DETERMINANT FACTORS OF NON-PERFORMING LOANS
IN CHINESE COMMERCIAL BANKS

Mei Ling Sun[1], Purwanto[2]
[1,2]Faculty of Business, President University, Bekasi, Indonesia

Abstract

The purpose of this research is to identify the influence of GDP growth rate, bank interest rate, inflation rate, capital adequacy ratio, and return on asset towards non-performing loans in Chinese commercial banks partially and simultaneously. This study has applied descriptive statistical analysis, classical hypothesis testing, multiple linear regression, and hypothesis testing. When selecting the observation data, this research adopts the intentional sampling method and panel data, 70 units of observational data in total, one part of the data was taken from the financial reports of seven selected sample companies on the Shanghai Stock Exchange in China, and another part of the data was taken from the kyle website. The method used in a quantitative approach with the instrument is EViews 10. The result indicates that BIR and IFR have a partially negative significant influence on NPL. However, GDP growth rate, CAR, and ROA have a negative insignificant effect on NPL. Simultaneously, all of the independent variables have a significant effect on NPL which is described by the value of 63.9% and the left 36.1% is explained by another factor that is excluded in this study. Furthermore, IFR was chosen as the most significant factor which influences NPL.

Keywords: GDP growth rate, BIR, IFR, CAR and ROA

Introduction

Banking is an important source of a country's economic development. While bank lending and lending practices are good for each other, banks sometimes also face the loss risk and some of the loans go bad. For the developing countries whose economic development is based on banking, the role of banks is even more important. For banks, non-performing loans (NPLs) have a serious impact on their survival. Therefore, it is of great help to find what determinants of non-performing loans are and put forward effective suggestions for the stable operation of banks (Ikram et., al, 2016).

After the first downturn in the world economy in the 2000s, in most countries, the percentage of non-performing loans to total loans has changed correspondingly little. Until the financial crisis of 2007-2008 engulfed the global economy, share prices of non-performing loans rose rapidly (Tanasković & Jandrić, 2015). The international financial crisis has worsened the global economy and markets. Since the crisis, non-performing loans have received widespread attention from bankers because they are considered to be one of the important factors leading to the banking crisis. The rise in non-performing loans has been even worse in countries with bank-based economies (Rachman et., al, 2018).

Past studies of failed banks have found that they appear to have a lot of bad loans, including non-performing loans. Moreover, the deterioration of loan portfolio quality in the banking industry is the main reason for the financial crisis, which reveals a relationship between macroeconomic and credit risk and the financial sector (Messai & Jouini, 2013). Setiawan et., al. (2017) pointed out that there are two reasons for bank failures, one of which is the quantity of non-performing loans, and the other is the quality of bank management. Revenue will be lost as lending problems increase; On the other hand, because of the quality of loans, this is caused by external factors such as the economic downturn.
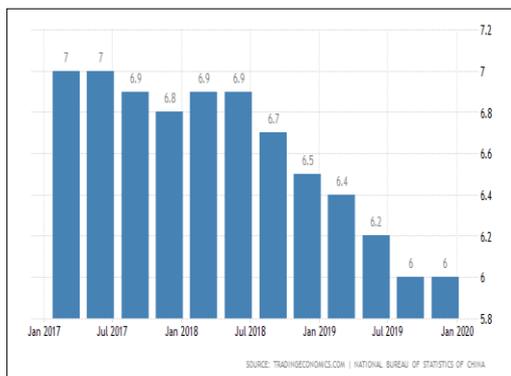
Figure 1. GDP Growth Annual of China
Source: Tradingeconomics.com-The National

Bureau of Statistics of China, 2020

Based on the chart listed above, it can be seen that China's GDP is still growing in general, but the growth rate has slowed down, especially from the second half of 2018 until January 2020. The slow growth of GDP, in terms of banks, may be due to the slowdown in the development of the banking sector, leading to slower economic growth. This also shows that macroeconomic factors have a certain impact on the banking industry.
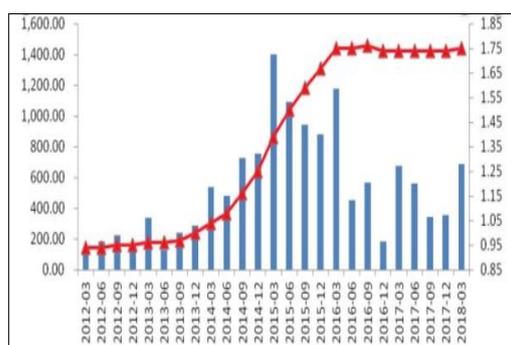
Blue: Quarterly increase in NPLs; Red: NPL ratio
Figure 2. Single-Quarterly Growth Rate of NPLs Remained Stable
Source: The China banking regulatory commission, 2019

