Tuuli Koivu

Monetary Policy in Transition – Essays on Monetary Policy Transmission Mechanism in China

Scientific monographs
E:46 · 2012
Huomautus
Tekijänoikeussyistä tästä tutkimuksesta julkaistaan sähköisenä vain lyhennetty versio, joka käsittää tutkimuksen ensimmäisen, Introduction-luvun ja viidennen luvun, Is there a bank lending channel in China? Tutkimuksen muut artikkelit julkaistaan tai on julkaistu aiemmin muissa julkaisusarjoissa.

Notification
For copyright reasons this work will be published only in electronic form in an abridged version. Except for chapter 1 (Introduction) and 5 (Is there a bank lending channel in China?), all the other articles included will be, or have been, otherwise published.

Abstract

China’s economic development has been exceptionally robust since the end of the 1970s, and the country has already emerged as the second biggest economy in the world. In this study, we seek to illuminate the role of the monetary policy in this successful economic performance and as a part of the extensive economic reforms of the last two decades. The five empirical essays seek to discover which monetary policy tools are the most used and most effective for guiding China’s economic development. In addition, we explore which monetary policy transmission channels are functioning and to what extent monetary policy impacts inflation and real economic developments in China. The results indicate that the conduct of monetary policy in China differs substantially from what is typical for an advanced market economy, where an independent central bank often aims to hit an inflation target by simply controlling the target interest rate. First, China’s monetary policy toolkit is highly diverse. Besides a collection of administrated interest rates, it contains quantitative policy tools and direct guidelines. Second, China’s central bank is not independent in its decision-making. For these reasons, it is exceptionally challenging to measure the monetary policy stance or to distinguish monetary policy from other macroeconomic policies in China’s case. This has been taken into account in this study by using a variety of monetary-policy indicators. Our results suggest that China’s monetary-policy implementation and its transmission to the real economy still rely heavily on quantitative policy tools and direct guidelines; interest rates play a much smaller role, in terms of both usage and effectiveness. Overall, our findings suggest that the direct link between monetary policy and real economic performance is weak in China. On the other hand, this study clearly shows that monetary policy has played a key role in price developments, which tells us that monetary policy has been an important factor in China’s economic success.

Key words: China, monetary policy, economic growth, inflation, exchange rates

JEL classification: E50, P30
Tiivistelmä


Asiasanat: Kiina, rahapolitiikka, talouskasvu, inflaatio, valuuttakurssit

JEL-luokat: E50, P30
Acknowledgements

The major part of this thesis was written at the Bank of Finland Institute for Economies in Transition (BOFIT). I am grateful to Dr Pekka Sutela who encouraged me to start the project and gave me the opportunity to pursue my doctoral studies. I also want to thank Head of BOFIT Iikka Korhonen and advisor Laura Solanko for both commenting on the work and providing me with a good working environment over the years.

I warmly thank my superiors Marcel Fratzscher and Ettore Dorrucci and my colleagues at the European Central Bank for giving me the opportunity to continue the project during my stay in Frankfurt as well as for many useful comments and discussions. I am also grateful to Tuomas Saarenheimo (Head of department) and my superiors at the Bank of Finland, Samu Kurri and Veli-Matti Mattila, for their encouragement over the course of the project.

I wish to express my most sincere gratitude to the thesis supervisor, professor Kari Heimonen, who has helped and supported me patiently throughout the project. I also want to thank the University of Jyväskylä for a scholarship at the final stage of the project. Professors Cheung Yin-Wong (City University of Hong Kong) and Eric Girardin (Université Aix-Marseille) are acknowledged for their critical review of my thesis and for valuable comments.

I warmly thank my co-authors Alicia García-Herrero, Aaron Mehrotra and Riikka Nuutilainen, who have helped me considerably along the way. It is always a pleasure to discuss economics in general and the specifics of the Chinese economy with you. My most sincere thanks go also to all my colleagues at the Bank of Finland for creating such a stimulating and supportive atmosphere. Special thanks are due to the BOFIT China team – Juuso Kaaresvirta and Jouko Rautava – with whom I have had years of the joy of exploring the interesting characteristics of the Chinese economy. I would also like to thank Päivi Määttä and Tiina Saajasto for excellent information services and research assistance at BOFIT. Thanks are also due to Glenn Harma and Greg Moore for substantially improving the language and to Päivi Nitosvaara for her editorial work.

Finally, I would express my deepest gratitude to my family and friends for their invaluable support during this project and more generally in my life.

Helsinki, August 2012
Tuuli Koivu
Contents

Chapter 1
Introduction ........................................................................................ 9

Chapter 2
Has the Chinese economy become more sensitive
to interest rates? Studying credit demand in China ......................49

Chapter 3
Monetary policy, asset prices and consumption in China..............67

Chapter 4
China’s exchange rate policy and Asian trade ...............................87

Chapter 5
Is there a bank lending channel in China? .................................129

Chapter 6
An analysis of Chinese money and prices
using McCallum-type rule .............................................................167
Chapter 1

Introduction

1 Introduction .................................................................................................................. 10
1.1 Background ............................................................................................................ 10
1.2 The targets and implementation of monetary policy in China .................................. 11
  1.2.1 The institutional framework and targets of monetary policy in China ............. 11
  1.2.2 Main monetary policy tools and their implementation in China ................... 12
    1.2.2.1 Commercial bank reserve requirements ............................................. 14
    1.2.2.2 Open market operations ................................................................. 15
    1.2.2.3 Rediscounting and central bank lending ........................................ 17
    1.2.2.4 Interest rate setting ........................................................................ 17
    1.2.2.5 ‘Window guidance’ ........................................................................ 19
    1.2.2.6 Exchange rate policy and capital controls ..................................... 20
  1.3 Characteristics of the Chinese economy affecting the monetary policy transmission mechanism .................................................. 22
    1.3.1 Over three decades of economic reform ................................................. 22
    1.3.2 China’s financial sector .......................................................................... 25
      1.3.2.1 Banking sector .............................................................................. 25
      1.3.2.2 Capital markets ............................................................................ 30
      1.3.2.3 Money markets ............................................................................ 31
  1.4 Summary of article findings ................................................................................... 33
    1.4.1 The interest rate channel .......................................................................... 33
    1.4.2 The wealth channel .................................................................................. 35
    1.4.3 The exchange rate channel ...................................................................... 36
    1.4.4 The bank lending channel ....................................................................... 38
    1.4.5 Identifying a monetary policy rule for China .......................................... 39
    1.4.6 Assessment of the effectiveness of monetary policy in China ................... 40

References .................................................................................................................... 43
1 Introduction

1.1 Background

Study of monetary policy impacts on the real economy has been facilitated in recent years by development of theoretical frameworks and econometric tools. So far, the work has tended to concentrate on analyzing the monetary policy transmission mechanism in advanced economies rather than emerging economies. This dissertation aims to fill partly the gap by exploring the links between monetary policy and economic development in China, the world’s largest emerging economy.

China’s development since the start of economic reforms in 1978 has been impressive. Real GDP has increased annually by 10% on average and the country has emerged as the second biggest economy in the world. In the five essays, we seek to illuminate the role of monetary policy behind the successful economic development and deepen the knowledge on the monetary policy transmission mechanism in China. In sum, the essays try to find out which monetary policy tools are the most effective ones in guiding economic development in China. Furthermore, we explore via which channels the monetary policy does affect the real economy and finally, we aim to make some conclusions regarding the overall effectiveness of China’s monetary policy. More particularly, in the first essay, we study the role of interest rate as a monetary policy tool in China. In the following three essays, we examine for the existence and impacts of a wealth channel, exchange rate channel and bank lending channel as mean for transmitting monetary policy to the real economy. Finally, we consider the usefulness of a quantity-based monetary policy rule in forecasting inflation in China.

Improving our understanding of how China’s domestic policymaking influences economic development undoubtedly provides valuable perspective on the economic reforms China has been putting in place for over three decades. Furthermore, any major economic development in China today is felt in the rest of the world, so it is hardly surprising that the impacts of China’s economic policies occupy centre stage in many international discussions.

This thesis is also motivated by a fact that older studies of Chinese monetary policy transmission channels may no longer be relevant as reforms may have modified those channels, but on the other hand studies of advanced economies may lack relevance to the Chinese
context. This study concentrates on analyzing the more recent period of economic reforms starting in 1994 when most of the currently existing institutions and legislation were already in place. By making this restriction, the study contributes to the existing literature by taking into account the numerous specific characteristics still prevailing in the Chinese economy but at the same time guarantees that the conclusions drawn here are relevant to current policymaking in China.

The first chapter aims to provide a framework for the following essays by introducing the targets and tools of the monetary policy in China, giving a brief description of the economic environment in which monetary policy is conducted and finally summarizing the conclusions of the essays. In particular, Section 1.2 describes China’s monetary policy, including the main policy targets and the monetary policy tools in regular use by the Chinese monetary authorities. Section 1.3 provides a short overview of China’s macroeconomic environment from the perspective of monetary policy, as well as the long path of economic reform and major developments in the financial sector. Section 1.4 summarizes our main findings and the five essays follow in Chapters 2, 3, 4, 5 and 6.

1.2 The targets and implementation of monetary policy in China

1.2.1 The institutional framework and targets of monetary policy in China

Like other parts of the Chinese economy, the institutions and practices of monetary policy have been reformed, although very gradually, since 1978. The law giving the People’s Bank of China (PBC) power to perform central bank functions was enacted by the People’s Congress in 1995, a decade after the PBC de facto became the central bank. Even so, the PBC to this day is not independent as it remains under the leadership of the State Council. In its own mission
description, the PBC notes this subordinate role but claims independence from all other institutions in the same sentence.¹

In 1993, the State Council stated: ‘The objective of the monetary policy is to maintain the stability of the value of the currency and thereby promote economic growth.’² While the State Council did not specify whether stable value of the currency meant low inflation or a stable exchange rate, Mehran, Quintyn, Nordman and Laurens (1996) see this as favouring monetary policy that targets inflation over targeting the external value of the currency. Liu and Zhang (2007) further note that, whatever the case, China’s monetary policy must also serve implicit objectives other than those officially declared. For example, China’s monetary authorities have targets related to unemployment, balance of payments and financial sector reform. This is hardly surprising, of course, given the PBC’s institutional framework and close relationship with the State Council.

Already prior to definition of the main monetary policy targets by law, the PBC began to set annual intermediate targets for monetary aggregates. In the 1986−1993 period, China had targets for currency in circulation and bank loan portfolios (Laurens and Maino, 2007). This changed in 1994, when the authorities started to set targets for M1 and M2 growth. Although Geiger (2008) notes that the new targets did not seem to be based on any model or theory, such nominal anchors likely increased the transparency of monetary policy as certain monetary developments began to be tracked in official documents such as the PBC’s Quarterly Monetary Policy Report. Still today, in addition to high importance achieving the main inflation and growth targets, the authorities monitor closely developments in monetary aggregates with respect to their annual targets.

1.2.2 Main monetary policy tools and their implementation in China

We will now introduce the main policy tools the Chinese officials use in order to achieve the targets set for the monetary policy. While the conduct of monetary policy in advanced economies in normal times

¹ ‘Under the leadership of the State Council, the PBC implements monetary policy, performs its functions and carry out business operations independently according to laws and free from intervention by local governments, government departments at various levels, public organizations or any individuals.’ From http://www.pbc.gov.cn/publish/english/968/index.html, accessed June 1, 2011.
often concentrates on interest rates, Chinese authorities employ a broad, ever-changing set of monetary policy tools to achieve their objectives.

In the early years of reform, direct monetary policy instruments dominated the conduct of monetary policy. Conway, Herd and Chalaux (2010) observe: ‘From 1984 until 1997, the PBC issued base money and implemented monetary policy under a system of central bank lending and credit controls.’ Gradual progress in banking reform eventually diminished the role of direct central bank lending in the economy, allowing the monetary authorities to turn to indirect measures. One of the cornerstones in this shift was the replacement of credit quotas with ‘window guidance policy’ and since 1998 the PBC’s monetary tool chest has emphasized indirect quantitative monetary policy tools, particularly open market operations and reserve requirements. Of course, it took years before these indirect tools functioned properly. Part of their ineffectiveness reflected soft budget constraints on state-owned enterprises who tended also to be major bank customers but were largely immune to the costs of borrowing (Mehran et al, 1996). As a result, use of the interest rate as basically the only monetary policy tool as in advanced economies was not sufficient in China’s economic environment.

Geiger (2008) divides China’s monetary policy tools into three categories (price-based instruments and quantitative-based instruments used by the PBC, and non-central-bank instruments). For our purposes, it is sufficient simply to list the policy tools the PBC used actively during our observation period. As will quickly become apparent, the use of administrative guidelines and quantitative-based instruments continues to dominate monetary policymaking in China, while the role of interest rates in influencing economic trends remains limited. Strikingly, how China’s monetary authorities apply this array of policy tools seems quite pragmatic and flexible. Tools considered effective for a particular economic situation are generally applied appropriately. For example, it seems that whenever inflation accelerates above the targeted level, the role of administrative guidelines increases. Moreover, the authorities show remarkable creativity in modifying tools as needed. It is noteworthy that the Chinese authorities also resort regularly to non-monetary tools to influence inflation or economic growth. For example, direct price controls are often imposed when inflation flares (Geiger, 2008). However, those measure are excluded from this study as we concentrate strictly on analysing the monetary policy in China.
1.2.2.1 Commercial bank reserve requirements

Although China introduced the minimum reserve requirement already in 1984 it was incorporated into regular use as a policy tool only in 1998 after the PBC removed the minimum requirement on bank excess reserves and allowed financial institutions to decide their own optimal levels of excess reserves based on their payment and transfer needs. Before the reform, the required reserve ratio had been 13% with an excess reserve ratio of 5–7%, meaning the effective reserve requirement approached 20%. With the reform, the 13% reserve requirement was divided into an 8% legally required portion and a 5% portion to be used for clearing and settlement among financial institutions (Xie, 2004).

Over the past decade, the reserve requirement has become a central monetary policy tool, playing a key role from 2002 onwards in efforts by the authorities to restrain money growth in the face of vast foreign exchange inflows. The shifts in the reserve requirement have been remarkable the ratio varying from 6% to more than 20% in the recent years (Figure 1.1).

In order to improve macroeconomic management, China has continued to modify the basic reserve requirement. Since 2003, the authorities have specified reserve requirements for different financial institutions. At the end of 2010, for example, the reserve requirement was 16.5% for large commercial banks with nationwide operations, 14.5% for small and medium-sized financial institutions and 11% for urban and rural co-operatives. In addition, the authorities have started to implement a new mechanism to adjust the reserve requirement on a continuous and case-by-case basis since the beginning of 2011. On top of general economic conditions, these individually defined requirements are based on eg banks’ capital adequacy ratios and credit portfolios.

