Journal of Applied Finance & Banking, Vol. x, No. xx, 202x, xxx-xxx
ISSN: 1792-6580 (print version), 1792-6599(online)
Scientific Press International Limited

The Effect of Monetary Policies on the Profitability of Commercial Banks in China

Shirong Zhao[1], **Shin-Ichi Nishiyama**[2]

Abstract

This paper analyzes monetary policies' effect on the profitability of commercial banks in China during the period 2007-2012 while controlling for a wide array of bank-specific, industry-specific, and macroeconomic determinants. The empirical results show that all kinds of interest rates and reserve requirement ratio have a negative effect on profitability. We also find that the impact of money supply on profitability is positive; however, the effect is not apparent for foreign exchange reserve and exchange rate. There is no significant difference between the two channels of monetary policies-interest rates and reserve requirement ratio. Finally, the impact of monetary policies on profitability is much more substantial for the banks with larger interest income share.

JEL classification numbers: G21, G32, E52
Keywords: profitability, monetary policy, Chinese banks

[1] Department of Clinical Pharmacy and Translational Science,
University of Tennessee Health Science Center. e-mail: szhao33@uthsc.edu
[2] Graduate School of Economics, Kobe University, Hyogo, Japan.

Article Info: *Received:* ….. .., 2020. *Revised:* ….. .., *2020.*
Published online: ….. .., 2020.

1. Introduction

Over the past four decades, China has implemented a series of market transformation reforms and asset privatization, and now is the second-largest economy in the world with the largest banking sector in terms of total assets. After the recent global financial crisis in 2008, the commercial banks in China have accomplished a large number of profits, even though the financial market in China is not free and there are many bank regulations, which mainly come from the central bank of China-the People's Bank of China (PBC). Most banks are either government-owned or holding in China, making monetary policies highly influential on asset prices and profits. Until now, bank loans are an essential financing source for Chinese firms, as China's financial market is not well developed. Therefore, as one crucial variable that can affect the banks' lending in China, monetary policies have attracted more and more researchers' attention.

As we all know, in China, the central bank and commercial banks sometimes have to take orders implicitly from the government to increase or decrease the money supply, the loan supply, and the interest rate, serving the need for economic growth. Considering this direct relationship between the central bank and the commercial banks in China, the monetary policies are critical factors affecting commercial banks' profits. This paper examines whether the monetary policies affect Chinese banks' profitability during the disruptive period 2007-2012. On the one hand, during this period, the global financial crisis struck the Chinese economy. On the other hand, in order to keep the GDP growth at least 8 percent, the Chinese government began carrying out a plan named "four trillion Renminbi plan". This stimulus mainly encourages banks to lend to state-owned companies to make large investments on education, transportation, house and so on. As the bank sector is the backbone of the Chinese economy and plays an influential intermediary role in the development of economy, the commercial banks in China got many privileges such as low interests and low reserve requirement ratio. While there have been many studies examining the profitability of the banking sector in developed and developing countries, empirical works in China are relatively scarce, not even speaking of monetary policies' effects on commercial banks' profitability in China.

In this paper, we have three hypotheses:

1, the monetary policies have an important influence on the profitability of commercial banks in China.

2, The interest rates and reserve requirement ratio are different channels influencing profitability.

3, The impact of the monetary policies on profitability depends on the characteristics of Chinese banks (such as the asset size, capital, loans, and interest income share).

The remaining part is organized as follows: Section 2 introduces the banking system and monetary policies in China. Section 3 is the literature review, and Section 4 introduces the data and model. Section 5 presents our findings. Finally,

Section 6 concludes.

2. Background on the Chinese Banking Industry

2.1 The Banking System

China's reforms started in 1978, shifting from a planned economy to a market economy. Before 1978, The PBC was the only bank in China. Therefore the banking system in China was very simple. It not only performs as the central bank, such as deciding the monetary and foreign exchange policy but also acts as the commercial banks. However, from September 1984, PBC began to change its role as the central bank, solely responsible for the conduct of monetary and foreign exchange policy. From 1994's financial reforms, China's banking system became diversified as SOCBs (state-owned commercial banks) were encouraged to operate independently from the government. After this reform, more and more banks were established.

The banking system in China consists of PBC, SOCBs, other commercial banks, city commercial banks, and rural commercial banks), policy lending banks, credit cooperatives, and foreign banks (see Table 1). The five SOCBs are the five largest commercial banks in China. Although they have already finished IPOs, to some extent, they are still under government control since the government still holds the largest shares of SOCBs. On the other hand, they have become more market-oriented than before.

The other commercial banks include joint-stock commercial banks (JSCBs), city commercial banks, and rural commercial banks. There are twelve JSCBs, which are still partially owned directly or indirectly by the government but can operate among the whole nation. Having absorbed management experience from foreign banks, these JSCBs are more competitive and market-oriented than SOCBs. Although there are many city commercial banks and rural commercial banks, their size is relatively small compared to SOCBs and JSCBs. For instance, some city commercial banks can only operate in a specific area.

The policy lending banks were established in 1994 to implement state policy in industrial development, import and export trading, and agriculture development. As for credit cooperatives, they are playing an essential role in complementing banking institutions. Finally, there are many foreign banks in China, but they can be engaged in a certain banking business due to China's government control.

Table 1: Classification of Banks in China

Type	**Name**	**Share of assets**	**Total assets**
		in 2012 (%)	（billion）
Central Bank	The People's Bank of China(PRC)	-	-
Policy Lending Banks	China Development Bank	-	-
	Agricultural Development Bank of China	-	-
	The Export-Import Bank of China	-	-
State-owned Commercial Banks (SOCBs)	Industrial and Commercial Bank of China	4.30	17,542.22
	China Construction Bank	3.43	13,972.83

	Agricultural Bank of China	3.25	13,244.34
	Bank of China	3.11	12,680.62
	Bank of Communications	1.29	5,273.38
Joint-stock Commercial Banks (JSCBs)	China Merchants Bank	0.84	3,408.22
	Industrial Bank	0.80	3,250.98
	China Minsheng Bank	0.79	3,212.00
	Shanghai Pudong Development Bank	0.77	3,145.71
	China CITI Bank	0.73	2,959.94
	China Everbright Bank	0.56	2,279.30
	Ping An Bank	0.39	1,606.54
	Huaxia Bank	0.36	1,488.86
	Guangdong Development Bank	0.29	1,168.15
	Evergrowing Bank	0.15	617.95
	Bohai Bank	0.12	472.10
	China Zheshang Bank	0.10	393.84
City commercial Banks (CCBs)	More than 100 banks	-	-
Rural Commercial Banks	Some	-	-
Postal Savings Bank	1	-	-
Credit Cooperatives	Rural and urban cooperatives	-	-
Foreign Banks	Branched, sub-branches, and subsidiaries	-	-

Note: the shares of assets in 2012 are calculated only for the commercial banks in China, based on their current assets in 2012. There are 126 commercial banks in 2012.

2.2 Monetary Policies in China

As we described before, the PBC began to take its responsibility as China's central bank from September 1984. In 1997, the Monetary Policy Committee (MPC) of the PBC was established. The MPC's responsibility is to analyze the current international and domestic economic and financial situation, then decide monetary policies. However, most of the MPC members are from the government's administration offices, such as the PBC, the Ministry of Finance (MOF), China Securities Regulatory Commission (CSRC), and so on. Therefore, the PBC is still not independent but influenced by the government. The PBC usually uses the reserve required ratio, the official discount rate, the interbank interest rate, the deposit interest rate, the lending interest rate, and the exchange rate to implement monetary policies.

Rediscount lending and open market operations started in 1994 and 1998, respectively. And for now, the PBC is still trying to liberalize the interest rates. For instance, in 2005, the exchange rate reform was enforced, and the exchange rate began to float, and from 2013, the lending interest rate is liberalized.

What most interests us is that, during the global financial crisis, the PBC uses the reserve requirement ratio irregularly. Table 2 shows the adjustment history of the reserve requirement ratio. We can see that from 2007, the PBC has adjusted the

reserve requirement ratio for 34 times, and this is quite strange and different from the cases of the U.S., Europe, and Japan. We know that the reserve requirement ratio is a crucial monetary policy instrument deciding the money supply. But the PBC uses it so frequently during this period. This gives us an excellent chance to evaluate the effect of reserve requirement ratio and its difference from other instruments, especially the interest rates. Usually, we consider the reserve requirement ratio and the interest rate are two different channels of monetary policies. However, we need to test this hypothesis.

Since some commercial banks have already finished IPOs, and the laws are becoming more and more complete, the PBC's mandatory power is becoming weaker. However, the government still owns the largest share of these commercial banks. The government also appoints the presidents of the commercial banks. The PBC is still having much influence on commercial banks.

Table 2: The History of Reserve Requirement Ratio's Adjustment

Times	Date	Before Adjusting	After Adjusting	Amplitude Adjust（Percentage）
45	2012.05.18	(Big) 20.50%	20.00%	-0.5
		(Middle and Small) 17.00%	16.50%	-0.5
44	2012.02.24	(Big)21.00%	20.50%	-0.5
		(Middle and Small)17.50%	17.00%	-0.5
43	2011.12.05	(Big)21.50%	21.00%	-0.5
		(Middle and Small)18.00%	17.50%	-0.5
42	2011.06.20	(Big)21.00%	21.50%	0.5
		(Middle and Small)17.50%	18.00%	0.5
41	2011.05.18	(Big)20.50%	21.00%	0.5
		(Middle and Small)17.00%	17.50%	0.5
40	2011.04.21	(Big)20.00%	20.50%	0.5
		(Middle and Small)16.50%	17.00%	0.5
39	2011.03.25	(Big)19.50%	20.00%	0.5
		(Middle and Small)16.00%	16.50%	0.5
38	2011.02.24	(Big)19.00%	19.50%	0.5
		(Middle and Small)15.50%	16.00%	0.5
37	2011.01.20	(Big)18.50%	19.00%	0.5
		(Middle and Small)15.00%	15.50%	0.5
36	2010.12.20	(Big)18.00%	18.50%	0.5
		(Middle and Small)14.50%	15.00%	0.5
35	2010.11.29	(Big)17.50%	18.00%	0.5
		(Middle and Small)14.00%	14.50%	0.5
34	2010.11.16	(Big)17.00%	17.50%	0.5
		(Middle and Small)13.50%	14.00%	0.5
33	2010.05.10	(Big)16.50%	17.00%	0.5
		(Middle and Small)13.50%	Unchanged	—
32	2010.02.25	(Big)16.00%	16.50%	0.5
		(Middle and Small)13.50%	Unchanged	—
31	2010.01.18	(Big)15.50%	16.00%	0.5
		(Middle and Small)13.50%	Unchanged	—
30	2008.12.25	(Big)16.00%	15.50%	-0.5
		(Middle and Small)14.00%	13.50%	-0.5
29	2008.12.05	(Big)17.00%	16.00%	-1
		(Middle and Small)16.00%	14.00%	-2
28	2008.10.15	(Big)17.50%	17.00%	-0.5
		(Middle and Small)16.50%	16.00%	-0.5
27	2008.09.25	(Big)17.50%	17.50%	—

