

Impact of the Shadow Banking System on Monetary Policy in China

Abstract

The shadow banking system in China has its own characteristics compared to conventional commercial banks and the foreign shadow banking system. Its emergence is important to the economic development and financial system in China. However, it also challenges the implementation of monetary policy and regulation. China is in the economic shunt period and their monetary policy system is somewhat lagging behind the advanced economic system. This paper is therefore designed to figure out the impacts of the shadow banking system on monetary policy. After analysis of SVAR model, OLS regression, trend graph and correlation coefficient, results show that an increase in the growth rate of the shadow banking system would affect the monetary policy by increasing money supply and the value of CPI. Moreover, the implementation of easy or tight monetary policy by increasing or decreasing the benchmark interest rate would not be able to achieve the original goals due to the activities of the shadow banking system. It is suggested that the Chinese authorities should follow the market requirement to improve the monetary policy system by means of supervision and regulation on the shadow banking system which would the monetary policy effect.

Keywords: Shadow banking system, monetary policy, China

1. Introduction

2008 was a notable year for the world, with a large number of financial predators suffering bankruptcy or being taken over due to the financial crisis in the USA, such as Bear Stearns, Lehman Brothers, Freddie Mac and Fannie Mae, etc. (Griffith, 2012). Moreover, this financial crisis encouraged the world to develop a new financial system, named the 'shadow banking system', a hidden credit relationship in securitization(Caijing.com.cn, 2012). Growth of the shadow banking system is based on development of financial innovations, and the core of this system is residential mortgage-backed securities which cast the prosperity of the US real estate and banking but which also inflated the virtual bubble and caused the systemic risk which ultimately became a financial crisis (Turner, 2012).

To address the financial crisis and stimulate the economy, China's government initiated an easy monetary policy and provided a stimulus package estimated at RMB4 trillion in 2008 (Chinaview.cn, 2008). However, since the reorientation of policies, most of the real estate projects have to deal with the issue of capital chain. Small and medium enterprises face increased difficulty in raising money from banks because of their high risk and low profit, therefore their only choice is to seek finance from private financial institutions, including micro-credit, mortgage and leasing companies (Adrian, et.al. 2012). Meanwhile, commercial banks try to lend in disguise and avoid the regulation supervision by issuing wealth management products(Zhang, 2012). All of these activities stimulate the development of the shadow banking system in China, and create an added risk, such as escaping loan debt which caused a lot of social attention. At this time, consideration of China's shadow banking system was being raised in line with an anticipation of the next subprime mortgage crisis.

As the shadow banking system has become the focus of social attention in China, there is both a theoretical and practical significance to studying and identifying this particular system (Caijing.com.cn, 2012). On one hand, it can inspire people to ponder the existing policy by adjusting the orientation of theoretical research of China's monetary policy and by improving it through discussion of recent financial developments. On the other hand, exploring

more effective means of monetary policy will be helpful to control the excesses of the shadow banking system and to resolve the causes of financial instability within the system. Meanwhile, a thorough regulation of the shadow banking system is necessary in order to promote this financial innovation in an orderly manner (Caijing.com.cn, 2012).

The aim of this paper is to identify the role of the shadow banking system in China's monetary and financial system, and to provide some recommendations to improve the monetary policy system.

The research questions set for the present study are:

1. How does the shadow banking system affect monetary policy?
2. Is it related to economic growth?
3. What is the relationship between the shadow banking system and money supply?
4. What is the relationship between the shadow banking system and deposits?

This paper will apply the structural vector auto regression model to analyze the contemporaneous relationship among the related variables which can indicate the shadow banking system, monetary policy and economic growth. The structural vector auto regression model is able to capture the instantaneous constitutive relationship between the variables in the dynamic system. It is also generally used to analyze financial indicators such as money supply and CPI based on economic theory basis(Gottschalk, 2001). In addition, OLS regression, correlation analysis and underlying trend analysis will be applied to determine linear relationships between each pair of variables. These methods will be used to help provide an explanation for the impacts of the shadow banking system.

The data collection might be a limiting and delimiting factor of this paper. The variable used to indicate the shadow banking system is selected as total loans (balance of loans from financial institutions) which includes loans issued by conventional commercial banks, entrusted loans and trust loans which belong to the activities of the shadow banking system. Furthermore, the index of the size of the shadow banking system in China not only includes entrusted loans and trust loans issued by trust companies and commercial banks, but

also includes private loans and wealth management products (off-balance sheet activities of commercial banks) , etc. It should be noted that it is difficult to estimate the exact size of the shadow banking system over a long period of time, as impacts on other systems need to be analyzed, and also this data is not available from the EIU country database, People's Bank of China (central bank) website or the wind information database. Therefore, in order to analyze the impacts of the shadow banking system on monetary policy, this paper will use total loans to indicate the shadow banking system. It might not be quite as accurate but can still provide a rational explanation for the specific situation in China which caused the activities of the shadow banking system to some extent.