Both required and excess reserves bear interest in China. Geiger (2008) suggests that interest rates on reserves in the 1990s were so high they encouraged many banks to hold excess reserves rather than extend credit (Figure 1.3). In recent years, the real interest rate on excess reserves has been mostly negative and the level of excess reserves has declined substantially.
1.2.2.2 Open market operations

Open market operations (OMOs) are another important tool in China’s monetary policy toolbox. Introduced in 1993, OMOs were initially limited by the lack of an interbank market and strict controls on interest rates. They were even suspended in 1997. For the re-launch in May 1998, the institutional foundation was bolstered and the PBC began trading bonds (which it later replaced with repurchase, or repo, transactions).

In June 2002, surging foreign exchange inflows forced the PBC to increase interventions in the exchange market, leading to rapid growth in the base money supply. To stabilize the situation, the PBC introduced reversed repos to soak up liquidity in the market. Of course, the PBC soon ran out of T-bonds and the outstanding repo contracts were converted into equivalent central bank bills. This creation of central bank bills provided room for the monetary authorities to continue sterilization of their intervention operations and central bank bills quickly became a major monetary policy tool.
At the end of 2008, the stock of central bank bills peaked at nearly 5,000 billion RMB (Figure 1.2) and constituted a significant share of commercial bank assets. Since mid-2010, the stock has declined rapidly probably due to PBC attempts to restrain the growth of sterilization costs following China’s policy to hold the value of the currency stable while trying to keep monetary growth in the domestic economy under control. Ljungwall, Xiong and Zou (2009) suggest the costs actually remained quite low for many years as interest rates on central bank bills were low compared to the interest China probably earned on its foreign reserves. The low interest rates were achieved through capital account restrictions and administrative monetary policy tools (see below) that limited the options of commercial banks to invest their excess liquidity in instruments other than central bank bills. Since autumn 2008, however, investment income on the foreign exchange reserves has likely decreased along with declining interest rates in the advanced economies. This has made sterilization operations more expensive. Thus, the recent drop in the stock of central bank bills likely reflects the desire of China’s authorities to limit their sterilization costs and rely instead on the reserve requirement as the major policy tool. Of course, neither of these tools is cost-free for commercial banks.

OMOs are currently conducted twice a week and in addition to central bank bills, which carry maturity of at least 3 months, the PBC
uses repurchase operations to regulate short-term liquidity in the market. It is important to notice that central bank bills are not just used in the macroeconomic policy context; they are sometimes used as a micro-level tool to keep bank credit growth under control. This is accomplished by issuing directed bills to commercial banks considered to have excessively high lending growth. The interest paid on these bills is typically lower than the market rate, so they may be considered a form of punishment.

1.2.2.3 Rediscounting and central bank lending

Both rediscounting and direct central bank lending have decreased their significance in policy making in China in the recent years. As mentioned above the PBC lent directly to state-owned companies in the early 1980s, then gradually withdrew from that role. Similarly, the PBC got out of the business of providing rediscount loans as a monetary policy variable in 2002, when the amount of outstanding rediscount lending decreased dramatically (the rediscount rate was set deliberately higher than the average money-market rate). Furthermore, the recent emphasis on limiting, rather than increasing, liquidity in the market has also decreased the role of these tools in the economy. At the moment, these instruments can no longer be seen as a means to influence general monetary conditions (Conway et al, 2010). Instead, both the rediscount rate and direct central bank lending have been directed towards political objectives such as agricultural reforms and economic development of western China. Central bank lending has also been used to indirectly subsidize rural credit cooperatives and bail out financial institutions, local governments and asset management companies (Geiger, 2008).

1.2.2.4 Interest rate setting

The PBC is responsible for setting numerous interest rates. In addition to the benchmark rates on loans and deposits with various maturities, the authorities define rates for required and excess reserves, central bank lending and rediscounting. Although some rates are adjusted very infrequently and the shifts in the benchmark rates can still be considered moderate compared to fluctuations in eg inflation rates it seems that the use of interest rates as a monetary policy tool has increased over the last years (Figure 1.3).
On the other hand, officials have only gradually withdrawn from interest rate regulation and let market forces influence rates (Porter and Xu, 2009). The liberalization of rates in the late 1990s began with interbank lending rates and repo rates. In 1998–1999, rates on treasury bonds and financial bonds of policy banks were deregulated. Rates in the wholesale market today are largely liberalized but progress in liberalizing bank deposit and lending rates has been plodding. The upper bound for lending rates was gradually increased after 1998 and completely removed in 2004, yet the minimum lending rate was left in place. Regarding deposit rates, modest liberalization on large deposits has taken place since 1999, but the PBC still sets a ceiling rate for most deposits.

Feyzioglu, Porter and Takáts (2009) itemize four impacts of interest-rate controls on the Chinese economy. First, the maximum deposit rate means real deposit rates are likely to be negative during periods of high inflation. As a result, the vast bank deposits of Chinese households typically yield very modest interest income. Second, the safeguarded margin between deposit and lending rates guarantees a steady profit flow to the Chinese banks. During the periods of high
credit growth, this implies an automatic increase in bank profits that may decrease the incentive for banks to increase efficiency or improve financial intermediation and risk analysis. Third, as interest rates do not fully serve the function to channel the funds to the most efficient projects, interest-rate controls together with limits on credit growth encourage banks to lend more to large companies. Finally, China’s monetary authorities do not yet avail themselves of the valuable data contained in interest rates on both macroeconomic and liquidity conditions.

From the point of view of monetary policy transmission mechanism, the impact of interest rates set by the authorities on the other interest rates is critical. While it appears the PBC could have a substantial impact on interbank interest rates as the interest paid on excess reserves sets a floor to the interbank market, the upper end of the interest rates in the interbank market is defined mainly in terms of market liquidity. Even though the central bank lending rate in theory sets a ceiling for market rates, such lending has not happened since 2001. As a result, money market rates have exceeded the central bank lending rate on several occasions.

The study of Porter and Xu (2009) reveals that the benchmark lending rate does directly impact the repo rate, but the link between quantitative monetary policy tools (ie open market operations and the reserve requirement) to the repo rate is quite weak. Analysis by Conway, Herd and Chalaux (2010) shows that the correlation between the central bank bill rate (assumed to be controlled by the PBC) and the repo rate has strengthened over the years, but correlation is still low compared to OECD countries. This can probably be attributed to market segmentation and China’s relatively high level of excess reserves held by banks. Although financial sector reforms have weakened these characteristics of the Chinese financial sector, we can summarize that interest-rate transmission in the financial market remains comparatively low.

1.2.2.5 ‘Window guidance’

While China abolished credit quotas officially in 1998, it has not stopped the authorities from issuing guidelines to commercial banks. This supportive attitude of monetary authorities towards state-owned companies is noted by Xie (2004), who lists trends in the official credit policy in 1998–2002. Guidelines for bank lending are referred to as ‘window guidance’ and still today constitute an important aspect of monetary policy. Although the PBC reports latest developments in
the window guidance policy in its Monetary Policy Report, the level of openness concerning the details of the use of this policy tool is low and it is impossible to quantify the impacts of this policy.

1.2.2.6 Exchange rate policy and capital controls

China’s strong management of its exchange rate constitutes a cornerstone of country’s economic policy and defines the framework for the use of other monetary policy tools. China had a dual exchange rate regime until the early 1990s. In 1994, the two exchange rates were unified and the renminbi basically pegged to the US dollar. This situation remained until July 2005, when the renminbi was revalued 2% against the dollar and the authorities announced that the value of renminbi would henceforth be defined based on a basket of currencies with a daily fluctuation band of 0.3%. A few weeks later, the PBC announced the basket would consist of eleven currencies (but gave no weightings). In practise, the renminbi tracked the US dollar for several months, then started to appreciate gradually. At the same time, daily fluctuations around the central parity increased. When the global financial crisis hit in summer 2008 and the uncertainty in the world economy increased the dollar peg was reimposed. The peg was lifted in summer 2010, and the renminbi again began to rise slowly against the dollar (Figure 1.4).

Given China’s pegged exchange rate, it is clear that it could not have liberalized capital flows without losing monetary policy independence. During the research period, China has still maintained a system of strict controls on capital flows. Foreign direct investment (FDI) is the most notable exception; China has been active in encouraging foreign direct investment inflows since 1992 and more recently China has encouraged domestic companies to make direct investments abroad. On top of the FDI flows, there are small programmes launched in 2006 (QDII and QFII) and in 2011 (RQFII) that allow qualified domestic institutional investors to invest into foreign instruments and qualified foreign investors to purchase certain Chinese instruments. However, the size of these programmes has been limited and their economic significance remains minor.

Since 2005, foreign exchange inflows to China have increased considerably leading to an active discussion about a possible

---

3 US dollar, euro, Japanese yen, South Korean won, Singapore dollar, British pound, Malaysian ringgit, Russian rouble, Australian dollar, Thai baht and Canadian dollar.
undervaluation of the Chinese renminbi (see, for example, Cheung, 2012). The monetary authorities’ interventions to the foreign exchange market has naturally increased the money growth in the economy and caused pressure on China’s monetary policy in the recent years. Although the majority of flows have been due to a growing trade surplus as well as a vast amount of foreign direct investment, there has been also discussion whether China’s capital controls are still binding. During our research period, China’s controls on capital flows have been considered binding which guarantees the country monetary policy independence (Ma and McCauley, 2007). This, of course, is a necessary starting point for this dissertation. However, the situation is about to change relatively quickly in the coming years along the internationalisation of the renminbi.

Figure 1.4
Renminbi exchange rate against the US dollar, end of period

Source: IMF.
1.3 Characteristics of the Chinese economy affecting the monetary policy transmission mechanism

Several characteristics of the Chinese economy likely have an impact on the monetary policy transmission mechanism. These factors limit to a certain extent the applicability to the Chinese context of research and theories related to advanced economies.

1.3.1 Over three decades of economic reform

China has remained steadfastly on its path of economic reform since 1978. The reform era is characterized by gradualism and pragmatism. Most importantly for our purposes, monetary policy still functions in an environment distinctly different from that of a market economy. The Chinese economy is essentially a transition economy, even though profound reforms have been implemented in some parts of its economy. Many parts of the Chinese economy are still running under central control and planning.

The gradual nature of reforms present a challenge for empirical economic research as the economic environment has been continuously evolving. China today is not the China that started reform over thirty years ago, not the China that prevailed in 1990s and not even the China of two years ago. Recognizing this, we concentrate our analysis on the Chinese economy since 1994, a year when many important reforms were already implemented. There is good reason for limiting our dates. Naughton (2007) designates 1993 as a watershed point in China’s reforms. Initially, the emphasis (and much of the success) was in agriculture, and in Naughton’s view, no ‘losers’ were created by economic reforms. In 1990s, however, the reform turned to the cities. Many existing institutions and practices were untouched by early reform, but later reforms affected state-owned enterprises, which meant that millions of people lost their jobs.

The early 1990s were also important with regard to institutional developments. 1994 saw key legislation, including a new company law, as well as regulation of the fiscal revenue system. In the sphere of monetary policy, the exchange rates were unified and renminbi convertibility on current account was introduced.

This watershed in reform also roughly coincides with China’s economic opening to the outside world. Even though the first special
economic zones to attract foreign investment were founded in 1979. FDI inflows were modest before the 1990s. After Deng Xiaoping’s famous southern trip in 1992, the opening policies were enhanced so that China began to open its domestic markets for foreign investors. FDI inflows increased sharply (Figure 1.5). China’s further cemented its opening policy in December 2001 with its accession to the World Trade Organization (WTO). WTO membership boosted FDI inflows and greatly increased foreign trade. As a result, China became the world’s largest exporting economy in 2009 (Figure 1.6).

Figure 1.5

Inward and outward foreign direct investment of China, USD bn

Source: UNCTAD.
Despite the long period of reforms, China’s economic structures still differ fundamentally from those of a typical market economy. The OECD (2010) estimates, for example, that product market regulation is considerably more restrictive in China than in any OECD country, or even Brazil, India, Russia or South Africa (Figure 1.7). In terms of barriers to entrepreneurship, China continues to place inordinate administrative burdens on startups and imposes significant barriers to competition. China is also one of the world’s most restrictive countries in terms of investment and trade. The Chinese economy is well-known for the large role of the public sector in e.g. China’s vast industrial sector (which is clear from the OECD indicator). In particular, public sector ownership is exceptionally high in the Chinese economy. From the point of view of this study, a significant characteristic of the Chinese economy is the vast public participation in the financial sector.
1.3.2 China’s financial sector

As the financial sector has a specific role in intermediating the shifts in monetary policy on the real economy, we introduce shortly the basic characteristics of the Chinese financial industry.

1.3.2.1 Banking sector

China’s financial system is dominated by a massive banking sector; the major source of external finance for companies and households. To give some idea of the scale, the outstanding amount of loans in banking institutions increased for example in 2009 by about 10 trillion CNY (nearly 30% of annual GDP), while the total new stock issues on the Shanghai and Shenzhen stock markets amounted to around 500 billion CNY and the amount of issued corporate bonds was even smaller. The role of China’s banking sector compared to banking sectors in most emerging economies is also staggering: the outstanding amount of loans to non-financial companies and households equalled 130% of GDP at the end of 2010.

China’s steps in reforming its banking sector have been particularly cautious. The PBC dominated the banking industry and provided credit to state-owned enterprises and other government units still in the beginning of 1980s (Chow, 2007). A number of key banking sector reforms took place in 1983–1984 after state-owned
companies were allowed to retain after-tax profits. The change laid the
basis for banking sector development by increasing the flow of
savings to the sector (Kudrna, 2007). Furthermore, the PBC was
transformed to a central bank with the cessation of its urban
commercial banking activities. The change led to the establishment of
four large state-owned banks\(^4\) and later on a number of smaller banks
(Mehran et al, 1996).

Only in 1995, the legal framework for commercial banking was
laid down and the orientation of the large four state banks was shifted
away from public sector activities by establishing three policy banks
specifically to finance large infrastructure projects (Kudrna, 2007). Of
course, even after the change, the vast public ownership\(^5\) in the
banking sector continued to link bank activities tightly to other
economic policies and the OECD (2005) observed that Chinese banks
often more closely resembled governmental agencies than market-
based institutions. Thus, it is not surprising that the banking sector
was in poor shape. Capitalization was low and the ratio of non-
performing loans to overall lending was high.