The chart above shows the growth of the NPL ratio in a single quarter from 2012 to 2018. The NPL ratio increased rapidly from 2013 to 2015, indicating that there were many non-performing loans on the banking industry of China at this stage. From 2016 to 2018, the increase of

the non-performing loan ratio was relatively stable, indicating that banks' non-performing loans decreased at this stage.

Tanasković and Jandrić (2015) believe that the factors influencing the growth of non-performing loans consist of three categories: macroeconomic aspect, institutional aspect, and bank-level aspect. Macroeconomic factors involve a gross domestic product, exchange rate, bank interest rate, inflation, unemployment, house prices, and stock prices; institutional factors is regarded as the institutional operating mode in the banking system; factors at the bank level are mismanagement.

Zeng (2012) shows that the financial crisis affected national output growth, with the more unstable the banks, the less economic output. Non-performing loans of banks depend on micro-economic factors but are influenced by macroeconomic factors.

The reason for this study is very simple. The researcher is mainly interested in the banking industry and wants to understand exactly what affects the stable operation of banks. Therefore, this paper analyzes what determinants affect non-performing loans on the banking industry of China and selects five independent variables including macroeconomic factors and micro-economic factors. Based on the study of the previous data, the researcher compiled some measures to reduce non-performing loans in the banking sector based on these factors. Through this study, the researcher hopes to make scholars have a comprehensive understanding of the influence of non-performing loans on the banking sector.

Literature Review
Credit Risk Management

Credit risk management refers to the systems, procedures, and controls put in place by management to ensure effective recovery of customer payments and minimize the risk of non-payment (Naceour & Goaied, 2003). Credit risk

management is a key component of the company's overall risk management strategy. Weak credit risk management is the main reason for many business failures. Many small businesses have neither the resources nor the expertise to operate a sound credit management system (Richardson, 2002).

In the process of resource allocation, banks also face a variety of risks when they make profits by taking advantage of the spread between savings and credit. One of the most important risks is the risk of credit default, which leads to an increase in non-performing loans. Non-performing loans can be defined as loans in default from which the bank cannot make a profit. Among the indicators of financial stability and bank performance, non-performing loans are one of the important indicators, reflecting the bank's asset quality, credit risk, and efficiency (Sari & Purwanto, 2014).

Theory of financial fragility

Generally speaking, financial vulnerability refers to the financial state in which the imbalance of financial system and structure leads to the accumulation of risks and the financial system loses all or part of its functions. In other words, the financial system itself is unstable and inherently fragile, so financial risks are ubiquitous (Wang & Li, 2019). Minsky (1982) puts forward financial instability hypothesis, focuses on the fragility of the credit markets, think that banks and other credit creation function of the intrinsic characteristics of financial institutions, so they must experience, the tide of cyclical crisis and bankruptcy and the impact will spill over to other sectors of the economy, eventually lead to the economic cycle and the economic downturn, safe borrowers is greatly reduced, the proportion will default behavior, produce a large number of non-performing loans.

Bank behavior theory

Bank behavior theory analyzes the causes of non-performing loans from the perspective of banks (Wang & Li, 2019). John H. Wood(1970) first put forward the loan customer relationship theory, and explained that maintaining customer relationship through increasing loan and lowering interest rate would lead to the decline of asset quality, lower profit, and weaker risk resistance, which would greatly increase the probability of non-performing loans. Eaton & Stiglitz (1986) put forward the theory of loan competition. In the inter-bank competition, banks relaxed the approval standards for loans and implemented low interest rates to attract customers, which led to the decline of bank profits and increased the credit risk and the probability of non-performing loans.

