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HOW DID REVENUE DIVERSIFICATION AFFECT BANK PERFORMANCE IN EMERGING ECONOMIES DURING THE FINANCIAL CRISIS?

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ABSTRACT

This study examines the impact of revenue diversification on bank performance in group E7 including seven largest emerging countries during financial crisis from 2007 to 2010. They are Brazil, China, Indonesia, India, Mexico, Turkey and Russia. The tests are executed to investigate whether revenue diversification strategy offers better risk-return tradeoffs and therefore boost performance and greater safety for these emerging banking industries. The thesis documents the increase of non-interest income at those banks in the period of time, and then assesses the financial implications of changes by evaluating diversification and risk-adjusted return measurement. Multiple regressions analyses using cross-sectional regressions and fixed effects regressions on panel data are applied.

Evidence suggests that diversification benefits exist in emerging banks during financial crisis, and these gains have been offset by the increased exposure to non-interest activities. The diversification benefits are also found in individual banks over time. The findings also reveal that revenue diversification effect is non-linear with risk and it is conditioned by the risk level. Moreover, empirical diversification is seen to be not homogeneous across bank specific pillars. Interestingly, it apparently indicates that the diversification effect is found to positive and quantitatively large for other-bank category, comparatively less benefits for commercial banks, and insignificant prosperity for investment banks and cooperative banks. Finally, empirical findings prove that banks which are large and well-capitalized have more incentives to diversify.

KEYWODS: Revenue diversification, non-interest income, bank performance, emerging economies.

1. INTRODUCTION

Diversification and its impact on firm's value are primary controversial concepts that attract the attention of investors and researchers in recent time. An opening question is therefore raised to prove that either the diversified or the focused strategy outperformed the other. It is due to the fact that the importance of choosing between two strategies affects greatly on firm's business and financial management since it could probably impacts their performance and charter value as a consequence. This study will concentrate solely on testing the benefits of revenue diversification by relating changes in bank performance in emerging markets during the financial crisis.

Diversification topic has been a central debate in strategic management studies since Ansoff (1957) published his pioneer work. He defined diversification as a particular kind of change in the product-market makeup of an organization and suggested that diversification is much more difficult than other strategies and it probably requires new skills, new techniques, and organizational changes in the structure of the firm. Extending Ansoff's definition, Aaker (2001) defined diversification as the strategy of entering product markets different from those in which a firm is currently engaged.

Regarding the benefits of diversification to banking stability in emerging economies, Nilsen and Roveli (2001) and Bekaert and Harvey (2002) found the link between the soundness of banking system and stable capital flows. Diversification in bank, in addition, has been defined as proactive strategies to broaden their business by offering non-traditional services. Non-interest income activities include loan origination, securitization, standby-letters of credit and derivative securities. These activities increasingly grow considerably, which in turns expand their share of total income to a great extent.

The structure of banking in economies market has witnessed a period of change during 1990s after the banking crisis which triggers significant macroeconomic disruptions. The crisis affected adversely on interest rates, currency and the supply of credit. In a research of banking system in emerging countries in 2005, the Bank for International

Settlements addressed five segments of recent banking developments. Firstly, the bank credit to the private sector has recently rise in a number of emerging banking markets after hitting a peak in the second half of the 1990s. In contrast, the share of bank credit to the business sector witnessed a significant decline due to lagging investment and the availability of financing in bond and equity markets. In addition, the lending to households has been increased nowadays; however, it could possibly expose them to new forms of risks.

Secondly, the pace of structure change in banking systems to privatization, consolidation and foreign bank entry in emerging nations have increased radically. Thirdly, in terms of risk management, "macroeconomic vulnerabilities" have declined thanks to higher reserves, more flexible exchange rates, domestic debt market development and improved fiscal policies. However, the lack of data on loan histories and the dependence on systematic risk assessment procedures and quantitative risk management techniques are the weaknesses of banking system. Moreover, the ability to react early with initial troubles before a banking crisis has been enhanced by increased authority, independence and legal protection for supervisors. Finally, regarding implications of monetary policy, domestic bank loan rates also appear to be more responsive to changes in money market rates in countries with profit-driven banking systems, besides long-term interest rates has been affected from global integrations.

1.1.Purpose of the study

Most of the previous studies tend to concentrate on large and complex banks in developed countries and largely ignore the banks in emerging markets. In fact, emerging economies are the most potential markets which witnessed a rapid growth during the past decades especially after the failure of banking system in 1990s. Over time, the structure of banking markets in emerging countries has been shaped by policies that encourage the provision of financial services to specific sectors of economies. They increasingly expand their banking activities and significantly play an important role in global market. The structure of banking model in those economies allows bank to combine a wide range of financial activities, including commercial

banking, investment banking and insurance. While most banking systems still aim at gaining income from traditional channels, the market has seen an increasing number of banks especially in East-Asia and Latin-America moving into investment banking-type activities, fee-based business and related activities. The changing trend in its turn will develop a diversified structure in bank and then produces its source of revenue.

According to Lown et al (2000), the achievements in emerging economies may differ from their industrialized counterparts due to economic growth and financial development. It is thanks to long-term growth potential for new activities that firms would be received more profitable. They also indicated that the rising income and average life expectancy in those countries also assure the long-term sustainability of non-interest activities such as insurance, increasing the possibility of successful diversification strategies. These above mentioned reasons, thus, facilitate to set the main purpose and motivation of the study with the aim at investigating whether and how the recent financial crisis affected on bank performance in seven selected countries.

My thesis will focus on analyzing group E7 which consists of seven largest emerging and developing economies by either nominal GDP or GDP (PPP) during the financial crisis time from 2007-2010. They are Brazil, China, Indonesia, India, Mexico, Turkey and Russia. The purpose of this study is to examine the impact of revenue diversification on bank performance particularly risk-adjusted return in selected nations. It will reflect the activities shifting away from traditional intermediation towards generating non-interest income. The tests are executed so as to find out whether revenue diversification strategy offers better risk-return tradeoffs and therefore boost performance and greater safety for these emerging banking industries. This thesis, therefore, will be documented the increase of non-interest income at those banks for the period of time and then assessed the financial implications of changes by evaluating diversification and bank’s adjusted-return measurement.

1.2.Structure of the Study

The structure of the study consists of a theoretical and an empirical part. The aim of the theoretical part is to introduce the research done in this topic as well as to explain the concept of diversification and bank performance in emerging economies. The measure of diversification and different methods of bank's performance measurement will be analyzed. The empirical part shows results which answer for the stated hypotheses of the study.

The first chapter draws a picture of background information on the topic and introduces the purpose of the study with research questions in brief. The second chapter reviews several main prior literature relating diversification strategy and firm's performance. The concept of diversification along with bank performance will be discussed in chapter three and four. The following chapter describes in details the expansion of banks into non-traditional services. Chapter six provides the chosen methodology; data collection procedure and hypotheses while empirical results obtained after the conducted tests are presented in the seventh chapter. Finally, the summary and the conclusion of the paper with suggested ideas for further research are presented in chapter eight.

2. LITERATURE REVIEW

The issue of specialization and revenue diversification of a firm's business activities in general and a bank's activities in specific has been increasing in the recent corporate finance literature. This topic is motivated by ongoing research which creates continuing conflicts about the benefits of diversification to banks. It raises a question of whether diversification improves or destroys the profitability and then the value of a firm. While a great deal of pieces of research remains theoretically that the diversification will affect positively on bank's revenue, others pieces show evidences to support the opposite side. The different in methodology, analytical approach and data used in these studies will lead to the different conclusions.

Few earlier studies find the advantages of expanding banking activities besides traditional channels. Boyd et al. (1980), Kwast (1989), Templeton and Severiens (1992) and Gallo et al. (1996) conducted the examinations of US banks and non-bank activities which revealed a risk reduction at low level for non-bank activities. In contrast, several significant literatures draw a general conclusion about the less benefit of bank expansion into non-traditional activities, which in turns cause higher risks and/ or lower returns.

Demsetz and Strahan (1997) showed that the better diversification is not a result lead to a decrease in the total risk. DeYoung and Roland (2001) have investigated the fee-based activities for 472 large commercial banks in US and found that the diversification is bound to increase the volatility of bank revenue and the existence of risk premium. Stiroh (2002, 2006) concluded that non-interest income has been associated with higher volatility, higher risk but not higher returns. The result of DeYoung and Rice (2004a,b,c) indicates a higher but more volatile rates of returns of non-interest income at US banking companies.

Other researches that are conducted outside US market produce other pictures of different countries in different markets. A study of loan portfolio diversity in a sample of 105 Italian banks was implemented by Acharya et al. (2006) found that the

diversification of bank assets does not produce a greater performance and/or greater safety for banks. Mercieca et al. (2007) focused on a sample of 755 small banks for 15 European countries found no direct diversification benefits within or across business lines, but an inverse association between non-interest income and bank performance. Smith et al. (2003) demonstrated that non-interest income is less stable than interest income based on data of 15 European Union banks. From the sample of 734 European banks, Lepetit et al. (2007) showed that banks expanding into non-interest income activities, presented higher insolvency risk than banks which mainly supplied loans. Another test about the effects of diversification on the large banks' market value from 42 countries of Laeven and Levine (2007) examines that the market values of diversified banks were lower than those of focused rivals.

2.1.Geographic diversification

Geographic and revenue diversification are the two main aspects of diversification which has been examined in prior literature although there are a little accurate prediction about their impact on firm value. The geographic diversification as well as relevant studies will be briefly introduced in order to emphasize the effects and the difference of two diversification types. Geographic diversification is when a bank operates outside its headquarter or its country, whereas revenue diversification occurs when banks generate income outside their traditional lending activities.

The main purpose of geographic diversification is to enhance market valuations through economic of scales, promote brand images and then increase return and reduce overall risk exposure. However, it is not always optimal for management to choose solely those branch sites offering the highest expected return. Other factors such as risk and the covariance of a proposed new branch's expected return or even the location and local economy should be taken into consideration. In fact, if two branches have similar cost to construct and create the same expected returns, management would possibly choose that branch location situated in a more stable economy so that the variability about the branch's expected return is lower. Such a choice would tend to lower the overall risk from the institution's whole portfolio of service facilities and other assets.

Rose and Scott (1978) collected data from the postwar period in the U.S, suggesting that it had a positive correlation between branch banking and financial stability in times of bank failures from 1946-1975. However, they did not establish a direct link between the benefits of diversification of loan portfolios and the deposit base to financial stability. In several investigation of the relationship between geographic diversification and bank stability during the Great Depression, Grossman (1994) found that those with large branching networks were less likely to experience banking crises. In contrast, Wheelock (1995) revealed that the more branch banks in states, the lower failure rates during 1930's in the United States.

Hughes et al (1996) conducted a research of the geographical diversification role on bank performance and safety and collected data from 443 US bank holding companies which are heterogeneous with respect to size. They demonstrated that an increase in the number of branches lowers insolvency risk and increases efficiency for inefficient bank holding companies. Moreover, an increase in the number of states in which a bank holding company operates increases insolvency risk but has an insignificant effect on efficiency. In fact, branch expansion faces the risk of insolvency for efficient bank holding companies, whereas an increase in the number of states has not had significant impact on insolvency risk. Nevertheless, the impact is likely to vary depending on the area where banks operate, according to Allen N. Berger (2001). The empirical findings suggested that there are no particular optimal geographic scopes for banking organizations - some may operate efficiently within a single region, while others may operate efficiently on a nationwide or international basis.

Carlson (2004) explains the geographically diversified banks are less likely to survive or the duration is relatively short when he tests the role of geographical diversification on bank stability during the Great Depression. In addition, in one research, Morgan and Samolyk (2003) examine geographic diversification in the US since 1994-2001 among Bank Holding Companies and find similarly negative results that means diversification is not associated with greater returns (ROE or ROA) or reduced risk. Consistent with those results, Kim and Mathur (2008) used a sample of 28,050 worldwide firm observations from 1990 to 1998, they revealed that industrial and geographic

diversifications are associated with firm value decrease. They also confirmed that geographically diversified firms have higher R&D expenditures, advertising expenses, operating income, ROE and ROA.

Deng et al, (2007) investigated the relationship between geographic, asset and revenue diversification and the cost of debt from 1994 to 1998. The results suggested that when the endogeneity of the diversification decision is controlled for, the diversification decreases the cost of debt to some extent. While discussing the empirical evidence of geographical diversification based on US county-banking states data, Huang (2007) thinks geographically diversified banks' lending is significantly less pro-cyclical across the course of a monetary cycle. It means that the supply of credit is the main source of volatility induced by monetary shocks and these multi-bank holding companies across borders could possibly help smooth out the effects of monetary shocks for their subsidiaries. The study further shows that diversified banks are able to hold a smaller amount of liquid assets during monetary tightening, explaining why they can maintain a relatively stable lending volume than do local banks.

Furthermore, based on two novel identification strategies of the dynamic process of interstate bank deregulation, Goetz et al (2012) find out that exogenous increases in geographic diversity reduce BHC valuations. It is because of geographic diversity triggers difficulties for shareholders and creditors to monitor firm executives, allowing corporate insiders to extract larger private benefits from firms. The data was collected quarterly since 1986 from balance sheet of US BHCs and their chartered subsidiaries. The state-specific and time-series pattern of interstate bank deregulation methods are applied to identify the exogenous component of the geographic diversity of BHC assets and then incorporate a gravity model of BHC investments across states to differentiate among BHCs within the same state.

2.2.Revenue diversification

There are three main distinct approaches used in the prior literatures to analyze the influence of diversification on bank profitability and risk. The first approach uses risk

return analysis that result from the merger simulations among existing individual banks and firms. The second approach using cross sectional regressions and/or panel regressions conducts an analysis of actual data of functionally diversified banks in non-interest income. The final approach focuses mainly on stock market reaction to the diversification decisions.

2.2.1. Synthetic bank simulations approach

The first approach uses risk return analysis that result from the merger simulations among existing individual banks and firms. Boyd and Graham (1988), Rose (1989) and Boyd et al. (1993) investigate the relationship between BHCs and non-bank firms through merge activities. The data was collected from the period 1971-1987 revealed that the most beneficial mergers were between BHC's and life insurance companies. The combination of BHCs with securities or real estate, in contrast, brings the increase of risk of failure. Saunders and Walter (1994) replicated the Boyd and Graham's work (1988) examine that when banks expand into insurance activities, they would receive more benefit as opposed to securities activities. Lown et al. (2000) conduct a similar test with the data for the period of 15 years from 1984 to 1998. They also produce the same conclusion except the latter combination case and suggest that the mergers between BHC's and life insurance firms facilitate less risky than those in either of the two individual industries.

2.2.2. Accounting analysis approach

The aim of accounting analysis approach is to study the impact of diversification reflected on the income statement and balance sheet data of bank activities. This method is the most favorite and popular of researchers in assessing the impact of diversification on firm's value since it requires less restrictive assumptions on the data generating process. Moreover, a huge datasets can be easily collected and analyzed compared to stock market data, making this approach adaptable and appealing.

Several causes were explored to explain why diversification benefits were not effective in some accounting analysis studies. DeYoung and Roland (2001) conducted a test in 472 large U.S commercial banks between 1988 and 1995, reporting three specific reasons about the disadvantages of diversification. Firstly, it requires a high cost for banks and customers on non-interest income activities compared to lending ones. Secondly, the ongoing lending activities are variable costs, whereas the fixed or semi-fixed labor cost of expanding into non-interest income is required and finally is related to fee-based activities.

Stiroh (2004a) on his research concluded that a little evidences support for diversification benefits when carrying out the examination of how non-interest income affects variations in bank profits and risk. The result showed that diversification benefits within broad activity, but not between them. In reality, he proved that the increase of non-interest income generating activities has linked to the decrease of risk-adjusted performance such as commercial and industrial lending, consumer lending, and trading.

Stiroh and Rumble (2006) analyzed US financial holding companies' balance sheet data from 1997 to 2001. Risk-adjusted measures of profitability and the measure of solvency risk are added. This study was concluded that although financial holding companies gain benefits from diversification, a greater reliance on non-interest income is more volatile and not more profitable than interest generating activities. Moreover, from this above study, the authors mentioned that higher correlation between non-interest income and interest income can be due to possible cross-selling of different products to the same customers. Sawada (2011) investigated the effect of revenue and loan diversification on bank performance, using data on Japanese banks for the period 1983–2007. The author confirmed that loan diversification increased bank profitability (return on assets ROA) and decreased risk (volatility of ROA), while revenue diversification did not have such effects.

