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Analysis of Banking Sector in Vietnam with reference to restructuring and cross ownership

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Analysis of Banking Sector in Vietnam with reference to restructuring and cross ownership

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Objectives of thesis

The main objective of this thesis is to obtain an overview in the performance of the Vietnamese banking sector (history, development and current situations). Besides that, the analysis also focus on how Vietnamese banking sector has been restructured with reference to cross ownership, and their impacts on performances of commercial banks as well as the whole Vietnamese banking systém. The data and analysis are used to make recommendations on how to solve cross ownership issue, and prevent potential problems while restructuring the banking sector.

Methodology

The main methodology aimed for this study is documental analysis, econometric models and SWOT analysis. The theoretical part mostly presents the general concepts (basis understanding) of cross ownership in banking sector, overview of Vietnamese banking sector, and measuring the performances of commercial banks by CAMELS Framework.

Secondary data are sources of information use to analyze the performances of Vietnamese commercial banks. The data are collected from internet (financial news, scientific researches, public reports of Vietnamese central bank and commercial banks, and other financial institutions. Secondary data also are used to analyze the impacts of cross ownership issue and ratios regarding CAMELS framework on the performance of banks.

In order to make recommendations, this thesis use SWOT analysis to identify the strengths, weakness as well as opportunities and threats of Vietnamese banking sector.

The proposed extent of the thesis

60 pages

Keywords

Vietnam, banking sector, restructuring, cross-ownership, econometric models, SWOT analysis, CAMELS framework, performances

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Declaration

I declare that I have worked on my diploma thesis titled "Analysis of Banking Sector in Vietnam with reference to restructuring and cross ownership" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 31 March 2017 _____

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Analysis of Banking Sector in Vietnam with reference to restructuring and cross ownership

Abstract

The recent financial crisis in 2008 and economic downturn in 2012 of Vietnam, together with the restructuring policies applied for banking and financial institutions made by the State Bank of Vietnam had significant impacts on the banks' operations. The ownership relationship among commercial banks and financial institutions was criticized for the inefficient performances of banks. This thesis examines the relationship between cross-ownership, restructuring policy with the performance of Vietnamese banks regarding the profitability of return on asset and return on equity.

The first part describes the banking theories and significance of monitoring and supervising banks' performances follow the CAMEL framework to maintain safety and soundness of banks. Literature review also shows empirical results of previous studies on the performance of banks and cross-ownership phenomenon.

Financial analysis for 25 Vietnamese commercial banks with indicators regarding components of CAMEL framework during the period of 2006-2015 showed that during the crisis and economic downturn, large banks performed better than small banks in term of profitability. The regression analysis for panel data of 25 banks in ten years indicated that the cross-ownership negatively affected banks' profitability. In term of restructuring, regression analysis show the negative relationship with ROE and ROA.

Keywords: Vietnam, commercial banks, CAMEL framework, financial analysis, panel data, regression analysis, SWOT analysis, cross-ownership, restructuring policy, profitability, non-performing loans

Bankovní sektor ve Vietnamu – analýza restrukturalizace a křížového vlastnictví

Souhrn

Vietnamský bankovní sektor prošel v posledních letech výraznou změnou. Vše odstartovala finanční krize v roce 2008, o čtyři roky později přišel pokles ekonomiky spolu s restriktivní politikou uplatňovanou vůči vietnamským finančním institucím.

Jako hlavní problem se ukázaly vlastnické vztahy mezi komerčními bankami a dalšími finančními institutcemi, které úzce souvisely se špatnými obchodními výsledky vietnamských bank.

Diplomová práce zkoumá vztah křížového vlastnictví, restrukturalizační politiky a výkonnosti vietnamských bank vzhledem k ziskovosti, rentabilitě aktiv a rentabilitě vlastního kapitálu.

První kapitola popisuje bankovní teorie a vysvětluje význam systému CAMEL, který pomáhá dohlížet na kondici bankovních ústavů. V další části literární rešerše jsou prezentovány dříve publikované empirické výsledky řešící vztah mezi výkonností bank a jejich křížovým vlastnictvím.

Finanční analýza 25 vietnamských bank (sledovaných systémem CAMEL) zabývající se obdobím 2006 – 2015 ukázala, že během ekonomické krize a poklesu ekonomiky si v oblasti ziskovosti vedly lépe velké banky. Regresní analýza pro panelová data 25 bank během testovaných 10 let ukázala, že křížové vlastnictví negativně ovlivňovalo ziskovost bank. S ohledem na zmíněnou restrukturalizaci, regresní analýza ukázala negativní vztah k rentabilitě vlastního kapitálu a rentabilitě aktiv.

Klíčová slova: Vietnam, komerční banky, CAMEL, finanční analýza, regesní analýza panelových dat, SWOT analýza, křížové vlastnictví, restrukturalizační politika, ziskovost, rizikové půjčky

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List of abbreviations

ACB Asia Commercial Joint Stock Bank

ABB An Binh Commercial Joint Stock Bank

CAR Capital adequacy ratio

COV Cross-ownership ratio

DAB DongA Joint Stock Commercial Bank

HDB Ho Chi Minh City Development Joint Stock Commercial Bank

VCB Joint Stock Commercial Bank for Foreign Trade of Vietnam

BIDV Joint Stock Commercial Bank for Investment and Development of Vietnam

KLB Kien Long Commercial Joint -Stock Bank

MDB Mekong Development Commercial Joint Stock Bank

MBB Military Commercial Joint Stock Bank

NAB Nam A Commercial Join Stock Bank

NCB National Citizen Commercial Joint-Stock Bank

NIM Net interest margin

NPL Non performing loans

MNR Management ratio

OCB Orient Commercial Joint Stock Bank

PGB Petrolimex Group Commercial Joint Stock Bank

RES Restructuring policy

ROA Return on Assets

ROE Return on Equity

SGB Saigon Bank for industry and trade

SHB Saigon Hanoi Commercial Joint Stock Bank

SCB Saigon Thuong Tin Commercial Joint Stock Bank

SAB Southeast Asia Commercial Joint Stock Bank

VAB Viet A Joint Stock Commercial Bank

VCC Viet Capital Commercial Joint Stock Bank

EXB Vietnam Export Import Commercial Joint - Stock Bank

VIB Vietnam International Commercial Joint Stock Bank

VND Vietnam Dong

VTB Vietnam Joint Stock Commercial Bank for Industry and Trade

MSB Vietnam Maritime Commercial Stock Bank

VPB Vietnam Prosperity Joint Stock Commercial Bank

TCB Vietnam Technological and Commercial Joint Stock Bank

1. Introduction

Recently, the banking sector, as a main source of capital for the economy in Vietnam, has achieved a rapid growth and remarkable success. Particularly, numerous banks were newly created in the period between 2004 and 2007 together with the growth in the bank's capital. However, the policy of capital adequacy that required commercial banks increase their charter capital from 1000 billion VNDs to 3000 billion VND[1] has led to the most debated issue of cross ownership. In which, commercial banks raised charter capital by their own loans or other banks' loans. This phenomenon was criticized as the main factor that led to the inefficient performance of commercial banks in Vietnam.

The cross ownership phenomenon was first defined by Stempel (1973)[2] as "a single entity owning or controlling multiple media outlets". In financial perspective, according to Porta, et al. (1999) it is called cross-ownership in which firms hold shares in one another. In Vietnam, there were six types of cross ownership in banking sector with the ownership of foreigner banks and financial institutions, state owned banks, state owned corporations and companies, joint stock banks in other commercial banks[3]. This complex of capital structure was considered as the reason of non-transparency in bank's operations.

The significance of CAMELS framework in supervision and monitoring banks' condition has been debated by many academists and researchers. On the one hand, Barker & Holdsworth (1993) and Hirtle & Lopez (1999) found that CAMELS rating are useful to evaluate bank's current conditions and estimaste bank's failures. On the other hand, Cole & Gunther (1996 and 1998) and argued that the information gathered by CAMELS is short lived since it focus on the time of examination and depreciates quickly. Despite of that, CAMELS framework is the most used model for estimation of banks' performances and soundness (Baral, 2005).

[1] According to State Bank of Vietnam (2007) available at: www.sbv.gov.vn
[2] cited in Lewis 2006 pg.3
[3] Macroeconomic Report 2012 by The Economic Committee of National Assembly

This thesis evaluates the performance of commercial banks using the financial indicator regarding CAMELS framework, and traditional performance measures of return on asset and return on equity. The financial ratios of these indicators will be used to analyze the financial performance of the commerical banks in Vietnam in the period of 2006-2015. During that period, the change in financial performance of banks will be discussed to determine the efficiency of bank's operation during the financial crisis in 2008 and recession in 2010. The overall rank for all indicator will be given to determine which bank had the best performance over the period.

This study also examines the relationship between capital, assets, management, earning, liquidity and sensitivity to market risk, cross ownership issue, restructuring policy and the profitability of bank (RoA, RoE) in order to determine which is mostly affect bank's profitability and the extent they affect the performance of banks in Vietnam.

2. Objectives and Methodology

2.1 Objectives

The main objective of this thesis is to evaluate the commercial banks' performance in the Vietnamese banking sector. Particularly, this study assess the financial indicators regarding profitability (ROA, ROE) as well as how it changed during the period from 2006 to 2015. In addition to that, this thesis evaluates the significance of cross ownership issue and its relationship with bank's performance.

The final objective of the thesis is figure out the efficiency of changes made by the restructuring policy by examining relationship between policy and banks' performances. The financial ratios used to assess performance of banks were selected based on the CAMELS system[4].

2.2 Methodology

The major tool used for theoretical part of this thesis is qualitative research regarding general concepts of banking theory, significance of measuring performance of banks, and cross ownership problem in banking sector. The main sources of information are books, academic journal articles, financial news, and official statistic database of State Bank of Vietnam.

Linear regression model is built to analyze the relationship between financial indicators of commercial banks and the relationships between profitability and cross ownership under the following assumptions:

- The profitability ratios including return on assets and return on equity (ROA and ROE) are used as dependent variables
- Capital adequacy ratio (CAR), non-performing loan ratio (NPL), managerial ratio (MNR), net interest margin ratio (NIM), total loan to deposit ratio (LDR) and cross

[4] CAMELS refers to: **C**apital adequacy, **A**sset quality, **M**anagement quality, **E**arning quality, **L**iquidity, and **S**ensitivity to market risk (MacDonald and Koch 2006, p.5)

ownership value (COV) are used as independents variables. The restructuring policy is added as dummy variable.

The panel data used for regression analysis were collected from financial reports, annual reports of twenty five joint-stock commercial banks in Vietnam for the period of ten years from 2006 to 2015. Statistic data are also used for financial analysis in order to assess bank's performance during different period of time.

SWOT analysis is used to identify the situations of the banking system which partly reflect the efficiency of restructuring policy for banking system. The identified remaining issues are expected to be used as basis for making recommendations.

2.3 Hypothesis of the research

In order to evaluate the performance of banks and identify the main indicator that affect bank's financial performance, this paper tests the following hypothesis:

Hypothesis 1: There is a significant relationship between capital adequacy ratios and performance of the banks.

Hypothesis 2: There is a significant relationship between asset quality ratios and performance of the banks.

Hypothesis 3: There is a significant relationship between management efficiency ratios and performance of the banks.

Hypothesis 4: There is a significant relationship between earnings ratios and performance of the banks.

Hypothesis 5: There is a significant relationship between liquidity ratios and performance of the banks.

Hypothesis 6: There is a significant relationship between cross ownership ratios and performance of the banks.

Hypothesis 7: There is a significant relationship between cross ownership ratios and performance of the banks.

2.4 Significance of the study

The recent failures of banks especially commercial banks with complex structure of ownership in Vietnam raised the significance for the study and examination of bank's performance and relationship with cross ownership.

Besides the traditional relationship between financial ratios (CAMEL) and bank's financial performance, this study is significantly important to create an overview of relationship between cross ownership and performances of commercial banks in Vietnam. The significance of cross ownership issue with its impacts on banks' performance could be used as useful information for policy makers during the process of restructuring the banking system in Vietnam.

This study is the first research that combines the cross ownership as one econometric variable to measure the financial performances of commercial banks in Vietnam which is different to previous research of Son et al., (2015) on impact of foreign and domestic ownership structure to performance of commercial banks in Vietnam. Thus, it is hoped that the results of this paper could give other researchers a background for doing further study in this area afterward.

2.5 Limitations of research

The research is limited to commercial banks established and operating in Vietnam. However, it is time consuming because of the large quantity of observations (250 observations in 10 periods). The author also had difficulty of gathering the information regarding cross-ownership due to the non-transparency in some banks. Besides, the financial ratios used as variables for econometric model used in this research were the selection of researchers. The similar model but different variables (financial ratios) could lead to different outcomes. Moreover, the CAMELS system also includes the Sensitivity to the market risk (equity risk, interest rate risk, currency risk, etc…) which is unavailable and difficult to be calculated. Therefore, it is not included in this research.

3. Literature review

3.1 Banking theories and importance of maintaining bank's safety and soundness

Werner (2014) indicated that there are three theories of banking which has been dominant during the different periods of time. The oldest is *the credit creation theory* of banking that each bank can create money out of nothing and extending a loan through accounting operations. This approach focuses on the asset transformation as the function of the bank itself including asset diversification and evaluation of riskiness of financial assets (Stantomero, 1984).

The *fractional reserve theory* states that only the whole banking system can create money while individual bank is financial intermediary operates as gathering deposits and lending these out. In this case, banks can benefit depositors by investing their wealth to the asset in which bank has special knowledge thanks to the asymmetries information (Leland & Pyle, 1977).

The presently dominant theory is *financial intermediation theory*, which according to Werner (2016), banks are merely financial intermediaries and not different from other non-bank financial institutions in which they all are collecting deposits and lending these out. In the other words of Dewatripont, et al., (2010), banks create liquidity by borrowing from depositors with short maturities and lending to borrowing at longer maturities.

In the modern industrial world, the principal types of banks are commercial banks which are private and public sector as profit oriented firms and central banks respectively. The major activities of commercial banks are borrowing deposit and lending loans. The term commercial banks covers insitutions ranging from small neighbourhood banks to multinational organizations with hundreds of branches. (Duignan, 2013, p. 2)

Banking sector, as the most important part of ecnomies in which it could enhance the development of the economy when its operations are well managed; however, in the economic recessions, or failure of its own operations, banks could threaten the stability of not only the banking system but also the whole economy due to its important role. For

example, the collapse of single financial institutions (Lehman Brothers Banking Coporation in the United State in 2008) led to a huge loss of confidence in the liquidity and soundness of the banking system.Therefore, it raises a need of bank regulation in order to ensure the saftety and soundness of banking operations.

The purpose of ensuring safety and soundness is to maintain confidence, protect depositors and maintain financial stability that could be accomplished through suppervision and examination, deposit insurance and lender of last resort (LOLR). Regulators supervise and examine individual banks, under conduct of business regulation, to identify problems and provide supervisory directives that request changes in operating policies before banks' financial condition get into dificulty, therefore guarantee the safety and soundness of the banking system (MacDonald, Koch, 2006, p.4-5). Thus, there is a need of measuring the performance of banks in order to examine the bank's operations. An example of system for regulators to assess banks' condition is CAMELS rating system[5] that at the conclusion of the examination, the bank is given a rating based on the six attributes of CAMELS.

3.2 Measuring banks' performance based on financial indicators

As mention above, there is a need for examination of bank's operations (performances). However, this type of measuring performance is only done by the management and regulatory which focus on internal level in order to ensure that the operations of banks are in consistent with bank regulations and the banks are not at risk of for instance liquidity. There is also external measurement rating system that is available for public such as investors, and depositors. The ratings process involves an analysis of business risk, such as competitions, diversity of product lines, and profitability compared to peers; and financial risk such as accounting, cash flows, and capital structure (Stowell, 2013, p. 143).

The measurement of performance could be divided into financial and non-financial performance by Ghalayini & Noble (1996), or structural and non-structural approaches by Hughes & Mester (2015). In particular, non-financial performance measure focus on the

[5] This was supported by numerous studies for instance: Barker & Holdsworth (1993), Hirtle & Lopez (1999), and Dincer et al., (2011)

long term factors such as customer satisfaction, internal business processes, innovation and learning which can *lead to better performance* of organizations (Otley, 1999) . However, there is also no clear evidence to support that in banking sector of developing countries (Munir et al., 2011).

Similarly, the structural approaches are based on the theoretical model of banking behavior regarding the cost minimization and profit maximization (Psillaki & Mamatzakis, 2017). Otherwise, measures of performance can be categorized in three main approaches: traditional measures of performance (RoA, RoE, cost to income ratio, net interest margin), economic measure of performance (economic value added, Risk adjusted return on capital) and market-based measure of performance (total share return, price-earnings ratio, price-to-book value, credit default swap) (Socol & Danuletiu, 2013).

The most commonly used approach of measuring bank's performance is non structural approach which is based on financial indicators such as return on asset (RoA), return on equity (RoE), Tobin's q-ratio. Nevertheless, the Tobin's q ratio measure the value of a bank's investment opportunities which according to Hughes, et al. (1997), should be gauged independently of the ability and action of the management. Therefore, this paper focuses only on the profitability of banks which include RoE and RoA.

For instance, return on assets is ratio of the net income for the year divided by total assets (usually average over one year). As an internal performance measure of shareholder value, return on equity is the most popular measure of performance. Its functions, according to European Central Bank (2010), consist of (i) propose direct assessment of financial return for shareholder's investment, (ii) allows comparison between different countries or different sectors of the economy. In addition, as an importance part of the intermediation function for banks, the net interest margin is also a measure for performance. However, in this paper that ratio is defined and used in the CAMEL framework as a part of Earning ratios.

3.3 CAMEL rating system and related financial ratios

The CAMELS rating system produces a composite rating of an institution's overall condition and performance by assessing five components: Capital adequacy, Asset quality, Management administration, Earnings, and Liquidity, and the addition of a sixth rating component for sensitivity to market risk (Federal Reserve, 1996).

