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Financial Development and Economic Growth: The Case of Chinese Banking Sector

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Abstract

China's economy has developed rapidly since the introduction of market reforms in 1978. In parallel came the reforms within the financial sector and the most of financial intermediation between savings and investment has been channelled through the banking sector. Thus far studies on the finance-growth nexus in China have focused on the financial sector as a whole. This thesis aims to determine the impact of different banking institutions on economic growth and assess the compatibility of state financial policies with country's economic performance. The empirical analysis is performed using annual data for the period 1978 to 2005. Using the Granger-causality test procedure under vector autoregressive model I examine the relationship between economic growth and, respectively, different types of banks and different types of loans. The procedure provides evidence that presence and direction of causality is affected by the type of bank as well as type of loan. There is two-way causality between economic growth and policy banks as well as rural credit cooperatives. The development of state-owned commercial banks and other commercial banks merely follows economic growth. Furthermore, loans to construction sector Granger cause growth and there is a one-way causality between growth and loans to commercial sector. The fact that policy banks manage to positively influence China's development might indicate that state policies concerning financial sector and economic growth are successful. However to sustain the growth it is important to further develop financial services, ensure better credit allocation and improve access to financing for private as well as small and medium-sized enterprises.

Key words: China, Financial Development, Economic Growth, Banking Sector, Granger Causality

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LIST OF ABBREVIATIONS

ADBC Agricultural Development Bank of China
ADF Augmented Dickey-Fuller
AMC Asset Management Companies
CBRC China Banking Regulatory Commission
CDB China Development Bank
CEIB Export-Import Bank of China
FDI Foreign Direct Investment
GDP Gross Domestic Product
JSCB Joint-Stock Commercial Bank
NPLs Non-Performing Loans
RCC Rural Credit Cooperative
ROA Return on Assets
ROE Return on Equity
SOCB State-Owned Commercial Banks
SOEs State-Owned Enterprises
TVEs Township and Village Enterprises
VAR Vector Autoregression

1. Introduction

China has developed rapidly since the introduction of the open-door policy in 1978 and its market structure is different now than it was at the beginning of the transformation. First decades of the reforms were characterized by the dominant position of the state-owned enterprises, nowadays it is the private sector that takes the lead. In the banking sector the monobank system was replaced by commercial banking, stock markets emerged and new regulatory bodies were established. Still the most of financial intermediation between savings and investment is channelled through the banking sector. However, the access to financial institutions is still restricted, with private enterprises having difficulties in receiving credit from banks or acquiring funds from capital market.

There is a long debated issue weather there is a connection between financial development and economic growth. The question is whether there is a causality and if so in what direction: is it the financial development that induces economic growth or maybe financial development merely follows economic growth. Many studies have proven active role of the financial sector. If that is the case, China can be an especially interesting aspect of this discussion, because it has managed to develop very fast although the country is considered to have weak financial institutions.

1.1. Aims and research questions

The aim of this thesis is to investigate the issue of finance-growth nexus in China and to determine the contribution of different banking institutions to growth by applying Granger causality test procedure. There is a possibility that it is not the whole financial sector but some more efficient parts of it that induce growth. Previous studies focused on aggregated values and did not reflect on contribution of particular banks and loans. Furthermore I would like to take into consideration the strong state involvement in the banking sector and try to assess how it might affect growth.

Therefore this thesis is intended to answer the following questions:

- Do different types of banking institutions affect growth differently?
- Can the purpose of a loan be a significant determinant of whether it contributes to growth?

- Are state policies concerning financial sector compatible with economic growth?

1.2. Method and material

In order to determine the connection between financial sector development and economic growth an analytical framework that draws on the finance-growth nexus literature will be developed. The works by Levine, Khan, Boyreau-Debray and Maswana among many others help to determine analytical framework and choose appropriate variables for the model. In the thesis Granger Causality Test under vector autoregression model was applied to examine the effects of banking sector development on growth. The ratio of total credit was first broken down to amounts of loans granted by different types of banks and secondly to different types of loans. The model also included control variables for the GDP growth: FDI flows as proxy of physical capital and population with above - secondary schooling as human capital. The data series were taken from China Financial Statistics (2007) and China Statistical Yearbooks.

1.3. Limitations

Possible limitation of the analysis is that credit ratios used in the study do not capture financial development that takes place outside the banking system such as the stock or bond markets. However, in China it might be of lesser significance since financial development comes about mostly within the banking sector and other channels are still not very developed.

Another, more general shortcoming, common for all studies of finance-growth nexus, is the fact that according to the theory financial institutions induce economic growth by reducing information and transaction costs, monitoring borrowers, managing risk or facilitating exchange of goods. Researchers, however, do not posses very good measures to assess how well a financial system provides these kind of services to the economy. Thus the empirical proxies of financial development do not correspond that closely to the theory (Demirguc-Kunt, Levine, 2008).

1.4. Disposition

The remainder of the thesis proceeds as follows: Section 2 gives an overview of theories and literature concerning financial development and economic growth nexus. Section 3 presents Chinese banking sector and state financial policies. Section 4 turns to

description of the data and variables. Section 5 describes the procedure of examining the connection between economic growth and different types of banks and loans. Section 6 presents the results. Finally, Section 7 concludes.

2. Financial development and economic growth: theory and literature review

The connection between financial development and economic growth is a long debated issue. Back in 1911 Joseph Schumpeter argued that financial development induces economic growth. His main point was that through the services that financial intermediaries bring about, like mobilizing saving, managing risk, facilitating transactions or evaluating projects, technological and economic development is stimulated. Technological change is the key in Schumpeter's reasoning. His idea of "creative destruction" is a process of constant replacement of old production methods and goods with better procedures, commodities, and services by invention and innovation. And financial intermediaries enable this technological innovation (King, Levine, 1993).

Hicks (1969) also noticed that financial institutions might facilitate growth. Though he focused on capital formation. From this perspective capital formation can be influenced by financial institutions through altering the savings rate or by reallocating savings among different capital producing technologies. Liquidity is crucial here. The high-return projects involve a long-run commitment of capital and savers are generally reluctant to lose control of their savings for a long time. The task of financial institutions is to enhance the liquidity of long-term investments so that more investment is expected in the high-return projects. According to Hicks the industrial revolution in England was mainly caused by the capital market improvements that moderated liquidity risk (Levine, 1997).

The above general view was shared by scholars like Goldsmith (1969), McKinnon (1973) and Shaw (1973), who opted for the proactive function of financial services as well. Goldsmith (1969) assumed that the size of a financial system is linked with the supply and quality of financial intermediation and his analysis on 35 sample countries proved a positive correlation between the financial development and economic growth. MacKinnon (1973) and Shaw (1973) suggested that state involvement in the development of financial systems

can be an obstacle for economic growth. Thus financial development was perceived to positively affect growth.

However, there were researchers who opposed this view or even neglected finance when analyzing economic development. The omission is especially notable in the works of 'pioneers of development economics', among which were works by three Noble prize winners (i.e. Bauer, Colin Clark, Hirschman, Lewis, Myrdal, Prebisch, Rosenstein-Rodan. Rostow, Singer, and Tinbergen). Neither of them included finance as a factor in development (Levine, 1996). Joan Robinson (1952) said that "where enterprise leads finance follows." It is suggested by this that financial development merely follows the growth in an automatic response to emerging demand for different financial arrangements. Lucas (1988) and Chandavarkar (1992) also expressed their doubts. The former claimed that economists "badly over-stress" the importance of financial factor in economic growth. The latter pointed out how finance had been ignored in the studies on development and drew attention to the analysis by Dornbusch and Reynoso (1989), which concluded that "financial factors are important only when financial instability becomes a dominant force in the economy".

The development of endogenous growth models gave a bigger scope for financial intermediation in influencing economic performance (Liu, Shu, 2002). Within these models Lucas (1988) and Romer (1986, 1990) enhanced the definition of investment to contain human capital and allow for externalities in investment. Given that they suggested that returns to investment are slightly diminishing or even non-diminishing. Following this idea, it is financial institutions, when properly fulfilling their tasks, that can generate externalities in investment and by this secure non-diminishing returns to investment in the endogenous growth models.

Nowadays the question is not if financial development is an important factor for growth but rather what the causality is. When we look at economic and financial development - which is the cause and which is the effect? Determining the roles of financial system can help us identify possible channels of influence.

There are seven main functions of financial system (Khan, 2000). Firstly, it mobilizes savings by pooling households' savings and making them available for lending. This way transaction costs related to external finance for both households and companies are

reduced. Firms save money by not having to contact many potential lenders and simply going to one financial institution. Likewise, savers do not need to evaluate every borrower and just place money with financial institution.

Allocation of savings is the second function. It is the financial system that decides who obtains loans. Due to the fact that financial institutions are specialists, they can determine the best investments, properly asses risks and make the decision about worthwhile borrowers cheaper than a typical small investor.

The third aspect is that by spreading investors' funds among many diverse investment opportunities financial system reduces the overall risk. This risk diversification reduces the uncertainty of households connected with individual projects, which in turn promotes savings.

The fourth role is linked with generating liquidity. Difficulties arise for investors when they unexpectedly need to withdraw their money, thus they are not that willing to commit themselves for long-term investments. Financial institutions however invest funds both in long and short term projects. This mix of long and short term investments not only brings higher profits but also investors can access their money if they unexpectedly need it. And what is more, at the same time it is ensured that worthwhile long term investments are funded, which gives us the fifth role.

The sixth one is to facilitate trade by extending credit and guaranteeing payments. There are various financial instruments like currency and demand deposits or credit cards that smooth the process of exchanging goods so individuals do not need to use barter. Furthermore, instruments like letters of credit help enterprises in managing their liquidity and order articles necessary for production in spite of delays in payments for their sales.

Exerting corporate control and monitoring managers is another role of financial system. In order to offset the information advantage of entrepreneurs and managers who manage their projects and know more about their process and outcomes than outsiders like creditors and shareholders, which may lead to different malfunctions and in consequence discourage investment and savings, banks monitor borrowers, and equity markets make it possible for shareholders to control managers by voting out poorly performing executives.

Additionally, Levine (2004) points out another way of influence on economic performance – informational effect. Financial institutions ensure that ex-ante information about possible investment and capital is made available, which maybe does not eliminate, but at least reduces the effects of asymmetric information.

The above roles indicate that properly functioning financial system is able to ensure more investments and savings, which through either capital accumulation (Hicks' type of channel; Hicks, 1969) or technological change (Schumpeter's type of channel; Schumpeter, 1911) leads to increase in output and, as a result, economic growth.

Since there can be significant correlation between financial development and economic growth, there comes the question of the role of state. The most popular view draws on the work of MacKinnon (1973), who described the case of financial repression where ceilings on interest rates harmed domestic savings, capital formation and economic growth. According to this view financial liberalization, thanks to which interest rates go up towards market-clearing levels making bank deposits more attractive, will lift the demand for money and bring about a higher level of investment and economic growth. On the other hand, Maswana (2008) compares financial system to ecosystem and draws conclusion that for some developing countries like China the most relevant function of financial systems is 'adaptive efficiency' instead of allocative one. This means that even with financial repression financial system can be coherent with country's developmental goals. And since financial system is integral to monetary and financial policies, it can support achieving better economic outcomes.

As for the empirical studies, King and Levine's (1993) research based on data from about 80 countries seems to support the view of active and positive role of financial institutions in encouraging economic growth. Also some other empirical studies such as one by Habibullah and Eng (2006) point toward positive correlation between financial development and growth. Furthermore there are studies providing evidence that the connection is not that straightforward. Shan, Morris and Sun (2001) as well as Demetriades and Hussein (1996) and Arestis and Demetriades (1997) all find positive causality, two-way causality and negative causality depending on the country examined. These results question

the accuracy of cross-country studies. They would imply that we have to be careful when generalizing the results, because each country can be a separate case.

Thus far there has been several studies conducted regarding the Chinese case. Aziz and Duenwald (2002) concentrate their analysis on provinces and discover that on this level financial development measured by the amount of bank credits was actually negatively correlated with growth in a given region, which would indicate inefficient allocation of loans. Also Hao (2006) uses provincial data, but his results indicate a positive relation nonetheless. It is explained by the fact that current allocation of loans is still better than state budgetary appropriation that took place before the reforms. On the macroeconomic level, studies using the VAR framework dominated. Basing on the data from 1983 to 1997 Liu and Shu (2002) find out that financial development and economic growth reinforced each other. Liang and Teng (2006) however argue that over the period 1952–2001 there is unidirectional causality from economic growth to financial development.

In general, empirical studies provide conflicting result on the direction of causality both among various countries and in the case of China. None of them studies the effects of development of particular elements of financial system. This thesis aims to fill the gap by applying Granger causality test within VAR framework and examining the role of different banking institutions and different types of loans.

