2 Literature Review

2.1 Introduction

This chapter describes the review of theories and other research study results that supporting the components and objectives defined in this research. In order to have a comprehensive and valid research approach and result, the quality of references used is the key point to avoid any bias on the research process and result. I have studied and reviewed several researches and publications that have significant relationship with this research topic and compiled the critical points that give positive contributions to my research process in order to deliver a comprehensive result.

The researches and publications used in this literature review obtained the data from both international and national level. Instead just relying to researches with data taken from US/Europe banking industry, I also use some publication of Bank Negara Malaysia as national banking regulator. This is expected to enrich my knowledge and understanding on the research topic.

2.2 Banking Functionalities

The existence of banking institutions was created by the need of financial intermediaries between agents with surplus cash to agents with deficit cash. The financial intermediation created process in which assets and liabilities are transformed into different format. Functional intermediaries then took place as channels to transform funds from people with extra money (depositors) to people who have less money (borrowers) to be able to execute activities that have been planned with the use of the

money. Banking institutions were then established as institution that performs functionalities as financial intermediaries

Allen (2001) presents the theory of the declining of traditional banking functionality over years. Using the data from US and UK compared to data from Japan, France, and Germany, the paper empirical analysis results show that the position of banking industry was still well maintained to the GDP relatively even though there are a declining trend.

2.2.1 Traditional Theories of Banking Intermediaries

Financial intermediaries traditionally were developed based on transaction cost and asymmetric information issues. Financial intermediaries plays important role in the economy. Without the establishment of functional intermediaries, the level of fund flows between household savers and corporate sector is likely to be quite low. The reason of this situation is that the household need to continuously monitor and check the operation of the corporate sector which leads to the expensive rate of transaction cost.

The study of Allen (2001) shows evidences that the role of bank in giving loan and receiving deposit, as what financial intermediaries acted, has been transforming. This situation was caused by the reduction of transaction cost and asymmetric information. Over some periods, the importance of traditional bank that take deposits and make loans has reduced.

The declined of role of banks as intermediation of credit risk has been most pronounced in a US. Bank has lost ground to other intermediaries such as finance companies and to securities markets. Not just on credit intermediation, banking role also has been declined in securitization, cash payment service, etc. If banks are shrinking

relative to other intermediaries, but are stable relative to total financial asset, then this implies that there is a switch from directly held assets to non bank intermediaries. Although the intermediation business has declined, banks have managed to prosper nonetheless, by shifting from traditional intermediation function to fee-producing activities such as trusts, annuities, mutual funds, mortgage banking, insurances brokerage and transaction services.

2.2.2 Dynamic Theory of Intermediation

In the discussion of risk management, Allen (2001) argued that risk management had become the main activities of banks and other intermediaries recently. With the use of derivatives by financial institution, it shows that risk management has transformed the role played by institutions in the capital market. The research shows that in US most of assets are held in risky based asset including domestic and foreign equity and real estate. It is quite contrasts to what happen in Japan, France and Germany. In those three countries, households are relatively shielded from risk.

The standard financial theory suggests that the main purpose of financial markets is to improve risk sharing. In fact, it is clearly recognized that financial markets in US and UK is more developed rather than those in Japan, France and Germany. There is solution provided by Allan (1997). It assumes that set of assets is given and theory focuses on the efficient sharing of these risks through exchange. For example, the standard diversification argument requires individuals to exchange assets so that each investor holds a relatively small amount of any one risk. Risks will also be traded so that more risk-averse people bear less risk than people who are less risk-averse. This is what we call

as *cross sectional risk sharing*, because it is achieved through exchanges of risk among individuals at macro economic shocks.

The traditional approach leads Allan (1997) to focus on the *inter-temporal smoothing* of risks that cannot be diversified at a given point in time. Based on this approach, risks can be averaged over time in a way that reduces their impact to individual welfare. One strategy is *intergenerational risk sharing* which spreads risks associated with a given stock of assets across generations with heterogeneous experiences. Another strategy is *asset accumulation* which reduces the fluctuations in consumption over time.

In the bank-based market financial system, inter-temporal smoothing plays important roles. In the bank-based financial system there is no competition in the market. This is a different situation with market-based financial system. In the market based financial system, inter-temporal smoothing does not work because of competition. In a good time, individual would rather withdraw their money and invest it to the other investment that gives more returns (as the basic characteristic of competition). Cross-sectional risk sharing becomes more important in market-based financial system. This clearly explained why in US and UK, cross-sectional risk sharing is more preferable rather than inter-temporal smoothing. Financial market system in US and UK is more developed rather than in Japan, France and Germany.

