percentage of loan corresponding to those properties, then multiplying with lending rate corresponding to different guaranteed assets. (Eximbank 2007.)

4.3.2.3 Internal Credit Rating System

In this part, the internal credit rating system will be presented due to its strong relationship with lending activities of the investigated bank. Besides, through the system's information the bank can classify credit level for each production and service field in different periods. Later, proper lending rate policies will be conducted for different business fields. (Eximbank 2011.)

As known, the internal credit rating system is the credit risk measurement tool implemented by many lending organizations in the world in order to contribute to ultimate decision on the cost of loans for different customers (Trading and Capital-Markets Activities manual 1998, 9). With this system, the case bank can separate customers into different groups. The system is a new tool of the investigated bank which was officially used by risk management department, lending units on January 30 2011 under the Decision No. 05/2011/QD-HDQT. Before that time, professional credit rating systems were not common in Vietnam. The case bank had to use the

service offered from Credit Information Center (CIC) for credit information. This agency is under the supervision of the SBV. However, the information from CIC is sometimes inadequate and unproductive. This is because CIC only collects credit history of the state lenders such as stated-owned commercial banks. In addition, banks are reluctant to reveal their customers' credit information due to privacy protection. These factors make the information quality unworthy. Therefore, the case bank was almost impossible to get access to credit profile of big enterprises as well as smalls and individuals properly. Due to the disadvantages of CIC and the case bank's orientation to international standards, the developing an internal credit system is crucial. (Eximbank 2011; The SBV 2012.)

The system was issued under the following documentation (Eximbank 2011):

- Decision No. 05/2011/QD-HDQT on internal credit rating regulation and guideline of implementing internal credit system in lending activities
- Guideline on instruction of using credit rating system software

It is impossible to mention all the contents of the above documentations but several crucial points relating to the decision on lending rates will be indicated.

The internal credit rating system categorizes customers into four groups: financial institutions, corporations, small enterprises and individuals. The classification is based on the business fields at first, and then on the company's size. For each group, a specific measurement method is applied to rank customers in the below list based on the exposure of its expected loss of which the bank can lose its capital, interest and other outstanding service fees. Depending on many criteria, credit officers give final marks, and then group in the following categories. (Eximbank 2011.)

- Group A: customers in this group are expected to expose highest credit. The bank will stand for nearly zero of credit risk as business contracts occur. In this group, the bank wishes the expected loss exposure to be 0%

- Group B: with this group, the bank would able to recover more than 80% of its capital, interest and other service fees. In other words, the expected loss exposure can be up to 20%.
- Group C: this group is referred to customers whose credit is medium. The possibility to get loss with customers in this group is assumed to be from 20% to 40% of the total amount including principals, interests and other service fees.
- Group D: the expected loss exposure scale for this group will be from 40% to 60%.
- Group E: the investigated bank grades this group with very high risk to have business relationship with. The possibility to obtain losses is estimated from 60% to 100% in case of default.

A unit called the Internal Control unit supervised by the Risk management unit will take responsibility for collecting and updating data of the existing customers and the new customers. Later, this unit will maintain, revise the existing clients' credit rating, evaluate the new clients' credit information and give rating. Every month, the unit will generate a report which informs the new clients' credit rating and changes in the existing customer's credit data. According to the regulation, the report needs to be submitted within the three first days of the new month. (Eximbank 2011.)

With the support of the internal credit rating system, the lending unit of the bank has information for the applied lending interest rate to be set according to the credit level of each customer. In each group of clients, an extra rate will be added to the lending rate offered to each particular group. The lower credit level the clients have, the more extra rate will be summed to the prevailing base rate. The ALM unit senior manager in Treasury department said that "the policy about extra rate adding to lending rate in order to compensate for credit risk caused by borrowers. They would be reviewed every quarter in the meeting of the ALM unit" (Dao 2012). The extra interest rate policy was regulated by Decision No. 301/QD-HDQT and No. 332/QD-HDQT

during the year 2011 in which the extra rates were changed in order to capture the changes of the financial market and make sure to comply with the relating regulation of the SBV such as Decision No. 6/2008/QD-NHNN (The SBV 2012). The detail of extra interest rates adding to lending rate offered for different groups of client must be confidential, so it is impossible to mention it here. In addition, with the system's data a report which rates business field in different credit levels for each period is used to set lending interest rate in different regions with particular business fields. Consequently, it can be seen that with the aid of internal credit rating system, the bank can reduce credit risks which mainly cause interest rate risks in lending activities and somehow gain more NII for the bank. (Eximbank 2011.)

In conclusion, the case bank has gained many advantages from the internal credit rating system. Firstly, the bank does not depend on the CIC. Next, the information has more accuracy in the bank's point of view due to basing on the bank's criteria. In addition, credit information of all kinds of client will be collected so that the bank will not suffer risks because of lacking the data in using the service of CIC. Finally, the risk management will be improved in common, and particularly the interest rate risk management process is more professional and closed to the international standards of banking services.

4.3.2.4 The Investigated Bank's Interest Rate Policies

The main business activities which gain the most profit of a commercial bank are from mobilizing and lending transactions (Economics Oxford Dictionary 2012). Hence, the policies relating to these activities are very important because initially they have a function of reducing the interest rate risk, and then maximizing the profit. To begin, the interest income from the indicated activities is analyzed and later the mobilizing and lending rate is looked through each year.

Compared to the interest incomes and expenses of the case bank (see Figure 13), it indicates that the differences between the two variables (interest income minus

expense) are positive and grow each year. 2008 was the year of volatility interest rate and the beginning of the liquidity crisis in banking industry. However, the interest profit of this year was higher than the previous year 2007 although the credit growth was the same and the credit balance was 10000 billion VND higher than the year 2007. These things prove that the bank had good policies in interest rate and managed its interest rate risk and credit risk efficiently. In the following year 2009, due to the decrease of interest rate, the interest income was similar to the year 2008 although the level of credit growth was nearly double. However, the interest profit of 2009 was higher than 2008. This can be explained that the SBV decreased its reserve ratio from 10 % to 3%. In addition, the bank became more active in taking advantages of the difference between mobilizing and lending rate as the SBV announced the decision on reducing base rate and discount rate. (Eximbank 2007-2011.)

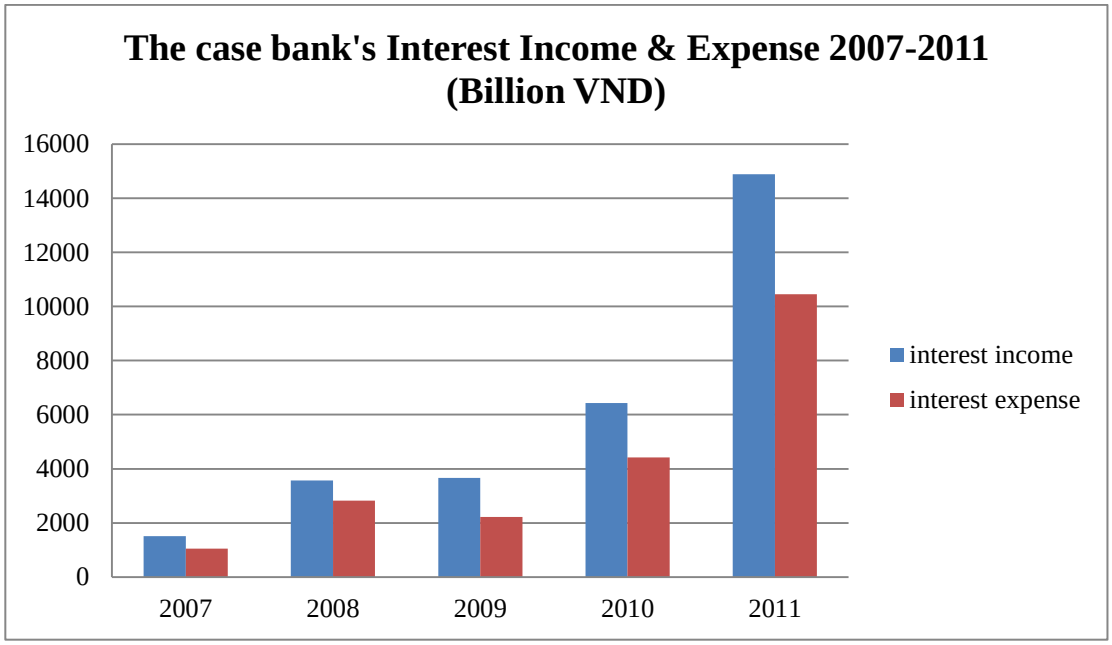


Figure 13. Interest income from mobilizing and lending activities of the investigated bank from 2007 to 2011. (Eximbank 2007-2011)

In the graph of Figure 14, during the time after 2009, the credit growth was dramatically increasing over the years from 38000 to 74000 billion VND. Similarly, the profit stayed in the trend, especially the income profit in 2011 doubled the year 2010 (from 2015 to 4444 billion VND). This is the result of implementation of internal credit rating system. The bank could choose value and more credit customers and expand its economic areas with high growth rate such as Ho Chi Minh city and other provinces in the South to offer loans, which made the cost for credit risk as well as interest rate risk reduce. Besides, the significant profit in 2011 has been made by the difference between mobilizing and lending rate higher than the previous year due to the changes in monetary policies of the SBV. In addition, the bank offered the competitive lending rate compared to other competitors to SMEs and export and import businesses to push up credit growth. (Eximbank 2007-2011.)

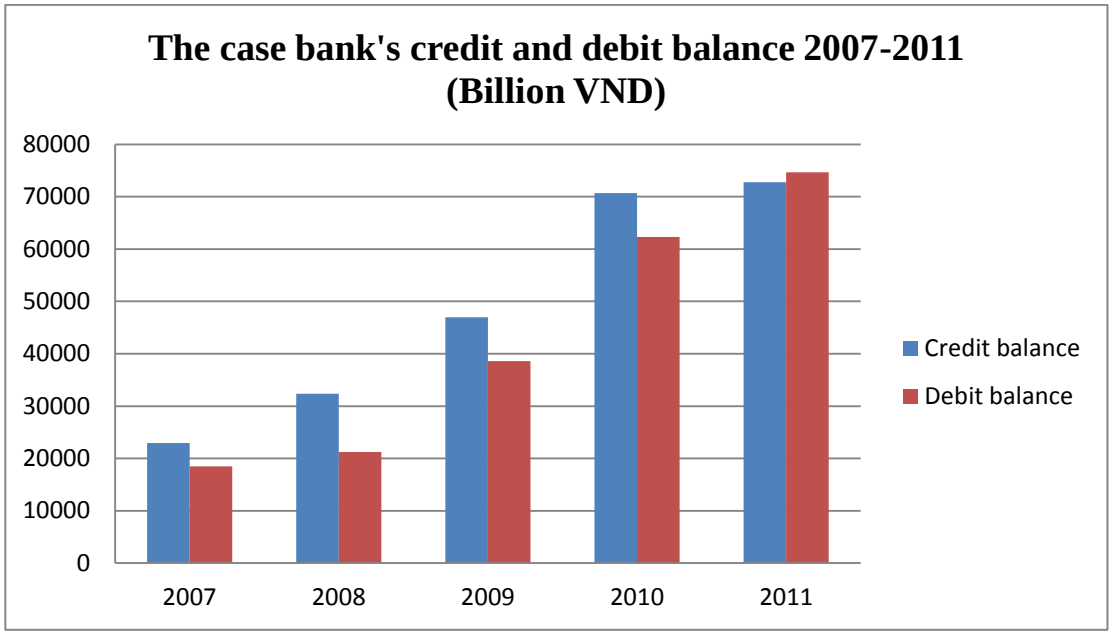


Figure 14. The case bank's credit and debit balance 2007-2011. (Eximbank 2007-2011)

In the following, the case bank's implemented interest rates for both mobilizing and lending activities are presented (see Figure 15). Due to the nature of lending and

mobilizing activities in Vietnamese financial market, the lending rate will be shown for both short- and long-terms, while there are only the short-term mobilizing rates indicated.