The paper is organized thus: Section 2 is a literature review designed to introduce a background to the shadow banking system and the effects of the shadow banking system demonstrated by the results of historical articles, reports and journals. Section 3 is the methodology applied in this paper, including a review of the research method, design appropriateness, and a discussion of data collection. Results and discussion are presented in section 4, which relate to the findings from the accumulated data. Finally, section 5 covers the conclusion and recommendations which provide a discussion of the results and suggestions for the future.

2. Literature Review

This section is designed to introduce the background of the shadow banking system in China from the view of its differences to commercial banks , the foreign shadow banking system and provides the rationale as to the existence of the shadow banking system. A discussion follows of the main impacts of shadow banking system on the monetary policy based on the results of previous studies.

2.1 The shadow banking system in China

The development of the securitization market in China is lagging behind the highly developed derivatives market of the USA and due to its particular legal system fails to be in line with the developed countries (Li, 2005). Shadow

banking in China has its own characteristics and is becoming a significant competitor and partner of commercial banks. According to IMF's Global Financial Stability Report, shadow banking in China is different from other countries, not only referring to credit intermediation involving entities or activities by non-banks but also acting as financial intermediation outside the regulated banking system with the following activities: underground banking, trust products, wealth management products (WMPs), and other off-balance-sheet loan-like claims held by commercial banks (Caijing.com.cn, 2012).

The shadow banking system in China copies of the operation model of commercial banks, its original fund is collected from bank deposits at low interest rates, and benefits from lending at high interest rates which replaces the role of commercial banks (Financialpost.com, 2012). According to Wen and Chen (2010) and Yi (2009), from the perspective of development, there are three main parts to the shadow banking system in China. Primarily, China's commercial bank is trying to develop asset-backed securities with the cooperation of non-bank institutions such as trust companies and assets-management companies. Meanwhile the large state enterprises, investment funds and private funds have participated in the credit market to invest and lend. Moreover, some pawn shops, guarantors and micro-credit companies also provide credit to the public through their lending activities.

Private finance in china is risky and outside the regulation. It features high liquidity, high interest rates and encourages deposits to run out at the bank (Cao and Lin, 2005). The shadow banking system grows rapidly in China owing to the process of financial disintermediation. Credit growth of the in-balance-sheet of commercial banks cannot meet and reflect public demand (Li and Wu, 2011). Meanwhile, the shadow banking system continues its innovation with the aid of diversification of financial institutions, financial products and financial instruments.

2.2 The Cause of Emergence of Shadow Banking System in China

Basically the shadow banking system is a market-oriented financing institution, it evolves as a result of the development of financial innovation and provides credit to the public independently of commercial banks. Its

emergence is the expression of social and financial development and the consequence of the growth of social demand. The shadow banking system in China acts as an intermediary to provide funds for the small medium enterprises or other entities which cannot obtain finance through traditional channels due to an imbalance of liquidity (Adrian, et.al. 2012).

2.2.1 Financial innovation

According to Adrian (2012), implementation of financial innovation impelsthe shadow banking system to generate apparent economic efficiencies, and create new channels of risk transmission between traditional banks and capital markets. Zhang (2012) suggested that while financial innovation of securitization brings prosperity to the financial market, it also breeds a huge shadow banking system outside the conventional commercial banking system.

2.2.2 Imbalance Liquidity

The imbalance liquidity in China is an important basis to the development of the shadow banking system, mainly reflected in the adjustment of national policy and the imbalances within commercial bank loans (Chinaview.cn, 2008). As a result from the unexpected adjustment in the national policy, the original investment might lose financial support and this would lead to a lack of cash flow. On the other hand, commercial banks prefer lending to large-scale enterprises which have sufficient sources of funding to be able to control credit risk and reduce credit cost. Small to medium enterprises therefore cannot gain sufficient loans from commercial banks and consequently rely on the shadow banking system.

China's government initiated an easy monetary policy to deal with the financial crisis of 2008, to boost domestic consumption and investment by reducing the reserve requirement ratio, to reduce the deposit and loan interest rate and introduce a discounted interest rate (Chinaview.cn, 2008). Meanwhile, a stimulus package estimated at RMB4 trillion was spent over the next two years to finance programs. In 2009, the government continued to implement the moderately easy monetary policy, by increasing the amount of money supply and credit supply. According to the report of China's monetary policy implementation in Q4 2009 (sina.com.cn, 2010), the growth of M2 in

2009 should be 17% according to the government's plan, although the residual amount of M2 was RMB58.62 billion, a growth of 29.42% year-on-year which was much higher than the expectations of the central bank. Under the flood of liquidity, circumstances owing to the easy monetary policy, both small medium enterprises and realty business were booming. But since the central bank implemented the tight monetary policy to restrain inflation and speculative behavior in 2010, money supply in the market was suddenly tightened preventing many investment projects from being completed. According to the Financial Statistics Report in 2011(news.cn, 2012), growth of new loans was falling.