Each component can be measured independently by different benchmarks yet they are also interconnected. For instance, asset quality is shown to affect bank costs which in turn affect the bank operations (Benstein, 1996), captial adequacy has a great influence on the quality of asset that increasing capital ratios sometime reduces the productivity of asset quality (Pastory & Mutaju, 2013), the ability of earning and profitability support the present and future operations of banks (Shar et al., 2011).

3.3.1 Capital adequacy

Bank's capital plays an important role in guaranteeing again losses due to the fact that even the best risk management techniques cannot buffer against unexpected losses or adverse shocks (Duignan, 2013, p. 31). The recent financial crisis in the USA since 2007 and similar situation happened in the Asian financial crisis of 1990s have proved that numerous depository institutions did not have a sufficient capital to absorb the losses of loan default or enough capital to support the adverse market conditions. (Cannata & Quagliariello, 2009).

On that basis, the international banking regulation (Basel accord III) set a higher requirement for bank capital that the total minimun capital is at 8% however the common equity is required is higher at 7.0 % because of the additional conservation buffer (2.5%). Particularly, the conversation and counter-cyclical buffer is expected that it can absorb unexpected losses during periods of economic distress (King & Tarbert , 2011; Ghosh et al., 2012).

As one of the most important indicators for the financial healthy of the banks and banking sector, the measurement of capital adequacy is done through significant ratios such as the ratio of total equity to total asset, the ratio of equity to net loans or the ratio of equity

to debts. Previous researches of Berger et al., (1995) and Ghosh et al., (2003) show that a positive relation exists between capital adequacy and profitability (return on equity).

However, the adequacy of capital can also be measured by the ratio compounded as a *ratio of total equity to total assets* for the measurement of the captial adequacy (Roman & Sargu, 2013). This paper also uses that ratio for further analysis.

3.3.2 Asset quality

According to the Federal Reserve System (2016), 'the asset quality reflects the quantity of *existing and potential credit risk associated with the loan and investment portfolios*, other real estate owned, and other assets, as well as off-balance sheet transactions'. In order to assess the quality of bank's assets, the asset quality ratio, which is expressed as a ratio of NPL to gross loans, is used to measure the efficiency in utilizing the assets of banks (Pastory & Mutaju, 2013). Indeed, Alhassan, et al., (2014), found out that '*the persistence of non-performing loans in addition to loan growth'* is the significant determinants of banks asset quality in emerging economies[6].

Although there are different determinants of banks' asset quality such as bank market structure, bank size, inflation, real exchange rate and GDP growth (Alhassan, et al., 2014); this research *chooses NPL to gross loans ratio as a proxy of asset quality.* The reason is that theoretically, this ratio is intended to identify problems in loan portfolio which represent for the credit risk (Pastory & Mutaju, 2013). In addition, the value of non performing loans in the asset structure of commercial banks in Vietnam was significantly high with increasing trend in the last 10 years which pushed the state bank of Vietnam to establish an asset management company (VAMC) to purchase and reorganize the NPL[7].

[6] The findings was proved based on data of 25 banks in Ghana from 2005 to 2010

[7] The loans in Vietnam are categorized in 5 groups, the total amount of NPL are the sum of loans in group 3 (overdue from 91 to 181 days), 4 (overdue from 181 to 360 days), 5 (overdue more than 360 days) (according to Decision 493/2005/QĐ-NHNN on 22/04/2005 of The State Bank of Vietnam)

3.3.3 Management quality

This term was defined by Federal Reserve (1996) as the capability of the board of directors and management, in their respective roles, to identify, measure, monitor, and control the risks of an institution's activities and to ensure a financial institution's safe, sound, and efficient operation in compliance with applicable laws and regulations.

According to Dincer, et al., (2011), it is the hardest component to measure when compare to others because it consists of a large range of issue such as education level and expertise of the management. There are two ratios including total income as a share of total expense and deposit interest expenses as a share of total expense that can be used to predict the management quality.

The cost to income ratio which is defined by operating expenses divided by operating income, according to Mathuva (2009), can be used for *benchmarking by the bank* when reviewing its operational efficiency. The study of Ghosh et al., (2003) and Hess & Francis (2004) found that there is an existence of negative relation between efficiency and the cost to income ratio, and an inverse relationship between the cost to income ratio and the bank's profitability. Nervertherless, while this ratio is negatively related to the management quality, it is positively related to the possible failures as a result of mismanagement in banks (Dincer, et al., 2011).

In this study, the management quality is assessed through the *ratio of operating expenses as a percentage of total assets* proposed by Roman & Sargu (2013) and Gunsel (2007) in which the management soundness of banks is expressed through the evaluation of opreating expenses spent as a percentage of total assets.

3.3.4 Earning ability

This ratio reflects not only the quantity and trend of earnings, but also factors that may affect the sustainability or quality of earnings. The excessive or inadequately managed credit risk can affect the quantity and quality of earning as a result of loan losses (Federal Reserve, 1996).

There are two traditional ratios (RoA and RoE) for measuring profitability of banks, which according to Dincer, et al., (2011), are both positively related to the financial performance of the banks. In the previous discussion (section 2.2), the earning ability of banks in this model is assessed by the net interest margin ratio (NIM). Although there were numerous studies that used the interest margin ratio to measure the operation efficiency of banks or proved that they are connected, there are also other researchers that considered and used NIM ratio for assessing the earning ability of banks.

Particularly, in the study of banks in Baltic countries, Euro area and the United States, Saksonova (2014) indicated that net interest margin is "*the most appropriate criterion* for evaluating the effectiveness and stability of banks' operations". Shehzad et al., (2010) and Haan & Poghosyan, (2012) used the NIM to proxy the efficiency of bank operations.

Nevertheless, the present and future operations of a bank depends on its ability of earning which according to Jha & Hui (2012), can be assessed by the absolute measures such as interest income, net interest income, non-interest income, net non-interest income, non-operating income, net non-operating income.

This paper use the measure of *net interest margin* (ratio of net interest income to the average earning assets) proposed by Stiroh (2004) and Jha & Hui (2012) to evaluate the earning ability of commercial banks in Vietnam. According to those authors, using NIM ratio as a explanatory variable will solve the difference of diversification between large and small banks that large banks may be more diversified than small banks (Stever, 2007).

3.3.5 Liquidity

The adequacy of bank's liquidity position should be considered by the current level and prospective sources of liquidity comparing to the amount of funds needed. There is a need for funds management practices to ensure that liquidity is sufficient to meet the financial obligations in a timely manner of banks. In addition, it should ensure the cost of maintaining liquidity is not high and the sources of fund should be available during the periods of financial stress or adverse changes in market conditions (Federal Reserve, 1996).

Roman & Sargu (2013) states that liquidity is the most important component for a bank with significant impact on the soundness of bank's financial position. This component is essential to measure the performance of banks since it shows the capacity of bank to payoff its shorterm liabilities and ability to deal with unexpected withdrawls. They suggest that the liquidity ratio should reflect the bank's capacity to handle the difficulty of cash flows during market shocks. There are different ratios that can be used to measure liquidity of banks include the ratio of liquid asset to total deposits and short term funding, the ratio of net loans to total deposits and short term funding, and the ratio of total loans to total deposits.

This study follows the *ratios of total loans to total deposits* which according to Dincer et al., (2011), is positively related to the liquidity level of banks, and positively or negatively related to the bank's performance and risk of failure.

3.3.6 Composite ratings

Federal Reserve (1996) indicated that, composite and component ratings are assigned based on a 1 to 5 numerical scale. A 1 indicates the highest rating, strongest performance and risk management practices, and least degree of supervisory concern, while a 5 indicates the lowest rating, weakest performance, inadequate risk management practices and, therefore, the highest degree of supervisory concern. Nevetherless, the contribution of each component in the total composite rating is not equal as the adequacy of capital and the capability of management accounts for the highest weight at 25 percent. The table 1 below illustrates the weight of each component in CAMELS composite rating.

Table 1: Contributions of CAMELS components

Components	**Weight**
Capital adequacy	25%
Asset quality	20%
Management quality	25%
Earning quality	10%
Liquidity	10%
Sensitivity	10%

Source: FIDC (2000), section 327.9 Assessment pricing methods

In addition, the composite ratings vary from 1 to 5 in which rate 1 represents for the insitutions that are sound in every respect and generally have components rated 1 or 2. The lowest level of composit rating is 5 reflects that institutions are extremely unsafe and unsound practices or conditions; having a critically deficient performance; often contain inadequate risk management practices relative to the institution's size, complexity, and risk profile[8] (Federal Reserve, 1996).

3.4 Empirical reviews on measuring banking performance

In the recent years, there have been few researches conducted to measure the performance of individual banks as well as the banking system in Vietnam. The following table summarizes the recent researches regarding the measurement of commercial banks' performances in Vietnam with different periods and methodology.

Table 2: The recent studies on performance of Vietnamese commercial banks

Authors	Data/period	Methodology	Main findings
Hung (2007)	13 Vietnamese commercial banks (2001-2003)	DEA, Malmquist total factor productivity index	The *sources inefficiency* of the sampled banks were found to be derived from both regulatory and technical (*managerial capacity*) problems The decline in total factor productivity was due to reduction in *technological efficiency*
Ngo (2012)	40 Vietnamese commercial banks (1990-2010)	General Data Envelopment Analysis (DEA), Tobit regression	The efficiency was higher at the beginning of 1990s and then decreased sharply afterward *Short term interest rates* and government expenditures have big *impact on the efficiency* of the Vietnamese bank They suggest that the Vietnamese banking system can work *more efficient* than in other situations under a *tighten regime of monetary policy* and/or loosen regime of fiscal policy
Vinh	20	DEA,	Joint stock commercial banks have greater

[8] Refer to appendix 1, p.76 for details

(2012)	Vietnamese commercial banks (2007-2010)	Malmquist index	efficiency than state-owned commercial banks The main source of *cost inefficiencies* was most likely attributable to *managerial capacity* and much less to regulatory problems.
Nahm & Vu (2013)	56 Vietnamese banks (2000-2006)	A new index approach	The average bank operated quite far below the frontier of the best-practice bank. The main source of *low profit efficiency* was *allocative* *inefficiency* rather than technical inefficiency
Tu et al., (2014)	40 Vietnamese Commercial banks (2010-2012)	Corporate Governance Index, questionnaires	There are positive relationships between CGI- corporate governance index- and the performance of the commercial banks
Ngo (2015)	12 Vietnamese banks (2003-2010)	CAMELS ratios analysis	Big banks tend to have less capital base than small banks; however, the effect of *ownership is not significant* State-owned commercial banks (SOCBs) have significantly more *nonperforming loans* than the joint-stock commercial banks (JSCBs) SOCBs have *lower net interest margin*, bigger banks *earn* less than smaller banks that suggesting the decreasing returns to scale in Vietnamese banking system

Sources: author's collection from mentioned researches

These studies have shown the efficiency in operations of commercial banks in Vietnam and the change of that performance during the examined periods. However, the relationship between performances of banks and some measurement ratios (capital adequacy ratios, asset quality ratios, non-performing loans to total loans ratios, and net interest margin) was not clearly identified. Each of these studies has indicated one single determinant that has impact on the performance of banks; however, all of them did not

provide an analysis for the whole relevant determinants (at least components of CAMELS framework).

In case of the last research of Ngo (2015), all the relevant determinants regarding CAMELS framework have been analyzed. Nevertheless, the study has focused on comparing the difference between performance of private-owned and the state-owned commercial banks without considering the evaluation of the relationship and effect of CAMELS's component to the performance of banks.

To the limit knowledge of the author, there is a shortage of studies on the performance of the banking sector in Vietnam so far. The reason for that could be the limitation of access to information for foreign researchers (except information on annual reports) which is usually unpublished. There is also a lack of studies on the performance done by CAMELS framework in the banking system level and written by English.

Vietnamese researchers tend to study on a particular bank in which the source of information is easily accessed. For instance, Dung (2007) conducted a research on the financial performance of private-owned joint stock commercial banks in Vietnam (CAMELS framework); Yen (2011) and Doan & Tuan (2014) studied on the performance of Military Commercial Joint Stock Bank by CAMELS and PEARLS framework.

3.5 Cross-ownership and empirical studies

3.5.1 Definition and types of cross-ownership

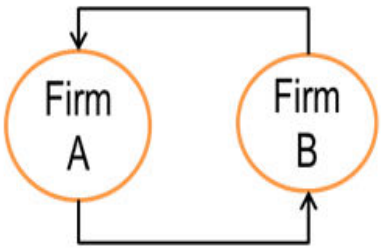
This phenomenon was first defined by Stempel (1973) as "a single entity owning or controlling multiple media outlets" (Cited in Lewis, 2008, p. 3). In the financial prospective, according to La Porta, et al. (1998; 1999) it is called cross-ownership when firms hold shares in one another. However, if firms hold share in one another insufficiently

to take part in the planning, management or governance, the case is considered as a financial investment[9].

This is different to the pyramidal ownership structure in theories of Graham & Dodd (2009, pp. 644-653) that a speculatie capital structure is created by a (or a series) parent company to control other firms' operations and profits. This capital structure, according to La Porta, et al. (1998), is an ownership relation with a top-down controlling meaning that there is only one direction of control either top-down or reverse.

The Economic Committee of National Assembly (ECNA) of Vietnam (2012) divided the cross-ownership phenomenon into three main types include simple cross-ownership, circular and network ownership. The first type is simple in which firm A and B owns shares in each other (Figure 1). The second type is more complicated in which A owns shares in B, while B owns shares in C and C owns shares in A (Figure 2). In this case, A does not directly owns shares of C however A is considered as indirectly owner of C since A directly owns B and B directly owns C. Thus, it is difficult for determining the actual shares hold by others in a firm since C also directly owns shares of A.

Figure 1: Simple cross-ownership



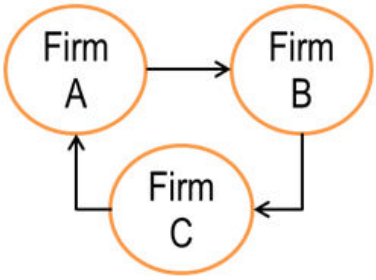


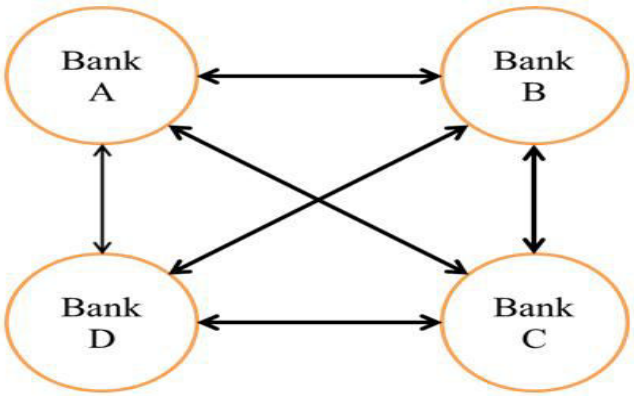
Figure 2: Circular ownership

Source: ECNA (2012)

[9] 5% of total shares is the minimum to become major shareholders (Law on Financial Institutions of 2010)

The last type of cross-ownership as the most complex structure is network ownership (Figure 3). Since firms have shareholding relations with a series of other firms, the ownership relations between them are significantly complicated as a matrix with both direct (A-B, B-C, C-D, D-A, A-C, B-D) and indirect (A via B to C and D, A via C to B and D) relationships.

Figure 3: Network ownership



Source: ECNA (2012)

This type of cross-ownership, according to the ECNA (2012), is the unable to determine the actually dominant ownership by a firm in others in the context of non-transparent and unverifiable information. While in pyramidal ownership model, the firm links vertically to other firms and control rights concentrate in parent company; in the cross-ownership models, the relationship is horizontally built that the voting rights to control a group are not concentrate in any firm but into firms in the group (Bebchuk, et al., 2000). The matrix in figure 3 is the best-described structure for the ownership relations among commercial banks in Vietnam[10].

[10] Refer to appendix 2, p.78

3.5.2 Empirical studies

There have been numerous studies on the impacts of cross-ownership on the operations of banking sector worldwide. For instance, on a study of Italian banking and financial sector, Trivieri (2007) and Gilo et al. (2006) indicated that cross-ownership reduces competition as a result of the collusion among firms, which in turn threatens the competitive environment and capacity of banks for competitiveness; especially in case of that major investors own many firms in the same industry according O'brien & Salop (2000).

In case of Vietnamese banking system regarding ownership issue, so far, to the best knowledge of author, there was only one research of Son et al. (2015) that studied on the impact of ownership structure on bank performance. The study analyzed data from 44 banks in the Vietnamese banking system in a period from 2010 to 2012. The main findings were indicated that private ownership has positive impact on the profitability of banks and the nonperforming loan ratio has negative relation with bank's profitability. However, the study focused only the different type of ownership such as foreign, domestic, state and private ownership. The cross-ownership relation was not mentioned and analyzed.

3.6 Reforms of Vietnamese banking sector

The state bank of Vietnam (SBV) was created in 1951 and the operations of banks were under fully supervision and management of the government. Since the economic and political reforms "Doi Moi" in 1986, the banking industry of Vietnam has been experienced four major reforms and achieved significant successes. The first reforms took place in a period between 1987 and 1990. In this reform, other banks with specialized functions were created and share the role of business activities with the SBV; however, the banking system at that time remained exclusively in the government's supervision.

These weaknesses led to the second reforms in banking sector from 1991 to 1997 with the appearance of commercial banks and other financial institutions working as intermediate banks. The SBV started to require commercial banks create regulatory reserves. The success of this period could be seen from the significant increase in the

number of banks that there were 74 banks in 1997 comparing to 9 banks in 1995. (SBV, 2016)

The third reform period took place between 1997 and 2001 with the creation of banking regulation and laws for financial institutions. The commercial banks became the leading forces in banking sector especially monetary operations. Besides, there was an increase in number of foreign banks operating in Vietnam (from 18 in 1997 to 26 banks in 2001). The global financial crisis in 2008 brought significant negative impacts on the banking sector of Vietnam; especially the real estate bubble caused a large amount of bad debts and threatened the stability of the whole banking system. The SBV has operated monetary policy actively and flexibly which focus on cutting down the high inflation in 2008 and preventing the economic downturn in 2009. (SBV, 2016)

In the light of the globalization and deeply integration of banking activities in the global market, in 2010, the National assembly of Vietnam has created the new banking regulation and regulatory[11] for financial institutions in order to meet the requirements of being WTO members as well as being consistent with international banking regulation (BASEL II, III).

