

The Relationship between Macroeconomic Factors and the Level of Non-Performing Loans (NPLs) of Commercial Banks in Vietnam

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Abstract— The purpose of this article is to estimate the effects of macroeconomic factors on the the level of non-performing loans (NPLs) of Commercial Banks in Vietnam by using econometric model on the commercial banks for the 2004-2015 periods. It is obvious that banks have to take risk all the time and there are three major risks, including credit risk, market risk and operational risk (Perez, 2014). Credit risk is one of the most important kinds of risk in commercial banking sector. The Basel Committee on Banking Supervision defines credit risk as the potential that a commercial bank borrower, or counter party, will fail to meet its payment obligations regarding the terms agreed with the commercial bank (Perez, 2014). This study also finds that NPLs are not the problem of the commercial bank but the government must consider it carefully. It is clear that commercial banks must have a right thought about NPLs as well as analyze the reasons to give the reasonable solutions to solve the issue. In addition, this study also points out that if the commercial banks in Vietnam try to hide the bad debt, the real status of the commercial bank will be reflected unexpectedly, leading to the results will affect to the capital supply of national economics.

Index Terms— Non-Performing Loans, NPLs, Commercial Banks, Unemployment Rate, GDP Growth, Inflation Rate, Lending Interest Rate, Official Exchange Rate.

1 INTRODUCTION

1.1 Background of Research

It can be seen that the Vietnamese economy in the first decade of the 21st century has a significant development in the banking sector. After 1990s, Vietnamese banking system is divided into two classes including State-Owned bank and Commercial bank; and this time is considered that commercial bank market start to establish in Vietnam (Minh, 2015). Commercial banks represent a big role in this development, especially in developing countries. Chand (2016) said that the commercial banks help in overcoming these obstacles and promoting economic development with important roles in the financing industry, financing trade, financing agriculture, consumer activities as well as monitoring monetary policies. The bank's capital rose rapidly and became an important factor in Vietnamese economic growth. However, a negative side always follows the result of any growth. Expanding operation leads to debt rate increase in most commercial and state-owned banks, especially non-performing loan (NPL). The level of NPL has become a serious problem for the Vietnamese economy in recent years.

There are previous studies relating to NPL in the world. Allen (1997) analyzed about the problem loans and costs efficiency in commercial. He tested the relationship among loan quality, cost efficiency, and bank capital; and the data suggest that problem loans precede reductions in measured cost efficiency; that measured cost efficiency precedes reductions in

problem loans; and that reductions in capital at thinly capitalized banks precede increases in problem loans. Agu (2013) had researched the study of the causes of bad and doubtful debts in Nigeria private banks. They concluded that lending involves more risk than virtually any other banking activities and the attitude of most borrowers towards loans and advance granted to them should not be ignored. In addition, there is a research about credit risk management and bad debt controlling with the case ANZ in Vietnam Bank by To Minh Thong from Lahti University of Applied Sciences. The research has been concluded that controlling bad debt rate is hard work for all commercial banks and there is no model of solution for all banks except specific solution of each bank.

Those are theories related to the loan problem that affects the bank's performance. Besides, they also contribute to the real development of commercial banks at the moment and how the government controls the banks in Vietnam.

1.2 Rationales and Problem Statement

As we know, commercial banks play a vital role in the financing area and it contributes a lot for the economy in the whole world. In Vietnam, after establishing in 1990, commercial banking sector has the significant growth, and the growth rate of revenue of the whole sector is approximately 19.47% since 2007 (Minh, 2015). The main purpose of this study is to analyze the relationship between macroeconomic factors and the level of NPL of the commercial banks in Vietnam. The re-

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search will focus on the effects of main macroeconomic factors that are lending interest rate, inflation rate, unemployment rate, GDP growth rate and exchange rate into the level of non-performing loan of the commercial banks in Vietnam.