2.2.3. Stock price impact approach

The third approach concentrates mainly on stock market reaction to the diversification decisions and then evaluates the potential diversification benefits. Santomero and Chung (1992) on their research provided evidences support for diversification. They used option pricing techniques to assess the volatility of asset returns and concluded that BHCs merger with securities firms does not pose the riskiness; moreover, the association with real estate will possibly cause higher risk but receive back higher returns.

A research from the US publicly traded firms between 1988 and 1995 of Delong (2001) classifies the banking activity based on focused or diversification and examines the abnormal returns of each group. An event study methodology was applied for the purpose of evaluating the cumulative abnormal returns (CARs) of bank mergers with non-bank firms. The analysis reveals that CARs grow in relative target to bidder size and reduce in the pre-merger performance of targets and then enhance value upon announcement. In detail, both activities and geography increase stockholder value by 3.0% while other types do not present the expected value.

Stiroh (2006a) in a research from 1997 to 2004 investigated the diversification on the return and risk of U.S BHCs. The paper is used a portfolio framework to evaluate the impact of increased noninterest income on equity market measures of return and risk of U.S. bank holding companies during the period of time. The author made a conclusion that non-interest income produces much more risky but not brings the higher mean equity returns. The result also suggested that the pervasive shift toward noninterest income has not improved the risk/return outcomes of U.S. banks in recent years. Baele et al. (2007) quantified the effect of diversification in terms of long-term performance/risk profile between diversified banks and their specialized competitors. They collected data from 143 listed European banks over the period 1989-2004. Tobin's Q, systematic and idiosyncratic components of bank were chosen to test the stated hypotheses. The result indicates that diversification improves bank value and mitigates idiosyncratic risk. However, these findings have conflicting implications for

different stakeholders, such as investors, bank shareholders, bank managers and supervisors.

2.3.Studies in emerging economies

Emerging markets increasingly attract the attention of researchers and investors in worldwide recently. It is the fact that economic reforms, the expansion of European Union and changing political climates may create more investment opportunities along with potential profits in the years to come. Although diversification topic has been researched in the U.S. and other developed countries; the market in developing ones starts fascinating analysts and investors after large changes during 1990s. However, there still remains a gap in research for emerging markets since those economies have suffered from insufficient privatization due to the existence of largest state-owned banks.

Odesanmi and Wolfe (2007) examined the impact of revenue diversification on insolvency risk across 22 emerging economies with 322 listed banks and concluded that diversification across and within both interest and non-interest income activities decreases insolvency risk. Allen N. Berger (2010), on the other hand, evaluated the empirical relationship between diversification strategies and the risk-return tradeoff in Russian banking during the 1997-2006 periods. He found out that banks' performance tends to be non-monotonically related to their diversification strategy. Moreover, a focused strategy is found to be associated with increased profit and decreased risk only up to a certain threshold.

In another research, Berger et al. (2010) also demonstrated that diversification discounts in financial conglomerates or diversified banks, based on cross-country data for Chinese banks. Gamra and Plihon (2011) conducted a study using a sample of 714 banks across 14 East-Asian and Latin-America countries over the post 1997- crisis time of changing structure. They reported that diversification gains are more than offset by the cost of increased exposure to the non-interest income, specifically by the trading income volatility. Nevertheless, this diversification performance's effect is found to be

no linear with risk, and considerably not the same among banks and across business lines. Gamra and Plihon also proved that if banking institutions choose the right niche, they can gain diversification benefits but depending on their specific characteristics, competences and risk levels.

From 153 commercial banks in five ASEAN countries data collection, Nguyen, Skully and Perera (2011) examined a research of the relations between bank market power and revenue diversification. Their empirical results point out that the loan and deposit market earn higher income from traditional activities. However, the market power creates new growth chances in non-traditional activities and delivers greater bargaining capacity with their customers. They also found that managers more focus on revenue diversification strategies at low degrees of market power and traditional interest-based products are more preferable at higher degrees of market power.

Turkmen and Yigit (2012) investigated the relationship between the credit diversification and performance of 50 Turkish banks between the time periods of 2007 – 2011. The study is examined the effect of sectorial and geographical diversification on the performance of Turkish banks and tried to explain how the diversification affects banks' performance. Return on asset (ROA) and return on equity (ROE) are used as measure of performance meanwhile Herfindahl Hirschman Index (HI) is used as a measure of diversification of banks. The number of credits and the amount of credits that banks let borrowers' use are employed as control variables. The empirical findings show evidences supporting the negative correlation between geographic diversification and bank performance. To be precise, Turkmen and Yigit demonstrated that focusing or diversifying credit portfolios influences the risk level that banks take on. Even worse, if the diversification level increases, it leads to rising of costs that are undertaken and diversification may not be associated with higher returns in every circumstances.

3. BANK DIVERSIFICATON

This chapter introduces theoretical background related to diversification especially in banking system. The definition of diversification would be presented in the first section with the aim at providing a general picture of this strategy. The motivation for diversification in emerging markets will also be discussed in detail after that. Risk-return trade off characteristics in financial markets, some endogenous reasons and banking crisis within 1990s will be considered as one of the main reasons that stimulates emerging banking change their approaches. These issues will be organized at the remainder of this section.

3.1.Definition of Diversification

Diversification is a heated debated subject in corporate strategy, with supporters and detractors on both sides of the issue, so what is diversification? In finance, diversification means reducing risk by investing in a variety of assets. If the asset values do not move up and down in perfect synchrony, a diversified portfolio will have less risk than the weighted average risk of its constituent. In general, the history of diversification dated back from a proverbial wisdom “Do not put all your eggs in one basket”. A review of the literature reveals that there is a great deal of variation in the way diversification is conceptualized, defined and measured.

Gort (1962) defined diversification in terms of the concept of ‘heterogeneity of output’ based on the number of market served by that output. He also pointed out that if two products are served separately, their cross-elasticity of demand is low and thus in the short run, the necessary resources employed in the production and distribution of one cannot be shifted to the other. To Berry (1975) diversification represents an increase in the number of industries in which firms are active. Kamien and Schwartz (1975) illustrated diversification as the extent to which firms classified in one industry produce goods classified in another. In all these early definitions, industry or market boundaries are assumed to be given. In contrast, Pitt and Hopkins (1982) used the word ‘business’

rather than industry, defining diversification as the extent to which firms operate in different business simultaneously. ‘Business’ definitions, in contrast to definitions of ‘industry’, assume the perspective of the firm as opposed to an external analyst and allow greater subjectivity in the measurement of diversification. During the expansion of U.S multinationals in the 1950’s and 1960’s, diversification was considered a necessary route to corporate success and counteracted a complete collapse. Throughout the post-war period, the trend toward diversification was persistent and strong, and debate focus on how much and to what extent to diversify.

However, recent attempts at defining diversification have shifted to the multidimensional nature of the diversification phenomenon. According to Booz, Allen and Hamilton (1985), defined diversification as a means of spreading the base of a business to achieve improved growth and/or (a) reduce overall risk that includes all investment except those aimed directly supporting the competitiveness of existing business; (b) may take form of investments that address new products, services, customer segments, or geographic markets; and (c) may be accomplished by different methods including internal development, acquisitions, joint-ventures, licensing agreement. Diversification from a view of Ramanujam & Varadarajan (1989) is defined as the entry of a firm or business unit into new lines of activity, either by processes of internal business development or acquisition. These definitions seem to capture the goals of diversification, its direction, and the means by which it is accomplished.

Related to financial intermediaries like banks, D’Souza and Lai (2004) indicated that diversification is particularly important for a bank, given its nature as a financial intermediary. Thanks to diversifying risks, the gaining from risk management in such financial firms will be enhanced to some extent. Moreover, some existing theories imply that increasing returns to scale linked to diversification. Banks acquire customer information during the process of making loans that can facilitate the efficient provision of other financial services, including the underwriting of securities. Likewise, securities and insurance underwriting, brokerage and mutual funds services, and other activities can produce information that improves loan making. Therefore, bank would engage in a large of activities that enjoy economies of scope and boost performance,

said the research by Diamond (1991), Rajan (1992) and Stein (2002). There is also a cost linked to intermediary risk, and a better diversified intermediary has less risk and lower costs.

Additionally, financial institutions could benefit to achieve credibility in their role as screeners or monitors of borrowers. As suggested by the work of Cammpell and Kracaw (1980), Diamond (1984), Boyd and Prescott (1986), the possibility of bad outcomes allows the intermediary to hide proceeds or to claim the bad luck instead of futile efforts led to negative results. Thus, they thought that an intermediary with better diversified investments is likely less face with very bad outcomes, reducing associated costs. Similarly, the conventional view is that greater competition has increased the need for bank to diversify: lower profits leave fewer margins for error, so diversification is in need of risk reduction. Nevertheless, reducing risk not always applies to all financial business and is not a primary reason which stimulates bank to diversify. In fact, diversification per se is no guarantee of a reduced risk of failure or for better performance, D'Souza and Lai (2004). Diversification is just a tool that helps banks expanding their banking activities (business lines) and their regions (geographic lines).

The bank's non-traditional activities from some existing literature reviews state that different financial activities affect different the level of risk at an individual bank. By definition, diversification involves moving into economic sectors that differ from the bank's home base, thus understanding of business environment and organizational knowledge will take time and efforts. Considerable literature review exists on nonfinancial corporate diversification, Denis et all (1997), Rajan Servaes and Zinggales (2000), Maksimovic and Phillip (2002) generally argued that any financial firm should concentrate on a single line of business for the purpose of gaining greatest advantage of management's expertise and reducing agency problems, leaving investors to diversify on their own.

3.2.Motivates for Diversification

There is now a large of burning questions mark over diversification studies for instance what are the reasons behind this strategy and what are the underlying forces driving the trend toward revenue diversification. The issues can be understood from policy markers' choices who try to capture the benefits associated with revenue diversification or react to the political and economic constraint of a jurisdiction (Yan, 2008). Additionally, in a counterpart research from the UK, Goddard, McKillop and Wilson (2008) found out that motives for diversification can be classified under the heading of market power, agency and resources.

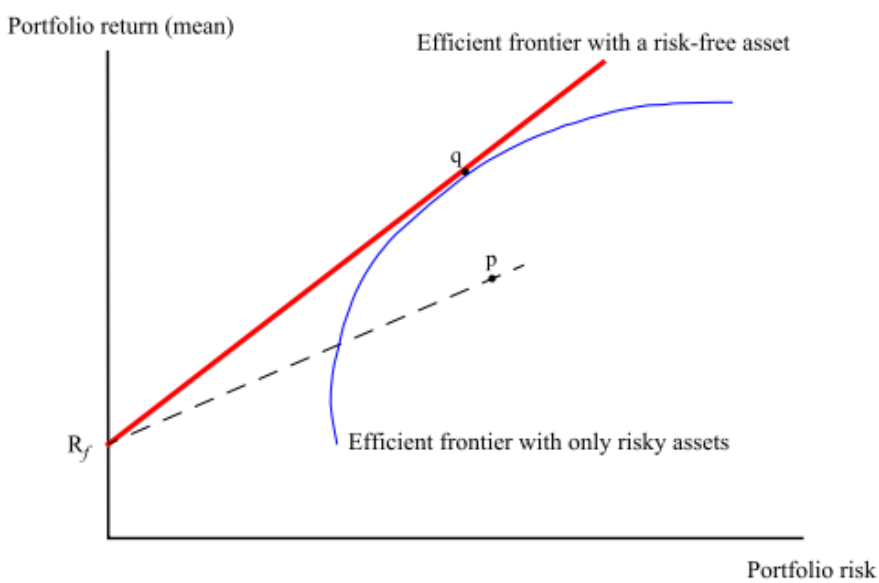
Market powers explain the ability of diversified firms indulge in various forms of anti-competitive behavior. For example, a diversified firm can use profits from one market to undercut its competitors in another market under a policy of cross-subsidization. Agency refers to the growth through diversification with the aim at satisfying the shareholder's requirements. However, whether diversification would increase or decrease shareholder value in profit-oriented firms is unclear since some papers saw a fall in shareholder value, which in turns attributed to inefficient investment and cross-subsidization of loss-making activities (Siggelkow, 2003). Resource refers to the specific assets, core competences or distinctive capabilities of the firms which can be exploited in new markets.

In this section, some significant reasons behind diversification strategy will be analyzed. Interestingly, reducing risk is not the main motivation stimulates banks diversify although it is one of crucial catalysts that protect the stability. Banks could possibly find benefits outside risk reduction in their revenue diversification strategy. Diversifying investment portfolios, expanding firm's activities, improving competition could be taken into account. Regarding to emerging markets, macro-economic issues after crisis 1990s or the entry of foreign banks have been considered as it triggers a new trend of banking system.

3.2.1. Risk-return characteristics

Standard capital market theory states that there is a tradeoff between risk and return which means the more risk is willing to accept, the more return can be expected. In fact, the 'no-free-lunch' theorem indicated no all else can be held equal. The decision to consume one product usually comes with the trade-off of giving up the consumption of something else. Or in other words, if you want higher expected return, you will have to pay a price in terms of accepting higher investment risk. However, this trade-off only holds true for the unsystematic risk, not for the risk that can theoretically be avoided by diversification. Financial theory therefore predicts that well diversified banks yield higher expected returns than banks with little diversification.

Figure 1. Efficient frontier with a risk free asset and risky asset



Naturally, profit-oriented banks would prefer investments with the highest expected return and they accept to invest in more risky assets. Non-traditional activities such as stockbroking, insurance, pension fund and real estate services are evidences of involving in risky portfolios. Their expansion seems to closely relate to trade off theory which states that potential return rises with an increase in risk. Low levels of uncertainty (low-risk) are associated with low potential returns, whereas high levels of

uncertainty (high-risk) are associated with high potential returns. However, due to risk-return tradeoff theory, banks aware that taking on some risk is the price of achieving returns; hence, they cannot cut out all risk, which is presented in figure 1.

Figure 2. Diversification does not always reduce risk. (Morgan and Samolyk, 2003)

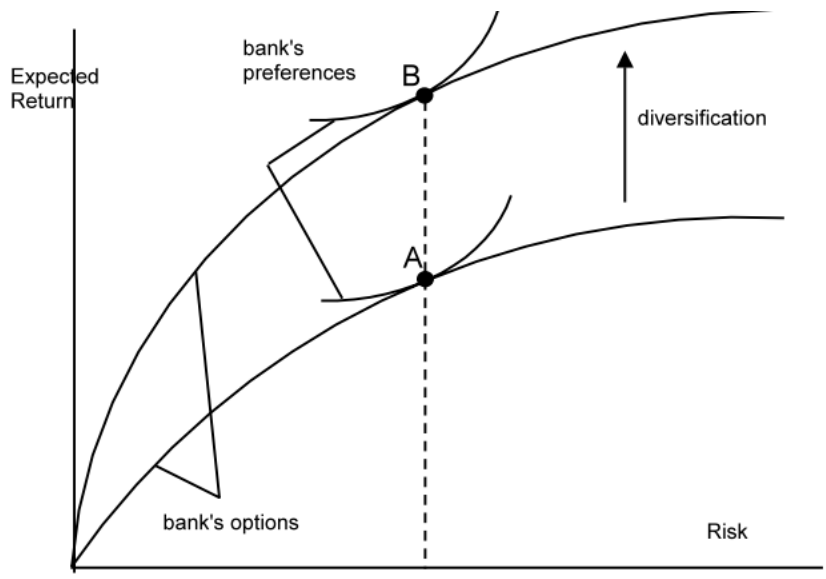


Figure 2 illustrates an outward shift in the risk-return frontier facing banking firms. The thick lines are the set of risk and return option of a bank in the efficient portfolio that means the bank can expect higher returns only by accepting greater risk. A greater ability to diversify implies an upward shift in the risk-return frontier; however, how bank responds to this shift depends on their risk preferences. The thin set of curve reflects the bank's aversion to risk since the slope indicates how much expected returns should rise to compensate the increase of risk. From the graph, it could be seen that bank would move from A to B for the purpose of diversifying. At point B, expected return is much higher but the overall level of risk is still the same. That is to say, the risk –return efficient of a bank depends on a bank's appetite for risk. A bank that is less risk averse, would choose higher return and risk (risk- return tradeoff theory) while the other may choose less risk. Therefore, the overall risk could probably goes up and down after diversification depends greatly on the choosing of bank's risk appetite.

However, whatever the actual portfolio choice along the improved risk-return tradeoff, risk adjusted return was showed at higher level at diversified banks.

3.2.2. Endogenous reasons

Regarding to emerging market, banking system in recent decades witnessed far-reaching change which faces a shrinking in traditional intermediation activities. In fact, many leading banks tend to expand their business into new business strategies including investment banking type and related fee-generating activities. There are at least five forces underlining this bank shift into non-traditional services: domestic deregulation, technology innovations, entry of foreign banks, corporate behavior changes and banking crises, according to Hawkins and Mihaljek (2011).