Under the rapid change of monetary policy, many small medium enterprises and financial programs raised by the RMB4 trillion have to deal with the issue of capital chain, meaning that the only choice available is to obtain finance from private lending (Hou, 2012). On the other hand, commercial banks have to actively develop off-balance sheet activities under tight credit control to avoid the regulatory policy and make profits from wealth management products, co-operation with trust companies and entrusted loans, etc.(Hou, 2012). All of these activities stimulate the development of the shadow banking system with enough market demand for the shadow banking system's products and institutions.

2.2.3 Investment demand

Deposited money in banks is always a safe and basic form of investment for residents and enterprises. However, according to Chen and Zhang (2012), the CPI grew by 5% in 2011 while the demand deposit interest rate was only 0.5% and one year deposit rate at 3.5%. They stated that people were living in an age of negative interest as there was an apparent decline in the actual income for currency. As a consequence, they preferred to invest in products issued by the shadow banking system with more than 10% annual earnings. In addition, these wealth management products and trust products have the features of strong flexibility, short-term investment and high profitability which can meet the demand of investors. Therefore shadow banking has adequate sources of fund and can provide a reliable service of credit to the public. "Shadow banking is inevitable when there is a growing need for diversified financial services which traditional banks can't provide," commented Zhou Xiaochuan, Governor of the People's Bank of China, the Country's central

bank, at the conference. (China Daily, 2012)

2.3 Impacts of the Shadow Banking System

There is much reference in literatures to analysis of the issues of the shadow banking system. For instance, Feng and Wang (2011) stated that the shadow banking system should be mainly responsible for the global financial crisis in 2008, but conversely promoted economic development. Ge (2010) stated that the regulatory authority should reform the scope of supervision of financial institutions and commercial banks, and they should also be aware of the excessive securitization activities of the shadow banking system. Wang (2010) claimed that the shadow banking system increases the amount of money supply which subsequently impairs the effectiveness of monetary policy raised by the central bank. Xu and Zhou (2011) stressed that the activities of the shadow banking system lead to an unstable economic situation. More details will be shown below.

2.3.1 The impact of shadow banking system on economic growth

According to Chen and Zhang (2012), the shadow banking system is one approach to resource allocation. They claim that the amount of small medium enterprises (SME) applied to 99% of the total enterprises in China, and the value of the products and services provided by SME accounted for 60% of GDP. These enterprises play a significant role in terms of boosting the economy, promoting innovation, export expansion and increasing employment. It is undeniable that the shadow banking system has provided a favorable financing environment for the development of small medium enterprises. Compared to loans provided by commercial banks, the specific lending mechanism of the shadow banking system also creates enormous market risks. In ideal conditions, a successful investment will provide the small medium enterprises with sufficient funding to make a profit, to allow development and to pay any debts. However, if the investment fails, these enterprises will face unpayable debts due to the high lending interest rate. It can be seen that the shadow banking system is a double-edged sword in the economic development.

2.3.2 The impact of the shadow banking system on monetary policy

2.3.2.1 The impacts on credit supply and money supply

According to Cao and Lin (2005), by analyzing the performance of monetary policy in China, they concluded that the main transmission mechanism of monetary policy in China was the credit conduction mechanism implying that credit supply is playing a significant role in the monetary policy raised by the central bank in China. Moreover, Li and Wu (2011) analyzed the challenge of shadow banking's functions on the monetary policy in China from the view of credit creation and introduced the process of credit creation of the shadow banking system. They stated that securitization products were private money which was not created by the central bank. The securitization product is like a new form of money which will affect the monetary liquidity which is used to level the money supply by the central bank, consequently affecting the monetary policy of the central bank.

Other than the analysis of impacts from the credit creation function of the shadow banking system, impacts from the view of the credit scale on monetary policy can also be analyzed. The shadow banking system usually provides money for small medium enterprises which then increase the amount of credit supply and influences the effectiveness of monetary policy raised by the central bank to control the credit scale. Owing to China's specific background of monetary policy, Hou (2012) proposed that it was difficult for small medium enterprises to obtain loans and that shadow banking has positive functions for the financing of these enterprises, but can still have limitations compared to conventional commercial banks. Wang (2010) analyzed the impact of shadow banking system on the money supply in China, from statistics showing the exact size of credit supply in the commercial banks' financial products market. Results show that the credit scale of commercial banks in 2010 was influenced by the activities of shadow banking and that the amount of credit supply exceeded the limit regulated by the central bank. This consequently affected the regulation and implementation of the central bank on monetary policy.

Furthermore, Xu (2009) introduced an equation: $L = NM$, where L is the amount of fund demand in market, N is the velocity of money activity and M is the money stock. He claimed that it was difficult for the central bank to achieve the ultimate goal of monetary policy by implementing money supply as the intermediate target. The reason given is that the central bank can control the

money stock but cannot directly control the velocity of money following the emergence of shadow banking system, which increases the velocity of money by securitization and participation of financial institutions. He stated that the efficacy of credit diffusion and market liquidity was determined by the velocity of money under the process of securitization, and that there would be lots of factors which could influence the velocity of money. He also illustrated the impact of securitization by introducing the case of FED, “the FED used M1 as intermediate target of monetary policy since 1979, but in 1980s they found that the relationship between money supply and nominal GDP, inflation was becoming unreliable while it was also the booming period for financial securitization. As a consequence, the FED announced that they will stop using money supply as the operational guideline of monetary policy in 1993.”

