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Master Degree Project in Finance

International Capital- and Liquidity Regulation

A challenge for Chinese banks?

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Abstract

The Chinese Banking Regulatory Commission started the implementation of global capital- and liquidity standards for commercial banks in China by issuing the first regulatory elements of the Basel III accords in June 2012. This paper analyses a sample of 163 commercial banks operating in China between 2007 and 2014 and studies their Tier 1 Capital Ratio and Net Stable Funding Ratio to see whether commercial banks in China can comply with the requirements of the regulations. It also compares these capital and liquidity measures with those of large, international banks and provides an overview of the Chinese banking sector and its history.

The results show that most of the commercial banks in China fulfil the minimum requirements for the Tier 1 capital ratio and the Net Stable Funding Ratio in 2014 and would have fulfilled these over the past eight years. Compared to the benchmark, commercial banks in China have lower capital ratios than most of the international banks but are within the average when comparing the Net Stable Funding Ratios. The analysis also shows that smaller- and medium-sized banks in China have high capital buffers but lower Net Stable Funding Ratios than large commercial banks.

Keywords: Basel III, China, Banking Regulation, Net Stable Funding Ratio, Capital Adequacy Ratio.

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List of abbreviations

ABC	The Agricultural Bank of China
ADBC	Agricultural Development Bank of China
ASF	Available Stable Funding
BCBS	Basel Committee on Banking Supervision
BOC	The Bank of China
BSC	Bankscope
CAR	Capital Adequacy Ratio
CBRC	China Banking Regulatory Commission
CCB	China Construction Bank
CDB	(State) Development Bank of China
CET 1	Common Equity Tier 1
CNY	Chinese Yuan
FSB	Financial Stability Board
GDP	Gross Domestic Product
GovDebt	Government Debt
G-SIB	Global Systemically Important Bank
ICBC	Industrial and Commercial Bank of China
IFRS	International Financial Reporting Standard
IMF	International Monetary Fund
KPMG	Klynveld Main Goerdeler and Peat Marwick
LCR	Liquidity Coverage Ratio
LR	Leverage Ratio
LTD	Loan to Deposit Ratio
MOF	Ministry of Finance
Mtgs	Mortgage Loans
NSFR	Net Stable Funding Ratio
PBOC	People's Bank of China
PRC	People's Republic of China
RCC	Rural Credit Cooperatives
RSF	Required Stable Funding
RWA	Risk Weighted Assets
SAFE	State Administration of Foreign Exchange
US	United States
WTO	World Trade Organization

1 Introduction

This thesis conducts a study of the Chinese banking sector by analysing a sample of 163 commercial banks operating in China between 2007 and 2014 to investigate the implementation progress of the recent capital and liquidity requirements of Basel III. Hereby, the paper studies two measures inside the regulatory framework. The Tier 1 Capital Adequacy Ratio (CAR) which is the amount of going-concern capital as a share of risk-weighted assets (BCBS, 2010) and the Net Stable Funding Ratio (NSFR) which as a long-term liquidity requirement that addresses maturity mismatches between bank assets and liabilities (King, 2013). The banks with available NSFR data in the sample account for 78% of the banking sector's total assets in 2014 and banks with available Tier 1 capital ratios for 71% respectively. This paper uses reported Tier 1 capital ratios directly but estimates the NSFR's for the sample banks to show whether Chinese banks comply with the minimum requirements and if they have met these requirements over the past years.

Furthermore, the paper compares Tier 1 capital ratios and estimated NSFR's with those of representative banks from all over the world using data from the official Basel III Monitoring Report (BCBS, 2015) to show how Chinese commercial banks perform compared to their international competitors.

The findings show that most banks in China generally meet the minimum requirements between 2007 and 2014. The largest commercial banks struggle with the capital ratios but are still above the minimum requirement of 6% Tier 1 capital ratio. Medium- and smaller-sized banks perform surprisingly well and show stable capital ratios. Some foreign banks show the highest capital ratios in the sample group because of high entry requirements on the Chinese market. Regarding the NSFR, the findings show that the largest commercial banks have the highest NSFR's. Medium- and smaller-sized banks still fulfil the minimum NSFR requirement of 100% but cannot keep up with the large banks.

Compared to the international benchmark, the largest Chinese commercial banks cannot keep up with the average Tier 1 capital ratios of large, international banks and are found in the lower 25th percentile. Again, medium- and smaller-sized banks in China seem to have stable capital ratios and are above the median of international competitors. Regarding the liquidity requirement, large Chinese commercial banks have NSFR's above the average of large, international banks. Medium- and smaller-sized banks in China are below the median of international competitors.

1.1 Background

The financial crisis from 2007 to 2009 showed that banks in many countries experienced liquidity shortages due to a mismatch of assets and liabilities and that proper liquidity risk management matters. Following events like the nationalization of Northern Rock triggered and motivated the need of new liquidity rules and global standards (King, 2013; Hong et al., 2014; Dietrich et al., 2014, Gobat et al., 2014). These events suggest that financial markets are not as efficient as expected, which means that the possibility of market failures makes room for regulation according to Brunnermeier et al. (2009).

China is the largest economy in the Asia-pacific area and with a nominal GDP of USD 10.45 Trillion in 2014, the second-largest market economy in the world. The country has the world's largest population with around 1.36 billion people. At the end of the first quarter of 2015, the bank sector accounted to over USD 28 Trillion in assets, which makes the Chinese banking sector one of the biggest in the world (Lulla & Khan, 2015). According to the Financial Stability Board (FSB, 2015), four of the five largest Chinese banks are considered as a global systemically important bank (G-SIB) and are therefore bound to an even higher loss absorbency requirement according to the BCBS (BCBS, 2013a). China is also an official member of the G-20 and the Basel Committee and thus is interested in engaging in the international financial regulatory reforms since the financial crisis. China wants to implement the new regulatory standards successfully to strengthen the banks, increase effectiveness and efficiency of the banking sector and reduce risks (BCBS, 2013b; CBRC, 2015).

1.2 Purpose

The importance of capital buffers and global liquidity standards has been increasing after the financial crisis which raised questions on the effectiveness of bank risk management practices. The regulatory and supervisory framework has been revised to ensure that commercial banks around the world are well prepared for future distress events (Vazquez & Federico, 2012). Therefore, the focus of this paper lies in the recently implemented Tier 1 capital adequacy requirement that has been binding since 2013 as well as one liquidity measure known as the Net Stable Funding Ratio (NSFR).

Chinese commercial banks frequently report their Tier 1 capital ratios since the first Basel regulatory framework had already been introduced in China in 1994. Compared to the Common Equity Tier 1 capital ratio (CET1 ratio), more Chinese banks reported Tier 1 capital ratios over the past years. One reason is that the new Basel III capital requirements that

require the disclosure of CET1 ratios have only been binding in China since 2013. Since this paper conducts an analysis of the capital ratios over the past eight years, the Tier 1 capital ratio is chosen as the main measure to be able to compare as many Chinese banks as possible.

The NSFR is currently being implemented and takes effect on January 1st, 2018 and can be reliably estimated based on historical financial data published by the banks (King, 2013; Dietrich et al., 2014; Gobat et al., 2014). An analysis of the Liquidity Coverage Ratio (LCR), which is a measure of short-term asset liquidity, requires detailed information on composition and duration of liquid assets and 30-day liabilities which usually cannot be found in a bank's financial reports. Given that data on inflows and outflows are not available this paper does not attempt to estimate the LCR and therefore focuses on the NSFR (King, 2013; Dietrich et al., 2014; Hong et al., 2014).

Additionally, this paper compares the results from analysing the Tier 1 capital- and Net Stable Funding Ratios of Chinese commercial banks with the respective ratios of large, internationally active banks from all over the world by using data from the official Basel III Monitoring Report (BCBS, 2015). The reason for this comparison is that Chinese commercial banks have started with different preconditions than banks in western countries. The banking system in China emerged from a centralized and planned market economy where the banks have been largely state-owned. By comparing them to other, internationally active banks this paper aims to show that, although the banking system in China differs to those in other countries, the Chinese commercial banks are still able to compete with large, international banks.

1.3 Contribution

So far, there have been many papers looking at the effect of Basel III requirements, like the Leverage Ratio (LR), the Liquidity Coverage Ratio (LCR) and the NSFR. A considerable amount of these papers have been focusing on countries in the Western hemisphere including the United States, the United Kingdom and Europe (Banerjee & Mio, 2014; Duijm & Wierts, 2014; Hong et al., 2014; Dietrich et al., 2014; Grill et al., 2015). However, there has been a deficit when it comes to looking at the Chinese banking sector.

Zou (2013) has been the first to look more closely at the implementation of Basel III in China, but he only covers the biggest five as well as four representative commercial banks in China. Chalermchatvichien et al. (2014) have been investigating the associations between bank risk-taking, ownership concentration and the Basel III standards using a sample of East

Asian banks from 2005 to 2009. However, they only cover eight Chinese banks out of 68 banks in total. Gobat et al. (2014) from the IMF have broadened the analysis of the NSFR and have been looking at a sample of over 2000 banks covering 128 countries with end-2012 data. They have included 41 Chinese banks in their analysis which accounted for 65% of the Gross Loans in the country in 2012.

Chinese research has been looking at the impact of the Basel III requirements on the banking industry. Hu & You (2011) are discussing the effects of the capital requirements on small and medium-sized banks, weighing the advantages and disadvantages of the new rules. Xie (2011) and Liao (2012) are evaluating the liquidity requirements and comparing them to traditional measures like the Loan-to-Deposit Ratio (LTD). However, to our understanding, there is still a lack of in-depth analysis of the Chinese banking sector and this paper is trying to fill this gap.

1.4 Research questions

In order to achieve the research purpose, this thesis will conduct an analysis of the sample and answer the following research questions:

1. Do commercial banks in China fulfil the minimum requirement of Tier 1 capital and Net Stable Funding Ratio and have they fulfilled these requirements in the past?
2. How do the commercial banks in China perform compared to the average of internationally active banks in 2014?

1.5 Thesis Disposition

The following chapter introduces the importance of the Basel III capital requirements as well as the long-term liquidity measure known as the Net Stable Funding Ratio by looking at previous research. A brief description of the dataset and the used methods follows in chapter 3. In order to understand the preconditions and role of commercial banks in China, Chapter 4 provides a current overview of the Chinese banking market and its history. Additionally, the chapter gives a summary of existing rules and regulations for banks before Basel III. Chapter 5 presents the Basel III regulations. The analysis of the sample and the comparison with the international benchmark follows in chapter 6. Chapter 7 discusses the findings and summarizes the challenges for Chinese banks. The final chapter concludes with answers to the research questions and provides an outlook for future research.

2 Related Literature

The main contribution of this paper is to respond to the question if the Chinese banking sector has successfully implemented the Basel III capital and liquidity requirements and if the commercial banks in China have fulfilled these requirements by analysing a sample of 163 Chinese banks from 2007 – 2014. The sample covers the biggest five Chinese banks. Four of them are considered a G-SIB (FSB, 2015) and the other banks are large, medium and small-sized banks operating in China (see Table A1 in the Appendix). Together, the banks with available NSFR data cover 78% of the total assets in the Chinese banking sector in 2014 and 71% of the total assets regarding available Tier 1 capital ratios, respectively. This thesis studies a large sample of Chinese banks over eight years which distinguishes it from previous research. However, to understand the importance of international capital and liquidity regulation, also outside of China, this chapter will relate to previous literature on international regulation and supervision and outline the most important work.

Hellwig (1991) and Merton (1993) have argued that the financial system is one of the key variables for a well-functioning economy and, therefore, for a fair and prosperous society. This system relies on financial institutions on which individuals, corporations and governments rely to allocate their assets and to reduce their risks.

A question often asked is whether financial markets and its major players, especially banks, should be regulated in order to avoid an instability of the financial system that might lead to a possible economic meltdown. In fact, this has been a field of intense debate and research resulting in many findings.

Loechel et al. (2010) have argued that the financial crisis in 2007/2008 was the turning point for the call of a stronger hand of supervision and that national interests can only be protected with international cooperation in capital markets despite unequal development and heterogeneity of domestic financial markets.

According to Vazquez & Federico (2012), bank failures in the U.S. and Europe during the peak of the financial crisis in 2007/2008 proved that individual bank decisions concerning the size of their liquidity and capital buffers were disproportionate with their risk-taking, thus suboptimal from the social perspective. Analysing a dataset of 11,000 banks in the U.S. and Europe during 2001-2009, they find that banks with weaker structural liquidity and higher leverage in the pre-crisis period were more likely to fail afterward. More importantly, their evidence indicates that regulations on capital, especially for larger banking groups, seem to be

more relevant. Their results provide support and importance to the proposed Basel III regulations, both on liquidity and capital.

King (2013) is the first to assess the NSFR for representative banks in 15 countries and examines different ways for banks to meet the NSFR requirement as well as estimating the impact of these ways on the banks' net interest margins. He uses end-of-year 2009 income statement and balance sheet data taken from the Bankscope database. He finds that the most cost-effective strategies to increase the NSFR are to increase higher-rated liquid assets and to extend the maturity of wholesale funding. The increase of the NSFR will lead to a decline in net interest margins according to his estimation. In general, the banks trade-off for increasing the resilience during stressful periods is lower profitability during normal times. We are relating this thesis to King's work in the sense that we will use his simplified version of the NSFR to estimate the respective values for Chinese banks.

Hong et al. (2014) have focused their research on a sample of 9349 U.S. commercial banks during 2001 and 2011 and are calculating the respective LCR and NSFR values for the banks. They examine potential links between the Basel III liquidity measures and bank failures and find that both the NSFR and LCR have limited effects on bank failures and that systemic liquidity risk is the main reason of bank failures in 2009 and 2010. The Basel III liquidity standards aim at improving the individual banks' liquidity buffer and maturity mismatch (bank specific liquidity risk), the systemic risk, on the other hand, is defined as the risk of simultaneous liquidity difficulties at several financial institutions. Nevertheless, Hong et al. suggest that a rules framework should target risk at both the individual and the system level to be effective.

A recent study of Dietrich et al. (2014) looks at a sample of 921 Western European banks between 1996 and 2010, analysing the characteristics and drivers of the NSFR. According to the authors, banks in Europe are expected to be more strongly impacted by the Basel III liquidity requirements than banks in the United States. They find that a majority of banks have historically not fulfilled the NSFR minimum requirements and that the NSFR did decrease more for larger banks than for medium-sized banks before the crisis. Smaller banks have significantly improved their NSFR since the start of the crisis. Connecting capital ratios and structural liquidity, they find that banks with higher capital ratios have stronger liquidity and that banks with a focus on lending/deposit-taking business have a higher NSFR than financial institutions with other focus (i.e. investment banking). Relating to this research, this thesis looks at large and medium to small-sized banks in China as well as banks that focus

their business on loans and deposits to see whether there are differences in the NSFR and capital ratios between those banks.