- Deregulation

Banking in the emerging economies was traditionally a highly protected industry which follows strictly regulated deposit and lending rates and pervasive restrictions on domestic and foreign entry. The banking crisis during 1990s which put a heavily pressure on global market, technology development and macroeconomic forced the banking industry and the regulators of approaching a new business method. The method was to deregulate the banking industry at the national level and open up financial markets to foreign competition. As a consequence, there is no longer the distance between banks and non-bank financial institutions as well as geographic locations of financial institutions. These changes, therefore, sustainably boosted competitive pressure on emerging banks and have led to deep changes in the banking strategies. The main point of new strategies is that it has been the removal of ceilings on deposit rates and the lifting of prohibitions on interest payments on current accounts at the domestic level. Thus, a source of cheap funding for many banks have been shrunk and put pressure on their traditional intermediation profits. Banks in its turn must involve in new activities and diversify their services, which fundamentally altered their income structure in terms of traditional line.

In addition, banks increasingly face competition from the non-bank financial institutions, especially for lending to larger companies, causing them expand their activities that had previously been reserved for other financial institutions. Furthermore, savers nowadays put their savings in several financial institutions such as mutual funds or pension funds. Banks; thus, cannot acquire all the core deposits they want, they engage in liability management by borrowing in the money market. This change in bank liability structure could possibly affect its allocation of resources between traditional and non-traditional activities. Accompanying deregulation has been greater emphasis on capital adequacy, which has encouraged banks to securities some assets, generate more fee-based income, and tried to improve efficiency.

- Technology innovations

In reality, new information technology is not a sound reason for the changes of banking industry in emerging economies in comparison with the industry economies. The low level of penetration of in most emerging economies means that the e-banking boom in the US and Europe is not seen as a threat to traditional banks in the areas. Nevertheless, banks are required to exploit advanced technologies in order to adapt and overtake new banking business models. The major issue about new technology is about the processing information which is the very essence of the banking business. The most significant innovation has been the development of financial instruments such as derivatives. In fact, risks can be reallocated to the parties that most willing and able to bear that risks.

Furthermore, banks are required to innovate in services and products, especially new deposit and loan-based offerings, differentiate strategies to set themselves apart from their rivals. Hence, they need to transform its business into a much wider array of off-balance sheet activities, ranging from credit lines to derivatives products. In this new technological environment, banks could probably sell more modern products while they still guarantee the management quality and customer services. One source of concern related to new banking technology is the emergence of a “digital divide” in the access to banking services. It is due to that customers are now better educated and affluent,

who will demand an improved service from banks through the Internet, which generate fee income for banks to a great extent.

- Entry of foreign banks

Due to banking crises, deregulation and globalization of financial services, the presence of foreign banks in the emerging economies in the second half of the 1990s increased rapidly. The role of foreign banks shapes important differentiating characteristics of banking system in emerging market economies. Empirical evidence from a number of studies found that the entry makes the market more competitive, reducing prices by raising deposit rates and lowering loan rates. The entry of foreign banks reflects the desire of both large international and regional banks to enter profitable markets and the improvement of efficiency and stability of the financial systems. The entry is expected to reduce the cost of re-capitalizing weak domestic banks.

As a result, the emerging markets gains potential advantages in foreign banks participation. In fact, foreign banks often bring state-of-the-art technology and do training for domestic bankers. They also familiar with a lot of financial instruments and techniques, and have faster and cheaper access to international capital markets and liquid funds. Empirical studies have concluded that overseas financial organizations would benefit national banking markets by increasing the degree of competition, launching a great deal of new financial products and better risk management techniques.

- Corporate behavior changes

Larger firms tend to move away from commercial bank loan toward open market securities like commercial paper or long-term bonds. In fact, bond outstanding have witnessed a considerable growth in almost all emerging nations over the last few years, allowing many firms find a cheaper approach to raise fund instead of borrowing from banks. Hence, banks are under increasing pressure to keep their customers and forced to develop techniques for better pricing and provisioning of credit risks, leading a

requirement of diversification in these banks. To be clarity, banks must diversify out of their traditional banking operations and provide fee-based services especially for hedging of risks. This is reason why a variety of contracts such as loan commitments, forward contracts and swap are released. The growth of off-balance sheet activities in providing such risk management services was apparently inevitable. In addition, banks have an incentive to enhance their presence and role of financial markets by offering both lending and other services to firms such as underwriting, guarantees, holding equity and engaging in venture capital activities. This is further stimulated by the development of financial instruments inducing more investment in real assets, trading-based services and banks could become more involved as asset gatherers and active intermediaries in these markets.

3.2.3. Banking crisis in the 1990s

Many banking systems in emerging economies have collapsed during the 1990s crisis after the external and banking systems were deregulated. A major collapse in emerging markets began with Asia in July 1997, when the Thai Government was forced to dramatically devalue its currency - baht, after failing to defend it in the face of a very large currency-account deficit, foreign debt, and a government budget shortfall. The result did backfire throughout Asia when currencies in the Philippines, Malaysia, and Indonesia came under attack from speculators. Meanwhile, financial panic seeped into emerging markets throughout the world, from Latin America to Russia, as financial difficulties surfaced in those nations. These troubles, therefore, have lost the confidence of investors about their return and economic recovery until 1999.

The reasons behind crisis cause some debates among researchers. Considerable attention in the financial crisis literature has been devoted to macroeconomic and institutional causes of banking crises. It is because of high growth of lending to the private sector, poor prudential regulations and bank supervisors that premature capital account is liberalized. However, the microeconomics is considered as the main catalyst of banking crisis. It includes the insufficiently diversified loan books that made specialist banks over-dependent on the particular sector served, over-optimistic about

lending to manufacturing firms and speculative property developers. Poor credit assessment, loans from the Government's commands or state-owned enterprises, inappropriate management incentives, excessive maturity risks and unappreciated currency mismatches (Plihon, 2011) are also the reasons.

After heavily suffering from the crisis during this period, the bank behavior of emerging economies has been changed, which profoundly shaped the banking system nowadays. Banks have restructured their portfolios towards highly liquid public securities, cash reserves and disproportionately decrease private sector credit. It in turn reflects the strategy to minimize risk after systematic distress. Likewise, the reduction of bank's profitability is often link directly to non-performing loans in the balance sheet, causing them invest in fee-based activities and Government's securities to protect themselves.

The model of universal banking after crisis expand to a great extent because it would allow banks to combine a wide range of financial activities and is assumed to be optimal for customers and financial stability (Schildbach, 2012). The idea of "one-stop shopping" of universal banking model saves a great deal of transaction costs and increases the speed of economic activities. Non-traditional activities are viewed as helping to reduce the risk of bankruptcy because they will be diversifying the income generated by the bank, which could generate a positive effect on firm value. Banks, therefore, must change the array of products and services in order to expand beyond traditional sources of revenues, helping increase profits and decrease risk exposures.

4. BANK PERFORMANCE

Banks and other financial institutions are one of the oldest and most important industries in the world. It is due to the fact that assets and liabilities, regulatory restrictions, economic functions and operating themselves lead those organizations become broad topics of both theoretical and practical area. In fact, banking and financial service industry has a profound effect in real life, impacting on the availability of jobs, the cost of livings, the adequacy of savings, and the quality of existence. Nowadays, it has a boom in financial services which causes the boundaries of between banking, insurance, security firms, finance companies, and other financial service providers are becoming dissolved. The industry is consolidating rapidly with substantially fewer but larger banks and financial firms, especially after the crisis recovery. The efficiency of banking sector could be considered as an important characteristic of well-functioning financial system of a country.

Due to the importance of banking performance in financial system generally and diversification strategies particularly, this chapter will describe a factual background of banking system and some crucial approaches in term of performance measurement. The remainder of this chapter is organized as follows. Section 1 provides an overview of modern banking system from its history to changing system nowadays. Section 2 introduces the roles of banks in financial market while section 3 discusses the scope of bank performance. In section 3, the analysis tool of financial performance as well as risk controlling within bank management will be figured out.

4.1.Overview of banking system

Banks are the principal sources of credit (loanable funds) for millions of individuals, families, businesses and many units of Government (Rose, 2008). In other words, bank can be defined in terms of the economic functions it serves, the services it offers or the legal basis for its existence. Certainly, banks can be identified by the functions they performs the economy which reflects the involvement in transferring funds from savers to borrowers (financial intermediation) and in paying for goods and services.

Historically, banks have been recognized for the great range of financial services they offer from checking accounts and saving plans to loans for businesses, consumers and governments. Nevertheless, bank services array are expanding promptly to include investment banking (security underwriting), insurance protection, financial planning, advice for merging companies, the sales of risk-management services to businesses and customers, and numerous other innovative services. Banks no longer limit their services offerings to traditional services but have increasingly become general financial service providers.

The primary purpose of this changing financial system is to encourage individuals and institutions to save and to transfer those savings to those individuals and institutions planning to invest new projects. This process, in its turns, encourages savings and transforms them into investment spending, stimulating the economy growth, unemployment rate decrease, and rising living standard. Moreover, the changes also involves in modern life as an essential tool of supporting consumption. To be precise, these include payment services that make commerce and market possible such as checks, credit cards, and risk protection services for those who save and venture to invest namely insurance policies and derivative contracts. It could be liquidity services which make it possible to convert property immediately into available spending power or credit services for those who need loans to supplement their income. As a consequence, a variety of banking types have been established with the aim at adapting the needs of communities and governments. The detail of some well-known banking types is listed as bellows.

Table 1. The different types of banking system. (Rose, 2008)

Name of banking type	Definition of Description
Central bank	Manage a state's currency, money supply, and interest rate
Commercial bank	Sell deposits and make loans to individuals and businesses
Community bank	Are smaller, locally focused commercial and savings banks
Cooperative bank	Help farmers, ranchers, and consumers acquire goods and services
Investment bank	Underwrite issue of new securities by their corporate customers
International bank	Are commercial banks present in more than one nation
Mortgage bank	Provide mortgage loan on new homes but do not sell deposits
Merchant bank	Supply both debt and equity capital to businesses
Minority bank	Focus mainly on customers belonging to minority groups
Retail bank	Are smaller banks serving primarily household and small businesses
Savings bank	Attract savings deposits and make loans to individuals and families
Universal bank	Offer virtually all financial services available in today's market place
Wholesale bank	Are large commercial banks serving corporations and governments

4.2.The roles of bank in financial market

The effect of financial market on decision making is dated back to Fisher's (1930) model of optimal investment and consumption choices. He showed why the decision by individuals to consume or save can be separated from the decision by firm to invest. He also demonstrated why net present value is the correct criterion for investment decisions. However, real financial markets have many more functions than solely allowing people to borrow and lend, as in the simple model of Fisher. The modern financial system of markets and institutions facilitates trade in a wide range of financial assets, such as stocks, bonds, currencies, insurance, and derivatives. That system is thus vast and complex which requires the enormous number of financial transactions conduct every day.

Financial market performs their functions in cooperation with a variety of financial institutions, intermediaries, service companies and regulators. A major function of the financial system is to facilitate the flow of funds from units with more money than investment opportunities (money surplus units) to units that have more investment opportunities than money (money deficit units). The surplus and deficit units could be

people, companies and governments. The flow of funds can take many different routes namely direct and indirect finance. Direct finance occurs when a money surplus unit buys securities straight from the issuer on a private or public market. However, the main flow of funds follows the indirect route and does not pass through a financial market. A common example is savings that people deposit at banks and that the banks use to make loans to other people.

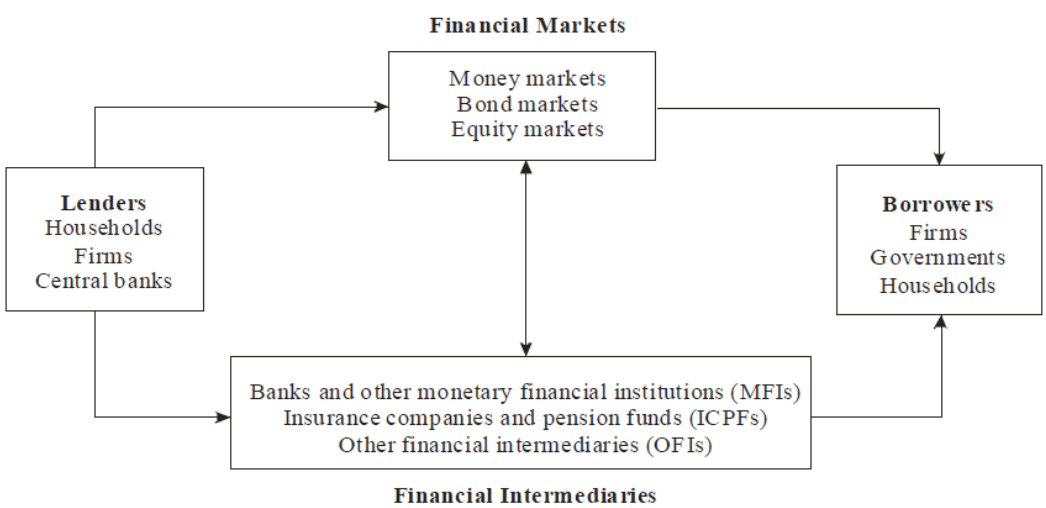
The second main function of the financial market is to determine prices of financial assets such as stocks, government and commercial bonds, derivatives, etc. In more general, financial markets determine the time value of money and the market price of risk. Market prices are found where demand meets the need supply and financial market is organized as a continuous process in which buyers and sellers interact to determine the price of the specific quantity of financial assets. The third main function is to provide marketability and liquidity. Marketability measures how easy it is to buy and sell a financial asset while liquidity measures how much value is lost in the transaction. An optimal marketability and liquidity make financial markets are attractive since it gives investors the flexibility to convert financial assets back to cash in case of need. Moreover, it also gives them to possibility to make the length of their investment period independent of maturity of financial assets. And last but not least the main function of financial markets and institutions is to provide a system for settling payments and clearing.

There are many different financial markets which are classified according to the characteristics of the trade securities, the organization of the market and the price discovery process. The most common subdivisions of financial markets are money and capital markets; stock, bond and derivative markets; and equity markets (Figure 3). Money markets are a form of direct finance and hence have wholesale markets with larger transaction sizes. In money markets, short term debt is traded, which has a maturity of less than a year such as treasury bills and commercial paper. Capital markets organizes the trade in long-term securities, with a maturity is more than one year. These include stocks, long-term government and commercial bonds.

The stock, bond and derivative markets are for immediate payment and delivery at the current price. Market for derivatives such as options and futures, determines prices today for a delivery that will take place in the future. The value of derivative securities depends on the value of the security of to be delivered on some future day. Equity market is the market in which shares are issued and traded, either through exchanges or over-the-counter markets. It is one of the most vital areas of a market economy because it gives company access to capital and investors a slice of ownership in a company with the potential to realize gains based on its future performance.

In fact, financial markets can be described as meeting places or networks of lenders, borrowers and financial intermediaries through daily financial transactions (Figure 3). Financial markets through these channels will take the responsibility of governing monetary, capitals, funding flows and risk.

Figure 3. An overview of the financial system. (Allen, Chui, and Maddaloni, 2004, p. 491)



Regarding to the roles of banks in financial markets, it is always mentioned as a type of financial intermediaries where provide services that facilitate financial transactions. To be precise, financial intermediaries can transform the flow of funds by changing the denomination, currency, maturity and risk of financial assets. Banks or particularly commercial banks are typical example of the process. Since commercial banks offer a

wide range of financial services to the public and the business community, including taking deposits, making loans and providing facilities for payment and foreign exchange. Therefore, banks thrive on the financial intermediation abilities that allow them to lend out money and receiving money on deposit. These activities are considered as the most important financial intermediary in the economy as it connects surplus and deficit economic agents.

Furthermore, banks perform an important role in terms of maturity transformation. They collect demandable deposits and raise funds in the short term capital markets and invest them in long term assets. This maturity mismatch allows them to offer risk sharing to depositors but also exposes them to the possibility that all depositors withdraw their money early. “Runs can involve the withdrawal of funds by depositors (retail runs) or the drying up of liquidity in the short term capital markets (wholesale runs)”, according to Allen and Carletti (2008). Additionally, in financial system, banks also play an important role in terms of credit provision and liquidity provision. That is to say, credit activity allows businesses to invest beyond their cash on hand, households to purchase homes without saving the entire cost in advance, and governments to smooth out their spending on tax revenues and infrastructure projects. Liquidity provision, on the other hand, protect against unexpected needs for cash. Because banks are the main direct providers of liquidity, both through offering demand deposits that can be withdrawn any time and by offering lines of credit.