		(Middle and Small)17.50%	16.50%	-1
26	2008.06.07	16.50%	17.50%	1
25	2008.05.20	16%	16.50%	0.5
24	2008.04.25	15.50%	16%	0.5
23	2008.03.18	15%	15.50%	0.5
22	2008.01.25	14.50%	15%	0.5
21	2007.12.25	13.50%	14.50%	1
20	2007.11.26	13%	13.50%	0.5
19	2007.10.25	12.50%	13%	0.5
18	2007.09.25	12%	12.50%	0.5
17	2007.08.15	11.50%	12%	0.5
16	2007.06.05	11%	11.50%	0.5
15	2007.05.15	10.50%	11%	0.5
14	2007.04.16	10%	10.50%	0.5
13	2007.02.25	9.50%	10%	0.5
12	2007.01.15	9%	9.50%	0.5
11	2006.11.15	8.50%	9%	0.5
10	2006.08.15	8%	8.50%	0.5
9	2006.07.05	7.50%	8%	0.5
8	2004.04.25	7%	7.50%	0.5
7	2003.09.21	6%	7%	1
6	1999.11.21	8%	6%	-2
5	1998.03.21	13%	8%	-5
4	1988.09	12%	13%	1
3	1987	10%	12%	2
2	1985	10% for all kinds of deposits	—	—
1	1984	for company's deposits: 20%, for rural deposits: 25%, for saving deposits: 40%	—	—

3. Literature Review

In the literature, banks' profitability is usually studied from bank-specific, industry-specific, and macroeconomic perspectives. The bank-specific determinants are usually bank size (the natural logarithm of total assets), capital structure (equity/assets), credit risk (loan loss provisions/total loans), and operating expenses (operating expenses/total assets). The industry-specific determinants are usually ownership (state-owned or not) and concentration. And macroeconomic determinants are usually GDP (the natural logarithm of GDP) and inflation rate. Depending on the stated objective of the research direction, different independent variables can also be incorporated into the models.

Although for now, there is numerous literature focused on the profitability of the banks, they are mainly researched on the developed countries, such as the U.S. banking system (Philip Bourke, 1986; Berger 1995; Hirtle and Stiroh, 2007; Kanasa, Vasiliou, and Eriotis, 2012), EU banking system (Pasiouras and Kosmidou, 2007), Greek banking system (Athanasoglou et al., 2008), Korean banking system (Sufian, 2011).

For instance, Sufian (2011) investigates the Korean banking sector's profitability during the period from 1992 to 2000. They find that banks with lower liquidity levels and higher income source diversification tend to exhibit higher profitability. In contrast, banks with higher credit risk and overhead costs always have a negative effect on profitability.

By contrast, fewer studies are focused on bank performance in developing

economies. Sufian and Habibullah (2008) examine Bangladeshi commercial banks' performance during the period from 1997 to 2004. They find that credit risk and loan intensity positively impact profitability, while non-interest income negatively impacts. Moreover, they find that size has a negative impact on return on equity. They also find that the inflation rate has a negative effect on profitability.

Recently, more literature has evaluated bank performance in China's economy. Alicia García-Herrero, Sergio Gavilá, Daniel Santabárbara (2009) analyzes the factors that cause China's banks' low profitability from 1997 to 2004. They find that banks with better capitalization, a higher share of deposits, and less concentration tend to exhibit more profitability. Moreover, they suggest that joint-stock commercial banks that are more market-oriented tend to be more profitable than those wholly state-owned. This result clearly shows the influence of government intervention in explaining banks' performance in China.

Gunji and Yuan (2010) investigate the impact of monetary policies on bank lending from 1985 to 2007. The monetary policies are measured by interest rates, such as deposit interest rate, lending interest rate, and interbank rate. They find that the impact of monetary policies on lending is weaker for larger banks. They also find that banks' responses to monetary policies do not necessarily vary according to their capital. They also find that profitable banks tend to be less sensitive to monetary policies.

Zhang and Daly (2013) examine the effects of bank-specific and macroeconomic factors on commercial banks' performance in China during the period from 2004 to 2010. They find that banks with higher credit risk and higher expense preference tend to exhibit higher profitability. Moreover, they find that China's financial service grows along with economic growth.

However, until now, there is no study focused on the effect of monetary policies on performance in the China banking sector. Based on China's unique case, it is deserved researching, and this becomes the main aim of this paper.

4. Data and Methodology

The bank-specific determinants are collected from the balance sheet statements and income statements of commercial banks in China over the period 2007-2012 that are available in the database of Wind Information Co. Ltd. The industry-specific and macroeconomic variables are also from the same database. Monetary policy variables are contained within macroeconomic variables. Due to the limit of the database, the total number of commercial banks in the sample is 154 over the full period 2007-2012. However, data are not available for some banks in some years; therefore, our data type is unbalanced panel data. In total we have 749 observations.

4.1 Performance Measure

In the literature, bank profitability, typically measured by the return on assets (ROA) and/or the return on equity (ROE). ROA measures a bank's ability to generate profits from the bank's total assets, while ROE measures return to shareholder's equity. Moreover, ROE is the product of ROA and financial leverage ratio (asset/equity). ROE ignores the risks associated with financial leverage. Therefore,

ROA emerges as a critical value for evaluating bank profitability. In this paper, we will use ROA as the primary dependent variable and use ROE as a robustness check.

4.2 Determinants of Bank Profitability

4.2.1 Bank-specific Determinants

Following Fadzlan Sufian (2011) and Athanasoglou, et al. (2008), the bank-specific variables are LNTA (log of the total assets), EQASS (book value of stockholders' equity divided by the total assets), LNDEPO (log of the total deposits), LOASS (book value of the loans divided by total assets), MEASS (management expenses divided by the total assets), GRPASS (general risk preparation divided by the total assets), IIASS (interest income divided by the total assets).

The LNTA variable is a measure of the bank size. This variable is used to test the relationship between size and profitability. If there is an economy of scale, that is to say, the larger the size, the less the cost, and the higher the profit, the coefficient of LNTA will be expected to be positive. And this is usually the case for developed countries' banks. However, for China's case, the coefficient of LNTA is expected to be negative, because in China, the "big five" banks are controlled to some extent by the government, and they can rely on monopoly to earn considerable amounts of profit, but they are not efficient from the view of the market.

The EQASS is included to examine the relationship between bank capitalization and profitability. Its impact on profitability seems to be ambiguous. The lower capitalization means the bank could have fully used financial leverage to earn more profits with higher risks. However, an increase in the capital means that the bank has a sound financial status and good profitability. All in all, the relationship between the capitalization and profitability seems to be not clear.

The LNDEPO is a useful proxy variable for network embeddedness. The banks with more massive deposits can earn more profit because lager deposits mean a larger bank size so that the bank can get a cheaper source of funds. For smaller banks they need to purchase funds from the inter-bank market, which means more costly.

The LOASS variable is a measure of liquidity. The ratio measures the percentage of the assets tied up in loans. We expect the coefficient is positive. If a bank has a reasonable loan term, it can get more interest income from the loan. On the other hand, it also means the bank owns the lower level of liquid assets from which the bank cannot get higher income.

The MEASS variable is included in the regression to represent the total amount of wages and salaries. It is reasonable to expect this variable has a negative relationship with profitability since reduced expenses will increase the bank's efficiency and, therefore, raise the bank's profit.

The GRPASS variable is included in the regression as a proxy of credit risk. Miller and Noulas (1997) suggest that increased exposure to credit risk is generally associated with decreased firm profitability, and therefore, we expect the relationship between GRPASS and profitability is negative.

The IIASS variable is included in the regression to measure how the banks

rely on traditional activities to get the profits. In recent years, more and more banks are trying to generate income from the "off-balance-sheet" business, such as service fees, guarantee fees, etc. Therefore, it is essential to include this variable in the regression to test if this is true for China's case. We expect the variable to exhibit a positive relationship with bank profitability because most of the banks in China are protected by the government to rely more on the interest income rather than non-interest income.

4.2.2 Industry-specific Determinants

The industry-specific determinants included in the regression models are CR5 (the asset share of the five largest banks). The CR5 variable is a measure of the concentration ratio. It is entered into the regression to examine the SCP hypothesis. The relationship between the CR5 and profitability is expected to be negative.

4.2.3 Macroeconomic Determinants

The macroeconomic variables included in the regression models are LNGDP (the natural log of GDP), INFL (the inflation rate), DEPORATE (the deposit interest rate of five years for the banks, measured as the average number for 12 months in a year), INTERRATE (the interbank interest rate of 30 days for the banks, measured as the average number for 12 months in a year), LENRATE (the lending interest rate between three years and five years for the banks, measured as the average number for 12 months in a year), RRRATE (the reserve's interest rate paid by the central bank to the commercial banks, measured as the average number for 12 months in a year), RRR (the reserve requirement ratio for the banks), LNM2 (the natural log of M2), LNRES (the natural log of the reserve), EXC (the exchange rate, measured as how much RMB one dollar equals to).

The LNGDP is included in the regression to reflect that GDP can influence many factors related to the supply and demand for deposits and loans. We expect the relationship between the LNGDP and profitability is positive because higher GDP means the economy is operating smoothly so that the banks can earn more profits.

