

# **The Factors Related to Credit Risk of Commercial Banks: The Case of China and Thailand**

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## **Abstract**

The financial system plays a crucial role in the country's economic development, in which banking sector is an important part in financial system. A commercial bank is a financial institution that offers a number of banking services such as deposits, personal and business loans, and investment products for supporting a sustainable economic development. In general, banks want to earn as much money as possible but at the low risk possible. Credit risk is one of the major issues in risk management in the banking sector, which refers to the risk that a borrower will default on any type of the debt by failing to make required payments or even not on time. Credit risk is the potential loss due to the nonperformance of a financial contract, or financial aspects of nonperformance in any contract. It leads to bad loan problem in banking sector. This research intended to investigate the factors related to credit risk of Chinese banking sector and Thailand banking sector during 2007 to 2014. It will be superiority to understanding the credit risk that banks facing, in order to implement effective credit risk management to supervise and reduce this risk to achieve the long-term success. The finding indicated that there are differences in Risk-weighted assets/Total Assets (RWA/TA) and Non-Performing Loans/Total Liabilities (NPL/TL) between Chinese commercial banks listed in SSE and SZSE and Thai commercial banks listed on SET during 2007-2014. The macroeconomic factors and bank-specific factors were more significant on explaining the RWA/TA and NPL/TL in Chinese commercial banks listed in SSE and SZSE; while macroeconomic factors and bank-specific factors are more significant on explaining the NPL/TL of commercial banks than those of RWA/TA.

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## **1. Introduction**

The financial system plays a vital role in the countries' economic development, and commercial banks as financial institution, is an irreplaceable part in financial system. In the past few years, due to the high-speed economic growth and loose monetary policy, banking sector have maintained the rapid expansion in both China and Thailand. From financial crisis we know that if a bank's assets value is lower than its liabilities value is the most significant point that leads bank failure or even bankruptcy. The reason often related to the decrease the asset's value is the increase in credit risk due to the non-performance loans (Apergis & Payne, 2013). After Asian financial crisis, great attention has been given to the non-performing loans of financial institutions. Chinese economic had a great develop in its economic transition from planned economy to market economy; however, a large volume of non-performing loans has been produced during this period. Chinese NPLs is mainly the result of extensive policy lending, low efficiency of large

commercial banks, weak corporate governance and poor operation skills of the banks, and the business cycles. In 2003, the government of China recapitalized the banks and set up the China Banking Regulatory Commission (CBRC) as the country's independent banking regulator. It is responsible for the national banking financial institutions and their business activity regulation. (Huang, 2006).

The financial crisis of 1997 has greatly affected the performance of Thailand banking industry. During this period, a mount of non-performing loans was produced. As a result, there are the initiatives to implement Financial Sector Master Plan (FSMP) as a medium-term development plan for financial institution under the supervision of Bank of Thailand. This plan prompted the Thailand banking sector increase its financial sector efficiency (Menkhoff & Suwanaporn, 2006). Basel Committee on Banking Supervision was written a document in 1988, which recommends certain standards and regulations for banks (Basel Committee on Banking Supervision, 2014). It was called Basel I, the Basel II came out with a revised Capital Framework in 2004 to replace the 1988 Accord. Most recently, the committee has published the Basel III. The changes aimed at rewarding and encouraging continued improvements in risk measurement and control. Those document mainly recommend that banks should hold a minimum capital to risk-weighted assets of 8%. Risk weighted assets is another main indicator for credit risk of commercial banks. In the last 15 years, from the table showed that banking sector of China and Thailand had done a great job in aspects of asset quality and credit risk control.

**Table 1 Bank Nonperforming Loans to Total Gross Loans (%)**

Year	Country	
	China	Thailand
1999	28.5	38.6
2000	22.4	17.7
2001	29.8	11.5
2002	26.0	16.5
2003	20.4	13.5
2004	13.2	11.9
2005	8.6	9.1
2006	7.1	8.1
2007	6.2	7.9
2008	2.4	5.7
2009	1.6	5.3
2010	1.1	3.9
2011	1.0	2.9
2012	1.0	2.4
2013	1.0	2.3

*Source: World Bank (2014)*

## 2. Related Literature

The credit risk in banking is ecumenical defined as the profitability of a borrower defaulting his loan commitments. A bank needs to implement effective credit risk management to manage and reduce this risk to achieve the long-term success. Credit risk is defined as one of the original and primary risk factors that financial institutions have been confronting all the time (Washington, 2014). Controlling non-performing loans is very important for both the bank performance and the economy's financial development (McNulty, Akhigbe, & Verbrugge, 2001). When the level of non-performing loans is quit high, the provisions are not adequate protection. Financial crisis are often related to

default loan of banking institutions, one of the important reasons triggered the financial crisis is the huge non-performing loans of the banking institutions.

Ongore and Kusa (2013) studies investigated the effect of bank specific and economic variables performance by taking ownership identity as moderating variables; it covered 37 banks of Kenya from year 2001-2010. The investigator use capital adequacy (CA), asset quality (NPLs), management efficiency (ME), liquidity management (LM), gross domestic product (GDP) and average annual inflation rate (INF) as independent variables to measure the bank performance (ROA, ROE, NIM). The results show a strong negative influence of non-performing loans in all three indicators of bank performance. It is evident that asset quality is one of the major factor to affect the bank performance, means that bank performance has a great influence on asset quality (NPLs) (Mohammed, 2012). The empirical literature by Shingjergji (2013) confirmed this conclusion. The researcher uses a simple regression model like OLS estimation to test capital adequacy ratio (CAR), loan to asset ratio (LTA), ROE, natural log of total loans and NIM for explain the non-performing loans ratio. The evidences shown that CAR and ROE were negative related with NPLs ratio; other three have a positive relationship with NPLs ratio.