Dynamic theory explains both the need and reality of financial innovation. In traditional bank-based economy, the main way to manage the risk is by inter-temporal smoothing. When the financial markets develop, there is a force to banks for competition. It creates inter-temporal smoothing become too difficult to implement. Financial market will offer higher returns so that individual will withdraw their money and invest it to the

market. Banks must compete and stop implementing inter-temporal smoothing in order to survive.

As what has been shown by the research result, in US and UK, banks have been forced to be more innovative in the product development. Their traditional role of taking deposits and giving loans has been shrinking. Although the regulation is designed to limit their activity to commercial banking, they have been able to increasingly skirt this regulation and lobby for changes so that they can enter to the underwriting, asset management, and insurance business.

The role of surviving intermediaries has become popular in which they have increasingly facilitated risk transfer and allocate it to those most able to bear it. Achieving this new role requires considerable change and innovation on the part of individual institutions and individual bankers.

Although that Allen (2001) has proposed the dynamic theory where slowly the roles of bank move to cross-sectional from inter-temporal smoothing, again the role of regulator in a country plays more. When the regulator still focuses on bank-based rather than market based, inter-temporal smoothing will always still be implemented.

Whether a country is more to market based or bank based, the dynamic theory that creates innovation must be continuously implemented. Even in the inter-temporal smoothing, product innovation must be put as the main focus. Product innovation is not implemented only through competition as what happen in market based financial system, but in any kind of financial system by financial intermediaries to maximized customer value.

2.3 Bank Risk

Risk management in banking sector has been a topic that becomes main concern in the management team of the banks. They are forced to maintain the safety and soundness of bank indicator growth in a positive and stable condition to prevent bank failure. The level of risk exposure of banks will determine the category of the bank whether it is in "*problem*" bank category.

Sinkey (1978) presents an empirical findings, that Net Capital Ratio (NCR) was the most important component in separating "*problem*" banks from the "non problem" ones. However, in his further finding, high volume of "substandard loan" was another component in contributing to the bank failure. He found out that not all "problem" banks with low NCR ended toward bank failure while all of failed banks were categorized as "problem" banks based on the assessment of the NCR before. This is a logical relationship as higher amount of loan relatively will generate result in a lower NCR.

The analysis presented by Sinkey (1978) has given further input for other researchers to do many more researches on risk management of banking industry focusing on how the loan contributed as important component in risk factor and how to find solution to manage it. The *credit risk* and *liquidity* then started become another hot topic in any risk management in banking industry discussion.

In the traditional way, banks will hold capital as buffer to face the solvency issue beside liquid assets, such as cash and securities, to guard against withdrawals by depositors. Banks then tried the access to the loan sales market to manage their risk in holding huge amount of loans. Cabenoyan (2004) delivers a finding that banks engaged in buying and selling in loan sales market had better opportunity in rebalancing their credit

risk. The research found out banks that rebalanced credit risk through loan sales and purchases hold lower level of liquid assets relative to other banks. This credit risk management approach was also affecting bank's investment in risky loan.

In the final testing by Cabenoyan (2004), it is presented that access to and aggressive use of loan sales activity allows banks to hold less capital, invest less in low-yield , high liquidity assets, while in the same time increase its holding of higher risk, higher return assets.

2.3.1 Risk and Productivity

There were several literatures tried to understand how the relationship between risk and productivity in banking institutions. As the risk management has been becoming main concern and it developed continuous scrutiny within the banking authorities, a consideration of effects of the risk management to the productivity of banks should be put in a loop to give better comprehensive information. Even though risk management is very important, productivity of the banks is still the main objective why banks are established and to run their functionalities.

Das (2002) tried to define the relationship among risk, capital and productivity change in the situation where liberalization of economy in a country had been started to be developed widely. Liberalization in the economy gave direct effect in the liberalization of financial sector which led to a requirement to determine whether the situation brought a direct effect to the bank productivity as well.

The research used the basic indicator of risk, credit risk and leverage, as main sources. Credit risk is the risk default of the assets of the banking firm. Leverage is the amount if borrowing relatively to the capital. Credit risk was represented by Non

Performing Loan (NPL) while leverage was represented by capital ratio to assets. This research also use input such as deposits, borrowing, fixed assets (capital), and some additional input such as contingencies and provision. The definition of the productivity is represented by loan growth, bank management quality and government involvement.

The result of the research presents interesting results. Banks with more capital (lower leverage) tends to be associated with less credit risk. To the extent that greater financial leverage tends to have positive effect to credit risk, the finding shows that the two type of risk reinforce each other. There are another interesting facts found out in the findings that loans to priority sector is not necessary lead to higher NPL. It is explained that loans to priority sector are subject to regulatory stipulation. The results also shows that for small banks, loan growth has negative effect on bad loans, which most probably due to the superior of management techniques in managing credit risk.