Naughton (2007) actually states that the potential magnitude of
negative impacts of a weak financial sector on the real economy was
not grasped by policymakers until the Asian financial crisis in 1997.
Only after the crisis had caused vast damage on a number of Asian
economies, China’s authorities began serious efforts to strengthen the
banking sector. The first round of bank recapitalization in 1998
involved injecting 270 billion CNY (3% of GDP in 1998) of capital
into the large four state-owned banks. In the 1999, 1.4 trillion CNY
(over 15% of GDP) in non-performing loans were transferred off bank
balance sheets to asset management companies created to deal with
the bad assets. In order to avoid another round of accumulation of
non-performing loans (NPLs), a new loan classification with five parts
was introduced and the banks were encouraged to reduce their NPL
ratios (OECD, 2005).

Although these reforms enjoyed modest success, it turned out that
the role of banks was not that easily changed. For example, Podpiera
(2006), using data for 1997–2004, found that Chinese banks still
failed to apply best practices in lending that considered company
profitability or pricing of credit risk. Furthermore, Shih (2004) notes
existing strong links between the central government and large banks’

\(^{4}\) Bank of China, Industrial and Commercial Bank of China, Agricultural Bank of China
and the People’s Construction Bank of China.

\(^{5}\) According to the OECD (2005), all but one of the major domestic commercial banks are
controlled by central or local governments.
headquarters. As a result, data from China Banking Regulatory Commission which show the share of non-performing loans in the commercial banks still exceeded 20% in 2002 (and unofficial estimates put the ratio much higher) is hardly surprising (Table 1.1).

WTO membership also served as an impetus to accelerating reform of the banking sector. Following the negotiated transition period, China’s banking sector was set to open up to international competition at the end of 2006 (Kwong, 2010). In 2002, the State Council made a plan of further reforms and established the China Banking Regulatory Commission (CBRC) to supervise banks. A second round of bank recapitalization started at the end of 2003. Thereafter, all four large state-owned banks were recapitalized and profound reforms implemented throughout the banking sector. Ma (2006) estimates the total cost of repairing bank balance sheets had already exceeded 20% of GDP by 2005.

Since this second round of recapitalization, the ratio of non-performing loans has remained low according to the official figures. As a positive signal, a share of loans becoming non-performing has become smaller although a part of the lower NPL ratios is explained by further transfers of old NPLs from the system and the rapid expansion of credit in the economy.

**Table 1.1  Non-performing loans in Chinese banking sector, end of period**

<table>
<thead>
<tr>
<th>Year</th>
<th>Large state-owned banks</th>
<th>Joint-stock banks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CNY bn</td>
<td>% of loans</td>
</tr>
<tr>
<td>2002</td>
<td>2,088</td>
<td>26.2</td>
</tr>
<tr>
<td>2003</td>
<td>1,917</td>
<td>20.4</td>
</tr>
<tr>
<td>2004</td>
<td>1,575</td>
<td>15.6</td>
</tr>
<tr>
<td>2005</td>
<td>1,072</td>
<td>10.5</td>
</tr>
<tr>
<td>2006</td>
<td>1,053</td>
<td>9.2</td>
</tr>
<tr>
<td>2007</td>
<td>1,115</td>
<td>8.1</td>
</tr>
<tr>
<td>2008</td>
<td>421</td>
<td>2.8</td>
</tr>
<tr>
<td>2009</td>
<td>363</td>
<td>1.8</td>
</tr>
<tr>
<td>2010</td>
<td>313</td>
<td>1.3</td>
</tr>
<tr>
<td>2011</td>
<td>300</td>
<td>1.1</td>
</tr>
</tbody>
</table>


In addition to a declining NPL ratio, another important aspect of banking reform has been the implementation of new rules on banks’ capitalisation. The rules concerning the calculation of capital adequacy ratio that took place in March 2004 are largely consistent with the Basel I standards (Kudrna, 2007). Success in hitting set
targets has been great. In 2003, only eight banks holding less than 1% of assets of the total banking system had capital adequacy ratios above the required 8%. By 2009, the entire sector met the capital adequacy criterion. The improvement in bank balance sheets has been accompanied with rapidly improving profitability (OECD, 2010). Some of the gains reflect higher productivity and reductions in staff.

Despite the successes, the Chinese banking sector faces serious challenges in for example implementing the international standards at the grass-root level (Kudrna, 2007, OECD, 2010). For our purposes, the most important characteristics of the Chinese banking sector are those that affect the monetary policy transmission mechanism. One such characteristic is the close linkage of the banking industry and local and state governments. Kudrna (2007) summarizes his analysis with the observation that ‘the largest Chinese banks remain under the firm state control, thus state policy objectives dominate over the long term stability of banks’. While dominance of the central government is probably clearest among the large state-owned banks, we can assume a tight linking of local government and smaller banks as well. The major reasoning behind the links is the vast public ownership in the banking sector. The opening of the banking sector to international competition under WTO rules at the end of 2006 did almost nothing to reduce the dominance of the large four banks that still account for a nearly half the market (Figure 1.8). The share of foreign-owned banks of the market is only a couple per cent. Although the strong links between banks and public sector may enhance the monetary policy transmission mechanism in the Chinese economy, a question rises whether the monetary policy tools can be genuinely market based in this kind of economic environment where banks’ profitability is overlooked by political purposes.
On the other hand, the transmission mechanism is probably affected by a fact that some parts of the Chinese economy are relatively independent from external financing. For example, Chinese households have traditionally had little access to bank financing. At the end of 2010, the share of bank credit channelled to households amounted to less than a quarter of all lending, and corresponded to a mere 28% of GDP which is small compared to advanced economies or the relative size of the Chinese banking sector. At the same time, numerous surveys have noted that the lack of external financing is one of the major obstacles facing small and medium-sized companies. Thus, despite the large size of China’s banking sector, the dependency of economic sectors on the banking sector development varies tremendously.

Finally, the effectiveness of the monetary policy is affected by the fact that China has a vast informal financial sector that operates outside the formal regulatory frameworks. Some estimates put the size of the informal financial sector to around 10% of GDP (OECD, 2010). The recent phenomenon of informal securitization of bank loans is also likely to change the dynamics between monetary policy and real economy in China in coming years. Fitch Ratings has paid particular attention to the trends in securitization. Since 2010, an increasing
amount of credit has shifted off bank balance sheets and beyond the control of banking authorities.\(^6\)

1.3.2.2 Capital markets

When stock markets were first established in the early 1990s, they suffered from serious institutional weaknesses. Green (2003) notes that China’s stock markets were mainly developed to support often poorly-performing state-owned companies. At the same time, the rights of the minority shareholders were weakened by the fact that listed firms remained under the state control; only some shares were even tradable (OECD, 2005). As a result, minority shareholders had little influence on corporate decision-making. Small investors also were constantly exposed to the risk of share dilution, so any speculation about the sell out of the state-owned shares tended to spark jitters about oversupply in the markets. In addition to the capital controls that originally forbid all foreign investment in A-shares,\(^7\) the lack of domestic institutional investors has been mentioned as an early weakness of Chinese stock markets (OECD, 2005).

In the mid-2000s, the Chinese authorities took several important steps to improve the functioning of stock markets. First, a growing, but still strictly limited, amount of foreign investment was allowed into the A-shares through the Foreign Qualified Institutional Investor programme (QFII). Rules preventing investment of domestic institutional investors in the stock markets were loosened. More importantly, listing rules were made more transparent to create a considerably more objective procedure than earlier. The new rules and restructuring of the Shenzhen stock exchange also encouraged small privately owned companies to list. Divestment of state-owned shares is now more openly scheduled to decrease the amount of uncertainty in the markets with regard to share price dilution.

The new rules have increased the number of listed companies in the stock markets so that at the end of 2011, around 2400 companies were listed in the stock exchange and the level of capitalisation was around 50% of GDP (Figure 1.9). Overall, however, China’s stock

---

\(^7\) When launching its stock markets, a small portion of shares were marked as B-shares denominated in US dollars. These could be bought and sold by foreign investors. A-shares, which constitute the lion’s share of tradable shares, are denominated in renminbi.
markets still play a rather small role as a source of external finance and as a format of saving.

The role of the bond markets is also limited in China. The OECD (2010) put the size of the bond market at the equivalent of 44.5% of GDP in August 2009, but noted that the market was dominated by bonds issued by the central bank, the treasury and development banks. Largely because of institutional reasons, the bond market only offers access to external finance for a few companies. The OECD (2010) estimates that the National Development and Reform Commission (NDRC), which is responsible for approving the bond issues of non-listed companies, needs to relax its approval practices considerably before the bond market can become a meaningful channel for external finance for small and medium-sized companies.

1.3.2.3 Money markets

Money markets were originally slow to develop in China, even if the main component of the market, the interbank market, was established in 1981. In the early years, market conditions were partially
unregulated which led to market abuses such as short-term borrowing to fund long-term lending (Mehran et al, 1996). The first unified national interbank market was established in 1996.

The interbank market for bonds launched in 1997. It allowed commercial banks, which had limited access to the stock exchanges, to participate in bond trading. The interbank market has been dominated by repo transactions as the amount of uncollateralized transactions is very small. The volume in the interbank market has increased rapidly since the mid-2000s (Figure 1.10). The rapid growth reflects the decline in banks’ excessive reserves, which has especially increased the dependence of small banks on market financing. At the same time, both the central bank and the State Administration of Foreign Exchange have tightened their liquidity providing policies. Overall, liquidity appears unevenly distributed among the banks: the four large state-owned banks are the main suppliers of liquidity in the repo market, while other banks (foreign banks, in particular) are net recipients (Porter and Xu, 2009). In addition, the new rules concerning the interbank market, revised in 1997, have strengthened the market and coverage of interbank market participants has been expanded. Foreign participants in the market are also more active.

With the establishment of the national market in 1996, the PBC began publishing CHIBOR interest rates based on the actual transactions in the market. The formation of a yield curve was initially difficult due to a fact that very few transactions involving longer maturities were made. To improve the situation, the PBC started to publish SHIBOR rates in the beginning of 2007. SHIBOR rates are based on daily average quotes of 16 banks and functionally similar to LIBOR rates. This increase in available data on market conditions is obviously very important from the point of view of Chinese monetary authorities.
1.4 Summary of article findings

The theoretical and empirical literature describes several channels through which monetary policy affects the real economy. In the following essays, we concentrate on four monetary policy transmission channels in the Chinese economy: the interest rate channel, the wealth channel, the exchange rate channel and the bank lending channel. Studying of these channels should hopefully deepen our understanding of the monetary policy transmission mechanism in China and allow us to specify the most efficient policy tools available to the Chinese authorities. We end by asking whether the PBC follows a quantity-based rule when conducting monetary policy. The essays concentrate on analyzing the more recent period of China’s economic reforms starting in 1994.

1.4.1 The interest rate channel

In advanced economies, central banks often use short-term interest rate as their main (or even sole) operational target. In China, the foundations of monetary policy are much more diverse. If anything,
the role of the interest rates as a part of monetary policy has been modest and earlier studies have noted only a weak linkage of the interest rate and the real economy in China. More surprisingly perhaps, the linkage that did exist functioned in a very unexpected way as recently as in the 1990s, ie interest rate hikes tended to increase economic activity rather than decrease it (Dickinson and Liu, 2007, Qin et al, 2005). Studies using more recent data have shown that the bizarre positive linkage of the interest rate to the real economy waned in the past decade, although at the same time the negative impact of the interest rate on the real economy remained weak (Laurens and Maino, 2007, Mehrotra, 2007). However, China’s reforms appear to be increasing the role of the interest rates in the economy. Banking reform, interest rate liberalization and reforms in the enterprise sector have made banks and their customers more sensitive to interest rate changes than earlier.

Our first essay contributes to the earlier literature by examining the emerging influence of the interest rate channel in affecting economic development in China. The empirical part of the essay closely follows the work of Calza, Gartner and Sousa (2003) on euro area, and concentrates on analyzing the impacts of interest rates in a framework of credit demand where credit demand is assumed to be affected by real economic output and the real lending rate. As causality may run both ways between variables, a vector error correction model is used in the estimations. Based on the literature on the interest rate channel, we assume the link from interest rate to credit growth and economic output is negative, although it has been suggested that credit demand may also include a counter-cyclical component (Bernanke and Gertler, 1995).

Using monthly data for 1998M1–2007M5, we identify a break point in the system in September 2001. Accordingly, we split the sample into two parts and run a separate estimation for each sub-period. Our finding of a positive, albeit statistically insignificant, link from interest rate to credit stock both in the long and short run in the first sub-period supports the findings of earlier studies on China’s monetary policy. In the latter sub-period, the link turns negative indicating that the behaviour in the Chinese financial sector is moving towards practices of advanced economies. However, even in the latter sub-period, the link from interest rate to economic output remains insignificant. Our results are confirmed by the paper by Girardin and Liu (2006), who also find a weak link between the short-term interest rate (CHIBOR) and economic output in 1999M1–2005M8.
1.4.2 The wealth channel

Our second essay considers the existence of a wealth channel in China. The logic behind the channel is that a loosening of monetary policy drives up asset prices and increases household wealth (Boivin, Kiley and Mishkin, 2011). Following the life-cycle hypothesis (Ando and Modigliani, 1963), households consume their lifetime income and wealth, so any increase in wealth increases consumption. Although the wealth channel is an integral part of many large macroeconomic models used by central banks, empirical studies of the entire chain of events from monetary policy to consumption are scarce. Most empirical studies concentrate on either the link from monetary policy to asset prices or the link from asset prices to consumption without combining the two parts. An exception is the paper by Ludvigson, Stein
dal and Lettau (2002), which estimates the size of the wealth channel in the US to be relatively small. We are not aware of any previous studies on the wealth channel in China.

We determine the existence of a wealth channel in China using a structural VAR model with five variables: household income, household consumption, consumer price inflation, monetary policy indicator and asset prices. We estimate separate models for two categories of asset prices: stock and housing prices. Due to data availability, our quarterly data starts in 1998 and runs through 2008.

Like other studies we find role of interest rate in the Chinese economy to be quite small, so we use the monetary aggregate M2 as our monetary policy indicator. The use of M2 is justified by its central role in communicating the PBC’s monetary stance: the PBC sets annual targets for M2 growth and closely tracks M2 in its reporting. A number of studies suggest that an increase in M2 accelerates inflation (Gerlach and Kong, 2005, Mehrotra, 2008). Furthermore, the broad monetary aggregate can contain information about monetary policy tools otherwise impossible to quantify such as the window guidance policy. On the other hand, the wisdom of relying on M2 for guiding monetary policy is questionable given that M2 is difficult to control, especially over the short run.

The estimations show that over the short run, there is a link from monetary policy to both stock and housing prices so that a monetary policy loosening causes prices to rise. This expected finding is stronger and more rapid in the case of stock than housing prices. However, the second phase of the channel, the affect of the stock prices on consumption, is rather weak although residential prices do influence household consumption in a statistically significant way. However, when we study explicitly those changes in residential prices
that are caused by monetary policy, we find little impact on household consumption. Thus, the existence of a wealth channel in China is questionable.