The lending rates for short- and long-term were stable from the beginning of 2007 until November, then they suddenly increased 1% for each maturity period in the last month. In the other hand, the mobilizing rates were changing during the time. During the first 5 months, the mobilizing yield moving between 8.5% to 9%. After that, they decreased under 8% in October, and instantly reached around 9% at the last two months. (Eximbank 2007-2011.)

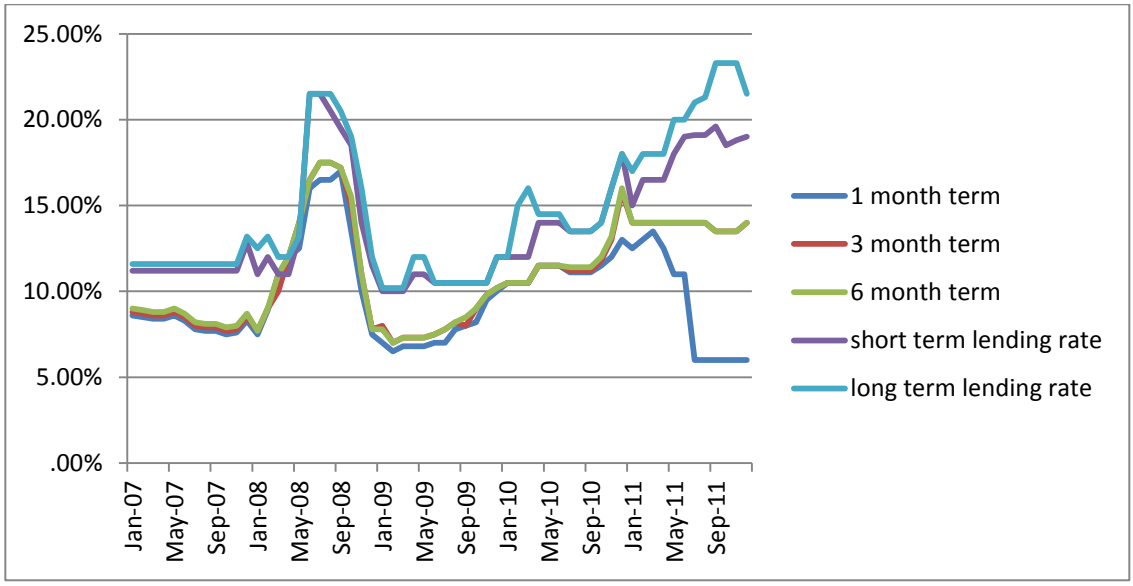


Figure 15. The interest rate fluctuation 2007-2011. (Eximbank 2007-2011)

Regarding figure 15, the year 2008 was the most volatile period of interest rate. The rates of lending and mobilizing activities fluctuated unpredictably in which the mobilizing rates changed more smoothly than the lending rates which changed sharply. For instance, in May and June the lending rates increased dramatically from 13% to 21.5%, meanwhile before that the rates moved around 11% to 13%. In the following months, the rate remained 21% for 3 months and declined rapidly to 12% at the end of the year. In contrast, the mobilizing rates decreased slightly in January

compared to December of 2007, and then they increased 1% to 2% each month until up to the peak of 17.5% in July and August. After that, they decreased sharply from 17% in September to 7.5% in December. During this period, there were a few times that the lending rate was lower than the mobilizing rate in April and May due to the slow reaction against the market which caused loss to the bank. Briefly, the dramatic fluctuation of interest rate in this year caused a strong shock to the financial market participants including the case bank. Although the lending rate policy changed slowly at the beginning compared to the mobilizing rate, the situation changed later. In addition, the case bank had complied the Decision No. 6/2008/QD-NHNN which limited the interest rate under 150% of the base rate. (Eximbank 2007-2011; The SBV 2012.)

Through the policies of reserve ratio, discount and base rates during period 2009-2010, it can be seen that these rates were quite stable although there was a little increase in 2010. Meanwhile the yield curves of rates offered by the case bank increased from 7% to 16% for the short-term mobilizing rates and 10% to 18% for the short- and long-term lending rates. Especially, these rates increased sharply during the last three years. It can be explained that the rate racing started again after cooling down by the monetary policies of the SBV. Besides, it is also seen that the moving trend of mobilizing and lending rates was similar to the year 2008 in which the lending rate changed slowly in responding to the mobilizing rate, but sometimes it fluctuated dramatically, especially a long-term one. (Eximbank 2007-2011; The SBV 2012.)

There are some issues that were discussed in 2011. The yield curve of both mobilizing and lending rates quite strange in comparison with other periods indicated that the SBV implemented many policies during this period. Firstly, the Circular No. 02/2011/TT-NHNN announced in March inhibited the mobilizing rate racing between commercial banks, which set ceiling mobilizing rate at 14%. However, a couple of month later, there was Circular No. 30/2011/TT-NHNN implemented in June, which set 6% for mobilizing rate with maturity period under 1 month, and 14% for the

remains. Secondly, the Decision No. 6/2008/QD-NHNN was rejected by the bank during this year in which the lending rate was set at the level over 150% of base rate. At the beginning of the year, the SBV's governor said that the base rate would be redefined (www.vneconomy.vn 2012). If so, the Decision No. 6/2008/QD-NHNN would be invalid. Therefore, the lending rates reached 20% for the short-term loans and 23% for the long-term loans; meanwhile the base rate remained 9% during the year. (Eximbank 2007-2011.)

4.3.2.5 Conclusion of Internal and External Policies

A research analysis is an important method to lead to the conclusion based on foundation of primary and secondary data. This section aims to respond evaluation questions in group 2 mentioned in part 2.4.4 and analysis impact of regulated and internal policies in interest rate risk management of the case bank. The analysis will be conducted for external and internal policies separately.

As seen, using interest rate as a main tool to operate Vietnam's economy of the SBV is the main reason causing interest rate risk assumed by banks. At the middle of 2008, Decision No. 6/2008/QD-NHNN was announced to regulate the ceiling for lending rate based on the base rate. In the case, there was decrease of base rate, while mobilizing rate was at high. The bank suffered from losses of interest margin. This happened to the following year 2009 and 2010 as the base rate was reduced significant. Moreover, the regulation about mobilizing rate ceiling was not received proper attention from the SBV, so occasionally encourage IRR for commercial banks. In addition, in order to protect interest income, the bank tended to offer loans for customers with high credit level, which caused losses in income from low credit customers. It can be said that the very high mobilizing rate is the main factor creating IRR for the bank. Therefore until 2011, the SBV issued Circular No. 02/2011/TT-NHNN and 30/2011/TT-NHNN which regulated mobilizing rate ceiling of 14%. Besides, the Decision No. 6/2008/QD-NHNN was not valid at that time. These polices could immediately reduce the mobilizing rate, but it could impact the banking

industry in the future. For example, as the mobilizing rate ceiling at 14%, customers tended to deposit money at state-owned commercial bank due to safety reasons. As the result, other commercial banks, due to lack of liquidity, had to borrow money in the interbank market with high rate. Later, the SBV had to announce increase in discount rate to cool down interest rate in the interbank market. (cf. The SBV 2012.)

The interest rate policies were unreasonable and inefficient to reduce interest rate risk to commercial banks during the period. The input and output interest rate was not managed rigorously. For instance, at the beginning lending rate was controlled by the SBV and mobilizing rate was decided by the market. On the other hand, the policies were conversed in 2011. The mobilizing rates were set limit, while the lending rates were manipulated by the state-owned commercial banks. Besides, the SBV significant depend on the use of administrative measures such as applying deposit or lending rate ceiling to control interest rate without developing market instruments such as open market operations, interbank market, etc. (cf. The SBV 2012.)

It is not only the downside in polices in managing the economy of the SBV causing IRR to the case bank, but also its internal policies posed obstacles to the ALM unit's IRR management.

Firstly, strict mobilizing polices such as before-maturity withdrawal interests regulation seems to immunize the bank's interest income from IRR. However, those polices partly restrict losses because the bank apply fixed rate for this activities. Besides, because of interest rate racing in Vietnamese financial market between commercial banks to attract deposits, customers usually had tendency to bargain for interest of their deposits. As a result, the real deposit rate usually higher than the listed rates. In addition, it also caused difficulties in managing liabilities.

Secondly, the bank implemented floating rate for loans during the period. After review the economy's status in the review period, the mobilizing rates was always increasing while lending rates fluctuated surprisingly, so risks from interest rate

moving easily caused losses to the bank. Besides, sometimes updating the lending rates did not catch up the change of mobilizing rate, which impacted on the bank's interest margin. Moreover, the bad-debt situation of the bank got worse in some period because overdue interest rates did not revise while offering new lending rates. For instance, in the middle of 2008 the overdue rate was 18% which was lower than new lending rate of 23% (Eximbank 2008).

Finally, according to the bank's financial report (2007-2011), it had used short deposit to fund medium- and long- term loans. Therefore, a reduce of money supply, along with consecutive interest rate increase had affected the liquidity and profitability of the bank.

4.3.2.6 Asset and Liability Management Unit Personnel

According to Basel's consultative document of management interest rate risk (2004), efficiency IRR management requires co-operation between employees inside the ALCO from the lowest to the top level, who conduct reports and decides strategies in managing interest rate. Therefore, communication and information exchange within the case bank's ALM unit need to be adequate and efficiency. This section will analyze this issue based on questionnaire's result. The questionnaires were sent to the members of the ALM unit including the three staffs who conduct monetary, economy policies forecast, and market interest rate report, and balance sheet status report (two from Treasury department and one from Finance department), and two credit seniors from corporate and consumer banking. In the questionnaire collected from the respondents, some conclusions are presented.

Firstly, almost respondents had experience in IRR management over 5 years. There were only two staffs from Treasury and Finance department having 2 and 3 year experience respectively. This indicated that the ALM unit was run by experienced employees. In the following, there was only one Finance department employee said that he/she understood IRR management process clearly, meanwhile the others who

making reports showed that they quite understood the process because they were dealing with separate tasks. The two credit senior managers indicated “quite understand” for this question. In fact, there was no need for them to understand the IRR process clearly, instead of catching up interest rate policies and implementing them into products offered for customers. Next, the result indicated that all five employees comprehend the importance of IRR management. However, they just recognized its influence when the interest rate volatility period started.

Fourthly, the good point is that staffs are able to receive the training program before starting to work. However, the members from Finance department has doubted the quality of these training sessions and even feel that the lessons do not help at all. Moreover, the credit senior managers have not received any training about the process of IRR management. In concerning to deliver IRR policies to employees on time, three ALM members from Treasury and Finance department stated that they had not usually received any changes in current regulations in proper time. Meanwhile, it is regular to two credit senior managers. In the next question, it is pointed out that investigated bank followed centralized management procedure, so the staffs had difficulty in presenting their opinions concerning changes in policies. Addition to this, all of them wished to contribute their opinions to policies to create sustainable development. The two employees from Treasury and Finance department mentioned that they were seldom asked to contribute to the policies, and the other was sometimes. In contrast, the credit senior managers said that they were never requested to present their feedbacks about customer’s behavior as there was no interest rate change to improve the policies. They mentioned that the ALM unit senior managers mostly focused on protecting the bank from the IRR without sharing the risk with customers. For instance, policies about lending rate promotion were only temporary. They just supported customers in a short period, when the promotion ended they would find other banks. Consequently, the bank lost opportunities to achieve customer’s loyalty. They suggested that the bank should have policies to support customers in the long term and share difficulties together.