The INFL is included in the regression to measure the relationship between inflation and profitability. Perry (1992) suggests that the inflation rate's effect on profitability depends on whether the inflation rate is anticipated or unanticipated. In the anticipated case, the banks can quickly adjust interest rates to increase revenues faster than costs. In this case, the inflation rate positively impacts bank profitability. However, in the unanticipated case, the interest rates are adjusted slowly, and banks' costs will increase faster than banks' revenues, having a negative effect on the banks' profitability. In sum, it seems that the relationship between inflation and profitability is ambiguous.

The DEPORATE is included in the regression to measure the relationship between the deposit interest rate and profitability. We expect the relationship is ambiguous. If the deposit interest rate is high, we expect that the bank will attract more money being deposited so that the bank can lend more money to persons and companies, which will surely increase the bank's profitability. However, on the

other hand, the bank needs to pay more money to borrowers who deposit money in the bank, which will surely decrease the bank's profitability. Therefore, the relationship between the deposit interest rate and profitability seems to be not clear.

The INTERRATE is included in the regression to measure the relationship between the interbank interest rate and profitability. We expect the relationship is negative. If the interbank interest rate is high, it means that money is entirely of lack in the interbank market. The banks that need money have to pay more interest rates to raise money, which will surely decrease the banks' profitability. Therefore, the relationship between the interbank interest rate and profitability seems to be negative.

The LENRATE is included in the regression to measure the relationship between the lending interest rate and profitability. We expect the relationship is ambiguous. If the lending interest rate is high, we can expect that the bank will earn more interest rate money from the loans lent to persons and companies, which will surely increase the bank's profitability. However, on the other hand, the bank will not attract more borrowers because the cost of raising money becomes higher. The private persons and companies will turn to other cheaper banks for raising money, which will surely decrease the bank's profitability. Therefore, the relationship between the lending interest rate and profitability seems to be not clear.

The RRRATE is included in the regression to measure the relationship between the interest rate paid on reserves and profitability. As we all know, the RRRATE is paid by the central bank to the commercial banks for their deposit reserve, which is undoubtedly lower than the lending interest rate. We expect the relationship is positive. If the RRRATE is high, we can expect that the bank will be paid more interest rate money by the central bank, which will surely increase the bank's profitability. Therefore, the relationship between the interest rate paid on reserves and profitability seems to be positive.

The RRR variable is included in the regression to measure the relationship between the reserve requirement ratio and profitability. This is special for China because RRR is a typical instrumental used by PBC to control the money supply. Almost every year, there is a change of RRR for every bank. Therefore it is interesting to test the relationship between the reserve requirement ratio and profitability. We expect the relationship is negative because the higher RRR means that the bank has to deposit more money in China's central bank, which means the bank has to control its scale of loans.

The LNM2 is included in the regression to measure the relationship between money supply and profitability. If the money supply increases, persons and companies will deposit more money in the banks so that the banks will have more money to make loans to persons and companies. Therefore, we expect the coefficient of LNM2 is positive.

The LNRES is included in the regression to measure the relationship between the reserve of China and profitability. As we all know, in recent years, the reserve of China increases very quickly because the net export for China is enormous, and persons and companies have to exchange RMB with foreign currency. That means

China's central bank has to sell more RMB in the market, which directly increases M2. Therefore, we expect the relationship between the LNRES and profitability is positive.

The EXC variable is included in the regression to measure the relationship between the exchange and profitability. We expect the relationship is ambiguous. If the value of RMB is higher, on the one hand, this will attract more foreign investment, more foreign currencies will be exchanged to RMB, which will increase the money supply for the whole bank sector, but on the other hand, persons and companies will get less RMB using the same foreign currencies, which will decrease the money supply to some extent. Therefore, the relationship between the exchange and profitability seems to be not clear.

Since DEPORATE, INTERRATE, LENRATE, RRRATE, and RRR are directly controlled by the Central Bank of China; in this paper, we name these five variables as direct monetary policies variables (simplified as DIRECMON) and name LNM2, LNRES, and EXC as indirect monetary policies variables (simplified as INDIRECMON).

Table 3: Description of the Variables Used in the Regression Models

Variable	Description	Expected Relationship with Profitability
Dependent		
ROA	The return on average total assets of the bank	NA
ROE	The return on average total shareholders' equity of the bank	NA
Independent		
	Bank Specific Determinants	
LNTA	The natural logarithm of the book value of the total assets of the bank	-
EQASS	Book value of stockholders' equity as a fraction of the total assets of the bank	+/-
LNDEPO	Calculated as the natural logarithm of total deposits of the bank	+
LOASS	Calculated as total loans divided by total assets. It's a measure of liquidity	+
MEASS	Calculated as management expenses divided by the total assets	-
GRPASS	Calculated as general risk preparation divided by the total assets. It's a proxy of the credit risk of the bank	-
IIASS	Calculated as interest income divided by the total assets. It's a measure of diversification of the bank	+
	Industry Specific Determinants	
CR5	The five largest banks' asset concentration ratio	+
	Macroeconomic Determinants	
LNGDP	The natural logarithm of gross domestic product	+
INFL	The annual inflation rate	+/-

	Monetary Policy Determinants	
DEPORATE	The average standard deposit interest rate (three months)	+/-
INTERRATE	The interbank market interest rate (30 days)	-
LENRATE	The standard lending rate (less than and equal to 6 months)	+/-
RRRATE	The interest rates paid on required reserves	+
RRR	The standard reserve requirement ratio for the banks in China	-
LNM2	The natural logarithm of one kind of money supply (M2)	+
LNRES	The natural logarithm of the total amount of the foreign exchange reserve of the central bank of China	+
EXC	The exchange rate of RMB. Calculated as how much RMB one dollar equals to	+/-

Table 4: Summary Statistics of Dependent and Independent Variables

Variables	Mean	Minimum	Maximum	Std. Dev.
ROA	0.0109	-0.0201	0.0434	0.0047
ROE	0.1703	-0.0602	0.4841	0.0710
LNTA	6.8482	4.4755	9.2441	0.7675
EQASS	0.0701	-0.1371	0.9836	0.0483
LNDEPO	6.7317	1.7548	9.1349	0.7728
LOASS	0.4788	0.0000	0.7619	0.0999
MEASS	0.0105	0.0004	0.0301	0.0033
GRPASS	0.0062	0.0000	0.0264	0.0042
IIASS	0.0453	0.0002	0.4028	0.0208
OWN	0.0441	0.0000	1.0000	0.2055
CR5	0.6762	0.6300	0.7400	0.0360
LNGDP	5.5975	5.4246	5.7151	0.0942
INFL	0.0336	-0.0070	0.0590	0.0226
DEPORATE	2.4148	1.7100	3.0450	0.5423
INTERRATE	3.3565	1.3908	5.0850	1.2594
LENRATE	5.5593	4.8600	6.2250	0.5256
RRRATE	1.6731	1.6200	1.8900	0.1017
RRR	16.0173	11.6250	20.8333	2.4547
LNM2	5.8400	5.6057	5.9886	0.1233
LNRES	4.4180	4.1842	4.5200	0.1068
EXC	6.6375	6.2900	7.3676	0.3284

Table 3 lists the variables used in the regression model. We also include the explanation of the variables and the expected effects of these determinants on the banks' profitability in China according to the literature and experience.
Table 4 presents the summary statistics of the dependent and independent variables.

Figure 1 presents the trend graph of the recent year's direct monetary policy variables.

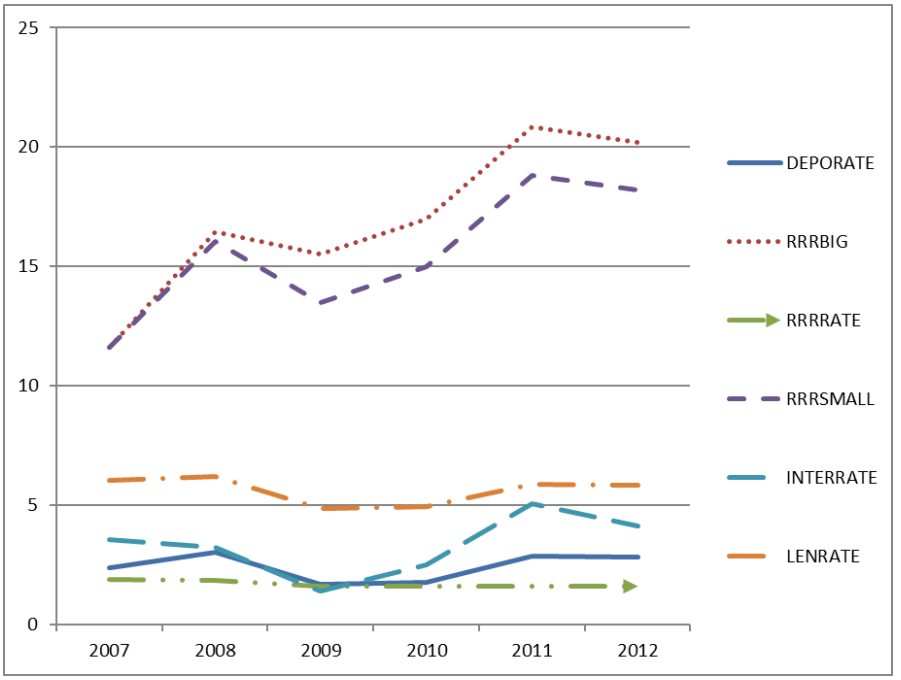

Figure 1: Trend of the Monetary Policy Variables

4.3 Econometric Specification

4.3.1 The Baseline Model

Following Sufian (2011) and Athanasoglou, et al (2008), a linear regression model is applied to evaluate the relationship between profitability and various determinants:

$$y_{it} = c + \sum_{b=1}^{B} \beta_b X_{it}^b + \sum_{u=1}^{U} \beta_u X_{it}^u + \sum_{m=1}^{M} \beta_m X_{it}^m + \varepsilon_{it} \qquad (1)$$

Where y_{it} is the profitability of bank i at time t, with i = 1, 2, … , N; t= 1, 2,…, T; c is a constant term; X_{it}^b represents the bank-specific determinants of a bank; X_{it}^u represents the industry-specific determinants of a bank; X_{it}^m represents the macroeconomic determinants of a bank; ε_{it} is a normally distributed random variable disturbance term.