The results reflect many characteristics of the Chinese economy. First and most important, income from investment typically represents tiny share of total household income. In addition, few families in China are in a position to sell their apartment even if prices go up. The contrary seems more likely for most families; higher prices mean they have to save more to afford an apartment. Thus, it is not surprising to find that household consumption is not much affected by fluctuations in asset prices.

Our results suggest that the overall reaction of household consumption to shocks in monetary policy is weak. This result confirms the earlier findings of Zhang and Wan (2002) and probably reflects the fact that for most of our research period, the access of households to bank credit was limited. Regarding the use of M2 as a monetary policy indicator, the results are encouraging. Confirming earlier results, M2 merits a closer look by authorities as a shock in M2 accelerates inflation.

1.4.3 The exchange rate channel

The raging international discussion on China’s exchange rate regime in recent years has helped produce an extensive body of academic literature attempting to pin down just how undervalued the renminbi actually is. Much less literature has been generated on the impacts of the renminbi exchange rate on the real economy in China or elsewhere. Our third essay studies the implications of exchange rate fluctuations on China’s foreign trade and asks whether a revaluation of the exchange rate be sufficient to balance country’s current account. This approach also illuminates the trade linkages between Asia and the rest of the world.

The earlier studies on the exchange rate elasticity of China’s foreign trade have used data mainly prior to China’s WTO membership and the possible changes in trade dynamics that accompanied it (see Bénassy-Quére and Lahrèche-Révil, 2003, Cerra and Dayal-Gulati, 1999, Cerra and Saxena, 2003, Dees, 2001, Eckaus, 2004, Kamada and Takagawa, 2005, Lau et al, 2004, Marquez and Schindler, 2006, Shu and Yip, 2006, Thorbecke, 2006, Voon et al, 2006, Yue and Hua, 2002). Here, we contribute to the earlier literature in several ways. First, we concentrate on analyzing China’s trade after the WTO membership. Second, by studying both exports and imports,
we can provide a rough estimate on the impact of real effective exchange rate fluctuations on China’s current account surplus. Third, we analyze China’s bilateral trade with its major trading partners to explore possible differences among the trade relationships and find the main reasons for exchange rate elasticities in trade. Fourth, we estimate how China’s exchange rate fluctuations affect exports from other emerging Asian countries.

Using the division suggested by Marquez and Schindler (2006), we study the impacts of exchange rate separately on Chinese ordinary and processed exports and imports. As expected, a renminbi appreciation leads to a decline in Chinese exports. The exchange rate elasticity is slightly higher among ordinary exports than among goods originating from China’s processing industry. The elasticities are close to the values estimated earlier for both China and the US and the UK (Hooper et al, 1998). However, also imports decline in a case of renminbi appreciation which means that from the point of view of trade balance, the decline in China’s exports is partly offset by a simultaneous drop in imports. As a result, a decline in the current account surplus due to an exchange rate appreciation remains relatively modest. A more recent study by Cheung, Chinn and Fujii (2009) came to the same conclusion.

Interestingly, renminbi appreciation leads to a drop in both ordinary imports and imports for processing. The estimations based on bilateral trade equations reveal that renminbi appreciation decreases imports both from Southeast Asian economies and from advanced economies. Naturally, the Asian supplies to China’s exporting industry decline when the renminbi appreciates but the result suggest that also a large share of imported investment goods goes to the exporting sector, so demand declines when the exporting sector weakens.

Finally, our study suggests that total exports of Southeast Asian economies could decline with an appreciation of China’s exchange rate. In other words, goods from these countries seem to be more complementary than substitutes for Chinese goods. The role of the East Asian supply chains is also emphasized in a micro-level study by Zhang (2008), who finds that for most goods produced in the region the final consumer is still in the US, even if the Chinese market has become more important over the years.
1.4.4 The bank lending channel

In the fourth essay, we examine whether the monetary policy can affect bank lending independently from credit demand. The traditional bank lending channel is based on the assumption that monetary policy can affect the loanable funds of banks by influencing reserves and deposits (Bernanke and Blinder, 1988). Disyatat (2010) adds that monetary policy can also impact on bank balance sheets via asset prices. A decrease in asset prices can reduce a bank’s capitalization, which forces the bank to look for new sources of external finance or decrease lending. In both models, monetary tightening leads to a reduction in bank credit in excess of the reaction of credit demand. This obviously implies curtailed spending by customers dependent on bank financing.

We are aware of only one earlier study on the bank lending channel in China, and that study’s results are inconclusive (Gunji and Yuan, 2010). Our aim then is to deepen the picture on the links between the monetary policy and bank behaviour in China. In principle, the channel could be functioning in China for two reasons. First, monetary authorities can have a direct impact on banks’ loanable funds as monetary policy is often conducted using quantity-based monetary policy tools. Second, many agents in the economy are dependent on bank financing due to the small size of capital markets.

We study the bank lending channel by using quarterly data for six bank groups. The research period is constrained by the data availability to start in 2002. We follow the earlier empirical literature on the bank lending channel and assume that if the channel exists, different type of banks would react to a monetary policy tightening in different ways. For example, lending of a highly capitalised bank would be less affected by a tightening that lending of banks with low level of capitalisation. We use both TSLS and GMM estimation methods. We only find weak evidence on the bank lending channel in China. Apparently, banks with higher levels of capitalisation are somewhat less affected by shifts in the monetary policy stance than banks with lower levels of capitalisation. However, the result can only be considered preliminary due to data limitations. Overall, our earlier result on the weak role of interest rate as a monetary policy tool in China is confirmed, while the quantity-based monetary policy tools seem to have their expected effects on credit growth.
1.4.5 Identifying a monetary policy rule for China

The PBC’s unclear communication about its use of monetary policy tools and targets has triggered a growing body of speculation as to which policy rules are followed. The empirical essays of this thesis strongly indicate the authorities focus on quantity-based monetary policy rules rather than an interest rate rule. This has led researchers to study whether the Chinese authorities apply a quantity-based monetary policy rule proposed by McCallum (1988, 2003). Under the McCallum rule, monetary growth is depends on its lagged growth, changes in money velocity and the deviation of GDP growth from its target rate. However, Burdekin and Siklos (2008) and Liu and Zhang (2007) point out the fit of this particular rule in its original format on China’s monetary policy is rather poor. In order to improve the fit, Liu and Zhang (2007) estimate a rule in which M2 growth depends on the size of output gap and the deviation of inflation from its target rate. Mehrotra and Sanchez-Fung (2010) model China’s monetary policy by using a hybrid McCallum-Taylor reaction function in which the monetary base reacts to the output gap, deviation of inflation from the target and the deviation of the nominal trade-weighted exchange rate from a long-run path.

We aim to contribute to the existing literature by studying whether deviations from the McCallum rule can be used to forecast inflation and whether the same deviations can be treated as shocks in monetary policy. By comparing the actual growth rates of the reserve money and M2 in China to the growth rates implied by the McCallum rule in 1994–2007, we see that in the early years of the period, monetary policy was contractive, ie money growth was lower than suggested by the McCallum rule. In the middle of the period, money growth seems rather neutral. At the end of the period, money growth is expansive with both reserve money and M2 growth exceeding the pace suggested by the rule.

A quick visual inspection of the data shows that the contractionary monetary policy coincided with falling inflation and GDP growth. At the end of the period, both inflation and GDP growth rates accelerated in line with the excessive monetary expansion. Studying the links more formally, we find that deviations from the McCallum rule are useful in forecasting inflation developments in China. Faster monetary growth than suggested by the rule implies higher corporate goods inflation in coming quarters. The reaction of consumer prices and asset prices (specifically, stock and land prices) are less robust. Finally, deviations of the monetary base from the rule are used as monetary policy shocks in a VAR framework. The findings are
encouraging in the sense that a positive shock in money growth leads to higher GDP growth in China.

This essay gives further support to the earlier analysis that the quantitative monetary aggregates do play an important role in the Chinese economy and their use as monetary policy tools should not be underestimated. This result is similar to found by Zhang (2009) who argues that a positive shock in a quantitative-based monetary policy rule leads to an increase in inflation and output. However, Zhang’s DSGE simulations suggest the potential effectiveness of an interest-rate-based price rule might actually be higher.

1.4.6 Assessment of the effectiveness of monetary policy in China

This dissertation studies the links between monetary policy and macroeconomic development in China during the most recent period of economic reforms. With regard to the achievement of the monetary policy targets, China’s monetary policy looks very successful. If we ignore the Asian crisis years in the late 1990s, real GDP growth has largely exceeded the targeted level (Table 1.2). In addition, inflation rates, which ran in the double digits in 1994−1995, have been tamed successfully. While China has recently experienced episodes of higher inflation, they have been mainly due to increased food prices. The economy has largely avoided second-round effects of such price hikes, and inflation quickly returned to the target level.

From the point of view of the Chinese monetary authorities, it would be flattering to credit these achievements to successful implementation of monetary policy. However, it is clear that a number of factors have contributed to China’s economic success. Indeed, our findings back up the existing literature on China’s monetary policy in showing a rather weak link between monetary policy and the real economy. Thus, the role of the monetary policy in creating high economic growth should not be overestimated. On the other hand, this study shows that the role of monetary policy behind price developments has been essential. These essays note that an unnecessarily loose monetary policy stance leads to a significant acceleration in inflation. Without low, fairly stable inflation figures, China would not have achieved such impressive growth.
Table 1.2  Targeted and actual values of selected monetary aggregates and China’s economic performance, 1994–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>M1 growth, %</th>
<th>M2 growth, %</th>
<th>RMB loan growth (trn)</th>
<th>CPI inflation</th>
<th>Real GDP growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target</td>
<td>Actual</td>
<td>Target</td>
<td>Actual</td>
<td>Target</td>
</tr>
<tr>
<td>1994</td>
<td>21.0</td>
<td>26.2</td>
<td>24.0</td>
<td>34.5</td>
<td>10.0</td>
</tr>
<tr>
<td>1995</td>
<td>21–23</td>
<td>16.8</td>
<td>23–25</td>
<td>29.5</td>
<td>15.0</td>
</tr>
<tr>
<td>1996</td>
<td>18.0</td>
<td>18.9</td>
<td>25.0</td>
<td>25.3</td>
<td>10.0</td>
</tr>
<tr>
<td>1997</td>
<td>18.0</td>
<td>16.5</td>
<td>23.0</td>
<td>17.3</td>
<td>6.0</td>
</tr>
<tr>
<td>1998</td>
<td>17.0</td>
<td>11.9</td>
<td>16–18</td>
<td>15.3</td>
<td>0.9</td>
</tr>
<tr>
<td>1999</td>
<td>14.0</td>
<td>17.7</td>
<td>14–15</td>
<td>14.7</td>
<td>1.0</td>
</tr>
<tr>
<td>2000</td>
<td>15–17</td>
<td>16.0</td>
<td>14–15</td>
<td>14.0</td>
<td>1.0</td>
</tr>
<tr>
<td>2001</td>
<td>13–14</td>
<td>12.7</td>
<td>15–16</td>
<td>14.4</td>
<td>1.3</td>
</tr>
<tr>
<td>2002</td>
<td>13.0</td>
<td>16.8</td>
<td>13.0</td>
<td>16.8</td>
<td>1.3</td>
</tr>
<tr>
<td>2003</td>
<td>16.0</td>
<td>18.7</td>
<td>16.0</td>
<td>19.6</td>
<td>1.8</td>
</tr>
<tr>
<td>2004</td>
<td>17.0</td>
<td>13.6</td>
<td>17.0</td>
<td>14.6</td>
<td>2.6</td>
</tr>
<tr>
<td>2005</td>
<td>15.0</td>
<td>11.8</td>
<td>15.0</td>
<td>17.6</td>
<td>2.5</td>
</tr>
<tr>
<td>2006</td>
<td>14.0</td>
<td>17.5</td>
<td>16.0</td>
<td>16.9</td>
<td>2.5</td>
</tr>
<tr>
<td>2007</td>
<td>16.0</td>
<td>16.7</td>
<td>16.0</td>
<td>16.9</td>
<td>2.5</td>
</tr>
<tr>
<td>2008</td>
<td>16.0</td>
<td>17.8</td>
<td>16.0</td>
<td>17.8</td>
<td>3.6</td>
</tr>
<tr>
<td>2009</td>
<td>17.0</td>
<td>27.7</td>
<td>&gt;5.0</td>
<td>9.6</td>
<td>3–4.8</td>
</tr>
<tr>
<td>2010</td>
<td>17.0</td>
<td>19.7</td>
<td>7.5</td>
<td>8.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>


The results also show that the implementation of monetary policy in China differs substantially from what is typical for advanced market economies. First, the role of the interest rates as a monetary policy tool remains small. Even though the essays and other recent studies suggest the impact of interest rates on the main targets of monetary policy (inflation and GDP growth) has increased, they are still limited. Accordingly, contrary to the normal practice in the advanced economies, China’s implementation of monetary policy and its transmission to the real economy relies strongly on the quantitative policy tools and direct guidelines. Out of the quantifiable monetary policy tools, monetary aggregates are found to have the closest links to macroeconomic, particularly inflation development.

Due to the diverse package of monetary policy tools, it is challenging to measure China’s monetary policy stance. In general, judging the success of monetary policy with respect to macroeconomic developments is complicated by the fact that isolating the impacts of the monetary policy from other factors in the economy is a non-trivial task. In China’s case, this is made all the more
challenging by the country’s political structure – monetary policy is not an area of independent decision-making. China aspires to political decision-making that is centrally orchestrated and generally aimed in the same direction. In such an institutional framework, a goal set for monetary policy such as annual growth targets for monetary aggregates must inevitably be subordinated to the overarching economic target such as economic growth. This might partly explain why China consistently misses its annual targets growth of monetary aggregates, yet, as Geiger (2008) points out, manages to achieve consistently high economic growth and low inflation.

The weak link between the monetary policy and the real economy is partly due to a fact that some segments of the economy, particularly households, are largely outside the influence of monetary policy in China. This finding probably reflects the fact that households have traditionally had limited access to financial markets in any role other than bank depositors. However, this seems to be changing as households become increasingly active as investors and debtors. Following similar reasoning, the previously overlooked monetary policy transmission channels, ie the wealth channel and the bank lending channel, have yet to play a significant role in the monetary policy transmission mechanism in China, but should be tracked as they now play significant roles in most advanced economies.
References


People’s Bank of China Annual Report (various issues).

People’s Bank of China monetary policy quarterly report (various issues).


Chapter 5

Is there a bank lending channel in China

Is there a bank lending channel in China.................................130

Abstract....................................................................................130

1 Introduction........................................................................130
2 Earlier literature on the bank lending channel.................133
3 Some characteristics of the Chinese banking sector
   and monetary policy..........................................................138
4 Studying the bank lending channel in China...............141
   4.1 TSLS estimations with pooled data...........................146
   4.2 Studying the behaviour of each banking group
       separately ...................................................................152
5 Conclusions........................................................................158

References.............................................................................160
Appendix..................................................................................164
Is there a bank lending channel in China?