3. Overview of financial sector and economic growth in China

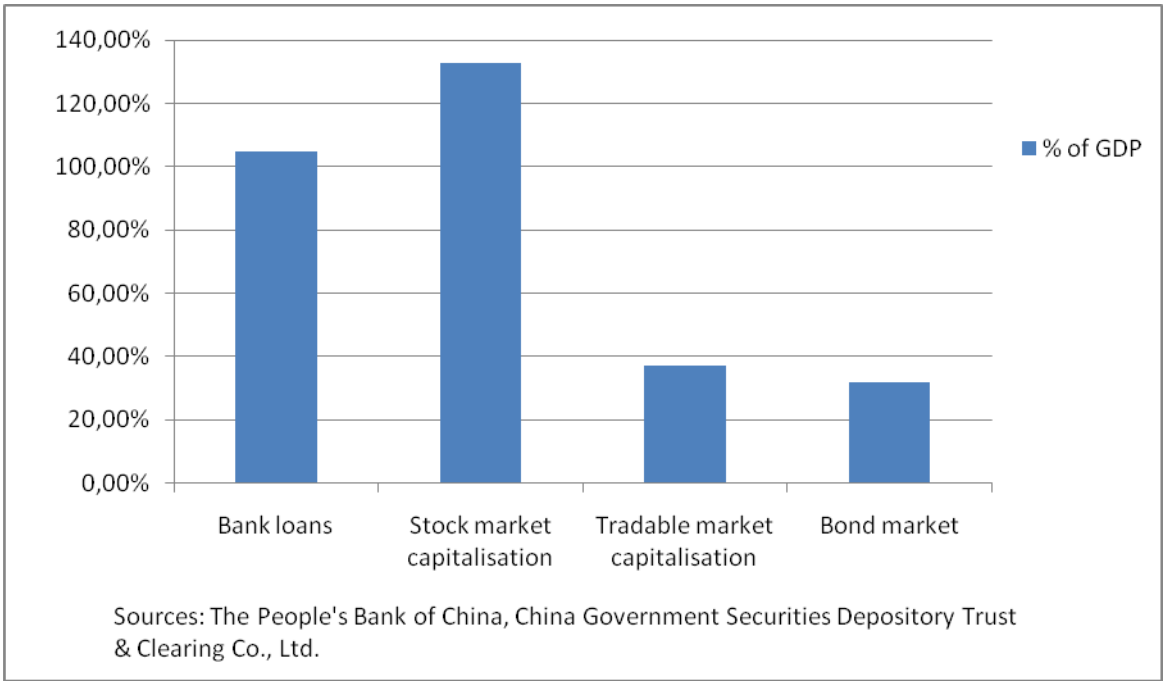
Most researchers would agree that financial sector reforms and development have been an important factor, on which sustained economic growth that has been observed throughout the last two decades in China depended. And the growth has been truly remarkable: since 1979 until 2005 the average annual growth rate stood at 9,6% (China Statistical Yearbook 2006). At the beginning, in 1980s, the growth was led mainly by increasing domestic consumption – it accounted for 70% of total GDP. Then in 1990s investment took over the chief position and consumption started losing ground. On the one hand there was increase in foreign investment, on the other – domestic capital investments had risen (Zhang, 2008). Private consumption fell from 49% of GDP in 1990 to 35% in 2008. Investment, on the contrary, grew from 35% to 44% of GDP (The Economist, 2009). To

measure the influence of financial system is far more difficult. First, we will look at the structure of financial sector in general.

Since the introduction of opening-up policy and reforms in 1978 Chinese financial sector has experienced significant changes: the monobank system was replaced by commercial banking, stock markets emerged and new regulatory bodies were established. Until today the most of financial intermediation between saving and investment is channelled through the banking sector. The role of stock and bond markets is still rather limited.

Stock markets were introduced in China in 1990. One in Shanghai, old financial centre of China. Shenzhen was a fast growing city in the southern part of the country and, for the balance, the government decided to establish a stock market there as well. Two thirds of trading takes place in Shanghai, the rest Shenzhen. Important aspect of the market is that although the indexes might reach heights and transaction flourish, the fact is that most of the shares are non-tradable. In 2007 tradable shares constituted 29% of the total and although the ratio increases, still most of the shares remain untraded (China Financial Stability Report 2008). The combined capitalisation of the Shanghai and Shenzhen stock exchanges at the end of 2007 stood as 133% of GDP. However the tradable market capitalisation was only 37% of GDP as shown in Fig. 1. Another problem is that stocks are not correctly priced. First they were underpriced but since 2007 a new feature emerged – overpricing. Stocks are more of a political issue in China and they play a minor role in financing business. In 2004 capital raised from the stock market made up 2.16% of all fixed asset investment. Also contribution of IPOs to national capital formation is very limited. On the other hand loans provided 80% of financing in 2007 compared to 13.1% of equity. Additionally, the importance of the banking sector is enhanced by the fact, that foreign companies are allowed only to get bank loans, they cannot loan from other companies. Thus it seems reasonable when analysing finance growth nexus to focus our attention on banks, which have the biggest share in financial sector.

Figure 1 Loans, stock and bond market size (Dec 2007)



Debt market in China, though developing, is still relatively narrow, segmented and lacking liquidity. The first unofficial bond markets began to develop in the 1980s. In the early 1990s the government began to seriously supervise and regularize the market and in 1997 trading of government bonds was launched on the interbank market. The corporate bond market was reserved for several selected state owned enterprises and remained very small. Most of the bonds are issued by the government and policy banks. The amount of bonds traded and issued has grown fast, in particular since 1998, due to expansionary fiscal policies (Bottelier, 2004). At the end of 2007 the total issuance accounted for 32% of GDP as seen in Fig. 1.

To sum up the banking sector plays the biggest role in the Chinese financial sector and possibly has the strongest connection with economic growth. Thus this is the segment I want to focus on in the analysis from now on.

3.1. Banking sector

China's financial system is dominated by the banking institutions. As shown in Fig. 1 total bank loans accounted for 105% of GDP in 2007. According to China Banking Regulatory Commission the total assets of the whole banking sector grew by 19.7% to 52,6 trillion RMB at the end of 2007. The banking sector can be divided into four main types of banks: state-

owned banks, commercial banks, credit cooperatives and foreign banks. Additionally there are nonbank financial institutions. The structure is presented in detail in Fig. 2.

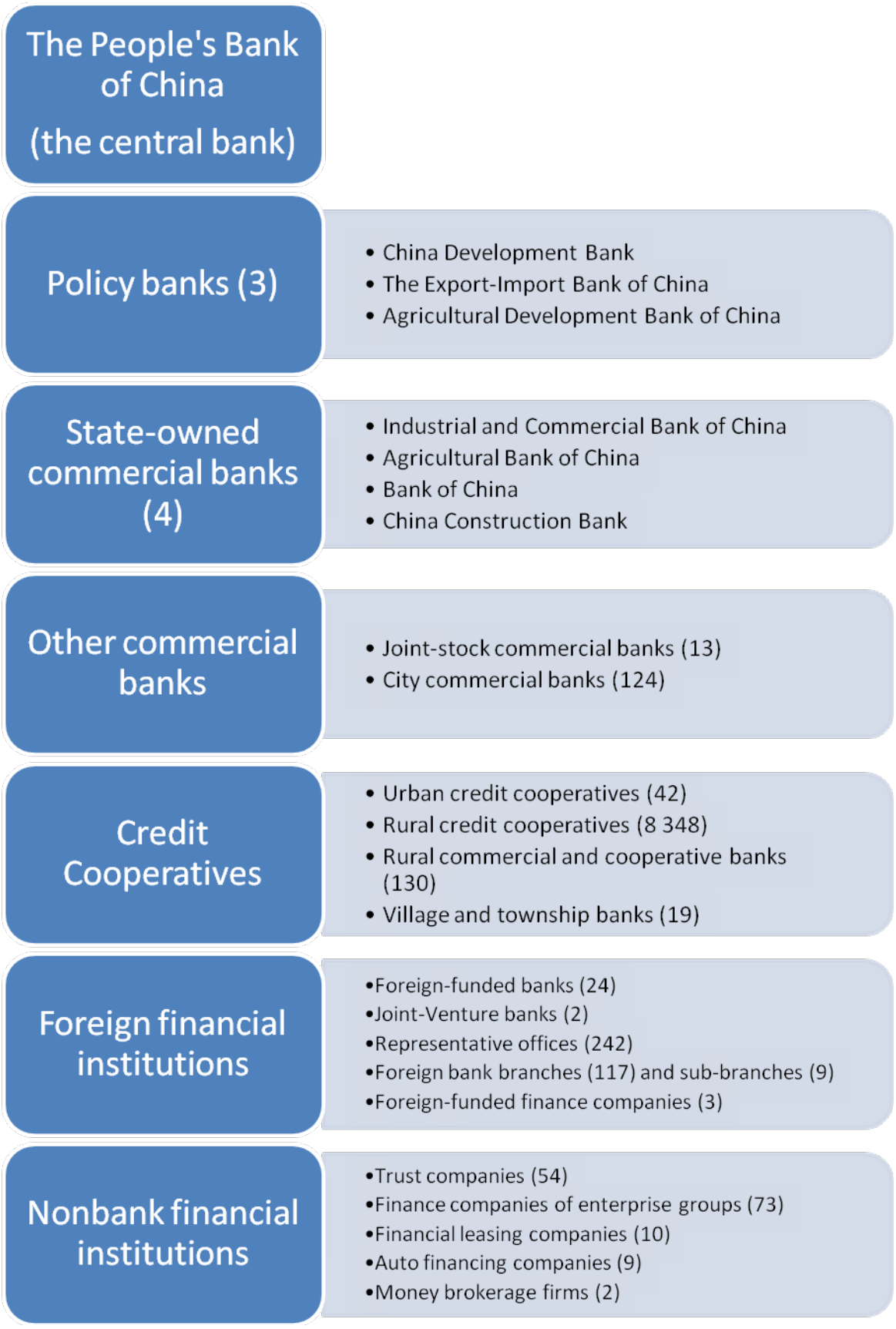
On the top of all institutions stands the People's Bank of China, which since 1983 serves as the central bank of China. It formulates and implements monetary policy and regulates financial markets. However, as opposed to the European Central Bank or the Bank of Japan, the Chinese central bank is not an independent body. The government has control over the expansion of new financial products and decisions concerning the level of the interest rates on loans. This way the authorities want to ensure that the policy of the central bank is compatible with other development policies and financial system stability (Maswana, 2008).

In 2003 the China Banking Regulatory Commission was created to take over the responsibility for the banking sector regulation and supervision from the People's Bank of China. The commission authorizes the establishment and termination of banking institutions as well as their business scope. Furthermore it formulates and enforces rules and regulations governing directly the banking sector.

When we look at the market share of different financial institutions by assets (Fig. 3), it turns out that the market shares are extremely uneven. State-owned commercial banks take up the biggest part of the market – good above 50% of all assets belongs to the big four. Their share has been decreasing continuously but slightly over the years of reforms and restructuring in the sector. Other commercial banks occupy the next spot with the share of nearly 20% at the end of 2007. The group comprises of joint-stock commercial banks and city commercial banks. Their share as well as number of banks and branches has been steadily increasing. The third biggest group is credit cooperatives. Rural and urban credit cooperatives together take up around 10% of the market, though credit cooperatives in the country have the dominant position in this group. Policy banks occupy around 8% of the total market share. The rest of the market, less than 10%, is shared by many, small in comparison, other financial institutions.

