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The Effects of Booming Credit Growth on the Soundness of Commercial Banks: Empirical Research with the Case of Vietnam

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Abstract

The research aims at investigating the impacts of rapid credit growth in Vietnam, that is called booming period occurred from 2007 to 2010, on the soundness of the Vietnamese commercial banks with quantitative methods. By using bank data collected from 18 major commercial banks from 2007 to 2013, the quantitative method is reflected through a strong regression model linking with variables for both microeconomic and macroeconomic factors. The influence of the credit boom was examined on basic aspects as asset quality, profitability, liquidity, capital adequacy. The findings shed lights on is that rapid credit growth weakens commercial banks on both sounder and less sound banks. Moreover, the findings also witnessed the relationship among rapid credit expansion and soundness of commercial banks, taking account the crucial role of bank performance as a determinant of credit growth.

Keywords: Rapid Credit Growth; Soundness of Banks; Asset Quality, Profitability, Liquidity, Capital Adequacy

1. Introduction

In recent years, across recent several emerging markets, the world observed a significant credit expansion for the private sector. The rapid credit growth reflected through a combination of numerous factors including higher corporate leveraging, booming the market capital, the financial development, and innovations of the whole country. The expansion of credit has brought crucial advantages, supporting saving channels both in domestic and while foreign, as well as helping economic growth. However, the vigorous economic improvement creates an upward trend in the price of assets, leading an increase for the borrowers' creditworthiness, which in turn encourage them to seek more loans against greater values of collateral. At the micro level, the fast credit growth may involve making new loans originated without proper screening and risk management, leading the constraint of capacity. Regarding macro-perspective, fast credit expansion may associate with strategy concerns that the whole financial market system becomes riskier when banks and financial institutions are willing to take on more risks. In addition, it may include reliance on the same asset types and loans, leading borrowers are becoming more exposed to shocks. Hence, the recent fast credit expansion may affect loan quality, promote systemic risk and deteriorate bank soundness. Most existing research has witnessed that credit extension and the soundness of the banking system are interrelated (Gourinchas, 2001). The brisk pace of rapid credit growth also associated with threats about prudential risks in terms of micro and macro levels. Therefore, the paper examines the effects of rapid credit growth on bank soundness by using Vietnam as a case study. Through quantitative method based on

macroeconomic factors and data of banks from 2007 to 2013, findings show that fast credit extension would weaken banks and its interconnection with sounder and less sound banks; besides, its effects on the soundness of banks linking with detail influence of rapid credit growth through main aspects such as profitability, liquidity, capital adequacy and the quality of assets.

2. Literature Review

2.1 Overall impacts of credit boom to the soundness of commercial banks

The majority of the field has primarily focused on developed economies, as the US Banking system and EU markets (Contessi and Fracis, 2009). Using the statistics quarterly from 1992 to 2001 in Latin American area, Maechler et al (2009) found that while the general, increasing loans of eight major banks had been associated with an enhancement in the soundness of banks, he argued the fast extension credit could weaken banks' soundness. Additionally, almost existing models anticipate a negative correlation among credit expansion and the soundness of commercial banks (Dell' Ariccia and Marquez, 2006), the sign of the result is ambiguous. It could be reviewed that banks' efficiency grows positively with credit extension in case of sounder banks because of their larger capacity and caution, while less sound banks tend to apply aggressive policies and bet their resources to take more risks to promote their customer base or to survive. In the assessment of credit quality, the quality of credit based on macroeconomic variables, which generally reflected by real GDP growth. If credit shocks happened in the period of the economy boom while provisions based on customer defaults of the current years, the provisions and LLRs is estimated to relate with GDP growth negatively. Hence, the relationship seems to have small lags variable in the business. (Arpa et al. 2001; Salas and saurina, 2002). Following a result from India case, Pandit et al. (2006) proposed suggestions in terms of banking lending system that big-scale banks have more advantages to insulate their lending supply through contractionary rules shocks compared to other small-scale names. In the same period, by collecting data from 1996 to 2000, RBI (2006) claimed that the major determinants of bank credit growth included non-performing loans, asset price, capital factor. Otherwise, credit booming is believed to associate positively with the output of the financial market (RBI, 2006).