Another important role of banks in financial markets is in respect to spurring growth, stated by Allen and Carletti (2008). Primarily, the participation of banks in economic development concentrate particularly upon providing credit and services to generate revenues, which are then invested back into a local, national, or international community. For the local community, banks maintain access to funding and financial services to both local business and citizens, as well as the money banks invest back into the community through employee payroll, business investments, and taxes. On a larger scale, national banks offer similar approach to credit and financial services to larger businesses, local governments, or even international customers. Investments made by

national banks are spread widely across the nation, thus impacting economic development across an entire country or geographic region.

4.3. Bank performance measurement

This section elaborates main points of bank performance measurement for the purpose of providing key analytical methods of bank's efficiency. The first sub section examines broad approaches used to measure bank performance and the last sub section is about risk-return controlling in bank.

4.3.1. The analysis scope of performance measurement

When it comes to a financial firm, performance refers to how adequately a financial firm meets the needs of its stakeholders (owners), employees, depositors, creditors and other borrowing customers. Moreover, the financial firm must find a way to keep Government regulators that satisfies its operating policies, loans, investments and public interest protection simultaneously. Inevitably, different stakeholders in a bank view performance from different angles. For instance, depositors are interested in bank's long term ability to look after their interests and their savings. Debt holders, on the other hand, look at how a bank is able to repay its obligations; a concern taken up by rating agencies. Equity holders, for their part, are bound to concentrate on profit generation for the purpose of ensuring a future return on their current holding.

However, in a simple way of thinking, bank performance in specific could be defined as its capacity to generate sustainable profitability. Profitability in a bank's first line of defense against unexpected losses since it strengthens its capital positions and improves future profitability through the investment of retained earnings. Although banking institutions have become increasingly complex, the key drivers of their performance remain earnings, efficiency, risk-taking and leverage. To be specific, "Earnings" reflects the amount of money that bank produces during a specific period usually a quarter and one year. It is the main determinant of its share price because earnings and circumstances relating to them can indicate whether the firm will be profitable and successful in long run. "Efficiency" refers to the bank's ability to generate revenue

from a given amount of assets and to make profit from a given source of income. “Risk-taking” is reflected in the necessary adjustments to earnings for the undertaken risks to generate them (e.g. credit-risk cost over the cycle). “Leverage” is the use of various financial instruments or borrowed capital such as margin to increase the potential return of investment.

There are three broad approaches used to measure bank performance namely accounting approach, economic and market-based measure of performance. Traditionally accounting methods primarily based on financial ratios which have been employed for evaluating bank performance. When looking to assess or improve their performance, banks often compare the performance of their peer and evaluate the trend of their financial performance over time.

- Accounting method approach:

The accounting method or the traditional measure of performance known as profitability ratios widely uses return on asset (ROA), return on equity (ROE), cost-to-income ratio, and net interest margin.

The return on asset (ROA) is the net income for the year divided by total assets usually the average value over the year:

Return on assets = net income / average total assets.

The return on equity (ROE) is the amount of net income returned as a percentage of shareholder equity. The ROE is useful for comparing the profitability of a company to that of other firms in the same industry and is considered as the most popular measure of performance.

Return on equity = net income / average total equity

The cost-to-income ratio equals a company's operating expenses divided by its operating revenues. The cost-to-income ratio shows the efficiency of a firm in minimizing costs while increasing profits. In other words, it shows the ability of the institution to generate profits from a given revenue stream. The lower the cost-to-income ratio, the more efficient the firm is running and the higher the ratio, the less efficient management is at reducing costs.

Cost-to-income ratio = operating expenses / operating revenues

The net interest margin is a performance metric that examines how successful a firm's investment decisions are compared to its debt situations. Net interest margin is also a proxy for the income generation capacity of the intermediation function of banks. A negative value denotes that the firm did not make an optimal decision as interest expenses were greater than the amount of returns generated by investments.

Net interest margin = net interest income / assets (or interest-bearing assets)

- Economic measure

The economic measures of performance estimate the development of shareholder value creation and the economic results generated by a company from its economic assets normally a fiscal year. The measure tends to focus on efficiency as a central element of performance. There are two sets of indicators that can then be identified amongst economic measures of performance. That is, indicators related to the total return of an investment and indicators related to the underlying level of risk associated with banks' activity.

The indicators related to the total return of an investment refer to the concept of an opportunity cost and the most popular one being economic value added (EVA). Developed by Stern and Stewart in 1991, EVA takes into account the opportunity cost for stockholders to hold equity in a bank, measuring whether a company generates an

economic rate of return higher than the cost of invested capital in order to increase the market value of the company.

EVA = return on invested funds – (weighted average cost of capital * invested capital) – (weighted average cost of debt * net debt)

The indicators related to the underlying level of risk associated with banks' activity, on the other hand, refer to risk-adjusted return on capital (RAROC). There are many different measures and different types of indicators under the generic name of RAROC such as RORAA (return on risk-adjusted assets), RAROA (risk-adjusted return on assets), RAROC (return on risk-adjusted capital). According to Kimball (1998) managers in banks must weigh complex trade-offs between growths, return and risk achieving. RAROC allows banks to allocate capital to individual business units according to their individual business risk. As a performance evaluation tool, it then assigns capital to business units based on their anticipated economic value added.

- Market-based measure

Market-based measures of performance characterize the way the capital markets value the activity of any given company, compared with its estimated accounting or economic value. The most commonly used metrics include total share return, price-earnings ratio, price-to-book value and credit default swap. To be specific, the total share return is ratio of dividends and increase of the stock value over the market stock price whereas price-earnings ratio (P/E) is a ratio of the financial results of the company over its share price. The price-to-book (P/B) value relates the market value of stockholders' equity to its book value and credit default swap (CDS) is the cost of insuring an unsecured bond of the institution for a given time period.

In reality, it is obviously that different stakeholders in banks will expect and assess bank performance in different views. For instance, depositors are interested in a bank's long-term ability to look after their savings and interests. Debt holders, on the other hand, look at how a bank is able to repay its obligations; a concern taken up by rating

agencies. Equity holders are bound to concentrate on profit generation, i.e. on ensuring a future return on their current holding. Managers, for their duties, seek profit growth; manage principal-agent operation, and long-serving employees.

4.3.2. Risk management in bank

Any profit-maximizing business, including banks, must deal with risk which derives from microeconomic or macroeconomic. Risk comes from the effects of inflation or recession, fiscal policy, natural disaster to new competitive threats or bankrupt of a supplier or customer. For banks where intermediation is the principal function, risk management consists largely of good asset-liability management (ALM). Notwithstanding the foregoing, ALM is vital role in managing risk; the movement of banks into new areas of off-balance sheet force risk management expanding to new risk arising from those activities.

Risk management involves in identification of the key financial risks, deciding where risk exposure should be increased or reduced, and finding methods for monitoring and managing the bank's risk position in real time. For all banks, from the traditional bank where ALM is the key activity to the complex financial conglomerate offering a range of bank and non-bank financial services, the objective is to maximize profits and shareholder value-added, and risk management is central to the achievement of this goal. Risk could be measured in terms of different financial products. But the objective of the bank as a whole will be to add value to the bank's equity by maximizing the risk-adjusted return to shareholders. Large universal banks will focus on the management of risk on the banking book (the traditional asset–liability management), the trading book (where banks are buying and selling bonds, equity, etc.), and in the risk management advice they give to corporate customers. In fact, inadequate risk management may threaten the ‘‘solvency’’ of a bank when liabilities in excess of assets. The most important types of risk encountered daily by financial institutions will be examined below

- Credit risk

Credit risk is known as the probability that some of a financial institution's assets, especially its loan, will decline in value. In order to measure credit risk, there are some indicators such as the ratio of nonperforming assets to total loans and leases; the ratio of net charge-offs of loans to total loans and leases; the ratio of allowance/provision for loan losses to total loans and leases; and the ratio of nonperforming assets to equity capital.

- Liquidity risk

Liquidity risk are concerned when financial firm has the danger of not having sufficient cash and borrowing capacity to meet customer withdrawals, loan demand, and other cash needs. One useful measure of liquidity risk include the ratios of

- Purchased fund (including Eurodollars, federal funds, large credit default swaps, and commercial paper) to total assets.
- Cash and due from balances held at other depository institutions to total assets.
- Cash assets and government securities to total assets.

- Market risk

Market risk is normally associated with instruments traded on well-defined markets, though increasingly, techniques are used to assess the risk arising from over the counter instruments, and/or traded items where the market is not very liquid. The value of any instrument will be a function of price, coupon, coupon frequency, time, interest rate and other factors. If a bank is holding instruments on account namely equities, bonds then it is exposed to price or market risk, the risk that the price of the instrument will be volatile. Two major types of market risks are currency and interest rate risk. Currency risk especially sensitive to market-value movements are bond portfolios and stockholder's equity whereas interest rate risk arises due to interest rate mismatches.

- Operational risk

The Basel Committee (2003) has listed the key types of operational risk as physical capital, human capital, legal and fraud. Physical capital is the subsets of which is damage to physical assets, business disruption, system failure, problems with execution and delivery, and/or process management. Technological failure dominates this category such as a bank's computer system. Human capital arises from human error, problems with employment practices or employees' health and safety, and internal fraud. Legal risk occurs as a result of the treatment of clients, the sale of products or business practices which forces bank being sued while fraud risk may be internal or external to the bank.

- Sovereign and political risks

Sovereign risk normally refers to the risk that a government will default on debt owed to a bank or government agency. Political risk is broadly defined as state interference in the operations of a domestic and/or foreign firm. Banks can be subjected to sudden tax hikes, interest rate or exchange control regulations, or be nationalized.

All of the various risks discussed above are interdependent, and as was noted earlier, there are other risks, common to all businesses including banks. As a consequence, it will affect greatly on a bank's profitability and risk exposure. It could be sudden, unexpected changes in taxation, regulatory policy or in financial market conditions due to war, revolution or market collapse, and macroeconomic risks such as increased inflation, inflation volatility and unemployment. Therefore, the identification and classification of risk are fundamental duties of bank management.

5. BANKING IN EMERGING ECONOMIES

Emerging economies or emerging markets are those of lesser-developed countries which are beginning to experience rapid economic growth and liberalization. Generally, these countries are described by a growing population experiencing a substantial increase in living standards and income, rapid economic growth, and a relatively stable currency. Emerging markets such as China, Russia, Mexico, India, and South Korea are sought by investors for the prospect of high returns since they often experience faster economic growth as measured by GDP. In fact, emerging markets normally do not have the level of market efficiency and strict standards in accounting and securities regulation to be on par with advanced economies, but they will typically have a physical financial infrastructure including banks, a stock exchange and a unified currency. This chapter, thus, identifies main issues of banking in emerging economies during financial crisis time. An introduction of those markets during period of time is illustrated firstly based on previous studies. The second section clarifies the expansion of banks into non-traditional services before the detailed figures are analyzed at the end of chapter.

5.1.Emerging economies during financial crisis

The financial crisis began from the U.S in the sub-prime mortgage housing finance market in 2007 and spread quickly to Europe to become a global crisis, affecting both financial systems across the globe and economic activities in virtually all countries. After the collapse of Lehman Brothers in September 2008, the crisis quickly spread across institutions, markets and borders. The transmission of the crisis from the U.S and Europe to the rest of the world came through a number of channels.

In reality, the financial institutions in emerging market economies had not engaged in popular practices that the financial centers in the major industrial countries often involve in. Balance sheets in emerging market were typically not exposed to the “toxic” assets that increasingly dominated positions in the major institutions. Derivatives were

employed much less frequently and were generally limited to the more traditional instruments. Financial institutions in emerging countries, in fact, either shied away from the exotic instruments such as credit default swap and collateralized debt obligations, or were prevented by regulation from holding or trading such instruments. The banking activities were generally boring and out-of-date style, according to Boorman (2009).

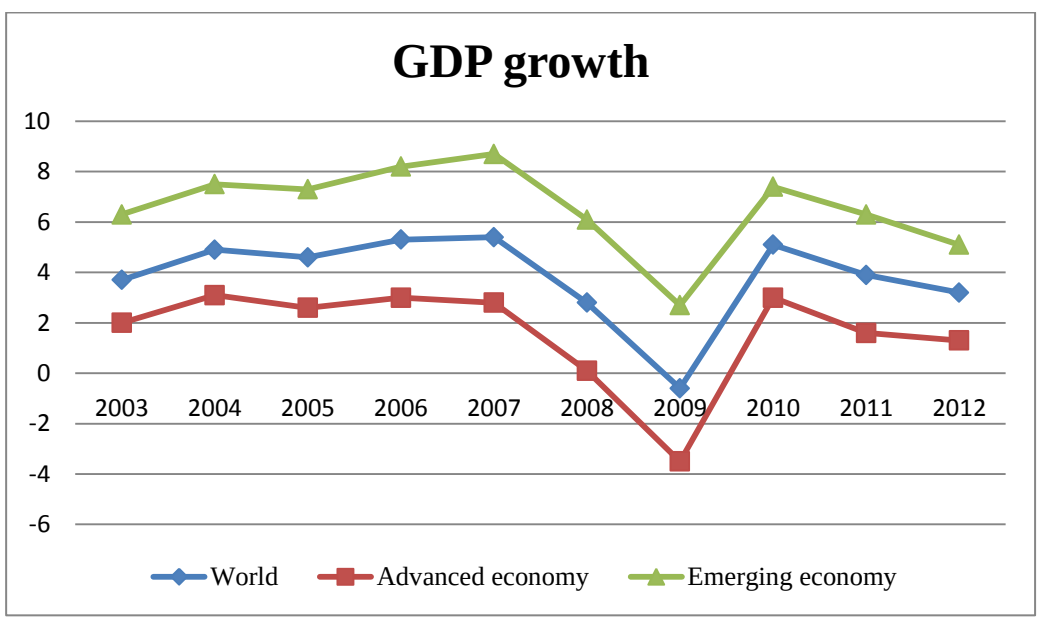
From the point of Boorman's view (2009), there are five major channels that brought the crisis to these emerging countries. Firstly, the withdrawal of funds by some of major financial institutions' subsidiaries located in emerging economies. Secondly, the freezing of the international credit markets since credit could not flow constantly through the international banks and global bond markets to emerging markets. Thirdly, the impact of the crisis on economic activity is reflected directly on export contracts. In reality, the crisis affected negatively on some large industrial markets (the U.S, EU, Japan), which are the large customers of emerging market exporters. As a result, the domestic economies of emerging markets witnessed a fall trade and then influenced on financial sectors as the quality of domestic credit deteriorated.

Fourthly, an important source of income and foreign exchange in many emerging market economies is remittances which tended to reduce over the period. Finally, the psychological factor is mentioned. The financial crisis in 2008 originating from the U.S and spreading quickly to other wealth countries was a surprise attack which undermined the business plans and expectations of almost everyone. The decline in assets values especially of equities and houses along with the increase of unemployment rate simultaneously brought the instability to financial systems and economics. Emerging countries, as a consequence, are also impacted profoundly from this global crisis.

According to Didier, Hevia and Schmukler (2011), although emerging countries suffered declines in real GDP growth comparable to those in advanced economies, emerging markets displayed a better recovery and a growing sooner. It could be seen that GDP growth indicators plummet by 50% in 2009 before witnessing a substantial

rise in 2010. However, due to the global financial crisis, there are huge changes in key aspects of emerging banking operations. These changes include bank funding maturity and sources of funding, bank lending (loan maturities, required collateral, types of borrowers) and liquidity management (liquid assets establishment, shortening of lending maturities). From a research work of Boorman (2009), a variety of policy responses were released after the crisis such as reserve enhancing measurement, strengthen financial sectors, fiscal stimulus packages and protectionist measures.