Bank profits usually show a tendency to persist over time. This reflects the obstacles to the market competition. Therefore, we include a lagged dependent variable into Equation (1)

$$y_{it} = c + \delta y_{i,t-1} + \sum_{b=1}^{B} \beta_b X_{it}^b + \sum_{u=1}^{U} \beta_u X_{it}^u + \sum_{m=1}^{M} \beta_m X_{it}^m + \varepsilon_{it}\,, \qquad (2)$$

where $y_{i,t-1}$ is one year lagged bank profitability and δ measures the speed of adjustment to equilibrium profitability. δ is expected to be in the range [0,1], if the value of δ close to 0 means that the bank sector in China is fairly competitive, while the value of δ close to 1 means that the bank sector in China is not competitive at all. If the value of δ is between 0 and 1, that means the profitability of the banks in China can persist.

Table 5: Correlation Matrix for the Bank-Specific Variables

Independent Variables	IIASS	GRPASS	MEASS	LOASS	LNDEPO	EQASS	LNTA
IIASS	1						
	—						
GRPASS	0.117526	1					
	(0.002)	—					
MEASS	0.324976	0.091487	1				
	(0)	(0.017)	—				
LOASS	0.182352	0.175604	0.368932	1			
	(0)	(0)	(0)	—			
LNDEPO	-0.162855	0.094434	-0.29458	-0.02345	1		
	(0)	(0.014)	(0)	(0.542)	—		
EQASS	0.010157	0.022668	0.232403	-0.11272	-0.38355	1	
	(0.792)	(0.555)	(0)	(0.003)	(0)	—	
LNTA	-0.183586	0.090998	-0.30148	-0.08607	0.987892	-0.28149	1
	(0)	(0.018)	(0)	(0.025)	(0)	(0)	—

Notes: Values in parenthesis are probability of the correlation.

Table 5 provides information on the degree of correlation among the bank-specific variables used in the regression analysis. Table 5 shows that in general the correlations are not strong, indicating that multicollinearity problems are not severe.

4.3.2 The FE Model

We apply the panel least square method model of the fixed effects model (FE Model). The choice to use the FE model rather than a pooled model and a random effects model (RE) has been tested using the Hausman test.

The following three models are used to test the three Hypothesis we proposed earlier. Model 1 is to test whether the monetary policies have an important influence on the commercial banks' profitability in China. Model 2 is to test whether the interest rates and reserve requirement ratio are different channels influencing profitability. Model 3 is to test whether the impact of the monetary policies on profitability depends on the characteristics of Chinese banks (such as the size, capital, loans, and interest income share).

Model 1

To test the impact of the monetary policies on the profitability of the commercial banks in China, by entering the variables described in Table 1 into the Equation (2), we can get the standard FE model as follows:

$$\begin{aligned} ROA_{it} = c &+ \delta ROA_{i,t-1} + \alpha_1 LNTA_{it} + \alpha_2 EQASS_{it} + \alpha_3 LNDEPO_{it} \\ &+ \alpha_4 LOASS_{it} + \alpha_5 MEASS_{it} + \alpha_6 GRPASS_{it} \\ &+ \alpha_7 IIASS_{it} + \alpha_8 CR5_t \\ &+ \alpha_9 LNGDP_t + \alpha_{10} INFL_t + \alpha_{11} MONP_t \\ &+ \varepsilon_{it} \qquad\qquad \varepsilon_{it} = \nu_i + u_{it} \end{aligned} \tag{3}$$

Where $MONP$ variable means only one of monetary policies variable such as the indirect monetary variables LNM2, LNRES, EXC, and the direct monetary variables DEPORATE, LENRATE, INTERRATE, RRRATE and RRR. Since these Monetary policies variables' correlations are so high, seeing Table 6, we have to enter them one by one to examine their effects on the profitability of the banks in China.

Model 2

Moreover, we need to examine the combining effect of the basic monetary policies on commercial banks' profitability in China. In China, the basic monetary policies are various interest rates and reserve requirement ratio, which are very different from the U.S. and European situations. In China, the central bank has the power to and also usually adjust the reserve requirement ratio; however, there is almost no change for the U.S. and Europe.

To test whether the interest channel and reserve requirement channel is different or not, we enter every kind of interest rates and reserve requirement ratio together into the regression simultaneous. We can get the standard model as follows:

$$\begin{aligned} ROA_{it} = c &+ \delta ROA_{i,t-1} + \alpha_1 LNTA_{it} + \alpha_2 EQASS_{it} + \alpha_3 LNDEPO_{it} \\ &+ \alpha_4 LOASS_{it} + \alpha_5 MEASS_{it} + \alpha_6 GRPASS_{it} \\ &+ \alpha_7 IIASS_{it} + \alpha_8 CR5_t \\ &+ \alpha_9 LNGDP_t + \alpha_{10} INFL_t + \alpha_{11} DRR_t + \alpha_{12} INTEREST_t \\ &+ \varepsilon_{it} \qquad\qquad \varepsilon_{it} = \nu_i + u_{it} \end{aligned} \tag{4}$$

Where INTEREST variable means only one kind of interest rates such as DEPORATE (deposit interest rate), INTERRATE (interbank interest rate), LENRATE (lending interest rate), RRRATE (interest rate paid on required reserve), and RRR means the reserve requirement ratio.

Model 3

At last, to test whether the impact of the monetary policies on profitability depends on the characteristics of Chinese banks (such as the asset size, capital, loans and income sources) , we add interactions of the monetary policies variables and the characteristic variables into the regression. We get the standard model as follows:

$$\begin{aligned} ROA_{it} = c &+ \delta ROA_{i,t-1} + \alpha_1 LNTA_{it} + \alpha_2 EQASS_{it} + \alpha_3 LNDEPO_{it} \\ &+ \alpha_4 LOASS_{it} + \alpha_5 MEASS_{it} + \alpha_6 GRPASS_{it} \\ &+ \alpha_7 IIASS_{it} + \alpha_8 CR5_t \\ &+ \alpha_9 LNGDP_t + \alpha_{10} INFL_t + \alpha_{11} INTEREST_t \\ &+ \alpha_{12} DIRECTMON_t * LNTA_{it} + \alpha_{13} DIRECTMON_t * EQASS_{it} \\ &+ \alpha_{14} DIRECTMON_t * LOASS_{it} + \alpha_{15} DIRECTMON_t * IIASS_{it} \\ &+ \varepsilon_{it} \qquad\qquad \varepsilon_{it} = v_i + u_{it} \end{aligned} \tag{5}$$

Where DIRECTMON variable means only one kind of direct monetary policies variables such as DEPORATE (deposit interest rate), INTERRATE (interbank interest rate), LENRATE (lending interest rate), RRRATE (interest rate paid on required reserve), and RRR.

Table 6: Correlation Matrix for the Monetary Policy Variables

Independent Variables	DEPORATE	DRRBIG	DRRRATE	DRRSMALL	INTERRATE	LENRATE
DEPORATE	1					
	—					
RRRBIG	0.40857	1				
	(0.421)	—				
RRRATE	0.330236	-0.71414	1			
	(0.523)	(0.111)	—			
RRRSMALL	0.605518	0.972391	-0.53119	1		
	(0.203)	(0.001)	(0.278)	—		
INTERRATE	0.794058	0.50766	0.056922	0.638618	1	
	(0.059)	(0.304)	(0.915)	(0.172)	—	
LENRATE	0.916713	0.02911	0.650366	0.254027	0.724626	1
	(0.010)	(0.956)	(0.162)	(0.627)	(0.103)	—

Notes: Values in parenthesis are probability of the correlation. RRRBIG is the reserve requirement ratio for the big banks, RRRSMALL is the reserve requirement ratio for the small banks.

Table 6 provides information on the correlation between the monetary policies independent variables used in the regression. Table 6 shows that the correlations among the macroeconomic variables are relatively high. To address this problem, we need to enter the monetary policies variables into the regression one by one to see their effect on the profitability of the banks in China.

5. Empirical Findings

5.1 The Effect of Monetary policies on Bank Profitability

5.1.1 Determinants of Bank Profitability: FE Analysis (ROA)

Table 7 shows results regarding the relationship between the profitability and the explanatory variables. We use Model 1 to do the analysis. We can see that the models perform well, with most variables being stable across the various regressions. Since the F-statistics for all the models are highly significant at the 1 percent level, these models have high explanatory power on explaining the commercial banks' profitability in China.

Table 7: Regression Results for Testing Hypothesis 1

	(1)	(2)	(3)	(4)	(5)	(6)
CONSTANT	-0.010379	0.029401*	-0.042176	-0.365964	-0.799881***	-0.351694*
	(-1.436)	(1.681)	(-0.350)	(-1.604)	(-2.624)	(-1.699)
ROA(-1)	0.062096	0.055332	0.070256*	0.087709**	0.066329*	0.08897**
	(-1.521)	(1.361)	(1.751)	(2.120)	(1.666)	(2.156)
Bank Specific						
LNTA	-0.004353	-0.006134	-0.006019	-0.005674	-0.007883**	-0.005735
	(-1.153)	(-1.606)	(-1.613)	(-1.521)	(-2.093)	(-1.540)
EQASS	0.029408***	0.024913***	0.021713***	0.020288**	0.020949***	0.020133**
	(3.603)	(2.999)	(2.664)	(2.481)	(2.589)	(2.464)
LNDEPO	0.006567*	0.004833	0.006174	0.005424	0.00804**	0.005451
	(1.660)	(1.211)	(1.579)	(1.382)	(2.041)	(1.392)
LOASS	-0.001642	-0.002073	0.002241	0.001474	0.001846	0.001392
	(-0.520)	(-0.659)	(0.697)	(0.455)	(0.578)	(0.430)
MEASS	0.073434	0.037813	-0.022583	-0.014678	-0.023972	-0.014089
	(0.812)	(0.416)	(-0.251)	(-0.163)	(-0.269)	(-0.157)
GRPASS	0.240864***	0.216076***	0.259589***	0.269909***	0.252456***	0.270423***
	(3.365)	(3.009)	(3.668)	(3.808)	(3.594)	(3.820)
IIASS	0.061222***	0.061425***	0.030498*	0.038082**	0.019452	0.038183**
	(4.249)	(4.291)	(1.943)	(2.336)	(1.208)	(2.357)
Industry Specific						
CR5		-0.022021**	0.002788	0.11246	0.245067**	0.110015
		(-2.494)	(0.066)	(1.443)	(2.478)	(1.531)
Macroeconomic						
LNGDP			0.007851	0.053261*	0.114633***	0.051612*
			(0.479)	(1.678)	(2.682)	(1.786)
INFL			0.023903***	0.02619***	0.031642***	0.02675***
			(3.835)	(4.113)	(4.643)	(4.177)
DEPORATE				-0.000916*		

				(-1.670)		
INTERRATE					-0.001013***	
					(-2.702)	
LENRATE						-0.000971*
						(-1.836)
RRRATE						
RRR						
LNM2						
LNRES						
EXC						
R^2	0.802	0.805	0.815	0.816	0.818	0.817
Adjusted R^2	0.725	0.729	0.741	0.743	0.746	0.743
Durbin-Watson Statistic	2.080	2.060	2.003	2.039	1.979	2.042
F-statistic	10.479	10.589	11.095	11.092	11.247	11.112
No. of Observations	550	550	550	550	550	550

Note: Values in parenthesis are t-statisitics; ***, **, and * denote significance at 1, 5, and 10% levels, respectively.