Non-performing loans

In China, non-performing loans (NPLs) are loans that in default, it is considered non-performing if the borrower delays repayment of principal and interest for up to three months (Chen et., al, 2016). According to Ikram et al (2016), NPLs hurt society and the economy because they lead to a decrease in social output and production growth. The problem of loan defaults has also been troubling policymakers makers in related areas because non-performing loans marked the beginning of the banking crisis. Rahman et al (2016) also believed that the main factor that triggered and exacerbated the financial and banking crisis was the increase in non-performing loans. Non-performing loans were also an indicator to measure the asset quality of lending institutions. According to Ozili (2019), non-performing loans can reveal the loan quality and credit situation of the banking sector, so they got more and more concern. A full understanding of the determinants of non-performing loans will help improve banks' risk management capabilities and facilitate the work of national banking regulators.

$$\text{NPL ratio} = \frac{\text{Non} - \text{performing loan}}{\text{Total loan}} \times 100\% \dots$$
.............(Eq. 1)

Gross domestic product

Gross domestic product (GDP) measures the market value of final goods and services and calculates all economic output in a given region (European Commission et al., 2009). Gross domestic product as the main measure of economic development, the higher the index, the more prosperous the economy. It is generally believed that GDP growth is negatively correlated with non-performing loans. This is because GDP growth promotes economic development and increases the income level of borrowers to some extent. Therefore, borrowers can repay loans on time, thus reducing banks' non-performing loans and increasing their income. Conversely, when the economy slows, the number of bad loans rises (Koju et., al, 2018).

$$\text{GDP growth rate} = \frac{\text{Current year GDP} - \text{last year GDP}}{\text{Last year GDP}} \times 100\%$$
....(Eq. 2)

Bank interest rate

Friedberg (2015) defines the loan interest rate as "the compensation obtained by the lender (or consumer) for giving up the excess funds" and the interest that must be paid. Borrowing refers to "the fees charged by individuals or organizations for using the borrowed money". In China, interest rate represents the ratio of interest to principal over a period of time. Due to the term of measurement is different; interest rate can be divided into annual interest rate, monthly interest rate and daily interest rate. According to the different economic relations attached to the interest rate, the interest rate can be divided into deposit interest rate and loan interest rate. From the borrower's point of view, the interest rate is the price paid by the borrower to the lender for using the lender's capital. From the perspective of the lender, the interest rate is the rate of return the lender gets for lending the capital (Chi &

Li, 2017).

$$\text{Interest rate} = \frac{\text{Interest}}{\text{Principal}} \times 100\% \dots$$
...............................(Eq. 3)

Inflation rate

In China, the rate of inflation refers to the increase in the general price level over a period of time (usually one year). In practice, inflation cannot be calculated directly and is usually reflected by the consumer price index (CPI). If the price index growth rate is greater than zero, it indicates the existence of inflation. If the price index growth rate is less than zero, there is deflation (Zeng, 2012). Inflation has always been an important indicator of economic stability. Inflation has a certain degree of influence on producers, participants, and consumers of economic activities, therefore, controlling macroeconomic factors will promote the reduction of non-performing loans (Chen et., al, 2018).

$$\text{Inflation} = \frac{\text{Current consumer price index} - \text{historical consumer price index}}{\text{Current consumer price index}} \times 100 \dots$$
(Eq. 4)

Capital adequacy ratio

Capital adequacy ratio as a means of explaining the ability of a bank to identify, control and monitor the risks that may occur affecting its total capital and it uses total capital and total risk-weighted assets to calculate. The ideal capital adequacy ratio would increase public confidence as the owner of the funds of the bank so that the public will have the desire more to save their money in the bank (Hardiyanti, 2012). It is a necessary prerequisite for the normal operation of every financial institution to maintaining the minimum capital adequacy ratio. The investment risk of banks will increase with the increase of the minimum capital adequacy ratio, so the capital adequacy ratio had a negative relationship with the non-performing loan, and the lower the capital adequacy

ratio is, the higher the non-performing loan will be (Koju et., al, 2018).

$$\text{Capital adequacy ratio (CAR)} = \frac{\text{Total risk weighted assets}}{\text{Total capital fund}}$$
.............(Eq. 5)

Return on asset

The analysis of return on assets is a way to reflect the profitability of banks. Profitability is the company's ability to generate revenue compared to sales, total assets, even its equity (Sartono, 2008). Rising non-performing loans may have reduced banks' interest earnings because borrowers did not recognize the interest, and banks' increased provision for loans created opportunities for interest income but led to losses. The return on assets is negatively correlated with the non-performing loan, which is the manifestation of the bad assets of banks, thus leading to the decline of the return on assets of banks (Rahman et., al, 2016). Higher return on assets means that banks have good financial performance and stable income, so they are in a position to carry out risky business.