Figure 4. The comparison of real GDP growth in major economies in 10 years

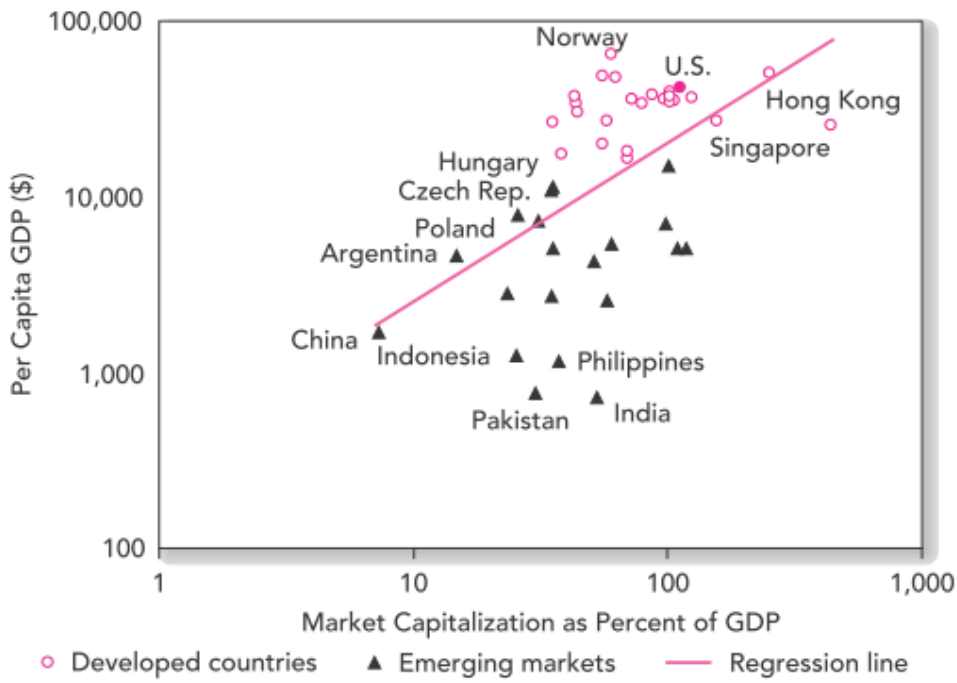


(Source: World Development Indicators database)

Illustrated by figure 5, emerging countries make up about 20% of the world GDP from 2005 to 2010 and approxiemately 10% of world market capitalization, suggesting that these markets are expected to show significant growth over the coming years, even absent spectacular growth in GDP. The growth of capitalization in emerging markets over the period of time was very large and much more volatile than growth in developed countries, indicating that both risk and rewards in this segment of the globe might be substantial. The regression line also pointed out that market capitalization to

GDP has positive correlation with per capita GDP. It means that an increase of the ratio of market capitalization is associated with an increase per capita GDP.0020

Figure 5. Per capital GDP and market capitalization as percent of GDP



In fact, a number of countries have involved in the International Monetary Fund (IMF) for support introduced deposit insurance schemes as a means of bolstering public confidence in their banking systems. Along with most of the world's more advanced economies, a large number of emerging market countries have also introduced ambitious fiscal stimulus packages. About one-third of the strategy comprised direct to the Government tax cuts and other revenue measure to stimulate private spending and about two-thirds accounted for expenditure measures. For example, in China, the stimulus package was comprised solely of expenditure measures whereas in India the measures were applied to temporary indirect tax reductions. In terms of protectionist measures, protectionist trade measures have also been part of the response to the crisis. Developed countries have relied solely on subsidies and other support packages.

Developing countries, on the other hand, have employed a variety of measures, including subsidies, import duties, import bans and non-tariff measures.

5.2.The expansion of banks into non-banking services

Non-banking financial services generally refer to non-interest income in bank. That is to say, any income that banks earn from activities other than their core intermediation business (taking deposits and making loans) is classified as non-interest income. These services include unit trust/mutual funds, stockbroking, insurance, pension fund or asset management, and real estate services. The expansion of this new trend is partly explained in chapter 3. It could be deregulation, new technologies, opportunities available to banks, and customers' demands. In fact, when customers buy a basket of financial services from banks, it helps them overcome information asymmetries that make it difficult to judge quality.

A bank with a good reputation can use it to market other financial services, which in its turns could possibly establish a competitive advantage and profit from offering those services. Most banks active in off-balance sheet instruments to improve their profitability because it generates fee income as well as it does not appear as assets or liabilities on the traditional bank balance sheet. Some off-balance sheet products have been offered by banks for many years with major services such as credit cards, letters of credit, acceptances, the issue of securities (bond equity), operation of deposit box facilities, acting as executor of estates, fund management, global custody and sales of foreign exchange. In general, the composition of non-interest income to be heterogeneous, consisting of the following, according to Heffernan (2004).

- Traditional fee income: intermediary service charges (deposit, chequing, loan arrangements), credit card fees and fees associated with electronic funds transfer, trust and fund management, and global custody services.
- Off-balance sheet fee income: loan commitments, note issuance facilities, letters of credits and derivatives.

- Newer source of fee income: securities brokerage, municipal securities, underwriting, real estate services, insurance activities.
- Management consulting.
- Securitization and proprietary trading.

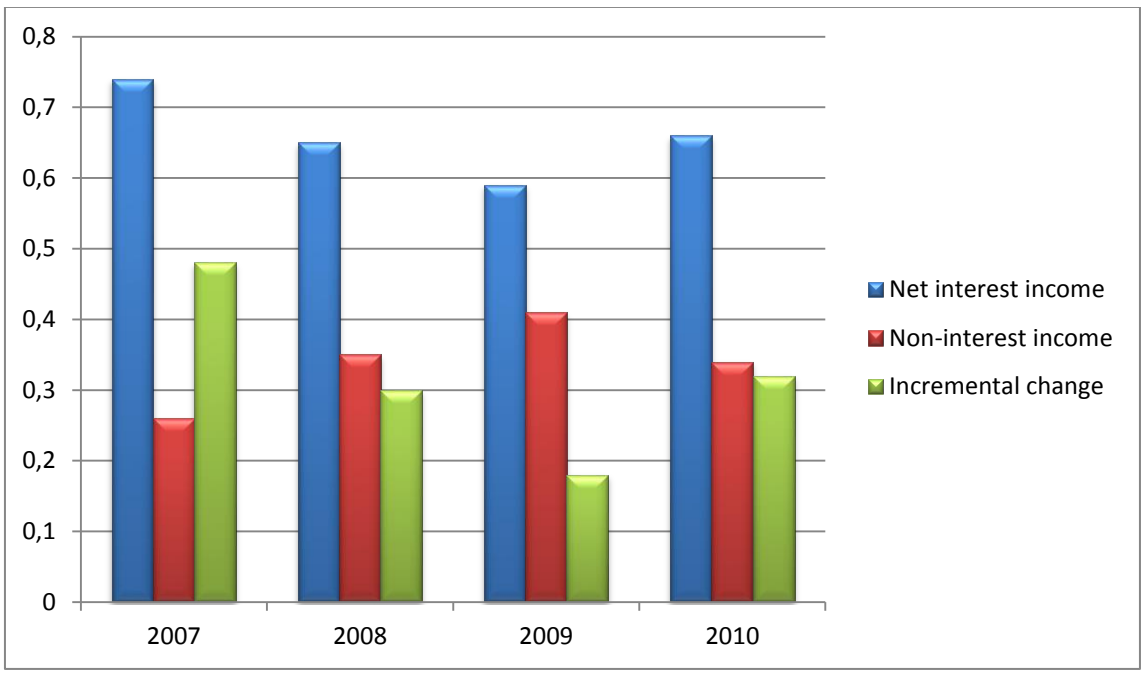
However, over the last 20 years, the most propriety products have been used or advised on the use of derivatives and securitizations.

- Derivatives: is a contract that gives one party a contingent claim on an underlying asset (bond, equity or commodity), or on the cash value of that asset, at some future date. The other party is bound to meet the corresponding liability. The key derivatives are futures, forwards, swaps and options.
- Securitization: the growth of securitization has been dramatically which includes the issue of bonds, commercial paper and the sale of asset backed securities. Banks are usually involved in these activities as indirect roles. A bond is an agreement to pay back a specified sum by a certain date. Short-term bonds have a maturity of up to 5 years; a medium-term bond matures in 5-15 years, while long bonds mature after 15 years or even longer.

  It is common for a bond issue to be handled by syndicate banks, with one bank acting as lead manager. Commercial paper has been issued as a promissory note, which agrees to repay the bearer at some specified date in the future. The issue of asset backed securities is the process whereby traditional bank assets (e.g mortgages) are sold by a bank to a trust or corporation, which in turn sells the assets as securities.

Banks are continually moving into diversified financial services and products that are listed above. Traditionally, banks have made most of their money on the difference between the interest rate that receive on the money loan out and the rates that pay on borrowed funds (net interest income). However, non-interest income has become an increasingly more important parts of a banks income statement, particularly for large and more diversified banks. The figure 6 below presents the ratio of net interest income and non-interest income to operating income over 4 years.

Figure 6. Ratio of net interest income and non-interest income to operating income.



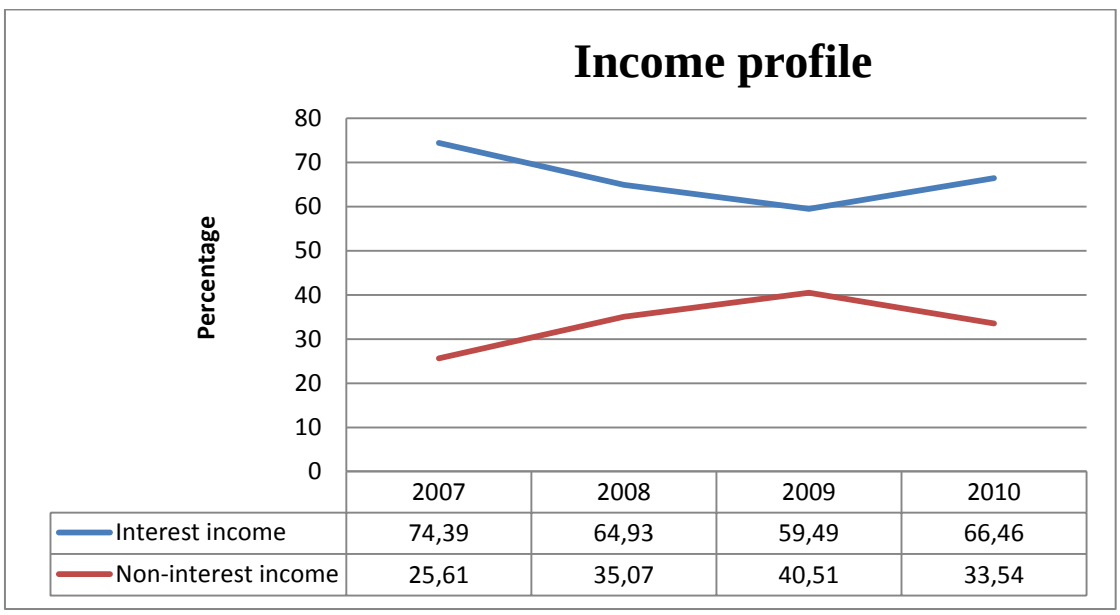
(Source: Bankscope)

The rapid of expansion of new forms of off-balance sheet demonstrated many banks are diversifying, and a result, non-interest income is an important source of revenue. From the figure 6, the gap between net interest income and non-interest income was narrowed in 2008 and 2009 when witnessed the peak period of financial crisis. Although net interest income still denominated in operating income of all selected emerging banks in 4 years, the growth of non-interest income were dramatically from 2007 to 2009 before decreased a few in 2010. To be specific, in 2009 the ratio of net interest income and non-interest income to gross income was around 0,6 and 0,4 in comparison with a huge gap 0,74 and 0,26 respectively in the first research year.

In figure 7, there is an upward trend in non-interest income from 2007 to 2009 in contrast to a downward trend in interest income (from nearly 80% to 60% - a decrease of 20%). However, after financial crisis time, the income profile of these selected emerging banks has witnessed a significant change when the proportion of interest

income begun to recovery to well under 65% in total operating income. The distance between two types of income source is narrowed compared to 2007. It is the fact that, when interest rates are increasing, noninterest income falls and vice versa. In contrast, changes in GDP are positively correlated with changes in interest income and negatively with noninterest income. Hence, when the economy slows, and with it interest income, noninterest income increases and acts as revenue buffer which accurately reflects the market conditions during financial crisis time.

Figure 7. Income profile of banks in emerging economies



	2007	2008	2009	2010
Interest income	74,39	64,93	59,49	66,46
Non-interest income	25,61	35,07	40,51	33,54

(Source: Bankscope)

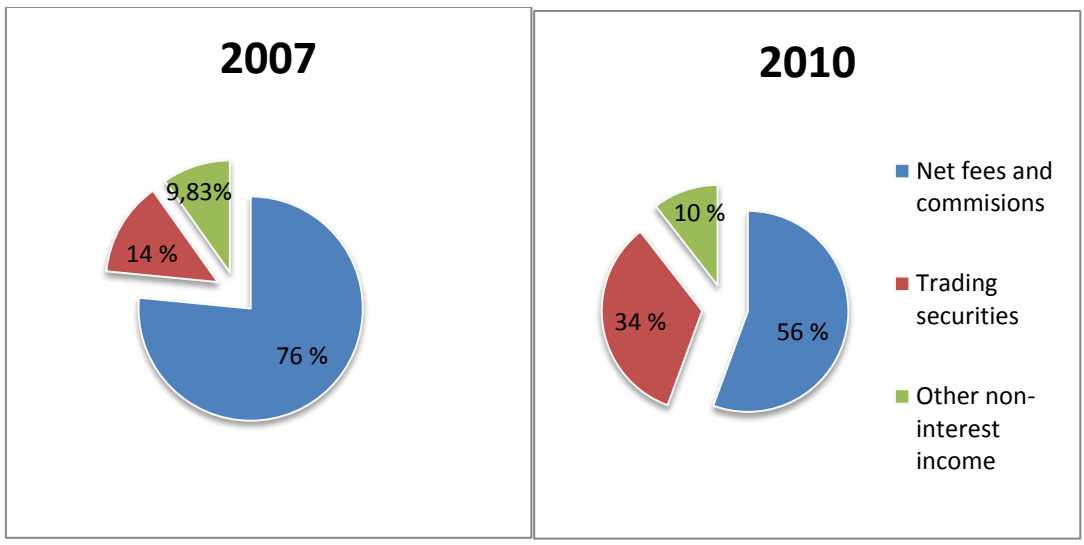
The source of the non-interest income varies when it is divided into fees and commissions, profit and loss from financial operations and others. In general, the components of non-interest income consist of the following services. Traditional fees income: intermediary services charges (deposit, cheque, and loan arrangements), credit card fees and fees associated with electronic funds transfer, trust and fund management, and global custody services. Newer sources of fee income: securities brokerage, municipal securities, underwriting, real-estate services and insurance activities. Fee

income from off-balance sheet items: loan commitments, note issuance facilities, letters of credit and derivatives. Management consulting, data processing or back office work, securitization and proprietary trading.

According to a research of Davis and Tuori (2000), the main source of non-interest income in 1995 in the U.S and the UK is fee and commissions. The same result has also applied for France, Italy and Austria, where fee and commissions played an important part of non-interest income. Denmark is the only country where profit and loss from financial operations is a key source of non-interest income. Sinkey and Nash (1993) showed that specializing in credit card lending (often generating fee income through securitization) gave rise to higher but more volatile income compared to banks undertaking more conventional activities.

Regarding to emerging market economies, fees and commissions has become the dominant source of non-interest income, replacing the traditional mainstays of service charges and income from trust activities. However, in the recent years, the proportion has been witnessed a large change to other sources coming from trading securities, investment securities or derivatives although fee income has accounted for most of the growth in non-interest income. In 2007, the fees and commissions comprised 76.54% of total non-interest income, comparing to 13.63% in trading securities and 9.83% from other income. Nevertheless, the net fees and commissions contracted three years ago (2010) decreased significantly to 55.64% while trading securities rose dramatically to 34%. The distance between net fees and commissions and trading securities has been narrowed when the latter accounted for 33.83% to total non-interest income. (Figure 8)

Figure 8: Non-interest income components in selected emerging economies



(Source: Bankscope)

5.3.The stylized facts of emerging banking market

This section clarifies the evolution that marked emerging markets' banking systems in recent time. The stylized facts of emerging markets especially seven selected countries will be focused. The information is collected from balance sheet and income statement before some financial key ratios are calculated at the end of section.

5.3.1. Balance sheet indicators

The emerging banking industry system has undergone substantial structure reforms after the crisis 1990s especially in Asian market. The largest proportion of total assets is loans, following deposit & short-term funding, other earnings assets and equity (table 2). Loans accounted for 51.74% of total asset in 2010, a decreased of approximately 10.5% in 2007. As can be seen from the table, the share of loans of total assets witnessed a downward trend as opposed to an upward trend in share of equity during the research time period. It could be the fact that the GDP index of these emerging

markets reduced significantly during financial crisis time whereas equity market returns have a negative correlation with GDP growth. Therefore, investors have been anticipating such growth and bidding up assets in advance. This in turns leads to these above mentioned trends.

The share of credit going to business sector has concentrated mainly on residential mortgage loans; however, loans to financial sector such as Consumer/ retail loans grew rapidly throughout the period. Investing in these assets, which appear to have relatively higher yields than Corporate and Commercial loan, allowed banks to mitigate the decline in the overall rate of return on their assets. Deposit & short-term funding refers to an amount of money placed in a bank or financial institution for a term no longer than one year. The share of deposit & short-term funding fell down considerably in times of post-crisis (from 48.28% in 2008 to 41.88% in 2009). Regarding to other earning assets, banks are likely to engage more in securities and derivatives investment which comprised 33.83% and 20.41% respectively while deposits from banks decreased to 18.99% at the end of 2010.