2.2 In the assessment of rapid credit growth

Tornell and Westerman (2002) estimated the movement of credit growth linked with a range of explanatory variables such as: the real exchange rate, real GDP, real investment and non-tradable output ratio in developed countries. Furthermore, Catao (1997) estimated the demand and support for private credit sector in Argentina from 1992 to 1997, a range of factors were found that weakened the credit channel such as interest rate, the level of indebtedness linking with the unemployment rate. On the other hand, two different correlation types were identified that included positive relationship among credit channel and real GDP, and negative impacts of both short and long-term interest rate with credit expansion. Shijaku (2013) tested a similar model method with Albania market, in this case, he proposed a positive link between lending channel to economic growth. In other words, the authors believed that the more qualitative of the banking credit system, the more return earned. Baraja et al. (2010) using the credit data in both Middle Eastern and North African, the researcher found that the crucial determinant was the funding quality of the bank. For more details, the main difference sign in terms of credit growth between 2 areas based on capitalization and liabilities quality. In the following years, Guo and Stepanyan (2011) examined the movement of banking credit system by the data collected from 38 emerging countries. He selected both pre-crisis and post-crisis period, and the results showed that credit expansion was fed by the increasing of domestic deposits and non-residents loans, the loose monetary policy coupled with greater credit growth ratio. Furthermore, their findings indicated that high level of GDP growth create a strong credit expansion and a higher level of the inflation rate, while the nominal credit trend was opposite line with real credit growth. Finally, Stepanyan reviewed a recommendation that credit expansion period should be linked with commercial banks having the safety balance sheet and low level of non-performing loans. In a similar research topic, Igan and Pinheiro (2011) reviewed the correlation among credit growth and the soundness of bank by observing two-way causality. Two periods were divided included moderate growth time and boom period. The findings proposed that credit expansion is recorded more-dependent on soundness in the non-boom period and at this sub-period, a bank with a higher level of soundness tend to build up faster. According to some recent estimations of credit growth, Tan (2012) pointed out

inefficient commercial banks in Philippines caused limitation for credit expansion. Besides, he indicated that interest margin is increasing along with the size, capitalization and ownership and overhead costs of banks. An analysis by Allen et al. (2014) also witnessed that some bank's specific factors like the growth rate of deposit, return ratios have become crucial determinants for credit growth in both normal period and booming time. Agreed with that finding, Scharfstein (2010) concluded that commercial banks focused more on deposit management leading to sounder performance during crisis-period.

2.3 Factors driving the soundness of commercial banks

In the assessment about the soundness of commercial banks, Kumbirai and Web (2010) examined the efficiency of South Africa commercial banking system from 2005-2009. They firstly investigated that banks' performance based on main serial factors such as credit quality, liquidity, size and ROE ratio. Also, they witnessed an upward trend in the overall bank performance by the first 2-year period of the entire research, associated with the onset of the current global financial crisis, which mainly is related to the credit boom. For more details, they reported a falling in the ROE annual, reducing liquidity and deteriorating the quality of the credit sector in the South African banking system. Similarly, in the study of profitability determinants in the Africa banking system, Avanda et al. (2013) revealed some different main factors included Bank Size and, in this case, the author denied the impacts from Cost Efficiency by the statistical result. However, the research by Avanda used First Bank of Nigeria Plc as the only case. Besides, he pointed out the significant impacts from Credit Risk (Loan Loss Provision - Total Assets) and Equity- Total Assets as Capital Adequacy in both long and short term. Furthermore, another factor called Labour efficiency, which based on the main concept of human capital and Staff-income-Total Assets was proposed to have impacts on the only side of long-run. He also addressed macroeconomic variables determined bank return, but only Broad Money Supply was recorded as a significant statistical value.

There is a range of existing research mentioning factors driving banks soundness, Al-tamimi (2010) divided selected factors into two different groups named external factors and internal factors. Ownership, the control of the firm, the return of the bank, the capital level will influence the soundness of commercial banks through internal policies of management and even the board.

Bank capital is considered as a stable source to maintain bank liquidity when the deposits from customers are mainly short-term, especially in markets which are not really developed. The capital rate also witnessed the abilities for intermediary institutions to cover harmful effects from the market (Sangmi and Nazir, 2010). In order to deal with the mentioned issue, almost central banks decided to control the capital ratio of commercial banks, also used capital adequacy such as rate to estimate the internal power of banks to cope with a crisis situation. In other words, the reducing in sub-optimal capital level leading a decrease of banking profit in terms of investment. Another factor was liquidity, which is generally considered as the capability reserved of a particular bank to meet its obligation or unexpected shocks from the customer. Regarding Dang (2011), he claimed a positive relationship between the liquidity of banks and the level of potential return. It is generally agreed to bring remarkable impacts on bank performance such as in researches by Tumin, Ilhomovich in 2009 and 2011 respectively. Nevertheless, with the same test by Said in 2011, the author witnessed that there is no correlation among liquidity and bank efficiency level based on his research in China and Malaysia cases.

By 2011, Gul et al pointed out that almost existing financial literature assumed to total banks' assets applied as a proxy of bank size. In other words, the size of commercial banks has considered important drivers of the variation of performance across intermediary institutions (Hassa, 2002). Hence, these findings were of the view that for banks to operate optimally by obtaining scope and scale, banks must possess a certain degree of size. Large-scale banks are more likely to gain economic advantages due to their superior capital and historical development compared to smaller banks (Dogan, 2013). Besides, Scheer in 1987 supported the initial theory with ideas of greater competitiveness power, higher market share, more ability in diversification their products in favor of larger banks. However, Jonsson in 2007 also raised a question that existing diseconomies of scale might make them become less efficient and less profitable compared to new-comer names. He tested the relationship among company size and its ROE through data collected from 250 firms included banks, civil engineering consulting during the period 2000 to 2004 and pointed out a weak and negative relationship between variables mentioned.