Among the petty ones of the last group are foreign banks and nonbank financial institutions. It does not mean they do not have any functions, however from the perspective of the whole sector their influence on the financial system is minor. As presented in Fig. 2, at

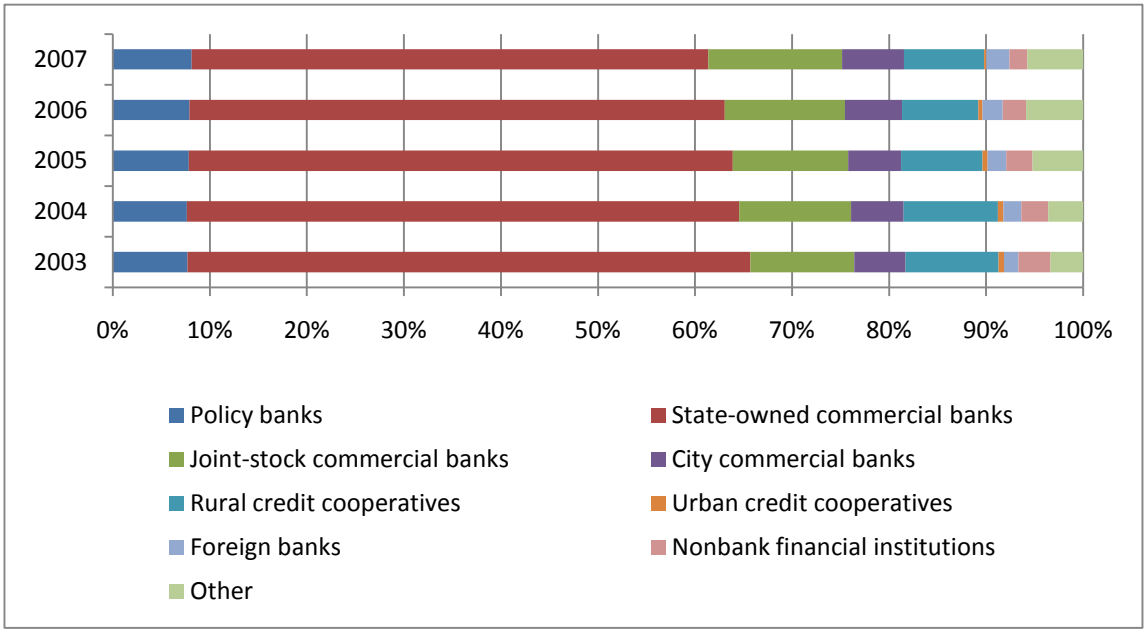
Figure 2 Structure of the Chinese banking sector (2007)



Source: China Banking Regulatory Commission 2007 Annual Report

the end of 2007 in China there were 242 representatives offices set up by 193 banks from 47 countries. Furthermore there were 24 wholly foreign-funded banks and 117 branches established by 71 foreign banks from 23 countries. The assets of foreign financial institutions accounted for only 2.4% of the market, but the figure has increased somewhat over the years. The role of foreign banks is constrained by China's domestic law, though the WTO accession requirements can allow for gradual increase in access to China's domestic market.

Figure 3 Market share (by assets) of China's banking institutions



Source: China Banking Regulatory Commission 2007 Annual Report

The original role of foreign banking institutions was to offer foreign currency intermediation and so help foreign investors and manufacturers in doing business in China. Thus, at the beginning RMB business was completely closed to foreign banks. Since 1996 local currency business has been gradually opened for foreign institution. First they could only offer RMB services to foreign clients in Shanghai and Shenzhen. Since the WTO entry the rules are started to be relaxed (Hansakul, 2004). By the end of 2006 the geographical restrictions and rules determining customer type were to be lifted. However the Chinese government still has means to constrain foreign banks.

Nonbank financial institutions is another minor group in the market share. They constitute to around 2% of the total assets (Fig. 3). There are five major types of nonbank financial institutions: trust companies, finance companies of enterprise groups, leasing

companies, auto financing companies and money brokerage firms (Fig. 2). These are usually small institutions operating rather locally. The government current concern is to improve corporate governance of trust companies and to transform them from “the previous financing platforms to financial institutions that are trusted by customers for wealth management" (CBRC 2007 Annual Report).

Table 1 Pre-tax profits of banking institutions (2003-2006)

Unit: 100 million RMB

	2003	%	2004	%	2005	%	2006	%
Financial institutions	322,8	100%	1035	100%	2532,6	100%	3379,2	100%
Policy banks	104,5	32,37%	130,9	12,65%	274,1	10,82%	311	9,20%
State-owned commercial banks	-31,9	0,00%	459	44,35%	1560,7	61,62%	1974,9	58,44%
Joint-stock commercial banks	146,5	45,38%	175,9	17,00%	289	11,41%	434,2	12,85%
City commercial banks	54,2	16,79%	87,4	8,44%	120,7	4,77%	180,9	5,35%
Rural credit cooperatives	-5,5	0,00%	96,6	9,33%	120,3	4,75%	186,2	5,51%
Foreign banks	16,6	5,14%	23,5	2,27%	36,6	1,45%	57,7	1,71%
Nonbank financial institutions	37,4	11,59%	50,2	4,85%	62,6	2,47%	129,5	3,83%

Source: Calculation based on China Banking Regulatory Commission 2006 Annual Report

However, when we take profits before tax into consideration the view of the strongest players on the market changes significantly. The data are available only since 2003, but still we can draw some conclusions. As shown in Table 1 up until 2004 state-owned commercial banks had losses in spite of their dominant position by the sum of assets. Other commercial banks, on the contrary, accounted for over 60% of all profits in the banking sector in 2003. The data would imply that there are serious issues in the performance of some institutions and different types of banks differ in the way they are managed, which can result in their diverse influence on economic growth.

Nonetheless ninety percent of the market in terms of assets (Fig. 3) belongs to four groups of institutions: policy banks, state-owned commercial banks, other commercial banks and rural credit cooperatives. These are the groups further study will be focused on.

3.1.1. Policy banks

The three policy banks: China Development Bank, the Export-Import Bank of China and Agricultural Development Bank of China, were established as a result of reforms in the banking sector in 1994. The aim of the reform was to separate commercial banks from policy lending and let policy banks handle the state funds assigned to promote policy-oriented investment and long-term projects. The banks were supposed to grant loans wisely, but were not expected to bring profits (Joseph, 1997). All three banks are solely owned by the central government. Funding of policy banks is organised mainly through issuing bonds and they accept few deposits. Their combined assets grew rapidly and now they account for around 8% of the market. The fact that now they continually keep their share indicates that state-directed lending is persistently present in the banking sector (Hansakul, 2004).

China Development Bank is the only policy bank with ministry status and it reports directly to the State Council. In 1994 it mainly took over the policy lending role from China Construction Bank and to some degree from Industrial and Commercial Bank of China (Maswana, 2008). Its main function is to foster China's economic development. The bank finances major projects and initiatives according to national development plan and industry policies. It focuses its attention on lending to construction and renovation projects in strategic economic sectors. This involves mostly medium and long-term loans. In the period from 1994 to 2005 nearly 90% of lending was allocated to power, road construction, railway, petro-chemical, coal mining, telecommunications, public facilities, and agriculture & related industries (CDB, 2009). For example China Development Bank committed funds to projects like Shnghai Pudog International Airport, the Neijiang-Kunming Railway, Beijing Subway and the Three Gorges Dam.

The Export-Import Bank of China (China Eximbank) reports directly to the State Council. In 1994 it largely took over the policy lending function from the Bank of China, mainly the role of trade financing (Maswana, 2008). China Eximbank is now the main channel for the government to finance exports and imports of mechanic and electronic products, complete set of equipment, high and new technology products as well as offshore construction contracts and overseas investment projects (CEIB, 2009). One of the projects is for example to support China's ship building industry. China Eximbank is also the only bank

in China that is allowed to extend Chinese Government Concessional Loan, which is a medium or long term, low interest rate credit granted to developing countries. In 2003 this included projects in 43 countries like Sudan and Indonesia (China Eximbank Annual Report 2003).

Table 2 Non-performing loans, ROA and ROE indicators for policy banks (2002-2006)

	China Development Bank			Export-Import Bank of China			Agricultural Development Bank of China		
	NPLs	ROA	ROE	NPLs	ROA	ROE	NPLs	ROA	ROE
2002	1,78%	1,20%	17,40%	5,01%	n/a	n/a	n/a	0,17%	6,97%
2003	1,34%	1,10%	16,00%	3,70%	0,03%	0,70%	42,00%	0,56%	21,77%
2004	1,21%	1,20%	17,70%	n/a	0,02%	0,72%	17,50%	0,32%	12,20%
2005	0,87%	1,30%	19,20%	4,91%	0,05%	1,26%	10,29%	0,66%	26,90%
2006	0,72%	1,19%	17,48%	3,47%	0,03%	1,58%	7,65%	0,98%	43,82%

Sources: China Eximbank Annual Reports; Agricultural Development Bank of China Annual Reports, China Development Bank; Gale, Collender, 2006; calculation of ROA and ROE based on KPMG 2008

In 1994 Agricultural Development Bank of China took over the function of policy lending from the Agricultural Bank of China (Maswana, 2008). It runs under the direct administration of the State Council and its main role is to offer short-term loans to state agencies that are responsible for the procurement of agricultural products. Furthermore it was responsible for funding projects that help the poor in the countryside and also general agricultural development projects (Lardy, 1998). In 1998 businesses related to poverty alleviation, comprehensive agricultural development and sideline business of grain and cotton enterprises carried out by Agricultural Development Bank of China was transferred to state-owned commercial banks. Agricultural Development Bank of China was assigned to manage the funds for purchasing grain, cotton and edible oil. In 2004 the bank widened its cope of operation by expanding its loans from traditional state-owned grain, cotton and edible oil enterprises first to multi-ownership ones and later also to agricultural flagship enterprises and agricultural processing enterprises (ADBC, 2009).

Profit was not the main purpose of their existence and policy banks were characterised by similar problems as all the other banks in China owned by the state: poor management and high ratio of non-performing loans. Agricultural Development Bank of

China ranks among one of the least profitable financial institutions in China. Its average return on assets from 1998 to 2006 was 0,04% (The Asian Banker, 2009). In the more recent period of 2002-2006 (Table 2), its ratio of non-performing loans was very high even compared to other policy banks. Other banks also have low profitability, though China Development Bank managed to significantly decrease the NPLs ratio. And what is interesting, generally policy banks are doing better than the state-owned commercial banks when we compare their indicators with the ones shown in Fig. 4, Fig. 5 and Fig. 6.

3.1.2. State-owned commercial banks

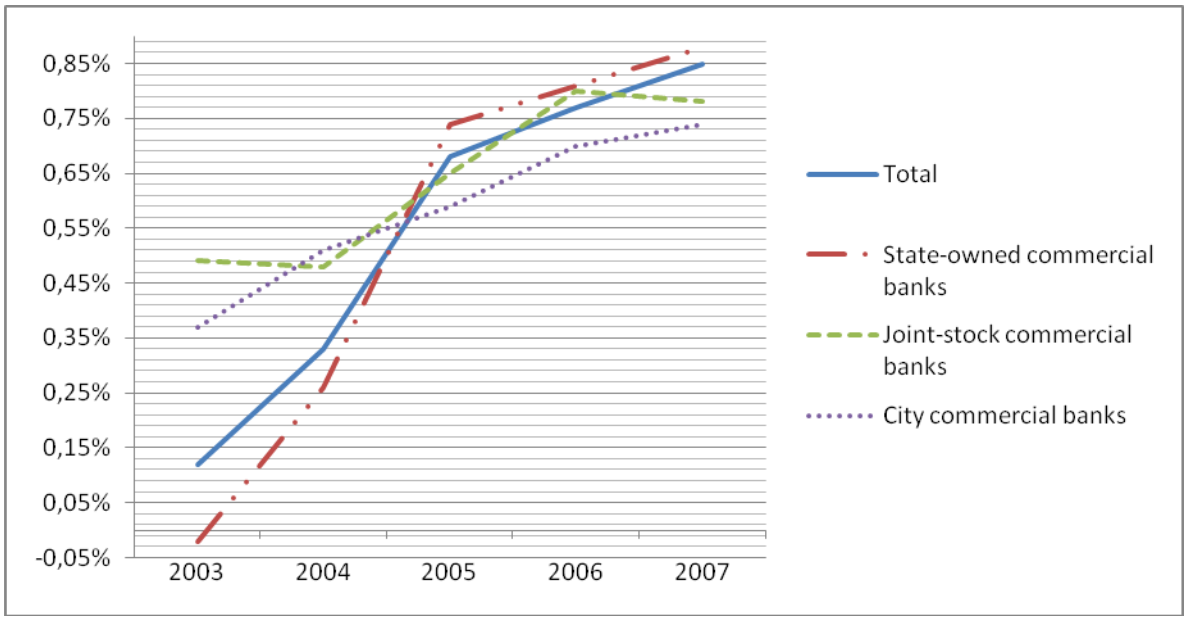
The state-owned commercial banks: Industrial and Commercial Bank of China, Bank of China, Agricultural Bank of China and China Construction Bank are called “the big four”. They represent around 60 % of China’s banking sector measured in terms of total assets (Fig. 3). They developed from national banks with specified functions. Agricultural Bank of China was originally established to provide loans to the agricultural and rural sectors. Bank of China primarily specialized in international transactions like foreign exchange services and trade credit. China Construction Bank initially was mandated to provide middle and long term credit for investment. Industrial and Commercial Bank of China was initially set up to offer working-capital loans to urban industrial and commercial sectors. As the financial reform progressed, these primary specified functions became less clear (Neftci, Ménager-Xu, 2006).

The four banks officially diverged from their initial functions in 1994 when the state-directed lending was handed over to the three newly established policy banks. From now on they were to concentrate on commercial business. However the legacy of their past lending kept on hindering their profitability and earnings (Hansakul, 2004). The state still owns the banks and interferes with the business, which results in weak internal control and no efficient risk management or incentive mechanism. And this in turn is a reason for poor operational performance (Chen, Shih, 2004).

As shown in Fig. 4 return on assets of state-owned commercial banks lagged behind other commercial banks in the period from 2002 to 2005. Both joint-stock commercial banks and city commercial banks have higher levels of ROA up until 2005. Only recently state-owned commercial banks have reached the levels of other commercial banks and even

exceeded them. Analogous results are from the analysis of figures for return on equity (Fig. 5). ROE of other commercial banks was significantly higher than state-owned banks, and joint-stock commercial banks reached higher levels than all the other banks up until 2007.