There are some reasons supporting for the study choosing Vietnam market as the target sample to conduct. The Vietnamese banking system witnessed a very high growth of deposit and credit during the period 2001 - 2010 with average rates of 28% and 31% respectively; especially, the credit growth was much higher (22% on average) than GDP growth due to expansionary monetary policy and high investment demand during this period (Ha, 2014). However, these indicators rapidly declined from the beginning of 2011 (the downtrend started from 2009) as Vietnamese banking sector went through tough times due to interest rate instability and many changes in credit policy in response to the global crisis.

According to Bezemer and Schuster (2014), the hot credit growth through the 2008 global financial crisis, followed by the 2011 credit squeeze and the collapse of stock and real estate markets, have led to the proliferation of non-performing loans (NPLs) in the Vietnamese banking system over the last years. The NPL ratio was reported by banks and announced by the State Bank of Vietnam (SBV) at around 4% on average during period 2011 - 2014. However, the international credit rating agencies such as Fitch and Moody's estimated that NPLs have accumulated in Vietnamese banking system at about 15%, if the debts were properly classified in accordance with IFRS (Ha, 2014).

In addition, Central Banking (2016) announced that SBV aims to put commercial banking sector on a stable footing to support growth, by taking non-performing loans into state-run "bad bank". This announcement can be said that the government has the serious concern about the level of NPL of commercial banks at the moment. The SBV has cut rates eight times since 2012, with the refinancing rate coming down to 7% from a high of 15% (Central Banking, 2016). This study will figure out the problem about NPL status of commercial banks, which is affected by macroeconomic factors analyzed as they walked from the period 2004 to 2015.

1.3 Research Objectives and Research Questions

This study aims to examine the effects of macroeconomic factors on the level of NPL of commercial banks in Vietnam and how the study will contribute to the development of the commercial banks, which play a vital role in Vietnam's economy. In order to meet the research objectives, the study is conducted to answer to following main questions:

- What are the relationship between macroeconomic factors and the level of NPL of commercial banks in Vietnam?
- How does Vietnamese government push the commercial banks up to minimize the level of NPL?

1.4 Significance of Study

Janvisloo (2013) said that the quality of loans could be one of the factors that limit the bank's loan supply and affect on

investment spending. Although banks have a significant role in transmission of monetary policy; in the meantime, their performance is strongly influenced by monetary and fiscal policies that are effective in recession and prosperity. In other words, macroeconomic variables can have direct effect on commercial banks loans quality as well as their transitional role.

After conducting the research, we can determine the relationship between macroeconomic factors and the level of NPL of commercial banks in Vietnam; and then analyze the reasons to give the reasonable solutions.

1.5 Scope and Limitation of the Study

Data is collected from website of the World Bank and the annual reports of 5 commercial banks which have influenced significantly on Vietnam's economy, which is uploaded on the websites of the chosen banks in Vietnam for over 10 years from 2004 to 2015. This study will apply ordinary least squares method based on the Gauss-Markov theory to determine the relationship between macroeconomic factors and NPL level of commercial banks in Vietnam.

The limitation of this study is the process of collecting data. Firstly, there are total 33 banks in Vietnam at the moment but only 5 commercial banks have adequate information for 10 years to analyze (Tran, 2015). The reason is that most of them established a few years ago and some are not listed on the stock exchange. Therefore, the conclusion of this study might be subjective partly because of the data is not collecting from all commercial banks in Vietnam at the moment. The next limitation is the accuracy of the data. Because it is the secondary data, it is obvious that there will be the mistakes in collecting and analyzing data because of the different systems in writing the annual report from the chosen commercial banks. According to Ha (2014), NPL reported by credit organization is different from their supervisor and the cause of that is including objective and subjective. The objective reason is because estimating credit quality has the qualitative factor leads to the valuation is also different. The subjective one is that credit organizations intentionally do not list items which are officially listed in NPL to reduce the level of NPL, and then the credit quality will be increased. The inconsistent data and numbers are the greatest challenges for the researchers to approach the phenomenon.

Although above limitation can reduce the efficiency of the study, this problem also give the current status of the level of NPL of commercial banks in Vietnam and figure out some solutions Vietnamese government can help to increase the quality of the lending rate of commercial banks.