Abstract

In this paper we examine whether banks’ loan supply plays a role in monetary policy transmission in China. While a number of earlier studies have found the bank lending channel to exist in many advanced and emerging economies, the results so far for China are far from conclusive. We explore the bank lending channel in China, applying both the TSLS and GMM methods to 2002–2009 data on six bank groups. Our findings confirm the earlier result that interest rates still play only a minor role in the Chinese economy, and so the People’s Bank of China’s use of a wide selection of monetary policy tools seems reasonable. The results indicate that the largest banks – state owned and joint-stock banks – respond most actively to shifts in monetary policy stance while the foreign owned banks and rural credit cooperatives are nearly immune to monetary policy. We also find weak evidence that higher levels of capital would reduce banks’ sensitivity to monetary policy. While similar results have been found for many advanced economies – results that might well suggest the existence of a functioning bank lending channel – our finding can only be considered a preliminary finding, due to the weak statistical significance and small sample size.

1 Introduction

Both the theoretical and empirical literature on the bank lending channel began to mushroom about two decades ago. Although the idea that monetary policy can affect banks’ loan supply is considerably older, Bernanke and Blinder (1988) provided a theoretical framework for it. They showed that monetary policy can have an additional transmission channel by affecting banks’ loanable funds and thus their lending. Over the last decade, numerous empirical papers have studied whether the bank lending channel exists, not only in the advanced economies but also in the emerging markets. Regarding China, however, the literature is scarce and does not provide a conclusive answer to the question of whether the bank lending channel exists there. This paper aims to fill that gap in the literature.
Most empirical studies have found that monetary policy can indeed have an impact on banks’ lending although the exact form of the bank lending channel varies among countries. Furthermore, the economic significance of the channel has been estimated to be rather small, partly due to rapid development of new financial instruments and central banks’ concentration on price-based policy tools, particularly in the advanced economies.\(^1\) The onset of the financial crisis in the second half of 2000s, however, put the spotlight on banks in the discussion of a monetary policy transmission mechanism.

The structure of the Chinese financial system seems favourable for fulfilling the essential requirements set out in the theoretical literature for the lending channel. First, banks play such a dominant role in China’s financial sector that at least some economic agents are dependent on bank financing, these being unable to obtain other types of external finance. Second, monetary policy still relies on quantitative tools such as reserve requirements and hence seems to be able to influence banks’ lending. On the other hand, the importance of the bank lending channel may be small due to the large share of investment that is financed from companies’ own cash flows.\(^2\) Moreover, households’ high savings rate and small credit stock suggest that borrowed funds play a rather limited role in household consumption (Koivu, 2012).

This study is motivated by the fact that a requisite of optimal policy-making is an understanding of the mechanisms through which monetary policy can affect real economic activity. In China’s case, an understanding of the transmission mechanisms is further motivated by on-going reforms in both monetary policy and in the financial sector, which could lead to substantial alterations in the transmission mechanisms. Because many economists still claim that banks are not totally market or profit oriented (see eg Podpiera, 2007), it is particularly interesting to find out how banks react to changes in the stance of monetary policy. Obviously, knowledge of the dynamics of the Chinese financial system is essential also for policy-makers in other countries, China being one of the largest economic powers in the world.

\(^1\) See eg remarks by Ben S. Bernanke on June 15, 2007 at the conference on The Credit Channel of Monetary Policy in the Twenty-first Century at the Federal Reserve Bank of Atlanta, Atlanta, Georgia. More evidence was found by Loutsksina and Strahan (2006) and by Altunbas, Gambacorta and Marques-Ibanez (2009).

\(^2\) For example, in 2004–2009 around 30% of all fixed-asset investment in China was financed from companies’ own funds.
This paper studies the monetary policy transmission mechanism using TSLS and GMM methods. These particular estimation procedures were chosen because we use lagged values of dependent variable as explanatory variables in the regressions, which means that the OLS method may give spurious results. In the estimation procedure we follow closely the earlier literature on the bank lending channel and study whether banks’ reactions to shifts in monetary policy are affected by their capitalisation levels. In a number of earlier studies on other countries, higher levels of capitalisation have made banks more immune to shifts in monetary policy. This has been seen as evidence of a functioning bank lending channel in the economy. Taking into account the specific characteristics of the Chinese banking sector as well as the data limitations, we also test whether banks’ dependency on deposit financing affects their reactions to changes in monetary policy.

This study confirms the earlier results that the interest rate still does not function as an effective monetary policy tool in the Chinese economy. In some cases, a hike in the interest rate actually leads to faster credit growth. Even the affects of changes in the reserve requirement are found to be weak and short-lived. As a result, the use of a wide selection of monetary policy tools seems to be justifiable in China’s case. The most efficient monetary policy indicator is found to be a value indicator constructed by Shu and Ng (2010) based on announcements by the People’s Bank of China (PBC). A rise in this index, which indicates monetary tightening, leads to a decline in bank-credit growth.

Regarding the existence of the bank lending channel in China, we notice that the impacts of monetary policy vary significantly among bank groups. While the large state owned banks and joint stock commercial banks do react to monetary tightening by slowing their lending growth, the reactions of foreign owned banks and rural credit cooperatives are considerably weaker. From the policy-making viewpoint, the result is of course encouraging, given that the large state owned banks and joint stock commercial banks cover the major part of the banking sector. However, with such a small sample size it is rather difficult to connect the differences in banks’ reactions to their characteristics, which could be taken as a sign of a bank lending channel. We are able to find only weak evidence that better capitalised banks are more immune to a monetary policy tightening than are banks with less capital.

This paper is organised as follows. We first provide a short overview of the earlier theoretical and empirical literature on the lending channel. In section 3, we briefly describe the functioning of
monetary policy and the banking sector in China and discuss whether the preconditions for the existence of a lending channel are in place. Section 4 concentrates on analysing the bank lending channel in China by first describing the data used in the study. The estimation methods and results are summarised next. Finally, some conclusions are drawn in section 5.

2 Earlier literature on the bank lending channel

The basic IS/LM model does not allow banks to play any particular role in the monetary policy transmission mechanism. By removing some of the assumptions of that basic model, Bernanke and Blinder (1988) develop a theoretical framework in which monetary policy can affect banks’ loan supply and thus the real economy via the bank lending channel. In their model, contractionary monetary policy reduces reserves and thus deposits, which forces banks to seek financing other than via reservable deposits. For banks that are illiquid or undercapitalised, the additional sources of finance can be scarce and costly, so that some banks will prefer to reduce their lending. The impacts of monetary policy running through the traditional interest rate channel are thus magnified, as monetary policy can also impact bank lending by affecting banks’ loanable funds.

Besides making a difference between deposits and other forms of financing available for banks, another distinction between the traditional IS/LM model and the one by Bernanke and Blinder (1988) is that in the latter model, bank credit is not a perfect substitute for bonds. By making this distinction, the authors remove the possibility that banks would simply reduce their bond holdings as a reaction to a decline in deposits caused by a monetary tightening. In that case, monetary policy could affect bond interest rates but not banks’ loan supply.

Two prerequisites for the existence of a bank lending channel emerge. First, at least some agents in the economy, either enterprises and/or households, have to be dependent on bank financing. Second, monetary authorities have to be able to affect the amount of banks’ loanable funds eg via imposition of a reserve requirement.

The first requirement is closely related to the concept of imperfect information. In the financial sector, banks function as special intermediaries of finance by gathering information about their customers so as to overcome the problem of imperfect and asymmetric
information. As a result, the form of finance they provide is special and cannot always be replaced by other forms of finance. For this reason, a functioning bank lending channel is likely to have a stronger impact on small companies and households, which are more dependent on bank finance than on large enterprises, which are more commonly listed on a stock exchange or can issue bonds.

As Disyatat (2010) notes, the second prerequisite connects the traditional form of the bank lending channel tightly to the concept of money multiplier. Moreover, the theory by Bernanke and Blinder (1988) is built on the assumed strong link from bank deposit to loan supply. However, Disyatat (2010) notes that in liberalised economies an adequately capitalised banking system can always lend enough to meet the demand. This is due to the fact that quantitative constraints on banks’ lending have become less effective as the role of reserve requirements have decreased. As a result, the only exogenous constraint on loan supply is in a form of capital requirement.

Thus, Disyatat (2010) does not consider the traditional form of the bank lending channel by Bernanke and Blinder (1988) relevant for the current environment but proposes an alternative theoretical framework which provides a channel for monetary policy to influence bank lending. This bank lending channel functions via banks’ balance sheets. A tightening of monetary policy leads to a reduction in banks’ leverage via its impacts on banks’ cash flows, net interest margins, and asset valuations through both prices and the discount factor. The resulting losses on banks’ assets can result in a diminution of bank capital and lead to a cutback in the supply of credit. Thus, even though the basic two requirements for the existence of a bank lending channel remain the same, the dynamics behind the second requirement are modified.

When the empirical papers on the bank lending channel started to come out it became clear that the theory by Bernanke and Blinder (1988) was difficult to test empirically. The first empirical paper on the bank lending channel was written by Bernanke and Blinder (1992). According to their VAR and impulse response analysis of US data, bank loans reacted more slowly to monetary tightening than did deposits and securities. Although the authors viewed the result as evidence of a lending channel, the paper could not give a convincing answer to the question of whether the loans actually reacted to changes in monetary policy or only passively adjusted to economic activity.

Searching for a more conclusive result, Kashyap, Stein and Wilcox (1993) studied the mix of business financing. They found that in the event of monetary tightening, firms shifted the focus of their external
financing from bank loans to issuance of commercial paper. Although the authors saw the result as support for the existence of a lending channel, Oliner and Rudebusch (1996) argued that the result could actually be due to the fact that different enterprises may react differently to a policy tightening. If, as a consequence of monetary policy tightening, small companies have to adjust their borrowing more than large enterprises, the results obtained by Kashyap, Stein and Wilcox (1993) may simply reflect this phenomenon and hence not provide convincing evidence of a bank lending channel.

Oliner and Rudebusch (1996) themselves found support for their argument using firm-level data, which enabled the authors to separate small and large firms in the U.S. manufacturing sector. They found that monetary contraction shifted all kinds of financing from small to large firms. Thus, the decrease in the share of bank loans in total financing was only natural because large firms often rely less on loans than do small firms. More evidence on the reactions of small firms to monetary tightening being stronger than those of large firms was found in the US data by Gertler and Gilchrist (1994).

These first steps in empirical analysis of the existence of the bank lending channel thus clearly showed that the empirical testing of the theory by Bernanke and Blinder (1988) was hindered by the difficulties in separating credit supply and demand. Although the bank lending was found to react negatively to a monetary tightening it was not possible to analyse the extent of the decline attributable to supply conditions.

As a result, empirical studies on the bank lending channel moved on to analyse bank lending with respect to banks’ characteristics and balance sheets even prior to the existence of a suitable theoretical framework. Kashyap and Stein (1995) were the first to use bank-level data. They analysed whether small and large banks’ balance sheets react differently to a monetary policy tightening in the US. They found that smaller banks react more strongly to a monetary contraction than larger banks. In a later study, Kashyap and Stein (2000) found even more convincing evidence of a bank lending channel when they also included the level of bank liquidity in the estimation. According to their results, small illiquid banks react more to a monetary tightening than do large liquid banks. Kishan and Opiela (2000) added the bank capital leverage ratio as a third bank characteristic in studying the lending channel. Using US data, they found that banks’ capitalisation also plays a role in monetary policy transmission. In their later paper, Kishan and Opiela (2006) found banks’ response to policy stance to be asymmetric. Since implementation of Basel I and the Federal Deposit Insurance
Corporation Improvement Act (FDICIA), contractionary monetary policy has had a restraining effect on the growth of lending by banks with low levels of capitalisation. On the other hand, the response of banks with low levels of capitalisation on monetary easing was found weak. The opposite is true for banks with high levels of capitalisation. Ashcraft (2006) studied whether banks affiliated with multinational holding companies react differently to monetary tightening. According to his results, based on extensive panel data on US banks, the lending of banks not affiliated with multinational companies is more sensitive to insured deposit growth. The result holds on the aggregate level, so that total lending is affected by monetary policy. However, Ashcraft did not find evidence that a decrease in bank lending would have a significant impact on real economic activity in the US.

Thus, the evidence from the US that big, liquid, highly capitalised and international banks are less affected by monetary policy tightening than the other banks seems to be rather convincing. More recently, studies covering also other economies such as the euro area, Eastern European countries and a growing number of other emerging economies have mushroomed. However, the results concerning the bank lending channel in the euro area are not as unanimous as those for the US. Although the bank lending channel is found to function in most cases, the findings vary not only across countries but also in respect to the bank characteristic that is important in terms of the bank lending channel. For example, findings from a number of country-specific studies (results from a number of parallel studies are summarised in Ehrmann et al 2001) using quarterly bank-level data and the GMM method suggest that the level of bank liquidity affects monetary policy transmission mechanisms in most Western European countries but bank size and level of capitalisation affect the banks’ reactions to monetary-policy shocks only in some countries. Somewhat different results were found by Altunbas, Fazylov, and Molyneux (2002), who studied 11 EMU countries in 1991–1999. Using annual data for the whole area, they found evidence that capitalisation affects the way banks react to monetary policy, in that undercapitalised banks tend to be more responsive to monetary policy. However, in their country-specific estimations on the four largest EMU countries, the authors could find weak evidence of a bank lending channel only in Italy and Spain. Using data solely on Italian banks, Gambacorta and Mistrulli (2004) confirmed the result that the level of bank capital does affect the way banks react to a monetary tightening. Gambacorta (2005) found that, besides an abundance of capital, several other factors reduced a bank’s sensitivity to monetary policy: liquidity level, the bank’s affiliation with a larger financial
group, and its access to internal capital markets. Otherwise, the size of
the bank did not have a significant impact. In a separate study on the
bank lending channel in Germany, Hülsewig, Mayer and
Wollmershäuser (2006) used a VAR model and aggregate-level data.
The authors compared theoretical and empirical impulse responses to
a monetary policy shock and found evidence of a functioning bank
lending channel in Germany. Finally, in a more recent study by
Brissimis and Delis (2010) higher levels of both liquidity and
capitalisation were found to make banks’ less sensitive to monetary
tightening, in both the US and euro area.

The recent variation in results might be related to the finding that
developments in banks’ product range and changes in banks’ practises
influence the functioning of the bank lending channel. For example,
Loutskina and Strahan (2006) and Altunbas, Gambacorta and
Marques-Ibanez (2009) found that the increase in banks’ securitisation
activity has reduced the effectiveness of the bank lending channel. As
banks’ new practices such as the securitisation have proceeded at
different pace in different countries, it may have led to the different
results concerning the bank lending channel in eg euro area.