Furthermore, recent research that has not been focusing on Europe or the United States is available (Chalermchatvichien et al., 2014). The authors' findings support this paper's focus to look at China, an emerging country according to Gobat et al. (2014). According to Chalermchatvichien et al. (2014), who study a sample of 68 East Asian banks during 2005 and 2009, East Asian nations were not affected by the European debt crisis and were not inside the research focus like U.S. banks after the financial crisis of 2007/2008. Additionally, they argue that during recent years, China, in particular, has shown impressive economic growth, often higher growth than in the western hemisphere. Due to their increasing role in the global economy an analysis of Chinese commercial banks should help us understand if the international capital- and liquidity regulations have been successfully implemented and if commercial banks in an emerging country can compete with the international average. Chalermchatvichien et al. (2014) find that banks with higher NSFR engage in less risk-taking (measured by the bank's Z-score). An increase in capital stability decreases the degree of risk-taking. The authors do not find that the NSFR has an influence on the volatility of equity returns.

The following chapter explains how the data sample and sample period have been chosen for the analysis. The usage of the Tier 1 capital ratios and the estimation method for the NSFR are presented as well.

3 Methodology and Data

This paper focuses on the Basel III Tier 1 capital- and long-term liquidity requirement known as the NSFR and investigates whether large, medium and small-sized Chinese banks can fulfil the minimum requirements and if so, to which degree. Additionally, the paper compares the estimated NSFR values as well as Tier 1 capital ratios with that of large, internationally active commercial banks by using data from the official Basel III Monitoring Report (BCBS, 2015).

3.1 The data sample

This paper collects data from the Bureau van Dijk Bankscope (BSC) database and looks at a sample of 163 banks operating in China in order to answer the above questions. The BSC database provides bank-specific annual financial information for banks in 179 countries and is reported on a consolidated basis. The data is expressed in Chinese Yuan (CNY) and balance sheet items are expressed as end-of-year values. To verify the accuracy of the Bankscope data selected annual reports have been compared to the financial statements available on Bankscope.

For the analysis of the data, this paper uses the time span from 2007 to 2014. The reason for analysing that particular period is that the Chinese government published new international accounting standards in February 2006 which became active on January 1st, 2007. Ensuring reliable and valid values before 2007 is therefore not possible. Moreover, at the beginning of this research, the annual reports from Chinese commercial banks for the year 2015 have not been published. Therefore, this paper mainly focuses on data between the years 2007 to 2014.

For analysing the Tier 1 capital ratios and estimating the Net Stable Funding Ratios, this thesis uses end-of-year values. The first reason is that Bankscope does not provide average Tier 1 capital ratios. The second reason is that in order to calculate the NSFR with average values the assumptions would have to be changed. In particular, the average values of loans and customer deposits are aggregated and it cannot be distinguished between different types of deposits or loans. Since different weights are assigned to different categories of deposits, the usage of the simplified version would not be possible in that case. Since the paper uses end-of-year values over a long time horizon, consistency of the data can be assumed.

3.2 The usage of Tier 1 capital ratios and the estimation method of the NSFR

The Tier 1 CAR's are directly taken from Bankscope and no calculation is needed. According to the BCBS (2010), the formula to calculate the Tier 1 capital ratio is given by dividing the Tier 1 capital by the total number of risk-weighted assets. One advantage of directly using Tier 1 capital ratios is that it makes a comparison within a large sample possible. Since the focus of this paper is on the Chinese banking sector and not on individual banks, the single components of Tier 1 capital ratios of the respective bank do not matter. On the other hand, the number of risk-weighted assets would be more accurate if every component is defined separately as required by the BCBS (2010). However, due to limitation in time and resources, this paper will not look into every component of risk-weighted assets in detail. Another advantage of using reported Tier 1 capital ratios is the high availability of data. Many Chinese commercial banks are not required to report the components of the risk-weighted assets in their annual reports. By using the calculated Tier 1 capital ratios, this paper ensures the best possible data density for Chinese commercial banks.

Relating to King (2013), this paper uses a simplified version to estimate the NSFR with some adjustments made compared to the original version. The simplified, adjusted version of the NSFR formula looks like the following:

$$NSFR = \frac{Available\ Stable\ Funding\ (ASF)}{Required\ Stable\ Funding\ (RSF)}$$

$$= \frac{Equity + Liabs_{>1yr} + \left(StableDeposits_{<1yr} \times 95\%\right) + (OtherDeposits \times 90\%) + (StDebt \times 50\%)}{(GovtDebt \times 5\%) + (Level\ 2\ Securities \times 50\%) + (Mtgs \times 65\%) + (AllLoans \times 85\%) + (Other \times 100\%)}$$

The respective weights are given by the official document to calculate the NSFR (BCBS, 2014) and update the previous weights that King (2013) is using in his paper.

Relating to Gobat et al. (2014), some important assumptions are made for the calculation of the NSFR which are the following: First, in the RSF denominator, all loans are weighted by 85% since it is not possible to distinguish the maturities given the annual report data. Second, Level 2 securities are added to the RSF since they play a major role in the balance sheets of the banks. Third, residential mortgage loans of any maturity are weighted with 65% according to BCBS (2014) and King (2013). However, according to Gobat et al. (2014), mortgage loans can be classified more conservatively because their risk level is not reported within the data. For this purpose, this paper conducts a sensitivity analysis by

changing the weight of residential mortgage loans to 85% and estimating the NSFR values again.

Chapter 6.1 presents a more detailed explanation of the NSFR formula as well as a sample calculation of a large commercial bank’s Net Stable Funding Ratio.

4 The banking system in China

In order to understand how the implementation process of the Basel III capital- and liquidity regulations affected Chinese banks during recent years, this chapter looks at the Chinese banking sector and how it evolved after the birth of the People's Republic of China (PRC) on October 1st 1949. The history of the banking sector presents differences between western banking industries and China since the Chinese banking sector was absolutely government owned and isolated from the outside economy until the economic reforms in 1978 (Martin, 2012).

4.1 The history of the banking sector

The People's Bank of China (PBC) has been established in December 1949 and acted as the main controller of financial services and national capital until 1986. The PBC was granting necessary credits to public companies only if they were part of the national planning. It was responsible for supervision and all banks were generally under its control (Loechel et al., 2010; Martin, 2012).

The first regulation rules were issued in 1986 and clarified the banking market structure with the PBC as a central bank, specialized banks (known as the "big four") and other financial institutions. Other financial institutions include trust and investment companies, rural credit cooperatives (RCC) or urban (or city) credit cooperatives that were all licensed by the PBC. The responsibilities of the PBC were currency issuance, interest rate decisions, foreign currency and credit plan management (Loechel et al., 2010). The most important banks that were separated out from the PBC in 1986 are the "big four", at that time entirely state-owned policy banks that had to operate in their respective market with clearly defined functions. (Martin, 2012). Those are:

- The Bank of China (BOC) which specialized in the field of foreign trade.
- The China Construction Bank (CCB) which specialized in the field of infrastructure finance.
- The Industrial and Commercial Bank of China (ICBC) which was mainly acting in the industrial sector.
- The Agricultural Bank of China (ABC) which focused solely on the agricultural sector.

Other, smaller state-owned banks, like the Bank of Communications, the China Development Bank and the Export-Import Bank of China were established during 1986 and 1994. In 2005, state-owned banks were starting to transform into joint-stock corporations, a process that was called "equitization" according to Martin (2012). Those banks were to operate as commercial banks afterward.

Over the years, smaller and more local focused banks developed, and some of them were established by provincial and municipal governments to take care of locally developed projects. Similar to the state-owned banks, these local banks were wholly owned by the local government. In the past 15 years, the "equitization" process for these banks started as well and these banks show similar share structure today since the local governments still hold the majority of shares (Martin, 2012).

The last group of local banks includes village and township banks, rural commercial banks, rural cooperative banks and rural credit cooperatives. In 2004, the process of transforming RCC's into joint-stock companies was started by the Chinese government. In 2010, the CBRC announced that domestic banks, private and foreign investors could purchase the remaining number of RCC's with private and foreign investors being limited to 20% of all RCC's (Martin, 2012).

Chapter 4.2 looks at the current state of the banking sector and shows how the different banking groups have influenced the market in 2014.

4.2 The banking sector in 2014

Only three banks remain fully state-owned until today: the Agricultural Development Bank of China (ADBC), the State Development Bank of China (CDB) and the Export-Import Bank of China. These policy banks each have their respective mission. According to Martin (2012), the ADBC is supporting the development of agriculture and rural areas in China. The CDB was traditionally responsible for raising funds for large infrastructure projects but has started to diversify its portfolio of investments as part of its transition into a commercial bank. The primary task of the China Export-Import Bank is to provide financial services to promote Chinese exports and manage the import of advanced technological products. All three state-owned banks report directly to the State Council and have to rely on directives for their operations (Martin, 2012).

Figure 1 illustrates a current overview of the banking sector in China and provides the number of banks in 2014 according to the CBRC annual report (CBRC, 2015).

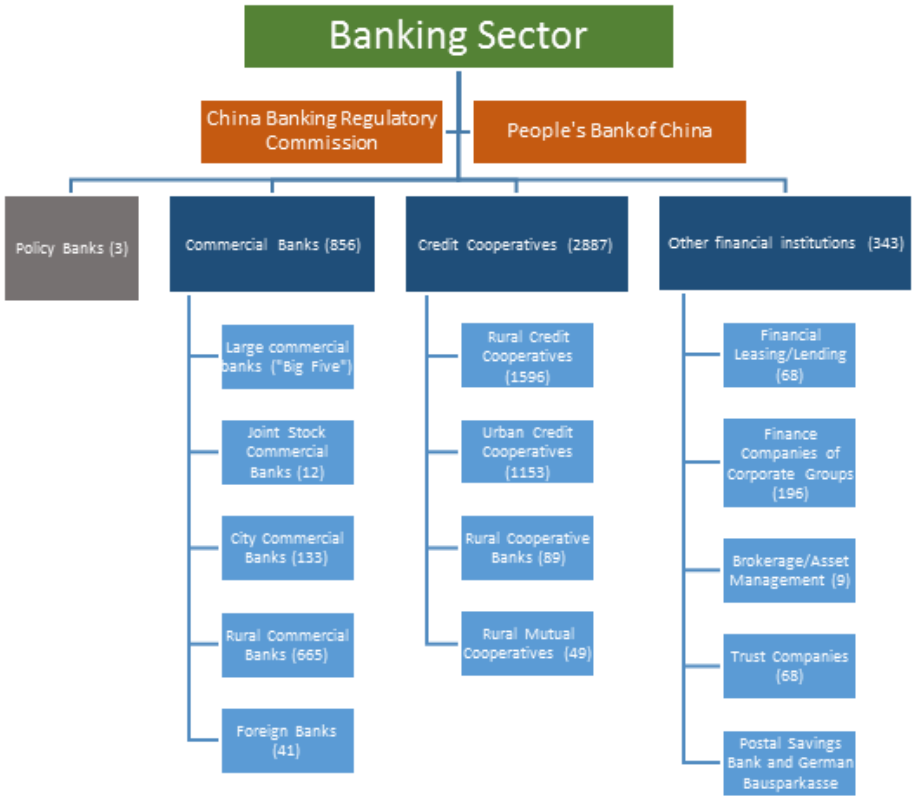

Figure 1: Overview of the Banking Sector in China in 2014.
Source: Own illustrations based on the CBRC Annual Report (2014) and KPMG (2005).

Regarding the Basel III capital- and liquidity requirements, the three state policy banks do not have to fulfill the regulations and are thus excluded from the sample. The commercial banks are the part of the banking sector that have to comply with the regulations. Credit cooperatives and other financial institutions do not have to comply with Basel III (BCBS, 2013b). The analysed sample includes all large commercial banks, all joint-stock commercial banks, 78 city commercial banks, 30 rural commercial banks, 37 foreign banks and the Postal Savings Bank. A complete list of the banks included in the sample and sorted by type is included in Table A1 in the Appendix.

The "big four" as well as the Bank of Communications have been transformed into joint-stock companies and are currently operating as commercial banks (the "equitization" process started in 2005). According to Martin (2012), four of the five equitized banks are still in government hands as the PBOC, the Ministry of Finance (MOF) and other government entities hold more than half of the non-tradable shares. The Bank of Communications is the exception with only about a quarter of shares owned by the state of China. After the

conversion to join-stock companies, these five largest banks have diversified their financial services and products to corporate and personal customers and are also investing overseas (Martin, 2012).

Relating to Martin (2012), the initial intent of equitizing the five largest banks was to create incentives for them to operate as a commercial bank focusing on profits and competition with less interference from the Chinese government. However, Martin (2012) argues that each of those five banks has a board of directors and senior officers that are appointed by the government in some way and thus, might still be heavily influenced by the state. It is undeniable that these five banks continue to dominate the banking sector in China. In the sample of 163 banks, they account for 54% of all assets and, according to Figure 2, their share of the total banking sector from 2003 to 2014 is still significant (41.4% in 2014). However, Figure 2 shows that their overall market share has decreased during the past decade and that primarily, joint-stock and urban (city) commercial banks were able to increase their share of the market steadily. The joint-stock commercial banks hold 18.2% of the total assets and are the second largest group.