In the year 2012, a restructuring plan for financial institutions in a period of 2011-2015 was officially announced. It contained four main criteria including capital, NPLs, liquidity, and management of banks[12]. In which, banks were required to be merged if their charter capital were less than 3000 billion VND. There were 14 commercial banks allowed to trade the non-performing loans; most of them are large banks such as Vietcombank, BIDV, Techcombanks, and other banks which have large size of capital. The policy regarding NPLs and the establishment of VAMC for trading NPLs are the main policies studied in this paper.

[11] Law on Financial Institutions of 2010 specifies 6 ratio categories to ensure safe activities in financial institutions: (i) solvency ratios; (ii) capital adequacy ratio; (iii) the maximum ratio of short-term capital used for mid- and long-term loan; (iv) foreign exchange and gold to equity position; (v) loan to deposit ratio, and (vi) ratio of mid- and long-term deposit to mid- and long-term loan balance (According to Economic Committee of National Assembly in 2012 report on *Cross Ownership of Financial Institutions and Corporations in Vietnam*)

[12] Decision 254/QĐ-TTg signed by the Prime Minister

4. Research development and application of methodology

4.1 Specifications of Linear Regression models

The regression models are built in order to test the effect of the ratios regarding components of CAMEL framework to the profitability (RoA, RoE) which are representative of the performance of commercial banks in Vietnam. The two proposed regression models are as follows:

$$ROE = \beta 0 + \beta 1CARit + \beta 2NPLit + \beta 3MNRit + \beta 4NIMit + \beta 5LDRit + \beta 6COVit + \beta 7RESit + Uit$$

$$ROA = \beta 0 + \beta 1CARit + \beta 2NPLit + \beta 3MNRit + \beta 4NIMit + \beta 5LDRit + \beta 6COVit + \beta 7RESit + Uit$$

In which:

Dependent variables: ROE and ROA – measurements for the performance of 25 commercial banks during the period 2010-2015

Independent variables:

CAR – Capital ratio represents for the banks' capital adequacy

NPL – Non-performing loan ratio represents for the banks' quality of assets

CIR – Cost to income ratio represents for the banks' management quality

NIM – Net interest margin ratio represents for the banks' earning ability

LDR – Total loan to deposit ratio represents for the liquidity of banks

COV – Cross-ownership value in capital structure

RES – Restructuring policy

Others: $\beta 0$ is constant, β is coefficient of variable

U is the residual error of the regression.

i refers to bank, t refers to year

4.2 Sample design and data collection

4.2.1 Sample design

Table 3: Classifications of variables

Variables	*Type*	*Mean*	*Calculation*	*Unit*
Return on Asset	*Dependent*	*Financial performance*	$ROA = \frac{NET\ PROFIT\ AFTER\ TAX}{TOTAL\ ASSET}$	*%*
Return on Equity	*Dependent*	*Financial performance*	$ROE = \frac{NET\ PROFIT\ AFTER\ TAX}{SHAREHOLDER'S\ EQUITY}$	*%*
Capital Ratio	*Independent*	*capital adequacy (H1)*	$CAR = \frac{TOTAL\ EQUITY}{TOTAL\ ASSETS}$	*%*
NPL Ratio	*Independent*	*asset quality (H2)*	$NPL = \frac{NON-PERFORMING\ LOANS}{TOTAL\ LOANS}$	*%*
Managerial ratio	*Independent*	*management efficiency (h3)*	$MNR = \frac{OPERATING\ EXPENSES}{TOTAL\ ASSETS}$	*%*
Net Interest Margin Ratio	*Independent*	*earnings ability (h4)*	$NIM = \frac{NET\ INTEREST\ INCOME}{AVERAGE\ EARNING\ ASSETS}$	*%*
Total Loan To Deposit Ratio	*Independent*	*liquidity (H5)*	$LDR = \frac{TOTAL\ LOANS}{TOTAL\ DEPOSITS}$	*%*
Cross Ownership	*Independent*	*Cross ownership (H6)*	*Proportion of shares owned by other financial institutions*	*%*
Restructuring	*Independent (dummy)*	*Changing in operations*	*Banks sold non-performing loans to VAMC and banks that were not*	*1, 0*

Sources of equations: Drake & Fabozzi, (2010, pg.263-265), IMF (2013), Roman & Sargu (2013), Pastory & Mutaju (2013), Stiroh (2004), Dincer et at., (2011)

4.2.2 Data collection

There are now 34 commercial banks operating in Vietnam; however, this research focuses on 25 banks that have been operating for a sufficient time period of ten years (from 2006 to 2015), and excluding newly established banks and merged banks. The sources of data are financial and annual reports published by banks, and the finance.vietstock.vn database (www.finance.vietstock.vn).

4.3 Regression analysis

4.3.1 Descriptive statistic of variables

This section presents the descriptive statistics for all variables involved in the regression model. The statistic includes mean, minimum, maximum, and standard deviation values. These figures provide an overall description about data used in the models.

Table 4: Descriptive statistic of variables

Dependent variables	Mean	Median	Minimum	Maximum	Standard deviation
ROA	1.2236	1.1600	0.0000	5.5400	0.85874
ROE	11.024	10.210	0.0000	34.420	7.1051
Independent variables	Mean	Median	Minimum	Maximum	Standard deviation
CAR	12.813	10.003	0.0000	61.408	8.9748
NPL	2.0192	1.8700	0.0000	10.030	1.3208
MNR	1.5425	1.4732	0.0000	6.9241	0.79707
NIM	3.0921	2.8342	0.0000	10.495	1.4235
LDR	96.981	87.621	0.0000	382.87	43.552
COV	9.9661	8.0550	0.0000	46.441	11.011

Source: Gretl

The average return on assets employed and return on equity in the commercial banks of Vietnam are both positive at 1.22 percent and 11.02 percent respectively. The variation is greater in ROE (7.1) as compared to ROA (0.8). This is because ROE have more difference between the minimum and the maximum values than ROA. It can be seen from table 12 that the minimum and maximum value of ROE is 0 and 34.42 percent whereas, these values for ROA is 0 and 5.54 percent respectively.

For the independent variables of capital adequacy, asset quality, management efficiency, earning, liquidity, and cross-ownership ratio, the mean values are also positive

in all the cases with the amount of 12.83, 2.01, 3.09, 96.98, and 9.96 percent respectively. Table 4 also indicates that the standard deviation value of cross-ownership ratio (11.2), liquidity ratio (43.55), and capital adequacy ratio (8.79) are more variable than the other independent variables. The reason for that is the gap between minimum and maximum value of COV (0 and 46.44 percent), LDR (0 and 382 percent), and CAR (0 and 61.48 percent).

4.3.2 Correlation analysis between study variables

The correlation matrix was created to determine the relation between the profitability measures of ROA, ROE, and the indicators of capital adequacy, asset quality, and management efficiency, earning ability, liquidity, cross-ownership issue, and restructuring policy as explanatory variables.

Table 5: Correlation Matrix between all variables

	ROA	ROE	CAR	NPL	MNR	NIM	LDR	COV	RES
ROA	1.0000	0.5726	0.4364	-0.3550	-0.0678	0.3707	0.4661	0.1386	-0.4642
ROE		1.0000	-0.2860	-0.4007	-0.2687	0.0272	-0.0019	-0.2043	-0.4157
CAR			1.0000	0.0234	0.4491	0.5628	0.6085	0.3416	-0.1350
NPL				1.0000	0.1484	0.0631	-0.1679	0.1769	0.2419
MNR					1.0000	0.7046	0.2607	0.1222	0.2269
NIM						1.0000	0.4664	0.1835	0.0127
LDR							1.0000	0.1370	-0.2119
COV								1.0000	-0.1290
RES									1.0000

Source: Gretl

Table 5 shows that the correlation between ROA, ROE and other variables are not in the same direction. While ROA has positive correlation coefficient with capital adequacy (CAR), earning ability (NIM), liquidity (LDR) and cross-ownership ratio (COV); ROE on the other hand has positive correlation coefficient with only earning ability (NIM). These two indicators have the same negative correlation coefficient with NPL, MNR, and RES.

Particularly, an increase in the ratio of capital adequacy, earning ability, liquidity ratio and cross-ownership ratio will results in an increase of return on assets though that the coefficient are low, as 0.43, 0.37, 0.46, and 0.13 respectively. Besides, as a result of

positive coefficient of 0.02, an increase in earning ability (NIM) reflects the same movement of return on equity.

By contrast, the negative coefficients between ROE and CAR (-0.28), LDR (-0.0019), and COV(-0.20) show that the return on equity is negatively influenced by the ratio of total equity to total assets, total loans to total deposits, and number of shares owned by other banks. The higher values of these ratios will result in the lower return on equity and vice versa.

The negative correlation coefficients between ROA, ROE and non-performing loans ratio, and management efficiency ratio indicate that the increase (or higher value) of non-performing loans and operating expenses will result in the decrease (or lower value) of return on both assets and equity. It is also applicable for the other direction that the decrease in NPLs ratio and operating expenses to total asset ratio (management efficiency) will result in the increase of return on both assets and equity.

4.3.3 Ordinary least squares models

a) Gretl estimation

The estimation was done by Gretl for panel data of 25 Vietnamese commercial banks during the period of 2006-2015. The results are as follow

Table 6: Parameters estimation of first equation (ROA)

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	1.01378	0.120065	8.444	<0.0001	***
CAR	0.0265565	0.00570871	4.652	<0.0001	***
NPL	−0.163010	0.0284744	−5.725	<0.0001	***
MNR	−0.556864	0.0661621	−8.417	<0.0001	***
NIM	0.338002	0.0389025	8.688	<0.0001	***
LDR	0.00151908	0.00107984	1.407	0.1608	
COV	0.000558142	0.00347254	0.1607	0.8724	
RES	−0.438509	0.0831668	−5.273	<0.0001	***

Source: Gretl

Based on the result of estimation for equation with ROA as dependent variable (table 6), the first equation is:

ROA = 1.01378 + 0.0265565CARit − 0.163010NPLit − 0.556864MNRit + 0.338002NIMit + 0.00151908LDRit + 0.000558142COVit −0.438509RESit + Uit

The result indicates that the capital ratio, net interest margin ratio, and liquidity ratio have positive relationships with return on assets. It means that the better adequacy of capital, higher earning ability, higher cross-ownership ratio, and higher liquidity do have effect of increasing return on asset of banks though that the liquidity and cross-ownership are not significance (coefficient = 0.001 and 0.0005 respectively). By contrast, non-performing loans ratio and operating expense to total assets ratio have inverse relationships with ROA.

Table 7: Parameters estimation of second equation (ROE)

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	17.0061	1.09850	15.48	<0.0001	***
CAR	−0.360810	0.0522300	−6.908	<0.0001	***
NPL	−1.46512	0.260518	−5.624	<0.0001	***
MNR	−2.79421	0.605328	−4.616	<0.0001	***
NIM	2.74240	0.355926	7.705	<0.0001	***
LDR	−0.00110066	0.00987962	−0.1114	0.9114	
COV	−0.0701883	0.0317709	−2.209	0.0281	**
RES	−5.51215	0.760908	−7.244	<0.0001	***

Source: Gretl

Based on the result of estimation for equation with ROE as dependent variable (table 7), the second equation is:

ROE = 17.0061 − 0.360810CARit − 1.46512NPLit − 2.79421MNRit + 2.74240NIMit − 0.00110066LDRit − 0.0701883COVit − 5.51215RESit + Uit

In this case, ROE has positive relationship of ROE with only net interest margin. The capital ratio, non-performing loans ratio, operating expenses to total assets ratio, liquidity ratio, and cross-ownership ratio have an inverse relationship with ROE. The liquidity is also not significant in this case due to the coefficient equal to 0.0001.

4.3.4 Verifications of models

R-squared:

R2 is basically a measure of goodness of fit, and its coefficient of determination is a statistical measure of how well the regression line approximates the real data points. It describes how well is the variation of dependent variable explained by the variation of independent variables.

Table 8: R-squared and Adjusted R-squared of models

	R-squared	Adjusted R-squared
ROA equation	0.600580	0.589027
ROE equation	0.511607	0.497480

Source: Gretl

As it can be seen from table 8, R-squared for ROA equation and ROE equation are 0.60 and 0.51 respectively. It is not possible to choose one exact value of R-squared which is ideal for every model. It might be common that the closer to value is to 1, the better the values actually fit. However, in some circumstances, that may be a bad thing because it is unreal to have really high value of R-squared. The expected value of R-square for these models is 0.5 (author's opinion). Therefore, it can be said that there is a goodness of fit for this data set.

Statistical significance of parameters:

The significance of parameters was tested by the following hypothesis:

H_0: parameters are not statistically significant

H_1: parameters are statistically significant

Alpha level of significance $\alpha = 0.01$, $\alpha = 0.05$ and $\alpha = 0.10$

Table 9: Statistical significance of parameters (ROA equation)

Parameters	p-value	Comparison	Results
CAR	<0.0001	P-value < 0.01	Significant
NPL	<0.0001	P-value < 0.01	Significant
MNR	<0.0001	P-value < 0.01	Significant
NIM	<0.0001	P-value < 0.01	Significant
LDR	0.1608	P-value > 0.10	Not Significant
COV	0.8724	P-value > 0.10	Not Significant
RES	<0.0001	P-value < 0.01	Significant

Table 10: Statistical significance of parameters (ROE equation)

Parameters	p-value	Comparison	Results
CAR	<0.0001	P-value < 0.01	Significant
NPL	<0.0001	P-value < 0.01	Significant
MNR	<0.0001	P-value < 0.01	Significant
NIM	<0.0001	P-value < 0.01	Significant
LDR	0.9114	P-value > 0.10	Not Significant
COV	0.0281	0.01<P-value < 0.05	Significant
RES	<0.0001	P-value < 0.01	Significant

Source: Gretl

It can be seen from table 9 and table 10 that most of the independent variables have statistical significance for parameters except for the case of liquidity ratio that are not significant in both equations, and cross-ownership ratio that is not significant in the ROA equation but significant in ROE equation.

The results also reflect that the capital adequacy, asset quality, management efficiency, earning ability and restructuring policy do affect the performance of Vietnamese commercial banks (measured by return on assets and return on equity). Besides, the liquidity does not really affect the profitability and performance of Vietnamese commercial banks.

In the case of cross-ownership phenomenon, the number of shares owned by other financial institutions in Vietnamese commercial banks only has an influence on the return on equity. The test results show no evidence to support the relationship between cross-ownership and return on assets of banks.

Multicollinearity test:

Table 11: Correlation matrix between explanatory variables

	CAR	NPL	MNR	NIM	LDR	COV	RES
CAR	1.0000	0.0234	0.4491	0.5628	0.6085	0.3416	-0.1350
NPL		1.0000	0.1484	0.0631	-0.1679	0.1769	0.2419
MNR			1.0000	0.7046	0.2607	0.1222	0.2269
NIM				1.0000	0.4664	0.1835	0.0127
LDR					1.0000	0.1370	-0.2119
COV						1.0000	-0.1290
RES							1.0000

Source: Gretl

The multicollinearity is a high dependency between explanatory variables (correlation coefficients positively or negatively exceed 0.8). As shown in table 11, there is no correlation coefficient between explanatory variables. Thus, there is no problem of multicollinearity in these models.

Heteroscedasticity test:

White's test is used for testing of heteroscedasticity with the following hypothesis:

H_0: there is no heteroscedasticity

H_1: there is heteroscedasticity

$\alpha = 0.05$

Table 12: White's test for heteroscedasticity

	P-value of the test	Comparison	Level of significance
ROA model	0.0303822	0.0303822 < 0.05	$\alpha = 0.05$
⇨ There is heteroscedasticity in the model			
ROE model	2.76632e-005	2.76632e-005 > 0.05	$\alpha = 0.05$
⇨ There is no heteroscedasticity in the model			

Autocorrelation test:

The Durbin-Watson test was done by the following hypothesis:

H_0: there is no autocorrelation

H_1: there is autocorrelation

$\alpha = 0.05$

Table 13: Durbin-Watson test for autocorrelation

Model	Durbin-Watson statistic	P-value
ROA as dependent variable	0< 1.31785 < 2	8.43508e-005 > α = 0.05
⇨ There is no autocorrelation in this model		
ROE as dependent variable	0< 1.01902 < 2	6.34565e-011 > α = 0.05
⇨ There is no autocorrelation in this model		

4.4 Financial performance analysis

4.4.1 Profitability analysis

In order to assess the performance by evaluating profitability of Vietnamese commercial banks, this paper employed ROA and ROE. Return on assets shows how profitable are the bank's assets in generating revenues. Return on equity shows the profitability of bank's own capitals. However, in different circumstances, a high level of these indicators can underline a high profitability but also a low level of capitalization, while a low level can underline a low level of profitability and a high capitalization of the bank (Evans et al., 2000, p. 7). The results of these indicators for twenty five banks in the selected period are summarized in the following tables.