2.3.2.2 The impacts on the monetary policy instrument

Chen and Zhang (2012) also stated the effectiveness of the central bank’s monetary policy would be affected during the period of development of the shadow banking system. They argued that, “the shadow banking system is outside the bank regulation and supervision; it has more flexibility to provide loans than traditional banks.” While the central bank increases the benchmark of lending rates to restrain the inflation rate and high demand for investment, the scale of entrusted loans and trust loans will grow rapidly under the motivation of high profits which implies that demanders would borrow money from the shadow banking system instead of traditional banks. Therefore the goal of tightening the money supply cannot be fully achieved as was the original expectation of the central bank. Meanwhile, with the existence of extra loan providers (the shadow banking system), the effectiveness of the limitation on the credit scale raised by the central bank would be influenced and could not achieve its original goals.

Yu and Zhang (2011) claimed that the great loss of deposits would also affect the implementation of required reserve. The reserve requirement is a tool of the central bank to control the amount of money supply and credit supply. It was put into effect at the expectation of regulators who believed that the higher rate of reserve requirement should result in a lower loan balance. However the growth of credit demand cannot be reduced by the implementation of high required reserve, another impact of the shadow banking system. Yu and Zhang (2011), by analyzing the average required

reserve and excess deposits from 2000-2011, pointed out that high reserve requirements would lead to a deposit loss in the banking system as people favored the shadow banking system. The fall in deposits would also pose increasing challenges to liquidity management for the banking sector.

Li (2013) analyzed the implementation of reserve requirement and stated that the government of China implemented the tight monetary policy in order to control the rapid growth of economy and restrain inflation caused by the easy monetary policy in 2009. The central bank increased its ratio of reserve requirement 12 times during the period from January of 2010 to June of 2011, but the consequences of these implementations were not optimistic. She claimed that the reason down to the activities of the shadow banking system which accrued large deposits but avoided the restraints of reserve requirement and hence flowed into private lending, trust companies and wealth management products issued by the banks.

According to Xu (2012), who analyzed China's economic situation in 2011, there was an inevitability of rapid expansion of shadow banking's credit scale. He also analyzed the double-track system of interest rate and found a significant difference between the folk lending rate and the benchmark interest rate. He also stated that the reduction of commercial banks' credit funds as a result of the implementation of tight monetary policy was the reason why small medium enterprises turn to high interest rate private lending. As a result of the fund demand of small medium enterprises, the interest margin is expanded and can affect the monetary policy instruments of central bank on benchmark interest rate.

According to Borst (2013), driving the rapid growth of wealth management products was a form of regulatory arbitrage to circumvent China's policy of low interest rates on deposits. Low interest rates are designed to sterilize foreign currency market intervention whilst keeping the banks profitable. This policy has not however been as beneficial for depositors as the actual income from deposits is negative during a period of low deposit rate and high inflation. Borst stated that the main alternatives to traditional deposit are real estate investment and wealth management products but the latter are more liquid than real estate investment and as a result, people prefer to place their money in wealth management products as a deposit-like investment. Furthermore, Borst suggested that depositors who invested their money in wealth management products would be unlikely to revert to traditional bank deposits

even when the interest rate is liberalized by the policy of central bank. He claimed that it was due to a combination of investors' habit and the ability of these funds to continue offering returns higher than those available on traditional bank deposits.

Maddaloni and Peydró (2011) analyzed the impact of interest rates (short-term and long-term) on lending standards via securitization activities, including these variables in the baseline regression. The results show that the impact of interest rates in the Euro area on the softening of lending standards is amplified by securitization activities and higher securitization leads to softer lending standards for mortgages. Results however highlighted a difference to the results in the U.S. where the interaction between long-term rates and securitization is not clear. This suggests that securitization may reduce the effect of long-term interest rates on lending standards.

Furthermore, Xu and Zhou (2011) pointed out that the development of the shadow banking system has influenced the effectiveness of China's monetary policy, through their analysis of the shadow banking system, which extends financial instability through the five mechanisms and connects it with the corresponding strategy of FED. Chen and Zhang (2012) similarly analyzed the interactions of the scale of the shadow banking system with economic growth, the effectiveness of monetary policy and the money supply respectively. They applied the short-term constraints of the SVAR model which uses monthly growth rates of CPI as variables for the effectiveness of monetary policy, monthly growth rates of GDP as variables for economic growth, monthly growth rates of M1 as variables for the amount of money supply and also uses monthly growth rates of the amount of trust loans and entrusted loans as variables for shadow banking, respectively. They purported that the shadow banking system will increase money supply in China but that there is no significant effect on inflation.