Pestova & Mamonov (2012) found out that during the latest crisis Russian banking system was faced a bad loan problem. They employed the percentage of nonperforming loans as indicator to measure the credit risk. Net interest margin (NIM), management efficiency (measured by cost to income ratio), operational efficiency, bank performance, and solvency ratio (capital adequacy ratio) as the bank-specific factors are related with credit risk. Low cost efficiency indicates low quality of bank management, which is the main reason lead to problem loans increase (Louzis, Vouldis & Metaxas, 2011; Podriera & weill, 2008). They also use bank's past profitability (ROA, ROE, NIM) should have positive sign impact on credit risk. GDP growth, inflation rate and exchange rates as macroeconomic factors related with credit risk. Capital adequacy ratio has a negative relationship with credit risk, which means that low capital adequacy ratio will lead to high probability of bank default. This statement was widely accepted in literature (Berger & Deyoung, 1997; Salas & Saurina, 2002).

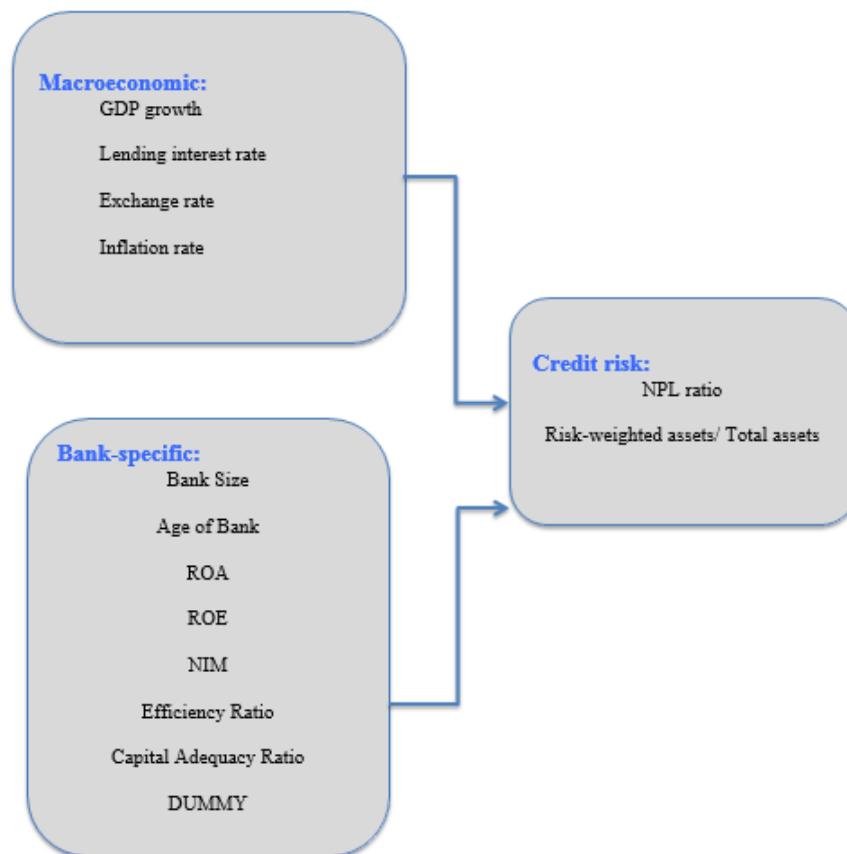
Vatansever & Hepsen (2013) employed ordinary least square estimation approach to investigate the impacts of macroeconomic indicators and bank-specific factors on non-performing loan ratio in Turkey. The researcher identify inefficiency ratio (INEF), debt ratio (DR), ROE, loan to asset ratio (LOAS), CAR as bank-specific factors; and totally twelve indicators as macroeconomic factors (such as GDP growth, interest rate, consumer price index, exchange rate, etc.). The results show that GDP growth and interest rate does not have significant effect on NPL ratio; inefficiency ratio of all banks negatively, return on equity (ROE), capital adequacy ratio (CAR) positively affect the NPL ratio. In the same study direction, Al-Wesabi and Ahmad (2013) studied on the factors affecting credit risk of Islamic banks in Gulf Cooperation Council countries. Twenty-five Islamic banks were selected in this research. The non-performing loans as indicator of credit risk as well and independent variables divided by three macroeconomic factors which are gross domestic product, inflation rate, LIBOR and six bank-specific factors which are natural log of total assets, management efficiency, regulatory capital, proportion of loans to deposit, risky asset, loan loss provision. Regression model is used to measure the variables affecting credit risk. After regression model measured, it found out that management quality; L/D; risk assets, and GDP are statistically related with NPL. Which

means that risky assets indicated the high credit risk; and GDP growth is declining, the credit risk will go up.