Finally, Ciccarelli, Maddaloni and Peydró (2010) attempted to
overcome the difficulties of the earlier papers in distinguishing
between the demand and supply sides of bank lending by using bank
lending surveys to study whether the supply of bank loans is affected
by monetary policy. Using the VAR method, the authors confirm that
the bank lending channel is found to function in both the US and euro
area.

For our purposes here, the papers on emerging economies are the
most interesting. Actually, there is a good deal of evidence of a bank
lending channel in a number of emerging markets. A high level of
liquidity, in particular, seems to decrease the negative impact of a
monetary policy contraction on bank lending in a number of new EU
member countries in Central and Eastern Europe (summarised by
Brooks, 2007). Bank capitalisation also plays a role in monetary
policy transmission, but bank size is found to be important only in
Hungary. Very similar results were presented in a recent paper on the
new EU member countries by Matousek and Sarantis (2008). They
found evidence of a bank lending channel in all eight CEE countries
studied. The channel seemed to have also macroeconomic relevance.

These results are supported by evidence from Turkey, where the
level of liquidity, but not capitalisation or size, has a robust impact on
the way bank lending reacts to a monetary policy contraction (Brooks,
2007). Using VAR analyses, the lending channel has been found to
function also in Chile and Egypt (Alfaro et al, 2003, Al-Mashat and
Billmeier 2007). Arena, Reinhart and Vázquez (2007) studied the bank lending channel in a number of Asian and Latin American emerging countries. They studied whether a bank’s size, liquidity or capitalisation affects its lending and found weak evidence that the level of capitalisation or liquidity affects the way a bank reacts to changes in monetary policy. Less capitalised or illiquid banks reduced their lending more than did highly capitalised, liquid or foreign banks when interest rates rose. In conclusion, the evidence of a bank lending channel from emerging economies is quite convincing.

Regarding the bank lending channel in China, a paper by Liu and Xie (2006) describes the Chinese financial sector from the perspective of a bank lending channel but does not include any econometric estimation. The only systematic research paper that we are aware of is by Gunji and Yuan (2010), which is based on bank-level data for 1985–2007. In the baseline model, the authors find that the bigger the bank, the less affected it is by monetary policy. Similarly, high profitability helps to shield a bank from monetary policy while the level of liquidity or capital does not seem to affect its lending. However, when the authors follow more closely the earlier literature on the bank lending channel by including lagged values of the dependent variable in GMM regressions, the results are nearly reversed: neither size nor profitability has a statistically significant impact on the way a bank reacts to changes in monetary policy. While liquidity and capital now seem to affect banks’ behavior, the sign of the interaction term is contrary to expectations, so that a higher level of capital or liquidity increases a bank’s vulnerability to monetary policy. We thus conclude that the results so far on China’s bank lending channel are inconclusive.

3 Some characteristics of the Chinese banking sector and monetary policy

As we saw above, there are two prerequisites for a bank lending channel to exist in an economy: at least some of the economic agents must be dependent on bank financing and monetary authorities must be capable of affecting commercial banks’ lending. In this section we examine whether these two prerequisites can obtain at some point as regards China’s banking sector.

While in the advanced economies, the development of diversified financial markets and current practices in both monetary policy and the banking sector have likely reduced the importance of the bank
lending channel, in the Chinese economy this does not seem to be the case. First of all, China’s banking sector is exceptionally large. At the end of 2009, the sector’s total assets3 amounted to more than 200% of GDP, making China’s banking sector one of the biggest in the world. The vast banking industry reflects not only banks’ traditional role as a part of the political system but also the lack of other investment and financing opportunities. Although the size of the stock market has recently increased, its share in companies’ external finance is still modest, and access to the stock markets remained until recently very limited for privately-owned and medium-sized companies. In addition, the corporate bond market is still miniscule. It is thus clear that China fulfils the first prerequisite, namely that bank credit plays an essential role in the economy and the large volume of financing that it provides would be difficult to replace with any other form of financing.

On the other hand, certain characteristics of the underdeveloped financial markets may also diminish the importance of bank credit in the Chinese economy. In particular, bank lending has been channelled to a large extent to the state-owned companies (see eg Liu and Xie, 2006). The limited access of small and medium-sized enterprises as well as households to external finance reduces their vulnerability to monetary contraction (Koivu, 2012). Thus, even if the bank lending channel exists, its impact on these parts of the economy is likely to be limited.

The fulfilment of the second prerequisite for the bank lending channel – the capability of authorities to affect bank lending – is facilitated by the fact that Chinese banks are still mainly publicly owned. Reflecting this ownership structure, the banking sector still has strong links to the public sector (Shih, 2008).

The existence of a bank lending channel is probably also supported by the nature of Chinese monetary policy. The use of quantitative rather than price-based policy tools increases the possibility that the bank lending channel in its traditional form exists in China. For example, in 2007 alone, China raised the commercial banks’ reserve ratio numerous times, in all from 9% to 14.5%, and in autumn 2008 the requirement was quickly lowered in response to onset of the global financial crisis (Figure 1). As another example of the use of quantitative monetary policy tools, the authorities still give direct guidelines to commercial banks, to either limit or boost credit growth.

3 The banking sector here includes policy banks, state-owned commercial banks, joint stock commercial banks, cooperative financial institutions, Post Savings Bank of China and finance companies.
At the same time, the use of interest rates as a monetary policy tool is still limited. Supporting this view, a number of studies have found quantitative tools to have had a significant impact on the real economy while the role of interest rates in the Chinese economy is still considered small (see eg Koivu, 2009, Laurens and Maino, 2007, Mehrotra, 2007 and 2008).

Figure 1  Consumer price inflation and use of monetary policy variables in China: commercial banks’ reserve requirement and 1-year lending rate, %

Source: CEIC.

The authorities’ power over the banks’ loanable funds is increased by the fact that the commercial banks have only limited access to forms of financing other than deposits of households and non-financial corporations. Earlier on, central bank lending was another source of finance for banks, but over the recent decade this source has been strictly limited, as the monetary authorities has been keen to control the amount of liquidity in the economy in the presence of vast inflows of foreign exchange. The establishment of the interbank market in the second half of the 1990s did not significantly change banks’ situation, as the market remained small and illiquid for many years (Xie, 2004). Only in very recent years, has the interbank market grown rapidly, and
it now seems to be increasingly effective in channelling money between Chinese banks.

The authorities’ relatively strong influence on banks’ loanable funds in China is reflected in the relatively modest in variation in the money multiplier. In many advanced economies, where the central banks have concentrated on guiding the target interest rates, the variation in the money multiplier has been more considerable (Figure 2).

![Figure 2](image)

Source: IFS.

4 Studying the bank lending channel in China

Now that we have seen that the two prerequisites for the existence of a bank lending channel are fulfilled in China, we turn to the question of whether the bank lending channel actually functions in the economy. First we approach the topic by analysing descriptively banks’ behaviour after an identified change in the country’s monetary policy

---

4 Defined as M2/M1, except for China’s money multiplier: (money + quasi-money)/money.
stance, after which we analyse the bank lending channel more formally by carrying out TSLS and GMM analyses.

As noted above, the earlier results on the bank lending channel in China are inconclusive. We aim to deepen the picture of the dynamics between monetary policy and banking sector in China by using quarterly data in contrast to Gunji and Yuan (2010), who use annual data. Unfortunately, the quarterly data are available only for six bank groups\(^5\) for 2002–2009.

When studying China’s monetary policy one of the challenges is to decide on a monetary policy indicator. As mentioned above, China has regularly used a wide selection of monetary policy tools\(^6\) and there is no consensus among researchers as to how to define the monetary policy stance in China. This is not so much of a problem for our first aim, which is to analyse commercial banks’ lending descriptively. For this purpose we can identify three turning points in the monetary policy stance during our research period by analysing the changes in both the reserve ratio and the benchmark interest rate for 1-year loans (Figure 1). Based on these time series we find that a minor shift in China’s monetary policy occurred in the second half of 2003 when the authorities began to tighten the policy stance eg by boosting the reserve ratio twice. Also the benchmark rate for bank credit was raised in the first half of 2004. An even more definite period of monetary tightening began in the second half of 2006 and lasted for about two years. This period involved not only a number of hikes in the reserve requirement but also some increases in benchmark interest rates. Both episodes of tightening were motivated by rapid increases in inflation. In our research sample, the only period when monetary policy was significantly eased began right after the full onslaught of the global financial crisis in the autumn of 2008.

If we now turn to an analysis of what happened to credit growth after these three turning points, we find that in 2004 credit growth slowed significantly after monetary tightening measures were implemented (Figure 3). In 2007–2008, somewhat surprisingly, the reaction was considerably milder, although the tightening was much more pronounced than during the previous period of tightening. On the other hand, credit growth responded very quickly and strongly to the loosening of monetary policy since the autumn 2008.

---

\(^5\) The groups: 1) large state-owned banks; 2) joint stock commercial banks; 3) urban city banks; 4) foreign-funded banks; 5) urban credit cooperatives; and 6) rural credit cooperatives.

\(^6\) A useful summary of Chinese monetary policy tools is found eg in Geiger (2006).
Interestingly, one finds substantial differences among bank groups’ reactions to the shifts in monetary policy. For example, lending by foreign funded banks seems to be nearly immune to the stance of monetary policy. In this group, credit growth accelerated during both periods of tightening and has actually slowed down since the second half of 2008. Another major exception is the group of urban credit cooperatives, whose lending has been declining since 2006 in the face of substantial structural reforms. Among the other bank groups, the overall trends in credit growth have been similar.

Figure 3
Credit growth in China in 2002–2009, annual %-change

Source: CEIC, People’s Bank of China.
Note: SOCB = state owned commercial banks, JSCB = joint stock commercial banks, UCB = urban commercial banks, UCC = Urban credit cooperatives, FFB = foreign funded banks, RCC = rural credit cooperatives. The vertical lines indicate turning points in monetary policy in 2003, 2006 and 2008.

Obviously, the descriptive analysis is not sufficient to determine which factors cause the shifts in credit growth. Thus, in order to further illuminate the dynamics of credit growth, we turn to econometric analysis. We analyse the bank lending channel in China following the approach by Kashyap and Stein (1995). This kind of specification, where credit growth is explained by macroeconomic
factors, monetary policy and bank-specific factors, is commonly used in the bank lending channel literature and allows us to compare our results for China with those for other countries. The equation to estimate is

\[ \Delta L_{i,t} = a\Delta L_{i,t-1} + \sum_{j=1}^{4} b_j \Delta M_{1-t-j} + \sum_{j=1}^{4} c_j \Delta MP_{t-j} + \sum_{j=1}^{4} d_j \Delta MP_{t-j} \cdot X_{i,t-j} + \lambda X_{i,t-1} + \varepsilon_{i,t} \]  

(1)

where \( \Delta L_{i,t} \) denotes the real growth rate of bank loans in period t and M is a set of macroeconomic variables. \( MP_t \) is a monetary policy indicator and \( X_{i,t} \) is the bank-specific variable. In studying the bank lending channel, we are particularly interested in the interaction term \( \Delta MP_t \cdot X_{i,t} \), which indicates whether bank characteristics play a role in the monetary policy transmission mechanism. In the equation, \( i = 1, \ldots, N \) refers to each banking group and \( \varepsilon \) is the error term. To avoid the problem of endogeneity, we have lagged all the explanatory variables.

The exact sources and definitions of the data are found in Table A1 in the Appendix. We measure credit growth in China by using data on banks’ claims in the non-financial sector.\(^7\) The set of macroeconomic variables is supposed to capture changes in credit demand, which we try to measure by using data on industrial output. We use industrial output instead of GDP simply because there are no official quarterly data on real GDP for our research period. Both credit stock and industrial production are in logs and real terms.

As already mentioned, there is no consensus among researchers as to how to define the monetary policy stance in China. While the monetary aggregates are often believed to best describe the policy stance, their use in this study would be problematic. Using reserve money would be problematic because the continuous changes in the reserve requirement may lead to misinterpretations of this indicator (Koivu, 2012). On the other hand, wider monetary aggregates (e.g., M2) are closely related to our dependent variable and so cannot be used. We end up introducing three indicators for China’s monetary policy: the reserve ratio, an interest rate, and the value indicator for monetary policy developed by Shu and Ng (2010). The trends in the monetary policy indicators are presented in Figure A1 in the Appendix. The

---

\(^7\) Unfortunately, sectoral credit data, which would enable more detailed analysis, are not available.
reserve ratio has since 2003 been specified for each banking group, and we use these group-specific ratios in our estimations. As the interest rate, we use a 7-day repo rate, argued to be the most significant of the Chinese interbank interest rates, given the liquid markets and frequent observations (Peng, Chen and Fan, 2006). This particular interest rate also follows rather closely the path of benchmark lending and deposit rates set by the PBC. According to Shu and Ng (2010), the value indicator is a 7-step measure that takes into account ‘apart from the stated broad policy direction, information such as the PBoC’s assessments on the near-term overall economic performance and the aims of macroeconomic adjustment’. The major sources used for the indicator are PBC’s Monetary Policy Reports and the announcements of the quarterly meetings of the PBC Monetary Policy Committee.

The choice of bank-specific variables is restricted by the availability of data. As mentioned above in the earlier papers the banks are often characterised by their size, level of liquidity and capital, and in some cases by their profits or links to multinational banks. However, data are not available on all these indicators, so we end up using two banking sector indicators: the level of capitalisation (Cap) and the share of deposits (Dep) in banks’ total liabilities. While capitalisation is commonly used in the earlier literature, the decision to use the share of deposits as an additional indicator is based on the theory by Bernanke and Blinder (1988). Accordingly, a monetary policy tightening forces banks to replace the loss of deposits with another kind of financing. This replacement is assumed to be more difficult and costly for banks that are not used to seeking financing from other sources. As a result, lending by banks that are more dependent on deposits might decrease more after a monetary policy tightening than would lending by banks with more diversified liability structures. On the other hand, according to Disyatat (2010), a policy tightening may actually influence more those banks that are dependent on market financing than banks relying on deposit financing. We can test the applicability of these theories to the Chinese data by using this particular variable.

Both of our time series on banks are normalised over time and over the mean of all bank groups by the following method

---

8 We follow here partly Ascraft’s (2006) indicator for the ‘bank finance mix’, defined as the ratio of insured deposits to the total of deposits and net federal fund borrowing.
\[
\begin{align*}
\text{Cap}_{it} &= C_{it} / A_{it} - 1 / T \sum_{t=1}^{T} \left( 1 / N \sum_{i=1}^{N} C_{it} / A_{it} \right) \\
\text{Dep}_{it} &= D_{it} / A_{it} - 1 / T \sum_{t=1}^{T} \left( 1 / N \sum_{i=1}^{N} D_{it} / A_{it} \right)
\end{align*}
\]

where \(A\) denotes total assets/liabilities, \(C\) capitalisation (paid-in-capital as % of total assets) and \(D\) the share of deposits in banks' in total liabilities.