2.4 Summary of the review of literature

The shadow banking system plays the same role as conventional commercial banks but is difficult to be regulated and supervised by the banking sector. It has more flexibility to provide loans to the public compared to commercial banks and owing to specific circumstances in China, the shadow banking system has its own characteristics quite different to those in other

developed countries. As a consequence of China's specific circumstances and regulation, the shadow banking system is good at providing money for small medium enterprises and for the collection of funds from bank deposits owing to its high interest rate which could encourage depositors to purchase financial products of the shadow banking system instead of depositing money in conventional banks. Furthermore, because of the flexibility of the shadow banking system, the monetary policy cannot achieve its original goals. The extra loan supply from the shadow banking system could influence the implementation of monetary policy on financial instrument, such as interest rate, reserve requirement, the amount of loan supply and money supply, etc. It can be seen from the results of historical literatures how the shadow banking system affects the monetary policy and this paper will endeavor to systematically analyze some of these effects.

3. Methodology

This section introduces how data for the present study was collected.

3.1 Research Design

It can be seen from the literature review that there are different effects of monetary policy under different economic climates because monetary policy and banks' liquidity would change under different economic climates, and shadow banking system has played a significant role in the World's economy. The purpose of this paper is to analyze the impact of shadow banking system on monetary policy. There are two main parts to the methods which will be applied in order to achieve the goals of this paper. The first part is the Structural Vector Auto Regression model (SVAR), the outcomes of which are impulse response and variance decomposition and which provide a clear relationship among the selected variables. However the establishment of the SVAR model needs to be based on the corresponding Vector Auto Regression model (VAR). Moreover, the feasibility of this transformation from VAR to SVAR is determined by the serial stability of the VAR model. Thus a VAR model will be established based on the selected variables and then the stability of the created VAR model will be tested by means of an AR roots table. The SVAR model would provide impulse response and variance decomposition if the VAR

model is stable (Gao, 2009). The combined data of shadow banking (total loans), economic growth (GDP), CPI, cost of borrowing and lending (short-term interest rate) and money supply (M1) will be analyzed. However this will not reflect the total impact of shadow banking. Therefore a simple analysis will be carried out of the relationship between the shadow banking system and other variables. Consequently the second part consists of Ordinary Least Squares regression (OLS), correlation analysis and underlying trend analysis.

3.1.1 Structural vector auto regression

In this paper, it is necessary to consider the contemporaneous relationship among the variables, which can provide evidence to show how the shadow banking system affects the monetary policy within a certain time frame. Variables are not only affected by their own lag value but are also influenced by other contemporaneous variables at the same time. Implementation of the structural vector auto regression model (SVAR) is therefore applied to solve this potential problem to a certain extent. As its name suggests, this model can capture the instantaneous constitutive relationship between the variables in the system.

The SVAR with p lags is defined as:

$$B_0 y_t = c_0 + B_1 y_{t-1} + B_2 y_{t-2} + \dots + B_p y_{t-p} + \epsilon_t \quad (3.3)$$

Where y_t is a $k \times 1$ vector of endogenous variable for $k = 1, \dots, K$, c_0 is a $k \times 1$ vector of constants, the coefficient matrices B_i are structural coefficients ($k \times k$ matrices for $i = 1, \dots, p$) and ϵ_t is a $k \times 1$ vector of error terms (white noise).

The equation (3.3) can be converted to:

$$y_t = B_0^{-1} c_0 + B_0^{-1} B_1 y_{t-1} + B_0^{-1} B_2 y_{t-2} + \dots + B_0^{-1} B_p y_{t-p} + B_0^{-1} \epsilon_t \quad (3.4)$$

When $B_0^{-1} c_0 = c$, $B_0^{-1} B_i = A_i$, and $B_0^{-1} \epsilon_t = e_t$,

One obtains the reduced form VAR:

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + e_t \quad (3.1)$$

As a consequence, the reduced form residuals can be retrieved from a SVAR model by $e_t = B_0^{-1} \epsilon_t$, and its covariance matrix by $\Sigma e = E(e_t e_t') = E(B_0^{-1} \epsilon_t \epsilon_t' (B_0^{-1})') = B_0^{-1} \Sigma (B_0^{-1})'$ (3.5)

Thus, the SVAR model can be gained after the estimation of the VAR model through the inner link between the SVAR model and the corresponding VAR model.

3.1.2 Ordinary least squares regression analysis, correlation analysis and underlying trend analysis

Ordinary least squares (OLS) regression can be used to estimate the linear relationship between two series variables. For instance, the relationship between response variables Y and explanatory X (shadow banking system) could be presented as:

$$Y_t = \text{Intercept} + \beta_0(\text{Index of shadow banking system}) \quad (3.6)$$

$$H_0: \beta_1 = 0; H_1: \beta_1 \neq 0$$

The testable hypothesis is whether the performance of shadow banking system differs significantly from the chosen variables.

The null hypothesis (H_0): there is no significant difference between the performance of shadow banking system and the chosen variables. The alternative hypothesis (H_1): there is a difference between the performance of the shadow banking system and the chosen variables.

Correlation coefficient is normally used to simplify the interpretation of the degree of the linear relationship between two variable series.