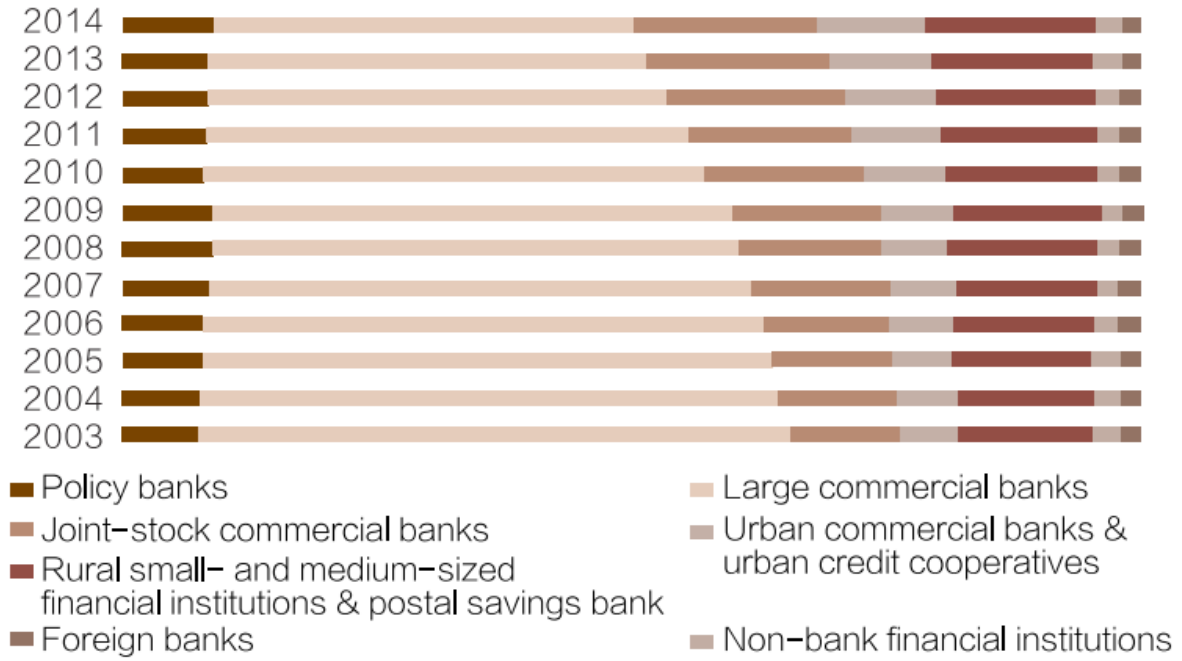

Figure 2: Market share (by assets) of banking institutions between 2003 and 2014.
Source: CBRC Annual Report (2014).

The policy banks can be excluded and do not have to fulfil the Basel III requirements because of their non-commercial focus. The third largest group consists of rural commercial

banks and the Postal Savings Bank of China and together, these banks account for 16.5% of the total assets. It is evident that foreign banks only hold a small share of the market.

According to the BCBS (2013b), the Chinese banking system is growing rapidly, but the core of its business remains traditional with a focus on credit products and services which are reflected in a high proportion of loans relative to total assets. There is a large percentage of risk-weighted assets (RWA) for credit risk. The BCBS (2013b) points out that overseas assets and assets in foreign currency are small and that the focus of the Chinese banking is domestic.

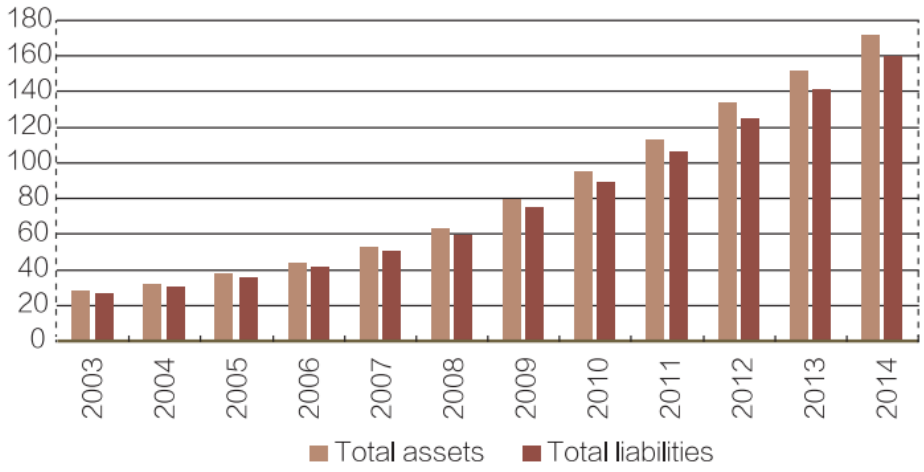

Figure 3: Total assets and liabilities of banking institutions between 2003 and 2014. Unit: CNY trillion.
Source: CBRC Annual Report (2014).

Figure 3 provides an overview of the total assets and total liabilities of the banking sector from 2003 to 2014. In 2014, the banking industry's total assets amount to CNY 172.3 trillion and total liabilities to CNY 160 trillion. Relating it to the GDP of China in 2014 (CNY 63.65 trillion), the banking sector's total assets represent about 270% of the GDP (CBRC, 2015).

These numbers show why the banking industry is considered one of the largest in the world and why regulating financial institutions are necessary in order to contain certain risk factors like liquidity or credit risk. The next section gives an overview of the existing supervision and regulations that were in place before the Basel III accords.

4.3 Banking Regulation and Supervision in China before the Basel III accords

According to Loechel et al. (2010) Chinese supervisors established and continuously improved the regulatory and supervisory framework in China over the past 30 years to meet international standards. They argue that because of the strict regulation in capital and liquidity the implementation of Basel III in China is no bigger challenge than in Western countries. Comparing the Chinese regulation system with other nations like the UK, France or Germany, the authors conclude that regulation in China can be characterized by high stability orientation instead of focusing on market competition and efficiency.

According to Figure 1, there are two key entities that supervise and regulate the banking sector in China, namely the central bank of China (PBOC) and the China Banking Regulatory Commission (CBRC). Next to them, two other entities, the Ministry of Finance (MoF) and the State Administration of Foreign Exchange (SAFE) are reporting to the ruling State Council of China. However, these two entities do not influence the banking institutions. The MoF is responsible for fiscal policies and the budget of the government. The SAFE monitors and supervises foreign exchange transactions and manages the foreign exchange reserves of the government (Martin, 2012).

China's central bank became a separate entity in 1979. According to Martin (2012), their focus lies on the implementation of monetary policies, issuing renminbi (the Chinese currency) and regulating its circulation, regulating the inter-bank lending and bond markets, administering foreign exchange and controlling the inter-bank foreign exchange market and regulating the gold market. It manages the state treasury, maintains financial statistics, organizes anti-money laundering operations and issues/enforces orders and regulations.

The CBRC was created in 2003 and is responsible for regulation and supervision. Their creation implies that they formulate and enforce the banking regulations, working together with the Basel Committee of Banking Supervision (BCBS) in order to implement the Basel III regulatory framework (Martin, 2012; BCBS, 2013b). According to Loechel et al. (2010), the regulatory rules enforced so far focus more and more on risk orientation, the separation between restricting activities and regulatory structure and macro-prudential oversight. However, they argue that there are still areas for improvement. Increased market and product variety, as well as services across sectors offered by banks, call for more regulation and supervision rules.

The PBC issued the first important regulations in 1994, which defined financial services and differentiated between the different bank types. A minimum capital amount for starting national banks as well as a minimum Tier 1 CAR of 4%, a total CAR of 8% and a loan-to-deposit ratio that should not be higher than 75% were issued in the same year. Additionally, risk weights for the calculation of risk-weighted assets and more liquidity regulations like a minimum deposit reserve ratio, a loan-concentration ratio for the largest lender/the ten largest lenders and the non-performing loan ratio have been issued (Loechel et al., 2010).

In 2002, the PBC issued rules for information disclosure which required banks to disclose their financial reports, risk management reports and other relevant items from the annual reports within four months after the accounting date. Annual reports had to be made available to shareholders and the public in major business places. The CBRC issued a new corporate accounting standard in 2007 which introduced the International Financial Reporting Standard (IFRS) in China (Loechel et al., 2010).

Regarding the regulation of foreign banks, the most important regulations were issued by the CBRC in 2006 and were the milestone for the opening of the banking sector to outside investors. At the same time, China fulfilled a World Trade Organization (WTO) requirement by opening its market. The rules allowed foreign banks to operate in any region, in the local currency and any customer type if the foreign bank was to be incorporated locally. However, they had to fulfil the same requirements as domestic banks. Additionally, every locally incorporated foreign bank had to have a minimum of CNY 1 billion in registered capital and have received a minimum of CNY 100 million in operating funds as a precondition. Each branch of a foreign bank had to have received CNY 200 million in operating capital for authorization (Lochel et al., 2010; Martin, 2012).

The first Basel accords were integrated by the PBC in 1994 and included the 1988 Basel accord's CAR of 4% for Tier 1 and 8% in total. In 2004, the CBRC released the Chinese version of the new Basel accord (Basel II). The big five commercial banks, joint-stock commercial banks and most of the city commercial banks had to fulfil the CAR until January 1st of 2007 (Loechel et al., 2010).

Summarizing this section, Chinese regulation and supervision has been focusing on capital stability early and accepted the initial versions of the Basel accords to be able to meet international standards. Entrance requirements for foreign banks are strict, and they have to

have large amounts of capital and operating funds to be authorized. According to Loechel et al. (2010), by joining the Basel Committee on Banking Supervision (BCBS) in 2009, China was planning to integrate the Basel III requirements in order to improve the regulatory and supervisory level in the following years. The next chapter outlines the Basel III capital- and liquidity requirements.

5 The Basel III capital- and liquidity requirements

The official "Assessment of Basel III regulations – China" report (BCBS, 2013b) summarizes the overall assessment by stating that the Chinese capital rules are closely aligned with the Basel III standards and that the total capital ratios of Chinese banks were above the minimum in 2012. However, the assessment is only looking at the capital adequacy ratio and only covering data from 12 domestic banks in 2012. Before the following chapter conducts an analysis of the sample at hand, the Basel III capital requirements, and one liquidity requirement are presented.

The capital requirements for China differ in the way that the CBRC's rules were stricter than the original Basel III standards. In particular, according to the assessment report (BCBS, 2013b), the commercial banks had to meet a minimum ratio of 5% for the Common Equity Tier 1 (CET1) by 1st of January 2013 which is 0.5% above the minimum required by the Basel standards. The minimum requirement for the Tier 1 CAR was remaining at 6%. The total capital requirement similarly remains at 8% as required. The difference between the total capital requirement and the Tier 1 requirement, as usual, can be met with Tier 2 and higher forms of capital (BCBS, 2010).

The capital conservation buffer was introduced earlier, from 1st January 2013 instead of 1st January 2016 as required. According to the Basel III accords, (BCBS, 2010) the capital conservation buffer is comprised of CET1 capital and is added to the regulatory minimum capital requirement to ensure that banks build up a capital buffer outside periods of stress so it can be used if unexpected losses occur. Including the capital conservation buffer, the CBRC requires commercial banks to have 7.5% CET1 as of 1st January 2013.

For the four Chinese G-SIBs (FSB, 2014), the additional loss absorbency requirement is currently 1% which will be applied as an extension of the capital conservation buffer and must be met with CET1 capital. It will be fully effective as of 1st January 2019 (BCBS, 2015).

As this paper concerns a second measure inside the Basel III accords, the Net Stable Funding Ratio (NSFR) is in focus. The BCBS defines the NSFR as "a longer-term structural ratio designed to reduce funding risk over a longer time horizon by requiring banks to fund their activities with sufficiently stable sources of funding in order to mitigate the risk of future funding stress" (BCBS, 2015). The NSFR can be calculated by taking a bank's available stable funding (ASF) and dividing it by its required stable funding (RSF). The calculated ratio has to be at least 100% by 1st January 2018 (Dietrich et al., 2014).

According to King (2013), the NSFR encourages banks to hold more high-quality, liquid assets and to fund from stable sources like deposits, longer maturity debt, and equity. It covers on- and off-balance sheet items and encourages banks to fund long-term illiquid assets with long-term capital. The Liquidity Coverage Ratio (LCR) which is a short-term liquidity measure and addresses liquidity risk is designed to make sure that banks have adequate liquidity to endure 1 month of stressed funding conditions. Banks have to fulfil the minimum LCR ratio of 60% by 1st of January 2015, and this minimum is steadily increasing by 10% until it reaches the final threshold of 100% by 1st of January 2019 (King, 2013).

This paper is not looking at the LCR since information on composition and duration of liquid assets and 30-day liabilities are not presented in the annual reports. Since the Chinese banks have to report this data only from 1st of January 2015, there was no similar measure in place before that time. The lack of a similar measure means that historical information for Chinese banks is not available which is different for the NSFR since it can be primarily calculated from balance sheet data as banks have to report that information in their annual reports.

The following chapter presents how the NSFR is calculated in detail and which assumptions have to be made before calculating it by using the simplified version (King, 2013). Moreover, a sample calculation for the Industrial and Commercial Bank of China (ICBC) is shown.

6 Analysis

This chapter analyses the sample of 163 banks in China by looking at the Tier 1 capital ratios and estimated Net Stable Funding Ratios from 2007 to 2014. The starting assumptions and adjustments of the simplified formula (see chapter 3.2) are explained in section 6.1. A sample calculation of the NSFR for a representative Chinese bank is also given. Chapter 6.2 conducts the analysis for the banks in China and explains how the sample is divided into three groups to ensure a better analysis between different banks according to their size and share of the total assets of the sample. Chapter 6.3 conducts a sensitivity analysis by changing one assumption in the formula for the Net Stable Funding Ratio. Chapter 6.4 compares the results from the analysis of Chinese banks with the international benchmark using data from the official Basel III Monitoring Report (BCBS, 2015).

6.1 Calculation of the NSFR and starting assumptions

The NSFR will be estimated using the simplified version mentioned in chapter 3.2 which relates to the simplified version used by King (2013).

The numerator measures the sources of available funding and gives greater weight to the most stable sources that are less likely to disappear under stressed conditions. Equity, long-term wholesale funding and long-term liabilities are the most stable form of funding and are given a weight of one. Stable deposits follow with a weight of 95%, less stable deposits with 90%. Short-term debt is considered as a least stable form of available funding and thus receives a weight of 50%. The weights have been updated in 2014 and differ to the ones King used for his research (King, 2013; BCBS, 2014).

Similarly, the denominator measures the sources of required funding and gives a factor based on an asset's expected liquidation value under stressed conditions. The higher the weight, the less stable the asset is considered. Here, this paper makes adjustments compared to the formula used by King (2013). Cash, securities with less than one-year maturity and interbank claims do not have to be funded and are not shown in the formula since their weight is zero. Government debt is considered as highly liquid and receives a small weight of five percent. Corporate loans maturing within one year and retail loans with the same maturity have to be funded with 50% and 85% of their value according to BCBS (2014).

However, since it is not possible to distinguish the maturity of loans given the data from the annual reports we assume all loans have to be funded with 85%. This assumption

may be more conservative, but it is relating to the assumption made by Gobat et al. (2014). Similarly, Level 2 securities are added to the RSF, which is an adjustment to King's version and relates to Gobat et al. (2014) as well. Unchanged are residential mortgages of any maturity that receive a weight of 65% and all other assets that must be completely funded and receive a weight of 1 (King, 2013; BCBS, 2014).