Return on assets

Table 14: Return on assets of Vietnamese commercial banks (2006-2015)

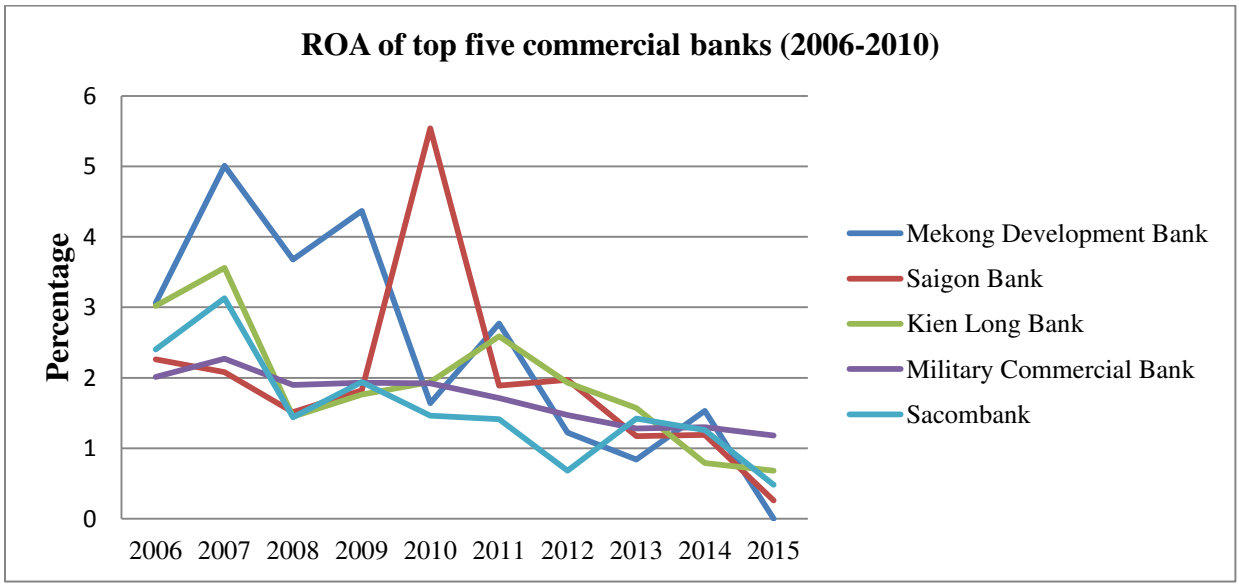
Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	**Rank**
ACB	1.47	2.71	2.32	1.61	1.25	1.32	0.34	0.48	0.55	0.54	1.26	**9**
DAB	1.48	1.68	1.73	1.52	1.34	1.56	0.86	0.46	0.03	0.03	1.07	**14**
SAB	1.12	1.64	1.32	1.73	1.47	0.16	0.06	0.2	0.11	0.11	0.79	***23***
ABB	3.07	1.59	0.32	1.56	1.54	0.77	0.91	0.27	0.19	0.14	1.04	**15**
VCC	1.85	4.57	0.18	1.64	0.98	2.14	1.08	0.47	0.66	0.19	1.38	**7**
MSB	1.23	1.33	1.26	1.6	1.29	0.69	0.2	0.3	0.14	0.11	0.82	***22***
TCB	1.84	1.79	2.37	2.24	1.71	1.91	0.42	0.39	0.65	0.83	1.42	**6**
KLB	3.02	3.56	1.45	1.76	1.94	2.59	1.93	1.57	0.79	0.68	1.93	**3**
NAB	1.41	1.65	0.17	0.67	1.09	1.44	1.04	0.6	0.57	0.53	0.92	**20**
NCB	3.28	1.36	0.55	0.96	0.81	0.78	0.01	0.07	0.02	0.02	0.79	***24***
VPB	1.4	1.61	0.78	1.27	1.15	1.12	0.69	0.91	0.88	1.34	1.12	**13**
SHB	1.07	1.85	1.46	1.52	1.26	1.23	0.03	0.65	0.51	0.43	1.00	**16**
HDB	2.15	1.36	0.51	1.35	1.01	1.07	0.67	0.31	0.51	0.5	0.94	**19**
OCB	1.98	1.85	0.6	1.81	1.88	1.34	0.87	0.8	0.61	0.47	1.22	**11**
MBB	2.01	2.27	1.9	1.93	1.92	1.71	1.47	1.28	1.3	1.18	1.70	**4**
VIB	1.15	1.11	0.46	1.01	1.05	0.67	0.65	0.07	0.66	0.63	0.75	***25***
SGB	2.26	2.08	1.51	1.82	5.54	1.89	1.97	1.17	1.19	0.26	1.97	**2**
SCB	2.4	3.13	1.44	1.94	1.46	1.41	0.68	1.42	1.26	0.48	1.56	**5**
VAB	1.63	2.15	0.73	1.61	1.34	1.06	0.7	0.23	0.15	0.21	0.98	**17**
PGB	1.99	1.75	1.21	1.21	1.63	2.63	1.3	0.17	0.52	0.16	1.26	**10**
EXB	1.74	1.78	1.74	1.99	1.85	1.93	1.21	0.39	0.03	0.03	1.27	**8**
VCB	1.89	1.32	0.64	1.64	1.5	1.24	1.13	0.99	0.87	0.85	1.21	**12**
MDB	3.06	5.01	3.68	4.37	1.64	2.77	1.22	0.84	1.53	0	2.41	**1**
VTB	0.48	0.76	1	0.58	1.11	1.51	1.28	1.07	0.92	0.79	0.95	**18**
BID	0.76	0.84	0.88	1.04	1.13	0.83	0.73	0.78	0.83	0.84	0.87	***21***

Source: authors calculations based on bank's annual reports and Finance.vietstock.vn

In regard to the return on asset ratio, it can be noted that all selected banks have positive value of ROA. The top five banks of highest level are MDB, SGB, KLB, MBB, and SCB which account for a value between 1.56 percent and 2.40 percent. In the bottom lines, the banks with lowest level of ROA are BIDV (BID), Maritimebank (MSB), Southeast Asia bank (SAB), National Citizen bank (NCB) and Vietnam International Bank (VIB), that has for ROA decrease from 0.87 percent to 0.78 percent respectively (table 14).

There was a decreasing trend in the ratio of return on assets in most of the studied banks. The following figures show the change of ROA ratio during the period of 2006-2015 for top five banks in the top level and five banks in the bottom positions.

Figure 4: Change in ROA of top five commercial banks during ten years

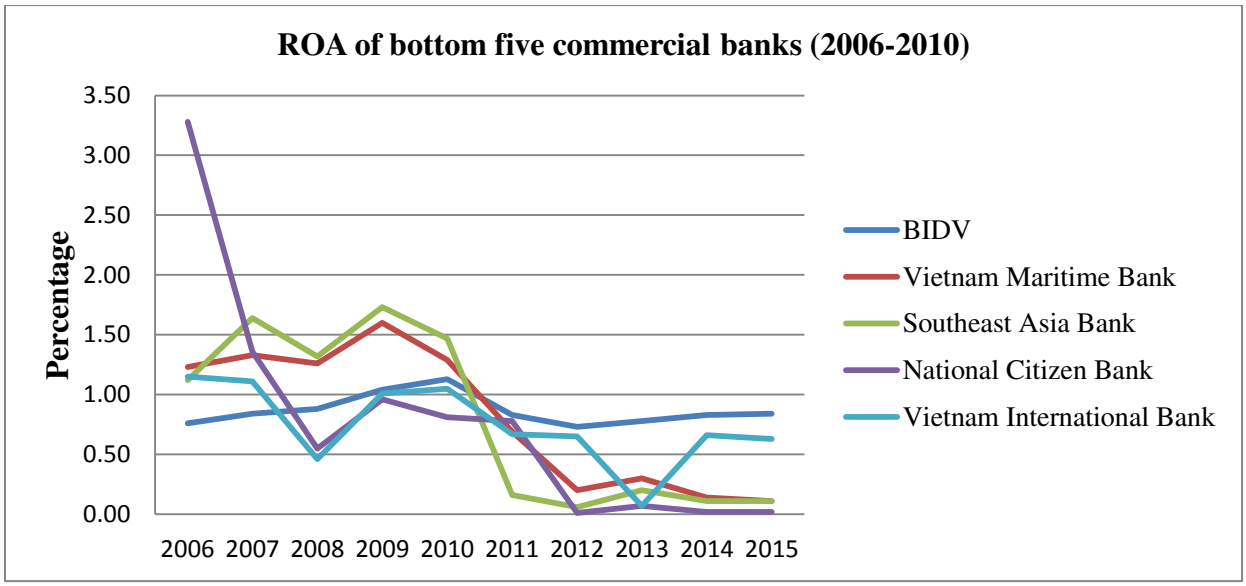


Source: data from table 14

In the first period of five years (2006-2010), except for a significant drop in year 2008, the top five banks maintained their ROA ratio around 2 percent. In the second period of last five years (2011-2015), ROA ratio started to fall quickly that since 2012 all of these five banks registered a ROA ratio below 2 percent. Finally, in the year 2015, there was only Military Commercial Bank that had ROA accounted for 1.18 percent whereas the other four banks hold less than 1 percent.

Figure 5 shows the similar situation that was occurred in the five banks in the bottom lines with the significant drop of National Citizen Bank from 3.28 percent in 2006 to 0.55 percent in 2008. Besides, Maritime bank, Southeast Asia bank, and National Citizen Bank registered ROA ratio less than 0.2 percent since 2012 before ending at 0.11, 0.11, and 0.02 percent in 2015 respectively.

Figure 5: Change in ROA of bottom five commercial banks during ten years



Source: data from table 14

Return on equity

As a result of the average value of ROE, that are displayed in table 15, a bank has highest average value of ROE was Asia Commercial Bank (ACB, 21.31 percent). The following banks in top five banks are Military Bank (MBB), Techcombank (TCB), Vietcombank (VCB) and BIDV (BID) respectively. The lowest value of ROE belongs to a group of Southeast Asia Bank (SAB, 6.64 percent), Nam A Bank (NAB, 6.52 percent), An Binh Bank (ABB, 5.82), National Citizen Bank (NCB, 5.72 percent), and VietCapital Bank (VCC, 5.57 percent).

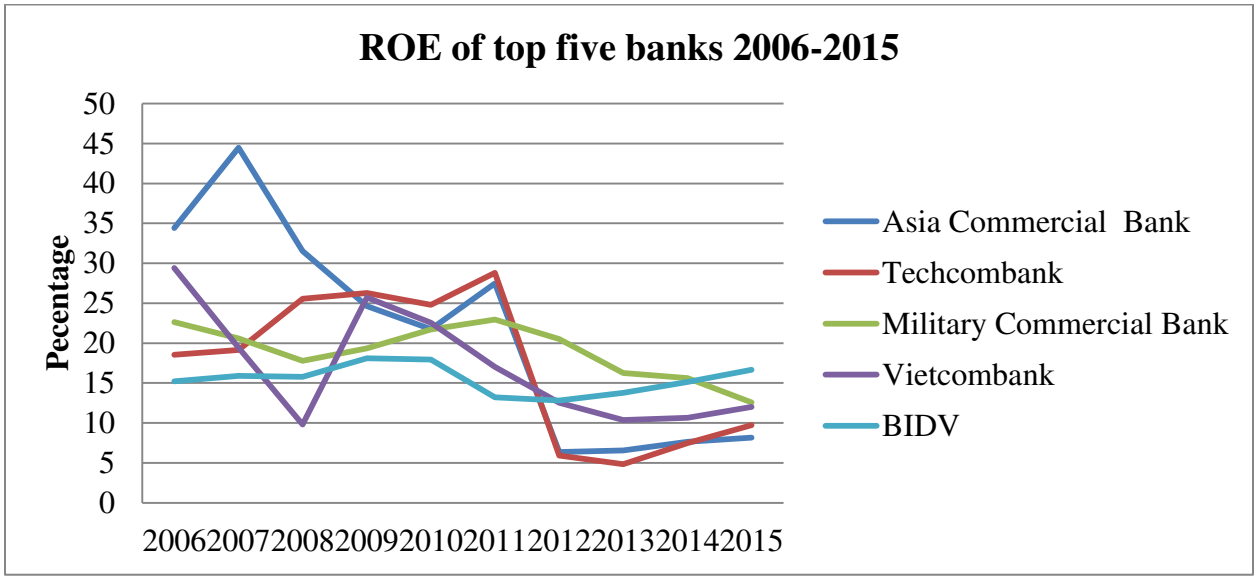
Table 15: Return on equity of Vietnamese commercial banks (2006-2015)

Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	Rank
ACB	34.42	28.12	28.46	24.63	21.74	27.49	6.38	6.58	7.64	8.17	21.31	**1**
DAB	13.62	13.99	15.98	15.23	13.71	16.86	9.69	5.47	0.47	0.55	10.56	**11**
SAB	14.63	13.52	8.51	9.52	11.21	2.24	0.95	2.68	1.52	1.60	6.64	***21***
ABB	8.44	8.82	1.54	7.38	10.85	6.55	8.30	2.64	2.04	1.59	5.82	***23***
VCC	7.42	13.07	0.55	5.06	3.55	10.04	6.22	3.18	4.96	1.61	5.57	***25***
MSB	15.20	12.90	16.86	28.48	23.42	10.08	2.44	3.57	1.51	1.01	11.55	**9**
TCB	18.54	19.13	25.54	26.28	24.80	28.79	5.93	4.84	7.49	9.73	17.11	**3**
KLB	9.99	11.26	4.42	8.47	9.00	11.81	10.17	9.06	5.14	4.90	8.42	**18**
NAB	9.89	11.87	0.99	4.29	7.89	9.03	5.62	4.13	5.68	5.76	6.52	***22***
NCB	6.67	13.59	6.90	12.70	9.84	6.35	0.07	0.58	0.25	0.20	5.72	***24***
VPB	19.49	15.03	6.23	11.88	12.98	14.28	10.19	14.17	15.01	21.42	14.07	**8**
SHB	2.76	9.44	8.76	13.6	14.98	15.04	0.34	8.56	7.59	7.32	8.84	**16**
HDB	12.66	16.75	4.97	11.2	12.97	14.44	7.3	3.11	5.46	5.62	9.45	**14**
OCB	16.65	13.55	4.01	10.51	11.13	8.79	6.07	6.20	5.53	5.08	8.75	**17**
MBB	22.63	20.58	17.80	19.35	21.71	22.96	20.49	16.25	15.62	12.56	19.00	**2**
VIB	16.39	18.31	7.55	17.68	16.58	8.66	6.33	0.61	6.34	6.09	10.45	**12**
SGB	15.47	14.43	11.12	12.34	29.12	8.90	8.69	4.91	5.18	1.25	11.14	**10**
SCB	19.76	27.36	12.64	18.25	15.24	14.47	7.10	14.49	12.56	5.64	14.75	**7**
VAB	9.91	14.07	5.22	13.31	10.43	7.12	4.62	1.69	1.31	2.17	6.99	**20**
PGB	4.88	15.06	8.35	16.51	13.40	18.73	8.30	1.19	4.00	1.22	9.16	**15**
EXB	18.58	11.25	7.43	8.65	13.51	20.39	13.32	4.32	0.39	0.29	9.81	**13**
VCB	29.42	19.43	9.81	25.71	22.55	17.02	12.53	10.38	10.65	12.01	16.95	**4**
MDB	17.69	15.92	11.75	12.34	6.68	9.89	2.93	1.60	2.63	0	8.14	**19**
VTB	11.33	14.12	15.7	10.23	22.15	26.76	19.81	13.21	10.47	10.25	15.40	**6**
BID	15.20	15.88	15.77	18.12	17.95	13.20	12.83	13.77	15.15	16.66	15.45	**5**

Source: authors calculations based on bank's annual reports and Finance.vietstock.vn

During ten years from 2006 to 2015, the downward trend was not consistent from year to year since there was two period of time (2007-2008 and 2011-2012) in which banks drop their ROE ratio more significant than other years. Besides, there were also some banks that had an increase of ROE during those periods such as Dong A Bank from 13.99 percent in 2007 to 15.98 percent in 2008, Maritime Bank from 12.90 to 16.86 percent in 2007-2008. Techcombank was the one experiencing an increase in 2008 among top five banks that having highest average ROE during ten years (see figure 6). In addition, the least change of ROE during ten year belongs to BIDV since it maintained its ROE around 15 percent from year to year (figure 6).

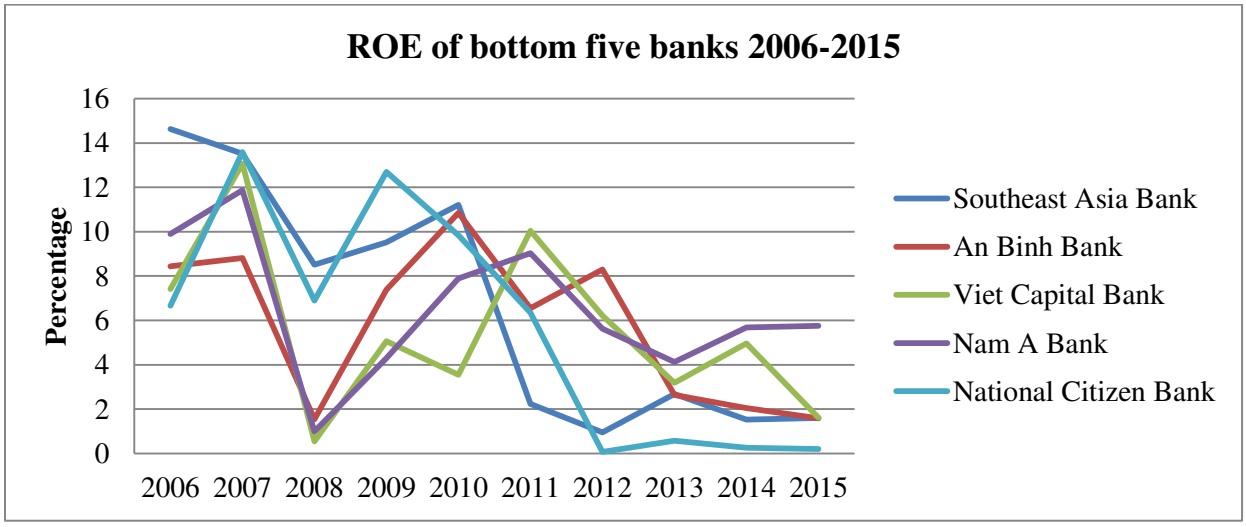
Figure 6: Change in ROE ratio of top five banks during ten years



Source: data from table 15

For the banks in the bottom line, there was no difference between them since all five banks saw the significant drop in 2007-2008 then quickly recover its ROE in 2009. For the second period of downturn, An Binh Bank registered a later decrease when it start to drop from 2013, whereas others started downward trend earlier, for example National Citizen Bank was in downward trend since 2009 (figure 7).