Table 2. Balance sheet indicators

	2007	**2008**	**2009**	**2010**
As % of total asset				
Loans	57.13	57.08	52.33	51.74
Equity	14.20	15.44	16.54	15.07
Deposit & short-term funding	49.54	48.28	41.88	43.22
Other earnings assets	27.50	24.31	29.15	29.92
As % of total loans				
Corporate and Commercial loan	12.09	11.92	11.44	11.62
Consumer/ retail loans	15.32	13.52	15.00	17.19
Residential mortgage loans	39.34	32.45	36.36	38.13
As % of other earning asset				
Total securities	21.44	21.69	22.25	33.83
Derivatives	13.63	51.38	27.67	20.41
Deposits from banks	25.34	43.06	25.90	18.99

Notes: Median value percentages Source: Bankscope

5.3.2. Income Statement indicators

Diversification in bank strategies into new market activities reflects a major ongoing shift in the structure of these emerging banking incomes. While most banks not surprisingly still rely on income from traditional banking and interest revenue remains dominant in the structure, the attention of non-traditional business income has increased and is relatively high. The expansion to non-interest income is clearly shown in 2009 when the gap between interest income and non-interest income reduced substantially. Banks tend to diversify their strategies by moving into new capital market activities and combining them with the traditional intermediation functions. It could be said that these emerging banks emphasized on non-interest income in financial crisis period with the aim at mitigating the risk that they can be suffered.

Table 3. Income Statement indicators

	2007	**2008**	**2009**	**2010**
As % of operating income				
Net interest income	74.39	64.93	59.49	66.46
Non-interest income	25.61	35.07	40.51	33.54
As % of non-interest income				
Net fees and commissions	76.54	43.43	39.10	55.64
Trading securities	13.63	21.69	22.25	33.83
Other non-interest income	9.83	34.88	38.65	10.53

Notes: Median value percentages Source: Bankscope

Noninterest income is a heterogeneous category that comprises many different activities which is broken down into four primary components – fiduciary income, service charges, trading revenue, and fees and other income. Although net fees and commissions still play a crucial role in non-interest income activities, the structure of the non-interest income has also shifted toward trading securities (table 3). The net fees and commissions contracted in 2010 to about 55% against 76% in 2007, whereas the net trading securities income rises dramatically to nearly 34%. Other non-interest income coming from fiduciary operation, ATM deposits or usage fees reach a peak in

2009 before decreasing sharply to the point of 2007. The share of the income was nearly equal to the share of fees and commissions during crisis time (2008 and 2009).

5.3.3. Financial ratios of banking system

In order to measure the efficient of bank's operation, the assessment of some key financial ratios is in great of necessity. Two major financial ratios to evaluate bank's profitability are return on assets (ROA) and return on equity (ROE). ROA measures how efficient management is at using its assets to generate earnings whereas ROE gives an idea to measure a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. In general, ROA and ROE during financial crisis declined steeply when falling into the lowest point in 2009 with 1.04% and 6.64% respectively. It demonstrates that banks earned less money on converting their investments into profit. One year later, banks staged remarkable recoveries after financial shocks but these ratios were much lower than that of 2007 (table 4).

Another commonly watched measure of bank performance is the net interest margin (NIM) which examines how successful a firm's investment decisions are compared to its debt situations. The spread of between the interest earned on the bank's assets and the interest cost on its liabilities is reflected exactly in NIM ratio. If the bank is able to raise funds with liabilities that have low interest costs and is able to acquire assets with high interest income, the net interest margin will be high, and the bank is likely to be highly profitable. The ratio in 2010 was 5.21 which had the lowest ratio among the selected research years. It is due to the fact that rates of return on securities are generally lower than those on loans, this shift contributed further to the narrowing of the NIM.

The cost to income, defined by the operating costs (administrative and fixed costs) divided by operating income, can be used for benchmarking by the bank when reviewing its operational efficiency. In fact, that there is an inverse relationship between the cost to income ratio and the bank's profitability, which means that the

lower the ratio, the more efficient the bank. It could be seen that there is a dramatic growth in cost to income ratio in the 2-year middle with nearly 84% and 88% respectively, higher than that of 2009 over 20%. It can be explained that costs were rising at a higher rate than income and banks gained less profit and less efficient than other years. It apparently reflects the worst financial crisis this time when triggering impressive results.

Capital fund to total assets ratio measures whether a company has sufficient capital to support its assets. Besides, capital funds to total net loans measures whether a company has sufficient capital to support its loans. These ratios can help banks determine the minimum capitals must have in order to guarantee the operations. The median of two ratios in the selected emerging banks was 13% and 23% respectively. On the other hand, the level of equity to assets and equity to loans ratios of these banks ascended and remained the trend until the end of 2009, which means that banks have riskier assets. Non-traditional activities in which banks engaged are more generators of profits than traditional ones but more risky.

Table 4. Financial ratios of banking system (%)

	2007	**2008**	**2009**	**2010**
Return on assets (ROA)	1.6	1.28	1.04	1.16
Return on equity (ROE)	11.98	8.93	6.64	8.02
Net interest margin (NIM)	5.85	6.45	6.02	5.21
Cost to income	60.81	83.97	87.71	82.09
Capital funds to total asset	13.82	12.85	13.09	12.65
Capital funds to total net loans	23.75	23.49	23.70	23.58
Equity to assets	14.20	15.44	16.54	15.07
Equity to loans	26.23	27.47	32.76	29.90

Notes: Median value percentages Source: Bankscope

6. DATA AND METHODOLOGY

This chapter clarifies the research hypotheses, data, empirical methodology and control variables explanation for the empirical test of the study. First section illustrates the research hypothesis while the second section explains the data as well as the collection method with a descriptive statistics table is provided. Applied methodology for the empirical tests and description of econometric models are explained in the last section of the chapter. The determinants of financial performance using cross-sectional are estimated with multiple regression analysis. Besides cross-sectional regression, fixed effects panel estimation with OLS estimator is also applied. All variables are calculated over time for each bank as a combination of means and standard deviations for all years the bank is observed.

6.1.Research hypotheses

The previous studies provide evidences to support for both the positive and negative impacts of revenue diversification strategy. Thus, risk-adjusted return, insolvency risk as well as bank performance improvement has been still controversial issue. This could possibly because economic booms and different bank structures can produce dissimilar results. In general, the stated hypotheses below will try to figure out the impact of non-interest generating activities on bank performance and risk taking. Moreover, the different impacts on different bank types and bank specific characteristics will be illustrated.

H_1: Diversification benefits exist and these gains have been offset by the increased exposure to non-interest activities.

In order to test the overall effect of revenue diversification and non-interest income on bank performance, the first hypothesis is stated. It is supposed that the rapid rate of growth in these economies provides potential diversification opportunities and thus effect on portfolio risks particularly when economic conditions are volatile. The test is

expected to demonstrate that revenue diversification enhance profitability and reduce risk. Some control variables are included to reflect bank strategic choices and characteristics that can evaluate the effectiveness.

H_2: The relationship between bank return and diversification is non-linear in bank risk

The hypothesis is expected to support for the U-shaped relationship, describing the relationship between diversification and performance, conditional on the risk level of bank. The estimations on risk-adjusted return performance will be conducted.

H_3: The effect of bank performance from diversification strategy is different with bank types.

The hypothesis is formed to test the banking aspects which will be estimated the diversification interacted with dummy variables of commercial banks, investment banks, cooperative banks, and other banks. It is expected to prove that the different types of bank will lead to different impacts from diversification strategy.

H_4: Large and well-capitalized banks are likely to benefit from revenue diversification in terms of risk prevention and charter value protection.

This hypothesis is proposed in order to test the impact of diversification may vary with banks characteristics and strategic choices. The estimation of regression will focus mainly on bank size and capitalization that the revenue diversification interacted with. The hypothesis is expected to show larger banks are more likely to have large off-balance sheet positions and higher charter value firms may have higher capital ratios to protect their value.

6.2. Data description

The empirical analyses are built on the bank-level and country-level indicators from 2007 to 2010. The period chosen during the financial crisis provides the banking trend in three major periods: the rise of transition economies (2007), during its distressed time caused by global financial crisis continued (2008-2009), and the recovery period (2010). Geographically the data consists of following seven largest emerging markets (group E7) are Brazil, China, Indonesia, India, Mexico, Turkey and Russia. The set of countries is justified by their growth trends in financial and economic development, which in its turn could generate clear and significant results among the rest of emerging countries.

All financial information data are taken from unconsolidated financial statements of listed banks obtained from the Bureau van Dijk's BankScope database. Apart from the presenting absolute values of lines of balance sheets and income statements, most common bank–level ratios are calculated to evaluate its performance. The macroeconomic data such as GDP and Inflation is taken from the World Bank: World Development Indicators database.

The chosen data method is following steps. Banks with less than four years of time series observations are eliminated. Other observations with missing, extreme or nonsensical values are also deleted. After that, the list of the banks is adjusted by type of its main activities since this study concentrates solely on banking services rather than macro management. From the bank lists, central banks, specialized government credit institutions, multilateral government banks are excluded. The database therefore comprises commercial, saving, cooperative, investment banks, Islamic banks and non-banks credit institutions in which commercial banks comprise of the largest observations. In total, the filtered database contains each year 915 observations across 1937 bank-level data. All observed variables in one observation per bank are averaged over all year from 2007 to 2010. Table 5 below presents the summary statistics for main primary cross-sectional sample.

Table 5. Descriptive statistics of variables

	Mean	Median	Std.Dev	Minimum	Maximum
Bank specific controls					
Equity/Asset (%)	19.536	15.713	12.787	1.685	77.214
Loan/Asset (%)	52.835	55.014	17.140	0.000	96.641
ROAA (%)	1.693	1.237	1.803	-3.191	26.350
ROAE (%)	10.944	9.005	9.355	-4.229	118.284
Total asset in US$m (Ln Size)	5.174	4.598	2.397	0.393	12.960
Insolvency risk					
RAR_{ROA}	0.140	0.089	0.216	-0.307	3.261
RAR_{ROE}	0.886	0.729	0.758	-0.342	9.585
Z-score	19.676	15.913	12.818	1.704	77.402
Revenue diversification					
HHI(rev)	0.339	0.346	0.094	0.000	0.500
HHI(non)	0.161	0.118	0.167	0.000	1.000
Macroeconomic indicators					
GDP_growth (%)	3.425	2.600	2.177	0.950	10.850
Inflation (%)	9.440	10.430	2.068	3.325	10.430
Observation	**915**	**915**	**915**	**915**	**915**

The data comprises of 915 banks in 7 countries during the period 2007-2010. ***Equity/Assets*** measures capitalization, ***Loan/Assets*** ratio of loans to total asset, ***ROAA*** and ***ROAE*** profitability***, Ln Size*** is the natural logarithm of the book value of assets, $\boldsymbol{RAR_{ROA}}$, risk adjusted return on asset, $\boldsymbol{RAR_{ROE}}$, risk adjusted return on equity, ***Z-score*** is a measure of bank stability. ***HHI(rev)*** is revenue diversification which measures diversification between interest and non-interest income, ***HHI(non)*** is non-interest income share which measures diversification within non-interest income generating activities. ***GDP_growth*** is the annual gross domestic product. ***Inflation*** is measured at consumer prices.

6.3.Research methodology

The cross-sectional regression for variable coefficients is applied in this study, which is also used in other research of Stiroh (2004, 2006), Gamra and Plihon (2010), and Köhler(2013). Multiple regression analysis will test stated hypotheses about the parameter in the population regression. However, I intend to explore further details about the difference between the diversification's impact within and across banks. The data, therefore, is grouped to become balanced panel data analysis and tested again by fixed effects panel estimation with OLS estimator for variable coefficients. Advantages of panel data compared with time series or cross-sectional data set is that they allow identification of certain parameters or questions, without the need to make restrictive assumption. Nevertheless, this method is solely applied to test the first hypotheses since it does not allow to control for country specific, bank specific and other factors. Dummy variables, moreover, are not applicable for this estimation method.

In addition, more functions forms such as quadratics and interaction term will be added to the equations.

Quadratic functions are used quite often in applied economics to capture decreasing or increasing marginal effects. The estimated equation as

$$\widehat{y} = \widehat{\beta_0} + \widehat{\beta_1}x + \widehat{\beta_2}x^2 \quad (1)$$

Then the approximation: $\Delta\widehat{y} = (\widehat{\beta_1} + 2\,\widehat{\beta_2}x)*\Delta x$, so $\Delta y/\Delta x = \widehat{\beta_1} + 2\,\widehat{\beta_2}x$ (2)

This says that the slope of the relationship between x and y depends on the value of x; the estimated slope is thus $\widehat{\beta_1} + 2\,\widehat{\beta_2}x$. The general formula for the turning point of any quadratic is $x^* = -\widehat{\beta_1}/(2\widehat{\beta_2})$, which leads to a positive value if $\widehat{\beta_1}$ and $\widehat{\beta_2}$ have opposite signs and a negative value when $\widehat{\beta_1}$ and $\widehat{\beta_2}$ have the same sign.

Interaction term, on the other hand, is likely to natural for the partial effect, elasticity or semi-elasticity of the dependent variable with respect to an explanatory variable to depend on the magnitude of yet another explanatory variable. It is often used to re-parameterize a model so that the coefficient on the original variable has an interesting meaning. The model with explanatory variables and an interaction as below

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_1 x_2 + \ldots + u \quad (3)$$

β_2 is the partial effect of x_2 on y when $x_1 = 0$. The model can be re-parameterized as

$$y = \alpha_0 + \delta_1 x_1 + \delta_2 x_2 + \delta_3 (x_1 - \mu_1)(x_2 - \mu_2) + \ldots + u \quad (4)$$

where μ_1 is the population mean of x_1 and μ_2 is the population mean of x_2. The coefficient now on x_2 and δ_2 is the partial effect of x_2 on y at the mean value of x_1. Therefore, in practice, if the means of variables are subtracted, these would typically be the sample means before creating the interaction term, the coefficients on the original variables have a useful interpretation.

6.3.1. Measure of diversification

The Herfindahl Hirschman Index (HHI) is computed for all banks to account for diversification between two major types of income generating activities. The measure of revenue diversification HHI(rev) accounts for variation in the breakdown of net operating income into two broad categories: share of net interest income and share of non-interest income. The revenue diversification, thus, is calculated as follows:

$$HHI(rev) = 1 - \left[\left(\frac{NON}{NON+NET} \right)^2 + \left(\frac{NET}{NON+NET} \right)^2 \right] \quad (5)$$

Share of Non-interest income is captured by NON and share of net-interest income is defined by NET. A higher value indicates a more diversified mix. The value 0 means

that all revenue comes from a single source or it is complete concentration whereas 0.5 is an even split between net interest income and non-interest income or it is complete diversification. A rise in both indices shows increase in revenue concentration and less diversification.

In line with Mercieca et al (2007), these above computations are also used to construct measures of diversification within non-interest income generating activities.

$$HHI(non) = (\frac{COM}{NON})^2 + (\frac{TRD}{NON})^2 + (\frac{OTOP}{NON})^2 \quad (6)$$

Where NON= COM+TRD+OTOP, and COM stands for fees and commission revenue, TRD captures trading income and OTOP is other operating income. Diversification variables measure the degree of bank diversification in which a higher value indicates a more diversified.

6.3.2. Measure of risk-adjusted return

Consistent with the literature on revenue diversification, the risk-adjusted returns on assets and equity (RAR_{ROA}, RAR_{ROE}) are used as additional measure of performance (Stiroh 2006). The main measure of insolvency risk is the Z-score. The formulas for the Z-score and RAR_{ROA}, RAR_{ROE} are shown below:

$$Z - score = \frac{ROA+E/A}{\sigma ROA} \quad (7)$$

$$RAR_{ROA} = \frac{ROA}{\sigma ROA} \; ; \; RAR_{ROE} = \frac{ROE}{\sigma ROE} \quad (8)$$

Where the return on assets (ROA) is the ratio of profit before tax to total assets, return on equity (ROE) is the ratio of profit before tax to total equity and E/A is the ratio of equity to total asset and a higher ratio indicate higher risk-adjusted profits. The risk adjusted returns on asset and equity (RAR_{ROA}, RAR_{ROE}) is calculated by dividing the

return on asset (ROA) and return on equity (ROE) by their standard deviations respectively. A higher Z-score indicates improved risk-adjusted performance and lower probability of bank insolvency. It is interpreted as the distance to default or the number of standard deviation that a bank's rate of return of assets has to fall for the bank to become insolvent.