As conclusion, the literature found out that higher productivity will lead to the lower credit risk. It is also having positive relationship with the bank capital. It supports the belief that banking institutions with poor performance tend to engage in risk taking activities compared to banks with good performance. In the end it is proven that productivity, capital, and risk taking tend to be jointly determined, reinforced, and compensating each other.

2.3.2 Banking Crisis

The financial crisis in 1997 in the region has triggered the banking authority of a country to put more concerns on the monitoring of bank risk. It has been acknowledged globally that financial crisis main cause was contributed by the failure of banking system.

In all country, the banking crisis main issue is started with the high number of NPL (Non Performing Loan) due to miss-management of the bank.

The capital inflows had triggered the credit expansion, which resulted in lower credit quality and led to assets price inflation. The inflated assist prices encouraged further capital inflows and lending. Weakness of banking corporate governance and lacking of market discipline in allowing excessive risk taking, are poorly enforced. Banks as financial intermediaries which main objective is making loan to boost their revenue took advantage of the situation. Loan valuation was implemented not in proper way, which resulted in huge amount of high risk credit distribution sector. When the macro economy crisis happened, as a systematic connection, the banking system was easily affected and collapse. Crisis in one country will then spread to the neighborhood countries and became region level crisis.

In any baking crisis, there is always a phenomenon of "*bank rush*" where the depositors withdrawal their deposit from the banks in huge amount of money due to the fear of bank collapse. However, Kunt (2000) presented an empirical study, using aggregate bank level data during 1997 crisis, that crisis were not accompanied by declines in bank deposits and credit did not fall relative to output, although the growth of both deposits and credits slowed down substantially. Output recovery began to rise after two year of crisis and it was not led by resumption in credit growth. Most of banks put their assets portfolio in other forms away from loans.

2.3.2.1 Malaysia Banking Crisis

Malaysia was actually not really affected in the South East Asia regional crisis in 1997. In the time before the crisis, Malaysia macro economic indicator was showing a

good result. The financial soundness had improved significantly in the 1990. The financial industry managed to reduced the NPL from 20% to 3.8% for banks and 4.7% for finance companies in 1996. Based on Lindgren (1999), the interest rate for credit expansion was still maintained at 30% annually to the private sector in particular to the property sector and for the purchase of stocks and shares, exposed to the financial system to potential risks from price declines in property and other assets that occurred in 1997. This condition gave result in the rise of NPL in 1997.

Bank Negara Malaysia (BNM) as financial authority had put concerns in this kind of situation. Some preventive actions had been taken immediately:

- Implementation of lending limit for property (20% of total loan) in April 1997
- No new loan approved for property sector in 1998
- Enforcement for the banks to submit credit plan to moderate loan growth of the banking system by 20% in March 1998 and by 15% in the end of the year.

Not only preventive action taken by BNM, a follow up actions also had been imposed in 2000 to strengthen the banking system (BNM Annual report 2000), such as:

- Investment in Shares and Interest-in-shares

  BNM put limitation in permissible investment to 5% of the investee corporation's paid up capital or 5% of the banking institution's paid up capital and published reversed whichever is lower, in any corporation that were listed in Main Board of KLSE.
- Minimum Guidelines of the Provision of Internet Banking Services

Domestic banking were allowed to provide wide range of internet based product and services

- Client Charter of Granting of Loans to Small and Medium Sized Industries by Banking Institution

  Banking institutions were required to publish a Client Charter which clearly stipulated the various documents and information that are needed by banking institutions to process a loan application to Small and Medium Sized Industries.

- Resolution of NPL of SME
- Increase of Minimum Capital Fund
- Outsourcing Bank Operation

2.3.2.2 Basel II Framework Adoption in Malaysia

Reflecting to the important of risk management in the banking sector and to prevent similar 1997 crisis, Malaysia started to adopt the Basel II Framework in 2004. The adoption of the framework was in line with the overall policy agenda by the government to promote integrated risk management system. The framework enforces banks to make decision on product portfolio, product pricing, and new business development to be based on on risk-adjusted returns and capital.

Two types of credit risk options started to be implemented in Malaysia. Banks had opportunity to determine the approach for the options, Standardized and Internal Rating Based (IRB) approaches, to be implemented in their institution.