Figure 4 ROA of Chinese commercial banks (2003-2007)

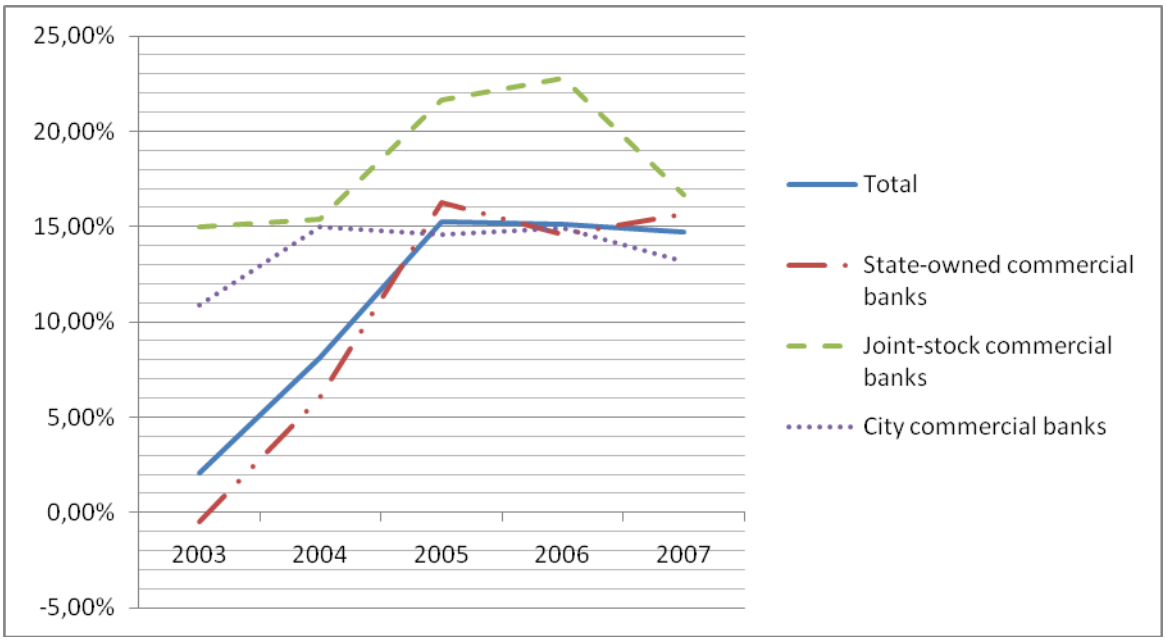


Source: Rowe, Shi, Wang, 2009

Hansakul (2004) compares ROA of two state-owned commercial banks, Bank of China and Industrial and Commercial Bank of China, with two joint-stock commercial banks, China Merchants Bank and Pudong New Development Bank, in the earlier period – from 1997 to 2002 and similar results can be seen. State-owned commercial banks have significantly lower indicators than joint-stock commercial banks throughout the given period. Thus they were less profitable from the beginning of the reforms and could finally catch up only in 2005.

The performance of the big four can be affected by old and unadjusted to commercial business corporate culture – they are still run similarly to state firms, with senior management selected by the government (Hansakul, 2004). McGee (2008) draws attention to another issue – employment. State-owned commercial banks have very high numbers of employees, they are on the top front among banks in the world. This fact combined with low profits per employee and mentioned before low return on assets indicates very low both efficiency and competitiveness.

Figure 5 ROE of Chinese commercial banks (2003-2007)



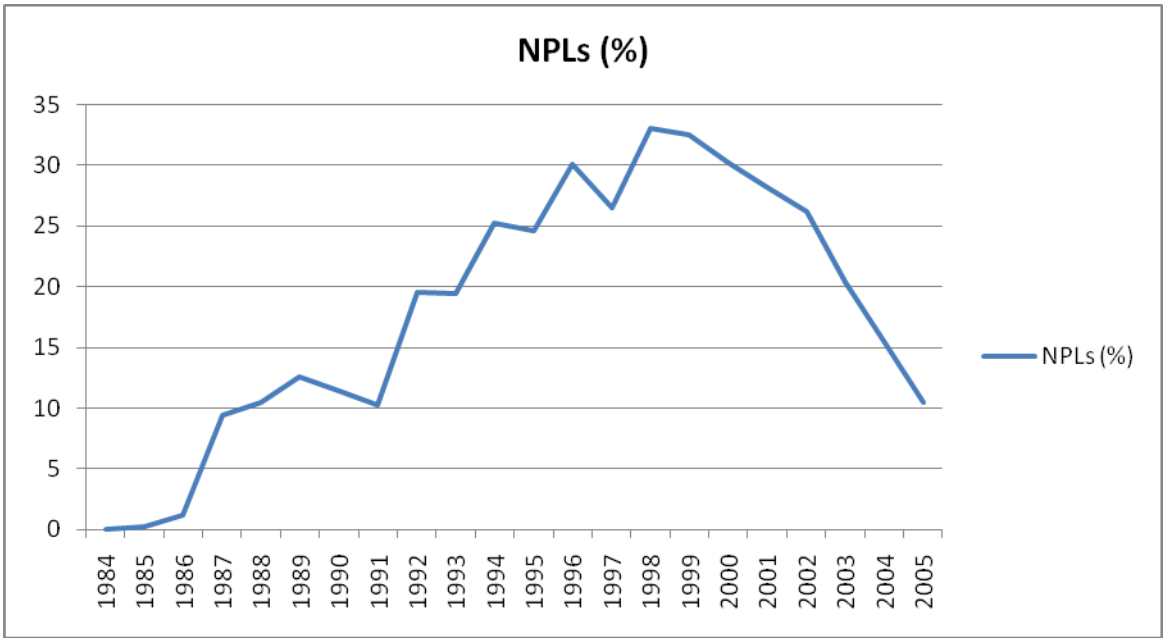
Source: Rowe, Shi, Wang, 2009

Fu and Heffernan (2009) tested the quiet-life hypothesis on the big four. The hypothesis says that companies with greater market power prefer more relaxed business environment and less effort is put into achieving the highest cost efficiency. This relaxed management could be one of the causes for inefficiency of the state-owned banks. It turned out that the state banks in China do not enjoy quiet life, possibly due to the fact that interest rates are controlled by the government and this prevents them from earning monopoly profits.

Well known problem of China's banking sector is the large amount of non-performing loans. According to China Banking Regulatory Commission at the end of 2006 NPLs of all commercial banks reached 1 254,92 billion RMB, which accounted for 7,09% of all loans in the sector. The vast majority, 1 053,49 billion RMB, belonged to state-owned commercial banks, and this represented 9,22% of their loans. However, in comparison to the past results these levels indicate an improvement in quality of loans. Fig. 6 presents how the ratio of NPLs in state-owned commercial banks changed over time. We see that since 1988 up until 2005 it did not fell under 10% and in 1998 it reached 33%. These very high levels of NPLs signal that business efficiency and corporate governance are far from optimal (Muroi, 2007). It is worth adding that there are estimations like in Matthews, Guo and Zhang (2007) or Wong and Wong (2001) that provide even higher levels of NPLs.

One of the main reasons for such high NPLs rates is the fact that on the shoulders of the state-owned commercial banks was put the responsibility of keeping state-owned enterprises alive (Wong, Wong, 2001). And state-owned enterprises very often treated bank credit as government grant and used it to finance circulating capital and fixed investment. And the banks had no possibility to pass on the burden (Huang, 2006).

Figure 6 NPLs of China's state-owned commercial banks (1984-2005)



Source: Huang (2006)

Finally the government became concerned with the growing number of NPLs. In 1999-2000 four asset management companies (AMC) were established. Their aim was to deal with the problem of bad assets in the state-owned commercial banks. AMC took over a sum of 1,3 trillion RMB of NPLs from the big-four (Hu, 2006). In 2003 the bank restructuring plan was initiated. As part of this plan the government, using special companies, injected into Bank of China, China Construction Bank and Industrial and Commercial Bank capital in foreign currency reserves. From 2003 to 2005 the total injection reached $60 billion (Muroi, 2007). Additionally there were further takeovers of the NPLs. The reform resulted in impressive improvement of the balance sheets of the banks: their NPLs ratios were much lower and Tier 1 capital adequacy ratios grew significantly (Hu, 2006).

Table 3 Distribution of NPLs of major commercial banks in 2006 (by industry) (excluding foreign banks)

Industries/Items	Outstanding Balance (RMB 100 million)	Share in total loans (%)
Total Loans	12511,23	7,27
A. Farming, Forestry, Animal Husbandry and Fishing	980,86	46,09
B. Mining	135,01	3,74
C. Manufacturing	4467,21	10,4
D. Production and Supply of Electricity, Gas and Water	325,33	2,18
E. Construction	225,71	4,27
F. Transport, Storage and Post	325,31	2,01
G. Information Transmission, Computer Services and Software	140,52	5,33
H. Wholesale and Retail Trades	2379,59	17,3
I. Hotels and Catering Services	250,17	19,55
J. Financial Intermediation	42,6	1,38
K. Real Estate	952,65	6,61
L. Leasing and Business Services	713,31	10,61
M. Scientific Research, Technical Services and Geologic Prospecting	62,89	13,6
N. Management of Water Conservancy, Environment and Public Facilities	90,18	1,3
O. Services to Households and Other Services	129,22	4,78
P. Education	73,01	2,38
Q. Health, Social Security and Social Welfare	35,6	4,31
R. Culture, Sports and Entertainment	90,21	14,83
S. Public Management and Social Organizations	123,95	5,39
Loans to Overseas	16,89	9,44
Personal Loans	950,97	3,39
Of which, Personal Consumption Loans	474,51	2,03

Source: CBRC 2006 Annual Report

Most of NPLs in state-owned commercial banks were generated in three sectors: the sector of farming, forestry, husbandry and fishery, manufacturing industry and the wholesale and retail sector. In 2003 together they amounted to nearly 75% of NPLs of the state-owned banks. The situation in the first sector is the worst - almost half of the loans given to the farming turns out to be non-performing (CBRC, 2004a). Similarly, when we take loans of major commercial banks (that is SOCB and JSCB) into consideration, the highest rate of NPLs is in farming, forestry, husbandry and fishery, as shown in Table 3. Also wholesale and retail trades as well as hotels and catering services had very high rates of NPLs.

3.1.3. Other commercial banks

Two main groups under other commercial banks are joint-stock commercial banks and city commercial banks. First joint-stock commercial bank was Bank of Communications established in 1986. Afterwards came another 11 banks including the CITIC Commercial Bank, Shenzhen Development Bank and Guangdong Development Bank. The monopoly of state-owned commercial banks was broken (Neftci, Ménager-Xu, 2006). Presently there are 13 joint-stock commercial banks in China (Fig.2). Their share of the market has grown continuously at the expense of state-owned commercial banks and now they represent nearly 14% of the market in terms of assets (Fig.3).

Until 1998 city commercial banks were called union banks. In spite of "union" in their names they were actually commercial banks with stock-holding features operating under the Law of Commercial Banks (Neftci, Ménager-Xu, 2006). There are currently 124 city commercial banks in China (Fig. 2). Owing to their history, mandate and capital strength, city commercial banks focus their business scope on the cities they are located in. The joint-stock commercial banks on the other hand can operate on national and regional level (Hansakul, 2004). During the years city commercial banks expanded their market share as well, up to approximately 6% at the end of 2007 (Fig. 3).

According to Lin and Zhang (2009) in the years 1997-2004 the average ownership structure of the joint-stock commercial banks' top then shareholders was the following: 51,6% of the stock belonged to the state, private investors owned an average equity stake of 4,6% and foreign investors 1,12%. In case of city commercial banks the state owned on average 35,87% of the stakes, approximately 24,37% was owned by private investors and 1,35% by foreign investors.

Fu and Heffernan (2009) point out that joint-stock commercial banks were set up to help in developing efficient banking system. Thus they are less likely to get engaged in the implementation of the state policy. However their ownership structure still puts them at risk of this kind of lending. The majority of shares is owned by central or local governments and state-owned enterprises and they can influence the banks to extend credit to a selected group. City commercial banks, on the other hand, are mostly vulnerable to the influences

coming from the local governments, especially as very often they own a large bulk of their shares. Thus they can also be exposed to the pressure of policy lending (Tong, 2005).