Further, Stephanou & Mendoza (2005) agreed that total assets is an important factors impact on the credit risk of commercial banks, at the same time, they also supplied that age of company was a probability factor that related to company default. Al-Wesabi & Ahmad (2013) investigated on credit risk of Islamic banks in GCC countries, NPL was used to explain the credit risk as well, and also GDP growth, inflation rate are the external independent variables, particular is management efficiency and risky asset which is real estate asset in GCC countries were employed by independent variables to measure the dependent variable. The results shown risky assets positive correlated to credit risk, and GDP growth negative related with credit risk.

Based on the previous researches in the studying of influential factors affecting the credit risk of commercial banks, the conceptual framework of this research can be drawn in the figure 2.1 below.

Figure 2.1 Conceptual Framework



## **2.1 Credit risk indicators**

In this research, the credit risk was measured by Non-performing Loans Ratio, and Risk-weighted assets.

### **2.1.1 Non-performing Loans Ratio**

Non-performing loans ratio reflects the return of bank's loans to non-bank borrowers, which is typically calculated from the amount of non-performing loans to total loans. The larger non-performing loans ratio means the worse credit quality of the bank, which can further lead to credit crunch and sizeable allowance provision. Under circumstance, the interest income tends to lower, and thus leads to lower profitability.

### **2.1.2 Risk-weighted assets**

The ration of risk-weighted assets can be calculated from adjusting each asset class for risks for determining a bank's real world exposure to potential losses. In other words, it demonstrates how much loss-absorbing capital a bank needs to sustain it through difficult markets. The nature of a bank's business means it is usual for almost all of a bank's assets will consist of loans to customers. Comparing the amount of capital a bank has with the amount of its assets gives a measure of how able the bank is to absorb losses. Therefore, the ratio of risk-weighted assets to total assets is employed as a measure of bank credit risk, as suggested by Lesle and Avramova (2012).

## **2.2 Macroeconomic Factors**

In this research, the macroeconomic factors were identified into four factors, including GDP growth, Lending interest rate, exchange rate, and inflation rate.

### **2.2.1 GDP Growth**

GDP growth is assessed through the annual percentage growth of GDP at market prices based on constant local currency. Annual data from 2007- 2013 was used, and the data was sourced from the World Bank website.

### **2.2.2 Lending Interest Rate**

Lending interest rate is the bank rate that usually meets the short-and medium-term financial needs of the private sector. It is differ by country, and annual data from 2007- 2013 was used, and the data was sourced from the World Bank website.

### **2.2.3 Exchange Rate**

Exchange rate is the official exchange rate that is determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly average. The official exchange rate is local currency units relative to the U.S. dollar.

### **2.2.4 Inflation Rate**

Inflation rate is measured by Consumer Price Index for all goods and services. Inflation is the rate at which the general level of prices for goods and services is increasing, and, follow up the purchasing power is decreasing.

## **2.3 Bank-specific factors**

In this research, the bank-specific factors were identified into eight factors, including bank size, age, efficiency ratio, capital adequacy ratio, ROA, ROE, net interest margin, and dummy variable.

### **2.3.1 Bank Size**

Bank size is measured by natural logarithm of total assets. Bank size is total assets of the banks are used to represent asset size.

### **2.3.2 Bank Age**

Age of bank is total periods from the year that bank was established until year 2013.

### **2.3.3 Efficiency ratio**

Efficiency ratio is measured by operating expenses over total operating income, expressed in percentage. It also called Cost to Income Ratio. It is the financial indicator to measure the impact of operating efficiency on the performance of the banks. The lower the bank's cost to income ratio show more efficient in carrying out its business activities (Parlan, Kristanto, & Nugroho, 2014).

### **2.3.4 Capital Adequacy Ratio**

Capital adequacy ratio reflects the amount of a bank's capital expressed as a percentage of its risk weighted credit exposures. Bank with good CAR have good profitability. With good capital requirement, commercial banks are able to absorb loans that have gone bad.

### **2.3.5 Return on Assets**

Return on Assets is measured by net income divided by total assets and expressed in percentage. ROA is an indicator of how profitable a company is relative to its total assets. ROA refer to the ability of bank management to increase the earning from bank assets.

### **2.3.6 Return on Equity**

Return on Equity is measured by net income divided by total equity and expressed in percentage. ROE refers to the effectiveness of management in utilization of the funds contributed by shareholders of a bank.

### **2.3.7 Net Interest Margin**

Net Interest Margin is measured by the net interest and dividend income to total earning assets and expressed as a percentage. It reflects the cost of bank intermediation services and the efficiency of the bank. The larger net interest margin represents higher the bank's profit and the higher level of stability.

### **2.3.8 Dummy variable**

Dummy variable is an artificial variable created to represent an attribute with two or more distinct categories/levels. Dummy variables assign "0" and "1" to indicate

membership in any mutually exclusive and exhaustive category (Skrivanek, 2009). In this study, dummy variables (DUMMY) were applied to see the difference between credit risk crisis (2007-2009) and post credit risk crisis (2010-2014) on credit risk of Chinese commercial banks and Thai commercial banks.

### **3. Research Methodology**

The scope of this study focused on banking sector, especially for Chinese commercial banks listed in Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE), and Thai commercial banks listed in Stock Exchange of Thailand (SET) cover the period from 2007 to 2014. The data for macroeconomic variables of two countries were obtained from the World Bank Website, which covered the period from year 2007 to 2014. Meanwhile, the data for bank-specific variables and credit risk indicators were obtained from published annual reports and statements of each commercial bank that came from the bank website or from SSE, SZSE and SET, which covered the period from year 2007 to 2014.