Table 1. Descriptive statistics for banking groups in 1Q02–4Q/09, period averages.

<table>
<thead>
<tr>
<th>Variable</th>
<th>SOCB</th>
<th>JSBC</th>
<th>UCB</th>
<th>UCC</th>
<th>FFB</th>
<th>RCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>total assets at end-2009, %</td>
<td>57.75</td>
<td>23.20</td>
<td>8.52</td>
<td>0.06</td>
<td>2.13</td>
<td>8.33</td>
</tr>
<tr>
<td>paid-in-capital, % of total assets</td>
<td>3.39</td>
<td>1.81</td>
<td>3.07</td>
<td>3.06</td>
<td>9.47</td>
<td>3.81</td>
</tr>
<tr>
<td>deposits as % of total liabilities</td>
<td>75.28</td>
<td>69.32</td>
<td>77.95</td>
<td>86.53</td>
<td>16.28</td>
<td>87.28</td>
</tr>
</tbody>
</table>

Source: CEIC.

Note: SOCB = state-owned commercial banks, JSCB = joint-stock commercial banks, UCB = urban commercial banks, UCC = urban credit cooperatives, FFB = foreign-funded banks, RCC = rural credit cooperatives.

As seen from Table 1, there are significant differences between bank groups. While the level of capitalisation of Chinese banks has traditionally been rather low, the foreign owned banks are clearly outliers in this respect. The foreign banks differ considerably from their Chinese counterparts also in terms of deposit shares. In the foreign banks, more than 80% of total liabilities are from sources other than deposits; at the other end, the rural and urban credit cooperatives are highly dependent on deposits. The other Chinese bank groups have somewhat more differentiated structures of liabilities.

4.1 TSLS estimations with pooled data

As mentioned above, we use quarterly data on six bank groups for 2002–2009, so that \(T > N\), which means that (unlike most of the earlier papers using micro-level data) we cannot rely on panel data.
estimation methods. Furthermore, due to the fact that we have a lagged dependent variable on the right hand side of equation (1), OLS estimation may produce spurious results. To avoid this problem, we employ an instrumental method of two-stage least squares for pooled data. In the first stage, an OLS regression estimation is carried out for each variable in the model using the instrument set; and in the second stage, the original equation is estimated with the variables replaced by their fitted values from the first-stage regressions.

In choosing the instruments, we need to take into account the constraint that the minimum number of instruments is the number of estimated coefficients. On the other hand, we try to avoid the problem of over-identification by keeping the structure of the instruments relatively simple. We thus introduce as instruments all the explanatory variables that are considered exogenous as well as the second lags of credit growth and the bank variable; their first lags presumably being correlated with the error term in (1).

The results from the TSLS estimations are presented in Tables 2–4. We introduce at most four lags in all specifications to capture delays in the monetary policy transmission mechanism. However, where not statistically significant\(^9\) we shortened the string of lags.

According to our results, credit growth is highly persistent in that the coefficient of lagged credit growth is found to be 0.8–1.2 in each specification. Somewhat surprisingly, reactions to all the other explanatory variables remain rather weak. For example, the positive reaction of credit growth to a rise in economic growth rate measured by industrial output growth dies out in some specifications. We assume that the weak link between economic development and credit growth is due to banks’ occasionally more political than financial-intermediary role in the economy. The weak and even negative link from economic growth to credit growth was also found by Koivu (2009).

\(^9\) In a few cases we also report marginally insignificant coefficients if leaving them out leads to much lower R\(^2\).
Table 2  Results for pooled TSLS using reserve money with 7-day repo rate as monetary policy indicator and loan growth as dependent variable

<table>
<thead>
<tr>
<th></th>
<th>Basic model</th>
<th>Level of capital</th>
<th>Dependence on deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std. error</td>
<td>Coefficient</td>
</tr>
<tr>
<td>ΔL_{t-1}</td>
<td>1.037***</td>
<td>0.109</td>
<td>1.045***</td>
</tr>
<tr>
<td>Δy_{t-1}</td>
<td>−0.699</td>
<td>0.489</td>
<td>−0.124</td>
</tr>
<tr>
<td>Δy_{t-2}</td>
<td>0.338</td>
<td>0.381</td>
<td>0.270</td>
</tr>
<tr>
<td>Δy_{t-3}</td>
<td>−0.724</td>
<td>0.483</td>
<td>−0.873**</td>
</tr>
<tr>
<td>Δy_{t-4}</td>
<td>0.984**</td>
<td>0.487</td>
<td>0.661**</td>
</tr>
<tr>
<td>Δinterest rate_{t-1}</td>
<td>0.024</td>
<td>0.021</td>
<td>0.016</td>
</tr>
<tr>
<td>Δinterest rate_{t-2}</td>
<td>−0.039**</td>
<td>0.019</td>
<td></td>
</tr>
<tr>
<td>Δinterest rate_{t-3}</td>
<td>0.045*</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>Δinterest rate_{t-4}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banking sector variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δint. rate_{t-1}·Banking sector variable_{t-1}</td>
<td>0.000</td>
<td>0.002</td>
<td>−0.003</td>
</tr>
<tr>
<td>Δint. rate_{t-2}·Banking sector variable_{t-2}</td>
<td>−0.002</td>
<td>0.004</td>
<td>−0.029</td>
</tr>
<tr>
<td>Δint. rate_{t-3}·Banking sector variable_{t-3}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δint. rate_{t-4}·Banking sector variable_{t-4}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>.26</td>
<td>.31</td>
<td>.32</td>
</tr>
</tbody>
</table>
Table 3  
Results for pooled TSLS using reserve money with reserve ratio as monetary policy indicator and loan growth as dependent variable

<table>
<thead>
<tr>
<th></th>
<th>Basic model</th>
<th></th>
<th>Banking sector variable</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std. error</td>
<td>Coefficient</td>
<td>Std. error</td>
<td>Coefficient</td>
</tr>
<tr>
<td>ΔLt−1</td>
<td>1.057***</td>
<td>0.100</td>
<td>1.120***</td>
<td>0.0111</td>
<td>0.937***</td>
</tr>
<tr>
<td>Δyt−1</td>
<td>−0.550</td>
<td>0.591</td>
<td>−0.604</td>
<td>0.608</td>
<td>−0.135</td>
</tr>
<tr>
<td>Δyt−2</td>
<td>−0.605</td>
<td>0.367</td>
<td>−0.631*</td>
<td>0.377</td>
<td>0.328</td>
</tr>
<tr>
<td>Δyt−3</td>
<td>0.318</td>
<td>0.553</td>
<td>0.351</td>
<td>0.568</td>
<td>−0.521*</td>
</tr>
<tr>
<td>Δyt−4</td>
<td>0.755***</td>
<td>0.284</td>
<td>0.751**</td>
<td>0.751</td>
<td>0.681**</td>
</tr>
<tr>
<td>Δres. reqt−1</td>
<td>−0.006</td>
<td>0.007</td>
<td>−0.005</td>
<td>0.007</td>
<td>−0.006</td>
</tr>
<tr>
<td>Δres. reqt−2</td>
<td>0.027***</td>
<td>0.007</td>
<td>0.028***</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Δres. reqt−3</td>
<td>−0.021*</td>
<td>0.011</td>
<td>−0.023*</td>
<td>0.012</td>
<td></td>
</tr>
</tbody>
</table>

R² | .35 | .32 | .37 |
Table 4  Results for pooled TSLS using reserve money with HKMA value indicator as monetary policy indicator and loan growth as dependent variable

<table>
<thead>
<tr>
<th></th>
<th>Basic model</th>
<th>Level of capital</th>
<th>Banking sector variable</th>
<th>Dependence on deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std. error</td>
<td>Coefficient</td>
<td>Std. error</td>
</tr>
<tr>
<td>ΔL_{t-1}</td>
<td>0.901***</td>
<td>0.081</td>
<td>0.960***</td>
<td>0.083</td>
</tr>
<tr>
<td>Δy_{t-1}</td>
<td>0.726**</td>
<td>0.316</td>
<td>0.729**</td>
<td>0.307</td>
</tr>
<tr>
<td>Δy_{t-2}</td>
<td>−0.720**</td>
<td>0.325</td>
<td>−0.764**</td>
<td>0.316</td>
</tr>
<tr>
<td>Δy_{t-3}</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δy_{t-4}</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔMP value indicator_{t-1}</td>
<td>−0.006*</td>
<td>0.003</td>
<td>−0.006*</td>
<td>0.003</td>
</tr>
<tr>
<td>ΔMP value indicator_{t-2}</td>
<td>−0.011***</td>
<td>0.004</td>
<td>−0.011***</td>
<td>0.004</td>
</tr>
<tr>
<td>ΔMP value indicator_{t-3}</td>
<td>0.018***</td>
<td>0.004</td>
<td>0.019***</td>
<td>0.004</td>
</tr>
<tr>
<td>ΔMP value indicator_{t-4}</td>
<td>−0.006**</td>
<td>0.003</td>
<td>−0.007**</td>
<td>0.003</td>
</tr>
<tr>
<td>Banking sector variable</td>
<td>0.001</td>
<td>0.001</td>
<td>−0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>ΔMPVA_{t-1}:Banking sector variable_{t-1}</td>
<td>0.004***</td>
<td>0.001</td>
<td>−0.022**</td>
<td>0.010</td>
</tr>
<tr>
<td>ΔMPVA_{t-2}:Banking sector variable_{t-2}</td>
<td>−0.000</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>ΔMPVA_{t-3}:Banking sector variable_{t-3}</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>ΔMPVA_{t-4}:Banking sector variable_{t-4}</td>
<td>−0.004***</td>
<td>0.001</td>
<td>0.009</td>
<td>0.009</td>
</tr>
<tr>
<td>R²</td>
<td>.46</td>
<td>.49</td>
<td>.45</td>
<td></td>
</tr>
</tbody>
</table>
Neither of the banking sector characteristics alone has a significant impact on credit growth. The positive coefficient of the level of capital in all specifications is as expected but never statistically significant. The coefficient of banks’ dependence on deposits is negative, which means credit growth is slower for banks whose liability structure is more concentrated on deposits. However, the link is not statistically significant.

Our results for banks’ reactions to monetary policy confirm the earlier result that the role of interest rates is still small in the Chinese economy (see eg Koivu, 2009). In both specifications with two separate banking sector indicators, a rise in the interest rate would actually lead to an increase in credit growth, although the result is not statistically significant. The result for banks’ reactions to a rise in the reserve ratio is not much more encouraging from the viewpoint of policy-makers. By summing up the significant coefficients on notes that the accumulated impact of a rise in the reserve ratio on credit growth is actually positive. Thus, a simple rise in the reserve ratio seems not to be sufficient to lower the growth rate. Part of the explanation behind the weak result may lie in the time period studied, which coincides with strong currency inflows to China, and the hikes in the reserve ratio probably sterilised only partly the impacts of the continuous currency market interventions. This implies that the growth of liquidity and credit have continued apace, even in the face of increases in the reserve requirement. Finally, our last monetary policy indicator is the value indicator developed by Shu and Ng (2010). As expected, a rise in this index leads to a slowdown in credit growth. However, the impact turns positive and less significant in the specification with banks’ dependence on deposits.

To study the existence of a bank lending channel in China we follow the earlier literature and use an interaction term between the indicators for monetary policy and banking sector characteristics. Based on the earlier literature, a decrease in credit growth caused by a tightening of monetary policy is expected to be partly offset by a high level of capital. Thus, in a standard case where a rise either in the interest rate, reserve ratio or the monetary policy value indicator leads to slower credit growth, the interaction term is expected to be positive. Expectations for the interaction term with banks’ dependence on deposit are ambiguous. According to the theory by Bernanke and Blinder (1988), a bank which is less dependent on deposit financing may suffer less from a tightening and thus the interaction term would be positive. On the other hand, Disyatat (2010) assumes that banks relying on larger market-based shares of financing are in a more vulnerable position, so that the impacts of monetary tightening on
their balance sheet and lending might actually be more extensive. This would imply a positive coefficient of the interaction term.

In China’s case, the interpretation of the coefficients of the interaction terms is complicated by the weak results obtained on the impacts of monetary policy on credit growth. Furthermore, only few interaction terms are statistically significant. When using the HKMA value indicator to measure the stance of monetary policy, we obtain only weak signs that a high level of capital makes a bank slightly less vulnerable to monetary policy. Even this effect is reversed later on. In addition, it seems that a monetary tightening, as measured by the value indicator, actually leads to a slightly smaller decrease in lending for banks that are highly dependent on deposits, thus providing slight support for the Disyatat (2010) view.

In sum, the results for pooled data on six bank groups do not clarify the mixed picture presented by the earlier study by Gunji and Yuan (2010) as regards the bank lending channel in China. If anything, our results cannot be seen as strong evidence of a bank lending channel in China similar in form to those found in a number of advanced economies. We look next at the results for individual bank groups, to determine whether data pooling hides the trends in the data that we are interested in.

4.2 Studying the behaviour of each banking group separately

So far, we know very little about how individual bank groups in China react to changes in monetary policy. In reality, their reactions can be rather heterogeneous, depending eg on their ownership and customer structure and operating area. To illuminate the reactions of each individual banking group to monetary policy, we estimate a separate dynamic equation for each banking group’s loan growth. We use the Generalized Method of Moment (GMM), because of the lagged dependent variable on the right hand side of the estimation equation

\[ \Delta L_t = a\Delta L_{t-1} + \sum_{j=1}^{4} b_j \Delta y_{t-j} + \sum_{j=1}^{4} c_j \Delta MP_{t-j} + \epsilon_t \]  

where \( \Delta L_t \) denotes the real growth rate of bank loans in period \( t \) and \( y \) is the proxy for economic activity, measured by industrial output. \( MP_t \) is an indicator of monetary policy and \( \epsilon \) is the error term. As regards measuring the monetary policy stance, we use the same three
indicators as above: 7-day repo rate, banking group specific reserve requirement and the value indicator developed by Shu and Ng (2010). To avoid the problem of endogeneity, we lagged all the explanatory variables. As instruments, we use all the exogenous variables in our equation and the second lag of the dependent variable. Due to the small sample size, we try to keep the number of estimated coefficients and instruments as small as possible. To test the validity of the instruments, we apply the Hansen test and report the J-statistics together with the results in Table 5–7.