2 LITERATURE REVIEW

2.1 Theoretical Background

Firstly, before going to the theory that proves the relationship between macroeconomic factors and the level of NPL, this article will provide the definition of those elements. A macroeconomic factor is a factor that is pertinent to a broad

economy at the regional or national level and affects a large population rather than a few select individuals (Factor). The study of macroeconomic factors allows economists to make deductions regarding the state of the economy as well as economic trends based on the signals from the these factors (Geek, 2015). In this research, there are total 5 macroeconomic factors analyzed to estimate the relationship with the level of NPL. They are unemployment rate, inflation rate, GDP growth, lending interest rate and official exchange rate in Vietnam in the period 2004-2015. In addition, the macroeconomic factors data of this research has been collected from The World Bank website about 5 factors in Vietnam in the 2004 - 2015 periods.

Klein N. (2013) claims that there is significant empirical evidence regarding the anticyclical behavior of the NPL. The theory illustrates that higher GDP growth usually translates into more income which improves the debt servicing capacity of borrowers. Conversely, when there is a slowdown in the economy the level of NPL is likely to increase as unemployment rises and borrowers face greater difficulties to repay their debt (Salas & Suarina, 2002; Rajan & Dhal, 2003; Fofack, 2005; and Jimenez & Saurina, 2005).

According to Louzis, Vouldis, and Metaxas (2010), exchange rate depreciation might have a negative impact on asset quality and interest rate hikes affect the ability to service the debt, particular in case of lending rate. Moreover, the theory mentioned the impact of inflation might be ambiguous that higher inflation can make debt servicing easier by reducing the real value of outstanding loan, but in the other hand, it can also reduce the borrowers' real income when wages are sticky.

2.2 Empirical Studies

There are some researches have investigated on the NPLs of commercial banks in the developing economies, those are presented in the following table:

#	Research Study	Author(s)	Source
1	Macroeconomic Factors That Affect The Quality of Lending In Albania	Eliona GREMI	Research Journal of Finance and Accounting Vol. 4, No. 9, 2013
2	Non-performing Loans: Affecting Factor for the Sustainability of Vietnam Commercial Banks	Nguyen Thi Minh Hue	Journal of Economics and Development, Vol. 17, No. 1, April 2015, pp. 93-106
3	The Impact of Macroeconomic Factors on Non-Performing Loans in the Republic of Moldova	Dorina Clichici & Tatiana Colesnicova	National Institute for Economic Research, Academy of Sciences of Moldova
4	Non-Performing Loans Sensitivity	Mohammadreza Alizadeganvisloo	American Journal of

to Macro Variables: Panel Evidence from Malaysian Commercial Banks	& Junaina Muhammad	Economics 2013; 3(C): 16-21
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Table 1. Empirical Studies on Non-Performing Loans

For the first study, the author concluded that high level of lending leads to low levels of NPL; negative relationship between level of NPL and inflation; positive correlation between interest rates and credit quality; commercial banks are exposed to the volatility of the exchange rate.

In the second study, researcher found out that the number of NPLs in Vietnam published by the SBV or other credit institutions might not reflect the situation of NPLs in Vietnam. The study in Moldova may have another conclusion. There is inversely proportional relationship between GDP growth rate, export growth rate and the dependent variable is validated for Republic of Moldova.

The research in Malaysia is similar to this research because they tested the relationship between macroeconomic factors and NPL rate. They concluded that lending interest rate and FDI net outflow (%GDP) are the most effective factors on NPL ratio with simultaneous positive effects and a reverse effect with 1 year delay. There is a robust negative relationship between NPL and GDP growth with the effects operating with up to 2 years lags.

2.3. Hypothesis Development

This study will test the relationship based on theoretical review. All of five factors will be tested in the same way of estimating positive or negative relationship based on the value of coefficients.