In order to measure the soundness of the bank, distance to default (Z-score) is mainly considered a method to estimate bank soundness, De Nicolo et al. (2005). For more details, it is directly based on the probability of default, when the value of current liabilities raised to higher than the total value of assets. The author suggested the greater value of the distance to default, the lower the probability for insolvency risk. Regarding recent research about indicators of banking system soundness, the report of Fitch's banking system considered asset quality, capital adequacy, liquidity, exchange rate compared to a system average of individual bank ratings. The Department of Banking and Finance in Ghana (2013) examined the activities of the bank by lending channel. Their result showed a statistically significant and positive among bank size as well as capital form with lending growth by using GMM-system indicators. Turning into macroeconomic factors, they also pointed out clues about negative impacts on lending behavior by exchange rate and lending rate of commercial banks. On one side, they provided clues in how bank characteristics and market environment affect the composition of liabilities portfolio. Besides, they also found out negative evidences and significant impacts of some macroeconomic indicators such as central bank lending rate and exchange rate on bank lending behavior. The relationship of banks although the negative evidences come out in a conclusion that this, policies aimed at maintaining stable macroeconomic fundamentals would greatly accelerate bank lending decision. On another side, bank characteristics and the institutional environment influence strongly to the composition of banks' loan portfolio.

A viewpoint to determine bank soundness and the impacts of rapid credit growth, bank-specific variables are likely to influence bank performance, while banks grow up their lending represented the supply-side factors of credit growth (Rajan, 2005). In the same assumption with recent research about bank soundness, Worrell in 2010 estimated bank ROE, liquidity, the size of total assets, bank ownership selected as explanatory variables. While bank regulators recently increasing their confidence about the distance-to-default measure in order to estimate bank soundness due to the successful commercial application by Moody's KMV, the theory also has been chosen through previous serial economist such as Black and Scholes in 1973, Ghosh (2010).

3. Methodology

3.1 Data Description

The authors looked at the bank-level data in Vietnamese from 2007 to 2013 from their own financial reports published, in which the impacts of credit growth 2007 - 2010 might be delayed to the following years. In addition, the credit boom has been estimated when the credit-to-GDP ratio increase greater than that is implied by a backward-looking. In other words, a credit boom period for the banking system in Viet Nam was estimated to be credit boom as in the period 2007-2010 when the total credit to GDP was much higher than 10 percent, up to 28% and 30% in 2007 and 2009 respectively. In comparison to historical trend from 1990, the credit boom episodes followed two conditions: the growth rate exceeded 10 percent, and the deviation is reported to be higher than 1.5 times of the historical standard ratio. The reason for limiting the sample period researched to before 2014 to be able to derive new policy implications at that time, linking with the effects of the global financial shock appeared and the entry to WTO in 2007. Another motivation for ranging time series of the soundness from 2007 to 2013 because the asset expansion in the banking system has been clear since 2007, which doubled from 2007 to 2010. Furthermore, this soundness of bank and impacts of credit growth obviously associated with non-performing loans sectors. Hence, this research limits the estimated period to avoid influencing of the formation of Vietnam asset management company - VAMC, issued in the Decree 53 at the middle of 2013, which support banks to dispose NPLs from their balance sheet up to 5 years.

The statistics are selected from 18 major ranked commercial banks in Vietnam in market share field from Bank Scope data. The banks elected for the model follow requirements. First, it is required to remain active at the end of 2013 with continuous data published at least 5 years. Second, the banks selected have to ensure legally its representation in Vietnam banking system, which is mainly divided into 2 major groups such as State-owned commercial banks (SOCBs); Joint-stock commercial banks.

To avoid potential estimation errors and to misreport, the paper dropped 5 percent of the observations on the tails of the distributions of the two main variables. Besides, the bank's total assets are reported that more than 85% of the total assets in the whole banking system during the period. Otherwise, the paper examined the macro-statistics through reports and information disclosure by the General Statistics Office of Vietnam; State Bank of Vietnam, the International Monetary Fund and the World Bank in the same period.

3.2 Dependent Variables

The paper firstly is seeking for the major impacts of the credit boom on Vietnamese commercial banks, in the period case from 2007 to 2013. Credit Growth (bankCrgrit) is reflected through the annual lending ratio published in commercial banks reports, which is estimated as to the total fund of commercial banks allocated to the market in terms of credit. In other words, data is ensured to collect from financial statement year by year, which is not adjusted for seasonal factors. According to the commercial banks' soundness, four bank-special factors are estimated as profitability, asset quality, capital adequacy as International Monetary Fund recommendation and the preferred factors which has been selected by many economists, namely distance to default - Zscore, Ghosh (2010), Izan and Pynheiro (2011) and Scales (1973).

The profit advisability of 18 commercial banks is delivered by the Return on Equity (ROEit), currently the most extensive measure of indicating profit, which demonstrates the generating profit and added value ability for banks' shareholders. In observational research towards commercial leverage, ROEit is an efficient approach, such as in Goddard et al. (2004), Hoffmann (2011).