4.3.2.7 Information Flow within the ALM Unit

According to the interview and questionnaire, the information flow inside this unit is similar to the Bank which obtains both bottom-up and top-down directions. First and foremost, top-down information flow means the policies, strategies, decisions and any important information from the top management to the lower member departments including Treasury and Finance departments, as well as Corporate and Consumer banking, and other departments if they may concern. As regards to the interviewees, the employees in the bank frequently receive notifications or announcements through tax, email, hardcopy as well as via the Intranet. It is the responsibility of almost all employees to check Intranet or email every day in order to update the latest notices from the upper departments. However, in case of some important policies or strategies, which need to be announced immediately to the staffs, the managers may call to discuss directly with their staffs. (Dao 2012; Tran 2012.)

Turning to the bottom-up information flow, it is pointed out that the reports are made weekly, monthly, quarterly or even immediately if some unexpected problems happen. In this case, the notifications have to be marked “urgent” or “important”. Significantly, the interviewees also stated that almost all reports composed are relied on the reporting rules defined by the ALM unit in a unique format so that every member does not confuse. The reports can be in form of hard-copies (printed document) or soft copies (emails, intranet messages) and are sent directly to the concerning managers and then the headquarters so that the necessary risk evaluations may be processed. (Dao 2012; Tran 2012.)

4.4 Interest Rate Risk Measurement, Simulation and Hedging

As finishing the review of the external and internal policies relating to the topic, this section will continue to discuss and respond the third group of questions mentioned in the evaluation of IRR management’s list. The IRR measurement, simulation, and

hedging will mainly illustrate the process of managing IRR in the investigated bank which emphasizes on the method used in these activities. The review period is starting from the volatility time 2007 to 2011. In addition, it should be mentioned that the review is also based on Vietnamese currency – VND. This is because almost net interest income comes from VND transactions. In spite of foreign currency's influence on the domestic currency, it should limit the review in VND so that the author does not confuse with different kinds of data.

The analysis data are collected from the financial statement published by the investigated bank at the end of fiscal years (December 31). In those statements (2007-2011), the interest rate sensitive asset and liability were regulated by the bank's board of manager and divided into different year definition (maturity bucket). Meanwhile, in other financial statement before that period accounts were just separated into short-, middle-, and long-term due to flat yield curve and insufficient attention on IRR management. (Eximbank 2007-2011.)

The case bank had strategies in managing toward international standards since Vietnam became a member of the World Trade Organization in 2006 (Eximbank 2007). Vietnamese financial market marked the fair competition of domestic and foreign commercial banks. As a result, domestic banks have been facing treats from the lack of capital, weak in operation and management such as financial and environment risks, un-development in information technology in banking sector. Therefore, in order to survive in that fierce competition, the case bank has had to change and improve their management system, especially risk management as Vietnam participated in international financial market. (Tran 2008.)

In this section, the information relating to IRR measuring, simulating and hedging is presented. Firstly, the bank's balance sheet structure is displayed to present the component accounts. Next, the gap analysis will be applied to see how the bank measures and monitors the risk. Thirdly, the interest rate risk exposure will be derived from the result of gap analysis to navigate the bank's IRR position. In the

following, the simulation of the IRR will continue to analyze net interest income in different scenarios of interest rate. Finally, the IRR hedging methods of the bank's ALM unit are discussed.

4.4.1 The Balance Sheet Structure

The consolidated balance sheet of the case bank (see Appendix 5) comprises accounts which are sensitive and not sensitive to the change of interest rate. They were displayed in Vietnam Dong (VND) and round to the nearest VND million. Certainly, it has been developed regarding the Vietnamese Accounting Standard, the requirements of the Vietnamese Accounting System for Credit Institutions and other relevant accounting regulations stipulated by the SBV. The general balance sheet prepared on the basic of daily balance sheet is apparently completed in each branch and subsidiary at the end of the month. Besides, the consolidated financial statements are accomplished with the support of historical cost concept. As regards to the accounting policies, they are thoroughly used and applied by the research bank. (Eximbank 2007-2011.)

4.4.2 Interest Rate Risk Measurement

In 2007, the ALM unit announced the Decision No. 121/2007/QD-HDQT which is regulated about the measurement, simulation, and hedging IRR to ensure long run income of the bank. (Eximbank 2007.)

In addressing IRR measurement, the interest rate sensitive and non-sensitive assets and liabilities were regulated in the Decision clearly. For instance, cash and precious metals are classified as non-rate sensitive items, balances with the SBV and other credit institution are considered as current, hence the interest rate adjustments may occur one day. Besides, the loan to customers, deposits from customers, investment securities, and etc are also sensitive to rate as their nature. Meanwhile, derivatives and other financial assets and liabilities are considered to non-rate sensitive because they are usually set with fixed rate. It is unnecessary to explain all the accounts of

both asset and liabilities. Therefore, Table 7 will summarize rate sensitive and non-sensitive accounts presented in the bank's balance sheet. (Eximbank 2007.)

Table 7. The summary of regulation about rate sensitive asset and liability (Eximbank 2007)

Asset		**Liabilities**	
Cash and precious metals	NRS	Due to Government and borrowings from the SBV and other credit institutions	RSL
Balances with the SBV and other credit institutions	RSA	Funds received from Government, international and other institutions	RSL
Trading securities	NRS	Derivatives and other financial liabilities	NRS
Derivatives and other financial assets		Deposits from customers	RSL
Loans and advances to customers	RSA	Certificates of deposits	RSL
Investment securities	RSA	Other liabilities	NRS
Investment in other entities and long-term investment	NRS		
Fixed and other asset	NRS		

These asset and liability's rate-sensitive items are calculated in the Gap report based on their maturity. However, it is impossible to analyze them in each different maturity. Therefore their maturity are divided into "non-interest bearing", "up to 1 month", "1-3 months", "3-6 months", "6-12 months", "1-5 years", and "over 5 years" time frames. Relating to maturity analysis of asset and liability accounts, there are some policies in the Decision No. 121/2007/QD-HDQT of the investigated bank. Balances with the SBV are categorized as compulsory deposits. The maturity terms of investment securities are different between each kind of securities. The maturity term of placements with loans to other banks; and loans to customers is calculated on the stipulated maturity date in contracts. The maturity term may be changed if loan contracts are extended. The maturity term of long-term investments is assumed to be more than one year. The maturity term of fixed assets is based on the remaining useful life of assets. In addition, the Decision No. 121/2007/QD-HDQT also stated that "the maturity term of deposits and borrowings from other banks; and customer deposits are determined to be based on features of these items or the maturity date as stipulated in contracts. Vostro account and demand deposits are transacted as required by customers, and therefore, being classified as current accounts. The maturity term of borrowings and term deposits is determined to be based on the maturity date in contracts. In fact, these amounts may be rotated, and therefore, they last beyond the original maturity date". (Eximbank 2007, 192.)

4.4.2.1 Income Gap Analysis

As indicated by the interviewees, during the review period they just paid attention to the impact of interest rate fluctuation on the NII, accounts volumes, and time. Therefore, income gap analysis was chosen as the main tool used to evaluate (Dao 2012; Tran 2012). Based on income gap reports' data generated by the members of the ALM unit, the author will present and analyze the efficiency of the method and other relevant information in order to satisfy with the requested research questions.

Before evaluating deeper into the investigated bank's IRR measurement, it should review the gap of assets and liabilities, the ratio of rate sensitive asset and liability (interest sensitive ratio), and the ratio of gap and earnings assets over the period from 2007 to 2011. The income gap will indicate the different between rate sensitive asset and liability in which reader can understand the policy and amount of fund in mobilizing and lending activities of the bank in particular years. In addition, the rate sensitive ratio contributes to the meaning of gap by which the bank is indicated as rate sensitive asset or liability. On the other hand, the ratio of gap and earning assets is calculated as the percentage of amount gap on the total assets. It offers the benchmark with other competitors in the domestic financial market. The data of the biggest Joint-stock commercial bank in Vietnam – Vietcombank which has a long history in developing and experiences in risk management is chosen as a base for comparison (see Table 8).

Table 8. The data of gap, gap ratio, gap/total asset ratio of the case bank in the reviewing period 2007-2011. (Eximbank 2007-2011; Vietcombank 2007-2011)

Items / Year	**Gap**	**RSA/RSL ratio of the case bank**	**RSA/RSL ratio of Vietcombank**	**Gap/Earning assets ratio of the case bank**	**Gap/Earning assets ratio of Vietcombank**
2007	5,615,820	1.23	1.08	19%	7%
2008	7,246,032	1.21	1.10	18%	9%
2009	4,125,645	1.08	1.07	7%	6%
2010	6,176,851	1.05	1.08	5%	7%
2011	4,139,430	1.02	1.06	2%	6%

Unit: million VND

In assessing the result of Table 8, it can come up with the following evaluation of gap and the reviewed ratios of the investigated bank during the period. The gap figures from 2007 to 2009 are positive and the gap ratios (RSA/RSL) are higher than one, which means the bank experienced rate sensitive asset position. The bank had its assets mature faster than liabilities, in which case the assets would be reinvested again with different price until such time the liabilities end their maturity period and require repayment. In addition, the case bank had also experienced increase in NII as the lending interest rates went up and vice versa. It can be seen that the balance sheet of the bank was adjusted in adapting the lending yields in the period as those rate were always much higher than mobilizing rates and in upward shape in most of the time. Therefore, the investigated bank gained consistent growth in NII during the time. (Eximbank 2007-2011; Vietcombank 2007-2011.)

During the period, the bank faced quite high gap ratio in the two year 2007 and 2008. However, those figures declined closing to one which is considered as the bank immune to interest rate risk in the following years with 1.08, 1.05, and 1.02 respectively. The interviewed manager from Finance department said that "the expected scale of gap ratio is between 0.8 and 1.2 which the ALM unit considers as safe" (Tran 2012). However, it can be seen that in 2007 and 2008 the ratios were over 1.2 that indicate the bank highly in IRR position. In addition, it is also higher than the ratio of Vietcombank who always had their ratio in safe scale. Although having unsatisfactory result in the first two years, the bank was improving their IRR management during the remaining period in which the ratios were lower than its big competitors. (Eximbank 2007-2011; Vietcombank 2007-2011.)

In addressing to the gap/earning assets ratio, the bank exposed a high percentage of gaps in earning assets which is assumed to bring exposure to NII as yields decline. However the ratio decreased significantly after the high peak of interest rate volatility in 2008. Especially 2011 marked with very low ratio of 2% that indicated the bank had been more safety from the interest rate fluctuation. Besides, it should be known that the bank would earn more NII increment with high ratio as rate increase. In

comparison with Vietcombank, they kept the ratio not too high or low with average of 7%. It can be explained that the bank believed its forecast of increase of yields so that ratio round 7% will make them safety in case rate decrease, meanwhile kept earning more NII surplus. Briefly, the case bank had strategy in adjusting balance sheet in the way to minimize risk. Meanwhile, Vietcombank believes in its forecast ability on rate fluctuation so that they will earn more on NII. However, the ratio was kept under 10% in order to lose much in case of unexpected decrease of yields. (Eximbank 2007-2011; Vietcombank 2007-2011.)

In the next, the author would like to analyze the re-pricing mismatching of assets and liabilities in different maturity bucket (see Table 9).

As mentioned above, the gap report of the bank is regulated to be divided into seven time frames “non-interest bearing”, “up to 1 month”, “1-3 months”, “3-6 months”, “6-12 months”, “1-5 years”, and “over 5 years”. Each unit of asset and liability matures at particular time date which is then classified into suitable maturity bucket so that the ALM unit will be able to adjust its balance sheet conveniently. (Eximbank 2007.)