H0: (when the coefficients = 0) None of macroeconomic variables affect the NPL rate

Hy: (when the coefficients ≠ 0) At least one macroeconomic variable affect the NPL rate

Where: Coefficients > 0: positive relationship

Coefficients < 0: negative relationship

3 METHODOLOGY

3.1 Research Method

In this research, the author will apply quantitative method, which is used to gather essential information to test the relationship between level of NPL of commercial banks and macroeconomic factors in Vietnam. According to Cooper et al. (2014), quantitative research is different from qualitative one that using numerical data that are analyzed using mathematically based methods. It is obvious that conducting study with quantitative method will provide a precise and reliability through actual data. Because of collecting real numerical data, the result received from this method is considered to be objective and reflect the actual issue. In addition, if different re-

searchers use the same data within the same period to carry out, the results should be the same. Moreover, quantitative research method is more useful when there is a large number of data need to be collected.

3.2 Design Frame

This study will use econometric model to justify the best result for the research questions. An economic model is one of the tools economists use to forecast future development in the economy (Hymans, 2015). In the simplest terms, econometricians measure past relationship among such variables as consumer spending, household income, tax rate, interest rate, employment rate, and the like, and then try to forecast how those changes in some of above variables can affect the future course of others (Hymans, 2015).

As mentioned in the previous section, the purpose of this study is to test the relationship between NPL of commercial banks and macroeconomic factors. Therefore, econometric model is the best one to find out the result. The basic tool for econometrics is the linear regression model, which is the most appropriate in this research. Ordinary Least Squares (OLS) is the standard linear regression procedure and estimates a parameter from data and applying the linear model (Cooper et al., 2014). OLS is usually used for estimation numerical data from economic factors since it provides the best linear unbiased estimator based on the Gauss-Markov theory.

In this model, a dependent variable represents the quantity the author wishes to explain variation in or thing the research aims to try to explain. When it comes to independent variable, is represents a quantity whose variation will be used to explain variation in the dependent variable.

The model is:

$$NPL(i) = \varepsilon + \varepsilon_1 * x_1 + \varepsilon_2 * x_2 + \varepsilon_3 * x_3 + \varepsilon_4 * x_4 + \varepsilon_5 * x_5$$

Where:

- Dependent Variable: NPL(i): NPL rate of 5 chosen commercial banks
- Coefficients: ε_i ($i= 1 - 5$)
- Independent Variables: unemployment rate (x_1), GDP Growth (x_2), Inflation Rate (x_3), Lending Interest Rate (x_4), and Official Exchange Rate (x_5)

Note: NPL rate is non-performing loan to total gross loan is calculated by the value of NPL divided by total value of loan portfolio.

3.3 Data Collection

To conduct the analysis, this research collects data of 5 macroeconomic factors from website of the World Bank from 2004 to 2015 which can be found in the table 1.

When it comes to NPL rate of 5 chosen banks, the author takes data from annual reports for 10 years in each bank and calculates NPL rate according to the formula mentioned in the previous section. The reason why this research focuses on 5 chosen commercial banks, consisting of VCB, ACB, MBB, EX-

IM and BIDV will be explained firstly. As mentioned in the above section, the sample in this research is those banks that have enough data about NPL for more than 10 years from 2004 to 2015 and 5 chosen commercial banks satisfy this requirement. In addition, all of them are listed on the stock exchange of Vietnam, so that the reliability can be assured. Moreover, 5 chosen commercial banks in this study are listed in the top ten of the largest commercial bank in terms of total assets and networks (Tran, 2015). It consists of two State-owned Commercial Banks, namely VCB and BIDV; and three Joint Stock Commercial Banks (Private commercial banks), namely MBB, ACB, and EXIM. Because of the significant influence of those commercial banks, the result of this research will partly prove the real relationship of macroeconomic factors and the level of NPL rate in the commercial banks.

In order to calculate NPL rate for 5 chosen banks, the study will look for the annual reports in 11 years from 2004 to 2015. The way to measure NPL for each commercial bank has been mentioned before. NPL is calculated by the sum of three groups of commercial banking loan that are classified as the third to the fifth can be easily find out in the annual reports of the chosen commercial banks. After that, this research will collect total loan each year and divided NPL by total loan and the result is NPL ratio.