According to To Ngoc Hung (2013), commercial banks now use the ratio of provision for credit losses on lending (LLRGLit) rather than NPL to reflects asset quality. The NPL has instead used to shows the loan portfolio aspect in researches, which is different in Vietnam because of the impaired regulation regarding debt arrangement (as cited in Do et al., 2017).

To display capital competence, commercial banks use The equity-to-total capital ratio (CAPit), in which they have a tendency to adopt financial leverage as holders strongly are the main capital streams, however, a low CAPit would put banks into a tough situation when it comes to economic variables. Hence, they need a high ratio of CAPit to avert a financial crisis.

To measure the soundness of commercial bank, most existing research use "distance to default" reflected the possibility of a particular bank. In this case, we applied the simple form of Z-score proposed by Black and Scholes (1973). The higher value of Z-score took account, the safer financial leverage, and potential return.

3.3 Independent Volatilities

There are two branches of independent volatility, which are macro and micro fluctuation.

Macro fluctuation

Through elected macro changes, it is quite clear to notice credit demand and profit advisability of individual commercial banks. To present the credit capital demand, the real GDP growth rate is favored, in which the higher GDP growth, the bigger investment flow in the country, specifically in the Vietnam economy of banking finance. To illustrate the credit capital need, the real lending interest rate (reallRit) is preferred, in which the high-interest rate would lead to high borrowing costs. Thus, it is important to have a converse increase in real GDP and reallRit. To express the foreign currency loan demand, the change of the real multilateral exchange rate (delReeRit) is suggested in the context of exchange rate variations (Igan and Pinheiro, 2011, as cited in Do, et al., 2017). The above macro fluctuations confirm the economic shifts as well as the business risks that would create certain impacts on banks.

Micro fluctuation

According to De Nicolo et al. (2005) (as cited in Do et al., 2017), the factors influencing a bank's solidity are related to its authority on price, scale, as well as its total asset construction. The liquid assets-to-total assets ratio (LIQ_{it}), suggesting the available liquid assets for instant expanse, which is used to demonstrate a bank's liquidity situation. This ratio offers safety improvement in business activities, however, creates an unhealthy effect on the bank's profit advisability.

The cost-to-income ratio (CI_{it}), specifying the competence of a bank in price authority, is another factor making changes to the solidity of the bank (De Nicolo et al., 2007). Another obvious factor was the size of assets which mainly influences to bank's competition position such as improvement, return, and safety. This factor is estimated to follow the form of the natural logarithm of the total assets instead of using total assets, Size_{it}, Berger et al. (2005). Generally, the size is expected to associate with a positive relationship with banks' soundness. It could be explained because the market share in Vietnam mainly belongs to large-scale state-owned banks such as Agribank, Vietcombank, Vietinbank, and BIDV because their advantages about capacity, client's confidence and government supporting.

Table 1: Variables

	Variables	Description	Symbol
Dependent Variables	The soundness of commercial banks	Profitability [Profit after Tax / Equity]	ROE_{it}
		Asset quality [Loan-loss Provisions/Outstanding Loans]	LLRGL_{it}
		Capital adequacy [Equity/Total Capital]	CAP_{it}
		Distance to default [zscore = (ROA + CAP)/δROA]	ZSCORE_{it}
	Credit growth of commercial banks	Credit growth rate [(Outstanding Loans in the period of t – Outstanding Loans in the period of t-1)/ Outstanding Loans in the period of t-1]	bankCrgr_{it}
Independent variables reflecting the characteristics of commercial banks	Size of assets	Ln (Total assets)	SIZE_{it}
	Liquidity	Liquid Assets/Total Assets	LIQ_{it}
	Structure of assets	Outstanding Loans /Total Assets	LA_{it}
	Operation Effectiveness	Cost/Income	CI_{it}
Macro independent variables	The cycle of the economy	Real GDP Growth Rate	RealGDP_{it}
	Interest rate	Real average Lending Interest Rates	RealIr_{it}
	Exchange rate	Annual Change of the Real Multilateral Exchange Rate	DelReeR_{it}

Source: Synthesized by authors

3.4 Model Specification

In order to reveal the impacts of fast credit expansion on banking system soundness, the paper ran the three stage least squares with two equations as follows:

Equation 1:

$$\text{BankCrgr}_{it} = f(\text{bankCrgr}_{i,t-1}; \text{banksoundness}_{i,t-1}; \text{RealGDP}_{t-1}; \text{RealIr}_{t-1}; \text{DelReeR}_{t-1}; \text{SIZE}_{i,t-1}; \text{LA}_{i,t-1})$$

Equation 2:

$$\text{Banksoundness}_{it} = f(\text{bankCrgr}_{i,t-1}; \text{banksoundness}_{i,t-1}; \text{RealGDP}_{t-1}; \text{SIZE}_{i,t-1}; \text{LA}_{i,t-1}; \text{CI}_{i,t-1}; \text{LIQ}_{i,t-1})$$

In this case, i reflects for the commercial bank called i , t reflects year t . Otherwise, a couple of lagged explanatory variables are also listed in the model to estimate the lagging impact of the rapid credit expansion and soundness of commercial banks. Furthermore, the variables are listed with the natural logarithm structure to value impacts among variables selected and to avoid auto-correlation.