The following sample calculation in Table 1 presents the estimated ASF, RSF and NSFR for the ICBC in 2014 and summarizes the starting assumptions.

	Weights	ICBC 2014
Required Stable Funding (RSF)		
Residential Mortgage Loans	65%	2070366,00
Other Mortgage Loans	65%	0,00
Other Consumer/Retail Loans	85%	993099,00
Corporate & Commercial Loans	85%	7962866,00
Other Loans	85%	0,00
Government Securities	5%	1577465,00
Total Securities		4486204,00
At-equity Investments in Associates	100%	28919,00
Level 2 Securities	50%	2879820,00
Total Assets		20609953,00
Total Earning Assets		16506192,00
Non-interest earning Assets	100%	4103761,00
Other Earning Assets	100%	0,00
Available Stable Funding (ASF)		
Customer Deposits - Current	90%	7619506,00
Customer Deposits - Savings	95%	0,00
Customer Deposits - Term	95%	7937095,00
Total Long Term Funding	100%	292472,00
Equity	100%	1537304,00
Other Deposits and Short-term Borrowings	50%	154512,00
ASF		16304827,65
RSF		14609771,4
NSFR		111,60%

Table 1: Sample Calculation of the NSFR for the ICBC in 2014.
Source: Own calculations based on data from Bankscope and weights from BCBS (2014) & Gobat et al. (2014).

The components of the ASF and RSF are weighted by their respective factor (BCBS, 2014; Gobat et al., 2014) and inserted into the simplified, adjusted formula shown above. Because of our first assumption, all loans are receiving the same weight. To get the Level 2 securities, government securities and at-equity investments in associates are deducted from

total securities. Similarly, to get non-interest earning assets, total earning assets have to be deducted from total assets. Only those components which receive a weight in Table 1 are used in the formula. Relating to Gobat et al. (2014), the current customer deposits are assumed to be less stable and thus receive a weight of 90%. Other deposits categories are considered stable with a weight of 95%.

The following section presents the analysis and shows how the bank's Tier 1 CAR's and NSFR values are developing between 2007 and 2014.

6.2 Analysis of Tier 1 CAR and NSFR for the banks in the sample

In order to better compare the banks in the sample regarding their size and market share this paper separates the total sample of banks into three groups. Figure 4 presents the asset proportion of the three groups of the total sample. The largest five Chinese banks (the "Top 5") already account for 54% of the total assets in 2014 and represent the first group. The second group consists of banks accounting for 80% of total assets (so from 54% to 80%) and are classified as medium-sized banks. The last group represents the last 20% of total assets and the included banks are categorized as small-sized banks. Inside group three, foreign banks have a share of only two percent of the total assets in the sample. A table with the share size of the entire banking sector as well as a list of banks that are included in group two and three can be found in the Appendix (Table A1 and A2).

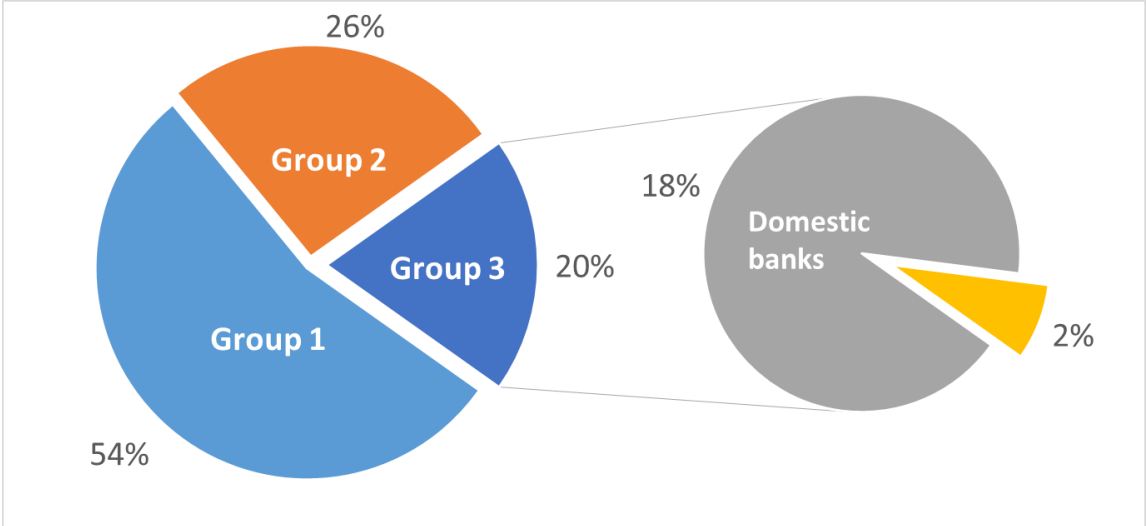

Figure 4: Asset proportion of the groups in the sample in 2014.
Source: Own calculations based on data from Bankscope.

Relating to Hong et al. (2014), robustness against outlier observations is ensured by excluding certain banks for particular years if balance sheet items necessary for calculating

the NSFR are missing. In particular, if total assets, long-term customer deposits or equity are not reported, the bank is taken out for that specific year. Otherwise, the NSFR cannot be calculated with accuracy and the value might be misleading. This exclusion leads to a smaller bank count for certain years and the summary for how many banks it was possible to calculate the NSFR given the balance sheet data is shown in Table A3 in the Appendix. Similarly, if the Tier 1 CAR is not reported, the bank is not counted in the analysis for that particular year.

The Tier 1 CAR does not need to be calculated and are directly taken from the Bankscope database which provides reported values for the banks from 2007 – 2014. Figure 5 gives an overview of how many banks fulfilled the minimum Tier 1 CAR requirement and Figure 6 presents the differences between the three groups.

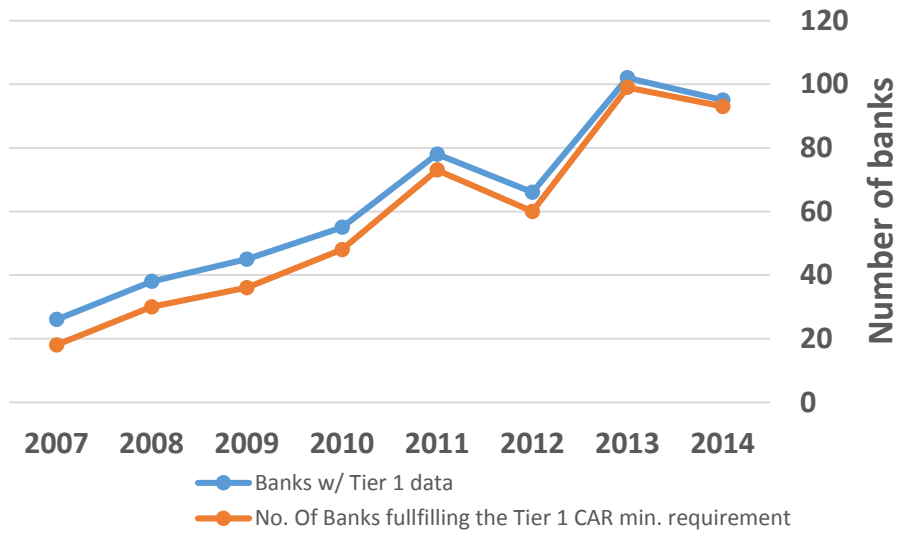

Figure 5: Count of banks with Tier 1 data and those above the minimum requirement.
Source: Own calculations based on data from Bankscope.

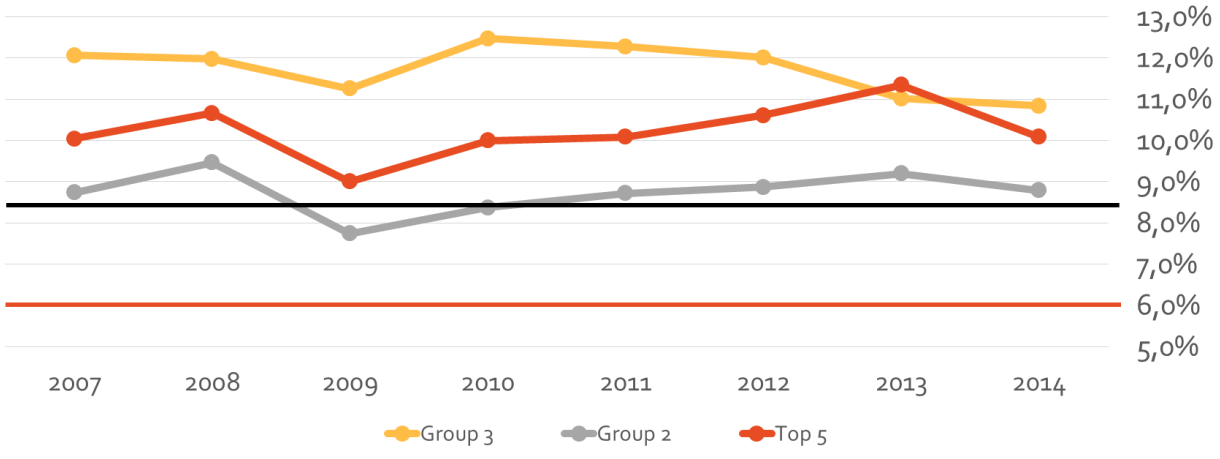

Figure 6: Tier 1 weighted average CAR for three groups.
Source: Own calculations based on data from Bankscope.

Over the past eight years, the number of banks reporting the Tier 1 CAR has steadily increased. At the same time, most of the banks fulfilled the minimum requirement of 6% plus 2.5% capital conservation buffer with 99 of 102 in 2013 and 93 of 95 in 2014 (see Table A3 for more details). This high number is not surprising since the banks have to report their ratios and fulfil the Basel III requirement as of 1st January 2013 but minimum CAR had to be reported and fulfilled even earlier.

All three groups met the minimum Tier 1 CAR of 6% on average. In 2009, the values were the lowest with a weighted average Tier 1 CAR of 7.7% for group 2 banks and 9.0% for the Top 5 banks which means that the group 2 banks would not have fulfilled the minimum plus the capital conservation buffer at that time. Moreover, group three that consists of small-sized banks regarding their asset share, has the highest weighted average Tier 1 CAR in all years except 2013. These high ratios can be explained by the high capital amounts that foreign banks have to bring in when they start a locally incorporated foreign bank in China. Since these foreign banks (37 in the sample in 2014) are included in the third group, they are responsible for an increase in the weighted average Tier 1 CAR. The peak of Tier 1 CAR has been reached in 2013 for the Top 5 banks with 11.3% on average and in 2008 for group two banks with 9.5%. However, their CAR in 2013 is the second highest with 9.2% which is still above the required minimum plus the capital conservation buffer.

Since the foreign banks only account for a small proportion of the total assets in the sample (2%), they have been excluded in figure 7 and group three is therefore shown twice, once with and once without foreign banks. The influence of locally incorporated foreign banks on the Chinese market remains small which does not favour an analysis where foreign banks are treated as a separate group. They are rather included in group three and excluded to see how the small-sized banks Tier 1 CAR's develop and if there is a large difference.

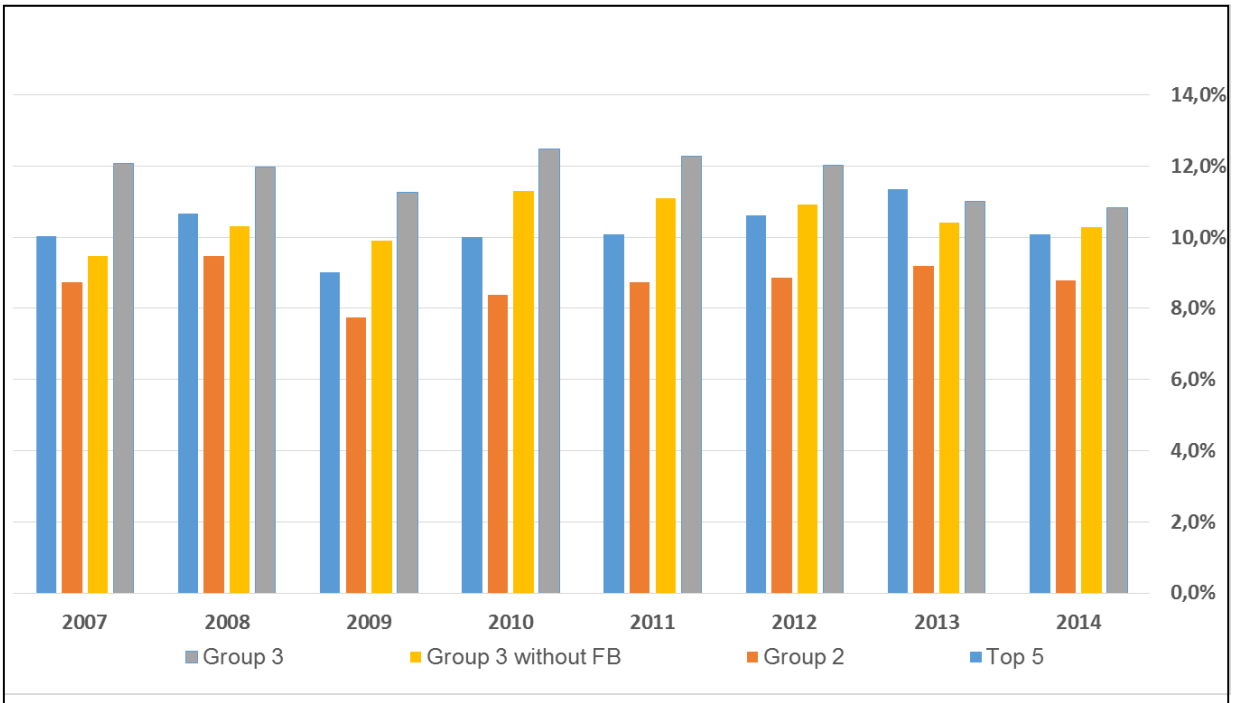

Figure 7: Tier 1 weighted average CAR's with foreign banks excluded as a fourth group.
Source: Own calculations based on data from Bankscope.

Now, the third group is only outperforming the other two groups between 2009 and 2012, and the trend has changed for the other years. The Top 5 have higher capital ratios in 2007, 2008, 2013 and almost the same in 2014. The influence of the foreign banks can be seen by comparing both group three values. Although the share of the foreign banks is small, their impact on the third group is evident between 2007 and 2012. Therefore, excluding them from the third group makes sense. Group 2 banks always have lower capital ratios compared to the other groups but are still able to fulfil the minimum requirement plus the capital conservation buffer from 2011 to 2014. The table with all the weighted average Tier 1 CAR's for the three groups between 2007 and 2014 is presented in Table A4 in the Appendix.