4. DATA ANALYSIS AND RESULTS

4.1. Descriptive Data

Descriptive data analysis involves the process of describing a large amount of raw data in the understandable and interpretable way. Descriptive analysis is also rearranging, ordering, and manipulating data to generate descriptive information (Zikmund, 2013).

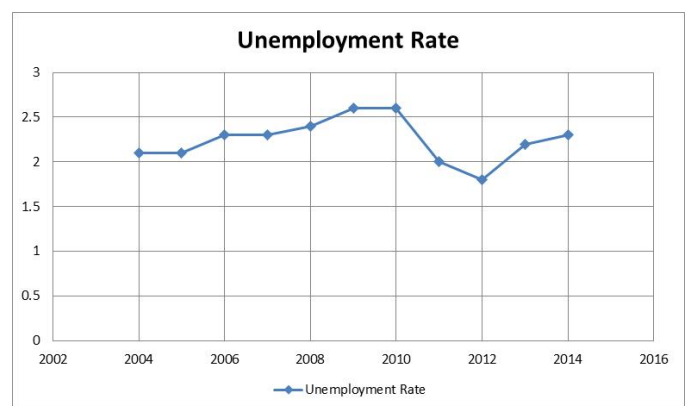


Figure 1. The Trend of Unemployment Rate (2004-2014)

Figure 1 showed that unemployment rate from 2004 to 2008 increased that indicates the paying ability for loan installment is not good. After the financing crisis in 2008, unemployment rate continues to increase until 2010 and it decreases to the lowest point in 2012 in the period 2004 - 2014.

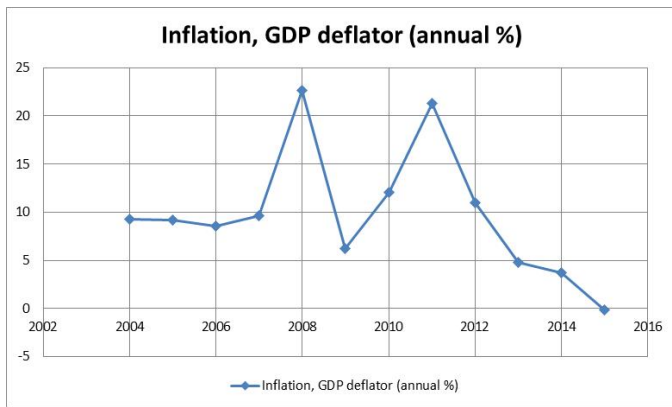


Figure 2. The Trend of Inflation, GDP deflator (annual %) (2004-2015)

Figure 2 illustrates the trend of inflation rate in Vietnam in the period 2004 – 2015. The highest point of this rate is in 2008 when there is financial crisis in the whole world and it has the decreasing trend since 2011.

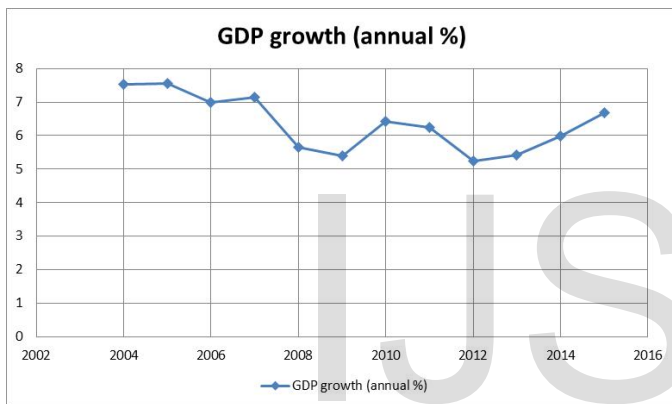


Figure 3. The Trend of GDP growth (annual %) (2004-2015)

Figure 3 has shown the annual GDP growth percentage in the same period with the above figures. The chart quietly fluctuated and growing since 2012.