Table 9 illustrates the re-pricing mismatches of rate sensitive assets and liabilities of the investigated bank during the analyzed period. In this table, the data is more detailed than Table 8’s because gaps are separated into different maturity bucket to analyze further. In all the cases, the mismatches were negative in the first period, in other words, there were more short term liabilities than assets. In order to explain this, it should know that the bank’s NII was mainly general from the lending and mobilizing activities which are presented in account “loans and advances to customers” and “deposits from customers” in assets and liabilities respectively. In reality, customers tended to deposit their money within 1 month and from 1 to 3 months during the period since they wanted to take advantage in the interest racing between commercial banks. In addition, borrowers were not interested in the two maturity buckets. Therefore, this liability was used in interbank market and to deposit

at SBV with lower interest rate. As a result, these maturity buckets were not the interest income source of the bank as rates increased. In the next maturity frame, the amount of fund deposit decreases as the maturity expands. Meanwhile, customers tend to borrow long-term loan (under 5 years) but this amount dramatically decreases in the "over 5 years" maturity bucket due to more risks exposure bearing by the bank. These things lead to form the way of manage assets and liabilities, which uses short-term deposit to support middle- and long-term loan. (Dao 2012; Tran 2012; Eximbank 2007-2011.)

Table 9. The case bank's re-pricing mismatch in the reviewed fiscal years 2007-2011. (Eximbank 2007-2011)

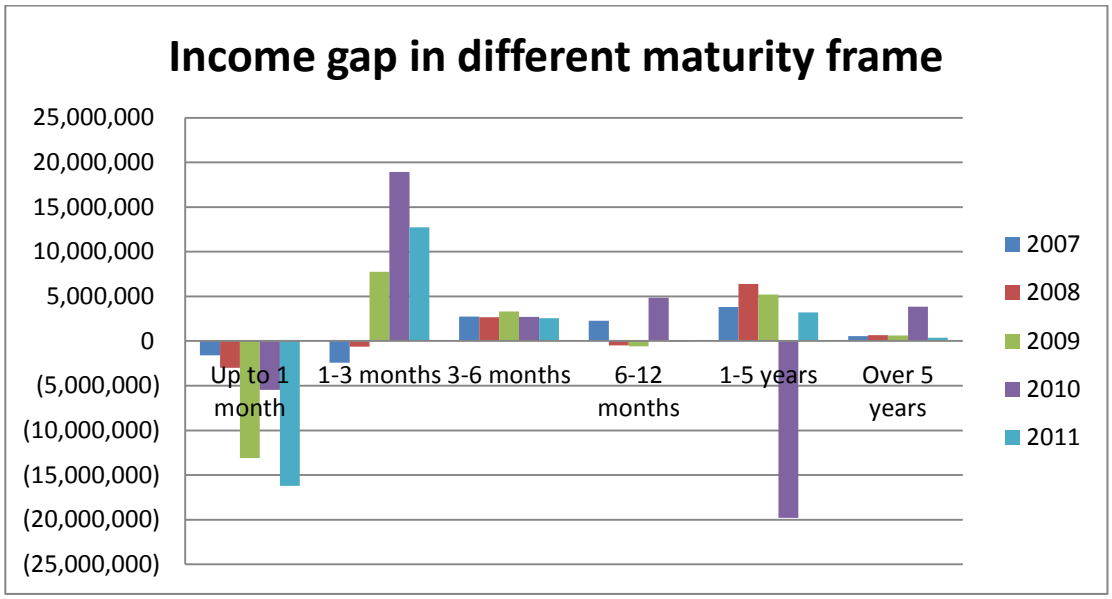
Year	Up to 1 month	1-3 months	3-6 months	6-12 months	1-5 years	Over 5 years
2007						
Assets	5,963,865	8,059,745	4,917,613	4,944,748	5,086,020	585,639
Liabilities	7,566,901	10,478,289	2,164,988	2,689,087	1,260,172	22,469
Re-pricing mismatch	**(1,603,036)**	**(2,418,544)**	**2,752,625**	**2,255,661**	**3,825,848**	**563,170**
2008						
Assets	15,613,558	7,113,746	4,861,606	4,283,708	7,019,636	670,599
Liabilities	18,605,612	7,742,126	2,190,284	4,779,920	609,236	8,984
Re-pricing mismatch	**(2,992,054)**	**(628,380)**	**2,671,322**	**(496,212)**	**6,410,400**	**661,615**
2009						
Assets	16,962,342	21,271,927	5,863,483	2,798,413	6,841,022	620,153
Liabilities	30,062,272	13,510,761	2,547,421	3,379,366	1,628,630	6,148
Re-pricing mismatch	**(13,099,930)**	**7,761,166**	**3,316,062**	**(580,953)**	**5,212,392**	**614,005**
2010						
Assets	36,495,411	50,609,550	13,234,273	9,317,858	6,021,064	3,854,661
Liabilities	41,976,052	31,659,231	10,541,742	4,474,596	25,828,074	610
Re-pricing mismatch	**(5,480,641)**	**18,950,319**	**2,692,531**	**4,843,262**	**(19,807,010)**	**3,854,051**
2011						
Assets	69,284,672	54,984,830	21,295,499	14,054,128	3,238,901	3,374,342
Liabilities	85,481,935	42,253,144	18,724,309	14,124,064	47,144	3,001,286
Re-pricing mismatch	**(16,197,263)**	**12,731,686**	**2,571,190**	**(69,936)**	**3,191,757**	**373,056**

Unit: million VND

The interviewed managers said that most of commercial bank in Vietnam could not raise middle- and long-term funds deposited from the public (Dao 2012; Tran 2012). Firstly it is due to the loss of public's confidence in the domestic currency – VND. Secondly, Vietnamese commercial banks are not able to create high liquidity financial instruments to attract funds. In addition, the undeveloped government bond market also contributes to this issue. Therefore this issue occasionally put the bank into passive position in managing IRR. Besides, it caused to liquidity crisis in such first years of reviewed period. However, the situation has been changed since 2010 as the bank recognized the risk source and change policies to avoid negative effect from the crisis. According to the figures in Table 9, the amount of deposit increased significantly in the "3-6 months" to "1-5 years" maturity bucket. The bank was able to attract middle- and long-term deposit fund so that the balance sheet structure was actively adjusted to minimize IRR and improve liquidity ability. (Dao 2012; Tran 2012; Eximbank 2007-2011.)

In the following, another issue relating to income gap of the bank will be analyzed the income gap of particular defined maturity during the period based on Figure 16.

In the first maturity period, the bank was in rate sensitive liabilities position due to customer's psychology in lacking trust in financial market and low demand on borrowing money from customer. However, as explained above, using short-term deposit to fund for middle- and long-term loans is risky in rate volatility period. Therefore, since 2010 the bank has changed lending policies to promote lending activities in interbank market to reduce IRR of this maturity period. In the following year 2011, the gap was high in negative way which defeated the bank's policy which burdened the "up to 1 month" time frame's interest expense. In addressing the bank's "up to 1 month" mobilizing rate at the first six months of 2011, the rates stayed around 9% to 11%, then they decreased sharply to 6% due to announcement about ceiling rate for under 1 month of fund mobilization regulated in Circular 30/2011/TT-NHNN published in 18 June. It is because the bank forecasted the yield would decline in this maturity frame. (Eximbank 2007-2011; The SBV 2012.)



Unit: million VND

Figure 16. The gap of each maturity bucket from 2007 to 2011. (Eximbank 2007-2011)

In contrast with the first maturity frame, the remaining periods indicated the bank in rate sensitive asset position. In which, the gaps were minimized to reduce IRR. This might be a good decision of the bank when it ensured the moving of interest rate in the future. As looking back the general policies for lending interest rate of the bank, it can be stated that the bank had gain advantage as the interest increase most of the time regardless 2008. The year 2008 was a difficult time for all commercial banks in Vietnam including the case bank. In order to protect NII from the crisis, the bank reduced gaps by cutting off offered loan and raising more funds from the public. (Eximbank 2007-2011.)

However, there is a distinction in the maturity frame “1-5 years”. The gap was largely negative which indicated the bank had been focusing in raising fund in this period. This action could be assumed as a solution for supporting middle- and long-term loan by short-term mobilizing fund. (Eximbank 2007-2011.)

In the next part of this section, the change of NII is calculated in different scenarios of interest rate in order to plan the balance sheet structure (see Table 10). The interest rate is assumed to increase and decrease 1%. Besides, the yield curve is simulated to move parallel with the old one which means the increase and decrease 1% is implemented for all maturity periods. In addition, in order to calculate the change of NII easily, the author assumes the bank apply floating interest rate policy for all maturity period.

Table 10. The effect of changes in interest rate to NII. (Eximbank 2007-2011)

	2011
Gap	4,139,430
Interest rate increase 1%	
∆NII	41,394
In which	
Over due	15,389
Up to 1 months	(161,973)
1-3 months	127,317
3-6 months	25,712
6-12 months	(699)
1-5 years	31,918
Over 5 years	3,731
Interest rate decrease 1%	
∆NII	(41,394)
In which	
Over due	(15,389)
Up to 1 months	161,973
1-3 months	(127,317)
3-6 months	(25,712)
6-12 months	699
1-5 years	(31,918)
Over 5 years	(3,731)

Unit: million VND

According to the result generated from Table 10, if the manager forecast the interest rate will increase 1% for all maturity period, the NII will increase 41,394 million VND. However, in practice, the rate of each maturity period would not increase in the same way. It is possible for the "up to 1 month" increases 2%, "1-3 months" and "6-12 months" increase 1%, while "1-5 years" is able to reduce 2%. In addition, the bank implements both floating and fixed interest rate for all rate sensitive item in assets and liabilities, so for different maturity period, and different kind of customers. According to the ALM unit managers, the floating and fixed rate policies are coordinated smoothly in how to eliminate IRR negative effect. They are changed in particular item in assets or liabilities and its maturity period.

4.4.2.2 Duration Gap Analysis

Income gap analysis targets to evaluate the changes of net interest income to the interest rate fluctuation. However it is certainly considered as short-term value relating to the company's profit. In reality, as analyzing any risks' impacts to bank's business, it is advisable to consider in both short- and long term effects of the risk. Hence, the bank should not only analyze the impact of IRR to its NII, but also observe change in the bank's economic value which is considered as long-term value. Due the liquidity crisis and bad debt occurred during the reviewed period, the case bank only focused on protecting its net interest income without paying attention to its market net worth. Therefore, the author would like to generate a duration gap analysis based on the data collected in 2011 (see Table 11 & 12) with the purpose of reminding the bank about the importance of its economic value and evaluating changes of interest rate to the bank's market value.