$$\text{Return on assets} = \frac{\text{Net profit after tax}}{\text{Total assets}}$$
....
.....................(Eq. 6)

Theoretical Framework
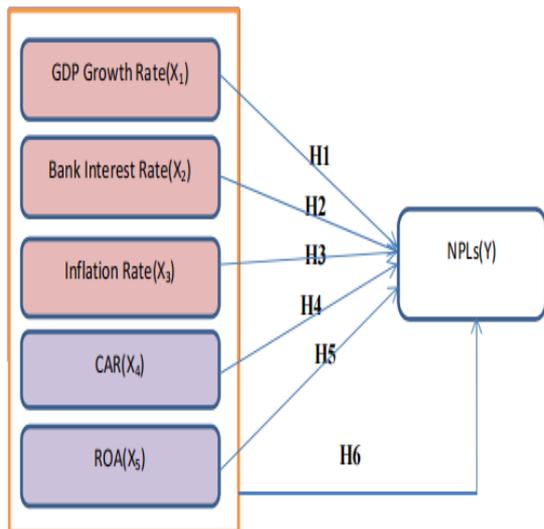
Figure 3. Theoretical Framework

Based on the theoretical framework, this study consists of two variables which are dependent and independent variable. The dependent variable describes by non-performing loans (NPLs). Furthermore, the independent variables explain by gross domestic product growth rate (GDP), bank interest rate (BIR), inflation rate (IFR), capital adequacy ratio (CAR), and return on asset (ROA).

Hypotheses

This hypothesis is used to analyze whether macroeconomic variables and micro-economic variables have an impact on the non-performing loans of Chinese commercial banks. Based on the above theoretical framework, the hypothesis is expressed as follows:

Hypothesis 1: There is a significant influence of GDP growth rate towards NPLs in Chinese commercial banks.

Hypothesis 2: There is a significant influence of BIR towards NPLs in Chinese commercial banks.

Hypothesis 3: There is a significant influence of IFR towards NPLs in Chinese commercial banks.

Hypothesis 4: There is a significant influence of CAR towards NPLs in Chinese commercial banks.

Hypothesis 5: There is a significant influence of ROA towards NPLs in Chinese commercial banks.

Hypothesis 6: There is a significant influence of GDP growth rate, BIR, IFR, CAR, and ROA towards NPLs in Chinese commercial banks all together.

Research Method
Research Design

In order to achieve the purpose of the research, researchers usually use the two research bases of quantitative method and qualitative method to implement the research framework to accomplish the grand goal of the research (Scheurich, 2014). In research, quantitative methods

are usually chosen to study the relationship between established meanings of social facts and the variables used in research. Using quantitative methods to study, data will be collected and will be compared to research conclusions at the same time to obtain the required information. On the other hand, if opinions and other relevant information are needed for research, qualitative methods are usually used. In this way, the researchers will gain some further insights for analysis in the study. Since this study needs to use numerical data to conclude, this study will use quantitative methods to support the determinants of non-performing loans in Chinese commercial banks. This research adopts a quantitative method, obtains the objective result through the calculation, the variable measurement, and the hypothesis.

The following are the criteria or characteristics that the researcher needs to determine the sample size of this study:

1. The bank has been listed and listed on the Shanghai stock exchange.
2. The bank released its annual report, 2010-2019.
3. The total assets of the selected banks were ranked in the top ten in 2019.
4. The company's shares have never been suspended on the Shanghai stock exchange.

Based on the criteria or characteristics determined above, the researchers of this study have selected 7 out of 10 commercial banks in China from 2010 to 2019 for research and analysis. Among seven commercial banks, five are state-owned commercial banks, namely Industrial and Commercial Bank of China (ICBC); China Construction Bank (CCB); Agricultural Bank of China (ABC); Bank of China (BOC); Bank of Communications (BCM). The other two are national joint-stock commercial banks, which are China Merchants Bank (CMB) and China Industrial Bank (CIB), actually Bank of Communications (BCM)

also. The data observations have chosen 70 observations data in total.