Regarding to economist perspective, the three-stage least squares method is generally considered as suitable and proper regression model for panel statistics link with a short period and include lagged dependent variables. In this case, my paper applied this method to reveal reciprocal correlation among two equations mentioned. Another reason was that three-stage least squares provide a higher level of consistency and adequacy compared to the dynamic regression or two-stage least squares method. Furthermore, the method allows to estimate a generating of the covariance matrix of the residuals through equations, leading the results becomes reliable. (Chris Brooks, 2008).

4. The regression results and implications

4.1 Correlation results and implications

Following the results recorded in Appendix 1, looking at the descriptive data of variables selected in the model. The paper witnessed the average expansion of credit in the case of Vietnamese banks was very high through the examination period with the standard ratio is about 46,58%, while this credit extension associated with high dispersion when the standard deviation recorded as near 39 proportion. In fact, looking at the Vietnam financial market, there is a range of banks experienced a high credit expansion while the rate of others is reported by a negative growth by 15.93 percent. It seems to fit with the real structure and competition for the banking system in Viet Nam, where the small number of state-owned commercial banks owned the most major credit market shares. Hence, despite the fact that quantity of Vietnamese commercial banks counted as high number compared to other countries in ASEAN, small-scale branches had less opportunities to grow up their credit field in the booming period because of the lack of resources, capital and client base. The result showed an outstanding increase in terms of asset quality (LLRGL), profitability (ROE) and CAP followed by an upward trend during the credit boom period. Besides, the loan loss reserves level for outstanding liabilities is indicated as 1.29% on average while this rate was just about 1.19% in the rapid credit growth period, much lowering than the remained rate (1.381%). Also, the average CAP and ROE rate of the commercial branches selected in the examined period was much greater than the normal rate compared at the same period. Recording to economist perspective, Keynes (1932) explained the reason through "Financial Accelerator Mechanism," which is supported by Fisher in the following year. The main theory claimed that the increasing asset price and market confidence affected positively to economic indicators. One of the most obviously benefits of using Z-score is that the estimator takes into account the banking operation risk level by the change of ROE. The regression also resulted that the commercial banking system in Vietnam has prepared a great safety level when the Z-score data remained over 30 on average during the examination period. Nevertheless, throughout the booming period in question, the Z-score has a lower level compared to the that in the remaining period, it seems a downward trend in the field of bank's soundness. Additionally, the data recorded a quite high level of dispersion of the Z-score, witnessing a limitation of harmonization in the Vietnamese banking system. This could lead to systemic risk and make commercial banks to be more vulnerable to prevent shocks from the real market.

The indicator also draws that the percentage of outstanding liabilities on the total banks' assets (LA) taking account about 55 percent on average, with a slightly high level of dispersion. In this period, the rate is reported to jump correspondingly, reflecting credit growth at this time. Similarly, the rate of liquid assets to total assets (LIQ) was 33.2% throughout the researched time. A reasonable explanation for that was commercial banks tend to expand their credit portfolio. The average real credit growth in Vietnam in the entire researched time was 6.23% while during the period of the credit boom, the real GDP growth rate is much lower than that of the minimum rate. In addition, the real average leading interest rates (Reallr) is indicated to be lower level throughout the credit boom.

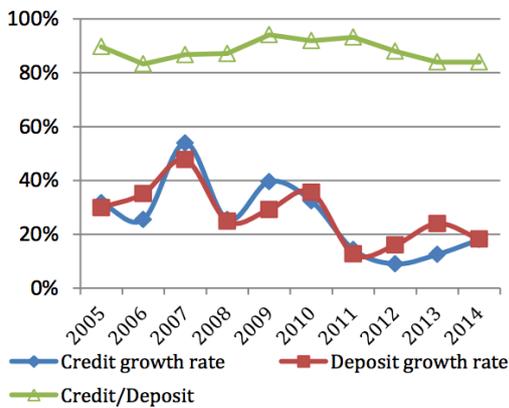
This results suggested that due to the expansion of the credit field, the real leading rate was lower than that in other periods because of high inflation. In terms of exchange rate factor, delReeR data showed a depreciation of the Vietnamese currency (VND) compared to the branches of key global currencies. The increasing of the devaluation led a significant jump in exchange rate risk, which affecting the soundness of Vietnam's banks negatively.

Looking at the Appendix 2, it was generally accepted that the correlation could describe the relationship among variables but not the causality. It also is ranged from -1 to 1 with the value of 1 reflected a positive linear correlation, and in the case of negative linear correlation (-1). Furthermore, a model with strongly correlated variables led to the multicollinearity problem, which harmed the accuracy findings. According to the Kenedy theory (2008), who suggested that a strong correlation among variables occurs when the absolute values exceed 0.8. In other perspectives, Sweeney and Williams (1990) examined the strongly correlated result should be above 0.7. In this case, it is clear to see that multicollinearity appeared by the value between a couple of variables such as (Z-score; CAP) and (realIr; delReeR). Nevertheless, there is no clue for auto-correlation in the model because of the low level of the correlation coefficients values recorded.