Figure 7: Change in ROE of bottom five banks during ten years



Source: data from table 15

Ranking for profitability

Based on the group average of these two indicators, the profitability of banks is ascending ranked from bank with lowest average value. The top five banks that hold the highest level of profitability are Military Bank (MBB), Techcombank (TCB), Asia Commercial Bank (ACB), Saigonbank (SGB) and SCB (SCB). Comparatively the bottom five ranked banks, that have average value for both indicators at lowest level, are An Binh Bank (ABB), Nam A Bank (NAB), Southeast Asia Bank (SAB) and National Citizen Bank (NCB).

Table 16: Ranks of profitability for Vietnamese Commercial Banks

Bank	ROA Rank	ROE Rank	**Profitability Rank**	Bank	ROA Rank	ROE Rank	**Profitability Rank**
ACB	9	1	**3**	HDB	19	14	**19**
DAB	14	11	**12**	OCB	11	17	**15**
SAB	23	21	**24**	MBB	4	2	**1**
ABB	15	23	**22**	VIB	25	12	**20**
VCC	7	25	**17**	SGB	2	10	**4**
MSB	22	9	**16**	SCB	5	7	**4**
TCB	6	3	**2**	VAB	17	20	**20**
KLB	3	18	**8**	PGB	10	15	**12**
NAB	20	22	**23**	EXB	8	13	**8**
NCB	24	24	**25**	VCB	12	4	**6**
VPB	13	8	**8**	MDB	1	19	**7**
SHB	16	16	**17**	VTB	18	6	**11**
				BID	21	5	**14**

Source: own computation

4.4.2 Capital adequacy analysis

The ratio selected for measuring the capital adequacy of commercial banks in Vietnam is the capital ratio of total equity to total asset. This paper summarizes the ratios among joint-stock commercial banks from 2006 to 2015. The rank for each bank is determined by the average value during the period.

Table 17: Capital ratios of commercial banks in Vietnam for the period 2006-2015

Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	Rank
ACB	3.70	7.33	7.38	6.02	5.55	4.26	7.16	7.51	6.90	6.35	6.21	***24***
DAB	12.59	11.77	10.13	9.88	9.70	8.87	8.81	7.86	6.48	6.21	9.23	**16**
SAB	10.35	12.83	18.59	17.91	10.40	5.48	7.44	7.17	7.09	6.81	10.41	**13**
ABB	38.22	14.44	29.31	16.93	12.24	11.37	10.65	9.97	8.47	8.99	16.06	**6**
VCC	29.31	37.10	31.48	33.24	25.27	19.45	15.80	13.96	12.85	11.42	22.99	**2**
MSB	9.33	10.72	5.74	5.56	5.49	8.31	8.27	8.79	9.05	13.05	8.43	**18**
TCB	10.17	9.04	9.46	7.91	6.25	6.93	7.39	8.76	8.52	8.57	8.30	***21***
KLB	38.48	29.01	35.63	14.93	25.54	19.36	18.54	16.26	14.56	13.32	22.56	**3**
NAB	15.42	12.72	21.88	12.22	14.99	16.69	20.47	11.32	8.93	9.63	14.43	**7**
NCB	46.26	5.85	9.87	6.24	10.10	14.30	14.76	11.02	8.72	6.67	13.38	**10**
VPB	8.26	12.02	12.88	9.25	8.70	7.24	6.47	6.37	5.50	6.91	8.36	**20**
SHB	38.68	17.61	15.76	8.80	8.20	8.21	8.16	7.21	6.20	5.50	12.43	**12**
HDB	17.52	5.36	17.50	9.39	6.86	7.88	10.22	9.97	8.92	8.82	10.24	**14**
OCB	12.93	14.08	15.76	18.37	15.95	14.75	13.93	12.09	10.28	8.55	13.67	**8**
MBB	9.54	11.75	9.98	9.98	8.10	6.95	7.33	8.40	8.26	10.49	9.08	**17**
VIB	7.20	5.55	6.60	5.21	7.03	8.42	12.87	10.38	10.54	10.21	8.40	**19**
SGB	14.93	14.06	13.12	16.29	20.97	21.51	23.83	23.84	22.03	19.11	18.97	**4**
SCB	11.59	11.38	11.34	10.14	9.20	10.28	9.01	10.57	9.52	7.72	10.07	**15**
VAB	18.11	14.02	14.02	10.84	14.10	15.88	14.36	13.27	10.22	9.36	13.42	**9**
PGB	40.81	11.61	16.59	10.50	13.27	14.74	16.59	12.90	12.95	13.66	16.36	**5**
EXB	10.62	18.67	26.62	20.40	10.30	8.88	9.29	8.64	8.73	10.53	13.27	**11**
VCB	6.66	6.86	6.21	6.54	6.72	7.81	10.02	9.04	7.51	6.70	7.41	***22***
MDB	18.38	35.18	28.29	41.17	22.14	37.91	46.38	61.41	54.95	0	34.58	**1**
VTB	4.16	6.41	6.37	5.16	4.94	6.19	6.68	9.38	8.32	7.20	6.48	***23***
BID	4.73	5.69	5.46	5.95	6.61	6.01	5.47	5.84	5.12	4.98	5.59	***25***

Source: authors calculations based on bank's annual reports and Finance.vietstock.vn

The table illustrates that there are 15 banks having total equity to total asset ratio more than 10 percent. Most of them are small and medium banks according to their size of total assets[13]. MDB, VCC, KLB, SGB, and PGB are in group of highest ratio of total equity to total asset at 34.58, 22.99, 22.56, 18.97, and 16.36 percent respectively.

On the other hand, TCB, VCB, VTB, ACB, and BID have lowest positions in ranking because of the poor financial soundness in the case of total equity to total asset ratio (between 5.59 percent and 8.30 percent). These five banks are large banks due to the size of total assets. They are formerly stated-owned banks (except for ACB) and the government still owning a large amount of share after the process of transforming from state-owned into joint stock banks.

[13] Refer to Appendix 3, p.79

While the fluctuation from year to year occurred in banks that having higher capital ratio, it can be seen from figure 8 that banks with lower ratio of total equity to total asset remained this ratio more stable over time.

Figure 8: Change in capital ratio of top five and bottom five banks

Source: data from table 17

4.4.3 Asset quality analysis

As one of the main indicators of asset quality, the non-performing loans ratio determines the healthiness of commercial banks. Particularly, this ratio reflects the quality of loans made by banks, the ability of issuing and managing credits in the lending processes, and the ability of banks to recover the loans. The higher non-performing loans ratio shows the lower quality of bank's assets and vice versa. The ratios of non-performing loans to total loans of researched banks are ranked as the following table.

Table 18: The ratio of NPLs to total loans of Vietnamese commercial banks (2006-2015)

Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	Rank
ACB	0.20	0.08	0.89	0.41	0.34	0.88	2.46	3.00	2.18	1.32	1.18	**3**
DAB	0.76	0.44	2.55	1.32	1.59	1.69	3.95	3.99	3.76	3.25	2.33	**17**
SAB	0.23	0.24	2.14	1.88	2.14	2.75	2.98	2.84	2.86	1.60	1.97	**12**
ABB	2.70	1.52	4.16	1.47	1.17	2.82	2.84	4.80	4.51	1.76	2.78	**23**
VCC	0.38	0.44	1.24	3.48	4.07	2.70	3.23	4.10	3.80	1.46	2.49	**20**
MSB	3.73	2.08	1.49	0.62	1.85	2.25	2.65	2.71	2.61	2.16	2.22	**15**
TCB	3.11	1.39	2.56	2.49	2.30	2.81	2.69	3.65	2.38	1.66	2.50	**21**
KLB	1.92	1.27	1.66	1.17	1.11	2.77	2.93	2.47	1.95	1.12	1.84	**7**
NAB	1.62	1.64	2.56	1.71	2.18	2.84	2.71	1.48	1.42	0.91	1.91	**10**
NCB	1.04	0.16	2.91	2.45	2.24	2.92	4.00	6.07	2.52	2.13	2.64	**22**
VPB	0.58	0.49	3.41	1.61	1.20	1.76	2.72	2.81	2.54	2.70	1.98	**13**
SHB	1.76	1.44	2.49	2.34	0.83	1.32	10.03	4.06	2.03	1.72	2.80	**24**
HDB	0.30	0.31	1.93	1.10	0.83	1.63	2.36	3.42	1.40	0.97	1.43	**6**
OCB	1.81	1.41	2.25	2.53	2.05	2.73	2.79	2.92	2.85	2.32	2.37	**18**
MBB	2.71	1.11	1.87	1.69	1.33	1.60	1.86	2.45	2.72	1.60	1.89	**9**
VIB	1.49	1.21	1.84	1.28	1.59	2.69	2.73	2.78	2.51	2.06	2.02	**14**
SGB	0.48	0.42	0.69	1.78	1.91	4.75	2.93	2.24	2.08	1.88	1.92	**11**
SCB	0.72	0.24	0.62	0.69	0.52	0.56	1.94	1.47	1.21	1.87	0.98	**2**
VAB	1.96	0.67	1.80	1.31	1.93	2.56	4.65	2.88	2.32	2.26	2.23	**16**
PGB	0.00	0.06	1.42	1.22	1.42	2.06	8.42	2.98	2.68	3.51	2.38	**19**
EXB	0.85	0.86	4.71	1.83	1.42	1.61	1.32	2.00	2.46	1.85	1.89	**8**
VCB	0.96	1.19	1.11	0.60	0.66	0.74	1.46	2.98	2.29	1.84	1.38	**4**
MDB	0.24	0.08	0.80	0.82	1.26	2.01	3.46	2.64	2.65	0.00	1.40	**5**
VTB	0.96	1.19	1.11	0.60	0.66	0.74	1.46	0.90	1.10	0.91	0.96	**1**
BID	9.20	3.37	2.16	2.40	2.32	2.41	2.69	1.86	2.03	1.62	3.01	**25**

Source: authors calculations based on bank's annual reports and Finance.vietstock.vn

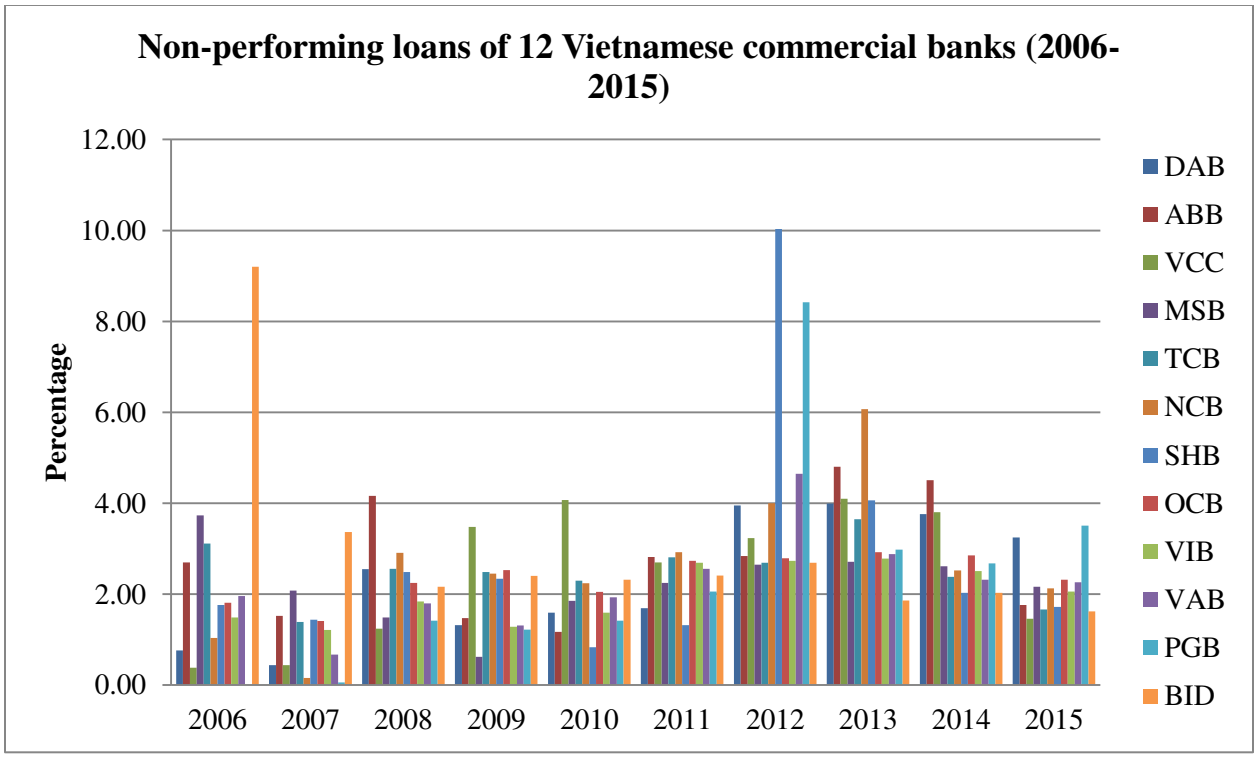
Vietinbank (VTB), SCB (SCB), Asia Commercial Bank (ACB), Mekong Development Bank (MDB), and Vietcombank (VCB) have better quality of assets due to the low average ratio of non-performing loans to total loans (from 0.96 to 1.40 percent). There are 12 banks that having more than 2 percent of NPL to total loans, especially the banks in bottom positions including TCB, NCB, ABB, SHB, and BID with 2.5, 2.64, 2.78, 2.80, and 3.01 percent respectively.

For these 12 banks, the highest amount of non-performing loans occurred in the period of 2012-2013. Particularly, in the case of Saigon Hanoi Bank (SHB) in 2012, the amount of non-performing loans was highest, at around 10 percent . It was followed by Petrolimex Group Bank (PGB) approximately at 8 percent (2012), Dong A Bank (DAB),

National Citizen Bank and VietA Bank around 4 percent. In 2013, there were five banks including DAB, ABB, VCC, NCB and SHB that having more than 4 percent of NPLs. (See figure 9)

Another noticeable bank in figure 9 is BIDV in which it experienced the NPLs ratio significantly high in the period of 2006-2010 (more than 9 percent in 2006 and around 3 percent for the rest) before slightly decreased and ended up at 1.6 percent in 2015.

Figure 9: Non-performing loans of 12 Vietnamese commercial banks during ten years



Source: data from table 18

4.4.4 Management efficiency analysis

The management quality has great importance in showing the healthy and stability of banks. In this study, the management quality of banks is measured by the ratio of operating expenses to total asset. The lower value of this ratio reflects the better efficiency of management and vice versa. The comparison between commercial banks in Vietnam for the period of 2006-2015 is illustrated in the following table.

Table 19: The ratio of operating expenses to total assets of Vietnamese commercial banks (2006-2015)

Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	Rank
ACB	1.04	0.94	1.51	1.08	1.05	1.12	2.42	2.26	2.15	2.00	1.56	**12**
DAB	0.72	1.26	1.63	1.71	1.67	1.98	1.98	2.06	1.80	2.2	1.70	**16**
SAB	0.51	0.40	0.89	0.87	0.81	0.58	1.26	1.00	0.97	1.14	0.84	**2**
ABB	0.85	0.85	1.83	1.33	1.55	2.08	2.40	1.85	1.64	1.85	1.62	**14**
VCC	5.99	0.98	1.66	2.17	1.32	1.23	1.71	1.75	1.93	1.51	2.02	**23**
MSB	0.98	0.79	0.89	0.80	0.80	1.10	1.69	1.58	1.39	1.73	1.17	**3**
TCB	0.73	0.61	0.84	1.28	1.06	1.16	1.83	2.11	1.95	1.92	1.35	**10**
KLB	2.08	1.45	2.77	1.59	1.44	1.99	3.06	2.75	2.27	2.26	2.17	**24**
NAB	1.32	1.54	2.00	1.18	1.18	1.30	1.97	1.45	1.24	1.66	1.48	**11**
NCB	2.12	1.07	1.65	1.08	1.37	1.75	3.01	2.13	1.64	1.36	1.72	**17**
VPB	0.74	1.77	2.42	1.73	0.91	1.57	1.83	2.34	2.26	2.94	1.85	**20**
SHB	0.10	0.06	0.08	0.06	0.06	0.14	0.15	0.12	0.10	0.06	0.09	**1**
HDB	1.21	0.64	1.38	1.05	0.98	1.32	1.51	1.30	1.83	2.26	1.35	**9**
OCB	0.90	1.32	2.05	1.78	1.43	1.67	1.86	1.86	1.67	1.61	1.62	**13**
MBB	0.77	0.53	0.68	1.14	1.14	1.35	1.54	1.52	1.55	1.56	1.18	**4**
VIB	1.18	0.99	1.75	1.53	1.27	1.75	2.79	2.03	2.03	2.09	1.74	**18**
SGB	1.38	1.19	1.55	1.87	1.64	2.08	2.58	2.59	2.02	2.13	1.90	**21**
SCB	1.65	1.15	1.86	1.58	1.43	2.54	2.73	2.61	2.35	1.66	1.95	**22**
VAB	1.34	1.02	1.51	1.35	1.27	1.47	1.29	1.27	0.98	1.05	1.26	**8**
PGB	1.17	0.51	1.65	1.52	1.73	2.58	2.89	1.99	1.86	1.97	1.79	**19**
EXB	1.01	1.05	1.25	1.39	0.78	1.04	1.35	1.25	1.27	1.85	1.22	**6**
VCB	0.73	0.82	0.78	1.37	1.48	1.55	1.45	1.33	1.19	1.23	1.19	**5**
MDB	2.07	1.01	1.44	1.85	0.43	2.66	4.98	6.92	4.83	0	2.62	**25**
VTB	1.58	1.16	2.56	1.30	1.96	1.97	1.87	1.72	1.48	1.38	1.70	**15**
BID	0.61	0.77	0.89	1.53	1.51	1.64	1.40	1.36	1.33	1.30	1.23	**7**