Result and Discusssion
Descriptive Statistic

Table 1. Descriptive Statistics

	NPL	GDP	BIR	IFR	CAR	ROA
Mean	1.271714	7.694000	5.215500	2.589000	13.55614	1.151429
Median	1.370000	7.230000	5.282500	2.345000	13.56000	1.150000
Maximum	2.390000	10.64000	6.290000	5.550000	17.52000	1.470000
Minimum	0.380000	6.110000	4.350000	1.440000	10.83000	0.800000
Std. Dev.	0.377916	1.325780	0.785917	1.130489	1.623067	0.175403
Observations	70	70	70	70	70	70

According to table 1 above, the information of each variable in descriptive statistical analysis are described as follows:1) NPL ratio was determined as the dependent variable of this research, with an average of 1.27% and a standard deviation of 0.38%. The maximum value was 2.39%, which appeared on ABC in 2015. The minimum was 0.38% in CIB in 2011; 2) GDP growth rate is one of the independent variables. It has an average of 7.69% and a standard deviation of 1.33%. The maximum value was 10.64% in 2010; the minimum value was 6.11% in 2019; 3) BIR is referred to as an independent variable in this research. The mean value is 5.22% and its standard deviation is 0.79%. The maximum value was 6.29% in 2012; the minimum value was 4.35% from 2016 to 2019; 4) IFR is also an independent variable in this research. The mean value is 2.59% and its standard deviation is 1.13%. The maximum value was 5.55% in 2011. The minimum value was 1.44% in 2015; 5) CAR is another independent variable in this research. The mean value is 13.56% and its standard deviation is 1.62%. The highest CAR from CCB in the year of 2019 which was 17.52%. The lowest CAR from CIB in the year of 2013 which was 10.83%; 6) ROA is the last independent

variable in this research. The mean value is 1.15% and its standard deviation is 0.18%. The maximum value was 1.47% at CCB from 2011 to 2013. The minimum value was maintained at 0.80% at BCM from 2018 to 2019.

Multiple regression analysis

Table 2. Multiple Regression Analysis Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.871779	0.844224	4.586198	0.0000
GDP	-0.016792	0.037230	-0.451033	0.6536
BIR	-0.208372	0.103737	-2.008651	0.0492
IFR	-0.071503	0.033422	-2.139430	0.0366
CAR	-0.034778	0.037280	-0.932881	0.3547
ROA	-0.631849	0.528179	-1.196277	0.2365

Effects Specification				
Cross-section fixed (dummy variables)				

R-squared	0.696195	Mean dependent var	1.271714
Adjusted R-squared	0.638577	S.D. dependent var	0.377916
S.E. of regression	0.227197	Akaike info criterion	0.028806
Sum squared resid	2.993870	Schwarz criterion	0.414262
Log likelihood	10.99179	Hannan-Quinn criter.	0.181914
F-statistic	12.08293	Durbin-Watson stat	1.233267
Prob(F-statistic)	0.000000		

For the regression coefficient of each independent variable, the multiple regression equation is established. According to Table 2, the equation of the multiple regression models is as follows:

$$NPLs = 3.871779 - 0.016792\ GDP - 0.208372\ BIR - 0.071503\ IFR - 0.034778\ CAR - 0.0631849\ ROA + \varepsilon$$
...............................(Eq. 7)

According to the result, the constant value is 3.871779 which mean if all the independent variables value is zero the amount of non-performing loan is 3.871779. The t-test result presents that BIR and IFR have partially significant to NPL which 0.0492 for BIR, 0.0366 for IFR. Another three variables did not have a significant effect on non-performing loans, GDP is 0.6536, CAR is 0.3547, and ROA is 0.2365. Thus, two of the independent variables affect NPL.

Interpretation of Results
The Influence of GDP Growth Rate towards NPL

Based on the analysis of table 2, the results show that the GDP growth rate has a negative insignificant impact on NPL, the value is 0.6536>0.05. The higher the GDP index, the better the economy and the more stable the banking sector (Mazreku et., al, 2018). Gross domestic product (GDP) measures the market value of final goods and services and calculates all economic output in a given region (European Commission et., al, 2009). It is generally believed that GDP growth is negatively correlated with non-performing loans. This is because GDP growth, to some extent, promotes economic development and raises the income level of borrowers. As a result, borrowers can repay their loans on time, thus reducing banks' non-performing loans (Koju et., al, 2018). The results of this research are consistent with the previous research made by Ikram et al. (2016) and Messai & Jouini (2013), showing a negative correlation and insignificant relationship. However, the research conducted by Mazreku et al. (2018) showed a significant negative correlation between the two variables.