When compared to the state-owned, joint-stock commercial banks as well as city commercial banks have been significantly more profitable. Moreover their balance sheets are usually healthier (Tong, 2005). Until recently, other commercial banks kept a bigger proportion of government bonds, which indicates that they preferred safer, more liquid assets. Only lately pressure has been put on state-owned banks to improve their balance sheets and allocate more assets as government bonds (Riedel, Jin, Gao, 2007). As mentioned before when describing profitability of state-owned commercial banks, other commercial banks have generally achieved higher return on assets as well as higher return on equity (see Fig. 4 and Fig.5). The difference in profitability was even more pronounced in the 1990s. Then ROA of joint-stock commercial banks exceeded 1% while profitability of state-owned commercial banks was around 0,3% (Wong, Wong, 2001). In case of ROE in more recent years their results were actually comparable to results of two policy banks – China Development Bank and Agricultural Development Bank of China. Though levels of ROA, compared to the results of China Development Bank in 2002-2006, were lower.

Table 4 NPLs of other commercial banks (1997-2006)

	1997	1998	1999	2002	2003	2004	2005	2006
Joint-stock commercial banks	11,80%	13,50%	17,13%	9,53%	6,50%	4,94%	4,22%	2,81%
City commercial banks	n/a	n/a	n/a	17,72%	12,85%	n/a	7,73%	4,78%

Sources: Wong, Wong, 2001; China Banking Regulatory Commission

Healthier balance sheets can be also traced to better risk management. Furthermore, other commercial banks have significantly lower rate of non-performing loans than state-owned commercial banks. When we compare the results from Table 4 with the ones from Fig. 6 we see that both types of other commercial banks had lower ratios of NPLs throughout the whole period. Moreover joint-stock commercial banks did definitely better - they had approximately half of the NPLs ratio of city commercial banks.

As opposed to state-owned commercial banks, joint-stock and city commercial banks were not subject to mandatory credit quotas before 1998. Since their establishment the

amount of loans they could extend was not limited. However they were somewhat limited in the types of loan services they could provide. Joint-stock commercial banks could handle loans backed by securities only at their head offices and city commercial banks could not handle them at all (Wong, Wong, 2001).

3.1.4. Rural credit cooperatives

The cooperative sector can be divided into rural credit cooperatives, urban credit cooperatives, rural commercial and cooperative banks and village and township banks. Among them rural credit cooperatives are definitely the most numerous. At the end of 2007 there were 8 348 of them operating in China (Fig. 2). As shown in Fig. 3, rural credit cooperatives own around 10% of the market in terms of assets. Recently their share has been declining slightly. Nonetheless they keep being the third major player on the Chinese market after state-owned commercial banks and joint-stock commercial banks.

First rural credit cooperatives were established in late 1950s when each farmer was required to contribute a small amount of cash. After abandonment of colleting farming in 1980s rural credit cooperatives continued as part of the state banking system. In 1990s they expanded rapidly and reached 49 000 in number (Hu, 2006). During the reforms in 2003 and 2004 they were placed under provincial governments and merged into county- or provincial-level RCC unions. A number of stronger rural credit cooperatives was restructured and transformed into provincial rural commercial banks or cooperative banks (Gale, Collender, 2006).

Shareholders, which normally are non-state sector rural households, are the owners of rural credit cooperatives. Nominally shareholders controlled the cooperative and its focus was on providing financing to its members. However in practice the control never really belonged to shareholders. Until 1996 rural credit cooperatives were supervised by Agricultural Bank of China, which actually controlled the funds. Also local governments managed to gain to some extent control over their operations (Laurenceson, Chai, 2003). In 1996 the control was taken over by People's Bank of China and from 2003 they are under China Banking Regulatory Commission. Very often local governments and officials make decisions instead of the farmers. There is also lack of transparency in their operations. All in all Xie (2006) argues that since the state gives implicit insurance on their deposits and

constantly interferes in their management and operations, rural credit cooperatives function more as local quasi state-owned banks.

The cooperatives provide financing mainly to small and medium sized enterprises as well as individuals. They concentrate their business scope on their home township or county. Since 1978 they gradually increased the share of the deposits they collected in the rural areas that were used to finance rural economic activities. At the beginning it was only 27%. The reason for the low numbers was that until mid 1980s rural credit cooperatives hand over much of their funds to Agricultural Bank of China so that rural savings could be channelled to finance economic activities in rural areas. Additionally until 1984 there were high legal barriers against noneconomic rural activities and establishment of rural enterprises. When these conditions were changed the ratio could rise. In 1995 the percentage of deposits allocated to rural loans reached 73% (Huang et al., 2005).

The ratio of non-performing loans in rural credit cooperatives has been very high. There are estimates that it reached 50% of total lending (Hansakul, 2004). CBRC reported that at the end of 2003 NPLs amounted to 504,9 billion RMB, which was almost 30% of the total (2004b). While about 800 million people, nearly two thirds of China's population, lives on the countryside, this makes rural sector extremely important. Thus the government is ready to financially support rural credit cooperatives in need (Hansakul, 2004). People's Bank of China has given loans to rural credit cooperatives in order to support the increase in agricultural lending. In 2003 and 2004 the government decided to clean up some old NPLs by injecting around $20 billion into the cooperatives (Gale, Collender, 2006).

3.2. State policies concerning financial sector and economic growth

Demirguc-Kunt and Levine (2008) stress that it is the government that has major influence on the way financial system in each country operates, moreover it determines the extent to which large parts of financial system have access to financial services. The degree of political and economic stability as well as the functioning of legal, regulatory and information frameworks depend hugely the government's actions and they all influence financial system performance. Moreover the government can decide on the ownership of financial institutions and the extent of contestability by domestic and foreign firms. Let's examine how the Chinese government deals with the above aspects of state influence.

Maswana (2008) stresses that Chinese government has a broad range of tools to implement its financial policies that need to respect country's development goals. The People's Bank of China, Chinese central bank, is not independent from the government and has to ensure that its actions are compatible with other development policies and financial system stability.

Firstly, the government can control the level of bank competition. Immediately comes the question what level is optimal? On the one hand higher competition means lower entry barriers, fewer regulatory limitations on bank activities, greater banking freedom and generally better institutional development (Demirguc-Kunt and Levine, 2008). On the other hand there are fears that higher competition might destabilize banking sector. However, recent studies (e.g. Berger et al., 2004; Beck, Beck, Demirguc-Kunt and Maksimovic, 2004) have revealed that bank competition has positive effect on efficiency, stability and firms' access to financing. Ownership structure is another crucial matter for the government, unavoidably connected with the competition issue. Empirical studies (e.g. La Porta et al., 2002; Barth, Caprio and Levine, 2004; Beck, Demirguc-Kunt, Martinez Peria, 2007) provide the evidence that foreign banks have usually positive effect on the system, state ownership however is connected with less and lower quality of access to financial services as well as greater fragility. State ownership of banks can be a cause of lower level of financial development and lower economic growth. Banks owned by the government have tendency to grant credit to politically-favoured and economically not feasible projects (Sapienza, 2004; Cole, 2005; Dinc, 2005; Khwaja and Mian, 2005; Beck, Demirguc-Kunt, and Levine, 2006). These results would imply the necessity of removing obstacles to foreign entry and implementing bank privatization policies.

In China first economic reforms were implemented in 1978, but changes in the banking sector came several years later. About competition we can talk since 1985 when the government decided to lift restrictions limiting the four existing state banks to perform in different sectors. This competition was very limited though and only in 1994 it was increased by establishing policy banks that took over policy loans and renaming the big four state banks as "commercial banks". Still the separation was far from perfect, and commercial banks continued to take part in policy lending. Up until now when it comes to assets the big four definitely dominates the market. The government actually eliminated competition

when it comes to price due to strict control of the interest rates for different kinds of deposits and this forced banks to attract customers by their financial fundamentals and quality of service. The central bank decides as well on the range within which other banks can determine their loan interest rate. Interbank rates were liberalized in 1999. The government has also influenced the competition conditions by guaranteeing deposits in state commercial banks giving them more protection. The guarantee means that these state banks cannot fail (Wong, Wong, 2001). Therefore, in spite of some progress, institutional arrangements in China inhibit efficient and effective competition in domestic banking sector.

Financial liberalization can be a complicated policy to implement. Deregulation of interest rates and more open policies of entry generally proved to induce financial development, especially in counties were financial system was initially repressed. Entry of foreign banks eventually increases competition, develops efficiency and improves the quality of services (Claessens, Demirguc-Kunt and Huizinga, 2001; Clarke, Cull and Martinez Peria, Sanchez, 2003). However, to ensure that financial liberalization will be successful, effective contractual and supervisory environment must be prepared (Demirguc-Kunt and Levine, 2008). In China first new banks appeared on the market in 1986. The policy of introducing new institutions was very careful and strict, especially when it comes to foreign banks. There were geographical restriction – foreign banks were allowed to operate only in certain cities. Furthermore there were restrictions on the services they could provide, for example they were banned from RMB services for local customers (Jacob, 2007). Yet entry restriction policies can also serve as a way to create rent opportunities so that banks have incentives to invest in deposit mobilisation (Maswana, 2008). As mentioned before interest rates have been strictly controlled. However Maswana (2008) does not consider it an obstacle for growth. He argues that this policy is significant to maintain the incentives for households and enterprises to expand their financial asset positions.

Access to financial services is gaining importance as another aspect of financial policies. According to modern development theory the lack of such access can lead to persistent income inequality and slower economic growth. Financing obstacles were found to be one of the main constraints for firms' growth. These obstacles affect households as well – for example with no access to credit they might not have funds to educate children, and child labour can increase (Demirguc-Kunt and Levine, 2008). Maswana (2008) suggests

that reduced availability of credit and other financial services or heavy costs imposed on taxpayers results from the fear for financial instability that could negatively affect effectiveness of monetary policy.

Impact of bank concentration frequently depends on regulatory and institutional system, thus it is advised for governments to concentrate on improving these underlying environments as well as ownership structure in order to support contestable financial system rather than seek to decrease the concentration levels in the banking sector (Demirguc-Kunt and Levine, 2008). Cai (2006) argues that high concentration is not necessary bad – especially in countries where banks' performance is discontent it might actually result in higher financial stability. In China there is high concentration in the banking sector due to large state-ownership and not many banks are actually profit-oriented. Though it is worth mentioning that in the last two decades the degree of concentration in China had fallen somewhat and this trend is set to be maintained (Cai, 2006).

Direct credit controls is another policy instrument used by the Chinese authorities. In 1988 direct credit control was applied for credit extended by specialized and universal banks as well as nonbank financial institutions and direct financing of firms. Credit plan contained ceiling for credit in the economy and assessed its compatibility with macroeconomic targets and objectives. The Peoples Bank of China decided on credit ceilings for state-owned banks as well as different types of loans such as working capital loans and investment loans (Tseng et al., 1994). The government influenced the banks' lending decisions through direct credit controls until 1998 when the credit plan was abolished (Wong, Wong, 2001). The central government wanted the investment funds to go to strategic sectors like raw materials and energy and opted for infrastructure investment as well as investment for technical upgrading of SOEs (Girardin, 1997).

Maybe financial policies can be seen as repressive but Chinese authorities have proven that they can be successful at ensuring domestic financial stability and resistance to external shocks. The government has kept the whole financial system under control and prevented financial institutions from engaging in risky actions like taking up foreign currency or derivative risks, which could result in the type of crisis that affected majority of the East Asian countries in 1997. Chinese currency, RMB, is only partially convertible - limited on the

current account but not on capital account transactions. This makes the currency less exposed to speculative attacks (Maswana, 2008).

3.3. How financial sector can affect economic growth in China?

Based on this chapter's analysis of financial sector in China and accompanying state policies I would expect the development of the four biggest types of banking institutions: state-owned commercial banks, policy banks, other commercial banks and rural credit cooperatives, to be mostly linked with economic growth. The direction of causality should vary due to different management abilities, level of government involvement and goals of business activity that these institutions represent.

State-owned commercial banks are characterised by strong sate involvement and although their aim is to be profitable, high level of non-performing loans as well as low returns on assets and equity throughout the analysed period indicate that their risk management and allocation of loans is not the best. Furthermore they have been burdened by supporting state-owned enterprises. However, they enjoyed privileged treatment from the government. Considered all that I expect their development has followed economic growth.

Similarly, in policy banks the government would decide on allocation of loans and the profitability of these banks was far from optimal. However, they did slightly better than the state-owned banks and profitability was not their main objective. Through them the government could support selected industries. If we suppose that market forces would be better at allocating the loans, then the causality should also go from economic growth to their development.

Joint-stock commercial banks and city commercial banks are institutions that are mostly directed towards profits and commercial lending. The influence of the government is of lesser extent and they have the lowest number of non-performing loans in their portfolio. Thus I would suspect they can induce economic growth.

The state interferes in the management of rural credit cooperatives and these institutions are plagued with high ratios of non-performing loans. This would suggest bad

allocation of loans. However, these institutions are not troubled with responsibility for financing SOEs. They rather lend to individuals and township and village enterprises. This might indicate that there is either two-way causality or one-way causality from the development of RCC to economic growth.

In the next chapters I will choose the appropriate variables to set up a VAR model and test the above hypotheses by applying Granger causality tests.