From the Equation 3 (see Appendix 3), the duration gap for the investigated bank in 2011 is

$$DURgap = DURa - (\frac{L}{A} * DURl)$$

Where: DURa: average duration of assets = 0.29

DURl: average duration of liability = 0.32

A: market value of asset = 184,381,821 million VND

L: market value of liability = 163,800,133 million VND

Thus:

$$DURgap = 0.29 - \left(\frac{163800133}{184381821} * 0.32\right) = -0.0057\ year$$

It is assumed that the interest rate increase from 10% to 11%. The change in market value of net worth as a percentage of assets is calculated as the below:

$$\frac{\Delta\,\mathrm{NW}}{A} = -DURgap * \frac{\Delta\,\mathrm{r}}{1+r}$$

Where: DURgap: duration gap = -0.0057

Δ r: change in interest rate = 0.11 – 0.10 = 0.01

r: interest rate = 0.1

Thus:

$$\frac{\Delta\,\mathrm{NW}}{A} = -(-0.0057) * \frac{0.01}{1.1} = 0.0052\%$$

The increase of rate to 1% would lead to changes in market value of net worth as a percentage of assets of 0.0052%. Consequently, with the asset of 184,381,821 million VND, there would be a rise in market value of net worth of 9,588 million VND if the interest rate increased 1%

Table 11. The Duration gap analysis of Eximbank from 2007 to 2011. (Assets side). (Eximbank 2007-2011)

	Amount (million VND)	Duration (years)	Weighted Duration (years)
Assets			
Cash and precious stones	7,295,193	0.00	0.00
Balances with the SBV and other banks			
Up to 1 month	31,291,927	0.01	0.00
1-3 months	21,419,327	0.17	0.02
3-6 months	11,589,341	0.33	0.02
6-12 months	2,394,740	0.58	0.01
Loans and advances to customers			
Up to 1 month	36,713,608	0.08	0.02
1-3 months	29,465,503	0.10	0.02
3-6 months	5,426,299	0.33	0.01
6-12 months	2,927,361	0.67	0.01
1-5 years	118,904	3.00	0.00
Over 5 years	11,655	6.00	0.00
Investment securities			
Up to 1 month	2,780,032	0.04	0.00
1-3 months	4,100,000	0.25	0.01
3-6 months	4,279,859	0.46	0.01
6-12 months	8,732,027	0.58	0.03
1-5 years	3,119,997	2.50	0.04
Over 5 years	3,362,687	5.20	0.09
Long-term investment	1,473,713	0.00	0.00
Fixed and other assets	7,879,648	0.00	0.00
Total	**184,381,821**		**0.29**

Table 11 calculates the durations of accounts in asset side of the case bank's balance sheet. Meanwhile, the liabilities' durations are illustrated in Table 12

Table 12. The Duration gap analysis of Eximbank from 2007 to 2011. (Liabilities side). (Eximbank 2007-2011)

	Amount (million VND)	Duration (years)	Weighted Duration (years)
Liabilities			
Borrowings from the SBV and other banks			
Up to 1 month	26,088,195	0.08	0.01
1-3 months	25,948,588	0.23	0.04
3-6 months	13,015,775	0.46	0.04
6-12 months	8,119,240	0.67	0.03
Deposits from customers			
Up to 1 month	44,491,826	0.08	0.02
1-3 months	7,103,520	0.17	0.01
3-6 months	1,103,307	0.42	0.00
6-12 months	1,010,446	0.83	0.01
1-5 years	56,969	4.50	0.00
Over 5 years	1,286	6.30	0.00
Derivatives and other financial liabilities	157,140	0.00	0.00
Valuable papers			
Up to 1 month	2,620,540	0.08	0.00
1-3 months	4,127,886	0.17	0.00
3-6 months	4,509,616	0.42	0.01
6-12 months	4,951,659	0.83	0.03
1-5 years	1,286	3.40	0.00
Over 5 years	3,000,000	5.80	0.11
Other liabilities			
Up to 1 month	12,281,374	0.08	0.01
1-3 months	5,073,150	0.21	0.01
3-6 months	95,611	0.42	0.00
6-12 months	42,719	0.83	0.00
Total	163,800,133		0.32

In the following part, the bank's interest rate risk exposure will be indicated and discussed based on the result of the risk measurement.

4.4.2.3 Interest Rate Risk Exposure

IRR exposure can be considered as the result of IRR measurement. Depending on the income or duration gap analysis, the ALM unit can draw the bank's IRR exposure from which the plan for adjusting balance sheet in the future can be mapped after combining with market and yield curve forecast and the government's relating policies and regulations. As the following, the bank's IRR exposure is generated from its IRR measurement. (Trading and Capital-Markets Activities manual 1998; Williamson 2008.)

As measurement result, the bank can be described as sensitive asset and can maintain it in many years, during which its assets will re-price faster than its liabilities. In that case the RSA is reinvested until the time RSL mature. Therefore, the bank will gain increase in NII as interest rate increase during the time due to the interest incomes more than interest expenses. On the other hand, the bank would experience IRR if interest rate was falling during the period as interest earning from reinvested RSA is lower than interest to be paid for RSL.

The bank also suffered from its balance sheet structure before 2009, in which the short-term deposits were used to fund the short-, middle- and long-term loans. It means that interest income was mainly contributed by middle- and long-term loans while short-term deposit was the main source which accounted for interest expense. Indeed, the highest interest income is from RSA account with maturity under 1 year. In the other side, interest expense is mainly required by RSL account with maturity with 1 month. As known from the disadvantage of the old balance sheet structure ,since 2010, the situation when the bank tried to raise long-term deposits in order to eliminate the negative influence of IRR.

In addition, it is also known the bank's IRR exposure by comparing net interest margin (NIM) via each year (see Figure 17). From that, it also reveals the efficiency in risk management of the bank in general, and particular IRR management. The gap

indicates that the efficiency in management of the bank has been improving through the years. Especially, 2009 is the most efficient year comparing to others. (Eximbank 2007-2011.)

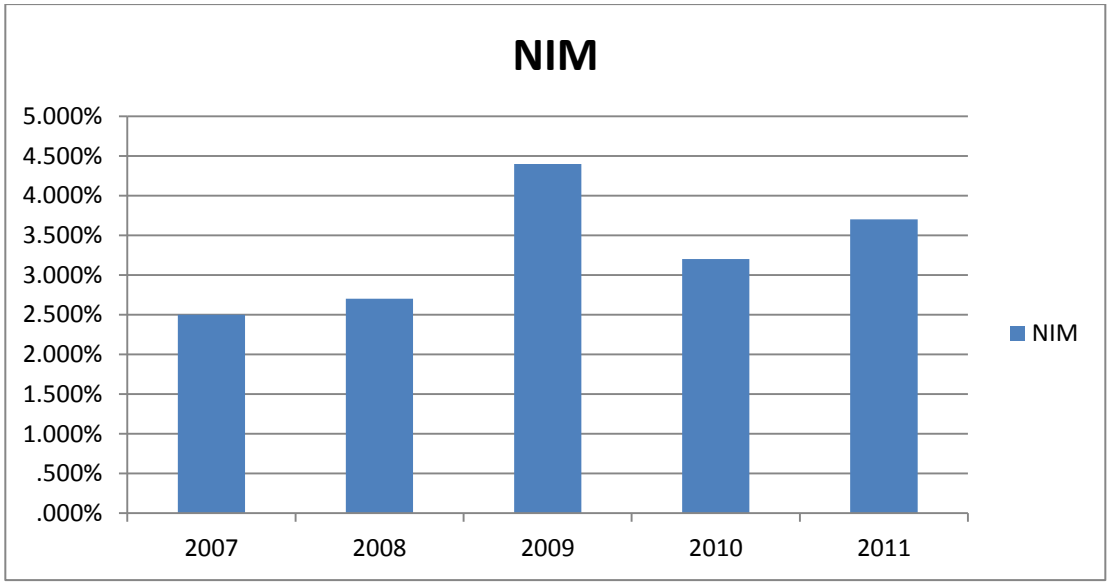


Figure 17. The case bank's net income margin from 2007 to 2011. (Eximbank 2007-2011)

In the next section, it will come up with simulation of IRR which evaluates the change of NII in different scenarios of interest rate. Simultaneously, with that result the ALM unit can build the future balance sheet to match with targeted objectives.

4.4.2.4 Interest Rate Risk Simulation

After IRR measurement, the managers come to the simulation step which according to the interviews is usually finished by senior managers of the ALM unit based on the reports from their staffs. With relating to income gap analysis, the focus of simulation model is to measure IRR's effect to target NII by mapping the future yield curve depending on forecasting the SBV's policies, projecting the composition of balance sheet, applying different interest rate scenarios, and then comparing risks and returns in each situation as well as forecasting potential losses assumed by the bank. The

interviewees said that simulation model is considered an improved step of gap analysis. For instance, the gap analysis only assumes the interest rate change in the same direction. On the other hand, simulation model can handle several different interest rate fluctuations including various profit-curve shapes. Besides, the model is calculated to be based on the market value of assets and liabilities, while the gap analysis is dependent on book values. Briefly, it can be summarized that simulation model can present the risk based on meaningful and clear assumptions to the managers. From its results, the risk and income under different interest rate scenarios are displayed on calculation of changes of net interest income and its present value. (Dao 2012; Tran 2012.)

According to Decision No. 121/2007/QD-HDQT, the simulation model is computed based on the designed software on a computer, in which a series of calculations with a range of scenarios and assumptions are performed. With the results from reports, the managers of ALCO inputs the data bank's current status, future interest rate fluctuation assumptions, the behavior of customers, and new business activities to generate a simulation model that indicates expected future cash flows, income and assets and liabilities of the bank to be replaced. In addition, at the moment, the ALM unit senior managers just process IRR simulation for maturity period under 5 years. It is legally mentioned in the Decision No. 121/2007/QD-HDQT that the bank will not rely on those analysis to deal with the IRR associated with longer term re-pricing imbalances due to complex of the financial market and lack of analysis methods. (Eximbank 2007.)

In order to clarify this issue, a simulation model for year 2012 will be conducted by the author based on the data of 2011 and other assumptions as the following. Firstly, the book values of rate sensitive assets and liabilities in 2011 are illustrated in Table 13. Besides, in order to calculate the impact of IRR on present value of stakeholder's equity, the book values of assets and liabilities are necessary to change to market value (see Table 14). Finally, it is assumable that in the first half of 2012 the mobilizing rate would increase 2% to "up to 1 month", and decrease 1.5% to "1-3

months", "3-6 months" and "6-12 months" maturity frames, and decrease 0.5% to bucket with maturity from 1 to 5 years. In the perspective of lending rate, the market rate tends to decrease 2% to all accounts with "under 1 year" maturity, and 1.5% to the remaining. Consequently, the figures will change as Table 15.

Table 13. The case bank's RSA and RSL book value in 2011. (Eximbank 2011)

	Up to 1 month	**1-3 months**	**3-6 months**	**6-12 months**	**1-5 years**	**Total**
Assets						
Balance with the SBV	2,166,290					
Due from and loans to other bank	28,825,637	21,419,327	11,589,341	2,394,740		
Loans and advances to customers	35,512,713	29,465,503	5,426,299	2,927,361	118,904	
Investment securities	2,780,032	4,100,000	4,279,859	8,732,027	3,119,997	
Total assets	**69,284,672**	**54,984,830**	**21,295,499**	**14,054,128**	**3,238,901**	**162,858,030**
Liabilities						
Borrowings from the Governmen t and SBV	1,292,844		19,513			
Due to and borrowings from other bank	24,795,351	25,948,588	12,996,262	8,119,240		
Customers deposit	44,491,826	7,103,520	1,103,307	1,010,446	45,858	
Issuing valuable papers	2,620,540	4,127,886	4,509,616	4,951,659	1,286	
Other liabilities	12,281,374	5,073,150	95,611	42,719		
Total liabilities	**85,481,935**	**42,253,144**	**18,724,309**	**14,124,064**	**47,144**	**160,630,596**

Unit: million VND

The following tables will illustrate the case bank's RSA and RSL market value in 2011 and their changes according to the predicted interest rate scenarios in 2012.