Figure 8 presents the number of banks that fulfil the minimum NSFR requirement of 100% from 2007 to 2014, and Figure 8 shows how the three groups differ from each other.

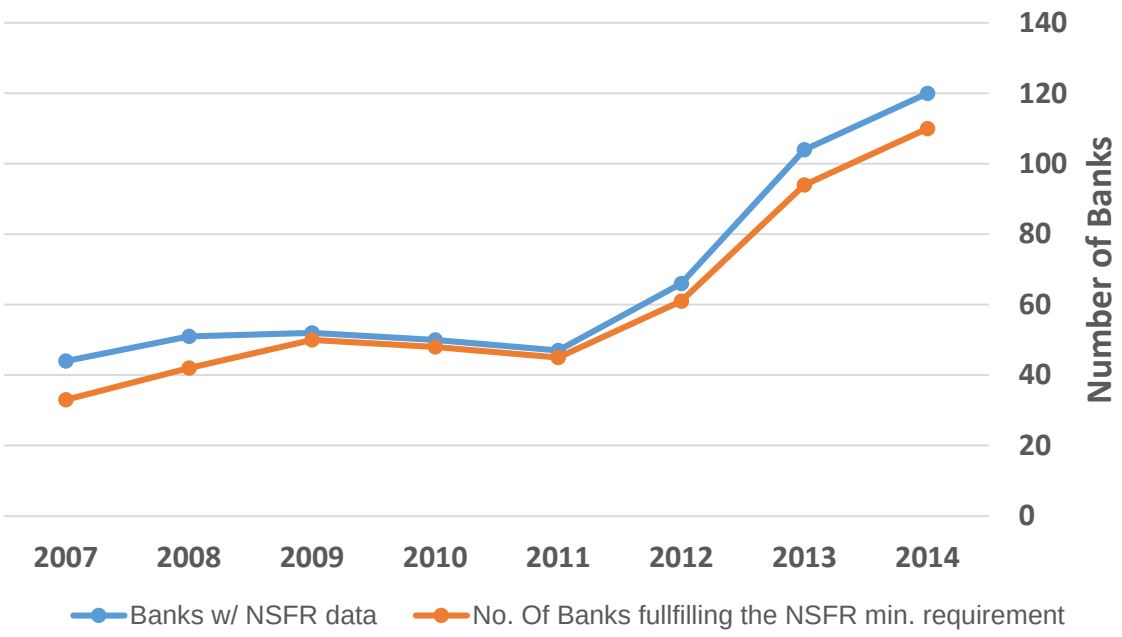

Figure 8: Count of banks with NSFR data and those above the minimum requirement.
Source: Own calculations based on data from Bankscope.

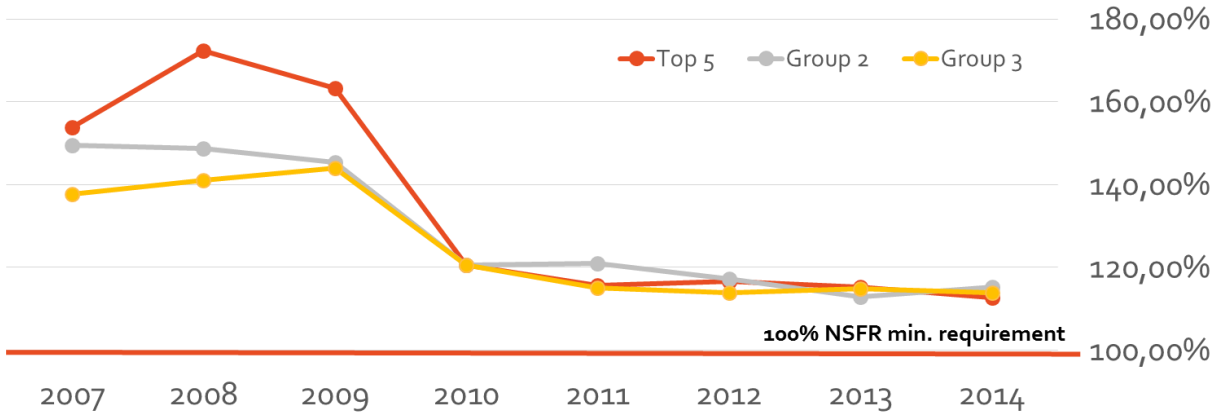

Figure 9: Weighted average NSFR for the three groups.
Source: Own calculations based on data from Bankscope.

Similar to the Tier 1 CAR, more banks have started to report the balance sheet items necessary to calculate the NSFR over the past years. Although the NSFR requirement is not phased in yet and banks will have to comply by 1st January 2018, the advantage compared to the LCR is that it is still possible to calculate the NSFR from annual report information if the balance sheet items required for the calculation are available. Overall, most of the Chinese banks in the sample fulfil the minimum requirement of 100%.

Between 2007 and 2009, the Top 5 banks have outperformed the other two groups and their weighted average NSFR is peaking in 2008 with an average ratio of 172.4%. This peak can be explained by looking at the ASF and RSF of the group. The ASF for the Top 5

increased by more than 12 percent compared to the RSF, which has been caused by a significant increase in customer deposits. The Top 5 were mostly relying on deposits at that time and the share of total deposits to total assets compared to the percentage of total loans to total assets has been much higher (see Table A5 in the Appendix). The steep decline for the Top 5 between 2009 and 2010 can be explained by a higher increase of the RSF, which grew by 57.2% (compared to 17.6% of the ASF) from the previous year. It has been caused by a significant increase in loans. In general, the Top 5 have increased their reliance on loans from 2007 where the share of corporate and commercial loans to total assets has been 15.9% compared to 38.5% in 2014. That explains the decline of the NSFR between 2008 and 2011 since the RSF has started to increase more than the ASF. In 2014, the Top 5 show a NSFR of 112.7% which is still above the minimum requirement.

Group 2 has been slightly outperforming the Top 5 in 2011 with an NSFR about 5% higher. However, the general trend in the last three years shows that all three groups have been on the same level, and the weighted average of the NSFR for all three groups seem to even out between a range of 112% and 118%. The total weighted average of all banks is 113.6% in 2014 and 114.7% in 2013 which is mostly due to the Top 5 that have a high share of total assets in the sample. All the weighted average NSFR values are presented in Table A6 in the Appendix.

Summarizing the results, most of the banks that report Tier 1 capital ratios or balance sheet items necessary to calculate the NSFR fulfil the minimum requirements. In most years, the Top 5 seem to outperform the other two groups when looking at the NSFR. However, these banks do not show the highest Tier 1 capital ratios in the past. In 2014 however, they reported a capital ratio which is above the other groups. Keeping in mind that the Top 5 Chinese banks combine more than half of the assets in the sample size and 43% of the banking sector's total assets in 2014 and the fact that four of them are considered G-SIBs, the overall market is heavily relying on their stability.

6.3 Sensitivity analysis of the NSFR

According to Gobat et al. (2014), the risk level of mortgage loans cannot be seen in the annual reports of the banks, and they assume a weight of 85% instead of 65% in the RSF denominator. Since the real estate market in China is quite large, we have calculated how the three groups rely on mortgage loans as a share of their total assets. The results can be seen in Table A5 in the Appendix.

Particularly for the Top 5 banks, their mortgage loans as a share of their total assets is increasing from 2.9% in 2007 to 10.9% in 2014. However, group two and three only marginally rely on mortgage loans as their ratios are around 3.5% to 4% of total assets in 2014 and have decreased since 2007.

The results of the sensitivity analyses can be seen in Table 2. As expected, the Top 5 bank's NSFR is declining the most with 3% in 2014 since they rely more on mortgage loans than the other two groups. As they account for 54% of the total assets in the sample, the overall weighted average NSFR in 2014 decreases by 2.2%. However, it cannot be concluded that changing the weight of the mortgage loans will lead to a massive decline of the NSFR. The minimum threshold is still fulfilled, and the NSFR only drops by a few percentage points which means that even a higher default rate of mortgage loans during a stressful period would not largely increase the funding risk of Chinese banks. The weighted average NSFR values with 85% weight for mortgage loans are presented in Table A7 in the Appendix.

	2014	2013	2012	2011	2010	2009	2008	2007
Total banks	-2,18%	-2,25%	-2,25%	-2,35%	-2,42%	-2,99%	-2,64%	-2,84%
Top 5	-3,00%	-2,78%	-2,52%	-2,46%	-2,50%	-3,05%	-2,73%	-2,92%
Group 2	-1,20%	-1,67%	-2,01%	-2,36%	-2,55%	-3,25%	-2,72%	-2,83%
Group 3	-1,10%	-1,01%	-1,03%	-1,32%	-1,11%	-1,14%	-1,02%	-1,11%

Table 2: Change of weighted avg. NSFR values with 85% weight of mortgage loans.
Source: Own calculations based on data from Bankscope.

6.4 Comparison of Chinese banks with the international benchmark

This section compares the Tier 1 CAR's and the estimated NSFR values with data from the official Basel III Monitoring Report (BCBS, 2015). The data included in the report is based on end of 2014 data and covers a sample of 221 banks in total. It includes 100 large and internationally active banks (defined as "Group 1" banks by the BCBS if their Tier 1 capital is more than 3€ billion) and 121 other banks (defined as "Group 2" banks, see Table A11 in the Appendix for more information on the sample). This data is used as a benchmark to see whether and to which degree Chinese banks can compete with their international competitors.

For the analysed sample, differentiating banks with Tier 1 capital above 3€ billion and those below leads to an unequal weight of the total sample since banks with Tier 1 capital above 3€ billion already accounted for 94% of the total assets of the sample in 2014. That is why the sample groups have been constructed as described in chapter 6b.

The Tier 1 CAR for the three groups are calculated again but the banks will not be weighted this time since the Tier 1 CAR in the monitoring report is an average value and not weighted. The Chinese banks within the three groups have been weighted since the larger banks have a higher share of total assets and comparisons within the sample are more reasonable with weighted averages.

According to the monitoring report (BCBS, 2015), the aggregate capital ratios are shown under the transitional and fully phased-in Basel III rules. Since the Chinese banks are not reporting the capital ratios in the fully phased-in view of 2022, this paper will compare the transitional capital ratios from the monitoring report with the average values taken from Bankscope. Fully phased-in means that the definition of capital and the calculation of risk-weighted assets differs from the transitional period which lowers the capital ratios in that case (BCBS, 2015).

The average Tier 1 capital ratio of group 1 banks is 12.8% at the end of 2014 and 11.3% for the Top 5 in China at the same time. Group two has a capital ratio of 9.2%. These results indicate that large Chinese banks have lower capital ratios than the international group 1 banks. Moreover, one-quarter of the international group 1 banks has a value below 11.9 % which would put the Top 5 and the group 2 banks inside the 25th percentile according to the monitoring report (BCBS, 2015). Figure 10 shows the gap that the Chinese banks have to the international 25th percentile which is 11.9% for the Tier 1 capital ratio.

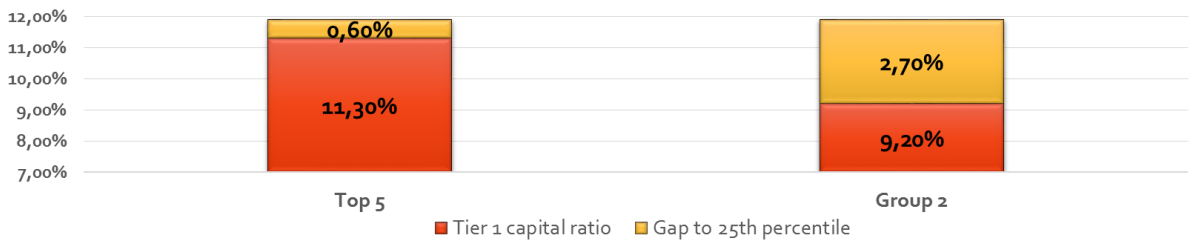

Figure 10: International comparison of Tier 1 CAR's of large Chinese banks in 2014.
Source: Own calculations based on data from the Monitoring Report (BCBS, 2015).

The third group from the sample will be compared with group 2 banks from the monitoring report since the third group mostly consists of smaller banks and their Tier 1 capital is mostly below 3 billion Euro. The aggregate average of international group 2 banks is 13.4%. Chinese small-sized banks have a Tier 1 CAR of 16.2% if foreign banks are included. Without foreign banks, the capital ratio is 11.2%. That means that domestic small-sized banks cannot compete with their international competitors but are still above the 25th

percentile which is 11.0% (BCBS, 2015). Figure 11 shows the gap of Chinese small- and medium-sized banks to the 75th percentile of international group 2 banks. Since excluding the foreign banks from the sample leads to a lower Tier 1 capital ratio, the small- and medium-sized banks in China are then below the median and the gap is 1.9%.

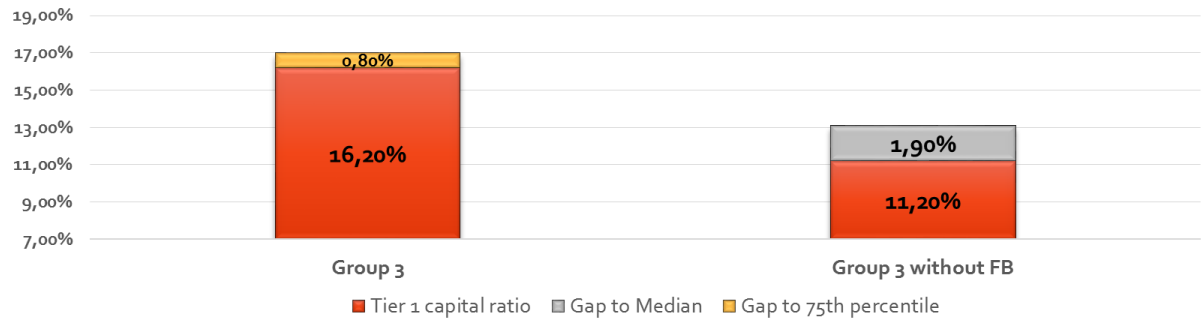

Figure 11: International comparison of Tier 1 CAR's of group three banks in 2014.
Source: Own calculations based on data from the Monitoring Report (BCBS, 2015).