The results indeed reveal significant differences between the bank groups’ lending behaviour. As noted in using the pooled data, lending growth is a relatively persistent phenomenon although the coefficients of lagged credit growth now vary more than earlier, between 0.2 and 1.0. Bank groups’ reactions to economic growth vary considerably. Urban credit cooperatives, which have been reformed and whose lending has been decreasing in recent years, actually react negatively to positive economic developments. All the other bank groups react positively to economic growth, although the size of the impact varies greatly. The strongest reaction can be seen in lending by the joint-stock commercial banks; the reactions of state-owned banks and rural credit cooperatives are considerably smaller. This result is not surprising taking into account the large banks’ role in carrying out very politically oriented functions and the concentration of rural credit cooperatives on lending projects in the countryside and in agriculture, in particular. Demand for these projects is not well captured by our indicator for macroeconomic conditions, industrial output growth.

Note the definite differences also in banks’ sensitivity to monetary policy. The earlier result, that the role of interest rates as a monetary policy tool is still limited, is confirmed again. None of the bank groups reacts to a rise in the interbank rate by decreasing their lending, as one would expect. Actually, some of the bank groups react positively to higher interest rates. The immediate impact of a hike in the reserve requirement on lending is negative in most bank groups. However, the impact turns rapidly positive and the accumulated impact one year after the hike is positive, except for lending by joint-stock banks and urban credit cooperatives. Confirming our results for TSLS, the value indicator for monetary policy stance developed by Shu and Ng (2010) has the most permanent effect on banks’ lending. When monetary policy is tightened, as measured by this indicator, lending decreases by all banks other than the rural credit cooperatives and foreign-funded banks.
Table 5  
Results for GMM estimations on each banking group with 7-day repo as monetary policy indicator and loan growth as dependent variable

<table>
<thead>
<tr>
<th></th>
<th>SOCB</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔL_{t-1}</td>
<td>0.910***</td>
<td>0.136</td>
<td>0.894***</td>
<td>0.125</td>
<td>0.782***</td>
<td>0.044</td>
<td>0.932***</td>
<td>0.204</td>
</tr>
<tr>
<td>Δy_{t-1}</td>
<td>-1.199***</td>
<td>0.295</td>
<td>-0.955***</td>
<td>0.325</td>
<td>-0.646***</td>
<td>0.076</td>
<td>0.641***</td>
<td>0.191</td>
</tr>
<tr>
<td>Δy_{t-2}</td>
<td>0.615***</td>
<td>0.120</td>
<td>-0.294**</td>
<td>0.133</td>
<td>-0.150**</td>
<td>0.069</td>
<td>-0.147</td>
<td>0.208</td>
</tr>
<tr>
<td>Δy_{t-3}</td>
<td>0.649**</td>
<td>0.237</td>
<td>0.890**</td>
<td>0.383</td>
<td>0.416***</td>
<td>0.416</td>
<td>-0.608***</td>
<td>0.093</td>
</tr>
<tr>
<td>ΔIR_{t-1}</td>
<td>-0.011</td>
<td>0.012</td>
<td>0.019</td>
<td>0.020</td>
<td>-0.005</td>
<td>0.010</td>
<td>2.154***</td>
<td>0.103</td>
</tr>
<tr>
<td>ΔIR_{t-2}</td>
<td>-0.006</td>
<td>0.008</td>
<td>-0.036**</td>
<td>0.015</td>
<td>0.019**</td>
<td>0.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔIR_{t-3}</td>
<td>0.023*</td>
<td>0.013</td>
<td>0.053***</td>
<td>0.016</td>
<td>0.077**</td>
<td>0.028</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔIR_{t-4}</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D_{Q408}</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>.31</td>
<td>.22</td>
<td>.27</td>
<td>.39</td>
<td>.81</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J-stat.</td>
<td>3.229</td>
<td>1.216</td>
<td>6.565</td>
<td>4.275</td>
<td>1.150</td>
<td>2.569</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6  
Results for GMM estimations on each banking group with reserve ratio as monetary policy indicator and loan growth as dependent variable

<table>
<thead>
<tr>
<th></th>
<th>SOCB</th>
<th>JSCB</th>
<th>UCB</th>
<th>FFB</th>
<th>UCC</th>
<th>RCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔL_{t-1}</td>
<td>0.771***</td>
<td>0.098</td>
<td>0.334**</td>
<td>0.138</td>
<td>0.665***</td>
<td>0.130</td>
</tr>
<tr>
<td>Δy_{t-1}</td>
<td>0.078</td>
<td>0.135</td>
<td>0.992***</td>
<td>0.327</td>
<td>0.997**</td>
<td>0.432</td>
</tr>
<tr>
<td>Δy_{t-2}</td>
<td>0.107</td>
<td>0.255</td>
<td>−0.567</td>
<td>0.478</td>
<td>1.511**</td>
<td>0.685</td>
</tr>
<tr>
<td>Δy_{t-3}</td>
<td>−0.778*</td>
<td>0.445</td>
<td>0.665</td>
<td>0.670</td>
<td>−2.552***</td>
<td>0.759</td>
</tr>
<tr>
<td>Δy_{t-4}</td>
<td>0.107</td>
<td>0.255</td>
<td>−0.567</td>
<td>0.478</td>
<td>1.511**</td>
<td>0.685</td>
</tr>
<tr>
<td>ΔRR_{t-1}</td>
<td>−0.018***</td>
<td>0.004</td>
<td>−0.034***</td>
<td>0.007</td>
<td>−0.019***</td>
<td>0.005</td>
</tr>
<tr>
<td>ΔRR_{t-2}</td>
<td>0.013***</td>
<td>0.003</td>
<td>0.005</td>
<td>0.006</td>
<td>−0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>ΔRR_{t-3}</td>
<td>0.010***</td>
<td>0.002</td>
<td>0.004</td>
<td>0.004</td>
<td>0.025**</td>
<td>0.011</td>
</tr>
<tr>
<td>ΔRR_{t-4}</td>
<td>0.022***</td>
<td>0.005</td>
<td>0.011***</td>
<td>0.003</td>
<td>−0.022**</td>
<td>0.009</td>
</tr>
<tr>
<td>R²</td>
<td>.45</td>
<td>.52</td>
<td>.26</td>
<td>.75</td>
<td>.82</td>
<td>.31</td>
</tr>
<tr>
<td>J-stat.</td>
<td>5.793</td>
<td>2.648</td>
<td>0.326</td>
<td>5.34</td>
<td>3.351</td>
<td>4.441</td>
</tr>
<tr>
<td>Country</td>
<td>Coef.</td>
<td>Std. error</td>
<td>Coef.</td>
<td>Std. error</td>
<td>Coef.</td>
<td>Std. error</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------------</td>
<td>-------</td>
<td>------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>SOCB</td>
<td>0.431***</td>
<td>0.047</td>
<td>0.223</td>
<td>0.152</td>
<td>0.882***</td>
<td>0.036</td>
</tr>
<tr>
<td>JSCB</td>
<td>0.189*</td>
<td>0.092</td>
<td>1.148**</td>
<td>0.431</td>
<td>–0.519***</td>
<td>0.100</td>
</tr>
<tr>
<td>UCB</td>
<td>–0.793***</td>
<td>0.125</td>
<td>0.017</td>
<td>0.062</td>
<td>0.901***</td>
<td>0.170</td>
</tr>
<tr>
<td>FFB</td>
<td>0.013**</td>
<td>0.005</td>
<td>0.003</td>
<td>0.006</td>
<td>0.004</td>
<td>0.008</td>
</tr>
<tr>
<td>UCC</td>
<td>0.080***</td>
<td>0.032</td>
<td>0.021***</td>
<td>0.004</td>
<td>–0.021***</td>
<td>0.004</td>
</tr>
<tr>
<td>RCC</td>
<td>0.080***</td>
<td>0.032</td>
<td>0.021***</td>
<td>0.004</td>
<td>–0.021***</td>
<td>0.004</td>
</tr>
</tbody>
</table>
It seems that the lending by these two groups is difficult to control by the monetary policy. This is not surprising given the special role of rural cooperatives in financing projects particularly in the rural areas and agriculture, which often have political backing and thus may be less affected by monetary policy actions. The operations of foreign funded banks have been restrained by strict rules that have limited their access to retail level business in domestic currency terms, even after banking regulation was harmonised by end-2006 in connection with the WTO membership agreement. Thus the gradual liberalisation of these restrictions, which is missing in our estimations, has probably affected foreign banks’ lending much more than the shifts in monetary policy.

The most sensitive bank groups in terms of monetary policy are the big state-owned banks and joint-stock commercial banks, ie the biggest banks in China. Lending by these banks decreases when the reserve requirement is increased or generally when monetary policy is tightened, as indicated by the value indicator. There may be many reasons for their sensitivity. First, these banks, particularly the big state-owned banks, have close ties to Chinese decision making and the government. Second, the banks may also be watched more carefully by the authorities simply because of their size. These two groups cover about three fourths of the whole sector and thus have major impacts also on developments in the real economy.

Finally, we try to determine whether there are factors internal to the banks that might explain the differences in sensitivity across the bank groups or in other words evidence of a bank lending channel. It is difficult to see how the sensitivity would be linked to banks’ dependence on deposits for financing. The large state-owned banks and joint stock commercial banks actually have rather diversified liabilities in their balance sheet compared to many other bank groups (Table 1). The result thus enhances slightly our earlier result that market-based finance makes banks more vulnerable to monetary policy, as argued by Disyatat (2010). On the other hand, the level of capital has been particularly low in the joint-stock banks while the bank groups immune to monetary policy – rural credit cooperatives and foreign funded banks – are among the banks with highest capital levels. This then confirms our result that a higher level of capital makes a bank respond less dramatically to shifts in monetary policy. However, one should bear in mind the caveats, such as the small sample size of this study, and so interpret the results with caution. Moreover, the results for individual bank groups assume that banks’ lending growth does not react differently to a shift in monetary policy eg because of a difference in customer composition.
5 Conclusions

This paper has studied the monetary policy transmission mechanism in China. More specifically, we have been interested in finding out whether commercial banks enhance the impacts of monetary policy by adjusting their credit supply to shifts in monetary policy stance. Most of the earlier studies on a number of advanced and emerging economies have found evidence of a bank lending channel meaning in that loan supply, and not only loan demand, is affected by monetary policy. In particular, highly capitalised, liquid and large banks have been found to reduce their lending less than other banks in response to a monetary policy contraction. There are, however, differences among the countries eg with respect to bank characteristics that are important in terms of the bank lending channel.

To our knowledge, there is only one earlier paper that studies econometrically the existence of a bank lending channel in China, and the results from that paper by Gunji and Yuan (2010) are quite inconclusive. This paper aims to deepen our knowledge of the bank lending channel in China by using quarterly data on six bank groups in 2002–2009 in estimation exercises using both TSLS and GMM.

Our first finding is related to the use of various monetary policy tools in China. The results clearly indicate that the interest rate still plays very minor role in the Chinese economy and that it alone is not a sufficiently effective tool to enable the Chinese authorities to control credit growth. This finding confirms the earlier results on China’s monetary policy transmission mechanism and justifies the Chinese monetary authorities’ conduct of monetary policy via several quantity- and price-based measures.

Following the earlier literature, we study the bank lending channel using an interaction term between the monetary policy indicator and a banking sector characteristic. The logic behind this is that some bank characteristics – eg a high level of capitalisation – can compensate partly for the effects of monetary policy on credit growth. For example, a bank with abundant capital may reduce its credit supply less than a bank with a lower level of capitalisation in response to a monetary policy tightening.

For China, interpretation of the results for the interaction term and thus the bank lending channel is complicated by the generally weak response of credit growth to shifts in the stance of monetary policy. As mentioned above, the interest rate does not seem to be effective in guiding credit growth in the Chinese economy, and even the response of banks to a hike in the reserve requirement seems to be short-lived.
Finally, by using a monetary policy value indicator developed by Shu and Ng (2010) we obtain more robust responses of banks to changes in monetary policy. Finally, we find weak evidence that a higher level of capitalisation makes a bank less responsive to shifts in monetary policy also in China. The impact of our second banking sector characteristic – banks’ dependence on deposits for financing – on bank lending is even more obscure but suggests that banks whose financing is more market based are more strongly affected by monetary policy. This result would be consistent with Disyatat’s (2010) view that monetary policy is more likely to have an impact on banks’ loan supply via its impact on asset prices and hence on banks’ balance sheets than by the traditional channel, which assumes that bank lending depends on deposits.

We acknowledge that the relatively small size of our data sample may give rise to problems, so that caution is advised in interpreting the results. Our data covers bank groups, not on individual banks, and it is possible that very heterogeneous banks are grouped together. Furthermore, when studying the banks group separately the question rises whether there are also differences among bank groups in their credit demand. If the different reactions of bank groups to a shift in monetary policy stance are due to differences in the banks’ credit demand, this will inevitably lower the reliability of the results.
References


## Appendix

### Table A1: Definitions of data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔlogL</td>
<td>Quarterly changes in claims on non-financial sector that are in logs and deflated by the consumer goods price index (CGPI) and seasonally adjusteda.</td>
</tr>
<tr>
<td>Δy</td>
<td>Quarterly changes in the real and seasonally adjusteda industrial value-added in logs.</td>
</tr>
<tr>
<td>ΔInt Rate</td>
<td>Changes in 7-day repo interest rate, in percentage points</td>
</tr>
<tr>
<td>ΔHong Kong</td>
<td>Changes in China’s monetary policy stance as indicated by the 7-value monetary stance indicator developed by Shu and Ng (2010).</td>
</tr>
<tr>
<td>Banks’ liquidity</td>
<td>Claims on government, cash, excess reserves and central bank bonds as % of total assets, seasonally adjusteda and normalized.</td>
</tr>
<tr>
<td>Banks’ capitalisation</td>
<td>Paid-in-capital as % of total assets, normalised.</td>
</tr>
<tr>
<td>Dependence of deposits</td>
<td>Other liabilities than deposits on banks’ balance sheets as a share of total liabilities, normalised.</td>
</tr>
</tbody>
</table>

Note: All series except for reserve money are from the CEIC. Reserve money data are from the IFS database.  
\(^a\) The author has seasonally adjusted the specified time series using X11 Arima.
Figure A1  

Monetary policy variables

- Value indicator, index, lhs axis
- 7-day repo rate, %, lhs axis
- Reserve requirement ratio, %, rhs axis

Source: CEIC.
Bank of Finland Publications

Scientific monographs

Series E (ISSN 1238-1691, print) (ISSN 1456-5951, online)
From year 2009 new ISSN numbers (ISSN-L 1798-1077, print) (ISSN 1798-1085, online)
(Series E replaces the Bank of Finland's research publications series B, C and D.)


E:45 Tatu Laine and Matti Hellqvist (eds.) Diagnostics for the financial markets – computational

E:46 Tuuli koivu Monetary Policy in Transition – Essays on Monetary Policy Transmission