2.3.3 Alternative Bank Risk Determinants

Regulation that has been implemented by the banking authority, combined with the rapid growth of technology and globalization, has created different form of banking

industry to adapt with the new environment. Banks become bigger through merger and acquisition, liberalization of financial sector has opened a wider market for bank operation and as product of this situation is very tough competition in the industry. This leads to the more products to be offered by the bank and more new complex system to be implemented. As direct implication based in the banking theory, bank risk will also be affected positively.

A research has been conducted to examine this implication. Stiroh (2006a) studied the implication of how risk is monitored and evaluated based on the rapid development of banking industry. The paper analyzes new determinants of risk based on the equity market volatility and how they have evolved. The market equity volatility is used as the expansion of banking industry will lead investors to put more awareness by themselves to new activities implemented by the banks. The research involved several activities. First it examined data from the balance sheet and income statement level which component that closely linked with the risk based on the *Basel Framework* enforced by the banking authority. In order to identify the most risky activities based on market judgment, the paper compares the equity market volatilities to exposure in specific lending based activities and concentration in different type of non-interest generating activities of the banks. Finally the paper estimated the risk and activity regressions with time varying parameter to identify variables that becoming more or less informative.

As the result of the research the paper shows some main conclusions. Risks that are measured by equity market volatility, is closely linked to specific operation choice of banks, as captured by cross-sectional differences in balance sheet and income statement. Lending based activities and greater reliance on activities that generate non-interest

income is systematically linked with higher risk. Information of revenue flow of banks somehow is seemed to be as predictor of the next equity market volatility. Even though this activity is traditional in nature, the market incorporation's information support the regulator and economist belief in transparency and market discipline to have a better understanding and ability to control complex financial institutions. The regulator might put limitation and tighten the supervision for these activities when they become fundamentally risky. Capital charge also can be implemented and disclosure might be increased.

Since the risk measurement has shifted from balance sheet to income statement to define the revenue stream and as the banks are continuously expanding the activities and transform the old ones, equity market investor definitely will follow these changes to identify the risk. It leads regulator and supervisor to put more attention to the activities which equity market has identified as risky ones such as more attention to market risk than credit risk measurement.

2.4 Bank Diversification

In the answer of globalization and the importance of risk management, topic of bank diversification has been placed in the main subject of discussion. Globalization is another main component that speeds up the diversification of banking system beside risk management. Started with the globalization of financial sector, the capital market has changed significantly. Customer will have no more limits in the accessibility of capital. The rapid growth of internet technology and the liberalization of financial sector allow them to have access to the international sources. This situation leads to the tough competition in the banking and financial sector. With strict policies imposed by the

banking authorities, banks will have to find away to survive and maintain their performance indicator growth.

Diversification of bank can be implemented in many forms. Banks can choose the geographical diversification approach. Herrero (2007) paper reported that international banks with a large share of assets allocated to foreign subsidiaries, especially to the emerging countries, are able to attain a higher-adjusted return. The paper stated that the international banking is a substantial which sometime unexploited by the banks. The international diversification gain to be considered in the second pillar of Basel II as the first pillar is based only on the idiosyncratic risk to recipient countries.

In detail, the paper provides facts showing robust systematic differences in the risk-return performance of international banks in their home countries as compared to subsidiaries in other countries. The performance in other countries somehow is more profitable and riskier especially in emerging countries in average.

Diversification also can be approached through portfolio model. This approach involves with how the banks internally managed its portfolio such as loan. Portfolio theory describes the relationship between return and risk in a given set of portfolio. Generally different portfolio composition, the risk level and expected return will be different as well. The *Markowitz* portfolio theory described in any portfolio textbook is the correct formula to explain portfolio diversification strategy.

Traditionally, banks will always focus on the diversification of their main business which is distributing lending to customer. In the case of lending based activity diversification, it is can be modeled as lending portfolio. Neuberger (1995) analyze the bank lending portfolio using adoption of a continuous-time portfolio framework with

endogenous financial intermediation. As applied in continuous time, diversification principle states that for a given loan volume, an increase in the number of loans with independent or imperfectly correlated risks reduces the dispersion of repayment flow through time without affecting the volume of losses expected over all periods of time.

The analysis shows that diversification might reduce the bank's collateral requirement besides increasing the credit risk exposure. Comparing between diversification and non-diversification case, the paper shows that diversification is able to operate with less amount of collateral. A well diversified bank is able to operate without collateral compared to single credit case which requires provision of collateral for development of financial intermediation. Through the model of continuous-time, shows the collateral role in commercial banking compared to investment banking. The model examine that there is no rationale for collateral in perfect market with unrestricted scope of diversification. Investment banks that operate in security market which is close to a perfect market will not require collateral. Even though there is transaction cost and asymmetric information which indicates market imperfections and the scope of diversification is limited because of indivisibilities, commercial bank can conduct activity in offering collateralized loans.