4.2 Regression results for the period 2007 – 2013

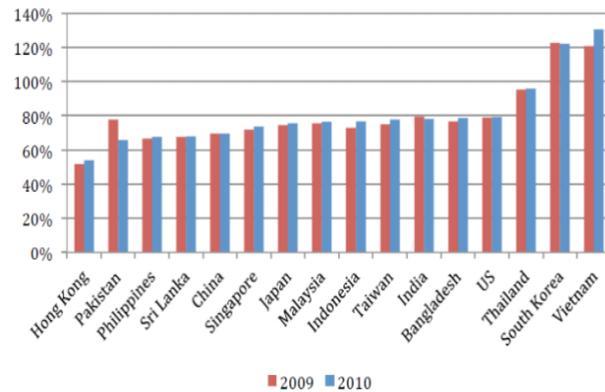
Looking at the data from Appendix 3, commercial branches in Vietnam tend to remain high credit growth. For more details, the credit growth variables (BankCrgr) is reported as a positive value in all equations and took significant account level. This results also witnessed that sounder banks would likely to keep credit expansion. The reason for that because commercial banks with greater Z-score coefficient in the previous year, they tend to concentrate more on credit growth in the next year. Similarly, increasing in CAP and ROE rates made commercial banks to be willing to grow up their credit (seeking more profits). In turn of LLRGL, the negative sign of the coefficient witnessed the greater risk provisioning ratio along with the deteriorated liability portfolio quality, which leads commercial banks to be more cautious in the expansion of credit. It could be explained when the profitability and the soundness followed an upward trend, and they may be willing to take more risks to maintain cash inflows. It is remarkable when credit extension in Vietnamese names selected remain higher and includes a large number of small-scale branches in favor of the variable Size took negative values in all equations and was significant at 10 percent. Hence, despite the fact that large-scale commercial banks had advantages in capital and cost compared to smaller names in the Vietnam market, they tend to become more cautious in credit growth. In another side, small branches tend to seek more market share and profit through the credit channel. It is reasonable because small-scale names mainly belong to new-comers, so they are willing to apply aggressive policies to extend customer base and to survive. This explanation is agreed with existing researches anticipating that the less-efficient banks are willing to take more risk (Berger and DeYoung, 1997; Berger and Humphrey, 1997). For policy-maker perspective, an important task is to determine what the bank takes more risk is. My paper outcomes suggest foreign-owned banks took part in higher level risk compared to other domestic banks by an aggressive strategy to entry Vietnam's market. Is also is claimed by Igan and Tamirisa in 2008, they provided clues that there is significant statistical evidence that credit growth of foreign banks associated with distance to default, the case applied was European countries. As a result, the increasing high-risk loans and lowering lending standards in terms of credit growth will harm the quality of credit expansion, which leads the whole banking system will be more instable when adverse shocks occur. The mechanism can answer why a financial shock is usually preceded by rapid credit expansion.

Figure 1: Credit and Deposit Growth in Vietnam banking system



Source: The SBV's website

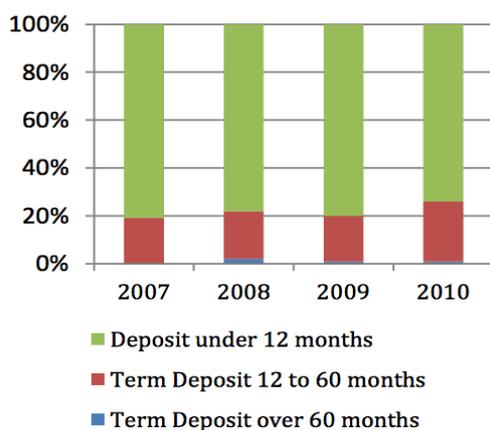
Figure 2: Loans-to-deposits rate



Source: The SBV's website

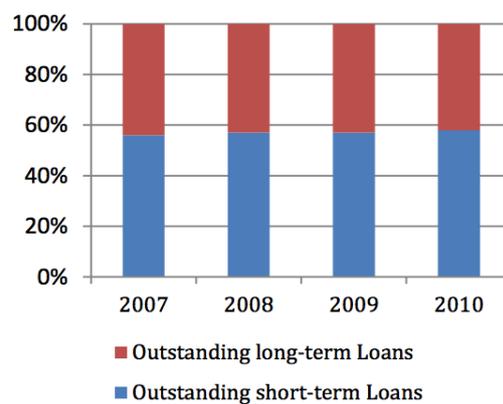
According to the real situation, in the period of the crisis, liquidity pressures have been appeared frequently in the Vietnam banking system due to the fast increasing of credit was much higher than that of existing deposit, causing a remarkable gap among assets and liabilities. Throughout the period from 2007 to 2010, the credit growth peaked at about 29% annual while the rate of deposits expansion average is reported as just 21.15% per annum by State Bank of Vietnam. The serious imbalance led loan-to-deposits rates up to the high level at 80-90% in this period. In the next following years, the banking system liquidity enhanced but recorded as relatively high level over 82% for loan-to-deposit rates, while this rates at Asian developed countries is controlled as 30-40% in same period. Another obvious reason agreed with the paper's results, the high level of liquidity risk was an imbalance of maturity of loans and deposits due to the rapid expansion of credit factors throughout 2007 to 2012. For more details, long and medium run loans were at about 40% while the major proportion in deposit belongs to short-term data, was about 80% (Figure 1 and 2), (Figure 3 and 4).