Summarizing the comparison, the largest 5 and other large Chinese banks are performing below the average of large, internationally active banks and are outperformed by over 75% of the banks. Group three banks are performing better than the average if foreign banks are included and below average if foreign banks are excluded.

For the NSFR, the BCBS is calculating weighted averages (BCBS, 2015). Group 1 banks have a weighted average NSFR of 111.2% whereas Group 2 banks have 113.8%. Looking at the weighted averages of Chinese banks, the Top 5 have a NSFR of 112.7% and Group 2 banks have a NSFR of 115.3%. Both are above the weighted average of international competitors and would place the Chinese banks in the second half above the median. Figure 12 illustrates the gap of the Chinese banks to the 75th percentile of large, international banks which is 117.1%.

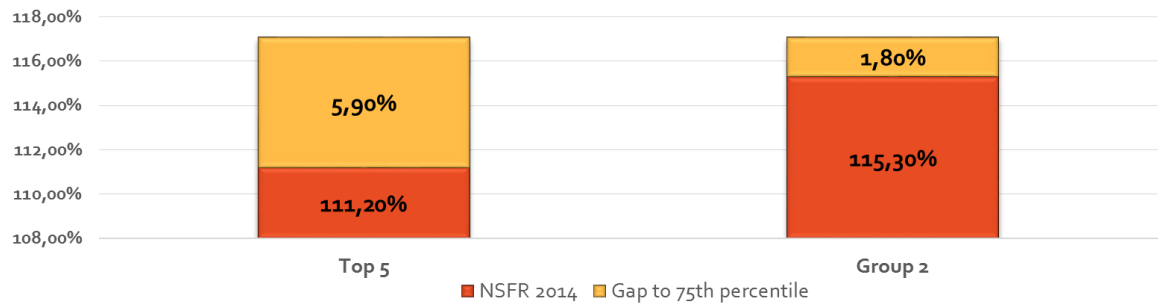

Figure 12: International comparison of the NSFR of large Chinese banks in 2014.
Source: Own calculations based on data from the Monitoring Report (BCBS, 2015).

The small-sized Chinese banks have a weighted average NSFR of 113.9% which is about the same as the weighted average of international group 2 banks. They are still below the median and thus in the lower half. Figure 13 shows the gap of small- and medium-sized Chinese banks to the median of group 2 international banks. The median is 116.7%.

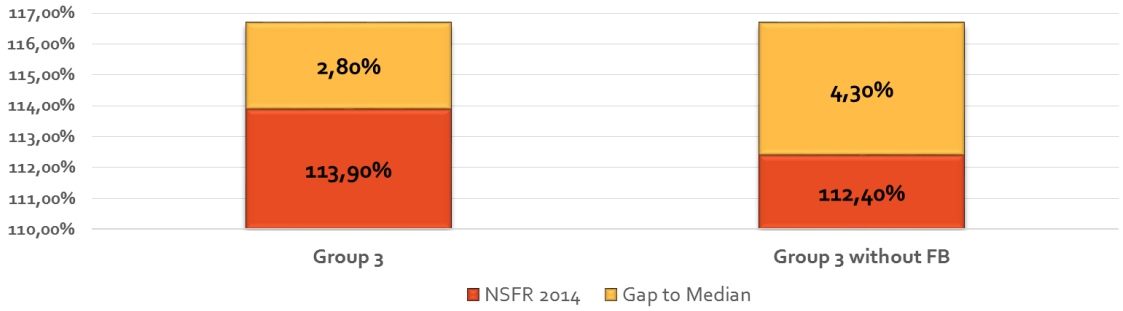

Figure 13: International comparison of the NSFR of group three banks in 2014.
Source: Own calculations based on data from the Monitoring Report (BCBS, 2015).

The tables with the Tier 1 capital ratios and NSFR's for international banks from the official Basel III Monitoring Report (BCBS, 2015) can be found in Table A8 to A10 in the Appendix.

Summarizing the findings, Chinese banks have a more stable NSFR when comparing the weighted averages to international competitors. The Top 5 are showing the highest values in 2014 and are in the second half of large, internationally active banks.

7 Discussion

The results indicate that the minimum requirements, both for the Tier 1 capital ratios and the NSFR, are generally met by all Chinese banks in the sample. However, over the past years, the NSFR of the biggest five banks has been steadily decreasing. The importance of these five banks is undeniable as they hold the largest share of the market in 2014 (CBRC, 2014) and account for over 50% of the total assets in the sample.

King (2013) argues that strategies to increase the NSFR require an increase of the ASF or a decrease of the RSF. One way of raising the ASF is to raise the share of stable and unstable deposits. Since stable deposits are weighted with 95%, this asset category would have a large impact on the ASF. However, according to the CBRC (2014), the largest five Chinese commercial banks are losing customers, and their share of the total market decreases. To attract more customers, the Top five have to compete with other large banks. To be more attractive for customers, they would have to offer better conditions than other banks which result in higher expenses. An increase in costs would lower their Net Interest Margin (King, 2013) and might therefore not be the superior strategy. A second strategy of raising the ASF is to increase the maturity of wholesale funding. The downside is again an increase in the interest expense since the cost of long-term debt is higher than short-term debt. The least desirable way of increasing the ASF is to increase shareholder's equity. Increasing shareholder's equity would lead to higher capital ratios at the same time but would lower the return on equity (King, 2013).

Decreasing the RSF is another possibility to lower the NSFR. Since the top five heavily rely on loans, they could reduce their loan portfolio or exchange loans with higher weight with loans that receive lower weight in the NSFR. An example would be to increase mortgage loans and reduce corporate loans. However, since four of the five largest Chinese banks are still largely owned by the government, it might be harder than expected. The policy of the Chinese government includes stimulating the economy by giving out loans to corporate customers. The decline in interest rate over the last years and the increase of real estate and commercial loans at the same time support this policy. According to the PBOC (2009), real estate loans have increased by 30.7% and loans to small- and medium-sized enterprises rose by 30.1 % from 2008 to 2009. The results from the sample analysis help to explain why the NSFR of the five biggest banks is declining. In order to increase the NSFR, a decrease of the RSF seems more reasonable if the government changes its course.

For the other large banks that are included in group two, the Tier 1 CAR are the main issue. An increase in Tier 1 capital or a reduction of a bank's risk-weighted assets can lead to a higher capital ratio. According to King (2013), substituting assets with high weight in the RSF by high-quality, liquid assets reduces the RWAs at the same time. Since the market share of other large banks, especially the joint-stock commercial banks and city commercial banks has been increasing during the past years, their importance for the banking sector increases as well. They will have to either increase their Tier 1 capital (with the downside of lower return on equity) or exchange their funding structure to achieve higher capital ratios and a lower RSF. There are synergies between the NSFR and the capital requirements which are an additional motivation for these banks (King, 2013).

Hu and You (2011) argue that the Basel III capital requirements will have a larger impact on the profitability and competitiveness of small and medium-sized banks in China than of the large commercial banks. Small and medium-sized banks may have limited ways of adjusting their capital buffer since their cost of adjusting the buffers would be higher in relative terms. The authors point out that these banks typically operate in rural and local areas only and at the same time do not have as many branches as large commercial banks. Therefore, their business depends more on the development of local businesses and individual loans (Hu & You, 2011). Looking at the results of the sample analysis, the medium and smaller-sized banks perform quite well regarding their capital ratios. Especially foreign banks are part of the last group, and their capital buffers are high because of the entry requirements on the Chinese market. But even without the foreign banks, the medium and smaller-sized banks have capital ratios above the minimum requirement. Their share of the total market is steadily increasing (CBRC, 2014) which proves them stable for the future.

8 Conclusion

The purpose of this thesis was to show whether commercial banks in China can comply with the Basel III capital- and liquidity requirements. For this reason, the Tier 1 capital ratio and the Net Stable Funding Ratio were analysed for 163 Chinese commercial banks in the sample. Additionally, a comparison with internationally active banks was conducted to see if Chinese commercial banks can compete with large banks around the world.

The main contribution of this thesis is that the analysis of a sample of Chinese commercial banks this large has not been done before. Previous research mainly focused on banks in western countries, partly because they were affected more by the U.S. financial crisis or European debt crisis (Chalermchatvichien et al., 2014). This paper builds on previous research by estimating the NSFR with a simplified formula and adjusting the assumptions according to King (2013) and Gobat et al. (2014). Nevertheless, the importance of Chinese commercial banks is undeniable and has been highlighted in this paper. The Chinese banking sector is one of the largest in the world, and this thesis is contributing to existing research by conducting a deeper and detailed analysis.

To achieve the research purpose, the results of the sample analysis have been used to answer both research questions. The findings prove that most Chinese commercial banks are currently fulfilling the minimum requirements of the tier 1 capital and net stable funding ratio and have been meeting them in the past eight years. Especially the five largest commercial banks, four of them considered systemically important, meet the requirements in all years. Smaller- and medium-sized Chinese banks show strong capital ratios, partly because of foreign banks that have to fulfil high entry requirements on the Chinese market. Some large commercial banks are struggling with their capital ratios but still meet the minimum requirements. Therefore, the first research question can be answered positively.

To answer the second research question, data from the official Basel III Monitoring Report was used to compare the results of the analysis with the respective data of international banks (BCBS, 2015). The findings suggest that for the larger commercial banks in China, improvements can be made since their Tier 1 capital ratios are below the 25th percentile in 2014. Medium and smaller-sized banks, on the other hand, are performing quite stable and do not need to fear the comparison to internationally active banks.

For the NSFR, the picture looks different. The larger Chinese commercial banks that have the most influence on the banking market show NSFR's above the median of international banks. Although they heavily rely on commercial- and mortgage loans, the largest Chinese commercial banks can still compete in the global perspective and show a healthy mix of their funding structure. Smaller- and medium-sized Chinese banks have NSFR's below the median but above the 25th percentile. The second research question can, therefore, be answered in the following way: Larger Chinese banks show lower capital ratios but higher NSFR's than the average of internationally active banks. For smaller- and medium-sized Chinese banks, it is the other way round. They show higher capital ratios than the international average but lower NSFR's.

Overall, we can conclude that there is room for improvement when comparing Chinese commercial banks to their international competitors. Since larger Chinese banks have more influence on the banking sector, improving the capital buffers will be the priority.

Since this paper limits its research on the long-term liquidity measure, an interesting issue for future research would be an analysis of the Liquidity Coverage Ratio (LCR) of Chinese commercial banks. At the beginning of this study, Chinese commercial banks did not disclose the necessary information to calculate the LCR. Since this requirement has been introduced on 1st of January 2015, the analysis of this short-term liquidity measure will be possible in the future.

Another interesting issue for future researchers might be to improve further the amount of available data of smaller- and medium-sized commercial banks in China that can be included in an analysis. Since more and more banks have reported their Tier 1 capital ratios over the past eight years, the same trend can be expected for the disclosure of liquidity measurements like the LCR or NSFR.

Reference List

Banerjee, R. N., & Mio, H., 2014. The Impact of Liquidity Regulation on Banks. BIS Working Papers No. 470. Monetary and Economic Department. Available at http://www.bis.org/publ/work470.pdf [Accessed 24 May 2016]

Basel Committee on Banking Supervision, 2010. Basel III: A Global Regulatory Framework for more Resilient Banks and Banking Systems. Available at http://www.bis.org/publ/bcbs189.htm [Accessed 10 May 2016]

Basel Committee on Banking Supervision, 2013a. Global systemically important banks: updated assessment methodology and the higher loss absorbency requirement. Available at http://www.bis.org/publ/bcbs201.pdf [Accessed 10 May 2016]

Basel Committee on Banking Supervision, 2013b. Regulatory Consistency Assessment Programme (RCAP) – Assessment of Basel III regulations – China. Available at http://www.bis.org/bcbs/implementation/l2_cn.pdf [Accessed 10 May 2016]

Basel Committee on Banking Supervision, 2014. Basel III: the net stable funding ratio. Available at http://www.bis.org/publ/bcbs271.pdf [Accessed 10 May 2016]

Basel Committee on Banking Supervision, 2015. Basel III Monitoring Report. Available at http://www.bis.org/bcbs/publ/d334.pdf [Accessed 10 May 2016]

Brunnermeier, M., Crocket, A., Goodhart, C., Persaud, A. D., Shin, H., 2009. The Fundamental Principles of Financial Regulation. Centre for Economic Policy Research (CEPR). Available at https://www.princeton.edu/~markus/research/papers/Geneva11.pdf [Accessed 10 May 2016]

Chalermchatvichien, P., Jumreornvong, S., Jiraporn, P., 2014. Basel III, capital stability, risk-taking, ownership: Evidence from Asia. Journal of Multinational Financial Management 28 (2014), 28 – 46.

China Banking Regulatory Commission, 2015. Annual Report 2014. Available at http://www.cbrc.gov.cn/EngdocView.do?docID=9C4B3E31E7C54C3E9B4C168A61F49F9B [Accessed 10 May 2016]

Dietrich, A., Hess, K., Wanzenried, G., 2014. The good and bad news about the new liquidity rules of Basel III in Western European countries. Journal of Banking & Finance 44 (2014), 13 – 25.

Duijm, P. & Wierts, P., 2014. The Effects of Liquidity Regulation on Bank Assets and Liabilities. Tinbergen Institute Discussion Paper. TI 14-018/IV/DSF 72. Available at http://papers.tinbergen.nl/14018.pdf [Accessed 24 May 2016]

Financial Stability Board, 2014. 2014 update of list of global systemically important banks (G-SIBs). Available at http://www.fsb.org/2014/11/2014-update-of-list-of-global-systemically-important-banks/ [Accessed 10 May 2016]

Gobat, J., Yanase, M., Maloney, J., 2014. The Net Stable Funding Ratio: Impact and Issues for Consideration. IMF Working paper 14/106 (Washington: International Monetary Fund).

Grill, M., Lang, J. H. & Smith, J., 2015. The Leverage Ratio, Risk-Taking and Bank Stability. European Central Bank. Available at

https://www.eba.europa.eu/documents/10180/1018121/Grill,%20Lang,%20Smith+-+The+Leverage+Ratio,%20Risk-Taking+and+Bank+Stability+-+Paper.pdf [Accessed 24 May 2016]

Hellwig, M., 1991. Banking, financial intermediation and corporate finance. In European financial integration, ed. A. Giovannini and C. Mayer. Cambridge: Cambridge University Press.

Hong, H., Huang, J., Wu, D., 2014. The information content of Basel III liquidity risk measures. Journal of Financial Stability 15 (2014), 91 – 111.