6.3.3. Empirical methodology

The first step is applied conventional Ordinary Least squares (OLS) estimation under the assumptions to test hypothesis 1. The empirical analysis aims to shed light on the impact of revenue diversification and bank's performance, risk adjusted return and controlling key banking aspects based on cross-sectional data method. The basic empirical specification for the cross-sectional between regressions is below. Where Y_i is a measure of performance, $HHI(rev)$ is revenue diversification, $HHI(non)$ is non-interest income share, and X is a vector of other control variables, all for banks i.

$$Y_i = \alpha_i + \beta_1 HHI(rev)_i + \beta_2 HHI(non)_i + \gamma X_i + \varepsilon_i \quad (9)$$

The same underlying data as in the previous analysis is used, but now treated each year of data for each bank as a separate observation to create observations cross-classified by bank and year. More precisely, I calculate averages and standard deviations over each year rather than over the bank full lifetime and construct a panel of bank/year observations. This allows including a fixed effect to capture unobserved heterogeneity, but comes at the expense of increased noise when mean and volatility are calculated. The basic fixed effect regression is

$$\overline{Y_{\iota,t}} = \alpha_i + \beta_1 \overline{HHI(rev)_{\iota,t}} + \beta_2 \overline{HHI(non)_{\iota,t}} + \gamma X_{i,t} + \varepsilon_{i,t} \quad (10)$$

where $Y_{i,t}$ is a measure of performance, α_i is a bank fixed effect and variables are means of observation in year t for bank i. $HHI(rev)$ is revenue diversification,

$HHI(non)$ is non-interest income share, and X is a vector of other control variables, all for banks i.

The hypothesis 2 is to examine the relationship between risk-adjusted return and diversification in banks. The quadratic trend is applied for the overall revenue diversification's measure with the aim at testing the non-linear of bank return and bank risk. The result will support for the inverted U-shaped which describes the relationship between diversification, performance and conditional on the risk level of the bank. The regression model is as follows where $HHI(rev)$ is revenue diversification, and X is a vector of other control variables, all for banks i

$$Y_i = \alpha + \beta_1 HHI(rev)_i + \beta_2 HHI(rev)_i^{\,2} + \gamma X_i + \varepsilon_i \quad (11)$$

The third hypothesis is to document the bank type impacts upon diversification benefits. The rationale behind testing for key banking characteristics is that different banks have differing functions, restrictions as well as ownership structure. Banks will adopt distinct diversification approaches to reach their strategic objectives; thus, the analytical consequences are bound to different. The interaction regression with dummy variables of commercial banks, investment banks, cooperative banks, and other banks will be run.

$$Y_i = \alpha + \beta_1 HHI(rev)_i * Dummy_{(banking\ aspects)} + \beta_2 HHI(non)_i * Dummy_{(banking\ aspects)} + \gamma X_i + \varepsilon_i \quad (12)$$

In order to test the fourth hypothesis, the regression will be run basing on data of total assets and equity to assets. The information reflects the aim of testing the different impact on different bank characteristics. Within the scope of the study, only two above indicators are added and therefore some conclusions related to size and capitalization of banks will be figured out. The bank specific characteristic interaction term will be

applied and reported. $HHI(rev)$ is revenue diversification, $HHI(non)$ is non-interest income share, and X is a vector of other control variables, all for banks i

$$Y_i = \alpha + \beta_1 HHI(rev)_i + \beta_2 HHI(non)_i + \beta_3 HHI(rev)_i * Size_i + \beta_4 HHI(non)_i * Size_i + \gamma X_i + \varepsilon_i \quad (13)$$

$$Y_i = \alpha + \beta_1 HHI(rev)_i + \beta_2 HHI(non)_i + \beta_3 HHI(rev)_i * Capital_i + \beta_4 HHI(non)_i * Capital + \gamma X_i + \varepsilon_i \quad (14)$$

6.3.4. Other control variables

There are some control variables which are included to reflect banks strategic choices and characteristics according to Hughes et al (1996), DeYoung and Roland (2001), DeYoung and Rice (2004), Stiroh and Rumble (2006) and Mercieca et al (2007). The primary objectives of including these variables is to guarantee that any potential independent effects on performance and insolvency risks does not influence the primary relationship being investigated. These control variables are described briefly below:

Loan/Asset (the ratio of total loans to total assets). This measure evaluates differences in the banks' asset portfolios. Banks that have an asset based diversification strategy may make more non-interest income, loans and grow sharply irrespective of the profitability of loans to other earning assets, Stiroh and Rumble (2006). It is possible that the increased illiquidity of the bank portfolios may increase its vulnerability to customer runs.

Equity/Asset (the ratio of book value of equity to total assets): This controls for the relationship between bank fragility and levels of capitalization. Lehar (2005) points out that capital cushions large shocks and protect banks when assets value decline reducing the probability of failure.

Size (the natural logarithm of banks' total assets): This variable controls for the fact that the larger banks are likely to more stable particularly since idiosyncratic risk tends to decline with size (Baele et al 2007). Moreover, according to Demsetz and Strahan (1997), they showed that larger banks may also have better diversification opportunities and thus less income volatility from branching into new markets.

GDP_{growth} and Inflation (%) (Annual Gross domestic product and Annual Consumer price inflation). GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

There is an obviously link between economic development and financial stability. In fact, there is a positive link between financial intermediary development and economic growth with bank failures themselves being a consequences of economic downturn, King and Levine (1993), Grossman (1994) and Levine et al (2000). Additionally, Nilsen and Rovelli (2001) suggested that a weak macro-economic environment will deter foreign investments, reverse capital flows and discourage financial innovation. On the other hand, financial stability could probably improve to a great extent during periods of economic growth if banks find it more profitable to diversify rapidly in the periods.

7. EMPIRICAL RESULTS

This chapter summarizes the results and interprets the empirical results. The first section of chapter indicates the interpretation of how revenue diversification impact on bank profitability and risk adjusted return in general. The second section shows the empirical results which prove for the hypothesis 2. After that, the answer how diversification performance's effect is different with bank specific characteristic will be illustrated in section three. Finally, the last sub-chapter provides possible explanation for the impact of bank's size and capitalization on revenue diversification by testing the total asset and equity to asset effects.

7.1.Revenue diversification and bank performance

In order to test empirically the first theoretical hypothesis, the first regression is run to examine the overall effect of revenue diversification and non-interest income on bank performance. The OLS regression is reported in table 6 with the first two columns representing the output with profitability performance and the last two columns focusing on risk-adjusted return performance. The bottom part of the table provides information about the observations for total unbalanced panels and results of the adjusted R squared for the whole model. Basically, the table reports the effect of diversification strategy on bank performance as well as risk management through two main independent variables namely HHI(rev) and HHI (non). The expansion to fixed effect panel regression is reported in table 7 at the end of this section. Finally, the purpose of change in estimated coefficients between the OLS, and fixed effect model is concluded.

Table 6 presents estimates of equation (9) using performance measures (ROAA and ROAE) as dependent variables. The coefficient on HHI(rev) in both cases is negative which means more diversified revenue streams are associated with lower profitability. In contrast, the coefficient of non-interest income share itself is positive and highly statistically significant at 1% level in all regression, suggesting that the diversification within non-traditional activities during financial crisis boost bank performance to a

great extent. It indicates that an increases reliance on non-interest income such as derivatives, securitizations and trading is associated with more profitability. This result is consistent with DeYoung and Roland (2001) and Stiroh (2004b, 2006) who find that non-interest income is the volatile component and increasing non-interest income is linked to high profits.

Table 6. The effect of revenue diversification and non-interest income on bank performance using OLS regression.

	Profitability performance		Risk-adjusted performance	
	ROAA	ROAE	RAR_{ROA}	Z-score
HHI(rev)	**-0.4668****	**-0.5829****	**-0.0810****	**-0.0342*****
	(0.0406)	(0.0508)	(0.0796)	(0.0106)
HHI(non)	**1.6375*****	**7.8636*****	**0.2324*****	**0.0813****
	(0.0000)	(0.0000)	(0.0000)	(0.0473)
Equity to assets	0.0506***	-0.1085***	0.0036***	0.0392***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Net loans to assets	-0.0098***	-0.0838***	-0.0015***	0.0044
	(0.0033)	(0.0000)	(0.0001)	(0.2302)
Log total assets	0.04662	0.5369**	0.0093**	-0.0326***
	(0.2009)	(0.0040)	(0.0451)	(0.0000)
GDP growth	-0.0087	0.5926***	0.0014	-0.0264***
	(0.8063)	(0.0011)	(0.7417)	(0.0000)
Inflation	0.0026	0.1067	0.0015	0.0119***
	(0.9613)	(0.6250)	(0.8416)	(0.0120)
Constant	0.0853***	10.5975***	0.0814***	2.1512***
	(0.0069)	(0.0012)	(0.0032)	(0.0000)
No. Obs.	915	915	915	915
Adjusted R^2	0.14	0.16	0.17	0.17

OLS Regression used ROAA, ROAE, RAR_{ROA} and Z-score as dependent variables. HHI(rev) is the revenue diversification's variables and measures diversification between interest and non-interest income; HHI(non) is the share of non-interest income and measure diversification within interest and non-interest income. Equation is estimated with OLS regression. Dummy variables for country, years and bank type are included in all regression but not reported.

***,**,* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 6 continues presenting the estimates using the risk-adjusted measures of financial performance (RAR_{ROA} and Z-score) as dependent variables. The information of Sharpe

ratio is excluded since it produces almost quantitatively similar to RAR_{ROA}. I find strong evidence that increased diversification diminish risk-adjusted performance as the coefficient on HHI (rev) is negative and statistically significant at 5% level of confidence in terms of RAR_{ROA}. At the same time, however, the coefficient on HHI (non) is positive and highly significant in all regressions, implying that an increased reliance on non-interest income is associated with improved performance. The control variables coefficients appear largely reasonable. The equity ratio, loan ratio, and macro-economic rates are included to control for other factors show that risk-loving banks may hold less equity, make more loans, and grow more rapidly. Equity to assets have almost all positive correlation with dependent variables and highly statistically significant at 1% level, indicating that a signal of banks risk-aversion. It means that safer banks have both high capital ratios and low risk. Net loan to total assets, in contrast, produces a negative relationship in both profitability and risk-adjusted return performance, which means that loans may be less profitable and bring more risks during crisis time.

Table 7 presents the profitability performance and risk-adjusted return performance using fixed-effect regression with 3660 panel observations. The negative diversification effect in OLS regression disappears but the positive non-interest share effect still remains. The two most important independent variables in this study show highly statistically significant results at about 1% and 5% for HHI(rev) and HHI(non), respectively. In all cases, the coefficient on revenue diversification is very statistical significance, indicating larger impact from changes in diversification within individual bank. To be specific, results on diversification variables illustrates a strong positive correlation between revenue diversification and bank profitability and risk-adjusted return. It means that banks which exhibit high degrees of diversification into non-traditional activities display higher return and lower risk. The main result from the earlier cross-sectional data analysis re-emerges in non-interest income share with all positively correlation with dependent variables except for insolvency risk. It suggests that during financial crisis time, emerging banks benefit from non-interest income generating activities which not only helps these banks increase returns but also reduces

risks. However, diversified banks in long term could possibly take on additional risk because they expect higher returns, but these are not always realized due to exogenous shocks to economic conditions.

Table 7. The effect of revenue diversification and non-interest income on bank performance using fixed-effect regression.

	Profitability performance		Risk-adjusted performance	
	ROAA	ROAE	RAR_{ROA}	Z-score
HHI(rev)	**5.5346*****	**4.7090*****	**2.6230*****	**3.6938*****
	(0.0104)	(0.0029)	(0.0102)	(0.0003)
HHI(non)	**0.5765****	**1.2644****	**0.2732*****	**-0.0223****
	(0.0521)	(0.0291)	(0.0021)	(0.038)
Equity to assets	0.0742**	0.2168	0.0352**	0.0071
	(0.0513)	(0.3682)	(0.0513)	(0.6371)
Net loans to assets	0.0360***	0.9187***	0.0171***	0.0607***
	(0.0087)	(0.0004)	(0.0087)	(0.0000)
Log total assets	2.2814***	2.1068	0.0654**	-4.0991***
	(0.0000)	(0.3850)	(0.0603)	(0.0071)
GDP growth	-0.0042	-0.0821	-0.0022	-0.0065
	(0.6745)	(0.1366)	(0.6745)	(0.1368)
Inflation	-0.0019	0.0316	-0.0009	0.0052
	(0.8778)	(0.6760)	(0.8778)	(0.3210)
Constant	-3.5612***	-6.9062***	-1.6877***	-3.7028***
	(0.0009)	(0.0005)	(0.0009)	(0.0000)
No. Obs.	3660	3660	3660	3660

Fixed-effect regression used ROAA, ROAE, RAR_{ROA} and Z-score as dependent variables. HHI(rev) is the revenue diversification's variables and measures diversification between interest and non-interest income; HHI(non) is the share of non-interest income and measure diversification within interest and non-interest income. Equation is estimated with fixed effects panel estimation with OLS estimator.

***,**,* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

In sum, the change in estimated coefficients between the OLS, and fixed effect model shows that apparent diversification benefits are primarily found looking in each years for individual banks than across over time. It could be concluded that the certain non-interest activities such as fees and trading makes these activities less profitable than interest generating activities across banks but more profitable within banks.

7.2. Revenue diversification and non-linear relationship with risk

In this sub-chapter, the empirical result of hypothesis 2 is presented which in turns shows the relationship between revenue diversification, risk and bank performance through a quadratic regression. The outcome is summarized in table 8, indicating the non-linear relationship between revenue diversification and risk-adjusted return. The finding of this section is consistent with Gamra and Plihon (2010).

Table 8 presents the coefficients on the diversification revenue variable which are used directly as a quadratic. The equation (11) is applied and showed a statistical significance result at 1% level. The coefficient on revenue diversification variables are negative and positive respectively, and it holds for all three measures of bank risk-adjusted performance. Since the coefficient on HHI(rev) is negative and the coefficient on $HHI(rev)^2$ is positive, this equation implies that, at low value of revenue diversification, an additional diversified portfolio has a negative on risk-adjusted return.

At some points, the effect becomes positive, and the quadratic shape means that the semi-elasticity of risk-adjusted returns on assets and equity with respect to revenue diversification is increasing as HHI(rev) increase. The positive value of $HHI(rev)^2$ indicates the curvature is upwards and these results provide support for the U-shape hypothesis, describing the relationship between diversification and performance with conditional on the risk level of banks. Results, therefore, are interpreted as diversification has a slight benefit at low bank risk levels, has maximum benefits at moderate risk levels and destroys bank profits at very high risk levels.

Table 8. The relationship between revenue diversification and risk-adjusted return

	Risk adjusted return		
	RAR_{ROA}	RAR_{ROE}	Z-score
HHI(rev)	**-9.5779*****	**-3.5163*****	**-1.9078*****
	(0.0009)	(0.0033)	(0.0000)
HHI(rev)^2	**15.2202*****	**5.7998*****	**3.0189*****
	(0.0008)	(0.0020)	(0.0000)
Equity to assets	0.0498***	-0.0091***	1.0035***
	(0.0000)	(0.0000)	(0.0000)
Net loans to assets	-0.0087***	-0.0063***	-0.0014***
	(0.0102)	(0.0000)	(0.0013)
Log total assets	0.0800**	0.0564***	0.0141***
	(0.0267)	(0.0002)	(0.0015)
GDP growth	-0.0351	0.0377***	-0.0025
	(0.3187)	(0.0098)	(0.5674)
Inflation	-0.0145	0.0018	-0.0014
	(0.7254)	(0.9168)	(0.9981)
Constant	2.3884***	1.4355***	0.3517***
	(0.0007)	(0.0000)	(0.0000)
No. Obs.	915	915	915
Adjusted R	0.13	0.15	0.19

Regression used RAR_{ROA}, RAR_{ROE} and Z-score as dependent variables. HHI(rev) is the revenue diversification variable used directly and as a quadratic. The quadratic term of HHI(rev) is incorporated to detect an expected inverted U-shaped relationship. Equation is estimated with OLS. ***,**,* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Finding from the above regression with quadratic term concludes that relationship between revenue diversification and risk-adjusted return is non-linear, which is a new approach to previous assumptions. Since the major existing research on banking diversification tends to oversimplify the analysis by assuming a linear relationship between diversification strategy and performance. However, recent studies start focusing on this U-shape line. Gamra and Plihon (2010) find evidence that the relationship between diversification and performance is controlled by the risk level and diversification enhance performance only at moderate levels of risk. Allen N. Berger (2010) indicates that bank performance tends to be non-monotonically related with diversification strategy, and the marginal effects of the focus indices on banks'

performance are also nonlinearly associated with the level of risk and foreign ownership. In his empirical findings, banks tend to obtain higher profits and lower risk when moving from a complete diversification strategy towards less diversification.