Figure 3: Vietnam banking deposit structure



Source: The SBV's website

Figure 4: Vietnam banking credit structure



Source: The SBV's website

The realGDP variable indicated the effect of the business cycle on the expansion of credit in banks. The result reviewed that the coefficient value is reported as positive and statistically significant in all equations listed. Bank credit often increases significantly throughout the period of economic expansion because of the relative growth of investment and the aggregate demand in the economy. It seems to become a factor keeping real credit growth

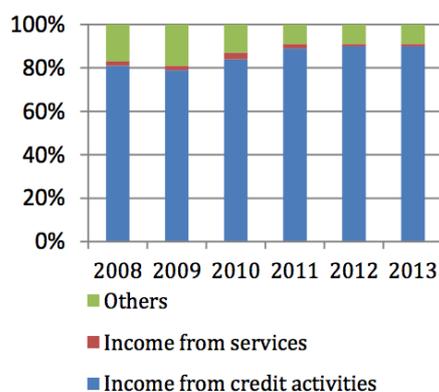
remain at great level by 6%. Nevertheless, policies about credit applied in the fast-growing period are quite "over-optimistic," which caused decisions about leading to being easier and riskier due to the increasing value of assets and corporate value.

In the fields of $RealR$ and $delReeR$ variables, they both showed a similar sign with anticipations, but both are not statistically significant enough in the estimation from 2007 to 2013. It suggests the change in both real interest rates and exchange rate bring little effect on the lending decision of banks in Vietnam. In the assessment of Vietnamese commercial banks soundness.

In fields of banks profitability, the high level recorded in ROE makes commercial banks more lucrative. This is reasonable for the real situation in Vietnam when commercial banks at the period of high credit growth compared to other developed ASEAN countries, in this case, banks preferred credit actions to gain the possible income. Besides, the rate of outstanding liabilities minus total assets (LA) brings a positive effect on the profitability. The result also witnessed that larger scale of commercial banks associated with higher profitability. It could be answered with the situation in Vietnam at the period when the large scale of commercial bank had the major market share. It is reported mainly as state-owned banks which has many competitive advantage and customer confidence.

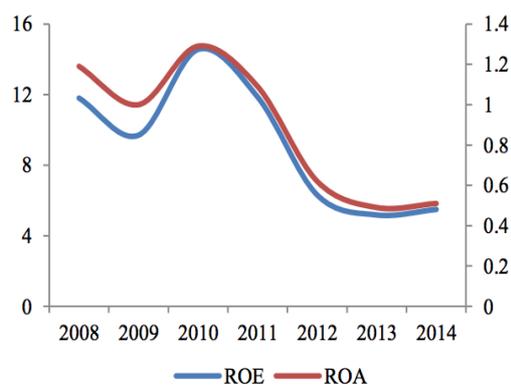
The return for commercial banks is also promoted during the expansion time. It explained the correlation among credit growth and ROE in the case of Vietnam, which is not really developed market when the commercial bank has been focusing on credit activities. However, the result showed a decline in the return of commercial banks after the period of crisis. The remarkable reason because following the expansion of credit, there is an outstanding increase in the amount of non-performing loans. In order to deal with the issue mentioned, clearly, SBV in 2012 imposed regulations based on the concept of Basel II in to force commercial banks that they have to promote risk provision by their income, leading a decline of ROE in the period after the current global crisis. (Figure 5 and 6).

Figure 5: Vietnam banking income form



Source: The SBV's website

Figure 6: ROA, ROE situation in Vietnam



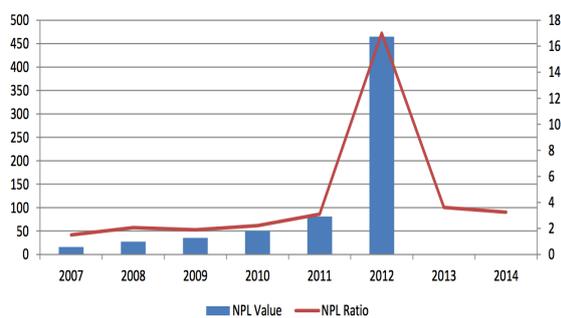
Source: The SBV's website

Looking at the capital form (CAP), credit expansion brings a negative effect to the rate of the equity of all capital. In this situation, it proves that commercial banks in Vietnam controlled their operation through deposits and mobilized funds channel instead of their own equity. Nevertheless, the data results were not significant enough, indicating the dispersion for using the fund to control loans between commercial branches.