King, M. R., 2013. The Basel III Net Stable Funding Ratio and bank net interest margins. Journal of Banking & Finance 37 (2013), 4144 – 4156.

KPMG, 2005. China's city commercial banks: opportunity knocks? Available at http://www.kpmg.com.cn/en/virtual_library/Financial_advisory_services/Chin_comm_bank/Opportunity_knocks.pdf [Accessed 10 May 2016]

Liao, M., 2012. The comparison of loan to deposit, liquidity coverage and net stable funding ratio. China Finance 40 Forum, 09.

Loechel, H., Packham, N. & Li, H. X., 2010. International Banking Regulation and Supervision after the Crisis. Implications for China. Available at http://www.frankfurt-school.de/clicnetclm/fileDownload.do?goid=000000263824AB4 [Accessed 10 May 2016]

Lulla, D. & Khan, S. A., 2015. China Banking report 2015. Available at http://go.snl.com/rs/080-PQS-123/images/China%20banking%20report.pdf [Accessed 10 May 2016]

Martin, M. F., 2012. China's Banking System: Issues for Congress. Congressional Research Service. Federation of American Scientists. Available at https://www.fas.org/sgp/crs/row/R42380.pdf [Accessed 10 May 2016]

Merton, R. C., 1993. Operation and regulation in financial intermediation: A functional perspective. In Operation and regulation of financial markets, ed. P. Englund. Stockholm: Economic Council.

The People's Bank of China (PBOC), 2009. Banking Institutions Loan investment report 2009. Available at http://www.gov.cn/gzdt/2010-01/20/content_1515740.htm [Accessed 10 May 2016]

Vazques, F. & Federico, P., 2012. Bank Funding Structures and Risk: Evidence from the Global Financial Crisis. IMF Working paper 12/29 (Washington: International Monetary Fund).

Xie, P., 2011. Impact and inspiration: Basel III on the Chinese regulatory framework. Financial Focus 02, 8 – 11.

You, C. & Hu, C., 2011. Impact of Basel III to small and medium size banks in China.

Zou, Y., 2013. Basel III and Its Implementation in China's Banking Industry. Available at https://publishup.uni-potsdam.de/opus4-ubp/files/6635/EFC_Yasheng_Zou_43_54.pdf [Accessed 10 May 2016]

Appendix

Table A1: Overview of the sample groups and respective bank type for included banks

Group One	Bank type	Group Two	Bank type
Industrial & Commercial Bank of China	Large commerical bank	**Postal Savings Bank of China Co Ltd**	Postal Saving bank
China Construction Bank Corporation	Large commerical bank	**China Merchants Bank Co Ltd**	joint-stock commerical bank
Agricultural Bank of China Limited	Large commerical bank	**Industrial Bank Co Ltd**	joint-stock commerical bank
Bank of China Limited	Large commerical bank	**Shanghai Pudong Development Bank**	joint-stock commerical bank
Bank of Communications Co. Ltd	Large commerical bank	**China CITIC Bank Corporation Limited**	joint-stock commerical bank
		China Minsheng Banking Corporation	joint-stock commerical bank
		China CITIC Bank	joint-stock commerical bank
		China Everbright Bank Co Ltd	joint-stock commerical bank
		Hua Xia Bank co., Limited	joint-stock commerical bank

Group Three	Bank type	Group Three(con't)	Bank type	Group Three(con't)	Bank type
China Guangfa Bank Co Ltd	joint-stock commerical bank	**Bank of Chengdu Co Ltd**	city commerical bank	**Wuhan Rural Commercial Bank**	rural commercial bank
Bank of Beijing Co Ltd	city commerical bank	**Bank of Kunlun**	city commerical bank	**Bank of Tokyo Mitsubishi UFJ (China) Ltd**	foreign bank
Bank of Shanghai	city commerical bank	**Bank of Kunlun Co Ltd**	city commerical bank	**Fudian Bank Co Ltd**	city commerical bank
Bank of Jiangsu Co Ltd	city commerical bank	**Bank of Chongqing**	city commerical bank	**Guangdong Nanyue Bank Co Ltd**	city commerical bank
Evergrowing Bank Co Ltd	joint-stock commerical bank	**Bank of Jinzhou Co Ltd**	city commerical bank	**Jinshang Bank Co Ltd**	city commerical bank
China Zheshang Bank Co Ltd	joint-stock commerical bank	**Dongguan Rural Commercial Bank Co Ltd**	rural commercial bank	**Bank of Jiujiang Co Ltd**	city commerical bank
China Bohai Bank	joint-stock commerical bank	**Tianjin Rural Commercial Bank co Ltd**	rural commercial bank	**Nanchong City Commercial Bank Co., Ltd**	city commerical bank
Chengdu Rural Commercial Bank Co Ltd	rural commercial bank	**Bank of East Asia (China) Ltd**	foreign bank	**Chang'an Bank Co.,Ltd**	city commerical bank
Chongqing Rural Commercial Bank	rural commercial bank	**Bank of Changsha Co Ltd**	city commerical bank	**Bank of Wenzhou Co Ltd**	city commerical bank
Bank of Nanjing	city commerical bank	**Standard Chartered Bank (China) Ltd**	foreign bank	**Qilu Bank co ltd**	city commerical bank
Bank of Ningbo	city commerical bank	**Guangdong Shunde Rural Commercial Bank C**	rural commercial bank	**Zhejiang Chouzhou Commercial Bank**	city commerical bank
Beijing Rural Commercial Bank Co Ltd	rural commercial bank	**Bank of Zhengzhou Co Ltd**	city commerical bank	**Hubei Bank Corporation Limited**	city commerical bank
Shengjing Bank	city commerical bank	**Bank of Suzhou Co Ltd**	city commerical bank	**Nanhai Rural Commercial Bank**	rural commercial bank
Shanghai Rural Commercial Bank	foreign bank	**Jiangsu Jiangnan Rural Commercial Bank Co Lt**	rural commercial bank	**Xiamen Bank**	city commerical bank
Huishang Bank Co Ltd	city commerical bank	**Bank of Dongguan**	city commerical bank	**Bank of Luoyang Co Ltd**	city commerical bank
Bank of Tianjin	city commerical bank	**Bank of Hebei Co Ltd**	city commerical bank	**Weihai City Commercial Bank Co Ltd**	city commerical bank
Guangzhou Rural Commercial Bank Co., Ltd.	rural commercial bank	**Hankou Bank**	city commerical bank	**Bank of Guilin Co Ltd**	city commerical bank
HSBC Bank (China) Co Ltd	foreign bank	**Huarong Xiangjiang Bank Co. Ltd**	city commerical bank	**Hangzhou United Rural Commercial Bank Co L**	rural commercial bank
Bank of Hangzhou Co Ltd	city commerical bank	**Citibank (China) Co Ltd**	foreign bank	**Fujian Haixia Bank Co Ltd**	city commerical bank
Xiamen International Bank	city commerical bank	**Bank of Qingdao Co Ltd**	city commerical bank	**China Resources Bank of Zhuhai Co Ltd**	rural commercial bank
Harbin Bank	city commerical bank	**Bank of Guiyang Co Ltd**	city commerical bank	**Wuxi Rural Commercial Bank Co.,Ltd**	rural commercial bank
Bank of Guangzhou Co,, Ltd	city commerical bank	**Bank of Nanchang co., Ltd**	city commerical bank	**Bank of Ningxia Co Ltd**	city commerical bank
Baoshang Bank	city commerical bank	**Bank of Lanzhou Co. Ltd**	city commerical bank	**Bank of Taizhou Co Ltd**	city commerical bank

Group Three(con't)	Bank type	Group Three(con't)	Bank type	Group Three(con't)	Bank type	Group Three(con't)	Bank type
Changshu Rural Commercial Bank	rural commercial bank	**Deutsche Bank (China) Co Ltd**	foreign bank	**Dongying Bank Co Limited**	city commerical bank	**CITIC Bank International (China) Limited**	foreign bank
Chongqing Three Gorges Bank Co., Ltd	city commerical bank	**Bank of Fuxin Co. Ltd**	city commerical bank	**Bank of Chengde**	city commerical bank	**Shaanxi Fuping BEA Rural Bank Corporation.**	foreign bank
Hang Seng Bank (China) Limited	foreign bank	**Bank of Rizhao**	city commerical bank	**Ningbo Commerce Bank Company**	city commerical bank	**Dah Sing Bank (China) Limited**	foreign bank
Sumitomo Mitsui Banking Corporation (China	foreign bank	**Zhongshan Rural Commercial Bank Company**	rural commercial bank	**Hana Bank (China) Company Ltd**	foreign bank	**Bank of Montreal (China) Co Ltd**	foreign bank
DBS BANK (China) Limited	foreign bank	**Jiangsu Zhangjiagang Rural Commercial Bank**	rural commercial bank	**Jiangsu Haian Rural Commercial Bank**	rural commercial bank	**Kookmin Bank (China) Co., Ltd.**	foreign bank
Zhejiang Xiaoshan Rural Cooperative Bank	rural commercial bank	**Jiangsu Zijin Rural Commercial Bank**	rural commercial bank	**JP Morgan Chase Bank (China) Co Ltd**	foreign bank	**Metropolitan Bank (China) Ltd**	foreign bank
Mizuho Bank (China) Ltd	foreign bank	**Qishang Bank.**	city commerical bank	**Bank of Jiaxing Co Ltd**	city commerical bank	**East West Bank (China) Limited**	foreign bank
Nanyang Commercial Bank (China) Limited	foreign bank	**Guangdong Huaxing Bank Co Ltd**	city commerical bank	**Zhuhai Rural Commercial Bank Limited**	rural commercial bank	**Bank Sinopac (China) Ltd**	foreign bank
Chinese Mercantile Bank	city commerical bank	**Jiangsu Wujiang Rural Commercial Bank**	rural commercial bank	**Bank Of Taian Co.,Ltd**	city commerical bank	**Morgan Stanley Bank International (China)**	foreign bank
Ningbo Yinzhou Rural Cooperative Bank	rural commercial bank	**Xiamen Rural Commercial Bank Co Ltd**	rural commercial bank	**Bank of Jining Co Ltd**	city commerical bank	**SPD Silicon Valley Bank**	foreign bank
Zhejiang Mintai Commercial Bank	city commerical bank	**Fubon Bank (China) Co., Ltd**	foreign bank	**Bank of Huzhou Co Ltd**	city commerical bank	**Chongqing Liangping ANZ Rural Bank Company**	foreign bank
Zhejiang Tailong Commercial Bank Co Ltd	city commerical bank	**Bank of Quanzhou Co., Ltd**	city commerical bank	**Wing Hang Bank (China) Ltd**	foreign bank		
Bank of Liuzhou Co Ltd	city commerical bank	**Foshan Rural Commercial Bank**	rural commercial bank	**Jiangmen Ronghe Rural Commercial Bank Co., Ltd**	rural commercial bank		
Guangxi Beibu Gulf Bank Co Ltd	city commerical bank	**Bank of Cangzhou Co Ltd**	city commerical bank	**Datong City Commercial Bank**	city commerical bank		
Urumqi Bank	city commerical bank	**Bank of Deyang**	city commerical bank	**Zhejiang Wenling Rural Commercial Bank Co Ltd**	rural commercial bank		
Jiangsu Jiangyin Rural Commercial Bank	rural commercial bank	**BNP Paribas (China)**	foreign bank	**Shinhan Bank (China) Limited**	foreign bank		
Bank of Inner Mongolia Co,, Ltd	city commerical bank	**Bank of Shaoxing Co Ltd**	city commerical bank	**Societe Generale (China) Limited**	foreign bank		
Bank of Weifang Co Ltd	city commerical bank	**Laishang Bank Co Ltd**	city commerical bank	**Woori Bank (China) Ltd**	foreign bank		
Bank of Handan Co Ltd	city commerical bank	**OCBC Bank (China) Limited**	foreign bank	**Bangkok Bank (China) Co Ltd**	foreign bank		
Jilin Jiutai Rural Commercial Bank Co Ltd	rural commercial bank	**Ningbo Cixi Rural Commercial Bank co.,Ltd**	rural commercial bank	**Industrial Bank of Korea (China) Limited**	foreign bank		
Bank of Yingkou	city commerical bank	**United Overseas Bank (China) Limited**	foreign bank	**Royal Bank of Scotland (China) Co Ltd (The)**	foreign bank		
Bank of Liaoyang Co Ltd	city commerical bank	**Bank of Jinhua Co Ltd**	city commerical bank	**Credit Agricole CIB (China)**	foreign bank		
Bank of Anshan Co Ltd	city commerical bank	**Yantai Bank Co Ltd**	city commerical bank	**Zhaoqing Duanzhou Rural Commercial Bank**	rural commercial bank		

Source: Own research based on data from Bankscope, the CBRC Annual Report (2014) and Martin (2012).

Table A2: Bank's Asset Share of the banking sector in 2014 and 2013

	Total Assets 2014 (mil CNY)	Asset proportion of sector 2014	Total Assets 2013 (mil CNY)	Asset proportion of sector 2013
Industry	172300000	1	151350000	1
All FI's on Bankscope	160797158	93%	141362495	93%
Banks w/ Tier 1 data	122565455,9	71%	110442132,7	73%
NSFR sample size (163 banks)	138137684,8	80%	116962709,6	77%
Banks w/ NSFR data	134287800,2	78%	111858577	74%
Banks fulfilling min. NSFR	131724478,2	76%	110107558,4	73%
Foreign banks w/ NSFR	2444784,925	1%	1642325,806	1%

Source: Own calculations based on data from Bankscope and the CBRC Annual Report (2014).

Table A3: Bank counts of available data and fulfilling the min. requirement of Tier 1 CAR and NSFR from 2007 to 2014

	2014	2013	2012	2011	2010	2009	2008	2007
Banks w/ Tier 1 data	95	102	66	78	55	45	38	26
No. Of Banks fullfilling the Tier 1 CAR min. requirement	93	99	60	73	48	36	30	18
Banks w/ NSFR data	120	104	66	47	50	52	51	44
No. Of Banks fullfilling the NSFR min. requirement	110	94	61	45	48	50	42	33

Source: Own calculations based on data from Bankscope.