In this study, Chinese commercial banks who were being listed in SSE and SZSE comprising of 14 Chinese commercial banks, excluding Bank of Beijing and Bank of Nanjing due to the availability of data; and 11 Thai commercial banks who were being listed in SET were investigated. As a whole, there were totally 25 commercial banks, including 14 Chinese commercial banks that listed in SSE and SZSE, and 11 Thai commercial banks that listed in SET. The research consisted of 200 observations, which use the annually date that covered the period from year 2007 to 2014, 112 and 88 observations respectively for Chinese commercial banks and Thai commercial banks. The data were processed with the regression analysis of both China and Thailand in order to see the size effect on credit risk of commercial banks.

**Table 2 The Banks Covered in the Study**

No	Institution Name	Year of Est.	Size	Abbreviation
Chinese commercial banks				
1	Bank of Communication Ltd	1908	Large	BOCM
2	Bank of China Ltd	1912	Large	BOC
3	Agriculture Bank of China Ltd	1951	Large	ABC
4	China Construction Bank Corp., Ltd	1954	Large	CCB
5	Industrial and Commercial Bank of China Ltd	1984	Large	ICBC
6	China CITIC Bank Corp., Ltd	1987	Medium	CITIC
7	China Merchants Bank Co., Ltd	1987	Medium	CMB
8	Ping An Bank Co., LTD	1987	Medium	PAB
9	China Industrial Bank Co., Ltd	1988	Medium	CIB
10	China Everbright Bank Company Ltd	1992	Medium	CEB
11	Hua Xia Bank Co., Ltd	1992	Medium	HXB
12	Shanghai Pudong Development Bank Co.,Ltd	1992	Medium	SPDB
13	China Minsheng Banking Corp.,Ltd	1996	Medium	CMBC
14	Bank of Ningbo Co., Ltd	1997	Small	NBCB
Thai commercial banks				
15	Siam Commercial Banks Public Company Ltd	1904	Large	SCB
16	Bangkok Bank Public Company Ltd	1944	Large	BBL
17	Bank of Ayudhya Public Company Ltd	1945	Medium	BAY
18	Kasikornbank Public Company Ltd	1945	Large	KABNK
19	TMB Bank Public Company Ltd	1957	Medium	TMB
20	Krung Thai Bank Public Company Ltd	1966	Large	KTB
21	Tisco Bank Public Company Ltd	1969	Small	TISCO
22	Kiatnakin Bank Public Company Ltd	1971	Small	KKP
23	CIMB Thai Bank Public Company Ltd	1998	Small	CIMBT
24	Thanachart Bank Public Company Ltd	2002	Medium	TCAP
25	Land and House Bank Public Company Ltd	2005	Small	LHBANK

#### 4. Research Results

The researcher investigated the factors related to credit risk of commercial banks during the period from 2007-2014 by using annual data (panel data) in the fixed effect model and random effect model, from 14 selected Chinese commercial banks listed in SSE and SZSE, and 11 Thai commercial banks listed in SET. The credit risk indicators were risk-weighted assets/total assets (RWA/TA) and non-performing loans ratio (NPL/TL). The result showed that there were multicollinearity problems existed, so this study dropped official exchange rate (EXCH) from the model. By comparing the variables for the credit risk of Chinese commercial banks between the pre-credit risk period of 2007-2009 and post-credit risk period of 2010-2014, China's GDPGR, which represents the country's economic growth, grew at larger pace for an average of 11% during the time before the credit crisis. After the outbreak of credit crisis in Europe, the country's GDP grew by only 8.6% on average. LIR was higher during the time before the credit risk crisis at 6.03%, compared to 6% for after the outbreak of such crisis. Chinese Yuan was stronger after the outbreak of the crisis at 6.37 Yuan per US dollar, from the average of 7.13 Yuan per US dollar during 2007 -2009. Chinese INF during the credit risk crisis was higher at 3.33, which decreased to 3.2 for 2010-2014. For the Bank specific factor, Chinese's LNTA, ROA, CAR and RWA/TA were lower during the time before the credit risk crisis in 2007-2009, in which the average figure of these variables were higher for 2010-2014. However, those of ROE, NIM, EFR and NPL/TL moved in the opposite direction showing the contraction for 2010-2014's average figures.

Through comparing the variables for the credit risk of Thai commercial banks between the pre-credit risk period of 2007-2009 and post-credit risk period of 2010-2014, Thailand's GDPGR, which represents the country's economic growth, grew at larger pace for an average of 3.6% during 2010-2014 due to the negative growth in 2009. After the



outbreak of credit risk crisis, the country's GDP showed the recovery in 2010 with the highest growth of 7.8% in 2010, and for average of 3.6% during 2010-2014. Thailand's LIR was also lower during credit risk crisis at 6.07%, compared to 6.74% for after the outbreak of such crisis. Thai baht was stronger after the outbreak of the credit risk crisis at 31.29 baht per US dollar, from the average of 34.04 baht per US dollar during 2007 - 2009. Thailand's INF during the time before the credit risk crisis was lower at 2.3%, which decreased to 2.84% for 2010-2014. For the Bank specific factor, the movements of these factors were all same as those of Chinese commercial banks. Thailand's LNTA, ROA, CAR and RWA/TA were lower during the time before the credit risk crisis in 2007-2009, in which the average figure of these variables were higher for 2010-2014. However, those of ROE, NIM, EFR, and NPL moved in the opposite direction showing the contraction for 2010-2014's average figures.