4. Data and description of variables

The main part of the data used in this thesis comes from the compilation of financial statistical data published by the Financial Survey and Statistics Department of the People's Bank of China. The data disaggregation is a strength of this newly released paper. They allow us to look closer at the performance of different banks and conduct comparison analysis. Originally they cover the period from 1949 to 2005 though in the study only the time after the reforms in 1978 will be analysed. Additionally, for the indicators outside of the banking sector the data from the Chinese Statistical Yearbook for 2008 are applied.

Following previous studies (e.g. Khan, 1999; Levine, 2000) the natural logarithm of the real per capita GDP is used as an indication of economic growth. Real GDP is calculated as nominal GDP divided by GDP deflator (1978=100) and the ratio of real GDP to total population gives us real per capita GDP. Heston (1994) suggests that real per capita GDP serves better as a measure in an analysis than total real GDP due to the fact that some of the common errors that are expected in the estimation of GDP and population are likely to counterbalance each other.

4.1. Indicators of financial development

Maswana (2006) suggests three indexes to proxy the development of the financial sector: financial deepening (M3/GDP), credit expenditure to the private sector by banks and ratio of total credit extended to the entire economy.

The first variable represents financial intermediary development. De Gregorio and Guidotti (1995) argue that monetary aggregates can be a good approximation of financial development since they are characterised by high correlation with the ability of financial

sectors to provide liquidity or transaction services as well as the ability of financial institutions to channel funds from agents willing to save to the ones that want to borrow. Maswana (2006) uses M3/GDP ratio to proxy that and points out that in developing economies, such as China, the role of capital markets is generally very small, and liquid aggregate like M1 would be related mostly to the ability of financial system to provide liquidity and serving as means of exchange. The case of monetary overhang in Eastern Europe and the former Soviet Union can be a good illustration why M1 might not be the best financial indicator – before the economic reforms these countries were characterized by high levels of monetization, which naturally was not a result of financial development. Since the ability of financial system to allocate credit is regarded as more related to investment and growth, researchers like Gelb (1989) or King and Levine (1993) tend to use least liquid aggregate, M3, when doing research on such countries. However in this thesis I will have to apply M2/GDP ratio due to the fact that data for M2 in China are more accessible, official and up to date. Also King and Levine (1993) use M2 in their study when M3 statistics are not available. Therefore the financial intermediary development indicator in this thesis will measure the sum of cash in circulation and all deposits of Chinese economy divided by GDP.

In this thesis I will take advantage of the more detailed data and break down the banks' credit expansion firstly into amounts of credit granted by different types of banks and then into different types of loans. Credits from the following categories of banks were used in the analysis: policy banks, state-owned banks, other commercial banks and rural credit cooperatives. Policy banks include China Development Bank, The Export – Import Bank of China and the Agricultural Development Bank of China. The category of state - owned commercial banks consists of Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China and China Construction Bank. Finally other commercial banks include Bank of Communications, China CITIC Bank, China Everbright Bank, Huaxia Bank, Guangdong Development Bank, Shenzhen Development Bank, China Merchants Bank, Shanghai Pudong Development Bank, Industrial Bank, China Minsheng Banking Corporation, Evergrowing Bank, China Zheshang Bank.

Loans are divided into: loans to industrial sector, loans to commercial sector, loans to construction sector, loans to agricultural sector, capital construction loans, technical improvement loans and finally other medium and long – term loans. Loans to industrial

sector, loans to commercial sector, loans to construction sector and loans to agricultural sector are working capital loans issued by financial institutions with maturity equal to or less than one year. The rest of the categories are loans issued by financial institutions with maturity longer than one year and are used for capital construction, technology upgrading etc.

As for the expenditure to the private sector, Maswana (2006) is not the only one suggesting to use this measurement. Beck et al (2000), Levine, Loayza and Beck (2000) or Khan (2000) recommend as well to restrict the credit by financial institutions to the private sector. This should exclude credits granted to the government, companies owned by the state or government agencies as well as credit issued by the central bank and development banks. However, as Liang and Teng (2006) point out, it is very difficult to apply it for the data of a transition economy like China. Furthermore in this study the point is to compare different banks of China that can affect growth, which includes the development ones. Only the central bank, due to its specific properties and functions concerning state administration, is excluded from the analysis.

Moreover the proxy of financial development could be more accurate if the data of the securities market had been included. Though, as mentioned in the previous section, in spite of its rapid growth the influence of Chinese stock market is still very limited and cannot be compared to the banking sector. Additionally due to its late introduction – in 1990, just including it together with the measures of the banking sector as an indicator of financial development could cause a problem of a structural break.

Basing on the paper by Maswana (2006) the end-of-year values from the balance sheet of banking institutions – here credit issued by different banks and values of different types of loans - are divided by nominal GDP.

4.2. Control variables

In the analysis we also include control variables that are associated with studies on economic growth. The first one is used as proxy of physical capital. Following Boyreau-Debray (2003) and Maswana (2006), we include the ratio of foreign direct investment flows to GDP. The proxy shows the degree of integration into the world economy, it controls for

external factors that can influence economic growth like openness to trade and external financing. The second variable controls for the influence of human capital on growth. Boyreau-Debray (2003) uses share of population with more than secondary schooling as the proxy of human capital. Since these data are unavailable, as the proxy I use number of graduates from institutions of higher education instead. All variables in the dataset are converted into natural logarithms in order to be able to interpret them in terms of growth when the first difference is taken.

4.3. Descriptive statistics

Table 5 presents descriptive statistics of all the variables described above that were used further in the study. The variables exhibit large variation. The highest dispersion among loans to different sectors is among capital construction loans, loans to commercial sector and other medium and long term loans. When it comes to credit extended by different banks, the share of joint-stock and city commercial banks' credit in China's gdp changed the most. Credit extended by state-owned banks as well as loans to industrial and commercial sectors had on average the biggest share in GDP. Data on national accounts is available for a long period, also data on loans to most of the sectors is there for more than 20 years. However information on credit extended by different institutions is more limited. As a result part of the analysis is conducted for the years 1996-2005, for which coherent data for all types of banks are available.

Table 6 and Table 7 present the correlation matrixes of the variables. Table 6 focuses on the first version of equation (1), where different types of loans are analysed. Table 7 reports the correlation of the variables from the second version of equation (1), in which credit extended by different banking institutions is included. As we would expect, both control variables are positively correlated with economic growth. Also money supply is positively correlated with GDP growth. The correlation between financial variables and growth varies among different types of loans. Loans to agricultural sector, capital construction loans and other medium and long term loans are positively correlated with growth. The rest is characterised by negative correlation. Very high positive correlation (0,99) exists between loans to commercial and industrial sector, however there is no indication that all short term loans are positively correlated with each other. Similarly, medium and

long-term loans do not have the same direction of correlation with each other. As the correlations are not too high, this may be a sign that it should be possible for the model to identify individual effects of these variables.

Table 5 Descriptive statistics

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurtosis	Obs.
GDP GROWTH	8,475	8,606	13,706	2,329	2,801	-0,319	3,058	28
Control variables								
EDUCATION	0,001	0,001	0,002	0,000	0,001	1,955	6,776	28
FDI	85,420	63,102	315,380	29,047	69,532	1,957	6,538	23
Financial variables								
M2	1,225	1,195	1,632	0,819	0,282	0,168	1,577	16
Loans to sectors								
INDUSTRIAL SECTOR	0,194	0,188	0,272	0,123	0,036	0,484	2,718	28
AGRICULTURAL SECTOR	0,062	0,059	0,118	0,024	0,022	0,620	3,495	28
CAPITAL CONSTRUCTION	0,091	0,060	0,220	0,003	0,076	0,525	1,850	20
COMMERCIAL SECTOR	0,254	0,289	0,339	0,090	0,074	-0,761	2,391	28
CONSTRUCTION SECTOR	0,049	0,050	0,085	0,026	0,013	0,899	4,337	21
TECHNICAL IMPROVMENT	0,042	0,048	0,072	0,010	0,021	-0,264	1,502	22
OTHER MEDIUM AND LONG TERM LOANS	0,071	0,025	0,246	0,002	0,085	1,131	2,808	18
Credit by types of banks								
POLICY BANKS	0,139	0,138	0,154	0,124	0,008	-0,078	2,908	10
STATE-OWNED COMMERCIAL BANKS	0,596	0,591	0,642	0,526	0,038	-0,312	2,158	10
OTHER COMMERCIAL BANKS	0,069	0,033	0,183	0,008	0,067	0,727	1,804	14
RURAL CREDIT COOPERATIVES	0,072	0,085	0,125	0,012	0,035	-0,407	1,939	28

Growth is also likely to be associated with credit extended by joint-stock commercial banks and city banks. However credit given by policy and state-owned banks does not move in the same direction. Both are negatively correlated with growth as well as credit extended by other commercial banks. Credit from state-owned banks is only positively correlated with

credit extended by rural credit cooperatives. This may be connected to the fact that one of the state-owned commercial banks had control over rural credit cooperatives for a long time, and then cooperatives were similarly supervised as quasi state-banks.

Table 6 Correlation matrix for the equation with different types of loans

	GDP GROWTH	FDI	EDU.	M2	AGRICULT. SECTOR	CAPITAL CONST.	COMMER. SECTOR	CONSTR. SECTOR	INDUSTRIAL SECTOR	OTHER MEDIUM AND LONG TERM LOANS	TECHNICAL IMPROV.
GDP GROWTH	1,00	0,84	0,34	0,32	0,22	0,33	-0,33	-0,27	-0,29	0,23	-0,24
FDI	0,84	1,00	0,14	-0,04	0,48	0,00	0,01	-0,25	0,04	0,00	0,01
EDUCATION	0,34	0,14	1,00	0,77	0,09	0,85	-0,85	-0,58	-0,80	0,80	-0,88
M2	0,32	-0,04	0,77	1,00	-0,34	0,98	-0,98	-0,45	-0,97	0,82	-0,90
AGRICULTURAL SECTOR	0,22	0,48	0,09	-0,34	1,00	-0,22	0,31	-0,52	0,41	-0,15	0,04
CAPITAL CONSTRUCTION	0,33	0,00	0,85	0,98	-0,22	1,00	-0,98	-0,51	-0,95	0,84	-0,94
COMMERCIAL SECTOR	-0,33	0,01	-0,85	-0,98	0,31	-0,98	1,00	0,49	0,99	-0,87	0,92
CONSTRUCTION SECTOR	-0,27	-0,25	-0,58	-0,45	-0,52	-0,51	0,49	1,00	0,43	-0,58	0,61
INDUSTRIAL SECTOR	-0,29	0,04	-0,80	-0,97	0,41	-0,95	0,99	0,43	1,00	-0,87	0,86
OTHER MEDIUM AND LONG TERM LOANS	0,23	0,00	0,80	0,82	-0,15	0,84	-0,87	-0,58	-0,87	1,00	-0,84
TECHNICAL IMPROVEMENT	-0,24	0,01	-0,88	-0,90	0,04	-0,94	0,92	0,61	0,86	-0,84	1,00

Table 7 Correlation matrix for the equation with different types of banks

	GDP GROWTH	EDUCATION	FDI	M2	POLICY BANKS	STATE BANKS	OTHER COMMERCIAL BANKS	RURAL CREDIT COOPERATIVES
GDP GROWTH	1,00	0,78	0,90	0,48	-0,60	-0,49	0,72	0,34
EDUCATION	0,78	1,00	0,69	0,79	-0,40	-0,39	0,89	0,46
FDI	0,90	0,69	1,00	0,26	-0,80	-0,59	0,53	0,07
M2	0,48	0,79	0,26	1,00	-0,20	0,09	0,94	0,85
POLICY BANKS	-0,60	-0,40	-0,80	-0,20	1,00	0,28	-0,40	-0,15
STATE BANKS	-0,49	-0,39	-0,59	0,09	0,28	1,00	-0,12	0,46
OTHER COMMERCIAL BANKS	0,72	0,89	0,53	0,94	-0,40	-0,12	1,00	0,76
RURAL CREDIT COOPERATIVES	0,34	0,46	0,07	0,85	-0,15	0,46	0,76	1,00

5. Empirical analysis

This section presents the empirical analysis of the influence of financial development on economic growth in China. I examine two aspects of the issue: the impact of different types of banks and the impact of different kind of loans. First, I present the growth model for each aspect and discuss the econometric method, which includes unit root and cointegration test procedures as well as causality tests. Second, I present and discuss the results.

5.1. Model specification

Based on the previous discussion of the characteristics of financial sector in China, I set up a simple model equation to test the hypothesis that different types of banking institutions as well as loans of different purpose may have different effect on economic growth in China.

The basic growth equation can be presented as:

$$Y_t = \propto + \beta X_t + \gamma Z_t + \varepsilon_t \qquad (1)$$

where Y is the real per capita GDP, X is a vector of financial development measures, Z is a vector of control variables, ε is the error term and t is a time subscript.