Table 14. The market value of RSA and RSL of the case bank with the indicated rate (Eximbank 2011)

	Up to 1 month	1-3 months	3-6 months	6-12 months	1-5 years	Total
Assets						
Rate	**6%**					
Balance with the SBV	2,164,562					
Rate	**6%**	**14%**	**14%**	**15.50%**		
Due from and loans to other bank	28,802,637	20,956,641	11,094,059	2,201,670		
Rate	**6%**	**14%**	**14%**	**15.50%**	**16%**	
Loans and advances to customers	35,347,555	29,081,940	5,194,401	2,659,224	76,177	
Rate	**8%**	**8.50%**	**8%**	**9%**	**10.50%**	
Investment securities	218,556	4,017,227	4,131,524	8,303,916	2,430,796	
Total asset	**66,533,310**	**54,055,809**	**20,419,983**	**13,164,810**	**2,506,973**	**156,680,885**
Liabilities						
Rate	**13%**		**13%**			
Borrowings from the Governmen t and SBV	1,279,743		18,450			
Rate	**17%**	**18%**	**18.50%**	**19.00%**		
Due to and borrowings from other bank	24,473,050	25,000,016	12,023,499	7,230,207		
Rate	**18.5%**	**19%**	**19.50%**	**20.50%**	**21.50%**	
Customers deposit	43,866,909	6,900,530	1,024,377	865,016	19,091	
Rate	**18.00%**	**18.50%**	**19.00%**	**20%**	**22%**	
Issuing valuable papers	2,584,643	4,012,743	4,194,321	4,253,695	654	
Rate	**16%**	**15.50%**	**18%**	**19%**		
Other liabilities	12,130,409	4,923,113	89,239	36,954		
Total liabilities	**84,334,756**	**40,836,401**	**17,349,887**	**12,385,872**	**19,745**	**154,926,660**
Gap	**(17,801,445)**	**13,219,408**	**3,070,096**	**778,938**	**2,487,228**	**1,754,224**

Unit: million VND

Table 15. The market value of RSA and RSL in case of interest rate change according to indicated assumption. (Eximbank 2011)

	Up to 1 month	1-3 months	3-6 months	6-12 months	1-5 years	Total
Assets						
Rate	8.0%					
Balance with the SBV	2,164,007					
Rate	8.0%	12.5%	12.5%	14.0%		
Due from and loans to other bank	28,795,263	21,002,955	11,143,148	2,218,523		
Rate	8.0%	12.5%	12.5%	14.0%	15.5%	
Loans and advances to customers	35,294,737	29,120,485	5,217,385	2,682,500	77,170	
Rate	10.0%	7.0%	6.5%	7.5%	10.0%	
Investment securities	210,608	4,031,233	4,158,093	8,371,311	2,458,513	
Total asset	**66,464,616**	**54,154,673**	**20,518,626**	**13,272,333**	**2,535,683**	**156,945,932**
Liabilities						
Rate	11.0%		11.0%			
Borrowings from the Governmen t and SBV	1,281,649		18,602			
Rate	15.0%	16.0%	16.5%	17.0%		
Due to and borrowings from other bank	24,508,239	25,096,357	12,117,669	7,312,370		
Rate	16.50%	17.00%	17.50%	18.50%	20.00%	
Customers deposit	43,929,177	6,920,051	1,031,606	877,165	20,188	
Rate	16.0%	16.5%	17.0%	18.0%	20.5%	
Issuing valuable papers	2,588,328	4,024,143	4,224,047	4,313,691	682	
Rate	14.0%	13.5%	16.0%	17.0%		
Other liabilities	12,148,003	4,941,061	89,877	37,480		
Total liabilities	**84,455,396**	**40,981,612**	**17,481,801**	**12,540,706**	**20,870**	**155,480,386**
Gap	**-17,990,780**	**13,173,061**	**3,036,825**	**731,628**	**2,514,813**	**1,465,547**

Unit: million VND

Regarding the result from Table 14 and 15, the changes of market value of assets and liabilities can be summarized as the following (see Table 16).

Table 16. Change in market value of assets and liabilities of the case bank in 2011.

Assets	**Change**
Balance with the SBV	(555)
Due from and loans to other bank	104882
Loans and advances to customers	32980
Investment securities	127739
Total asset	265047
Liabilities	
Borrowings from the Government and SBV	2058
Due to and borrowings from other bank	307862
Customers deposit	102264
Issuing valuable papers	104835
Other liabilities	36706
Total liabilities	553726
Gap	(288677)

Unit: million VND

It can be seen that if the interest rate changed according to the indicated scenario in the year 2012, the market value of the bank's income would decrease 288677 million VND. Moreover, the market value of stakeholder's equity would also decrease 0.19 million VND.

In conclusion, the ALM unit will plan scenarios that change of interest rate will be decided based on the report of regulated policies forecast. Later, the managers will narrow the most possible scenarios of interest rate to calculate the changes in market value of assets and liabilities. In the following, the result of the changes in market value is combined with the business scenarios, the bank's business status, and target variables such as income to make decision on restructuring balance sheet in order to obtain objective. Besides, the business targets of the bank such as investment, lending and mobilizing activities will be set and transferred to relevant department. Although

the simulation model of the ALM unit has some advantages, but it also reveals some weaknesses need to be improve. Firstly, the simulation model is computed on each maturity bucket. It tends to make difficulty for managers when they set targets for each deposit or loan's maturity such as 1, 2, or 3 months. Secondly, the managers also meet difficulties in deciding purchasing or selling government bonds, value papers or derivative instruments in the financial market because the simulation model does not indicate the change of their market value as changes in interest rate.

4.4.2.5 Interest Rate Risk Hedging

After examining the effects to other banking risk such as credit, IRR hedging strategies for particular situation will be formulated from the IRR measurement's result and IRR simulation's plan to obtain objective figures such as NII, cash flow, etc (Bessis 2002). According to Decision No. 121/2007/QD-HDQT, there is currently on-balance sheet adjustment method is used to overcome the risk, including buying and selling assets, changing liabilities structure, re-pricing financial assets and liabilities, or alter and mix the volume balance sheet components (Eximbank 2007).

As indicated in the bank's IRR exposure, the bank experienced itself asset sensitive balance sheet. Therefore, if the bank faces a falling interest rate environment, the ALM unit can alter the volume of accounts on its balance sheet in order to protect its NII. According to the interviews, the bank lengthened the maturity structure of its assets, while its liabilities' maturity structure is shortened. On the other hand, during an upward interest rate environment, the bank was on point of vantage. At that time, its assets were shortened and its liabilities might be remained or lengthened in order to maximize its NII. Besides, the bank overcame the risk by re-pricing strategies. In order to hedge the risk effectively, the short-term deposit rate was increased, while the long-term loan rate was remained or increased. (Dao 2012; Tran 2012.)

The bank in study obviously obtains one effective technique to improve the asset sensitive balance sheet as it makes short-term deposits to the central stated bank or

other financial institutions to reduce the interest expense paid for the account "deposits from customers" in the maturity of under 1 month.

As can be seen from this research, the observed bank certainly has done well to obtain positive balance sheet. However, the negative gap in "under 1 month" maturity frame could arise when raising deposit interest rate competitions. In order to reduce the effect of this problem and achieve the positive gap, it is crucial that the mentioned bank have to upgrade the credit quality to reduce giving acceptances for customers associated with bad debt because it also accounts for a specific amount to IRR. In fact, the bank has changed its potential and focused on the customers from state-owned enterprises with long term finance and at a corporate interest rate to small and medium enterprises at a variable interest rate to diversify its credit products. In addition, with the support of internal credit rating system, it hopes that the credit risk, as well as IRR will be reduced significantly.

As concerned the liability side, diversifying the maturity of customers' deposit as well as mobilizing the fund from interbank market are proved to be an effective strategy to maintain the growth objective of the investigated bank. Actually, improving the relationship with existing customers and attracting more potential ones is significantly important at the moment.

Currently, the bank's head office has communicated the main goals and objectives to each branch with the aim to achieve the consolidated balance sheet. Also, the ALCO are trying aggressively to control the IRR to ensure the consistent growth in net interest income. Implementing on-balance sheet hedging method is popular in Vietnamese financial market. However, it is costly and complicated in calculation. Therefore, derivative instruments can be seen as alternative solutions for IRR hedging. However, it is in the development stage. (Dao 2012; Tran 2012; The SBV 2012.)

As the matter of fact, until now there have been just a few commercial banks using derivative instruments to overcome IRR as well as to protect their NII in the Vietnamese financial market. The case bank is one of the first commercial banks which are offered licenses to implement derivative instruments by the SBV since 2000. However, through the years this activity is still in a trial period which is shown by insignificant revenue and low number of transactions. In addition, due to the bank's nature of business supporting export and import activities, it is only foreign exchange option available. With the above situation, a question has been rising why derivative instruments are undeveloped in banking industry. (The SBV 2012.)

The first to mention is the lack of demand from the bank. It can be explained that although the derivative instrument is not new in the Vietnamese financial market, it exposes many risks because it is still immature and lack of interest in developing by the government and financial institutions themselves. Therefore, the observed bank did not want to make transaction; as known the advantage of those instruments in protection against the floating interest rate, especially in the rate volatility period. Moreover, there is no particular division of responsibility in the bank's board of managers. As a result, the fear of responsibility appears in managers in controlling derivative instruments because their decisions affect significantly to the bank's profit. (Dao 2012; Tran 2012.)

Secondly, the government's legal regulation for derivative instruments used to reduce IRR is not sufficient. In recent years, the SBV has allowed the commercial bank to implement such new business activity - interest rate swap which regulated in Decision 1133/2003/QD-NHNN signed in September 30 2003. However, the regulation for interest rate future, forward, and option have not been paid attention until now. The issue also means that financial institutions have freedom in those transactions without any protection from the government. In addition, the unreasonable of some regulations restricts development of derivative market. For instance, the tax applied for interest rate swap is not clarified in specific situations; hence it is difficult to determine which tax would be used due to floating rate

changing every day. To the case of future contract, the concerned profit will be taxed; while if enterprises get losses, it is not deducted into taxed income. This caused many disadvantages for the participants of derivative transactions because in developed countries, derivative instruments are used as tools for enterprise including financial institutions to overcome risk, rather than a product offered by only banks. (Dao 2012; Tran 2012.)

Finally, the knowledge and experience in the fields is limited. Therefore, in spite of existing for a long time, derivative instruments are considered as new and complicated products in the Vietnamese financial market. Moreover, the complicated requirements in developing derivative instruments are generally a barrier. It is because it is necessary for enterprises as well as financial institutions having a forecast system to predict interest rate yield curve, along with suitable IRR measuring methods, and experienced managers and employees in this field. (Dao 2012; Tran 2012.)

In conclusion, from the above mentioned reality relating to implementation of derivative instrument in hedging IRR, it can be derived some suggestions which will be mentioned in the next part – conclusion.

4.5 Internal Controls and Independent Audits

An internal controls and independent audits are considered as the crucial step in making sure that the management of interest rate risk is effective and comply with the policies regarding the risk management. In this part, the audit process and the internal control process of the case bank are presented and assessed based on the benchmark criteria. (Basel 2004, 19.)

4.5.1 Independent Audits

An internal control process with the ALM unit is necessary to ensure the effectiveness of IRR management (Basel 2004, 19). According to the Decision No.

121/2007/QD-HDQT, the independent audits of the investigated bank include the steps (see Appendix 6) in order to assess the reasonableness and validity of scenarios and assumptions and the validity of the calculation of measuring and simulating risk methods.

In relation to the information in the interviews with the two senior managers, there are the following assessments. The ALM unit has its own internal control system separated from the Risk Management sub-committee. As mentioned, the ALM meeting is a place where old policies are reviewed whether obtaining the objects or not, and new policies and procedure will be established, in which policies directly associate with investment, lending and mobilizing activities which usually change once per months, or even every day such as the interest rate in interbank market. On the other hand, the policies relating to technique, procedure, and etc of IRR management are evaluated and updated once per year. As evaluated in preceding sections, the bank does not have adequate process for identifying and evaluating IRR because there are only income gap analysis applied and on-balance sheet hedging method implemented. (Dao 2012; Tran 2012.)