The results indicated that there were differences in RWA/TA and NPL/TL between Chinese commercial banks listed in SSE and SZSE and Thai commercial banks listed on SET during 2007-2014. The results suggested that macroeconomic factors and bank-specific factors were more significant on explaining the RWA/TA and NPL/TL of Chinese commercial banks listed in SSE and SZSE. Particularly, compared the regression results of RWA/TA and NPL/TL in both countries, the researcher found out that those macroeconomic factors and bank-specific factors were more significant on explaining the NPL-TL of commercial banks than those of RWA/TA. For Chinese commercial banks listed in SSE and SZSE, the results of the regression analysis suggested that GDPGR, INF, ROE and CAR were negatively and significantly related with RWA/TA, while LIR, NIM and DUMMY were positively and significantly related to RWA/TA. Meanwhile, LIR, AGE, LNTA, ROE and NIM were positively and significantly related with NPL/TL, while ROA, EFR and DUMMY were negatively and significantly related to NPL/TL of Chinese commercial banks during the period. For Thai commercial banks listed in SET, the results from regression analysis indicated that only ROE was negatively and significantly related with RWA/TA. At the same time, LNTA and CAR were positively and significantly related with NPL/TL, while AGE and INF were negatively and significantly related to NPL/TL.

## **5. Discussion**

There were different factors that related to credit risk of commercial banks in China and Thailand. Both countries have central banks set up to responsible for maintaining monetary stability, preventing and defusing financial crisis in order to maintain financial stability and provide financial services. Banking sector in both countries seemed to have credit risk problem due to the similar characteristics. First, for the banking sector does not have complement credit risk detection mechanism, most of banks not really evaluate security or collateral before examination and approval the loans. And low management for collection loans back on time, it leads more default loans produced in the banking sector. Second, government controls the credit risk system in financial sector. Based on the global economic environment, macro policy and industry policy adjusted all the time, it also exposure more risk in banking sector. However, for the state owned commercial banks normally can get the specific guarantee from country's government, it lead more bad loans there. Third, the borrowers (enterprises) do not have

the consciousness of risk prevention, some of enterprises have insufficiency operation ability, cannot adjust themselves to accommodate the global economic environment. And the top management of both banks and enterprises have serious corruption problem. Finally, they transfer the credit risk back to banking sector.

However, it is important to notice that LIR, ROE, NIM and DUMMY were significantly related to credit risk of Chinese commercial banks, however, except ROE has negative and significant relationship with RWA/TA, the other three independent variables were insignificant related to credit risk of Thai commercial banks. It is also important to notice that regression results of AGE have different results on NPL/TL of Chinese commercial banks and Thai commercial banks. LNTA of all commercial banks covered in this study showed positive coefficient relationship with NPL/TL, it suggested that the large banks carry on more non-performing loans than others size of banks. ROE of all commercial banks covered in this study showed negatively coefficient relationship with RWA/TA. It suggested that banks with the effective management in utilization of the shareholders' funds will have lower risk-weighted assets/ total assets ratio. Those factors were not that sensitive related to credit risk of Thai commercial banks, there were some reasons listed as follow: first, the credit risk of commercial banks not only depends on bank policy, also Thailand royal culture and history is another important element, some risk monitoring policies were more difficult to implement in the banking sector. Second, the stock exchange market can help regular the commercial banks activities to be more effective, and monitoring risk to accelerate the commercial banks development. The stock return is a basic indicator for stock exchange market, but the credit risk of Thai commercial banks is not that significant correlated with stock returns. Stock returns should be negatively related to the banks non-performing loan ratio, and the capital adequacy ratio is positive correlation, but the correlation is not significant in Thailand banking sector.

## **6. Recommendations**

There are some recommendations for the banking sector and country policy maker of banks. For banking sector, the finding suggested that bank management plays an important role in shaping its credit risk management rather than macroeconomic factors. The improvement of banks' performance and efficiency will lead to well managed on credit risk. Banks need to hire the one who has high experience and qualification on credit risk management, and need to consistently train their employees to be more professional as well. As the large banks play critical role in country's economic development, larger size of banks likely to have higher non-performing loan ratio in both Chinese and Thai commercial banks. Therefore, Assets Management Company should be established for assisting the commercial banks to control the bad loans. Also, the descriptive statistic showed the differences between credit risk crisis and post-credit risk crisis. The study recommend the banks must recognize their problem loans more rapidly and must adapt and maintain their efficiency performance and risk management as it will sustain banks for the worst scenarios in economic conditions. For policy maker of banks, the researcher suggested that higher lending interest rate is a trigger of higher credit risk in the commercial banks. The study recommends that banks should keep lending interest rate as low as possible to make sure that repayment is punctual and affordable for the

creditors. The policy maker of banks need to fixed lending interest rate is considered for huge sum of money so as to reduce the bad loans. Further, the policy maker can push the university colleges of the country added “credit risk management course” on their curriculum to accelerate effective credit risk management development.