It is a relative measure of co-movements between variables:

$$\text{Correlation coefficient (AB)} = \rho_{AB} \frac{\text{Covariance(AB)}}{\sigma_A \sigma_B} \quad (3.7)$$

Trend analysis is used solely to show the vague relationship between two or more variables, it is not conclusive. It is however useful to analyse the variables by graphs along side the methods listed above.

3.2 Data Description

For analyzing the impacts of the shadow banking system in China, this paper utilizes in excess of 12 years' data from February 2002 to April 2013. There are 147 observed values in each variable which will be analyzed by the SVAR model and the data found from this period is considered sufficient to analyze how the shadow banking system affects monetary policy. The collected data from China, for the analysis of SVAR model, includes GDP, CPI, money supply, total loans and short-term interest rates. In order to explicitly reveal the relationship among variables by the SVAR model, all the data should be analyzed monthly by growth rate. China's data for the analysis of OLS regression, trend analysis and correlation analysis, is collected as a growth rate annually from August 2003 to April 2013, including total loans, total

deposits, household savings deposits, M1 and M2. The value of lending interest rate and deposit interest rate will also be directly used.

3.2.1 Shadow banking system

The total loans will be selected as indicators for the shadow banking system from the Wind database. It includes trust loans and entrusted loans which can show the role and rough size of the shadow banking system in the financial world.

3.2.2 The effectiveness of the monetary policy

The consumer price index could reflect the effectiveness of the monetary policy, the increase in the CPI means the implementation of easy monetary policy, and vice versa. (Collected from EIU).

3.2.3 Economic growth rate

There is no monthly GDP provided by government or any other country database, so the industrial production index will be used to indicate the monthly growth rate of the GDP. (Collected from EIU)

3.2.4 Money supply

According to the money definition in China, M0 is cash currency in circulation; M1 is M0 plus checkable demand deposit; M2 is M1 plus most savings deposits including household saving, fixed deposits, and money-market deposits (Pbc.gov.cn, 2012). Consequently, M1 is more suitable to analyze the impact of the shadow banking system on money supply in the SVAR model. (Collected from EIU). In addition, the relationship between shadow banking and M2 will be analyzed in an OLS regression, correlation analysis and underlying trend analysis.

3.2.5 The cost of borrowing and lending

Short-term interest rate will be selected as the indicator of opportunity cost of lending (Collected from EIU). The higher short-term interest rate reflects the higher cost of borrowing and lending. The lending interest rate is working capital loans of one-year maturity, and the deposit interest rate is interest rate of institutional and individual deposits, with a one-year maturity.

3.2.6 Deposits

Total deposits indicate the amount of deposits including household savings deposit and other deposits, and household savings deposits would indicate the value of individual deposits.

3.3 Instrumentation

Eviews 7.2 will be applied in the SVAR model. It is normally used for general statistical analysis and econometric analysis such as time series estimation and forecasting. The rest of the methods will be analyzed in Excel including OLS regression, underlying trend analysis and correlation analysis.

3.4 Validity and reliability

Some of the data collection is approximate implying that the process of analysis may not be correct, such as monthly GPD indicated by the industrial production index, index of the shadow banking system indicated by total loans including short-term and long-term loans. However, the chosen approximate data is the main determinants of change in the variables which also implies these data can be seen as representative for the monthly GPD, index of shadow banking system and so on. Therefore the data collected from the EIU country database and the Wind database provide validity and reliability.

3.5 Summary

It can be concluded that this paper will apply two main part methods to analyze the impact of shadow banking on the monetary policy. The SVAR is an overall method to provide impulse response and variance decomposition for the collected simultaneous variables including monthly GPD, CPI, M1, total loans and short-term interest rates. It is helpful to analyze the relationships in the dynamic system which include the shadow banking system, economic growth and the effectiveness of monetary policy. The combined methods of OLS regression, trend analysis and correlation analysis are some easier methods by which to analyze the impacts of shadow banking on individual economic indicators. It is helpful to understand the different degrees of impact on various aspects.

All the data is collected from the Wind database or the EIU country

database during the period between February 2002 and April 2013 and then this data would be applied to the software of Eviews 7.2 and Excel to be analyzed by the methods mentioned above. The results and discussion will be presented in the next section, including impulse response, variance decomposition, OLS regression, correlation coefficient and graph of trends.

4. Results and Discussion

This section presents and discusses the outcomes from the selected methodology to provide an appropriate means with which to analyze impacts of the shadow banking system on the monetary policy and economic growth in China. The outcomes will be discussed one by one according to the process of methodology, including the outcomes from the SVAR model (impulse response and variance decomposition), OLS regression, correlation analysis and underlying trend analysis.

4.1 Outcomes from the SVAR Model

4.1.1 The process of SVAR

As stated in the Methodology, data for the SVAR model is collected from the Wind database and EIU country database (see appendix 1). Moreover, to gain a SVAR model by applying Eviews 7.2, we need first to estimate a VAR model first, to test its stability and determine its lag order.