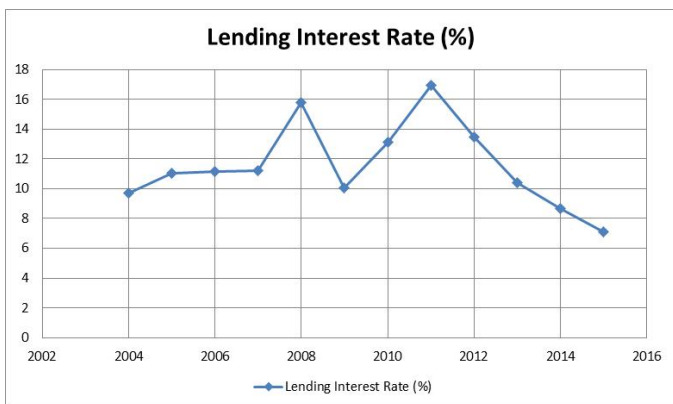


Figure 4. The Trend of Lending Interest Rate (2004-2015)

Figure 4 illustrates the trend of lending interest rate in Vietnam from 2004 to 2014. It is obvious that the shape of this chart is similar to the chart in figure 2. It can be said two elements have the relationship.

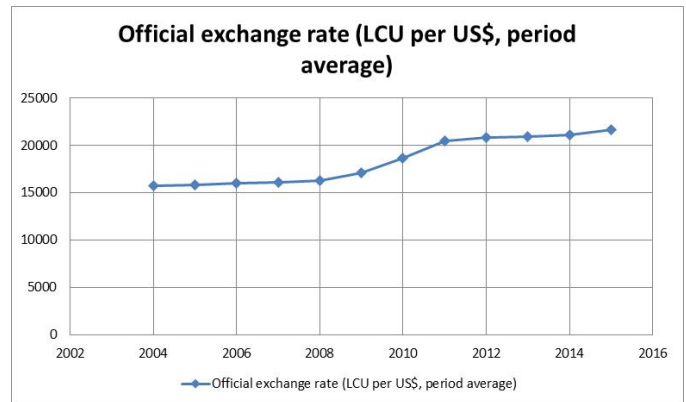


Figure 5. The Trend of Official Exchange Rate (2004-2015)

Figure 5 is the chart shows the exchange rate VND/USD and it has increased over time.

NPL rate of 5 chosen banks can be viewed in the following table:

	ACB	VCB	BIDV	MBB	EXIM
2005	0.298	3.645	31.302	3.16	1.116
2006	0.195	2.657	9.593	2.823	0.845
2007	0.084	3.874	3.978	1.013	0.875
2008	0.886	4.612	2.708	1.921	4.712
2009	0.408	2.47	2.818	1.728	1.834
2010	0.336	2.831	2.71	1.354	1.42
2011	0.893	2.033	2.96	1.613	1.611
2012	2.501	2.401	2.916	1.856	1.318
2013	3.025	2.725	2.368	2.459	1.982
2014	2.178	2.307	2.033	2.757	2.497

Table 2. Non-Performing Loan Ratio (%), (2004-2014)

4.2. Data Analysis Procedure

For the econometric model, this study has run the Eviews software to analyze the data according to Least Squares model. The below tables represent the result of regression output for the research.

Dependent Variable: NPL				
Method: Least Squares				
Date: 03/17/17 Time: 12:32				
Sample: 2005 2014				
Included observations: 10				
NPL = $\epsilon + \epsilon_1 \cdot UNEMPL + \epsilon_2 \cdot GDP + \epsilon_3 \cdot INFL + \epsilon_4 \cdot R + \epsilon_5 \cdot EX$				
	Coefficient	Std. Error	t-Statistic	Prob.
ϵ	0.159630	0.173703	0.918978	0.4101
ϵ_1	-0.040708	0.029038	-1.401878	0.2336

ϵ_2	0.009199	0.010704	0.859408	
ϵ_3	0.002076	0.002786	0.745145	0.4976
ϵ_4	-0.006100	0.006189	-0.985623	0.3801
ϵ_5	-2.33E-06	4.27E-06	-0.545974	0.6141
R-Squared	0.589659	Mean dependent var		0.028528
Adjusted R-Squared	0.076732	S.D. dependent var		0.018431
S.E. of regression	0.017709	Akaike info criterion		-4.945741
Sum squared resid	0.001254	Schwarz criterion		-4.764190
Log likelihood	30.72871	Hannan-Quinn criter.		-5.144902
F-statistic	1.149597	Durbin-Watson stat		1.694926
Prob(F-Statistic)	0.459109			