The Influence of BIR towards NPL

The second hypothesis states that "There is a significant influence of BIR towards NPL." According to table 2 above, which presents a negative significant value of 0.0492 the hypothesis is accepted. Friedberg (2015) defines the loan interest rate as "the compensation obtained by the lender (or consumer) for giving up the excess funds" and the interest that must be paid. Borrowing refers to "the fees charged by individuals or organizations for using the borrowed money". The loan interest rate is the interest that the customer must repay after the maturity of the money borrowed from the bank according to the interest rate set by the bank. It is also important to understand that changes in bank interest rates have a significant

impact on the economy (Murthy et., al, 2017).

In principle, loan interest rate and non-performing loan should be positively correlated, but the statistical results of this study are contrary, because there is an asymmetric relationship between loan interest rate and non-performing loan in the short term and a symmetric relationship in the long term (Bahruddin & Masih, 2018). Therefore, in the economic downturn, whether the bank increases the loan interest rate or reduces the loan interest rate, due to the economic conditions at that time, the level of non-performing loans will rise in a short period of time. This means that even if banks offer lower interest rates during the financial crisis, the number of non-performing loans will continue to rise. The study similar with the previous research made by Mazreku et al. (2018) and Murthy et al. (2017), showing a significant negative correlation. However, the research of Rehman et al. (2016) shows that there is a significant positive correlation between these two variables.

The influence of IFR towards NPL

The third hypothesis states that "There is a significant influence of IFR towards NPL." The table 2 above showing a negative significant value of 0.0366 the hypothesis is accepted. According to the price stability index, Rinaldi & Sanchis (2006) believed that low level of inflation is conducive to economic growth, while high inflation weakens borrowers' solvency by reducing their real income, thus increasing non-performing loans. Inflation, another important indicator of economic stability, is negatively correlated with the level of non-performing loans. At the same time, it has a certain impact on producers, participants, and consumers of economic activities, so controlling macroeconomic factors will promote the reduction of non-performing loans (Chen et., al, 2018). The statement in line with the previous research made by Mazreku et al. (2018)

and Kjosevski & Petkovski (2017), showing a significant negative correlation. However, the research of Tanasković & Jandrić (2015) shows that there is an insignificant negative correlation between these two variables.

The influence of CAR towards NPL

Based on an analysis of table 2, the results show that CAR has a negative insignificant impact on NPL, the value is 0.3547>0.05. Capital adequacy ratio mainly refers to the risk losses that banks bear with their own capital, which is also necessary to ensure the normal operation and development of banks. The ideal capital adequacy ratio would increase public confidence as the owner of the funds of the bank so that the public will have the desire more to save their money in the bank (Hardiyanti, 2012). The investment risk of banks will increase with the increase in the minimum capital adequacy ratio, so the capital adequacy ratio is negatively correlated with non-performing loans. The lower the capital adequacy ratio is, the higher the non-performing loans will be (Koju et., al, 2018). The results above showing consistent with the previous research made by Rahman et al (2017), showing an insignificant negative correlation. However, the research of Kjosevski et al (2019) shows different results, which is a significant positive correlation between these two variables.

The influence of ROA towards NPL

Based on the analysis of table 2, the results show that ROA has a negative insignificant impact on NPL, the value is 0.2365>0.05. Return on assets is often seen as an important measure of a bank's performance. There is a negative correlation between return on assets and non-performing loans, that is, the higher the return on assets, the fewer non-performing loans (Rahman et., al, 2016). ROA analysis is a method to reflect the profitability of banks. Profitability is the company's ability to generate revenue compared to sales, total assets, even its equity (Sartono, 2008). Higher ROA

means that banks have good financial performance and stable income and can carry out risk business. The results obtained within this research are in line with the previous research made by Rahman et al (2017), showing an insignificant negative correlation. However, the research of Kjosevski & Petkovski (2017) shows that there is a significant correlation between these two variables.