## **7. Suggestion for Future Research**

This research investigated the macroeconomic factors and bank-specific factors that related with credit risk of commercial banks. Thus, the result of this study can apply for the commercial bank industry only and thus may not be used in other types of financial institutions. Therefore, the future research is recommended to study the same dependent variables of other financial institutions such as government banks, insurance companies, and others to further identify the generalization of the study. The researcher collected the data from the secondary source for Chinese commercial banks and Thai commercial banks during the period of 2007-2014, and thus the further research should be applied to commercial banks in other locations or even different period of times. Further, this research has only four macroeconomic factors and eight bank specific factors affecting the bank’s credit risk, in which there might be more factors affecting the credit risk that are not in the focus of this study. The researcher suggested that the further research should also study.

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## Appendix

### Summaries of the Variables

Variable	Notation	Measurement	Research Support
Independent Variables			
Macroeconomic Factors			
GDP growth rate	CDPGR	Annual percentage growth rate of GDP at market prices based on constant local currency	Warue, (2013); Beck, et al., (2013); Thiagarajan, et al.,(2011); Derbali,(2011); Ali& Daly, (2010).
Lending Interest rate	LIR	Bank rate that usually meets the short-and medium-term financial needs of the private sector	Warue, (2013); Beck, et al., (2013); Washington, (2014).
Exchange rate	EXCH	Official exchange rate	Washington, (2014)
Inflation rate	CPI	Consumer Price Index	Washington, (2014); Ongore & Kusa (2013); Al-wesabi & Ahmad, (2013)
Bank-specific Factors			
Bank size	LNTA	Natural logarithm of total assets	Warue, (2013); Al-wesabi & Ahmad, (2013)
Age of bank	AGE	Total amounts period from bank's establishment year until year 2013	Stephanou & Mendoza, (2005)
Return on Assets	ROA	Net Income/Total Assets	Pestova & Mamonov, (2012)
Return on Equity	ROE	Net Income/Total Equity	Shingjergji, (2013); Pestova & Mamonov, (2012);
Net Interest Margin	NIM	Net Interest and Dividend Income/Total	Pestova & Mamonov, (2012)

		Earning Assets	
Efficiency ratio	EFR	Operating expense/operating income	Vatansever & Hepsen, (2013); Pestova & Mamonov (2012)
Capital Adequacy Ratio	CAR	(Tier 1 Capital + Tier 2 Capital)/Risk Based Assets	Vatansever & Hepsen, (2013); Ongore & Kusa (2013); Shingjergji (2013)
Dependent Variables			
Credit Risk Indicators			
Non-performing Loans Ratio	NPL_TL	Non-performing Loans/Total Loans	Beck, et al., (2013); Warue, (2013); Ongore and Kusa (2013); Al-wesabi & Ahmad (2013)
Risk-weighted Assets	RWA_TA	Risk-weighted Assets/Total Assets	Zribi & Boujelbene, (2011); Thomson, (1989); Lesle & Avramova, (2012); Al-wesabi & Ahmad, (2013)

### Descriptive Statistics for Chinese Commercial Banks (Year 2007-2014)

Variables	Obs.	Minimum	Maximum	Mean	Std. Dev.
GDPGR	112	7.40	14.20	9.5000	2.06899
LIR	112	5.30	7.50	6.0125	.69127
EXCH	112	6.14	7.61	6.6588	.45923
INF	112	-.70	5.90	3.2500	2.00710
AGE	112	10.00	106.00	37.0000	29.46123
LNTA	112	11.23	16.84	14.8167	1.19588
ROA	112	.13	1.49	1.1082	.23947
ROE	112	3.80	111.61	20.7656	9.50119
NIM	112	1.95	4.18	2.7103	.37177
EFR	112	23.12	46.49	34.7130	4.81237
CAR	112	5.77	21.00	11.7939	1.97574
RWA_TA	112	47.28	72.91	59.2756	6.47739
NPL_TL	112	.36	23.57	1.4266	2.26497

### Compare Means for Chinese Commercial Banks (Year 2007-2009 and Year 2010-2014)

Variables	Obs.		Minimum		Maximum		Mean		Std. Dev.	
	Year 07-09	Year 10-14	Year 07-09	Year 10-14	Year 07-09	Year 10-14	Year 07-09	Year 10-14	Year 07-09	Year 10-14
GDPGR	42	70	9.20	7.40	14.20	10.60	11.0000	8.6000	2.29613	1.24993
LIR	42	70	5.30	5.60	7.50	6.60	6.0333	6.0000	1.04966	.33708
EXCH	42	70	6.83	6.14	7.61	6.77	7.1300	6.3760	.34709	.22671
INF	42	70	-.70	2.00	5.90	5.40	3.3333	3.2000	2.92213	1.18322
AGE	42	70	10.00	13.00	101.00	106.00	34.5000	38.5000	29.60574	29.48532
LNTA	42	70	11.23	12.47	16.28	16.84	14.3126	15.1191	1.24616	1.06321
ROA	42	70	.13	.64	1.49	1.47	.9843	1.1826	.28603	.16937
ROE	42	70	3.80	14.42	111.61	26.65	21.6250	20.2500	15.20736	2.66167
NIM	42	70	1.95	2.07	4.18	3.48	2.8174	2.6460	.47054	.28215
EFR	42	70	29.84	23.12	46.49	43.41	37.5060	33.0373	4.17254	4.39472
CAR	42	70	5.77	9.88	21.00	16.20	11.2533	12.1183	2.63634	1.36570
RWA_TA	42	70	47.28	47.40	72.91	72.31	55.8836	61.3109	5.83366	6.00566
NPL_TL	42	70	.36	.38	23.57	2.03	2.2814	.9137	3.54237	.29126