Source: authors calculations based on bank's annual reports and Finance.vietstock.vn database

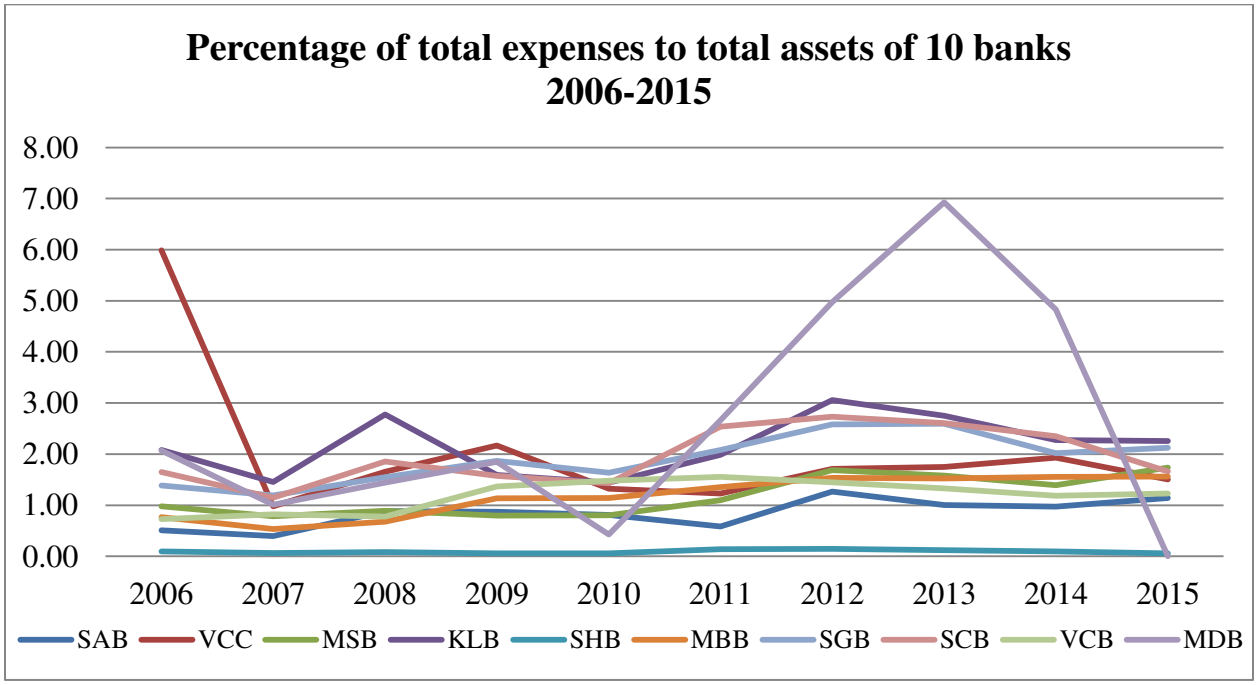
The most efficient of management belong to Saigon Hanoi Bank with the average operating expenses to total assets is 0.09 percent. The least management efficiency position was accounted by Vietcapital Bank, Kienlong Bank, and Mekong Development Bank with 2.02, 2.17, and 2.62 percent respectively. There are only three banks with the ratio of operating expenses to total assets more than 2 percent.

The ratio of operating expenses to total asset in Vietnamese commercial banks increased during the economic downturn in 2008 and 2012. While there were trivial difference of this ratio between commercial banks in the middle of ranking (table 19), there were noticeable differences between top five banks and bottom five banks over the period of 2006-2015.

It can be seen from figure 10 that there was an increase in the ratio of total operating expenses to total assets for both of the top five banks and top five banks and bottom five banks during the period of 2006-2012). However, most of these banks slightly decreased and maintained the operating expenses around 2 percent in the last 3 years. It reflects that the gap between best and worst managed banks was reduced.

One exception which can also be seen in figure 10 is the case of Saigon Hanoi Bank (SHB). During the period of 2006-2015, it maintained the management efficiency ratio around 0.1 percent from year to year. It was the best management efficiency in term of operating expenses to total asset ratio.

Figure 10: The ratio of total operating expenses to total assets of 10 Vietnamese commercial banks (2006-2010)



Source: data from table 19

4.4.5 Earning ability analysis

The net interest margin ratio represents for the bank's capacity of making profit. It also reflects the effectiveness and stability of banks' operations. The high NIM ratio is an important sign that a bank is succeeding in managing its assets and earning money. By contrast, the low NIM ratio indicates that a bank is struggling to make profits. The NIM ratios for Vietnamese commercial banks during the period of 2006-2015 are as follow.

Table 20: Net interest margin ratio of Vietnamese commercial banks (2006-2015)

Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	Rank
ACB	2.06	1.73	3.12	2.10	2.41	3.07	4.46	2.92	2.92	3.16	2.80	**15**
DAB	2.89	2.15	3.04	3.03	3.09	4.78	4.26	3.53	2.08	2.24	3.11	**11**
SAB	1.92	1.89	3.19	2.57	2.14	0.90	1.73	1.21	0.99	1.47	1.80	**25**
ABB	2.50	2.02	2.35	2.77	3.59	5.27	4.46	2.42	2.45	2.79	3.06	**12**
VCC	3.92	2.97	3.71	4.80	2.45	2.81	2.53	2.32	2.29	1.60	2.94	**14**
MSB	1.32	2.06	2.32	2.10	2.11	1.54	2.19	1.89	1.42	1.76	1.87	**24**
TCB	2.78	2.44	3.16	2.95	2.39	3.34	3.38	3.14	3.69	4.12	3.14	**10**
KLB	5.41	5.30	4.74	3.52	4.48	5.35	6.37	5.37	3.88	3.73	4.82	**2**
NAB	2.85	3.27	2.08	2.11	2.38	3.43	3.58	1.57	1.98	3.00	2.63	**18**
NCB	3.90	0.82	2.13	1.64	2.85	3.97	4.35	2.58	2.06	1.98	2.63	**17**
VPB	2.43	2.74	3.83	2.95	2.12	2.79	3.36	3.96	3.60	5.70	3.35	**7**
SHB	2.29	0.88	1.36	2.59	2.70	3.02	1.85	1.67	1.82	2.04	2.02	**22**
HDB	2.04	0.99	1.31	1.40	1.84	3.75	2.07	0.44	1.89	3.50	1.92	**23**
OCB	3.39	3.34	2.84	4.12	3.61	4.10	4.79	4.17	2.93	2.87	3.62	**4**
MBB	3.08	2.29	3.50	2.83	3.53	4.15	4.03	3.68	3.50	3.55	3.41	**6**
VIB	2.52	1.90	2.48	2.09	2.41	4.03	5.30	2.98	3.09	2.89	2.97	**13**
SGB	4.25	3.76	3.04	4.76	3.94	6.11	7.35	5.25	4.83	3.92	4.72	**3**
SCB	3.46	2.02	2.11	2.62	2.99	5.00	5.06	4.65	3.90	2.84	3.47	**5**
VAB	2.54	2.10	2.33	2.68	2.75	2.95	1.77	2.10	1.33	3.04	2.36	**21**
PGB	1.42	1.79	2.52	3.05	3.55	6.81	5.39	2.29	2.70	2.82	3.23	**8**
EXB	2.40	2.28	3.20	3.55	2.48	3.17	3.36	1.74	1.82	2.99	2.70	**16**
VCB	2.41	2.17	1.75	2.68	2.81	3.55	2.76	2.40	2.13	2.39	2.50	**20**
MDB	5.89	6.04	6.93	7.06	2.35	8.33	8.74	10.49	8.42	0	6.43	**1**
VTB	2.72	2.93	3.89	1.93	3.46	4.60	3.89	3.39	2.89	2.56	3.23	**9**
BID	1.59	2.52	2.69	2.50	2.65	3.28	2.88	2.71	2.75	2.38	2.59	**19**

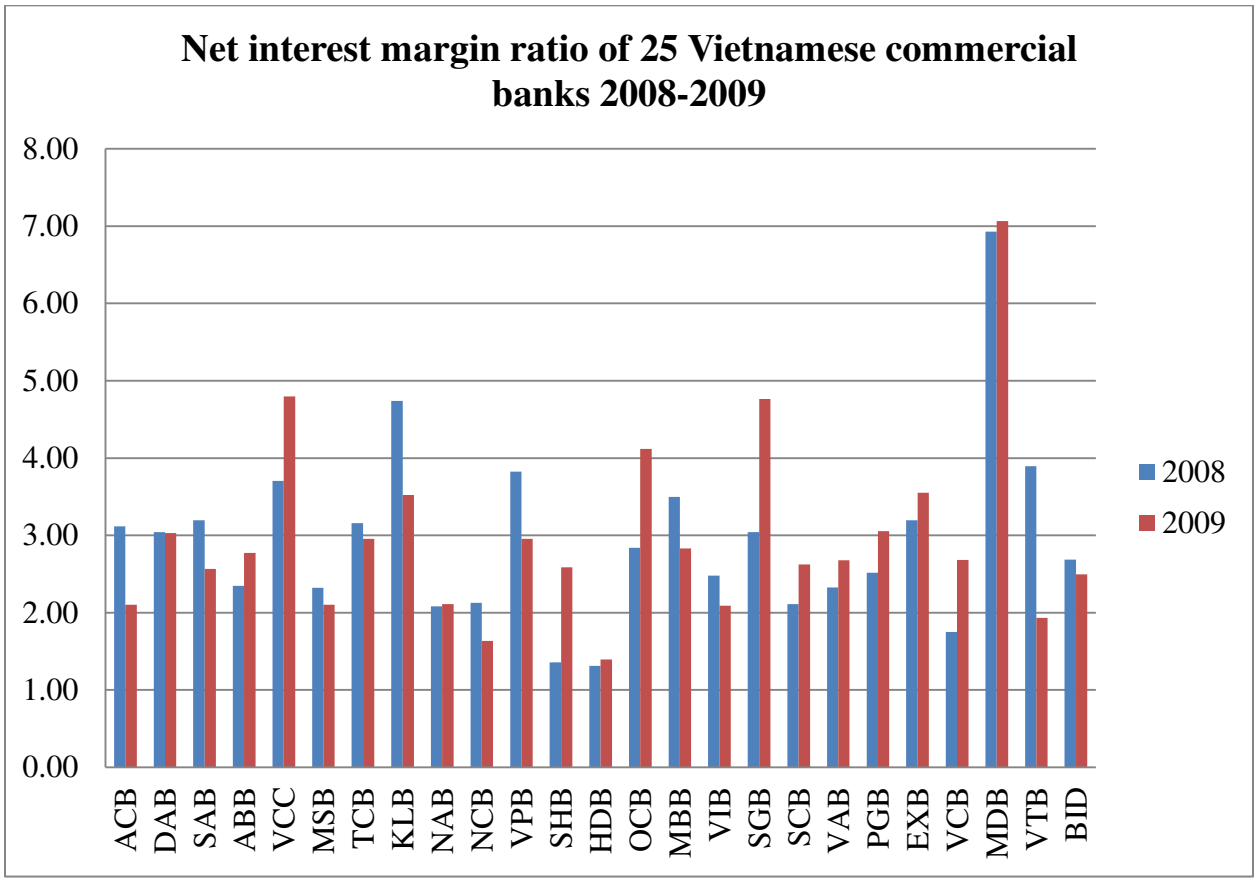
Source: authors calculations based on bank's annual reports and Finance.vietstock.vn database

The ability of earning was highest in Mekong Development Bank at 6.43 percent in average of ten year, followed by KLB (4.82 percent), SGB (4.72 percent), OCB (3.62 percent), and SCB (3.47 percent). They are smaller banks, except for SCB (SCB), due to their size of assets (refer to Appendix 3, p.79). There are only three banks that having less

than 2 percent of NIM and also standing for the bottom positions including HoChiMinh Development Bank (HDB, 1.92 percent), Maritime Bank (MSB, 1.87 percent), and Southeast Asia Bank (SAB, 1.80 percent).

In the first economic downturn of 2008-2009, the NIM ratio of banks changed differently to each other. During these two years, the NIM ratio of 12 banks was decreased, whereas other 13 banks saw an increase of NIM by the end of 2009. Besides, by the end of this period, there were only 3 banks including VCC, SGB, and MDB that had the NIM ratio exceeding 4 percent (figure 11).

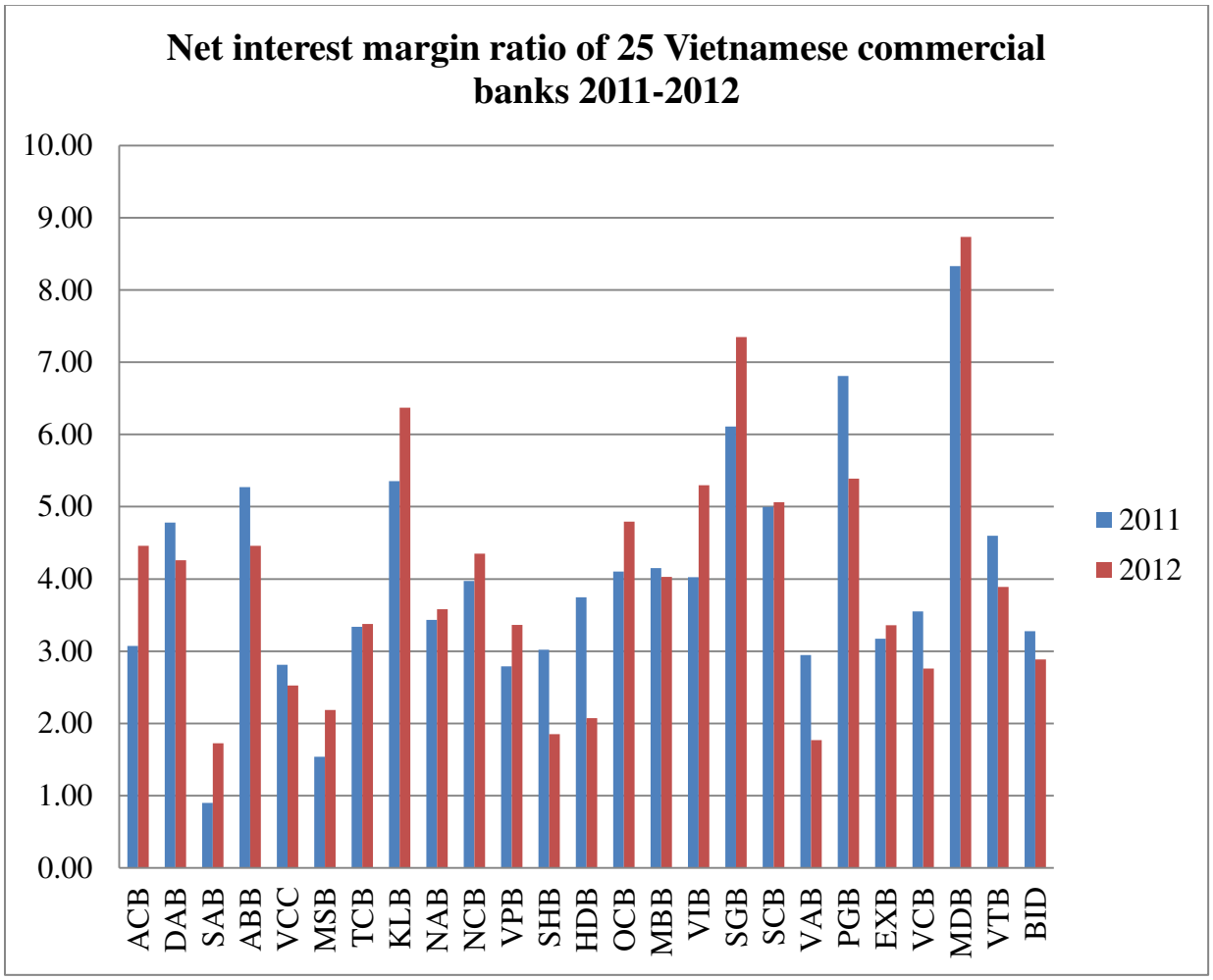
Figure 11: Net interest margin of 25 banks in 2008-2009



Source: data from table 20

For the second period of 2011-2012, the situation was the same as in the first period since there are 12 banks saw a decrease and 13 banks experienced an increase of NIM. However, in this period there were 13 banks that registered a NIM ratio over 4 percent, which was much more than the number in first period (figure 12).

Figure 12: Net interest margin ratio of 25 Vietnamese commercial banks 2011-2012



Source: data from table 20

4.4.6 Liquidity analysis

Liquidity management is the most important operation that has significant impact on the financial soundness of banks. The importance of this criterion was highlighted by the recent credit crisis in the United States of America. In this paper, the liquidity is measured by the ratio of total loans to total deposits. The lower value indicates the higher liquidity of banks. The state bank of Vietnam has published the ceiling level of total loans to total deposits ratio is 84% in 2014[14].