Simultaneous influence of GDP, BIR, IFR, CAR, and ROA towards NPL

According to the hypothesis states "There is the significant simultaneous influence of GDP, BIR, IFR, CAR, and ROA towards NPL in commercial banks." The f test shows that the probability (0.000000)<0.05. The coefficient of determination is 0.638577; it means all the independent variables influence around 63.9% of the dependent variable, while the remaining around 36.1% is explained by another factor which is excluded in this research.

The most significant influence factors towards NPL of commercial banks in China

The results of the t-statistical test are used to determine that the independent variable has the greatest influence on the dependent variable until the minimum. The higher the t-statistic, the more meaningful it is for the dependent variable. In addition, the degree of significant influence can also be sorted according to the value of probability in t-statistics. The closer the probability value is to 0, the more significant its influence on the dependent variable is. According to the test result, simultaneously, the most significant variable that influences the NPL of commercial banks is IFR. The value of probability is the lowest among all the independent variables which are 0.0366. Therefore, it is concluded that the bank must pay attention to inflation in the macro factors because, in the inflation period, currency devaluation will lead to the borrowers' weak ability to repay loans, which has a huge impact

on the bank's non-performing loan ratio.

Conclusions

GDP growth rate has an insignificant negative correlation with the non-performing loan ratio. The higher the GDP growth rate is, the lower the non-performing loan ratio will be. Bank interest rate has a significant negative impact on the non-performing loan ratio. The higher the loan interest rate is, the lower the non-performing loan ratio will be. The inflation rate has a significant negative impact on the non-performing loan ratio. The capital adequacy ratio has an insignificant negative impact on non-performing loans. The lower the capital adequacy ratio is, the higher the non-performing loans. The return on assets has an insignificant negative impact on the non-performing loan ratio. The higher the return on asset is the less non-performing loans will be. The test shows that independent variables have a significant influence on dependent variables simultaneously. The coefficient of determination is 0.638577; so GDP growth rate, bank interest rate, inflation rate, capital adequacy rate, and return on asset are influence around 63.9% on non-performing loans, while the remaining around 36.1% is explained by another factor which is excluded in this research. Meanwhile, according to the test results, the most significant variable affecting the non-performing loans of commercial banks is IFR. Therefore, it is concluded that banks must pay more attention to inflation from the perspective of macro factors because, in the inflation period, currency depreciation will lead to borrowers' weak ability to repay loans, which will have a great impact on the non-performing loan ratio of banks.

Recommendations
Commercial Banks

The researcher suggests that commercial banks should fully understand the determinants of non-performing loans. For example, this study has proved that macroeconomic factors, inflation and interest rates, have

a significant impact on non-performing loans, which is conducive to improving the risk management ability of banks and promoting the stable development of banks. Also, as mentioned above, the relatively low management level of China's banking industry. Therefore, bank management needs to clarify the direction of credit risk management to ensure that borrowers can effectively repay loans, to avoid a series of consequences such as bad debts, capital shortage, and inability to operate or even bankruptcy of banks as far as possible.

Investors

Higher non-performing loan ratios mean banks face losses, fewer assets, and lower profitability, because non-performing loans mark the beginning of the banking crisis. The researcher suggests that investors need to understand the non-performing loan status of banks before investing. Therefore, investors must pay close attention to the reasons for the low performance of banks. That way, investors can avoid investing in a financially troubled company. As a result, investors have the ability to avoid losses as part of risk management. On the contrary, the banking sector would be stronger if it had the backing of investors.

Future Researchers

On the basis of previous studies, this study considered various influencing factors and selected a total of five independent variables from two aspects, including three macroeconomic variables and two factors on bank's financial ratio, to study the determinants of non-performing loans in the banking industry. However, the results show that only one aspect of this study is significant, that is, macroeconomic factors. Therefore, the first suggestion for future researchers is to hope that they can further study and get the results of the significant influence of the bank's factor, namely the financial ratio, on the non-performing loan ratio.

In addition, relatively few bank samples were selected for this study, so it is suggested that future researchers may appropriately increase the number of research samples or add several other variables, so as to obtain more comprehensive research results. Third, as the researcher conducts research from the top ten banks in China by assets, and the sample banks selected for the study are mostly state-owned commercial banks, the research results are of more reference significance for state-owned banks. Therefore, it is suggested that future researchers should pay more attention to non-top 10 non-state-owned commercial banks, so as to get effective suggestions on the management of non-state-owned commercial banks.