Table 7: Regression Results for Testing Hypothesis 1 (Continued)

	(7)	**(8)**	**(9)**	**(10)**	**(11)**
CONSTANT	-0.126972	-0.931447***	-0.263016*	-0.085668	-0.805241
	(-1.007)	(-2.612)	(-1.818)	(-0.661)	(-0.512)
ROA(-1)	0.090896**	0.08026**	0.089764**	0.080273*	0.065473
	(2.217)	(2.007)	(2.219)	(1.930)	(1.584)
Bank Specific					
LNTA	-0.005964	-0.006916*	-0.006573*	-0.005647	-0.006342*
	(-1.606)	(-1.859)	(-1.772)	(-1.504)	(-1.671)
EQASS	0.019814**	0.019506**	0.01955**	0.021**	0.021965***
	(2.429)	(2.398)	(2.406)	(2.564)	(2.687)
LNDEPO	0.005622	0.00657*	0.006229	0.005578	0.006596
	(1.442)	(1.692)	(1.606)	(1.407)	(1.646)
LOASS	0.001222	0.001942	0.001086	0.001856	0.002379
	(0.378)	(0.608)	(0.337)	(0.572)	(0.736)
MEASS	-0.013158	-0.026631	-0.013542	-0.018084	-0.0247
	(-0.147)	(-0.299)	(-0.152)	(-0.201)	(-0.274)
GRPASS	0.270842***	0.263388***	0.268592***	0.26598***	0.256147***

	(3.836)	(3.750)	(3.822)	(3.740)	(3.598)
IIASS	0.037622**	0.028729*	0.034062**	0.03576**	0.027227
	(2.359)	(1.843)	(2.180)	(2.138)	(1.593)
Industry Specific					
CR5	0.043419	0.283468**	0.092956*	0.020567	0.178068
	(0.950)	(2.488)	(1.742)	(0.444)	(0.491)
Macroeconomic					
LNGDP	0.020389	0.135931***	0.007927	0.008328	0.109333
	(1.180)	(2.663)	(0.487)	(0.508)	(0.522)
INFL	0.028238***	0.03095***	0.030801***	0.024412***	0.02433***
	(4.341)	(4.596)	(4.606)	(3.900)	(3.862)
DEPORATE					
INTERRATE					
LENRATE					
RRRATE	-0.005871**				
	(-2.207)				
RRR		-0.000869***			
		(-2.647)			
LNM2			0.02787***		
			(2.707)		
LNRES				0.006792	
				(0.912)	
EXC					0.011485
					(0.486)
R^2	0.817	0.818	0.818	0.815	0.815
Adjusted R^2	0.744	0.745	0.746	0.741	0.741
Durbin-Watson Statistic	2.046	2.019	2.043	2.025	1.990
F-statistic	11.164	11.237	11.248	11.025	11.004
No. of Observations	550	550	550	550	550

Note: Values in parenthesis are t-statisitics; ***, **, and * denote significance at 1, 5, and 10% levels, respectively.

The coefficients of ROA(-1) are always positive, showing that banks' profitability persists over time. However, the coefficients are not large, implying that the Chinese banking sector does not have large departures from a perfectly competitive market.

The relationship between bank size (LNTA) and the profitability is negative, supporting our expectation. However, it is not the usual case. First, the larger bank seems to be related to higher market power to get the inputs at a lower price. Second,

there should be the economy of the scale, which means that a larger bank can efficiently decrease the average cost by allocating fixed costs over a higher amount of services. But this case is not suitable for China, since the “big five” banks have always been responsible for promoting the development of China's economy by carrying out the mandatory orders from the central bank or even from the government. Therefore the “big five” banks are not market-oriented, and the coefficient of the LNTA must be negative. However, in all the 11 regressions, there are just four regressions in which the coefficients are statistically significant.

The impact of capitalization (EQASS) on the commercial banks' profitability in China is positive and statistically significant at 5% level in all the models. This result provides support for the argument that well-capitalized banks face a lower risk of going bankrupt, which is very important for the banks in the developing countries since this shows a good financial status to the customers that the well-capitalized banks can withstand the financial crises and can face the unstable macroeconomic conditions in China.

The effect of network embeddedness (LNDEPO) on the commercial banks' profitability in China is positive, which also supports our expectations. This result shows that larger banks with higher network embeddedness can absolutely attract more deposits and therefore tend to have higher loan terms, making it have a higher level of profitability. Unfortunately, the significance of the coefficient is not enough.

As for the effect of bank liquidity, most regressions show that the coefficient of LOASS is positively but not significantly related to profitability, which supports our expectation. As we all know, the higher the LOASS, the lower the liquidity. The results show that, in China, the bank with less liquidity seems to have higher profitability levels. This may be evidence for the efficient market hypothesis exiting in China since the loan market is an excellent indicator to testify whether the bank sector is efficient or not. We can expect that more efficient bank seems to have higher ability to control the production costs and find higher-quality customers, enabling them to offer more loans for the privates and companies and ultimately gain larger market share and higher profitability.

Most regressions show that the effects of management expenses (MEASS) on the commercial banks' profitability in China is negative but not significant. The results show that the increase in management expenses will reduce the profitability of commercial banks in China. Cost management is needed to increase the level of profitability. We recommend that the commercial banks in China reduce unnecessary welfare for their employers, which is too common and costly for these banks.

Surprisingly enough, the impact of GRPASS on the profitability is positive and statistically significant at the 1 percent level in all models. This result suggests that banks with higher general risk preparation exhibit higher profitability. The commercial banks in China usually take a certain percentage from the net profits as the general risk preparation. Then from the view of accounting, general risk preparation belongs to the owner’s equity. The higher the general risk preparation, the higher the equity ratio, the higher the profitability. Then it makes sense that the

coefficient of GRP is significantly positive.

As for the impact of interest income, IIASS exerts a positive and significant effect on bank profitability. We find that Chinese commercial banks' profitability would increase by about 0.03 percent for a 1 percent increase in interest income ratio. The result implies that the commercial banks in China derive a high proportion of income from the traditional activities-interest sources rather than the "off-balance-sheet" business. This shows that the banks' development in China is now at a relatively lower level compared to those in developed countries. It also means that even though the commercial banks in China earn outstanding profitability, it is superficial. Commercial banks in China need to build their business from the "off-balance sheet" activities.

The impact of concentration (CR5) is positive but not always statistically significant in all regression models. This means that the higher the concentration ratio is, the more profitable the banks are. This empirical finding supports the Structure-Conduct-Performance (SCP) hypothesis, which states that firms in highly concentrated markets tend to collude and earn more profits.

The impact of GDP on ROA is positive but not always statistically significant in all regression models. This means that higher GDP growth will increase commercial banks' profitability in China, which is suitable for our expectations. A good economy indeed fosters the banking sector.

We can see that the impact of inflation (INFL) on the commercial banks' profitability in China is positive and statistically significant at the 1 percent level in all regression models. This implies that during 2007-2012, the inflation rate levels were anticipated by the banks in China, and they can adjust the deposit interest rates and lending interest rates and hence earn higher profits.

As for the impact of all kinds of interest rates on the profitability of the commercial banks in China, the deposit interest rate (DEPORATE), the interbank interest rate (INTERRATE), the lending interest rate (LENRATE), the interest rate paid on reserve (RRRATE) all exert a negative and statistically significant impact on at the 10 percent level or better in all regression models The outcome shows that all kinds of interest rates of the commercial banks in China are mainly protected and controlled by the central bank of China. The empirical findings clearly show that there does exit financial repression in the banking sector of China. Financial repression has been exceptionally useful as an instrument to serve the government's objectives. And the commercial banks in China exert massive profitability from the financial repression.

The impact of the reserve requirement ratio (RRR) on the commercial banks' profitability in China is negative and significant, which is in our expectation. The empirical findings show that for sure, if the central bank increases the reserve requirement ratio, the commercial banks have to deposit more money in the central bank, which means that this will directly decrease the money supply and the money that the commercial banks can use to loan to private persons and companies.

As expected, the effect of the indirect monetary policy variables-the money supply (LNM2) and the foreign exchange reserve (LNRES) is positive, but for

LNRES, the coefficient is not statistically significant. The total amounts of M2 and RES are all the monetary policies' outcomes, and therefore, in this paper, we call them the indirect monetary policy variables. For instance, if M2 is higher, it means that the central bank in China has already increased the money supply by using some policy instruments, such as decreasing the interbank interest rates or reserve requirement ratio.

The impact of the exchange rate (EXC) is positive but not statistically significant at all. Therefore, we couldn't say that the fluctuation of the exchange rate does affect the profitability of commercial banks in China.

Finally, we need to check which determinant has the most powerful influence on commercial banks' profitability in China. We check this by standardizing all the variables and recalculate their coefficients. For the independent variables, their coefficients multiplied their standard deviations and were divided by the dependent variable's standard deviations equal to their new coefficients. The new coefficients are listed in Table 8. The coefficients' meaning is that if the independent variable increases by one standard deviation, how many standard deviations the dependent variable will increase or decrease by.