After the collected data is imported to the Eviews 7.2, it is opened as a VAR model (see appendix 2) and this requires serial stability which can be tested by AR roots in the table shown below:

Table 4-1: AR roots table

Roots of Characteristic Polynomial
 Endogenous variables: CPI RATE RGDP RM1 RSB
 Exogenous variables: C
 Lag specification: 1 2
 Date: 09/06/13 Time: 22:05

| Root | Modulus |
|----------------------|----------|
| 0.939458 - 0.080135i | 0.942870 |

| | |
|-----------------------|----------|
| 0.939458 + 0.080135i | 0.942870 |
| 0.528395 | 0.528395 |
| 0.348612 | 0.348612 |
| 0.120600 - 0.292318i | 0.316218 |
| 0.120600 + 0.292318i | 0.316218 |
| -0.064857 - 0.264893i | 0.272717 |
| -0.064857 + 0.264893i | 0.272717 |
| -0.233165 - 0.066809i | 0.242548 |
| -0.233165 + 0.066809i | 0.242548 |

Data source: EIU country
database, Wind database,

All the roots are less than 1 which implies that there is no root lying outside the unit circle. It can be seen that this VAR model satisfies the stability condition. Furthermore, another important problem in SVAR model is to determine the lag order. This model is judged by AIC, SC criteria to select the best order. As table 4.2 shown below, suggests, order 1 is the best according to the value of SC as order 1 is lowest.

Table 4-2: Lag Length Criteria

VAR Lag Order Selection Criteria
Endogenous variables: CPI RATE RGDP RM1 RSB
Exogenous variables: C
Date: 09/06/13 Time: 23:11
Sample: 1 147
Included observations: 139

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|-----|----------|-----------|-----------|------------|------------|------------|
| 0 | 2046.854 | NA | 1.20e-19 | -29.37919 | -29.27363 | -29.33629 |
| 1 | 2442.742 | 757.5996 | 5.77e-22 | -34.71572 | -34.08238* | -34.45834* |
| 2 | 2471.985 | 53.85652 | 5.43e-22 | -34.77676 | -33.61563 | -34.30491 |
| 3 | 2496.968 | 44.21568 | 5.45e-22 | -34.77652 | -33.08762 | -34.09020 |
| 4 | 2521.578 | 41.78315 | 5.52e-22 | -34.77090 | -32.55422 | -33.87010 |
| 5 | 2549.864 | 45.99056 | 5.32e-22 | -34.81819 | -32.07372 | -33.70291 |
| 6 | 2576.590 | 41.53168 | 5.27e-22 | -34.84303 | -31.57077 | -33.51327 |
| 7 | 2604.026 | 40.65955* | 5.21e-22* | -34.87807 | -31.07803 | -33.33383 |
| 8 | 2630.594 | 37.46305 | 5.24e-22 | -34.90063* | -30.57281 | -33.14192 |

* indicates lag order selected by the criterion

Data source: EIU country database, Wind database,

In the end, the SVAR model could be established as (see appendix 3):

$$B_0 y_t = c_0 + B_1 y_{t-1} + \epsilon_t \quad (4.1)$$

Where $y_t = [\text{CPI}, \text{RATE}, \text{RGDP}, \text{RM1}, \text{RSB}]$.

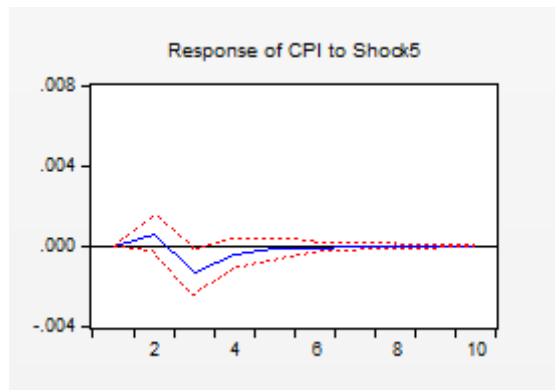
4.1.2 Impulse response

The impulse response functions are obtained from the SVAR model, to reflect an error, or the reaction of any dynamic system in response to some external change. For instance, in this paper it would reflect a dynamic effect of the shadow banking system on other variables, including the amount of money supply, CPI, GDP.

4.1.2.1 Response to the development of shadow banking system

Performance indicators of the shadow banking system are represented by the monthly growth rate of the total loans, and the shock of its changing to other variables is named shock 5.

Figure 4-1: Response of CPI to Shock 5

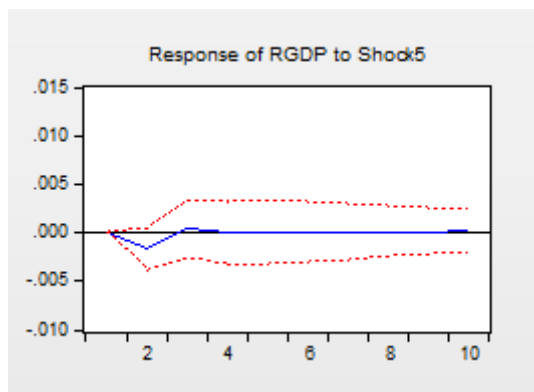


Data source: EIU country database, Wind database

The monthly growth rate of CPI is to indicate the effectiveness of the monetary policy. From Figure 4.1, it can be seen that CPI is affected by the shadow banking units and it drop rapidly to the maximum value of the negative effects (approximately -0.01%) in period-2, and then slowly rising, reaching towards zero, but it has been less than zero which implies that the development of the shadow banking system has some negative effect on

CPI. However, the impact of the shadow banking system on CPI would gradually lessen with the passage of time and the impact can be ignored after 9 months. This illustrates that the development of shadow banking has a lagged effect on the CPI.