In addition, according to the senior manager from Finance department, the ALM unit does not currently have enough information, as well as technologies to generate proper duration gap analysis to offset the cons of income gap. In addition, the current IRR simulation method has some disadvantages that do not assess and quantify different kinds of bonds, value papers, etc and their maturity in order to contribute to restructure balance sheet. Along the simulation process, the forecast for potential loss is also taken into account. However, the unit does not pay much attention to stress test due to dependence on security and support from the SBV. (Tran 2012.)

4.5.2 The Interest Rate Risk Limits

IRR limit is a set of numbers that are established to regulate reasonable risk limits with the bank's risk tolerance. They are based on the amount of capital and income

situation and risk tolerance limits. These limits should be appropriate to the bank's business scale, complexity and efficiency of bank capital. (Trading and Capital-Markets Activities manual 1998, 4.)

The Decision No. 121/2007/QD-HDQT regulated that the IRR limit had to cover the risk to income, and gap limit. Income risk limits are set to control the risk of income depending on the defined future period and the interest rate scenarios. The Gap limits is proposed to reduce the revenue' risk of banks from any change in interest rate. In addition, they aim at controlling volume or re-pricing amount of assets and liabilities in such a period. (Eximbank 2007.)

These limitations are usually conducted as a fraction of interest rate-sensitive assets by interest-sensitive liabilities in a defined period. Actually, the figure which is greater than 1 indicates that the bank is in interest rate-sensitive assets and its re-pricing assets are certainly much more than its re-pricing liabilities. On the other hand, if the rate of RSA/RSL is lower than 1, it means that the banks incur interest-sensitive liabilities and their revenues could diminish as interest rate enhances. (Eximbank 2007.)

Besides, the varieties of other Gap limits that banks can employ to manage their risks include Gap/total assets, Gap/total liabilities. (Eximbank 2007.)

In conclusion, the bank seems to have an adequate IRR limit's policy that fulfills its role as tools minimize IRR exposure regarding earning protection. In this sense, the limits are established for the risks on earning which mainly focuses on immunizing its NII from mismatch of rate sensitive assets and liabilities. However, the bank has forgotten another impact of IRR which is economic value. Since the case bank is a joint-stock commercial bank, IRR effect on the bank's economic value should be assessed carefully and properly in the future.

4.5.2.1 Interest Rate Risk Reporting

IRR reporting is considered as a bridge used to link different members who have different tasks together (Choudhry 2011). As mentioned in Decision No. 121/2007/QD-HDQT, the reporting process is implemented according to the decision-making process (see Figure 10) in section 4.2. Depending on the nature of the issues, the different kinds of reports will be sent to managers in different time. For instance, the updating of the interest rate in the interbank market and actions of other banks will be sent to CEO every day. Next, the gap report, IRR exposure report, simulation and scenarios report, profit and return analysis, cost and return of capital are generated monthly and sent to the ALM unit meeting. Finally, the summarized IRR reports, IRR exposure, IRR management strategies, and review of IRR policies, procedures should be submitted to the board of managers at least quarterly. (Eximbank 2007.)

In addition, the Decision also regulated the reports to meet the following requirements that allow managers to measure the levels and trends of integrated interest rate risk. Then they can evaluate the IRR under main assumptions that contain the business and interest rate scenarios. Besides, these assumptions are consistent with changes in profit curve shape or in speed of previous loans' payment and withdrawals before maturity. Finally, the ALM unit managers are able to assess the correlation between the levels of risk and the implementation. When the managers consider about primary interest rate risk strategies, they should evaluate the effect of potential risk (the reversal interest rate fluctuation) as opposed to the effect of potential income. (Eximbank 2007.)

In conclusion, it can be seen that the ALM unit reporting system meets the international requirements mentioned in section 2.4.1.3.

5 CONCLUSIONS AND ASSESSMENT

Since interest rates had been kept in stable levels by the Central bank to encourage credit development for a long time, the lack of plans providing against the interest rate risk led to undesired results in the Vietnamese banking industry. Hence, the risk management is considered as the prior issue at the moment. By introducing and evaluating the interest rate risk operations at a Vietnamese joint-stock commercial bank, the researcher has successfully fulfilled the research objectives.

Briefly, interest rate risk is one of the financial risks assumed by banks. The risk occurs when there is a mismatch between re-pricing assets and liabilities. It is formed in four types – basis, yield curve, re-pricing and optional risks. Interest rate risk has significant impact on banks' short- and long-term value (earning and economic value), especially commercial banks whose main revenues rely on investment, and mobilizing and lending activities. Due to its impacts, the interest rate risk management should be considered in proper manner. The well-established structure of the risk management unit, the unit's personnel, a set of policies concerning to the risk, the reporting of the risk measurement, simulation, hedging, risk and return, and the risk limits should be taken into account. In addition, the crucial role of regulatory environment imposed by the Central Bank in managing interest rate risk cannot be ignored. The aim to this thesis is definitely not to introduce the theories to the audience, but crucially to use the theories as a foundation for the assessment of the effectiveness of the interest rate risk management actual accomplishment replied on the existed benchmarks.

In the case bank, the interest rate risks are mainly exposed in two forms – re-pricing and yield curve risks. Although, the importance of the risk in the financial market has been rising for many years, it is currently managed by a small unit from non-credit risk management department. As interest rate risk management of the case bank has been developed in recent years; hence it still confronts many difficulties such as irrational monetary and fiscal policies of the Central Bank, significant influence of

competitors in interest rate market, lack of smoothness in co-ordination between mobilizing, lending, and overdue interest rate policies, and defects of these policies. In addition, the disadvantages of current measuring, simulating, and hedging interest rate risk methods are also difficult for the risk management of the case bank.

In regard to the assessment of the efficiency, the investigated bank's interest rate risk management resulted in the average level because of the following reasons. Firstly, the managers understood logically many main aspects associating with interest rate risks. They reacted properly to any change in the market situation. However, sometimes the lending and overdue interest rate policies were not updated in time. In addition, it can be seen that the knowledge concerning the issue fully exists in senior level in the risk management unit. Meanwhile, the lower levels exposed inadequate interest rate risk management knowledge. Next, although the limit ratios were based on the international standards, they were inefficient at the beginning periods because they put the bank in risky position. Besides, the structure of balance sheet posed unbalancing situations for accounts with maturity time under 1 month. Finally the risk measurement, simulation and hedging methods to support have small defects but they reveal the scale and complexity of risks inside and outside the bank's balance sheet, the changes of interest rate in variety of logical interest rate scenarios, and the suitable hedging method in obtaining good risk and return. However, lack of other methods in measuring, simulating and hedging the risk reduced the bank's competitive advantages against its competitors in the financial market, especially foreign banks who have adequate and efficient interest rate risk management process.

In brief, the case bank exposes quite good interest rate risk management process. However, there are still existing areas to be improved. This thesis will conclude with some constructive recommendations for the State Bank of Vietnam, the investigated bank, and further studies.

5.1 Suggestions for the State Bank of Vietnam

As indicated through this thesis, the regulatory policies issued by the SBV are one of the sources causing interest rate risk to Vietnamese credit institution. The following constructive suggestions aim to reduce the downsides in the current policies. At first, the SBV should operate policies concerning money as well as interest rate flexibly and carefully in order to create convenient macro-economic environment for credit institutions' operations. Moreover, the inflation rate should be controlled efficiently. In addition, the SBV should minimize the use of administrative intervention therapies toward the market to avoid shocks or increase the risks for credit institutions. Instead, the market instruments such as open market operations should be used to control the financial market.

Next, the SBV needs to make the domestic financial market more transparent. Hence, they should focus on inspection, supervision strictly the activities relating to real estate loans, consumer credit, investment lending, security trading, investment, and financial support for projects. In addition, the SBV should build the policies which encourage commercial banks to borrow from each other on the interbank market before approaching the capital of SBV.

Besides, market research concerning the reactions of the financial participant (including individuals and businesses) against many changes in the SBV's decisions, policies regarding monetary and interest rate should be implemented in order to identify the effect of those policies to the market.

Finally, the SBV should increase supporting the interest rate risk management in commercial banks through training courses that introduce experiences of the risk management in domestic and foreign banks. Besides, the information system CIC needs to be improved for the purpose of supporting commercial banks to obtain sufficient information about customers so that the decision-making on lending will become easier.

5.2 Suggestions for the Case Bank

It is significant that the case bank should have an adequate and efficient interest rate risk management model that is suitable to the bank's business capacity. During reviewing process, the bank has some good points that are appreciated, but there are still others necessary to be ameliorated.

The first thing to be mentioned is the source of information contributing in making interest rate decision. The unit's managers are strongly influenced by the actions of competitors, instead of solving customer's constructive opinions and needs. Actually in the period of economic recession and liquidity crisis in banking industry, loyal customers will contribute to protecting the bank's profit and economy value. Therefore, the bank should share win-win position with customer and accompany them overcome the risk.

Next, the information technology system should be improved in supporting employees in collecting data and making report with dedicated software. Moreover, the ALM unit should increase the amount of staff that is consistent with the importance of managing interest rate risk. Besides, specific defined and required standards should be introduced in order to reduce mistakes caused by staff's calculation skill and to make internal audit more efficient.

The third thing needed to be improved is all the policies regarding interest rate risk management activities which should be updated simultaneously. For instance, the lending, overdue and mobilizing interest rate policies must be consistent and supportive together. Sometimes due to only paying attention to the deposit interest rate racing, the lending rate was lower than the mobilizing rate. Or the loan rate was higher than the overdue rate, which created bad debt for the bank because borrowers tended to pay their overdue fine.

In addressing recommendations for employees, the staff training course about the interest rate risk should be developed in appropriate quantity and quality. Every

employee should be trained with basic knowledge about banking risks in general. Moreover, each risk such as interest rate and credit risk is necessarily understood by the relevant employee clearly. Besides, the whole process in which these risks are managed should communicate to them. This thing will aid employees to comprehend each other's task so that reporting will be in a consistent and understandable way. Furthermore, cross-check is able to make between the members in the unit before official submitting. In addition, the unit employees should change their attitude toward the training if there is lack of enthusiasm.

Concerning the unit's managers, they need to change their conception about team-work. Ideas and opinions of all members in the unit should be welcomed and commented so that they can study and improve knowledge and experience together, and the quality of final decision will be improved. Besides, they can collaborate with relevant units to organize many courses of assessment, measurement and risks analysis for staff frequently.

Regarding the interest rate risk measurement, simulation, calculation and evaluation should be based on each maturity such as 1 month, 5 months, 1 year, or 2 years, instead of grouping them into maturity bucket so that the results are more accurate and managers can easily make proper decision for each financial instrument in assets and liabilities. In addition, IRR measurement must evaluate the impact of interest rate fluctuation on the bank's economic value by applying duration gap analysis. Besides, the simulating method does not still measure IRR on bonds, valuable papers, and derivative instruments. According to the experience of some international banks (Barbican consulting 2013), the basic value point method is considered as a tool to fix this gap. It is usually used by many big banks to measure the interest rate risk associated with swap instrument, bond portfolios and money market books.

Due to high cost and complication to calculate on-balance sheet hedging, the implementation of derivative instruments in the risk hedging is highly recommended to apply. Firstly, the bank can start with some available instrument in the market. The

bank can start with other banks in the financial market and then apply to corporations and individual customers. Besides, along with trainings relating to the issue for employee, conferences are held to introduce this kind of financial tools in protecting the customer's profit. Finally, the whole process of each instrument is examined in order to find out the points needed to be improved.

As mentioned, the balance structure of the bank has problems that deposits are used to fund for long-term loans. It is not able to create long-term funding products at the moment because the bank cannot offer more interest rate. A suggestion is offered that it can attract long-term deposits via the pension fund channels.