Table 8: Regression Results for Testing Hypothesis 1 (Supplement Facts)

	(1)	(2)	(3)	(4)	(5)	(6)
ROA(-1)	0.062096	0.055332	0.070256	0.087709	0.066329	0.088970
Bank Specific						
LNTA	-0.708764	-0.998750	-0.980026	-0.923852	-1.283526	-0.933784
EQASS	0.301279	0.255229	0.222445	0.207847	0.214618	0.206259
LNDEPO	1.076608	0.792332	1.012178	0.889222	1.318094	0.893648
LOASS	-0.034783	-0.043913	0.047472	0.031224	0.039104	0.029487
MEASS	0.051952	0.026751	-0.015977	-0.010384	-0.016959	-0.009968
GRPASS	0.213119	0.191186	0.229687	0.238819	0.223376	0.239273
IIASS	0.269888	0.270783	0.134446	0.167879	0.085751	0.168324
Industry Specific						
CR5		-0.168273	0.021304	0.859362	1.872678	0.840679
Macroeconomic						
LNGDP			0.156823	1.063887	2.289791	1.030948
INFL			0.114799	0.125783	0.151968	0.128473
DEPORATE				-0.105378		
INTERRATE					-0.270645	
LENRATE						-0.108269
DRRRATE						
DRR						
LNM2						
LNRES						
EXC						

	(7)	(8)	(9)	(10)	(11)
ROA(-1)	0.090896	0.080260	0.089764	0.080273	0.065473
Bank Specific					
LNTA	-0.971071	-1.126077	-1.070229	-0.919456	-1.032617
EQASS	0.202991	0.199835	0.200286	0.215141	0.225027
LNDEPO	0.921682	1.077100	1.021195	0.914469	1.081362
LOASS	0.025886	0.041138	0.023005	0.039316	0.050395
MEASS	-0.009309	-0.018841	-0.009581	-0.012794	-0.017474
GRPASS	0.239644	0.233049	0.237653	0.235342	0.226642
IIASS	0.165851	0.126648	0.150157	0.157643	0.120026
Industry Specific					
CR5	0.331786	2.166119	0.710323	0.157163	1.360705
Macroeconomic					
LNGDP	0.407270	2.715217	0.158342	0.166352	2.183923
INFL	0.135619	0.148644	0.147928	0.117244	0.116850
DEPORATE					
INTERRATE					
LENRATE					
RRRATE	-0.126625				
RRR		-0.452517			
LNM2			0.728729		
LNRES				0.153932	
EXC					0.800203

From the outcome, we can see that the coefficients for LNTA, LNDEPO are the two largest. We can say that the total assets and the commercial banks' deposit term have the most potent influence on the profitability of the commercial banks. The outcome shows that if LNTA or LNDEPO increases by one deviation, ROA will also increase by one deviation. We can easily understand this, since the larger the commercial banks are, the more powerful they are, the more profit they earn.

5.1.2 The Impact of Two Channels of Monetary policies on the Profitability

Now, we need to check our second hypothesis - whether there is a big difference between the two different channels of monetary policy variables-all kinds of interest rates and reserve requirement ratio. We enter the cross-term of one type of interest rates and reserve requirement ratio into the regression one by one to see their combining effect on the profitability of the commercial banks (Use Model 2). The outcome is listed in Table 9.

Table 9: Regression Results for Testing Hypothesis 2

	(1)	(2)	(3)	(4)
CONSTANT	-0.930485***	-0.962161***	-0.962161***	-0.919103**
	(-2.605)	(-2.688)	(-2.688)	(-2.539)
ROA(-1)	0.08172**	0.073112*	0.073112*	0.082339**
	(1.979)	(1.801)	(1.801)	(1.995)
Bank Specific				
LNTA	-0.006843*	-0.007609**	-0.007609**	-0.006817*
	(-1.821)	(-2.013)	(-2.013)	(-1.816)
EQASS	0.019442**	0.020102**	0.020102**	0.019419**
	(2.384)	(2.466)	(2.466)	(2.382)
LNDEPO	0.006474	0.007504*	0.007504*	0.006439
	(1.642)	(1.881)	(1.881)	(1.635)
LOASS	0.001872	0.001847	0.001847	0.001838
	(0.579)	(0.578)	(0.578)	(0.568)
MEASS	-0.025627	-0.025531	-0.025531	-0.025133
	(-0.286)	(-0.286)	(-0.286)	(-0.280)
GRPASS	0.264336***	0.257278***	0.257278***	0.26472***
	(3.742)	(3.650)	(3.650)	(3.748)
IIASS	0.029608*	0.022927	0.022927	0.029962*
	(1.767)	(1.382)	(1.382)	(1.793)
Industry Specific				
CR5	0.28396**	0.295043**	0.295043**	0.280959**
	(2.488)	(2.577)	(2.577)	(2.449)
Macroeconomic				
LNGDP	0.135661***	0.138941***	0.138941***	0.134033**
	(2.652)	(2.717)	(2.717)	(2.581)
INFL	0.030913***	0.032237***	0.032237***	0.03091***
	(4.581)	(4.705)	(4.705)	(4.582)
DEPORATE	-0.0000976			
	(-0.144)			
INTERRATE		-0.000609		
		(-1.020)		
LENRATE			-0.000609	
			(-1.020)	
RRRATE				-0.000141
				(-0.207)
RRR	-0.000835**	-0.000454	-0.000454	-0.000813*
	(-2.049)	(-0.866)	(-0.866)	(-1.907)
LNM2				
LNRES				

EXC				
R^2	0.818	0.819	0.819	0.818
Adjusted R^2	0.745	0.745	0.745	0.745
Durbin-Watson Statistic	2.023	2.000	2.000	2.025
F-statistic	11.138	11.174	11.174	11.139
No. of Observations	550	550	550	550

Note: Values in parenthesis are t-statisitics; ***, **, and * denote significance at 1, 5, and 10% levels, respectively.

The outcomes show that compared to Model 1, the coefficients for most dependent variables remain unchanged, and the significance also remains unchanged. And we can see the result is robust enough.

From the outcomes, we can see that the coefficients for any interest rates and reserve requirement ratio are all negative but not statistically significant. Since the cross-terms' coefficients are not significant, we cannot say there is a big difference between the interest rates and reserve requirement ratio. Therefore, we need to refuse the second hypothesis.

5.1.3 Whether the Impact of the Monetary Policies on Profitability Depends on the Characteristics of Chinese banks

Now, we need to check whether the effect of the monetary policies on profitability depends on the commercial banks' characteristics in China. Using Model 3, we enter the cross-terms of one direct monetary policy variables (DEPORATE, INTERRATE, LENRATE, RRRATE, RRR) and the characteristics (LNTA, EQASS, LOASS, IIASS) at one time into the regressions. And the outcomes are listed in Table 10.

The outcomes show that compared to Model 1, the coefficients for most dependent variables remain unchanged, and the significance also remains unchanged. For instance, in all the five regressions, the coefficients for LNTA and MEASS remain negative. And for other dependent variables, most of the coefficients remain positive. Therefore, we can see these five models are relatively stable.

The coefficients of the cross-terms of DIREC and LNTA are negative but not significant at all. It means that the impact of monetary policies on profitability is more substantial for larger banks, just as we expect. In China, larger banks are mostly controlled by the government, and their profitability is mainly influenced by the central banks' monetary policies. These outcomes explain why the “big five” banks can earn more profitability than other commercial banks in the global financial crisis, when the monetary policies give more advantages to the “big five” banks than other banks, such as decreasing the reserve requirement ratio and allow the high loan term for the commercial banks.

The coefficients of the cross-terms of DIREC and EQASS are positive but

not significant at all. It means the impact of monetary policies on profitability is weaker for sounder capital, just as we expect. The banks with sounder capital are expected to be safer and can effectively adjust to reply to monetary policy changes.

The coefficients of the cross-terms of DIREC and LOASS are negative but not significant at all. It means the impact of monetary policies on profitability is more vital for banks with higher liquidity, just as we expect. For instance, If the central bank enforces tighter monetary policies, the banks with larger loan terms cannot adjust their loans at once and have to undertake the risks and even losses coming from the changes of the monetary policies. Therefore, the effect of monetary policies on profitability is stronger for banks with higher liquidity.

The coefficients of the cross-terms of DIREC and IIASS are negative and significant. It means the impact of monetary policies on profitability is stronger for the banks with a larger share of IIASS, just as we expect. As we showed before, the income from interest rates explains most of the commercial banks' profitability. Therefore, the banks with a larger share of IIASS are more sensitive to the monetary policies' changes, especially the changes in all kinds of interest rates.

Table 10: Regression Results for Testing Hypothesis 3

	(1)	(2)	(3)	(4)	(5)
CONSTANT	-0.22749	-0.60854**	-0.21806	-0.14593	-0.90801**
	(-0.991)	(-1.963)	(-1.041)	(-1.112)	(-2.544)
ROA(-1)	0.080275*	0.037779	0.080283*	0.0966**	0.061426
	(1.951)	(0.925)	(1.950)	(2.355)	(1.534)
Bank Specific					
LNTA	-0.00719*	-0.00919**	-0.00635	-0.0068	-0.007721*
	(-1.896)	(-2.422)	(-1.570)	(-1.327)	(-1.958)
EQASS	0.002128	0.018858	-0.03226	-0.15416	0.008752
	(0.086)	(1.227)	(-0.559)	(-1.238)	(0.200)
LNDEPO	0.007701**	0.00878**	0.007697**	0.006046	0.007821**
	(1.963)	(2.248)	(1.963)	(1.534)	(2.025)
LOASS	0.005772	0.001541	0.014268	0.091145**	-0.001103
	(0.794)	(0.319)	(0.872)	(2.053)	(-0.089)
MEASS	-0.03406	-0.06433	-0.03508	-0.05322	-0.058531
	(-0.379)	(-0.713)	(-0.390)	(-0.583)	(-0.648)
GRPASS	0.249245***	0.212413***	0.254086***	0.24573***	0.216974***
	(3.555)	(3.013)	(3.625)	(3.431)	(3.090)
IIASS	0.224395***	0.13773***	0.417986***	-0.2724	0.416959***
	(3.363)	(3.662)	(2.848)	(-1.041)	(4.009)
Industry Specific					
CR5	0.061456	0.177483*	0.055876	0.045635	0.262445**
	(0.783)	(1.761)	(0.767)	(1.001)	(2.296)
Macroeconomic					