Another tool to measure diversification of portfolio is using Herfindahl Index. It is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. Using Herfindahl Index approach, Archaya (2004) presented an empirical result of diversification in loan portfolio. The paper described that industrial loan does not result in an efficient tradeoff between risk and return. Increase in loan portfolio diversification does not give significant effect to the loan portfolio return for

low and medium insolvency risk banks. It is getting worse with high insolvency risk banks, where the loan risk of banks increases due to diversification.

The paper also deliver findings that broad asset sector diversification appear to affect bank performance in different way with industrial diversification and the effect of industrial and asset sector diversification on bank with medium insolvency risk level cannot be assessed without taking a stand on how much bank return should be increased per unit increase of bank risk.

Heyden (2006) shows there are conflicting theories on optimum degree of diversification. One theory stated that the optimum organization of banks is where it is as diversified as possible while in corporate finance theory described that a firm will achieve its maximum return when it is able to focus on the business operation to obtain greatest management expertise and to reduce agency problems. The paper result supports the second theory. It is explained that the impact of diversification to the bank return changes according to the level of bank risk. The paper also shows that diversification will have positive relationship with bank's profitability in the case of moderate risk level and industrial diversification. In the end it suggest that banks should evaluate carefully the actual riskiness of their activity in the making decision whether to increase the degree of industrial, sector, or geographical diversification.

Similar research result by Stiroh (2006b) presented that diversifications are more than offset by the increase of non interest activities exposure. It is volatile enough but less profitable than lending activities. Marginal increase in the diversification is not associated with performance. It may reflect to change in managerial focus or just reflect the endogenous nature of diversification decision. In the other way, marginal increases in

non interest income are still associated with the declines in risk-adjusted profits. The paper also shows that diversification creates more volatile revenue stream which might contribute some effect to stakeholders. Regulator will put concern on the volatile revenue stream as it might affect the default probability. Shareholder will more concern on potential implication on the firm value due to potential miss-investment and increased cost. Managers and borrowers could be affected by the swing of revenue due to inefficient or restricted credit allocation.

While most of findings by Stiroh (2006b) show that diversification tends to reduce revenue, the research also explains the possibilities that contribute to those facts. One explanation is the simple analogy where competition will force revenue to reduce. Another explanation is the miss-understanding of the idea of diversification. Most of the implementation of diversification tried to selling many products to same customer which will reduce the potential diversification benefits. Another interpretation of research result is that managers tend to have more interest in expected return than volatility. This will make managers to go in to higher risk activity than lending based activity which will reduce the incentive for debt-holders to monitor and discipline managers. Higher risk activities will also lead to agency problem. The previous lending problem activities are also part of the reason of failure of diversification which led managers to over-react by shifting the activities to unprofitable non-interest based activities. Less knowledge in the business best practice, technology, expertise or avoiding further research on the understanding the main cause of previous lending problem activities, led the managers to lower level profit generation even though in some level it might be profitable, adjustment cost could hold down short-run.

Merceica (2007) also presented similar results. Using data from small banks in Europe, the paper suggests a negative link between non interest income generation activities and risk-adjusted performance. The result indicates that small banks can adjust their performance by expanding their resources within the business line where they possess the expertise and comparative advantages. The research also suggests that specialization is important for small financial institution and highlights that intermediation theory on diversification is not applicable for the small banks in Europe instead it is aligned with corporate finance literature.

The analysis of the paper also describes that the there is negative correlation between activity restrictions and risk-adjusted performance and positive correlation between banking freedom and insolvency risk. The scope of reducing risk through diversification is the interest of the authority and regulator. The shifting to non interest income is inefficient trade-off between risk and return and the result suggest that diversification does not contribute to positive indicator in the banking industry in Europe.

2.4.1 Diversification and Market Value

The diversification of banking industry has changed banks into full financial conglomerates. Baele (2007) presented some interesting finding on how financial conglomerates possess a comparative advantage in terms of return and risk by analyzing long-term performance and riskiness of banks with different degrees of functional diversification using stock market data. The paper is looking capital market data rather than using accounting based data because the equity prices are forward-looking and having better identifier of prospective performance and risks associated with different strategic options. To evaluate the risk component, the paper examines an extended

version of market model to decompose total risk into systematic and idiosyncratic component. The reason is that investors with well diversified portfolios tend to be interested in systematic risk incorporated in the bank equity returns, while regulators, bank managers, large stakeholders are interested in idiosyncratic and total volatility. The paper supports the finding in Stiroh (2006a) that banks which rely more on non-interest sources of income have systematically higher market betas and definitely higher systematic risk. Banks have opportunity to diversify the functionalities, from commercial banking to the insurance and mutual fund activities. The non interest income component actually describes all the revenue stream of the bank's diversified activities from various financial services provided.