### Independent Sample T-test Results for Chinese Commercial Banks

	Period	N	Mean	Std. Deviation	t	Sig.
RWA_TA	2007-2009	42	55.8836	5.83366	-4.680	0.000
	2010-2014	70	61.3109	6.00566	-4.714	0.000
NPL_TL	2007-2009	42	2.2814	3.54237	3.222	0.002
	2010-2014	70	0.9137	0.29126	2.497	0.017

**Descriptive Statistics for Thai Commercial Banks (Year 2007-2014)**

Variables	N	Minimum	Maximum	Mean	Std. Dev.
GDPGR	88	-2.30	7.80	2.9000	3.20535
LIR	88	5.90	7.10	6.7250	.46020
EXCH	88	30.49	34.52	32.3238	1.48911
INF	88	-.80	5.50	2.6375	1.70005
AGE	88	2.00	110.00	46.3182	29.06574
LNTA	88	10.40	14.83	13.2530	1.17125
ROA	88	-6.40	3.26	1.1399	1.01242
ROE	88	-95.60	277.45	15.6043	32.62023
NIM	88	.76	5.73	3.2283	.84573
EFR	88	32.73	152.50	53.4428	14.71837
CAR	88	1.48	24.81	14.9749	2.60039
RWA_TA	88	32.95	92.95	66.7614	12.92440
NPL_TL	88	1.14	16.10	4.4203	3.24664

**Table 16 Comparing Means for Thai Commercial Banks (Year 2007-2009 and Year 2010-2014)**

Variables	N		Minimum		Maximum		Mean		Std. Dev.	
	Year 07-09	Year 10-14	Year 07-09	Year 10-14	Year 07-09	Year 10-14	Year 07-09	Year 10-14	Year 07-09	Year 10-14
GDPGR	33	55	-2.30	.10	5.00	7.80	1.7333	3.6000	3.07608	3.10078
LIR	33	55	6.00	5.90	7.10	7.10	6.7000	6.7400	.50436	.43572
EXCH	33	55	33.31	30.49	34.52	32.48	34.0400	31.2940	.53279	.72407
INF	33	55	-.80	1.90	5.50	3.80	2.3000	2.8400	2.61283	.70674
AGE	33	55	2.00	5.00	105.00	110.00	43.8182	47.8182	29.26757	29.10968
LNTA	33	55	10.40	11.04	14.39	14.83	12.9179	13.4540	1.21275	1.10852
ROA	33	55	-6.40	.20	3.26	2.20	.9497	1.2540	1.52826	.48162
ROE	33	55	-95.60	2.20	277.45	91.80	17.2555	14.6136	51.53153	11.74971
NIM	33	55	.76	1.71	5.73	5.00	3.3618	3.1482	1.01617	.72321
EFR	33	55	32.73	35.84	152.50	75.83	59.5442	49.7820	19.79631	8.96563
CAR	33	55	1.48	12.41	19.80	24.81	14.0739	15.5155	3.37287	1.83281
RWA_TA	33	55	36.93	32.95	92.95	90.00	65.7945	67.3415	13.48234	12.66841
NPL_TL	33	55	1.14	1.20	16.10	8.30	6.5294	3.1549	4.25728	1.37569

### Independent Sample T-test Results for Thai commercial banks

	Period	N	Mean	Std. Deviation	t	Sig.
RWA_TA	2007-2009	33	65.7945	13.48234	-0.541	0.590
	2010-2014	55	67.3415	12.66841	-0.533	0.596
NPL_TL	2007-2009	33	6.5294	4.25728	5.441	0.000
	2010-2014	55	3.1549	1.37569	4.417	0.000

### T-test Results for RWA\_TA (Year 2007-2014)

	Group	N	Mean	Std. Deviation	t	Sig.
RWA_TA	C	112	59.2756	6.47739	-5.338	0.000
	T	88	66.7614	12.92440	-4.965	0.000

### T-test Results for NPL\_TL (Year 2007-2014)

	Group	N	Mean	Std. Deviation	t	Sig.
NPL_TL	C	112	1.4266	2.26497	-7.670	0.000
	T	88	4.4203	3.24664	-7.357	0.000

Table 20 Correlation Analyses for Chinese Commercial Banks (Year 2007-2014)