References

Chen, F. W., Feng, Y., & Wang, W. (2016). Impacts of Financial Inclusion on Non-Performing Loans of Commercial Banks: Evidence from China. *Sustainability*, 10(9), 3084.

Chi, Q., & Li, W. (2017). Economic Policy Uncertainty, Credit Risks and Banks' Lending Decisions: Evidence from Chinese Commercial Banks. *China Journal of Accounting Research*, 10(1), 33-50.

Hardiyanti, N. (2012). Analisis Pengaruh Insider Ownership, Leverage, Profitabilitas, Firm Size, dan Dividen Payout Ratio terhadap Nilai Perusahaan. Semarang: Universitas Diponegoro.

Ikram, A., Su, Q., Ijaz, F., & Fiaz, M. (2016). Determinants of Non-Performing Loans: An Empirical Investigation of Bank-Specific Microeconomic Factors. Journal of Applied Business Research (JABR), 32(6), 1723-1736.

Kjosevski, J., & Petkovski, M. (2017). Non-Performing Loans in Baltic States: Determinants and Macroeconomic Effects. Baltic Journal of Economics, 17(1), 25-44.

Kjosevski, J., Petkovski, M., & Naumovska, E. (2019). Bank-Specific and Macroeconomic Determinants of Non-Performing

Loans in the Republic of Macedonia: Comparative Analysis of Enterprise and Household NPLs. Economic Research-Ekonomska Istraživanja, 32(1), 1185-1203.

Koju, L., Koju, R., & Wang, S. (2018). Macroeconomic and Bank-Specific Determinants of Non-Performing Loans: Evidence from Nepalese Banking System. Journal of Central Banking Theory and Practice, 7(3), 111-138.

Mazreku, I., Morina, F., Misiri, V., Spiteri, J. V., & Grima, S. (2018). Determinants of the Level of Non-Performing Loans in Commercial Banks of Transition Countries.

Messai, A. S., & Jouini, F. (2013). Micro and Macro Determinants of Non-Performing Loans. International Journal of Economics and Financial Issues, 3(4), 852-860.

Murthy, U., Kamil, N. M., Mariadas, P. A., & Devi, D. (2017). Factors Influencing Non-Performing Loans in Commercial Banks: The Case of Banks in Selangor. International Journal of Business and Management, 12(2), 246.

Ozili, P. K. (2019). Non-Performing Loans and Financial Development: New Evidence. The Journal of Risk Finance.

Rachman, R. A., Kadarusman, Y. B., Anggriono, K., & Setiadi, R. (2018). Bank-Specific Factors Affecting Non-Performing Loans in Developing Countries: Case Study of Indonesia. The Journal of Asian Finance, Economics and Business (JAFEB), 5(2), 35-42.

Rahman, M. A., Asaduzzaman, M., & Hossin, M. S. (2016). Impact of Financial Ratios on Non-Performing Loans of Publicly Traded Commercial Banks in Bangladesh. International Journal of Financial Research, 8(1), 181.

Rehman, R., Mangla, I. U., & Zhang, J. (2016). Chinese Banking Reforms, An Analysis and Evaluation of Non-Performing Loans (NPL's).

Sari, S. D., & Purwanto, P. (2014). Non-Performing Loans Analysis in Big Four Indonesia Commercial Banks by Assets Quarterly Period 2005-2013. ISSIT 2014, 1(1), 52-66.

Sartono, A. (2008). Manajemen Keuangan Teori dan Aplikasi. Yogyakarta: BPFE.

Scheurich, J. (2014). Research Method in the Postmodern. London: Routledge.

Setiawan, C., Hasan, T., Hassan, M. K., & Mohamad, S. (2017). Non-Performing Loans and Bank Efficiency of Conventional and Islamic Banks in the Organization of Islamic Cooperation (OIC) Countries. Journal of Islamic Economics, Banking and Finance, 113(6223), 1-26.

Tanasković, S., & Jandrić, M. (2015). Macroeconomic and Institutional Determinants of Non-Performing Loans. Journal of Central Banking Theory and Practice, 4(1), 47-62.

Zeng, S. (2012). Bank Non-Performing Loans (NPLS): A Dynamic Model and Analysis in China.

Wang, S. J., & Li, J. Z. (2019). Theoretical Research on the Causes of Non-Performing Loans in Banks. School of Economics, Yunnan University.