The research analysis result shows that there is a strong positive relationship between franchise value, which is defined as present value of the current, and future profits that a bank expected to earn, and the degree of functional diversification. The result also shows that the stock market anticipates the potential improvement of future bank profit through the diversification of income sources. In the risk examination, the paper presented a non-linear relationship diversification and bank specific risk. It shows that some bank diversification is able actually to reduce idiosyncratic risk. However the paper argues that this kind of evidence has a specific condition based on the specific case which is Europeans banks as research data source, since banks that are involved in various activities, generate returns which moderately correlated in most periods. Based on the systematic risk or market beta, the paper confirms the existing evidence that larger and more diversified banks have systematically higher market betas. This evidence is logically accepted as the broader banks involve in various business line, the higher exposure of banks to business cycle shocks in the market.

There are some implications to shareholder based on the research discussion. The investors with diversification of portfolios, such as pension fund, are primarily interested in systematic risk exposure. They are facing a trade-off between higher potential expected returns and higher systematic risk, which supports the general corporate finance theory. In the other side, shareholders with huge stakes and bank-dependent parties such as borrowers, customers and managers, should put concern more to firm-side risk. For them, diversification seems to have payoff in term of reducing bank-specific risk. Too much dependency to non interest revenue source might banks increase the exposure to higher risk since the relationship is non linier. Again, there is still depends on what kind of activities the banks choose and how the banks manage the interaction with the economy-wide and market shocks.

2.5 Bank Incomes

Income from banking institutions comes from various activities conducted by the banks which include the traditional interest based income or non-traditional fee based income as result from bank functional diversification. In general, based on accounting structure the income is simplified divided into interest and non interest based income.

2.5.1 Income Structure

The best study regarding income structure is well presented by DeYoung (2001) which is also become the main reference for many studies in bank diversification topic. The observation started with the facts that banks has been earning non interest based income sources such as checking, trust, letter of credits and cash management, and then banks generate more non interest income based from several new sources. First is the less traditional fee based income such as insurance and mutual fund sales, continue with the

charging of financial services which is supposed to be free of charge service before. Banks charges for services such as traveler checks and data processing although customers still enjoy the higher interest rate in their balance. Last is the opportunities for banks to earn fee based income from originating and servicing loans separate from interest income by holding loans on the book which is supported by the positive growth of securitization in mortgage, credit card and other loan sales market. This paper in the end presented the study of the shifting towards non interest and fee based income contribute effect to the volatility of bank earnings.

There are three fundamental observations described in the research regarding the fee based income is not more stable than interest based income in traditional banking activities. First is the more stable relationship for loan based customers rather than income based customers. In the condition of loan based customer, the cost of switching and information will be higher if the customers or the banks try to discontinue the relationship. This makes the revenue of the banks from traditional loan based activity looks more stable in long period. The environment for non interest based or fee based income is different with the loan based relationship situation. In this situation, banks are facing very tight competition in the industry as all of other banks will try to provide the best service and product to the customers which sometime the demand is not in the continuous pattern. This creates more fluctuations in the revenue stream compared to the loan based revenue stream.

The second observations suggests that in producing both fee based products and loan based products, banks use many different mixes of inputs. In the lending relationship between banks and customers, increasing the amount of loans actually only

requires increase of variable cost which is the interest expense. In the other side, the expanding the fee based products require higher fixed cost such as labor, which is increasing the banks operating leverage. The high ratio of fixed-to-variable expenses turns any given amount of revenue volatility into an even greater amount of earning volatility.

The last fundamental observation is the fact that banks are not required to hold capital for fee based activities by regulators and banks that take this kind of situation is able to increase their return on equity. This kind of advantage eventually will create an opportunity to transform their interest based risk on-balance sheet into fee based off-balance sheet risk which arbitrage the risk based capital regulation.

The interesting review of the research is how the model proposed applied to the multi product banking firms. The paper states that a firm that has a relatively higher ratio of fixed-to-variable expenses is said to have a "high degree of leverage". This statement explains in general, the relationship between the top and the bottom lines on a firm's income statement. In a "highly leverage" firm, it shows that if sales revenue increases, the earning will increase more than proportionally because its low variable expenses allow it to retain a relatively large portion of each additional revenue unit.