Table 3. Regression Analysis

4.3 Findings of the Study

Impact of unemployment rate on the level of NPL

Coefficients $\epsilon_1 = -0.040708 < 0$ and it will reject H_0 and accept H_1 . Theoretically expected a positive correlation between unemployment rate and the level of NPL, however, the data do not represent reality as to the level of unemployment in Vietnam. Its result from the model shows that negative association for every one unit decrease in the level of unemployment rate will increase by ϵ_2 units.

Impact of GDP growth on the level of NPL

Coefficients $\epsilon_2 = 0.009199 > 0$ and it also reject H_0 and accept H_1 . This result points out the positive relationship between GDP growth and level of NPL that is proven by the theoretical background of this research.

Impact of inflation rate on the level of NPL

Coefficients $\epsilon_3 = 0.002076$ of sample is positive and it has the same result with the theory in this research. However, the theory also points out the opposite impact when there is the special situation of the economy might happen.

Impact of lending interest rate on the level of NPL

Coefficients $\epsilon_4 = -0.006100 < 0$ shows that there is a negative relationship between lending interest rate and NPL rate. When lending interest is too high, borrowers cannot pay the interest and it will lead to the payment period can be lasted and those loans will be classified in NPL.

Impact of official exchange rate on the level of NPL

Coefficients $\epsilon_5 = -2.33E-06 < 0$ and it will reject H_0 and accept H_1 . This result does not reflect the theory that there is a

positive relationship between exchange rate and the level of NPL.

To conclude, all 5 macroeconomic factors have effect on the level of NPL in commercial banks in Vietnam. However, there are differences among those factors into NPL level. That is the reason why commercial banks have to consider different macroeconomic factors to create the good ideas for the banks in order to develop the banking industry and then Vietnamese economy will go up quickly.

5 CONCLUSION

5.1 Summary of the Findings

The research has found out that there is a consistent relationship between macroeconomic factors and the level of NPL in commercial banks in Vietnam. Unemployment rate and GDP growth have the clear positive relationship with NPL rate. When it comes to inflation, the finding and the theory also tell the positive relationship, however, in the reality, the opposite side usually happens when the economy has the irregular issues.

In addition, the research provides the measurement to calculate NPL for those commercial banks in Vietnam. The reason why other findings are slightly different is because the way they measure NPL.

5.2 Research Implications

To improve the level of NPL in commercial banks, it is necessary for the government, all commercial banks and enterprises as well to coordinate. Firstly, commercial banks need to carry out seriously the necessary of building risk investing funds. There should be more measurements to control the investment portfolio in Vietnamese commercial banks frequently to minimize bad debts. Next, the ability to solve the NPL must be improved by value detail the loan for individual and companies as well. Thirdly, the government needs to manage the real estate market and reduce the inventory in the businesses seriously, as noted by prior researches; real estate market is one of the riskiest investment markets in Vietnam last years (Central Bank, 2016). NPL classification in commercial banks in Vietnam should comply with the international standard to have more specific ways to solve the different groups of lending loans. The last one is also the vital decision for Vietnamese government that those commercial banks are small and/or weak in operation should be incorporated or other banks have financial potential can buy back those commercial banks.

5.3 Research Limitations and Future Research Directions

The secondary data is one of the limitations in this research. In addition, there is not adequate number of commercial banks in Vietnam to conduct the data. It is obvious that the study is used for university so that the model and research method is quite simple and not reflects the whole impact of the problem. If any researcher wants to understand the issue

deeply, it is better to apply some other complicated model and collect real data from chosen commercial banks.

ACKNOWLEDGMENT

The authors wish to thank Nguyen Tat Thanh University and five participant banks which gave them opportunity to complete this study.

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