Table 21: The liquidity ratio of Vietnamese commercial banks (2006-2015)

Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average	Rank
ACB	50.45	57.30	53.89	71.16	80.87	71.60	80.90	76.49	74.21	75.74	69.26	**3**
DAB	84.02	123.46	109.97	121.58	120.55	120.18	97.96	80.13	65.74	73.90	99.75	**15**
SAB	95.51	102.33	87.42	76.66	86.34	56.22	51.61	56.44	70.10	74.43	75.71	**5**
ABB	71.98	100.65	96.76	84.93	83.84	96.78	63.83	61.87	56.53	64.23	78.14	**7**
VCC	156.76	251.48	208.58	197.76	113.98	82.83	74.85	82.29	87.49	84.52	134.05	**24**
MSB	77.62	88.12	78.83	78.85	64.82	60.02	47.31	40.73	36.33	43.90	61.65	**1**
TCB	90.91	81.06	65.16	66.69	64.95	70.57	60.23	57.58	60.25	77.66	69.51	**4**
KLB	133.38	141.18	132.19	101.06	105.30	102.11	89.67	90.23	80.81	80.08	105.60	**19**
NAB	107.72	96.03	109.28	110.81	90.76	106.91	77.67	84.02	81.08	84.83	94.91	**14**
NCB	64.29	70.97	90.55	102.43	99.23	86.06	103.21	72.19	67.29	59.42	81.56	**8**
VPB	88.70	104.10	90.68	95.11	104.69	98.15	61.37	61.86	71.30	88.33	86.43	**10**
SHB	133.56	148.86	65.49	86.57	94.03	82.81	71.77	82.99	83.62	87.35	93.71	**12**
HDB	168.63	250.77	141.47	86.34	83.25	71.80	61.15	69.46	63.46	74.93	107.13	**20**
OCB	184.89	130.21	125.48	125.56	132.15	139.60	110.84	104.49	88.54	93.04	123.48	**23**
MBB	56.59	64.49	57.04	72.89	73.10	64.72	62.14	63.17	58.53	65.75	63.84	**2**
VIB	92.84	93.92	81.94	83.74	91.70	96.97	85.28	79.36	76.02	88.22	87.00	**11**
SGB	121.87	112.90	109.49	113.19	113.70	122.58	102.87	97.83	94.06	87.66	107.61	**21**
SCB	81.73	79.58	75.35	97.73	104.25	106.17	88.30	82.96	77.67	70.36	86.41	**9**
VAB	107.26	125.48	88.26	110.27	139.35	157.16	84.64	75.42	79.04	82.00	104.89	**18**
PGB	201.78	145.87	106.75	90.20	100.71	109.18	109.22	98.69	79.62	93.12	113.51	**22**
EXB	77.35	80.23	67.54	98.03	106.13	138.01	105.48	103.99	84.96	85.23	94.70	**13**
VCB	55.31	67.40	69.10	81.03	83.58	89.90	82.66	80.62	74.91	75.63	76.01	**6**
MDB	231.90	382.87	102.44	348.67	40.73	251.07	243.07	223.00	203.51	0	202.73	**25**
VTB	87.58	89.16	97.51	108.81	112.39	112.88	114.04	102.33	102.67	108.23	103.56	**17**
BID	85.47	95.38	96.01	107.33	101.72	119.78	110.21	113.57	99.68	104.66	103.38	**16**

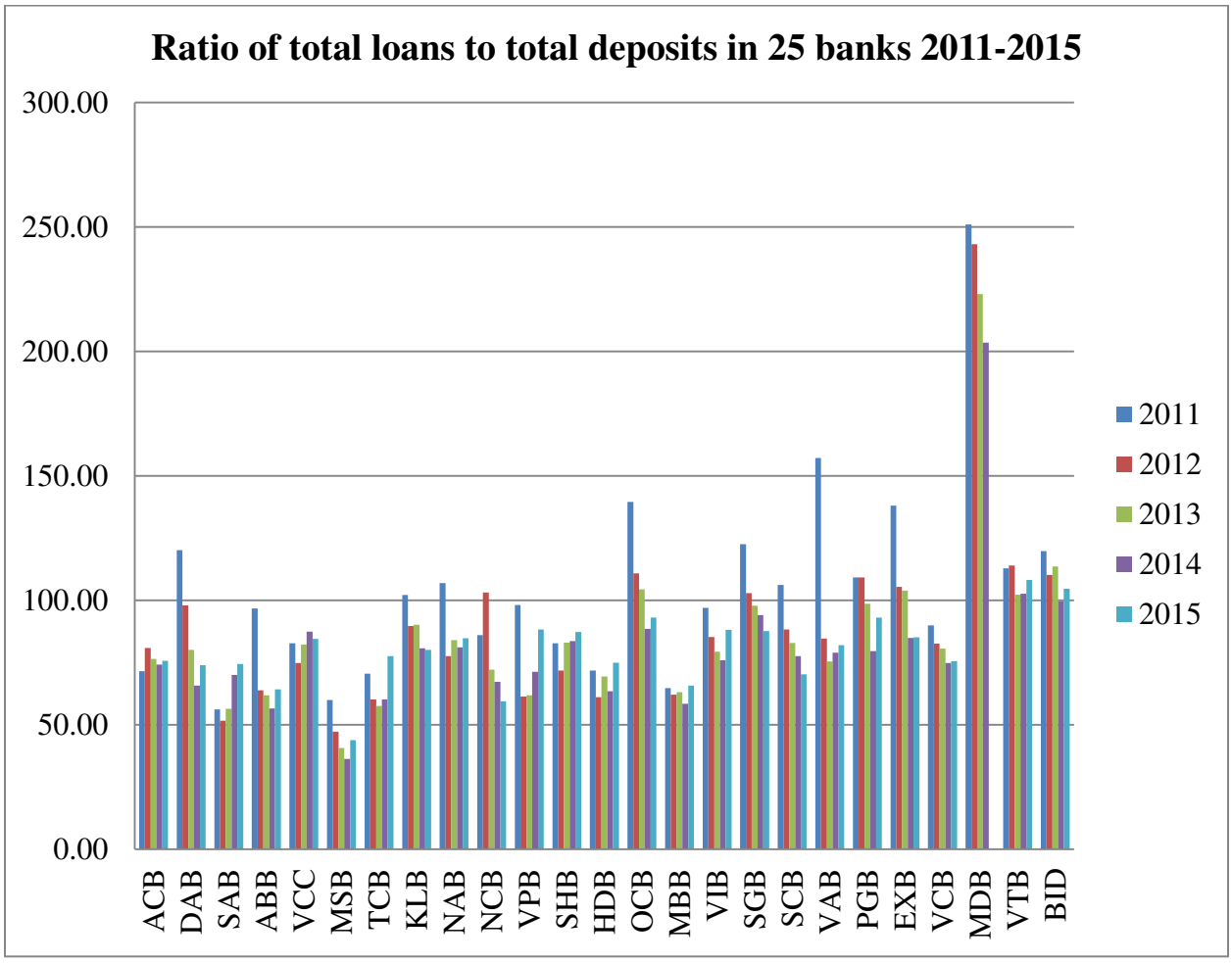
Source: authors calculations based on bank's annual reports and Finance.vietstock.vn

[14] The LDR was being floated since 2010 (decision 19/2010/TT-NHNN) and then tightened from 2014 (decision 6/2014/TT- NHNN)

It can be seen from the table that there are only seven banks that having liquidity ratio of total loans to total deposits less than 80 percent as a requirement of the state bank of Vietnam. Especially, the least soundness bank in the case of liquidity is Mekong Development Bank with the average value at more than 200 percent.

The data also show the downward trend of liquidity ratio used in most of banks during the period of 2006-2015. It can be seen from Figure 13 that the liquidity ratio was decreased since 2011 in banks which had higher value than 84 percent. In most of banks, this ratio was maintained lower than 84 percent since 2013 except for MDB, VTB, and BIDV (more than 100 percent during the whole period).

Figure 13: Liquidity ratio of 25 banks 2011-2015



Source: data from table 2

4.5 SWOT analysis

This method analyze the situations of Vietnamese banking sector during a period of 2006-2015 for both internal and external factors regarding strengths, weaknesses, opportunities and threats.

4.5.1 Strengths

The most visible strength of commercial banks in Vietnam is the numerous subsidiaries across the country which helps banks approaching their customers easily. The number of subsidiaries is particularly high in large banks such as Vietinbank (1152 subsidiaries), BIDV (576), Vietcombank (440) and SCB (416). It explains for the high market share of these banks in which Vietcombank accounted for 13.5 percent of total loans made, Vietinbank and BIDV accounted for 10.5 anand 10.1 percent respectively (Annual reports).

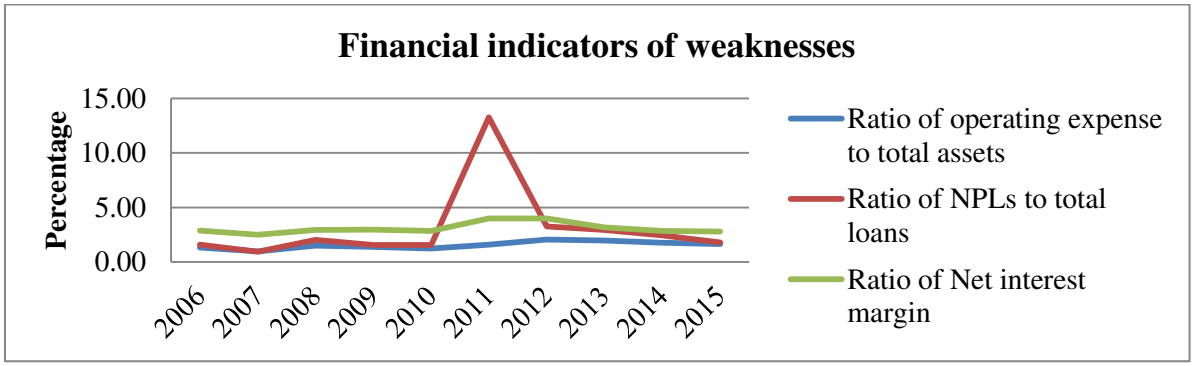
The high market share of commercial banks can also be seen from the high liquidity ratio. In 2006, the average ratio of total loans to total deposits was 108.32 percent. It slightly reduced to 104.56 percent in 2011 and down to 76% percent in 2015.

There are also other strenghs, which are difficulty to be measured such as brand reputation, understanding of envrionment in domestic market, relationship with loyal customers. (Fullbright, 2013)

4.5.2 Weaknesses

The most critical weakness of commercial banks in Vietnam was the inefficiency in managing loans which led to the increase of non-performing loans. Besides, the inefficient of managing expenses, especially operating expenses, and the decrease of banks' earning ability also underlines the weakness of the banking sector as well as bank's management.

Figure 14: Financial indicators indicate weaknesses in commercial banks 2006-2015

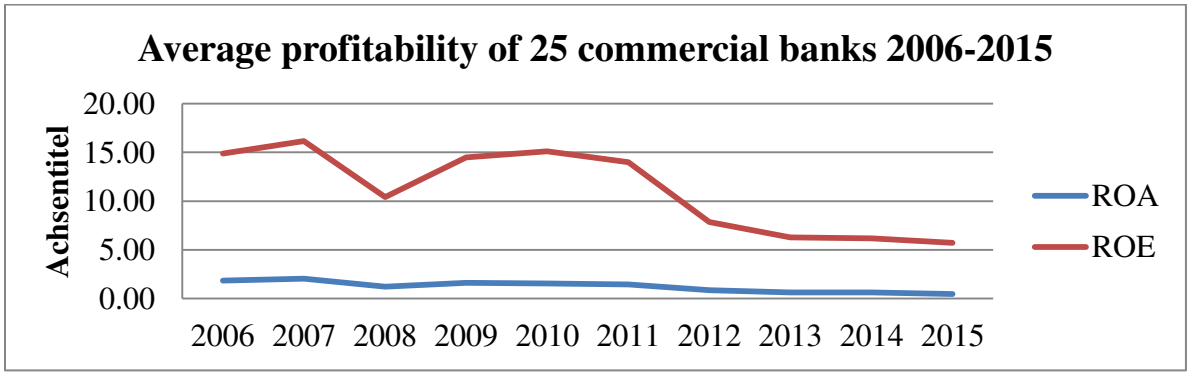


Source: data from table 18, 19 and 20

This figure shows the change on the average of 25 commercial banks for three ratios including NPLs, NIM and operating expenses to total assets from 2006 to 2015. The upward trend of non-performing loans to total loans ratio indicates that the amount of NPLs increased over years. Especially for the year 2011, the average NPLs of these 25 banks was more than 13 percent. The decrease in year 2012 was because of VAMC which purchased NPLs from commercial banks. Therefore, the management of loans was still inefficient.

For the expenses and NIM, they also saw an upward trend over the period. Despite that earning ability was not affected by financial crisis in 2008, there was only slight increase in 2011 before starting to decrease from 2012 to 2015. The inefficient management of expenses and low earning ability has led to the decrease in profitability of banks during the period. (Figure 15)

Figure 15: Average profitability of Vietnamese commercial banks 2006-2015



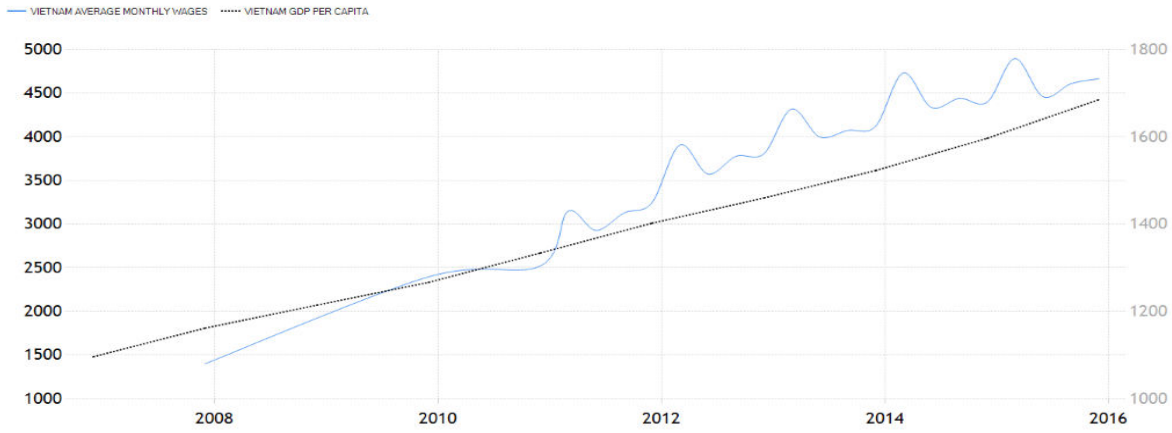
Source: data from table 14 and 15

4.5.3 Opportunities and threats

The participation of Vietnam into WTO in 2007 has opened the economy to foreign investments and entry of foreign banks into domestic market. This situation brings both opportunities and threats to Vietnamese commercial banks.

On the one hand, the entry of foreign investments contributes to the growth of the economy including increase GDP and income (figure 16). The increase of income and GDP per capita reveals that there would be an increase in the need of financial and banking services as well. In fact, the proportion of people using banking services in Vietnam was less than 30 percent of total adults by 2014, according to report of Worldbank (2015).

Figure 16: GDP per capita and average monthly wages from 2006-2015



Source: tradingeconomic.com, 2016

On the other hand, the participation of foreign banks with advance technology and capital into Vietnamese banking sector threatens the market share of domestic banks. Particularly, foreign banks could pressure domestic banks to reduce costs, diversify their financial services, improve quality of services in order to compete and remain their market shares. During the period of 2006-2015, the number of foreign banks opened subsidiaries in Vietnam has increased from 31 banks in 2006 to 49 banks in 2015 and increasing (SBV, 2015).

5. Results and discussion

5.1 Overall performance of banks

The overall performances of Vietnamese commercial banks are evaluated by combining two profitability measurements and five indicators of CAMEL (refer to appendix 4, p.80). The best performance was ranked for Military Commercial Bank because of the high ROE and ROA (2^{nd} and 4^{th}), good management of operating expenses (4^{th} in management efficiency), and high level of earning ability (6^{th}) as well as low level of liquidity (2^{nd}). However, the capital adequacy of this bank was ranked relatively low at 17^{th} place. The other four banks in a group of best banks are SCB, Asia Commercial Bank, Saigon Hanoi Bank, and Vietcombank.

The banks least efficient of overall performance include Viet A Bank, Vietnam International Bank, Viet Capital Bank, Bank for Investment and Development of Vietnam, and National Citizen Bank in which the worst bank is National Citizen Bank. Although NCB has normal liquidity ratio (81 percent on average) and capital ratio (13 percent on average); this bank registered for the low asset quality due to average 2.6 percent of non-performing loan, low ability of earning (2.63 percent), and low level of both ROA (0.79 percent) and ROE (5.72 %).

These figures and ranks only reflect the average performance of banks during a period of 2006-2015. In the period of recession and crisis, the performance of banks showed distinct trends.

In the period of crisis 2007-2009, it is noted that most of the selected banks experienced a decline of its profitability (ROA, ROE) to the bottom line in 2008. The decrease of profitability in the small banks was significantly high. For instance, Nam A, An Binh, Southeast Asia, and Vietcapital saw a decrease more than 50 percent of its ratio of ROE. On the one hand, small banks in a group of least efficient performance such as Viet Capital Bank and National Citizen Bank, together with other small banks (An Binh, Nam A, Vietcapital), recovered its profitability quickly and significantly in year 2009.

On the other hand, in the best group, Military Bank and Vietcombank slightly recovered these ratios; meanwhile, Asia Commercial Bank continued its decline. However, it should be noted that the decrease of profitability in the large banks was small; especially in the case of Techcombank, during 2007-2009 its profitability increased.

For the recession period in banking sector 2011-2013, there was a downward trend of profitability ratio for all commercial banks. In this case, although the profitability decrease in 2011-2012 of large banks was also significant as small banks, they slightly recovered it in 2013 for example of SCB and BIDV. Meanwhile, all the small banks continued its decrease, and medium sized such as VPB and SHB that they slightly increased profitability[15].

Regression analysis has shown the relationship between performance of banks measured by profitability ROA, ROE, and the other performance indicators. Particularly, the capital ratio, net interest margin ratio, and liquidity ratio have positive relationships with return on assets. It means that the better adequacy of capital, higher earning ability, and higher liquidity do have effect of increasing return on asset of banks though that the liquidity is not significance (coefficient = 0.001). Adversely, non-performing loans ratio and operating expense to total assets ratio have inverse relationships with ROA. It underlines that the high level of non-performing loans (low quality of asset), and high level of operating expenses (less management efficiency) do have effect of decreasing return on asset.