Table A4: Weighted average Tier 1 Capital Ratios from 2007 to 2014

	Tier 1 Ratio 2014	Tier 1 Ratio 2013	Tier 1 Ratio 2012	Tier 1 Ratio 2011	Tier 1 Ratio 2010	Tier 1 Ratio 2009	Tier 1 Ratio 2008	Tier 1 Ratio 2007
Top 5	10,1%	11,3%	10,6%	10,1%	10,0%	9,0%	10,7%	10,0%
Group 2	8,8%	9,2%	8,9%	8,7%	8,4%	7,7%	9,5%	8,7%
Group 3	10,8%	11,0%	12,0%	12,3%	12,5%	11,3%	12,0%	12,1%
Group 3 without FB	10,3%	10,4%	10,9%	11,1%	11,3%	9,9%	10,3%	9,5%
Total Avg. Tier 1 CAR	10,0%	10,9%	10,5%	10,1%	9,9%	8,9%	10,6%	10,0%

Source: Own Calculations based on data from Bankscope.

Table A5: Share of Balance Sheet Items to Total Assets for three groups from 2007 to 2014. For example, the share of residential mortgage loans for 2014 to total assets is the sum of each bank's residential mortgage loans divided by the sum of total assets of the five banks included in the first group.

Average of top 5 (0 ~ 54%)	2014	2013	2012	2011	2010	2009	2008	2007
Residential Mortgage Loans	10,14%	9,18%	7,54%	6,63%	5,77%	4,49%	3,08%	2,93%
Other Mortgage Loans	0,71%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Other Consumer/Retail Loans	4,79%	4,51%	3,86%	3,09%	2,28%	1,64%	1,14%	0,94%
Corporate & Commercial Loans	38,49%	35,22%	32,10%	28,78%	25,77%	22,51%	17,28%	15,87%
Other Loans	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Government Securities	9,53%	9,28%	9,35%	8,21%	10,16%	9,64%	8,80%	7,22%
Total Securities	21,08%	19,48%	17,39%	16,33%	16,22%	15,32%	13,32%	12,02%
At-equity Investments in Associates	0,06%	0,06%	0,06%	0,06%	0,05%	0,04%	0,03%	0,01%
Other Earning Assets	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Cash and Due From Banks	17,28%	16,17%	15,73%	14,53%	12,04%	0,24%	0,22%	0,22%
Total Assets	100,00%	91,76%	83,79%	74,65%	65,49%	56,58%	45,37%	38,33%
Total Earning Assets	79,71%	72,84%	65,68%	58,27%	51,88%	55,01%	43,99%	37,14%
Customer Deposits - Current	36,00%	35,44%	32,95%	30,62%	28,48%	24,37%	18,72%	17,14%
Customer Deposits - Savings	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Customer Deposits - Term	38,69%	35,25%	32,18%	28,13%	24,58%	21,41%	18,24%	14,20%
Total Long Term Funding	1,47%	1,15%	1,06%	0,87%	0,53%	0,49%	0,30%	0,30%
Equity	7,32%	6,12%	5,44%	4,61%	3,96%	3,06%	2,67%	1,10%
Other Deposits and Short-term Borrowings	2,20%	2,35%	1,57%	1,38%	0,66%	0,45%	0,50%	0,82%

Average of group two (54%~80%)	2014	2013	2012	2011	2010	2009	2008	2007
Residential Mortgage Loans	3,77%	4,77%	5,72%	7,38%	8,50%	8,86%	7,40%	7,47%
Other Mortgage Loans	0,55%	0,69%	0,68%	0,00%	0,00%	0,00%	0,00%	0,00%
Other Consumer/Retail Loans	7,24%	8,31%	6,12%	5,37%	4,63%	2,92%	2,45%	2,50%
Corporate & Commercial Loans	28,17%	35,29%	36,39%	38,27%	42,04%	45,50%	45,54%	43,37%
Other Loans	5,04%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Government Securities	4,32%	3,49%	3,76%	5,10%	5,61%	7,83%	9,54%	9,72%
Total Securities	24,61%	18,77%	13,83%	11,66%	12,68%	16,72%	18,36%	20,35%
At-equity Investments in Associates	0,04%	0,06%	0,07%	0,03%	0,04%	0,04%	0,05%	0,01%
Other Earning Assets	0,48%	0,57%	0,48%	0,47%	0,26%	0,00%	0,00%	0,00%
Cash and Due From Banks	14,41%	13,23%	13,63%	13,76%	13,53%	0,27%	0,30%	0,43%
Total Assets	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
Total Earning Assets	83,52%	84,82%	84,45%	84,73%	84,93%	98,22%	97,56%	98,00%
Customer Deposits - Current	27,57%	27,29%	27,94%	31,31%	36,72%	37,26%	33,47%	38,51%
Customer Deposits - Savings	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	1,86%
Customer Deposits - Term	41,89%	40,39%	39,69%	38,94%	38,67%	38,33%	41,63%	34,07%
Total Long Term Funding	1,55%	1,56%	1,83%	1,46%	1,54%	1,65%	2,14%	1,56%
Equity	5,72%	6,09%	5,79%	5,72%	5,40%	4,92%	5,56%	5,67%
Other Deposits and Short-term Borrowings	2,97%	2,14%	1,98%	2,00%	1,18%	2,31%	2,58%	2,46%

Average of group three (80%~100%)	2014	2013	2012	2011	2010	2009	2008	2007
Residential Mortgage Loans	3,18%	2,99%	2,79%	3,39%	3,27%	2,82%	2,99%	4,28%
Other Mortgage Loans	0,22%	0,11%	0,06%	0,06%	0,02%	0,00%	0,00%	0,00%
Other Consumer/Retail Loans	5,35%	4,62%	3,70%	3,05%	2,77%	2,31%	2,19%	1,94%
Corporate & Commercial Loans	32,28%	32,83%	31,93%	34,70%	34,37%	34,75%	37,24%	37,11%
Other Loans	0,66%	1,98%	4,18%	4,07%	7,59%	12,45%	9,05%	12,48%
Government Securities	5,75%	5,76%	6,01%	7,39%	6,68%	5,70%	7,16%	5,74%
Total Securities	28,06%	25,10%	26,18%	24,26%	24,60%	22,64%	22,35%	17,66%
At-equity Investments in Associates	0,05%	0,06%	0,08%	0,09%	0,09%	0,06%	0,05%	0,04%
Other Earning Assets	0,02%	0,00%	0,68%	0,06%	0,00%	0,07%	0,16%	0,02%
Cash and Due From Banks	13,86%	14,23%	14,51%	15,19%	13,75%	5,29%	4,48%	3,62%
Total Assets	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
Total Earning Assets	84,17%	83,83%	83,34%	82,75%	84,42%	92,61%	92,47%	93,47%
Customer Deposits - Current	23,29%	26,20%	28,11%	31,33%	36,58%	34,09%	34,37%	32,61%
Customer Deposits - Savings	2,17%	3,49%	3,39%	1,72%	2,28%	2,00%	0,85%	0,46%
Customer Deposits - Term	39,29%	37,08%	34,81%	36,53%	35,17%	40,76%	36,02%	33,47%
Total Long Term Funding	1,52%	1,19%	1,04%	0,83%	0,80%	1,17%	1,37%	1,52%
Equity	6,72%	6,41%	6,56%	6,75%	6,89%	6,68%	6,98%	6,67%
Other Deposits and Short-term Borrowings	3,12%	1,66%	1,86%	1,85%	2,47%	3,38%	5,21%	7,73%

Source: Own calculations based on data from Bankscope.

Table A6: Estimated weighted average NSFR for all banks, the three groups and the third group without foreign banks from 2007 to 2014.

	2014	2013	2012	2011	2010	2009	2008	2007
Total Weighted Average NSFR	113,58%	114,68%	116,45%	116,65%	120,60%	159,32%	167,14%	152,70%
Top 5	112,65%	115,29%	116,55%	115,73%	120,59%	163,39%	172,37%	153,82%
Group 2	115,31%	112,99%	117,27%	121,01%	120,62%	145,36%	148,69%	149,48%
Group 3	113,87%	114,80%	113,86%	115,11%	120,60%	143,97%	140,97%	137,73%
Group 3 witout FB	112,36%	113,78%	112,61%	113,49%	119,29%	145,03%	145,25%	143,83%

Source: Own calculations based on data from Bankscope.

Table A7: Estimated weighted average NSFR with 85% weight of mortgage loans. Similar to Appendix 6.

	2014	2013	2012	2011	2010	2009	2008	2007
Total Weighted Average NSFR	111,10%	112,10%	113,83%	113,92%	117,68%	154,55%	162,73%	148,36%
Top 5	109,27%	112,09%	113,61%	112,88%	117,57%	158,40%	167,67%	149,32%
Group 2	113,92%	111,10%	114,91%	118,16%	117,54%	140,63%	144,65%	145,25%
Group 3	112,61%	113,64%	112,68%	113,59%	119,27%	142,32%	139,54%	136,21%
Group 3 witout FB	111,21%	112,68%	111,49%	111,99%	117,96%	143,36%	143,81%	142,04%

Source: Own calculations based on data from Bankscope.

Table A8: Aggregate capital Ratios from the Monitoring report.

Aggregate capital ratios and (incremental) capital shortfalls — Table 1

	Fully implemented requirement, in per cent		Basel III capital ratios, in per cent		Risk-based capital shortfalls, in billions of euros[1]		Combined risk-based capital and leverage ratio shortfalls, in billions of euros[1]	
	Min	Target[2]	Transitional	Fully phased-in	Min	Target[2]	Min	Target[2]
Group 1 banks								
CET1 capital	4.5	7.0	11.7	11.1	0.0	0.0	0.0	0.0
Tier 1 capital[3]	6.0	8.5	12.8	11.7	0.0	6.5	3.1	8.1
Total capital[4]	8.0	10.5	15.5	13.3	0.0	40.6	0.0	40.6
Sum					0.0	47.2	3.1	48.8
Of which: G-SIBs								
CET1 capital	4.5	8.0–9.5	11.5	10.8	0.0	0.0	0.0	0.0
Tier 1 capital[3]	6.0	9.5–11.0	12.6	11.6	0.0	3.8	2.7	5.0
Total capital[4]	8.0	11.5–13.0	15.2	13.1	0.0	30.4	0.0	30.4
Sum					0.0	34.1	2.7	35.4
Group 2 banks								
CET1 capital	4.5	7.0	12.8	12.3	0.0	1.5	0.0	1.5
Tier 1 capital[3]	6.0	8.5	13.4	12.6	0.4	5.9	4.3	8.4
Total capital[4]	8.0	10.5	15.8	14.0	1.8	5.5	1.8	5.5
Sum					2.2	12.9	6.2	15.5

[1] The shortfall is calculated as the sum across individual banks where a shortfall is observed. The calculation includes all changes to risk-weighted assets (eg definition of capital, counterparty credit risk, trading book and securitisation in the banking book). The Tier 1 and total capital shortfalls are incremental assuming that the higher-tier capital requirements are fully met. [2] The shortfalls at the target level include the capital conservation buffer and the capital surcharges for 30 G-SIBs as applicable. [3] The shortfalls presented in the Tier 1 capital row are *additional* Tier 1 capital shortfalls. [4] The shortfalls presented in the total capital row are *Tier 2* capital shortfalls.

Source: Basel Committee on Banking Supervision.

Source: BCBS, 2015.

Table A9: Transitional CET1, Tier 1 and total capital ratios from the Monitoring report.

Transitional Basel III CET1, Tier 1 and total capital ratios

In per cent — Table A.2

	Group 1 banks			Of which: G-SIBs			Group 2 banks		
	CET1	Tier 1	Total	CET1	Tier 1	Total	CET1	Tier 1	Total
Max	26.4	26.4	29.9	19.5	21.1	27.2	73.2	73.2	73.2
75th percentile	13.1	14.3	17.1	12.3	13.7	16.6	16.4	17.0	19.0
Median	12.2	13.0	15.5	11.5	12.6	15.5	12.8	13.1	15.4
25th percentile	10.9	11.9	14.3	10.7	11.9	14.3	10.9	11.0	13.3
Min	8.2	8.4	11.4	9.3	10.5	12.6	6.7	7.0	10.0

Source: Basel Committee on Banking Supervision.

Source: BCBS, 2015.

Table A10: LCR and NSFR from the Monitoring report.

Liquidity coverage ratio and net stable funding ratio

In per cent — Table A.17

	Liquidity coverage ratio			Net stable funding ratio		
	Group 1 banks	Of which: G-SIBs	Group 2 banks	Group 1 banks	Of which: G-SIBs	Group 2 banks
Max	400.0	156.6	400.0	167.5	147.4	197.5
75th percentile	143.4	131.7	224.4	117.1	113.2	135.7
Median	123.4	124.8	144.9	108.1	107.4	116.7
25th percentile	108.6	119.6	102.2	100.4	100.6	106.0
Min	54.8	103.1	21.9	78.9	78.9	34.3
Weighted average	125.3	126.8	143.7	111.2	111.8	113.8

Source: Basel Committee on Banking Supervision.

Source: BCBS, 2015.

Table A11: Number of banks and country of origin included in the Monitoring report.

Number of banks for which data have been provided — Table A.1

	Group 1 banks				Group 2 banks			
	All	RWA and capital data	leverage data	liquidity data	All	RWA and capital data	leverage data	liquidity data
Argentina	0	0	0	0	3	2	2	3
Australia	4	4	4	4	1	1	1	1
Belgium	2	2	2	2	2	2	2	2
Brazil	2	2	2	2	0	0	0	0
Canada	6	6	6	6	2	2	2	2
China	6	6	6	6	0	0	0	0
France	5	5	5	5	4	4	2	2
Germany	8	8	8	8	34	34	34	34
Hong Kong SAR	0	0	0	0	0	0	0	0
India	5	5	5	5	5	5	5	5
Indonesia	0	0	0	0	2	2	2	2
Italy	2	2	2	2	14	13	14	14
Japan	14	14	13	13	5	5	4	4
Korea	4	4	4	4	3	3	3	3
Luxembourg	0	0	0	0	3	2	2	2
Mexico	0	0	0	0	7	7	7	7
Netherlands	3	3	3	3	12	10	11	12
Russia	1	1	1	1	0	0	0	0
Saudi Arabia	3	3	3	3	0	0	0	0
Singapore	3	3	3	3	0	0	0	0
South Africa	3	3	3	3	2	2	2	2
Spain	2	2	2	2	5	5	3	5
Sweden	4	4	4	4	4	4	0	0
Switzerland	2	2	2	2	9	8	6	6
Turkey	3	3	3	3	0	0	0	0
United Kingdom	5	5	5	4	4	4	2	3
United States	13	13	13	13	0	0	0	0
Total	100	100	99	98	121	115	104	109
of which: G-SIBs	30							

Source: Basel Committee on Banking Supervision.

Source: BCBS, 2015.