LNGDP	0.032204	0.08858**	0.028627	0.020374	0.131414**
	(1.008)	(2.042)	(0.976)	(1.181)	(2.576)
INFL	0.023269***	0.023486***	0.024827***	0.029612***	0.022447***
	(3.480)	(3.210)	(3.710)	(4.532)	(3.148)
DIRECRMON	0.004187*	0.001175	0.004151	-0.0006	0.000541
	(1.681)	(1.052)	(1.550)	(-0.028)	(0.720)
DIRECTMON*LNTA	-0.00024	-0.00014	-0.00021	0.001007	-0.000092
	(-0.913)	(-1.220)	(-0.760)	(0.524)	(-1.250)
DIRECTMON*EQASS	0.00787	0.001893	0.009538	0.104122	0.000951
	(0.827)	(0.465)	(0.929)	(1.402)	(0.358)
DIRECTMON*LOASS	-0.00154	-0.00014	-0.00217	-0.05369**	0.000133
	(-0.595)	(-0.137)	(-0.758)	(-2.023)	(0.184)
DIRECTMON*IIASS	-0.06811***	-0.02474***	-0.06585***	0.192298	-0.021387***
	(-2.921)	(-3.480)	(-2.621)	(1.199)	(-3.788)
R^2	0.823	0.825	0.823	0.820	0.826
Adjusted R^2	0.750	0.752	0.749	0.746	0.754
Durbin-Watson Statistic	2.010	1.941	2.002	2.076	2.007
F-statistic	11.223	11.342	11.196	10.997	11.424
No. of Observations	550	550	550	550	550

Note: (1) is when DIRECTMON equals to DEPORATE; (2) is when DIRECTMON equals to INTERRATE; (3) is when DIRECTMON equals to LENRATE; (4) is when DIRECTMON equals to RRRATE; (5) is when DIRECTMON equals to RRR; Values in parenthesis are t-statistics, ; ***,**, and * denote significance at 1, 5, and 10% levels, respectively.

5.2 Robustness Checks: Alternative Measure of Bank Profitability (ROE)

To check for the robustness of the above results, we use ROE instead of ROA as the dependent variable. The results are listed on Table 11, Table 12 and Table 13.

Table 11: Robustness Checks for Hypothesis 1 (ROE)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
CONSTANT	0.122425	0.918708***	-2.074275	-4.495711	-14.80903***	-4.672751
	(0.979)	(3.014)	(-0.995)	(-1.141)	(-2.790)	(-1.303)
ROE(-1)	0.122329***	0.115679***	0.113616***	0.115848***	0.106428***	0.116155***
	(3.269)	(3.113)	(3.127)	(3.176)	(2.943)	(3.187)
Bank Specific						
LNTA	-0.100116	-0.135987**	-0.134125**	-0.130877**	-0.165256**	-0.130914**
	(-1.524)	(-2.051)	(-2.068)	(-2.012)	(-2.524)	(-2.015)
EQASS	-1.53739***	-1.628168***	-1.672029***	-1.68011***	-1.684648***	-1.68213***
	(-10.848)	(-11.307)	(-11.837)	(-11.850)	(-12.007)	(-11.868)
LNDEPO	0.11376*	0.079082	0.100791	0.094736	0.131586*	0.094166
	(1.648)	(1.138)	(1.480)	(1.380)	(1.918)	(1.374)

LOASS	-0.019267	-0.027858	0.048771	0.043614	0.042941	0.042378
	(-0.349)	(-0.509)	(0.869)	(0.770)	(0.770)	(0.749)
MEASS	1.03525	0.295014	-0.737737	-0.657081	-0.785704	-0.641001
	(0.657)	(0.187)	(-0.472)	(-0.419)	(-0.506)	(-0.409)
GRPASS	2.153687*	1.649231	2.442722**	2.541176**	2.334561*	2.559641**
	(1.735)	(1.327)	(1.989)	(2.055)	(1.914)	(2.072)
IIASS	0.817695***	0.827367***	0.264803	0.315795	0.080301	0.322346
	(3.286)	(3.354)	(0.974)	(1.124)	(0.288)	(1.154)
Industry Specific						
CR5		-0.43872***	0.592885	1.411773	4.664768***	1.491151
		(-2.859)	(0.814)	(1.050)	(2.709)	(1.199)
Macroeconomic						
LNGDP			0.379153	0.718662	2.174363***	0.746385
			(1.337)	(1.312)	(2.922)	(1.492)
INFL			0.348092***	0.362229***	0.479847***	0.368334***
			(3.237)	(3.313)	(4.063)	(3.351)
DEPORATE				-0.006738		
				(-0.724)		
INTERRATE					-0.017046***	
					(-2.606)	
LENRATE						-0.008001
						(-0.891)
RRRATE						
RRR						
LNM2						
LNRES						
EXC						
R^2	0.724	0.729	0.743	0.743	0.747	0.743
Adjusted R^2	0.617	0.624	0.641	0.640	0.646	0.640
Durbin-Watson Statistic	2.153	2.145	2.073	2.083	2.062	2.084
F-statistic	6.784	6.915	7.275	7.223	7.378	7.230
No. of Observations	550	550	550	550	550	550

Table 11: Robustness Checks for Hypothesis 1 (ROE) (Continued)

	(7)	**(8)**	**(9)**	**(10)**	**(11)**
CONSTANT	-2.980731	-15.18679**	-4.822441*	-2.086311	-33.0826

	(-1.355)	(-2.443)	(-1.906)	(-0.923)	(-1.238)
ROE(-1)	0.116476***	0.116251***	0.115438***	0.11367***	0.108365***
	(3.203)	(3.215)	(3.187)	(3.107)	(2.961)
Bank Specific					
LNTA	-0.132371**	-0.146494**	-0.139293**	-0.134016**	-0.148154**
	(-2.042)	(-2.262)	(-2.153)	(-2.049)	(-2.247)
EQASS	-1.686889***	-1.701724***	-1.69325***	-1.672167***	-1.664951***
	(-11.912)	(-12.055)	(-11.990)	(-11.794)	(-11.782)
LNDEPO	0.094347	0.106008	0.100119	0.100628	0.118529*
	(1.383)	(1.564)	(1.475)	(1.455)	(1.700)
LOASS	0.039548	0.044914	0.036071	0.04868	0.053974
	(0.699)	(0.804)	(0.640)	(0.860)	(0.959)
MEASS	-0.609685	-0.771241	-0.591728	-0.736104	-0.862113
	(-0.390)	(-0.496)	(-0.379)	(-0.469)	(-0.550)
GRPASS	2.593248**	2.524083**	2.602178**	2.444791**	2.275578*
	(2.104)	(2.065)	(2.121)	(1.974)	(1.841)
IIASS	0.327792	0.233352	0.298777	0.266066	0.138545
	(1.188)	(0.862)	(1.101)	(0.928)	(0.474)
Industry Specific					
CR5	1.016072	4.731171**	1.70728*	0.597723	7.710819
	(1.272)	(2.381)	(1.831)	(0.740)	(1.252)
Macroeconomic					
LNGDP	0.51261*	2.267435**	0.3905	0.379388	4.502879
	(1.699)	(2.548)	(1.381)	(1.334)	(1.267)
INFL	0.38687***	0.448567***	0.426717***	0.348169***	0.369589***
	(3.467)	(3.866)	(3.716)	(3.230)	(3.389)
DEPORATE					
INTERRATE					
LENRATE					
RRRATE	-0.058301				
	(-1.286)				
RRR		-0.012776**			
		(-2.237)			
LNM2			0.33746*		
			(1.904)		
LNRES				0.001753	
				(0.014)	
EXC					0.467616
					(1.164)
R^2	0.744	0.746	0.745	0.743	0.744

Adjusted R^2	0.641	0.644	0.643	0.640	0.641
Durbin-Watson Statistic	2.088	2.097	2.092	2.073	2.052
F-statistic	7.251	7.334	7.300	7.210	7.244
No. of Observations	550	550	550	550	550

Note: Values in parenthesis are t-statisitics; ***, **, and * denote significance at 1, 5, and 10% levels, respectively.

All the regression models perform reasonably well with most the coefficients staying the same as when ROA is the dependent variable. The coefficients keep almost the same sign and the same order of magnitude as before. Moreover, they remain significant virtually as they were in the baseline regressions.

Table 12: Robustness Checks for Hypothesis 2 (ROE)

	(1)	**(2)**	**(3)**	**(4)**
CONSTANT	-15.32035**	-15.94267**	-15.92838**	-17.97841**
	(-2.462)	(-2.557)	(-2.523)	(-2.194)
ROE(-1)	0.11408***	0.10826***	0.114394***	0.115208***
	(3.142)	(2.959)	(3.152)	(3.178)
Bank Specific				
LNTA	-0.153591**	-0.163179**	-0.152827**	-0.150691**
	(-2.344)	(-2.479)	(-2.334)	(-2.307)
EQASS	-1.698755***	-1.689884***	-1.69921***	-1.700374***
	(-12.022)	(-11.962)	(-12.025)	(-12.032)
LNDEPO	0.114904*	0.127803*	0.113922*	0.111196
	(1.668)	(1.838)	(1.656)	(1.622)
LOASS	0.050474	0.042951	0.050296	0.049459
	(0.895)	(0.769)	(0.891)	(0.874)
MEASS	-0.880995	-0.786062	-0.875975	-0.856474
	(-0.564)	(-0.506)	(-0.560)	(-0.547)
GRPASS	2.419802**	2.372397*	2.428413**	2.454599**
	(1.965)	(1.935)	(1.973)	(1.994)
IIASS	0.161471	0.102917	0.168129	0.187619
	(0.561)	(0.359)	(0.586)	(0.659)
Industry Specific				
CR5	4.704423**	5.013853**	4.887429**	5.530059**
	(2.367)	(2.513)	(2.443)	(2.206)
Macroeconomic				
LNGDP	2.29825**	2.343979***	2.381157***	2.667694**
	(2.578)	(2.632)	(2.629)	(2.273)
INFL	0.455156***	0.48291***	0.453921***	0.450889***
	(3.909)	(4.073)	(3.901)	(3.880)
DEPORATE	0.008489			

	(0.739)			
INTERRATE		-0.014241		
		(-1.370)		
LENRATE			0.007959	
			(0.686)	
RRRATE				0.034926
				(0.523)
RRR	-0.015878**	-0.003146	-0.016017**	-0.016025*
	(-2.240)	(-0.348)	(-2.161)	(-1.899)
LNM2				
LNRES				
EXC				
R^2	0.746	0.747	0.746	0.746
Adjusted R^2	0.644	0.645	0.644	0.644
Durbin-Watson Statistic	2.086	2.071	2.087	2.091
F-statistic	7.283	7.316	7.281	7.276
No. of Observations	550	550	550	550

Note: Values in parenthesis are t-statisitics; ***, **, and * denote significance at 1, 5, and 10% levels, respectively.