The degree of total leverage is modeled as the percentage change in earning caused by a one percent change in revenue. The extension of this model shows that high degree of total leverage can contribute a given amount of revenue volatility into a higher amount of earning volatility. By an assumption that the firm is price taker in output market, the model breakdown the earning volatility into two parts: volatility due to largely external market condition and volatility due to internal production and financing

consideration. In banks that carry multiple products, the two earning volatility parts are influence by the product mix. Multiple product firms will have a multiple output demands which some of them are more volatile than others. This will have impact to the revenue streams which definitely will more volatile than others. The paper gives example in the case of revenue generated from merger and acquisition financing will be more volatile as compared to service charge to depositors. The degree of total leverage also depends on the product mix as not all products are produced in the same ratio of fixed –to-variable expenses.

The significant implication from the model is that changes in product mix of banks tend to change the fundamental characteristic of bank failure. Even though non performing interest bearing assets is always the main cause of bank failure, the reduction of earnings from multi product might affect banks capability in rebuilding capital from earning retained. When fee based revenues are more volatile that interest based revenue, or the production and financing the fee based activities need more fixed cost than interest based activities, banks earning will be more volatile as they shift the business line towards fee based activities. This kind of situation will give impact in holding capital constant, as higher earnings volatility will tend to lead to insolvency probability.

2.5.2 Bank Activity and Funding

Based on the simple understanding, bank income is generated from bank activities which can be generally divided into interest based activities and non interest based activities. In order to be able to run activities, banks require funding to leverage on their activities. Traditionally in the situation of banks as financial intermediaries, banks get their funding from deposits. With the shifting of bank functionalities to fee based income

institution, the financial structure of funding has been change as well especially with the rapid growth of diversification.

Kunt (2010) has done some study on how banking institution funding strategy is contributing to what are expected in the implementation of diversification. The research evaluates the implications of bank activity mixes and funding strategy to its return and risk. It describes the bank activity mixes through non interest based income such as fees, commissions, and trading income, to total income, while in the funding it differentiates the deposit based and non deposit based such as money market instruments.

The main goal of the research is to find relationship between bank activity and funding strategies to the risk and return of banks. In detail, there are three objective tried to be achieved. First is to show trends in the non traditional banking activities and non deposit funding in bank's asset and funding mix. Secondly is the correlation of the shares of non interest income and non deposit income to some variable range from bank level parameters, macro economics and institutional indicators. Finally is the effects of different activity mixes and funding strategies are correlated with bank returns and risks. In this case, bank risk is defined using Z-score which is the no of standard deviations that a bank's return on assets has to fall for the bank to become insolvent.

The paper shows that there is association between the non deposit funding activities and non interest based income generating activities with large and fast growing institutions. In developed countries, dependency to non deposit funding is quite common situation while in developing country, dependency to fee based activity is shown significantly. The paper also shows that based on bank's variables that put restriction in

asset mixes and fee-generating activities are associated with the increase of non deposit funding.

The research presents that rate of return of the banks and risks increase when the fee based income share increases. The increase of fee based income share also gives result in some risk diversification benefits in very low level. In other side, the increase of non deposit funding creates a lower bank rate of return on asset while it gives a risk diversification benefit even though in low level. Based on endogenous issue analysis, it is shown that higher share of non interest based income or non deposit funding share, increase the risk of the bank while it is also give a positive impact on the rate of return of the bank asset.

In the process of presenting the analysis result, the research use some correlation analysis process among the variables define. The variables defined based on reality that income stream of the banks reflect the bank's strategy, capacity, and the market environment where the bank operates. The non deposit funding share reflects the funding intention and funding possibilities. The analysis is grouped into two parts. The first parts use the bank's variable. The first analysis of the first part shows the relationship between income share and bank's variables. It is supported with the facts that investment banks will rely more to fee based income. The fast growing banks will also have same situation, having higher fee income share. Banks with greater equity will also tend to have association with fee based income generating activities. On the bank expenses also shows that banks with higher overhead costs are estimated to have higher fee based in come level.

The second analysis shows some relationship between fees based income share with some macro economic variables such as GDP and inflation. Higher GDP growth are seen to be associated with high fee based income share. That shows that macroeconomic environment affects the bank resources that are allocated in fee generating activities. The third and last analysis includes non deposit funding. Associated with the bank variables, the ones that give higher fee based income share give the same result to the non deposit funding share. This suggests that fast growing banks are heavily financed through non deposit funding. Investment banks, non bank credit institutions are also rely more to non deposit funding. The analysis also shows that non deposit funding has lower association with macroeconomic variables.