Equation (1) will be used in two variants. The first one will include money supply and loans extended from different types of banks that will be used as measures of financial development. In the second one measures of financial development will consist of money supply and different types of loans.

Following Maswana (2006) the process of estimation and testing of each variant of equation (1) is divided into three stages: a study of the integration order of the variables, a test for cointegration of time series and application of the Granger causality test.

5.2. Stationarity test procedure

When mean, variances and covariances of the series do not change over time, we call the process stationary. In order to transform nonstationary time series Y_t into a stationary

one we have to differentiate it θ -number of times. A series which becomes stationary after first differencing is said to be integrated of order one, denoted *I* (1). The order of integration can be determined by applying a unit root test, augmented Dickey-Fuller test (Verbeek, 2008). The estimated equation is the following:

$$\Delta Y_t = \delta + \pi Y_{t-1} + c_1 \Delta Y_{t-1} + c_{p-1} Y_{t-p+1} + \gamma t + \varepsilon_t \qquad (2)$$

where δ is the drift parameter. Equation (2) can be also estimated without a trend term by eliminating γt. The null hypothesis of a unit root $H_0: \pi = 1$ against $H_1: \pi < 1$(stationarity) is tested.

5.3. Cointegration test procedure

If it is determined that the time series is nonstationary, it is necessary to test for cointegration. As Engle and Granger (1987) point out, it is possible that a linear combination of nonstatoinary series will be stationary. If such a stationary combination does exist, the non-stationary time series are said to be cointegrated. Then it is possible to interpret it as a long-run equilibrium relationship among the variables. I use the method developed by Johansen (1991, 1995a) to perform cointegration tests.

We consider nonstationary time series as a vector autoregression (VAR) of order p:

$$\Delta y_t = \pi y_{t-1} + \sum_{i=1}^{p-1} \tau_i \Delta y_{t-1} + B x_t + \varepsilon_t \quad (3)$$

where:

$$\pi = \sum_{i=1}^{p} A_i - I\,, \qquad \tau_i = -\sum_{j=i+1}^{p} A_j\,, \qquad (4)$$

and y_t is a k-vector of non stationary I(1) variables, x_t is a d-vector of deterministic variables, and ε_t is a vector of innovations.

According to Granger's representation theorem, if the coefficient matrix π has reduced rank r<k, then there exist k x r matrices α and β each with rank r such that π=αβ'

and β'y_t is I(0). Here r is the number of cointegrating relations and each column of β is the cointegrating vector. The elements of α are the adjustment parameters. In Johansen's method our objective is to estimate the π matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of π. There are two test statistics: the trace statistic and the maximum eigenvalue statistic. The first one tests the null hypothesis of r cointegrating relations against the alternative of k cointegrating relations. The second one tests the null hypothesis of r cointegrating relations against the alternative of r+1 cointegrating vectors (Quantitative Micro Software, 2005).

5.4. Causality tests procedure

In order to test causality, Granger (1969) suggests a procedure, in which we examine how much of the current value of Y can be explained by past values of Y and then we look whether adding lagged values of X can improve the explanation. X is said to Granger cause Y if X helps in the prediction of Y, or equally if the coefficients on the lagged X's are statistically significant.

To select the lag order under VAR model, the sequential modified likelihood ratio (LR) criterion will be computed. The χ^2 test statistic is:

$$LR = (T-m)\{log|\Omega_{l-1}| - log|\Omega_l|\} \sim \chi^2(k^2) \quad (5)$$

where m is the number of parameters per equation under the alternative, l is the lag order, and (T-m) indicates small sample modification. The tested null hypothesis is that the coefficients on lag l are jointly zero.

Under the VAR model, for all possible pairs of (y, x) series in the group following bivariate regressions are performed:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_l y_{t-l} + \beta_t x_{t-1} + \ldots + \beta_l x_{-l} + \varepsilon_t \quad (6)$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \ldots + \alpha_l x_{t-l} + \beta_t y_{t-1} + \ldots + \beta_l y_{-l} + u_t$$

where α and β are coefficients and ε_t and u_t are error terms.

The test statistic is the Wald statistic for the joint hypothesis:

$$\beta_1 = \beta_2 = \ldots = \beta_l = 0 \quad (7)$$

The null hypothesis is that X does not Granger-cause Y in the first regression and that Y does not Granger-cause X in the second regression.

6. Results

The augmented Dickey-Fuller tests are performed on all series to examine their properties. The ADF test results presented in Table 8a suggest that at the 1% significance level we cannot reject the null hypothesis for any variable, which means that the unit root problem exists and the series are nonstationary. Almost all the variables have unit roots both when we include intercept and when we include intercept and trend. RURAL CREDIT COOPERATIVES and CAPITAL CONSTRUCTION have unit roots when both intercept and trend is included. POLICY BANKS and OTHER MEDIUM AND LONG TERM LOANS have unit roots when only intercept is included. The first differences of all the variables (Table 8b) are tested to be stationary at the significance level of 10%. This implies that the series are I(1) in log-levels and I(0) in first log differences.

Since the series are known to be nonstationary, it is valid to carry out the Johansen cointegration test. The number of cointegrating vectors is tested based on the assumption that the series have linear deterministic trend and there is intercept in cointegrating equations. The lag length of 2 in levels is determined based on Akaike Information Criterion (AIC).

The trace statistics and the maximum eigenvalue statistics for the given variables are presented in Tables 10 - 23. The null hypothesis of no cointegrating relations was rejected at the significance level of 5% in all of the tests. The null hypothesis of one cointegrating equation was rejected in all of the tests as well. Yet the null hypothesis of two cointegrating equations was not rejected at the significance level of 5%, except for GDP GROWTH and STATE BANKS where it was not rejected at the significance level of 10%. The maximum eigenvalue statistics showed no cointegrating equations for GDP GROWTH and M2, GDP

GROWTH and CONSTRUCTION SECTOR, GDP GROWTH and COMMERCIAL SECTOR, GDP GROWTH and OTHER COMMERCIAL BANKS, GDP GROWTH and EDUCATION as well as GDP GROWTH and OTHER MEDIUM AND LONG TERM LOANS. However due to the fact that trace statistics are more robust than maximal eigenvalue statistics in testing cointegration vectors (e.g. Cheung, Kai, 1993; Kasa, 1992; Liang, Teng, 2006) I assume the results given by trace statistics to be more adequate. Thus there is cointegration between economic growth and all financial development variables. This in turn indicates a long-run equilibrium relationship among the variables and is consistent with the theory of finance and growth.

Table 8 Unit root test results (level)

Variable	ADF test statistic (Intercept)	Critical values			ADF test statistic (trend & intercept)	Critical values		
		1%	5%	10%		1%	5%	10%
GDP GROWTH	-3,71	-3,74	-2,99	-2.64	-3,31	-4,44	-3,63	-3,25
FDI	-2,22	-3,79	-3,01	-2,65	-2,30	-4,47	-3,64	-3,26
EDUCATION	-0,92	-3,72	-2,98	-2,63	-2,53	-4,36	-3,60	-3,23
M2	-1,14	-3,96	-3,08	-2,68	-2,67	-4,80	-3,79	-3,34
POLICY BANKS	-0,36	-4,58	-3,32	-2,80	-20,81	-5,52	-4,10	-3,51
STATE BANKS	-4,33	-4,58	-3,32	-2,80	-3,32	-5,83	-4,24	-3,59
OTHER COMM. BANKS	-0,54	-4,07	-3,12	-2,7	-2,43	-4,99	-3,87	-3,38
RURAL CREDIT COOPERATIVES	-4,93	-3,71	-2,98	-2,63	-2,09	-4,35	-3,59	-3,23
AGRICULTURAL SECTOR	-1,96	-3,70	-2,98	-2,63	-2,07	-4,33	-3,58	-3,22
COMMERCIAL SECTOR	3,19	-3,70	-2,98	-2,63	0,37	-4,33	-3,58	-3,22
INDUSTRIAL SECTOR	-0,11	-3,70	-2,98	-2,62	0,01	-4,33	-3,58	-3,22
CONSTRUCTION SECTOR	-2,31	-3,83	-3,02	-2,65	-2,09	-4,53	-3,67	-3,27
CAPITAL CONSTRUCTION	-3,91	-3,85	-3,04	-2,66	-1,60	-4,99	-3,87	-3,38
TECHNICAL IMPROVEMENT	-1,29	-3,80	-3,02	-2,65	-3,13	-4,99	-3,87	-3,38
OTHER MEDIUM AND LONG TERM LOANS	0,06	-4,12	-3,14	-2,71	-4,67	-4,66	-3,73	-3,31

Table 9 Unit root test results (first difference)

Variable	ADF test statistic (Intercept)	Critical values			ADF test statistic (trend & intercept)	Critical values		
		1%	5%	10%		1%	5%	10%
GDP GROWTH	-4,16	-3,80	-3,02	-2,65	-3,98	-4,49	-3,65	-3,29
FDI	-3,58	-3,78	-3,01	-2,64	-3,48	-4,46	-3,64	-3,26
EDUCATION	-7,83	-3,71	-2,98	-2,62	-3,22	-4,37	-3,60	-3,23
M2	-2,90	-4,00	-3,09	-2,69	-2,80	-4,80	-3,79	-3,34
POLICY BANKS	-20,42	-4,58	-3,32	-2,80	-16,11	-5,83	-4,24	-3,59
STATE BANKS	-3,49	-4,80	-3,40	-2,84	-3,92	-6,29	-4,45	-3,70
OTHER COMM. BANKS	-2,63	-4,21	-3,14	-2,71	-3,66	-5,52	-4,10	-3,51
RURAL CREDIT COOPERATIVES	-5,05	-3,71	-2,98	-2,62	-7,56	-4,35	-3,59	-3,23
AGRICULTURAL SECTOR	-4,43	-3,71	-2,98	-2,62	-4,35	-4, 36	-3,59	-3,23
COMMERCIAL SECTOR	-2,47	-3,71	-2,98	-2,62	-3,49	-4,35	-3,59	-3,23
INDUSTRIAL SECTOR	-3,11	-3,71	-2,98	-2,62	-3,86	-4,35	-3,59	-3,23
CONSTRUCTION SECTOR	-3,06	-3,83	-3,02	-2,65	-3,29	-4,57	-3,69	-3,28
CAPITAL CONSTRUCTION	-3,30	-4,58	-3,32	-2,80	-7,33	-4,99	-3,87	-3,38
TECHNICAL IMPROVEMENT	-2,20	-3,92	-3,06	-2,67	-4,67	-4,57	-3,69	-3,28
OTHER MEDIUM AND LONG TERM LOANS	-4,18	-4,12	-3,14	-2,71	-3,74	-4,99	-3,87	-3,38

Table 10 Johansen cointegration test for GDP ROWTH and POLICY BANKS

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.861060	25.26382	15.49471	0.0013
At most 1 *	0.694029	9.474111	3.841466	0.0021
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.861060	15.78971	14.26460	0.0285
At most 1 *	0.694029	9.474111	3.841466	0.0021

Table 11 Johansen cointegration test for GDP GROWTH and STATE BANKS

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.01 Critical Value	Prob.
None *	0.995661	46.74142	13.42878	0.0000
At most 1 *	0.331466	3.221343	2.705545	0.0727
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.01 Critical Value	Prob.
None *	0.995661	43.52008	12.29652	0.0000
At most 1 *	0.331466	3.221343	2.705545	0.0727

Table 12 Johansen cointegration test for GDP GROWTH and OTHER COMMERCIAL BANKS

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.574151	17.48789	15.49471	0.0247
At most 1 *	0.453190	7.243851	3.841466	0.0071
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.574151	10.24404	14.26460	0.1964
At most 1 *	0.453190	7.243851	3.841466	0.0071

Table 13 Johansen cointegration test for GDP GROWTH and RURAL CREDIT COOPERATIVES

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.527301	33.00884	15.49471	0.0001
At most 1 *	0.405642	13.52711	3.841466	0.0002
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.527301	19.48172	14.26460	0.0068
At most 1 *	0.405642	13.52711	3.841466	0.0002

Table 14 Johansen cointegration test for GDP GROWTH and AGRICULTURAL SECTOR

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.433286	18.70473	15.49471	0.0158
At most 1 *	0.140592	3.939304	3.841466	0.0472
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.433286	14.76543	14.26460	0.0416
At most 1 *	0.140592	3.939304	3.841466	0.0472

Table 15 Johansen cointegration test for GDP GROWTH and CAPITAL CONSTRUCTION

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.608185	20.94800	15.49471	0.0068
At most 1 *	0.310842	5.956560	3.841466	0.0147
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.608185	14.99144	14.26460	0.0383
At most 1 *	0.310842	5.956560	3.841466	0.0147

Table 16 Johansen cointegration test for GDP GROWTH and COMMERCIAL SECTOR

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.389241	16.60672	15.49471	0.0339
At most 1	0.135555	3.787343	3.841466	0.0516
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.389241	12.81938	14.26460	0.0835
At most 1	0.135555	3.787343	3.841466	0.0516