In term of return on equity, the regression analysis has shown the positive relationship of ROE with only net interest margin, and negative relationship with capital ratio, non-performing loans ratio, operating expenses to total assets ratio, and liquidity ratio. This result indicates that if the lower quality of asset (higher NPLs ratio), and the more capital adequacy (higher proportion of capital) adversely affect the return on equity of banks (lower). The increase in ability of earning results in the increase of return on equity as well. The effect of liquidity is also not significant in this case. The result of regression

[15] Refer to table and figures in section 4.4.1 p.43

analysis is consistent with the financial analysis. For example, in the period of high non-performing loans ratios, the profitability of banks is low and vice versa.

In short, there are significant relationships between banks' performance and capital adequacy, asset quality, management efficiency and earning ability. The effect of liquidity is not significant to the performance of banks selected in this study.

5.2 Effects of cross-ownership and restructuring to bank's performance

During the study period, there were 18 banks registered for the ownership of other financial institutions in their equity structure. For the other 6 banks, there were ownership by the foreign banks; however, this study focus only on the cross-ownership among Vietnamese financial institutions therefore it was not counted. The high proportion of this ratio concentrated on the small banks such as Vietcapital, An Binh Bank, Dong A Bank. The case of Military Commercial Bank, the increase of cross-ownership ratio was because of the capital withdraw of Vietnamese government. The main owners in cross-ownership issue were large banks for instance Vietcombank, Techcombank.

The analysis has shown a positive relationship between cross-ownership ratio and return on asset. However, the effect of cross-ownership in this case is not significant because the coefficient is only 0.0005. This has been proven by the test for statistical significance of parameters in regression analysis.

By contrast, in the case of return on equity, the cross-ownership ratio has shown the significance of its impact on ROE. It also has been proven by the test for statistical significance of parameters. The coefficient of -0.07 underlines an inverse relationship between cross-ownership and ROE of banks.

From those viewpoints, it can be concluded that the less proportion of share owned by other banks and financial institutions in the equity structure of a bank is consistent with the high return on equity of that bank. In comparison with data collected, the result is consistent with banks that have cross-ownership ratio decreased over time since.

In term of restructuring, regression analysis show the negative relationship with ROE and ROA. It is consistent with the performance of banks since the restructuring policies in Vietnamese banking sector started in 2012 and the performance (ROA, ROE) of most banks was in downward trend afterward. Besides, the coefficient of dummy variable indicates the average difference of banks' performance between a period of structuring and non-structuring. The coefficient is -0.4underlines that the average performance in the period of 2012-2015 is lower than the average performance in the period of 2006-2011. The change in performance (ROA, ROE) of banks[16] in the period of 2006-2015 has shown the consistent with the coefficient.

In brief, the restructuring policy has a negative relationship with the performance of banks, and banks performed worse in the period of restructuring than the period without it.

5.3 Recommendations

It is crucial for State bank of Vietnam and other authorities to tighten the regulation and supervision regarding commercial banks due to the inefficient performance in the recent. Based on the results of SWOT analysis, the following recommendations should be noted in order to exploit the strengths and opportunities as well as solving the remaining weaknesses and threats.

First of all, SBV should continue to maintain the merger and acquisition policy that concentrated on small banks. There should be more banks to be merged in order to increase the level of equity that result in better adequacy of capital. The amount of subsidiaries and ATMs of merged bank would be significantly increased that resulting in better approach to customers. Besides, reducing number of small banks will ensure the stability of banking system since most of small banks performed inefficiency during recessions.

Secondly, SBV should encourage the participation of foreign banks into Vietnamese banking sector. The participation of foreign banks by entry mode of subsidiaries could threaten the market share and profitability of domestic banks. However, it could also pressure domestic banks to reduce costs, diversify their financial services,

[16] Refer to table and figures in section 4.4.1 p.43

improve quality of services in order to compete and remain their market shares. Moreover, the presence of foreign banks would help to identify the weak banks and force them to merger to compete. On the other hand, the take-over and joint venture mode of entry come together with advance technologies and capital that would help small banks improve their operations.

Thirdly, continuing to strictly supervise and reduce the non-performing loans in banks. Although the establishment of Vietnamese Asset Management Company helped banks reducing their NPLs by purchasing and reorganizing them, the amount of NPLs handled was still small in comparing with the total NPLs in the banking sector (only 8 percent according to SBV, 2016). It was because the size of capital of VAMC was small; therefore, increasing capital for VAMC could be a possible solution.

Finally, continuing to reduce the cross-ownership among banks and financial institutions in order to avoid connected lending, virtual capital, and below-standard loans.

For other researches, it would have great contribution for analyzing and measuring not only banks but also other financial institution if the last CAMELS component of Sensitivity to market risk were added. Moreover, the study on other cross-ownership types with measurement of number of financial institutions that a bank is owning equity, would also make relevant supports to clarify the impact of this phenomenon.

6. Conclusion

This thesis has underlined the importance of maintaining the safety and soundness of banks as well as the stability of banking sector by examining and monitoring the bank's performance. Based on its significance, the financial indicators including measurements of profitability and components of CAMEL framework were selected to assess the performance of bank. The liner regression model was created to examine the relationship between capital adequacy, asset quality, management efficiency, earning ability and liquidity, and the bank's performance represented by return on asset and return on equity.

As a result of regression analysis of panel data for 25 Vietnamese commercial banks in a period of ten years from 2006 to 2015, there are both positive and negative relationships between the studied variables. Capital adequacy has a positive relationship with ROA; however, it is negatively related to ROE. It is significant for both ROE and ROA at the 1% significance level.

Asset quality and management efficiency have an inverse relationship with ROA and ROE. The significant level for these variables is also at 1%. Earning ability has positive effect to both ROA and ROE at 1% of significance level. The liquidity has positive relationship with ROA but negatively related to ROE. However, it is not significant for the select commercial banks during this studied period because of not only low coefficient but also statistical test of P value (not significant at all level of 1%, 5%, and 10%).

There are different types of cross-ownership in Vietnamese banking sector. However, this study focuses on the equity ownership among Vietnamese financial institutions. The proportion of share owned by other financial institutions in the equity structure of bank was used as representative ratio for cross-ownership. Regression analysis of ordinary least square method showed that cross-ownership registered for negative relationship with to ROE and positive relationship with ROA. Nevertheless, it is significant in the case of ROE at 5% and not significant at all level in the case of ROA.

The restructuring policy, in which banks started to sell it non-performing loans to the Vietnam Asset Management Company from 2012, has also been registered for the

negative relationship with ROA and ROE. Beside the significant level of 1% in both cases, the coefficient of variable as -0.4 also reveals that the profitability (ROA, ROE) of banks in the period of restructuring (2012-2015) was less than its value in the period of non-restructuring (2006-2011). Thus, the restructuring policy regarding to the trade of non-performing loans did not have an increasing effect to the profitability of Vietnamese commercial banks selected in this study. In other words, there was no evidence to support that the restructuring policy improve banks' profitability.

It is possible to conclude from financial analysis that there was a downward trend of profitability (ROA, ROE), asset quality (NPL), earning ability (NIM) in most banks except for the fluctuations during crisis (2008-2009) and recession of banking sector (2012-2013). During the financial crisis and recession of banking sector, the large banks operated more efficient than the small banks in which it suffered less from shocks and stably maintained profitability afterward. In the last three years of the studied period, the performance of banks was still in a downward trend.

As a result of combining all analyzed financial indicators, Military Commercial Bank was the best performing during ten years whereas National Citizen Bank was rated as the least efficient of performance. This also supports to the conclusion that large banks was performing better than small banks because MBB has the size of total assets larger than NCB.

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8. Appendix

List of supplements

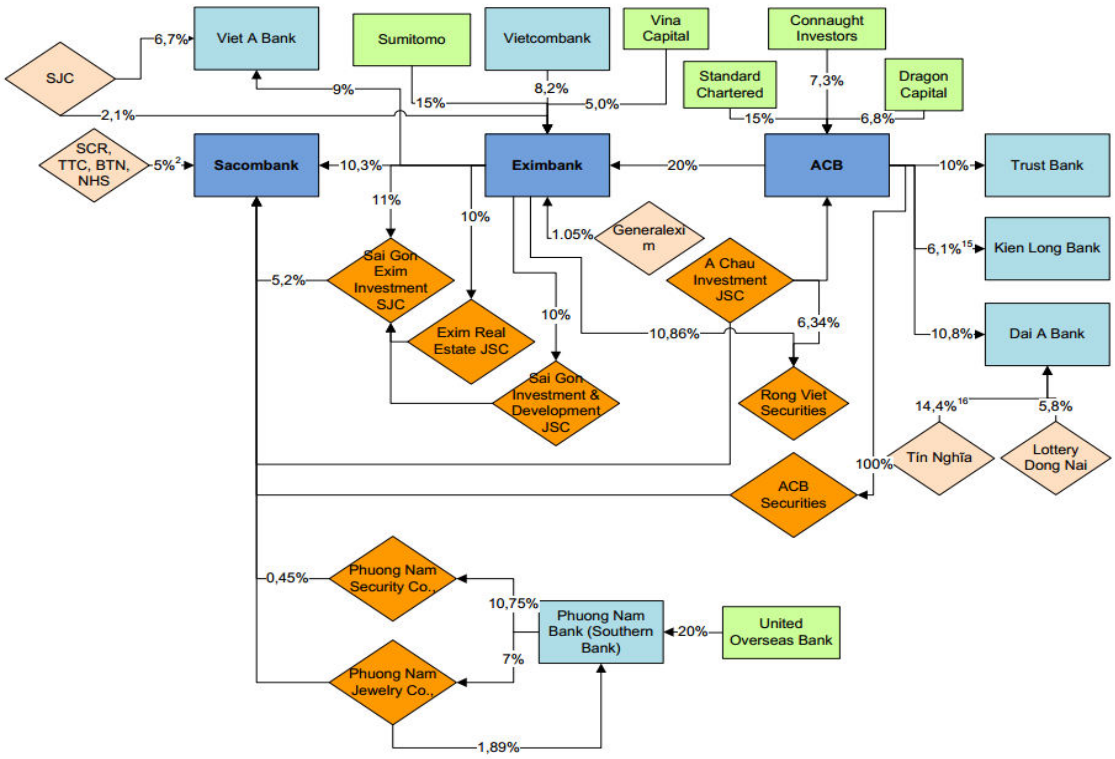
Appendix 1: Indications of composite ratings

Composite	Indications for financial institutions
Composite 1	• are **sound in every respect** and generally have **components rated 1 or 2**. • any weaknesses are minor and can be handled in a routine manner by the board of directors and management. • are resistant to outside influences such as economic instability in their trade area. • in substantial compliance with laws and regulations • the strongest performance and risk management practices relative to the institution's size, complexity, and risk profile, • no cause for supervisory concern.
Composite 2	• are **fundamentally sound** generally **no componen**t rating should **be more severe than 3** • only moderate weaknesses are present and are well within the board of directors' and management's capabilities and willingness to correct. • are stable and are capable of withstanding business fluctuations • in substantial compliance with laws and regulations • no material supervisory concerns, the supervisory response is informal and limited.

Composite 3	• exhibit some **degree of supervisory concern** in one or more of the component areas **(but will not cause a component to be rated more than 4)**. • a combination of weaknesses that management may lack the ability or willingness to effectively address weaknesses within appropriate time frames • are more vulnerable to outside influences than those institutions rated a composite 1 or 2 • may be in significant noncompliance with laws and regulations • require more than normal supervision, which may include formal or informal enforcement actions
Composite 4	• generally exhibit **unsafe and unsound** practices or conditions. • weaknesses and problems are not being satisfactorily addressed or resolved by the board of directors and management • are not capable of withstanding business fluctuations • Close supervisory attention is required, which means, in most cases, formal enforcement action is necessary to address the problems
Composite 5	• exhibit **extremely unsafe and unsound** practices or conditions; exhibit a critically deficient performance; often contain inadequate risk management practices relative to the institution's size, complexity, and risk profile • the volume and severity of problems are beyond management's ability or willingness to control or correct • are of the greatest supervisory concern

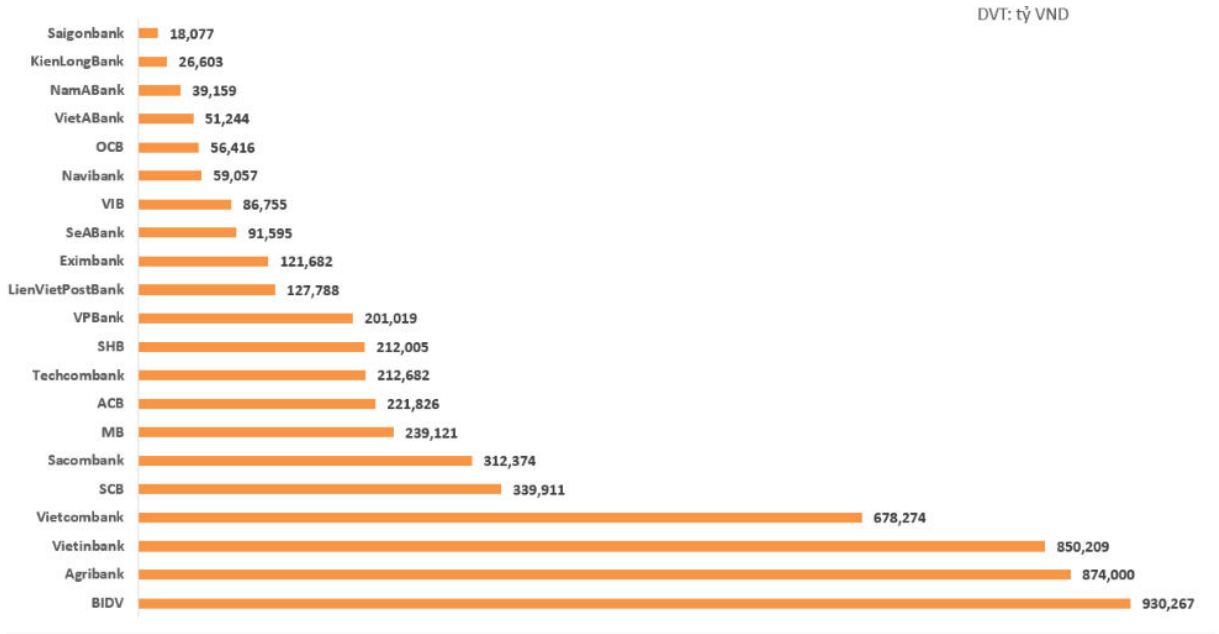
Source: Federal Reserve Release 1997

Appendix 2: Cross-ownership amongst some Joint stock commercial banks in Vietnam



Source: Economic Committee of National Assembly (2012)

Appendix 3: Total assets of Vietnamese commercial banks by June 2016 (billion VND)



Source: Cafef.vn, 2016 (Tien & Lam, 2016)

Appendix 4: Ranking banks combining all indicator of performance

Bank	ROA		ROE		Capital		Asset quality		Management		Earning		Liquidity		Overall Rank
	Average	*Rank*	*Average*	*Rank*	*Average*	*Rank*	*Average*	*Rank*	*Average*	*Rank*	*Average*	*Rank*	*Average*	*Rank*	
ACB	1.26	9	21.31	1	6.21	24	1.18	3	1.56	12	2.80	15	69.26	3	3
DAB	1.07	14	10.56	11	9.23	16	2.33	17	1.70	16	3.11	11	99.75	15	15
SAB	0.79	23	6.64	21	10.41	13	1.97	12	0.84	2	1.80	25	75.71	5	17
ABB	1.04	15	5.82	23	16.06	6	2.78	23	1.62	14	3.06	12	78.14	7	15
VCC	1.38	8	5.57	25	22.99	2	2.49	20	2.02	23	2.94	14	134.05	24	23
MSB	0.82	22	11.55	9	8.43	18	2.22	15	1.17	3	1.87	24	61.65	1	12
TCB	1.42	6	17.11	3	8.30	21	2.50	21	1.35	10	3.14	10	69.51	4	6
KLB	1.93	3	8.42	18	22.56	3	1.84	7	2.17	24	4.82	2	105.60	19	8
NAB	0.92	20	6.52	22	14.43	7	1.91	10	1.48	11	2.63	18	94.91	14	18
NCB	0.79	24	5.72	24	13.38	10	2.64	22	1.72	17	2.63	17	81.56	8	25
VPB	1.12	13	14.07	8	8.36	20	1.98	13	1.85	20	3.35	7	86.43	10	11
SHB	1.00	16	8.84	16	12.43	12	2.80	24	0.09	1	2.02	22	93.71	12	19
HDB	0.94	19	9.45	14	10.24	14	1.43	6	1.35	9	1.92	23	107.13	20	20
OCB	1.22	11	8.75	17	13.67	8	2.37	18	1.62	13	3.62	4	123.48	23	13
MBB	1.70	4	19.00	2	9.08	17	1.89	9	1.18	4	3.41	6	63.84	2	1
VIB	0.75	25	10.45	12	8.40	19	2.02	14	1.74	18	2.97	13	87.00	11	22
SGB	1.97	2	11.14	10	18.97	4	1.92	11	1.90	21	4.72	3	107.61	21	4
SCB	1.56	5	14.75	7	10.07	15	0.98	2	1.95	22	3.47	5	86.41	9	2
VAB	0.98	17	6.99	20	13.42	9	2.23	16	1.26	8	2.36	21	104.89	18	21
PGB	1.26	10	9.16	15	16.36	5	2.38	19	1.79	19	3.23	8	113.51	22	14
EXB	1.27	8	9.81	13	13.27	11	1.89	8	1.22	6	2.70	16	94.70	13	6
VCB	1.21	12	16.95	4	7.41	22	1.38	4	1.19	5	2.50	20	76.01	6	5
MDB	2.41	1	8.14	19	34.58	1	1.40	5	2.62	25	6.43	1	202.73	25	9
VTB	0.95	18	15.40	6	6.48	23	0.96	1	1.70	15	3.23	9	103.56	17	10
BID	0.87	21	15.45	5	5.59	25	3.01	25	1.23	7	2.59	19	103.38	16	24