The first step of second part analysis looks at the relationship between fee based income share and restriction of bank activities which is giving result as negative correlated. The other analysis step also shows that fee based income share is negatively related with the restriction of self-dealing. The fee based income share is also negatively related with the index of official bank regulatory power. Another finding shows that fee based income share is negatively related with protection of share holder rights which reflects the conflict of interest between bank manager and share holder.

As conclusion the research, Kunt (2010), higher non interest based income share and non deposit funding share lead to higher risk of the bank even though the impact is difficult to establish due to endogenous concerns. It is also suggested to the bank regulator to find the optimal model for the banks through its policies of banking power and restriction. The US crisis has shown that the market can easily destroy the banking institutions that have wrongly chosen business model. The paper also shows that banks

with higher dependency to interest based income and deposit based funding are safer than banks that invest heavily in fee based generating income and non deposit funding sources. This indicates that non interest income and non deposit funding are very risky.

2.5.3 Bank Income Volatility and Portfolio

Volatility of income is very important in banking institutions. All institution will expect a relatively stable income stream. As explained in previous section, income is divided into two category based on its sources, interest based and non interest based income. Each of categories will have potential contribution in the total income volatility.

Stiroh (2004) presents that non interest income is much more volatile that interest based income. Starting from discussion of the shifting towards non interest based activity has given contribution in higher level of bank revenue; the paper shows evidence of some implication of non interest based income. Non interest income is considered to be less dependent in overall business condition than traditional interest income. This situation leads to some understanding that increase dependency to non interest income will reduce the cyclical variation in bank profits and revenue. The expansion of product lines and cross selling opportunities might deliver diversification benefits on the bank revenue portfolio with the growing of non interest income. If interest income and non interest income are negatively or weakly correlated, non interest income will have possibility to reduce bank risk and improve bank revenue diversification. The paper also discusses about the importance of risk reduction by both individual banks and the banking regulator. With the capability of non interest income to reduce volatility and risk, it is a reasonable situation whereby the regulator reduces the capital requirement for the banks

with diversified revenue portfolio. In order to examine the fluctuation of bank revenue contributed by interest and non interest income, the paper use portfolio approach.

With the consideration of banks that engage in two type of activities to generate equity returns: traditional lending and securities investing activities that generate interest based income (I), and activities that generate non interest income (N).

Stiroh (2006c) presents a model of revenue portfolio:

$$E(R) = E(R_N).w + E(R_I).(1-w)$$

$$\sigma_R^2 = \sigma_N^2.w^2 + \sigma_I^2.(1-w)^2 + Cov(N,I).2.w.(1-w)$$

Standard portfolio theory describes that a bank's total expected return, E(*R*), and total variance of return, σ_R^2 , depend on the relative shares of each activity, while *w* represents the proportion of total activities that generate non interest income, the expected return of activity $E(R_N)$ and $E(R_I)$, respectively, the variance of returns on each activity, σ_I^2 and σ_N^2, respectively and the covariance between, *Cov*(*N,I*).

Stiroh (2004) creates a modification of standard decomposition of portfolio return volatility into decomposition of portfolio growth volatility. If net operating revenue (OPREV) is defined as the sum of net interest income (NET) and non interest income (NON), then the volatility of net operating revenue growth is defined as:

$$\sigma^2_{d\ln OPREV} = \alpha^2\sigma^2_{d\ln NON} + (1-\alpha)^2\sigma^2_{d\ln NET} + 2\alpha(1-\alpha)Cov(d\ln NON, d\ln NET)$$

Where α = NON/(NET + NON) is the non interest share of bank revenue growth, $d \ln X$ is the growth rate of X, and the contribution of each component to overall volatility is the share-weighted variance, e.g., $\alpha^2 \sigma^2_{d \ln NON}$ is the contribution of non interest income.

The findings by Stiroh (2004) shows that in aggregate level, non interest income is much more volatile than traditional interest based income. Even though there are facts that operating revenue volatility becomes less volatile as non interest income grew in importance, this is caused by the declining the volatility of interest based income that more than offset the increase of non interest income growing share.

Besides looking at the volatility of revenue decomposition, this paper also conducts some analysis on the bank level variables. The result shows that the growth of non interest income is correlated with net interest income. In the breakdown of non interest income sources, service charge and fees are highly correlated with net interest income. Trading and fiduciary income, as part of other non interest income source, shows similar correlation too. In the study of risk and return, there is negative relationship between non interest income shares and profits per unit of risk. Trading activities seems to be the most related component to the profit per unit of risk while fiduciary income is correlated with higher profit per risk and stable income growth.

Similar with other research results on non interest income and bank diversification, the paper also presents that there is doubt on the belief that noninterest income will stabilize revenue and profitability of the bank which is expected to reduce the bank risk level.