Table 17 Johansen cointegration test for GDP GROWTH and CONSTRUCTION SECTOR

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.459928	17.18456	15.49471	0.0276
At most 1 *	0.250536	5.479548	3.841466	0.0192
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.459928	11.70501	14.26460	0.1222
At most 1 *	0.250536	5.479548	3.841466	0.0192

Table 18 Johansen cointegration test for GDP GROWTH and INDUSTRIAL SECTOR

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.481892	15.79886	15.49471	0.0450
At most 1	0.000714	0.017132	3.841466	0.8957
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.481892	15.78173	14.26460	0.0286
At most 1	0.000714	0.017132	3.841466	0.8957

Table 19 Johansen cointegration test for GDP GROWTH and OTHER MEDIUM AND LONG TERM LOANS

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.676845	23.47922	18.39771	0.0089
At most 1 *	0.421586	7.664511	3.841466	0.0056
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.676845	15.81471	17.14769	0.0773
At most 1 *	0.421586	7.664511	3.841466	0.0056

Table 20 Johansen cointegration test for GDP GROWTH and M2

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.633852	18.63043	15.49471	0.0163
At most 1 *	0.278214	4.564367	3.841466	0.0326
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.633852	14.06606	14.26460	0.0537
At most 1 *	0.278214	4.564367	3.841466	0.0326

Table 21 Johansen cointegration test for GDP GROWTH, INDUSTRIAL SECTOR, COMMERCIAL SECTOR and TECHNICAL IMPROVEMENT LOANS

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.883444	73.02026	47.85613	0.0000
At most 1 *	0.708977	34.33141	29.79707	0.0140
At most 2	0.388684	12.11306	15.49471	0.1516
At most 3	0.165403	3.254516	3.841466	0.0712
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.883444	38.68885	27.58434	0.0013
At most 1 *	0.708977	22.21834	21.13162	0.0351
At most 2	0.388684	8.858549	14.26460	0.2981
At most 3	0.165403	3.254516	3.841466	0.0712

Table 22 Johansen cointegration test for GDP and FDI

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.661188	30.21424	15.49471	0.0002
At most 1 *	0.299852	7.485728	3.841466	0.0062
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	0.661188	22.72851	14.26460	0.0018
At most 1 *	0.299852	7.485728	3.841466	0.0062

Table 23 Johansen cointegration test for GDP and EDUCATION

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.325575	18.73649	12.32090	0.0037
At most 1 *	0.278728	8.495229	4.129906	0.0042
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.325575	10.24126	11.22480	0.0741
At most 1 *	0.278728	8.495229	4.129906	0.0042

The Jahansen cointegration tests indicate that there are two co-integrating vectors in the set. Next, it is necessary to determine the number of lags for testing causality by applying the sequential modified likelihood ratio (LR) test. For the series concerning credit extended by different banks the LR test statistic at lag 2 shows the ability to reject null hypothesis. For the series regarding loans to different sectors the null hypothesis is rejected at lag 3. The lower maximum lag length of the first equation results also from the fact, that there are less observations available for it. Considering that for the whole period of 1978-2005 the data are not complete it is unreasonable to apply many more lags.

The causality analysis is performed using the equations (6) and (7). Table 24 reports the results for causality tests between economic growth and activity of different types of banks. Table 25 shows the results for the causality tests between economic growth and use of different types of loans.

Table 24 Results of the causality tests for different types of banks

Null hypothesis	Chi-sq	Probability	Causality
POLICY BANKS does not Granger Cause GDP GROWTH	21.82580	0.0000	POLICY BANKS<->GDP GROWTH
GDP GROWTH does not Granger Cause POLICY BANKS	17.99812	0.0001	
STATE BANKS does not Granger Cause GDP GROWTH	1.567582	0.4567	GDP GROWTH->STATE BANKS
GDP GROWTH does not Granger Cause STATE BANKS	33.36153	0.0000	
OTHER COMMERCIAL BANKS does not Granger Cause GDP GROWTH	5.042033	0.0804	GDP GROWTH ->OTHER COMMERCIAL BANKS
GDP GROWTH does not Granger Cause OTHER COMMERCIAL BANKS	14.66321	0.0007	
RURAL CREDIT COOPERATIVES does not Granger Cause GDP GROWTH	7.166228	0.0278	RURAL CREDIT COOPERATIVES<->GDP GROWTH
GDP GROWTH does not Granger Cause RURAL CREDIT COOPERATIVES	111.1511	0.0000	
M2 does not Granger Cause GDP GROWTH	1.031420	0.5971	No causality
GDP GROWTH does not Granger Cause M2	0.121339	0.9411	
EDUCATION does not Granger Cause GDP GROWTH	4.667482	0.0969	No causality
GDP GROWTH does not Granger Cause EDUCATION	1.528922	0.4656	
FDI does not Granger Cause GDP GROWTH	4.726531	0.0941	GDP GROWTH->FDI
GDP GROWTH does not Granger Cause FDI	104.7912	0.0000	

Table 25 Results of the causality tests for different types of loans

Null hypothesis	Chi-sq	Probability	Causality
M2 does not Granger Cause GDP GROWTH	0.195293	0.6585	No causality
GDP GROWTH does not Granger Cause M2	2.497452	0.1140	
EDU does not Granger Cause GDP GROWTH	21.80758	0.0001	EDUCATION ->GDP
GDP GROWTH does not Granger Cause EDUCATION	0.157707	0.9841	
FDI does not Granger Cause GDP GROWTH	16.55505	0.0009	FDI <->GDP GROWTH
GDP GROWTH does not Granger Cause FDI	63.10339	0.0000	
AGRICULT. SECTOR does not Granger Cause GDP GROWTH	3.971986	0.2645	No causality
GDP GROWTH does not Granger Cause AGRICULT. SECTOR	2.547963	0.4667	
CAPITAL CONSTR. does not Granger Cause GDP GROWTH	5.498146	0.0640	No causality
GDP GROWTH does not Granger Cause CAPITAL CONSTR.	0.587103	0.7456	
COMMERCIAL SECTOR does not Granger Cause GDP GROWTH	2.296265	0.5132	GDP GROWTH ->COMMERCIAL SECTOR
GDP GROWTH does not Granger Cause COMMERCIAL SECTOR	9.357877	0.0249	
CONSTRUCT. SECTOR does not Granger Cause GDP GROWTH	6.534698	0.0381	CONSTRUCTION SECTOR ->GDP GROWTH
GDP GROWTH does not Granger Cause CONSTRUCT. SECTOR	3.378888	0.1846	
INDUSTRIAL SECTOR does not Granger Cause GDP GROWTH	3.601543	0.1652	No causality
GDP GROWTH does not Granger Cause INDUSTRIAL SECTOR	1.309289	0.5196	
OTHER MED. AND LONG does not Granger Cause GDP	1.585331	0.4526	No causality
GDP does not Granger Cause OTHER MED. AND LONG	0.580049	0.7482	
TECHNICAL IMPROVEMENT does not Granger Cause GDP	0.557203	0.7568	No causality
GDP does not Granger Cause TECHNICAL IMPROVEMENT	0.027431	0.9864	

The null hypothesis that credit from policy banks does not Granger cause economic growth was rejected, which implies that policy banks induce economic growth in the long run. And economic growth Granger causes credit from policy banks, thus there is two-way causality between the two variables. The null hypothesis that state-owned commercial banks do not Granger cause economic growth was accepted, however the inverse null was rejected, implying that the causality goes from economic growth to state-owned banks. Similarly credit extended by other commercial banks is influenced by economic growth. There turned out to be two-way causality between economic growth and rural credit cooperatives.

Furthermore the results of causality tests provide little evidence that different types of loans affect growth. Granger test detected that only loans to construction sector Granger cause growth. A one-way causality was also determined between growth and loans to commercial sector. There is no causality for other types of loans.

The results imply that growth and money supply are not connected by the causality. As other indicators of financial development showed some causality, this may indicate that M2 is not the best proxy for financial development. Although it is not as narrow as M1, it still can be more of a sign of financial deepening, which is not necessary connected with economic development. For further study it might be better to use M3 or develop a different measure of financial development.

Generally either there is two-way causality or one way-causality from economic growth to financial development. Policy banks and economic growth mutually affect each other. Policy banks are institutions, in which government has ultimate control, which might suggest that funds are not allocated efficiently. Their profitability is also low and they have high ratio of non-performing loans. The fact that they manage to positively influence China's development might indicate that state policies concerning financial sector and economic growth are successful. And the projects that are financed through policy banks are actually helping to generate growth in the long run. These are primarily focused on strategic sectors and follow national development schemes. Large infrastructure projects are the flagship investments of the government. This can be mirrored by the fact that loans to construction sector induce economic growth.

There is also a two-way causality between economic growth and rural credit cooperatives. These institutions have always been closely linked to the state. Their management skills are considered low, one indication being high numbers of non-performing loans. What might explain the fact that they have positive influence on growth, is the aim of the loans. Rural credit cooperatives extended their loans largely to township and village enterprises, which developed vibrantly when China introduced economic reforms. TVEs are said to have played significant role in China's economic development (Goodhart, Xu, 2006). They were found to be more efficient than state-owned enterprises as well as competitive in international markets (Fu, Balasubramanyam 2003). Rural credit cooperatives

finance small and medium sized enterprises in rural areas and through this channel they might have contributed to economic growth.

State-owned commercial banks only follow economic growth and financial development comes about as a result of increased demand for financial services. They do not induce growth. This might result from the burden of financing state-owned enterprises. SOEs are proved to be inefficient and large proportion of them are losing money (Perotti, Liaxiang, Liang, 1999). The share of SOEs in China's total industrial output has decreased from nearly 78% in 1980 to less than 29% in 1996 (Perotti, Liaxiang, Liang, 1999). It is the growing private sector that induces growth in China. And the big four is reluctant to give loans to small and private firms. The causality goes from economic growth to the state-owned banks, which may imply that the prospering economy is encouraging them to extend more credit. The same direction of causality is shown with loans to commercial sector. These two results can be connected as the big banks have dominant position on the market and are responsible for most of the loans to commercial sector.

Other commercial banks follow economic growth as well, which is surprising given the fact that they are the most profitable and best managed banks in China. State influence might have been strong enough to force them to support SOEs resulting in not pro-growth activity. Another possibility is that commercial banks prefer to give loans to companies, which they know, which are big or have state-protection instead of giving them to small enterprises of unknown financial situation. Thus, it's largely SOEs that receive loans, and, as mentioned before, this type of companies do not drive economic development in China.

The analysis shows that that to some extent state policies concerning banking sector and economic growth might be successful. The results suggest that state-directed lending channelled through policy banks has brought positive effects on China's economic development. It might be the case that because of loans (even the bad ones) positive externalities in other sectors emerge. Directed credit can be treated as institutional investment which relies on creating jobs, adopting technology or assimilating supportive policies and affects total factor productivity, which in turn creates growth (Maswana 2006). Direct loans are also used to reduce regional disparities when less developed provinces are provided with referential credit treatment. For example China Development Bank allocates

around 40% of its loans to projects in Western and Central regions and almost 10% to North-East parts of China (CDB, 2009). Thus Maswana's (2008) hypothesis of adaptive efficiency of Chinese financial institutions can be partially supported. Although commercial banks might not induce growth, but policy banks and rural credit cooperatives actively support the development of the economy. Chinese financial system may not have the allocative efficiency, however it offers a stable framework for economic activity.

7. Conclusion

This study examined the long-run relationship between economic growth and financial development in China for the period 1978-2005. The focus was put on effects of different kinds of banks as well as different types of loans. The Johansen test for cointegration rejected the null hypothesis of no cointegrating relations, which implies that there is a long-run equilibrium relationship between economic growth and financial development. I use Granger causality test in VAR framework in order to determine causality between the variables.

The procedure provides evidence that presence and direction of causality is affected by the type of bank as well as type of loan. There is bidirectional Granger-causality between economic growth and credit extended by policy banks. Similar causality exists between economic growth and operations of rural credit cooperatives. Also state-owned commercial banks and other commercial banks are economically related to economic growth. However, there is only a unidirectional causality from economic growth to financial development in their case. The effects of activity of distinct banks is partially mirrored in the results of Granger-causality for different types of loans. Loans to construction sector, which can be linked to policy banks' projects, are proved to Granger-cause economic growth. And there exists unidirectional causality from economic growth to loans to commercial sector, which are a large part of operations in commercial banks.

The study suggests the need to continue reforms in the financial sector. Since the introduction of market reforms Chinese banking institutions have significantly improved their management and profitability. The role of sound financial system has been recognised and state policies concerning banking sector have proven to be successful in supporting

economic growth. However, to sustain the growth it is important to further remove market imperfections, develop better credit allocation and improve access to financing for private as well as small and medium-sized enterprises.

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