According to the quality of assets, there is a negative correlation among credit expansion and risk provision, which mainly deteriorated through the NPL ratio. The rate also improved rapidly since 2011, which reflected the new non-performing loans has raised significantly by the credits granted previously. However, the model results showed not really significant outcomes because bad debt has jumped rapidly by a range of reasons such as

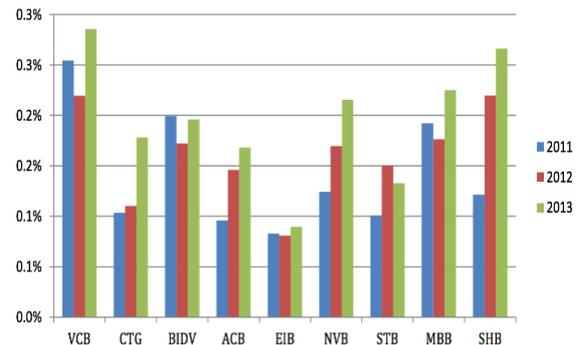
inefficient corporate governance, poor investment method, inadequacies in credit risk provision (To Hung, 2012). Furthermore, following outcomes of credit boom from 2007, this led to unstable economic expansion in Vietnam banking system such as an increasing a huge amount of credit flowing into stock and real estate factors leading bubbles in the real estate financial market. In addition, the coefficient of LLRGL variable witnessed a positive sign, linking with high confidence. It is clearly to see that less effective banks associated with greater credit risk also bring a remarkable effect of asset quality. The result also is supported by Marque (2006), and Lowy (2002), they proposed speeding up of credit factors is the main reason for increasing risk in the banking system through credit losses and raising NPL rates. The more details for the Vietnam case will be mentioned as in (Figure 7). The model results also found that large-scale banks have focused more in fields of credit risk provision because they tend to avoid systemic risk. Figure 8 also shows the real situation that some large-scale listed bank tend to build up credit risk provision.

Figure 7: NPL rates in Vietnam



Source: Synthesized by authors

Figure 8: Credit loss management



Source: Synthesized by authors

Regarding to the distance to default (Z -score), the regression outcomes witnesses a negative effect of credit expansion on the Vietnamese commercial bank's soundness by great significance level of the coefficient of Bankergr variable. It is reasonable because commercial banks especially small-scale focusing on high-speed credit expansion, which in the period of the credit boom and financial crisis considered as non-traditional lending, causing a higher level of risk. To cover fast credit growth, SBV also takes actions to depreciate Vietnam currency to ensure domestic goods competitiveness, leading reducing the high speed in following years.

In sum, the credit expansion from 2007 to 2010 brought considerable impacts on the stability of the market as well as the soundness of commercial banks, which has been estimated by applying the three-stage least squares method. There is a range of significant results has been founded such the outcomes about Z -score, the profitability, the liquidity of commercial banks and the fast expansion impacts on the size of bank as well as bank's ownership has been revealed.

5. Recommendations

In order to deal with the issue mentioned, the paper proposes a range of policy recommendations to avoid another unexpected negative impact in the near future. First, to avoid potential outcomes of credit shocks, early warning estimators need to prepared before introducing solutions to make sure that credit expansion met the line with natural capital absorption of Vietnam financial market. For more details, one of the most obvious changes related to credit boom period was as a credit-to-GDP ratio. Hence, there is a necessary to oversight the speed of credit growth based on the capacity of capital absorption, represented by the economic growth ratio. In addition, 2% threshold is considered as a proper rate to alarm early warning of the credit boom period in a range of countries with 87% confidence related to existing banking shocks (BIS, 2010). Turning into the case of Vietnam, the paper suggested the same rate as 2 percent threshold should be addressed. Besides, we also need to consider real economic growth as another reliable indicator due to the positive relationship between credit demand of the market in terms of consumption and investment and high-speed GDP growth period. Another alternative indicator is

focusing on substantial movements in asset prices such as real estate and securities, which reflects potential risks when bank lending increase sharply related to economic factors like real estate and security markets. According to the recent global financial crisis, the fast expansion in house price-to-per capita income rate which up to over 2% is one of the first sign for the beginning of the credit boom. Turn into macroeconomic policies, my recommendation focusing on enhancing the role of supervision in the banking system. It is necessary for SBV to apply transparent risk provision method to commercial branches. Furthermore, commercial banks should be required to joining stress test frequently, including promoting specific prepared solutions to deal with unexpected shocks from the credit market. Likewise, the State Bank of Vietnam should adjust its supervisory model as the first actions to prevent uncontrollable expansion in the credit market. In terms of macro-prudential surveillance, it is also necessary to apply specific supervision for non-bank credit institutions. Regarding to commercial banks, during the rapid credit extension period, credit risk provision needs to be promoted, linking with raising their awareness and liquidity. Judging from the case of Vietnam, when major banking system activities focusing on credit field, maintaining a decent market share of state-owned banks could be a reasonable method to boost customer confidence as well as claim reliable insurance to deal with the downturn of the economic market. Last but not least, diversification in the banking system should be addressed to raise the competitiveness between the foreign bank and domestic banks.

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