7.3.Revenue diversification and banking type

Table 9 explains the empirical result for the third hypothesis which was stated that the diversification performance's effect is different with bank types that some banks gain greatly from diversification and otherwise is not. In this section, I present the impact of diversification on different bank types by classifying four categories of bank based on their own business strategy. Commercial banks, Investment banks, Cooperative banks, and Other banks are included in the regression as dummy variables. The rationale behind testing for key banking aspects is that different banks could probably have differing functions, restrictions and ownership structure which in turn triggers distinct approaches to diversification and as a consequence achieves different results. Adding interaction term in the regression model is to expand the understanding of the relationship among the variables.

The estimates of diversification interacted with dummy variables of investment banks, cooperative banks, commercial banks, and other-banks are presented in column 1,2,3,4, respectively in table 9. Results show that the coefficient of the diversification interaction variables vary significantly with the bank types especially for commercial banks and other-banks. Interestingly, the diversification effect seems to appear positive and quantitatively large for other-bank category, comparatively negative significant relationship for commercial banks. The other-bank category includes highly specialized activities such as saving banks, real-estate and mortgage banks, medium and long-term credit banks and Islamic banks. In fact, commercial bank is bound to the majority of bank type and they have more opportunities to enter profitable business lines; however, the recent expansion does not always bring the total risk reduction.

Regarding the non-interest income share interaction variables, the significant result solely re-emerges in commercial banks and other-banks, comparing to insignificant outcome for investment banks and cooperative banks. The coefficient in both two bank type are highly positive and significant at 1% level in all specifications, which means that non-interest income portfolios provide some gains for commercial banks and other-banks. Combining above result, it could be seen that although non-interest generating incomes bring benefit to commercial banks in terms of reducing risk but higher degree of diversified portfolios are not optimal investment. By contrast, degree of diversification is beneficial for other-bank, which helps them produce better financial performance.

To sum up, the result confirms to the third hypothesis, suggesting that the empirical diversification is seen to be not homogeneous across bank specific pillars. It is due to the fact that banks of different types have more or less complex organization that entail differ materially in both the non-interest income share and the degree of diversification. Interestingly, it apparently indicates that the diversification effect is found to positive and quantitatively large for other-bank category, comparatively less benefits for commercial banks, and insignificant prosperity for investment banks and cooperative banks. The reasons behind the results could be explained by limitation on bank strategic objectives and distinct competitive advantage. To be specific, investment banks are naturally well diversified toward non-traditional activities; therefore, more diversification barely exert a significant impact. Meanwhile, other-banks are highly specialized banks that allows them have straight forward decision making. This result is consistent with Berh (2007) and Gamra and Plihon (2010), who prove that specialized banks tend to have higher benefits than their diversified rivals.

	Risk-adjusted return								Z-score			
	RAR_{ROA}				RAR_{ROE}							
HHI(rev)*INVESTMENT_BANKS	-0.0362				-0.1576				-0.0681			
	(0.8195)				(0.7674)				(0.5820)			
HHI(rev)*COOPERATIVE_BANKS		-0.1087				-0.2123				0.1288		
		(0.7488)				(0.8521)				(0.9448)		
HHI(rev)*COMMERCIAL_BANKS			**-0.1509*****				**-0.4544*****				**-0.2895*****	
			(0.0053)				(0.0124)				(0.0056)	
HHI(rev)*OTHER_BANKS				**0.0335*****				**0.0720****				**0.1748***
				(0.0069)				(0.0370)				(0.0880)
HHI(non)*INVESTMENT_BANKS	-0.0951				0.2622				-0.1509***			
	(0.7370)				(0.7825)				(0.0053)			
HHI(non)*COOPERATIVE_BANKS		0.0843				-0.0879				0.1903		
		(0.7956)				(0.9358)				(0.3674)		
HHI(non)*COMMERCIAL_BANKS			**0.2235*****				**0.6403*****				**0.2529*****	
			(0.0000)				(0.0003)				(0.0000)	
HHI(non)*OTHER_BANKS				**0.2328*****				**0.0434*****				**0.2920*****
				(0.0109)				(0.0013)				(0.0000)
Equity to assets	0.0037***	0.0036***	1.0047***	0.0034***	-0.0087***	-0.0088***	-0.0086***	-0.0090***	1.0036***	1.0029***	1.0022***	1.0034***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Net loans to assets	-0.0017***	-0.0017***	-0.0014***	-0.0018***	-0.0071***	-0.0070***	-0.0063***	-0.0073***	-0.0102***	-0.0106***	-0.0015***	-0.0018***
	(0.0000)	(0.0000)	(0.0005)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Log total assets	0.0151***	0.0149***	0.0099***	0.0147***	-0.0078***	0.0079***	0.0636***	0.0749***	0.0150***	0.0014***	0.0099***	0.0136***
	(0.0000)	(0.0000)	(0.0061)	(0.0011)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0061)	(0.0001)
Constant	0.0825***	0.0819***	0.1088***	0.0434***	1.0246***	1.0244***	1.1082***	1.0475***	0.0825***	0.0819***	0.1833***	0.0936***
	(0.0143)	(0.0151)	(0.0032)	(0.0056)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0143)	(0.0015)	(0.0000)	(0.0000)
No. Obs.	915	915	915	915	915	915	915	915	915	915	915	915
Adjusted R^2	0.11	0.11	0.14	0.14	0.13	0.14	0.14	0.14	0.13	0.13	0.12	0.13

***,**,* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 9. Revenue diversification, bank type and risk-adjusted performance.

7.4.Revenue diversification and bank specific characteristics

This section answers the hypothesis 4 which will indicate how the impact of diversification could probably vary with other aspects of a bank characteristics and strategic choices. To be precise, only the impact of diversification on bank size and capital ratios will be mainly focus on. Other banks characteristics such as growth, profitability and efficiency are tested but do not show significant results in exploring the diversification potential. The regression is expected to show whether larger banks are more likely to have large off-balance sheet positions and higher charter value firms may have higher capital ratios to protect their value. The result of regression is presented in table 10.

Table 10 reports results; for each measure of risk-adjusted performance, the first column reports the diversification interacted with bank size and the second column reports the interaction with capitalization. The finding implies the impact of diversification with bank characteristics and confirms that the sign impact may vary and depends on different types that banks operate. The estimates of regressions with the diversification revenue solely concentrate on bank size and capitalization. With bank specific characteristic interaction, it appears that banks tend to gain form revenue diversification but this gain differs notably with banks variation in performance.

Regarding the asset interaction terms, the diversification variables enter all regression positively, inversely to a negative correlation found when the diversification variable is separated. The significant result in interaction term reflects that it exist an interaction effect between diversification strategy and bank size. Not surprisingly, larger banks seem to have larger benefits from diversification since they are able to perform new activities more easily and tend to be more efficiently. The positive coefficient of non-interest income share interaction term once again confirms that the effective of expanding non-traditional activities depends on bank size. The result is consistent with Deyoung and Roland (2011) and Stiroh (2004), who show that non-interest generating activities increase the benefits of larger banks.

Table 10. Interaction regression in terms of bank specific characteristics

	Risk-adjusted return				Z-score	
	RAR_{ROA}		RAR_{ROE}			
HHI(rev)	-0.3698**	-0.1383	0.1117	-0.5865	-0.7297***	0.5057***
	(0.0295)	(0.2868)	(0.8462)	(0.1855)	(0.0000)	(0.0000)
HHI(non)	0.5928***	-0.1051	1.3017***	0.0866	-0.0453	-0.3020***
	(0.0000)	(0.1845)	(0.0013)	(0.7484)	(0.6828)	(0.0000)
HHI(rev)*size	0.0512**		-0.0453		0.1353***	
	(0.0652)		(0.6301)		(0.0000)	
HHI(non)*size	0.0536***		0.1055**		0.0194	
	(0.0011)		(0.0585)		(0.2056)	
HHI(rev)*equity to assets		0.0025		0.0238		-0.0265***
		(0.6482)		(0.2196)		(0.0000)
HHI(non)*equity to assets		0.0200***		0.0302***		0.0230***
		(0.0000)		(0.0050)		(0.0000)
Equity to assets	0.0039***	0.0005	-0.0082***	-0.0202***	0.03899***	0.0457***
	(0.0000)	(0.7755)	(0.0002)	(0.0046)	(0.0000)	(0.0000)
Net loans to assets	-0.0014***	-0.0016***	-0.0070***	-0.0069***	0.0011***	0.0007**
	(0.0005)	(0.0001)	(0.0000)	(0.0000)	(0.0056)	(0.0584)
Log total assets	0.0027	0.0134***	0.1042***	0.0709***	-0.1072***	-0.0501***
	(0.8155)	(0.0002)	(0.0085)	(0.0000)	(0.0000)	(0.0000)
Constant	0.1183**	0.1367***	0.8133***	1.2244***	2.5299***	2.1148***
	(0.0849)	(0.0114)	(0.0005)	(0.0000)	(0.0000)	(0.0000)
No. Obs.	915	915	915	915	915	915
Adjusted R^2	0.10	0.11	0.15	0.15	0.19	0.19

Regression used RAR_{ROA}, RAR_{ROE} and Z-score as dependent variables. Where HHI(rev)*size, HHI(non)*size, HHI(rev)*equity to assets and HHI(non)*equity to assets are respectively the diversification and non-interest income interaction terms with size and capital. Bank size and capital are controlled respectively by Log total assets and Equity to assets. Dummy variables for country, years and bank type are included in all regressions but not reported.

***,**,* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

With the capital ratio interaction term, it appears that the benefits of diversification increase with the capitalization. When both interactions are included, only HHI(non) variable (diversification within non-interest income) produces very positively significant result at 1% level in all regressions whereas HHI(rev) variable (diversification between interest and non-interest income) is significant in Z-score regression. It means that banks have larger capitalization gain more from non-traditional services and the benefits of diversification and non-interest exposure vary

with leverage. This finding supports the idea that high capital banks have more incentive to obtain diversification benefits and protect better their charter value. Gamra and Plihon (2010) also affirm the above conclusion. They explain that larger banks which have been involved in banking activities for a longer period of time, have had time to discover the optimal level of diversification. They also indicate that high capitalization banks are more likely to have implemented the business practices and advanced technology needed to be successful for extended activities.

To conclude, the finding in this section is consistent with the fourth hypothesis and suggests that banks which are large and well-capitalized have more incentives to diversify. This result is important but not surprising, since it is generally accepted that larger banks have better opportunities to diversify. It confirms that the impact of diversification vary with other aspects of a bank characteristics and strategic choices. These large banks are more likely to have large off-balance sheet positions while still controlling risks and protecting better their charter value especially during financial crisis time.

8. CONCLUSION

The structure of banking in financial market has witnessed a period of change during 1990s after the banking crisis triggers significant macroeconomic disruptions. From that time, a rapid movement of financial institutions around the world towards greater diversity of products and services has been remarked. Since the recent financial crisis brought an unprecedented spate of bank failures on a global scale, the issue of banks' optimal diversification strategy has gained renewed attention among legislators, regulators, practitioners, and academics. However, the major existing research on banking diversification tends to oversimplify the analysis by assuming a linear relationship between diversification strategy and performance. Moreover, most of the previous studies tend to concentrate on large and complex banks in developed countries and largely ignore the banks in emerging markets. In fact, emerging economies are the most potential markets which witnessed a rapid growth during the past decades especially after the failure of banking system in 1990s.

Based on sample of seven selected emerging countries from 2007 to 2010, the thesis strives to fill the gap in the literature by examining whether revenue diversification strategy offers better risk-return tradeoffs and therefore boost performance and greater safety for these emerging banking industries. Seven largest emerging and developing economies by either nominal GDP or GDP (PPP) are consisted during the financial crisis time, including Brazil, China, Indonesia, India, Mexico, Turkey and Russia. Multiple regressions analyses using cross-sectional regressions and fixed effects regressions on panel data are applied.

The main findings of the study reveal that diversification benefits exist in emerging banks during financial crisis, and these gains have been offset by the increased exposure to non-interest activities. In fact, individual banks exhibit high degrees of diversification into non-traditional activities display higher return and lower risk during financial crisis. Non-interest incomes itself bring benefits to these emerging banks which not only help them improve profits but also reduce risks to a great extent. The

whole result in the first hypothesis implies that the certain non-interest activities such as fees and trading makes these activities less profitable than interest generating activities across banks but more profitable within banks.

Finding from the regression with quadratic term concludes that relationship between revenue diversification and risk-adjusted return is non-linear, which is in contrast to previous assumption. Since the major existing research on banking diversification tends to oversimplify the analysis by assuming a linear relationship between diversification strategy and performance. In addition, the empirical result provides support for the U-shape hypothesis, describing the relationship between diversification and performance with conditional on the risk level of banks. It is thus interpreted as diversification has a slight benefit at low bank risk levels, has maximum benefits at moderate risk levels and destroys bank profits at very high risk levels.

Regarding the test of revenue diversification and bank type, the empirical diversification is seen to be not homogeneous across bank specific pillars. It is due to the fact that banks of different types have more or less complex organization that entail differ materially in both the non-interest income share and the degree of diversification. Interestingly, it apparently indicates that the diversification effect is found to positive and quantitatively large for other-bank category, comparatively less benefits for commercial banks, and insignificant prosperity for investment banks and cooperative banks. The other-bank category here includes highly specialized activities such as saving banks, real-estate and mortgage banks, medium and long-term credit banks and Islamic banks.

Finally, empirical findings from the regression with bank specific characteristics reveal that banks which are large and well-capitalized have more incentives to diversify. In order to test this regression, only bank size and capital ratios variables are added. Other banks characteristics such as growth, profitability and efficiency are tested but do not show significant results in exploring the diversification potential. This result is important but not surprising, since it is generally accepted that larger banks have better

opportunities to diversify. It confirms that the impact of diversification vary with other aspects of a bank characteristics and strategic choices. These large banks are more likely to have large off-balance sheet positions while still controlling risks and protecting better their charter value especially during financial crisis time.

This thesis strives to fill the gap in the study by investigating the link between revenue diversification strategies and the risk adjusted performance in the banking industry of emerging economies. The empirical analysis of this study are hoped to contribute some insight on the issue of how bank diversification strategies affect bank performance in a broader prospective. However, it would be a better approach if this study can be extend observations and applied by further advanced empirical methods such as the System Generalized Method of Moments estimator (GMM). This method is expected to control for the endogeneity of the diversification decisions as banks may diversify in strategic response to their business opportunities or merger and acquisitions are explicitly model.

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APPENDIX

Summary of selected studies on revenue diversification

Author(s)	Analytical approach	Market and Data	Is diversification beneficial?	Result
Boyd and Graham (1988)	Synthetic bank simulations	US listed financial firms (1971-1984)	Yes	Reducing the volatility of BHC profits
Rose (1989)	Synthetic bank simulations	Random sample of all firms (1966-1985)	Yes	Firm risk maybe reduced through selected product- line diversification.
Boyd et al. (1993)	Synthetic bank simulations	US listed financial firms (1971-1987)	Yes	Mergers of BHCs with life insurance firms may reduce risk.
Lown et al. (2000)	Synthetic bank simulations	US listed financial firms (1984-1998)	Yes	Gaining benefits from securities activities.
DeYoung and Roland (2001)	Accounting analysis	US commercial banks (1988-1995)	No	High cost for banks and customers.
Stiroh (2004a)	Accounting analysis	US commercial banks (1978-2001)	No	Decreasing of risk-adjusted performance such as lending and trading.
Stiroh and Rumble (2006)	Accounting analysis	US FHC's (1997-2004)	No	Non-interest income is more volatile and not more profitable than interest generating activities.
Sawada, Michiru (2011))	Accounting analysis	Japanese banks (1983–2007)	No	No increase of bank profitability but a decrease of risk like loan diversification.
Santomero and Chung (1992)	Stock price impact	US listed BHC's (1985-1989)	Yes	The association with real estate will cause higher risk but receive back higher returns.
Delong (2001)	Stock price impact	US publicly traded firms (1988-1995)	Yes	Enhancing stockholder value.
Stiroh (2006a)	Stock price impact	US listed BHC's (1997-2004)	No	Producing much more risky but not bringing the higher mean equity returns.
Baele et al. (2007)	Stock price impact	Listed European banks (1989-2004)	Yes	Improving bank value and mitigating idiosyncratic risk.