Next, a recommendation for the bank is that it should not rely too much on the SBV. The limit ratios must be in a scale that is consistent with the bank's business capacity, and capital. In addition, the bank should implement a strict credit approval process to build a disbursement plan relatively accurate. Also, it is recommended that a good relationship with customers be established in order to correctly forecast possibility of withdrawal or possibility of repayment capacity of clients to predict the liquidity of the bank more efficiently. Besides, preparing reasonable investment structure should be paid attention. Along with focusing on traditional banking sectors, it is necessary to expand into other areas to minimize the risks brought by external factors.

Finally, a sustainable banking system is required the contribution of all participants. Therefore, the bank should actively provide the detailed information about customers, the business situation of customers as well as customers' balance sheet to the SBV in order to attain more accurate network information (CIC). The reason for this issue is that if one member meets problems, the whole system would be in crisis.

5.3 Suggestions for Further Studies

Interest rate risk and liquidity risk management is a new topic in the Vietnamese financial market. Therefore, the banking system is facing the problems of limited experience in the risk management procedures, lack of information technologies in

collecting, processing data, and evaluating the result for decision-making. In addition, challenging economic environment, non-transparent legal and regulatory environment are the factors that make the risks management inefficient. A further research will be in macro level. It means the future research will be conducted with all commercial banks including domestic and foreign banks participating in the Vietnamese financial market. As a result, the released research results may be different from this thesis's because it reflects the practice in managing the risk in the whole system. In addition, the gaps and deficiencies in the legal systems and policies relating to the issue will be analyzed significantly and detailed. Besides in sense of tendency to comply international standards (Basel), there are more methods and tools used in measuring and simulating interest rate risk are going to be introduced. Furthermore, some solutions for implementing derivative instrument in hedging the risk will be offered in a manner that is suitable for nature of the financial market.

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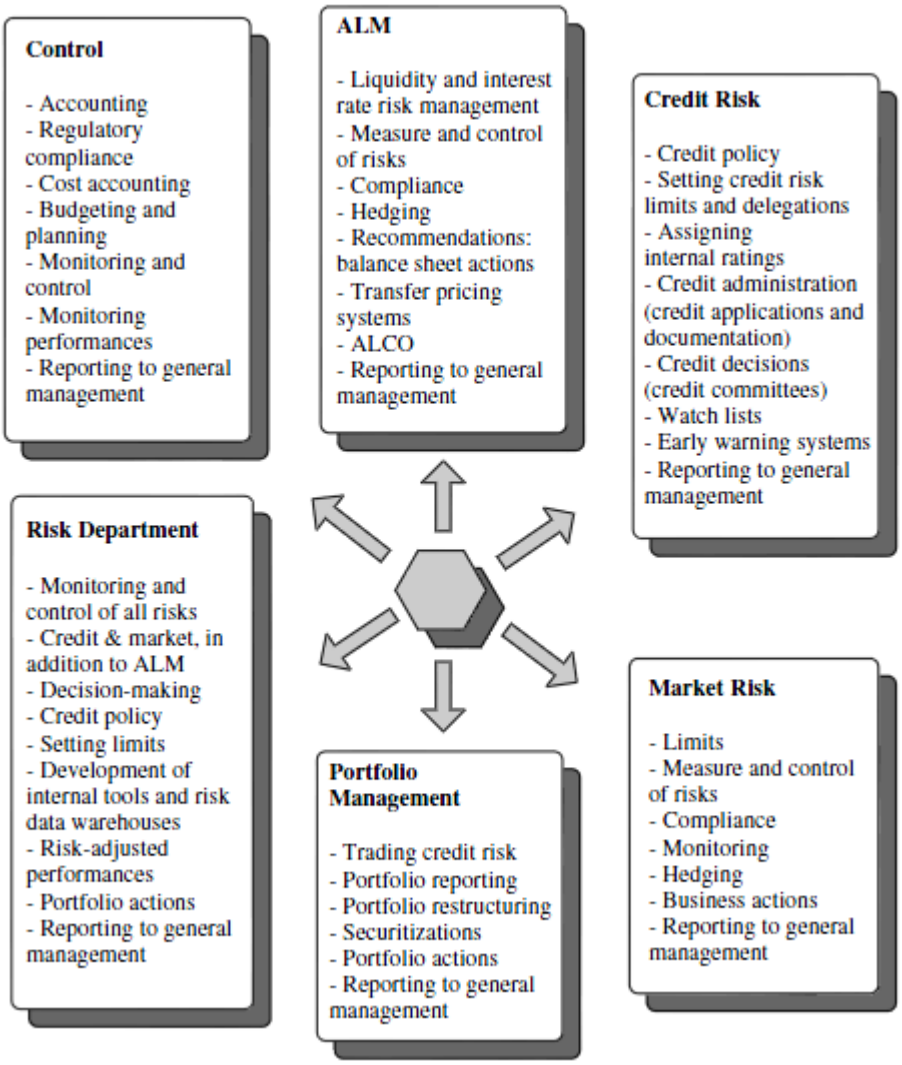
APPENDIX 1

Functions of central units of the risk department (Bessis 2002, 69)



APPENDIX 2

Income gap analysis equation (Oracle Finance 2008, 4)

Interest – sensitive ratio = rate sensitive asset / rate sensitive liability (1)

Gap ($) = RSA ($) – RSL ($) (2)

Δ NII = Δ r * Gap ($) = Δ r * (RSA ($) – RSL ($)) (3)

Where

Gap ($) = maturity gap

RSA ($) = rate sensitive asset

RSL ($) = rate sensitive liability

Δ NII = the change in net interest income

Δ r = the change in interest rate

APPENDIX 3

Duration gap analysis equation (Oracle Finance 2008, 4)

$$DURgap = DURa - (\frac{L}{A} * DURl) \quad (4)$$

$$\frac{\Delta \mathrm{NW}}{A} = -DURgap * \frac{\Delta \mathrm{r}}{1+r} \quad (5)$$

Where

- DURgap: duration gap
- DURa: average duration of asset
- DURl: average duration of liability
- L: market value of liability
- A: market value of asset
- ΔNW: change in net worth
- Δr: change in interest rate
- r: interest rate

APPENDIX 4

The reserve ratio issued by the SBV in the period 2007-2011 (The SBV, 2012)

Applied Date	**Decision Number**	**Deposit in VND**	
		Non-term & below 12 months	**Up to 12 months**
06/01/2007	1141/QD-NHNN	10%	4%
02/01/2008	187/QD-NHNN	11%	5%
12/01/2008	2811/QD-NHNN	8%	2%
12/05/2008	2951/QD-NHNN	6%	2%
05/11/2008	2560/QD-NHNN	10%	4%
24/02/2009	370/QD-NHNN	3%	1%
01/03/2009	379/QD-NHNN	3%	1%
01/02/2010	74/QD-NHNN	4%	2%
01/05/2011	750/QD-NHNN	3%	1%
01/06/2011	1209/QD-NHNN	3%	1%
01/09/2011	1925/QD-NHNN	3%	1%

APPENDIX 5

The case bank's balance sheet structure (Eximbank's financial reports 2007-2011)

Asset		**Liabilities and shareholders' equity**	
Cash and precious metals		Due to Government and borrowings form the SBV	
Balances with the SBV		Deposits and borrowings from other credit institutions	
Placements with and loans to other credit institutions		Deposits from customers	
Trading securities		Derivatives and other financial liabilities	
Derivatives and other financial asset		Funds received from Government, international and other institutions	
Loans and advances to customers		Certificate of deposits	
Investment securities		Other liabilities	
Investment in other entities and long-term investment		**Total liabilities**	
Fixed assets		Shareholders' equity	
Other assets		**Total shareholders' equity**	
Total Asset		**Total liabilities and shareholders' equity**	

Unit: million VND

APPENDIX 6

The ALM unit internal audit process (Eximbank 2007)

Step 1	Reviewing the historical issues relating to the risks assumed by the bank. The previous IRR inspection reports, the latest IRR assessment profile are used in this step
Step 2	Defining the current IRR profile of the bank by review the following documentations • The previous quarter IRR profile • Income statement and balance sheet • A list of investment details and balance sheet account since the latest inspection • The latest ALCO meeting records
Step 3	Reviewing the historical documents containing the similar interest rate and business scenarios to the prevailing status to find out the moving trend of interest rate, and income margins Analyzing trends in volume, interest rates, and a mixture of financial instruments in balance sheet to address whether any significant changes in the portfolio of the bank Assessing the potential loss
Step 4	Conducting gap analysis reports, simulation model report, the confirmed the validity of the model report
Step 5	Discussing between the ALM unit managers about below issues: • The efficiency of IRR measuring, simulating and hedging methods • Changes in IRR management strategies • The efficiency of the ALM unit organization, human resources

APPENDIX 7

INTERVIEW QUESTIONS

General questions:

1. Nowadays interest rate risk is considered as the most important risk should be managed after credit risk in Vietnamese financial market, especially in the period after 2007. What is the interest rate status in the market during this period?
2. What are the forms of interest rate risk exposing to your bank?
3. What is the impact of IRR on your bank?
4. What kind of services (financial instruments) directly and indirectly suffered interest rate risks?
5. What is the interest rate risk exposure of your bank?

Questions regarding interest rate risk management implementation in the bank:

1. Does your bank have asset and liability committee which manages liquidity risk and interest rate risk? If yes, pleased describe the structure and decision-making process of the bank's ALCO.
2. What is the source of information using in conducting IRR management policies?
3. In practice, are those policies reviewed and improved? How often do you assess the effectiveness of them?
4. What is the main content of the bank's IRR management policies? In your opinion, do you think they are adequate and efficient in dealing with IRR in Vietnamese financial market?
5. It is known that the State Bank of Vietnam uses interest rate as a tool to control the financial market, could you indicate and explain which policies of SBV influence on the bank's IRR management policies?
6. How do the policies communicate with the bank's ALCO members?

7. What tools do you use in measuring, simulation, and hedging IRR? How do they work?
8. How was the bank's income impacted by the risk during the period?
9. How many reports need to be generated to serve for managing IRR? What is the content and function of each report?
10. Are there IRR limits to be set under the bank's capacity? What are they?
11. What do you think of the role of internal audit which reviews the efficiency of the IRR management process, and the policies? Could you pleased describe the process of internal audit?

Thank you for your answer!

APPENDIX 8

QUESTIONNARE

Pleased fill in the blank or circle the answer

Personal details:

1. Age: _____
2. Education: _____
3. What is your current position in the bank? _____
4. What is your main duties in the bank's ALCO?

   _____

Questions relating to interest rate risk management

1. How long do you experience in interest rate risk management
   a) Under 1 year
   b) 1 – 3 years
   c) 3 – 5 years
   d) Over 5 years
2. How do you evaluate your understanding of IRR management process, and IRR policies?
   a) No knowledge
   b) Limited knowledge
   c) Reasonable knowledge
   d) Adequate knowledge
3. In your opinion, IRR management in your bank is
   a) Not necessary
   b) Not so necessary
   c) Quite necessary
   d) Very necessary

4. Do you attend any training course regarding IRR management?
    a) Yes
    b) No
5. How often do you receive IRR management training courses?
    a) Under 3 months
    b) Over 3 months – 6 months
    c) Over 6 months – 1 year
    d) Over 1 year
6. How do you evaluate the quality of those training courses?
    a) Very bad
    b) Bad
    c) Normal
    d) Good
    e) Very good
7. How often have you been notified the changes or new policy on time?
    a) Seldom
    b) Sometimes
    c) Regularly
8. Are you asked for your opinions to contribute to the IRR management policies adjustment?
    a) Never
    b) Seldom
    c) Sometimes
    d) Regularly
9. Do you wish to contribute your opinion to the policies?
    a) Yes
    b) No

10. If yes, what do you want to contribute?

_____

_____

_____