It is interesting to note that when we use ROE as the dependent variable, the coefficient of EQASS becomes negative compared to the baseline regressions. It is easily understood. When EQASS becomes larger, it means the share of equity becomes larger, and ROE (return on the total equity) should become smaller.

Table 13: Robustness Checks for Hypothesis 3 (ROE)

	(1)	(2)	(3)	(4)	(5)
CONSTANT	-3.368245	-13.6468**	-3.696017	-2.641542	-15.09114**
	(-0.844)	(-2.499)	(-1.014)	(-1.146)	(-2.392)
ROE(-1)	0.102862***	0.095453***	0.10386***	0.115469***	0.1035***
	(2.813)	(2.610)	(2.840)	(3.142)	(2.839)
Bank Specific					
LNTA	-0.136157**	-0.172793***	-0.114552	-0.159765*	-0.142771**
	(-2.043)	(-2.589)	(-1.612)	(-1.777)	(-2.056)
EQASS	-1.400676***	-1.505071***	-1.104472	-2.992475	-1.078304
	(-3.227)	(-5.554)	(-1.091)	(-1.367)	(-1.395)
LNDEPO	0.116462*	0.135618**	0.115835*	0.101645	0.115303*
	(1.687)	(1.971)	(1.680)	(1.467)	(1.689)
LOASS	0.013587	0.054222	-0.050994	-0.589235	0.070916

	(0.106)	(0.639)	(-0.178)	(-0.754)	(0.324)
MEASS	-0.671948	-1.292964	-0.616296	-0.628199	-1.205814
	(-0.425)	(-0.812)	(-0.390)	(-0.392)	(-0.755)
GRPASS	2.29852*	1.970853	2.384614*	2.704795**	2.072066*
	(1.867)	(1.587)	(1.939)	(2.155)	(1.673)
IIASS	3.441159***	1.037831	7.36468***	6.042952	3.887783**
	(2.921)	(1.578)	(2.851)	(1.317)	(2.115)
Industry Specific					
CR5	0.957713	4.212612**	1.004541	0.987101	4.504142**
	(0.702)	(2.372)	(0.792)	(1.232)	(2.229)
Macroeconomic					
LNGDP	0.52853	2.016705***	0.530175	0.502176*	2.227115**
	(0.951)	(2.639)	(1.038)	(1.657)	(2.470)
INFL	0.285844**	0.428344***	0.29911***	0.394689***	0.373139***
	(2.478)	(3.382)	(2.598)	(3.499)	(3.018)
DIRECRMON	0.085087*	0.01863	0.085174*	-0.212861	0.011004
	(1.934)	(0.944)	(1.803)	(-0.561)	(0.826)
DIRECTMON*LNTA	-0.005847	-0.002973	-0.005765	0.011799	-0.001748
	(-1.254)	(-1.442)	(-1.162)	(0.349)	(-1.342)
DIRECTMON*EQASS	-0.104225	-0.048113	-0.100832	0.762798	-0.036134
	(-0.625)	(-0.672)	(-0.560)	(0.584)	(-0.771)
DIRECTMON*LOASS	0.011422	-0.005326	0.01705	0.386861	-0.002043
	(0.252)	(-0.293)	(0.341)	(0.828)	(-0.161)
DIRECTMON*IIASS	-1.126588***	-0.196513	-1.213071***	-3.499795	-0.199872**
	(-2.740)	(-1.598)	(-2.746)	(-1.244)	(-2.006)
R^2	0.750	0.750	0.749	0.745	0.750
Adjusted R^2	0.646	0.647	0.646	0.640	0.646
Durbin-Watson Statistic	2.063	2.044	2.064	2.078	2.080
F-statistic	7.212	7.237	7.209	7.053	7.236
No. of Observations	550	550	550	550	550

Note: (1) is when DIRECTMON equals to DEPORATE; (2) is when DIRECTMON equals to INTERRATE; (3) is when DIRECTMON equals to LENRATE; (4) is when DIRECTMON equals to RRRATE; (5) is when DIRECTMON equals to RRR; Values in parenthesis are t-statistics, ; ***,**, and * denote significance at 1, 5, and 10% levels, respectively.

6. Conclusions

The global financial crisis has an influential negative impact on the Chinese economy. However, due to the Chinese government's "four trillion plan" to increase the GDP, the commercial banks take advantage of China's central bank and exert a large profit.

This study is the first to examine the effect of monetary policies on commercial banks' profitability in China during the period 2007-2012. The

empirical findings suggest that Chinese banks with larger assets tend to be less profitable, showing that larger commercial banks are not market-oriented enough. The empirical results also indicate that adequate capital and higher general risk preparations have a positive impact on banks' profitability. And banks' profitability mainly relies on interest income. Furthermore, higher deposits and higher loans are positively relevant to banks' profitability, while higher expense preference behavior is negatively relevant to banks' profitability. A positive relationship between banks' profits and the big five concentration ratio implies that these larger banks tend to exert monopoly profits. The inflation rate and GDP exert a positive effect on bank profits.

By examining the effect of monetary policies on banks' profitability, our results show that all kinds of interest rates and reserve requirement ratio show a negative impact on bank profits. And the effect of money supply on profitability is positive, but for foreign exchange reserve and exchange rate, the effect is not apparent. Moreover, there is no significant difference between the two channels of monetary policies-interest rates and reserve requirement ratio. Finally, the impact of monetary policies on profitability is much more substantial for the banks with larger interest income share.

Future research could extend the data period to make the paper more convincing. Another extension could include more variables such as the number of employers, the location, the ownership, taxation, the index of regulation, and so on. In terms of methodology, a higher method, such as GMM, could also be used.

References

[1] Aigner, D. J. and S. F. Chu (1968), On Estimating the Industry Production
[2] Alicia. G. H., S. Gavila and Daniel.S., (2009), "What Explains the Low Profitability of Chinese Banks," Journal of Banking & Finance 33 (2009) 2080-2092.
[3] Angelos Kanas, Dimitrios Vasiliou and Nikolaos Eriotis, (2012), "Revisiting Bank Profitability: A Semi-parametric Approach,"
[4] Aremu M. A., E. I. Chirstopher and Musapha. A. M, (2013), "Determinants of Banks' Profitability in A Developing Economy: Evidence from Nigerian Banking Industry," Journal of Contemporary Research in Business, January 2013 Vol4, No 9.
[5] Berger, A. N., (1995), "The Relationship between Capital and Earnings in Banking," Journal of Monetary Economics, 20, 501-520.
[6] Deger Alper and Adem Anbar, (2011), "Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey," Business and Economics Research Journal, Volume 2.Number 2, 2011, pp139-152.
[7] Fadzlan Sufian, (2011), "Profitability of the Korean Banking Sector: Panel Evidence on Bank-Specific and Macroeconomic Determinants," Journal of Economics and Management, 1, 43-72.
[8] Fadzlan S. and M. S. Habibullah, (2009), "Determinants of Bank Profitability in A Developing Economy: Empirical Evidence from Bangladesh," Journal of Business Economics and Management, 10:3, 207-217.
[9] Fadzlan. S. and M. S. Habibullah, (2010), "Does Economic Freedom Fosters Banks' Performance? Panel Evidence from Malaysia," Journal of Contemporary Accounting & Economics 6 (2010) 77-91.
[10] Fadzlan. S. and M. S. Habibullah, (2012), "Globalizations and Bank Performance in China," Research in International Business and Finance 26 (2012) 221-239.
[11] Fotios. P. and K. Kosmidou, (2007), "Factors Influencing the Profitability of Domestic and Foreign Commercial Banks in the European Union," Research in International Business and Finance 21 (2007) 222-237.
[12] Hiroshi Gunji and Yuan Yuan, (2010), "Bank profitability and the bank lending channel: Evidence from China," Journal of Asian Economics 21(2010), 129-141.
[13] Hirtle, B. J. and K. J. Stiroh, (2007), "The Return to Retail and the Performance of US Banks," Journal of Banking and Finance, 31, 1101-1133.
[14] Khizer Ali, Muhammad. F. A. and Hafiz. Z. A., (2011), "Bank-Specific and Macroeconomic Indicators of Profitability-Empirical Evidence from the Commercial Banks of Pakistan," International Journal of Business and Social Science Vol. 2 No. 6, April 2011.

[15] Miller, S. M. and A. G.Noulas(1997), "Portfolio Mix and Large-Bank Profitability in the USA," Applied Economics, 29, 505-512.
[16] Panayiotis, P. A. and S. N. Brissimis and Matthaios D. D., (2008), "Bank-specific, Industry-specific and Macroeconomic Determinants of Bank Profitability," Journal of International Financial Markets, Institutions & Money 18(2008) 121-136.
[17] Perry, P., (1992), "Do banks Gain or Lose from Inflation," Journal of Retail Banking, 14, 25-40.
[18] Philip Bourke, (1989), "Concentration and Other Determinants of Bank Profitability in Europe, North America and Australia," Journal of Banking and Finance 13 (1989) 65-79 North-Holland.
[19] Sami. B. N. and M.Omran, (2011), "The Effects of Bank Regulations, Competitions and Financial Reforms on Banks' Performance," Emerging Markets Review 12 (2011) 1-20.
[20] Samy Ben Naceur, (2003), "The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence".
[21] Samy Ben Naceur and Mohamed Goaied, (2010), "The Determinants of the Tunisian Deposit Banks' Performance," Applied Financial Economics, 11:3, 317-319.
[22] Xiaoxi Zhang and Kevin Daly, (2013), "The Impact of Bank Specific and Macroeconomic Factors on China's Bank Performance," Global Economy and Finance Journal Vol. 6. No. 2 September 2013.
[23] Xueming Luo, (2003), "Evaluating the Profitability and Marketability Efficiency of Large Banks: An Application of Data Envelopment Analysis," Journal of Business Research 56 (2003) 627-635.