	RWA_TA	NPL_TL	GDPGR	LIR	EXCH	INF	AGE	LNTA	ROA	ROE	NIM	EFR	CAR	DUMMY
RWA_TA	1.000													
NPL_TL	-.267**	1.000												
GDPGR	-.399**	.362**	1.000											
LIR	-.109	.271**	.689**	1.000										
EXCH	-.476**	.367**	.940**	.464**	1.000									
INF	-.149	.411**	.411**	.456**	.313**	1.000								
AGE	-.024	-.065	-.065	-.021	-.074	-.025	1.000							
LNTA	.081	-.314**	-.314**	-.107	-.361**	-.127	.576**	1.000						
ROA	.170	-.319**	-.319**	-.022	-.394**	.025	.139	.378**	1.000					
ROE	-.220*	.190*	.190*	.190*	.163	.089	-.019	0.81	.110	1.000				
NIM	0.115	.275**	.275**	.246**	.290**	.543**	-.306**	-.453**	.215*	.050	1.000			
EFR	-.190*	.338**	.338**	-.016	.435**	-.061	-.272**	-.462**	-.514**	-.083	.145	1.000		
CAR	-.101	-.084	-.084	.065	-.142	.085	-.286**	.131	.564**	-.184	.262**	-.312**	1.000	
DUMMY	.407**	-.294**	-.564**	-.023	-.798**	-.032	.066	.328**	.403**	-.070	-.224*	-.452**	.213*	1.000

\*. Correlation is significant at 5% level.

\*\* . Correlation is significant at 1% level.

**Table 21 Correlation Analyses for Thai Commercial Banks (Year 2007-2014)**

	RWA_TA	NPL_TL	GDPGR	LIR	EXCH	INF	AGE	LNTA	ROA	ROE	NIM	EFR	CAR	DUMMY
RWA_TA	1.000													
NPL_TL	.017	1.000												
GDPGR	.047	.028	1.000											
LIR	-.013	.012	.094	1.000										
EXCH	-.042	.495**	-.233*	-.189	1.000									
INF	.026	-.032	.435**	.442**	-.365**	1.000								
AGE	-.068	.028	-.006	.010	-.056	-.009	1.000							
LNTA	-.007	.009	.000	.064	-.197	-.002	.689**	1.000						
ROA	.146	-.316**	.015	-.008	-.152	.048	.225*	.075	1.000					
ROE	-.130	.078	.019	.073	.026	.042	-.061	-.034	.537**	1.000				
NIM	.031	-.021	-.005	-.153	.110	.025	.243*	.015	.276**	-.200	1.000			
EFR	-.046	.419**	.025	-.027	.312**	-.006	-.266*	-.215*	-.855**	-.462**	-.111	1.000		
CAR	-.082	-.062	-.029	-.130	-.208	-.096	.291**	.185	-.090	-.546**	.245*	.028	1.000	
DUMMY	.058	-.506**	.284**	.042	-.898**	.155	.067	.223*	.146	-.039	-.123	-.323**	.270*	1.000

\*. Correlation is significant at 5% level.

\*\*. Correlation is significant at 1% level.

### Regression Results for All Commercial Banks

	Dependent Variables			
	Chinese Commercial Banks		Thai Commercial Banks	
	RWA_TA (Model 1)	NPL_TL (Model 2)	RWA_TA (Model 3)	NPL_TL (Model 4)
<b>Independent Variables</b>				
<b>Constant</b>				
Coefficient	52.29479	-7.529830	27.7131	-31.7934
P-value	(0.0165)**	(0.0064)***	(0.6956)	(0.0537)*
<b>GDPGR</b>				
Coefficient	-0.81362	-0.023273	-0.08851	0.06931
P-value	(0.0357)**	(0.7628)	(0.7943)	(0.3751)
<b>LIR</b>				
Coefficient	1.387924	0.366290	1.470857	0.414583
P-value	(0.0942)*	(0.0398)**	(0.5103)	(0.4192)
<b>INF</b>				
Coefficient	-1.06077	-0.072317	-0.52219	-0.26587
P-value	(0.0001)***	(0.1680)	(0.4338)	(0.0853)*
<b>AGE</b>				
Coefficient	0.052622	0.009347	-2.01697	-1.4653
P-value	(0.2914)	(0.0520)*	(0.115)	(0.0000)**
<b>LNTA</b>				
Coefficient	-0.46508	0.405371	8.331494	7.319017
P-value	(0.7039)	(0.0030)***	(0.1721)	(0.0000)**
<b>ROA</b>				
Coefficient	1.844876	-4.314693	2.817401	0.025744
P-value	(0.5065)	(0.0000)***	(0.2293)	(0.9616)
<b>ROE</b>				

Coefficient	-0.07983	0.200388	-0.10725	0.015265
P-value	(0.0437)**	(0.0000)***	(0.0267)**	(0.1645)
<b>NIM</b>				
Coefficient	8.023646	1.288324	2.710564	-0.23625
P-value	(0.0002)***	(0.0009)***	(0.1357)	(0.5682)
<b>EFR</b>				
Coefficient	-0.06012	-0.055116	0.07121	0.031467
P-value	(0.6323)	(0.0169)**	(0.6319)	(0.3576)
<b>CAR</b>				
Coefficient	-0.70189	0.028876	-0.27295	0.307646
P-value	(0.008)***	(0.5889)	(0.5593)	(0.0053)***
<b>DUMMY</b>				
Coefficient	4.781988	-0.704736	6.063504	-1.59382
P-value	(0.0002)***	(0.0043)***	(0.2059)	(0.1482)
<b>Observation</b>	112	112	88	88
<b>R squared</b>	0.819378	0.880444	0.764410	0.803316
<b>Hausman Test (Prob)</b>	1.000 (>0.05)	1.000 (>0.05)		
<b>F statistic (Prob)</b>	0.0000	0.0000	0.0000	0.0000
<b>FE Model</b>			✓	✓
<b>RE Model</b>	✓	✓		

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