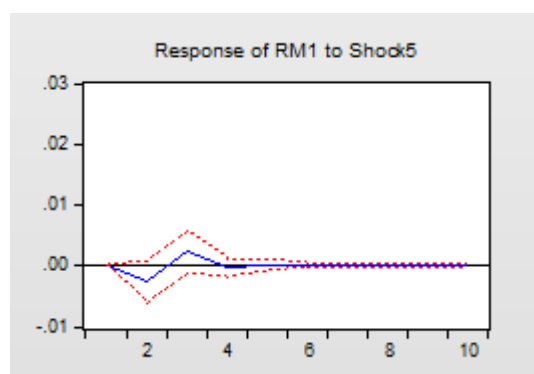
Figure 4-2: Response of RGDP to Shock 5



Data source: EIU country database, Wind database

As shown in Figure 4.2, the RGDP indicates economic growth, it is represented by the monthly industrial production index. After the RGDP experiences the shocks of the shadow banking system, there is a decline in the GDP growth rate in period-2 which reaches the maximum of negative effects -0.02%, and then rebounds to a positive number. To the end of period-6, the effect tends to remain at zero. This illustrates that the development of shadow banking has played a negative role in economic development, but in comparison, the positive effect on economic development is more evident in the long term.

Figure 4-3: Response of RM1 to Shock 5



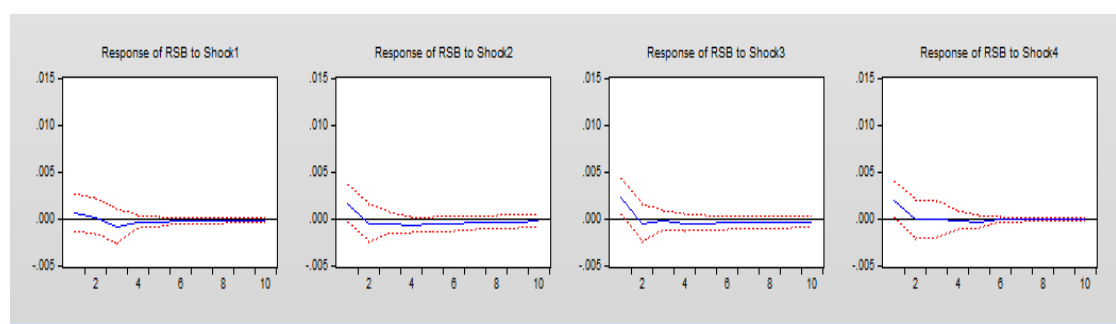
Data source: EIU country database, Wind database

Figure 4.3 shows the shocks of the shadow banking system on the monthly growth rate of M1. After the RM1 experiences the shocks of the

shadow banking system, the growth rate of M1 slow down and reach the lowest value in period-2, but then rebounds to a positive number in period-3. In period 4, the impact tends to remain at zero. This illustrates that the development of the shadow banking system will have a negative impact on the amount of money supply within the first 2 months, but the impact will be positive in the next period. The effect of shocks would disappear after 4 months.

4.2.1.2 Response of the development of the shadow banking system

Figure 4-4: Response of RSB



Data source: EIU country database, Wind database

As shown in Figure 4.4, the shocks of CPI (shock 1) to the monthly growth rate of the shadow banking system indicate that there is a positive impact initially and then it drops slowly to negative effects during period-3, and it tends to zero in period-4. This means that an increase in inflation will have a negative impact on the development size of the shadow banking system. The increase of CPI indicates the implementation of easy macro-monetary policy, while it also indicates that shadow banking reduced in size to a certain extent due to the high cost of financing. This is consistent with actual phenomena in the real economy.

The shocks of short-term interest rate (shock 2) indicate that the impact is positive in the first place and then quickly turns negative, tending to zero in period 6. It illustrates that if the central bank increases the cost of borrowing, shadow banking will increase in the short term but will need to expand rapidly during the next 7 months. In general, it can be concluded that the high cost of borrowing in the market will increase the size of shadow banking.

The growth rate of GPD (shock 3) would also affect the size of shadow banking, after giving a positive impact initially, the impact turning into a negative one in period 2 and tending to zero in period 6. It illustrates that economic development will also promote growth of the shadow banking system in the short-term (i.e. about 2 months).

From the shocks of M1 (shock 4), it can be seen that the impact of errors is positive in period-1 and then decreases gradually in the period-2 to zero. It illustrates that the easy monetary policy will evoke the development of shadow banking system.

4.1.3 Variance decomposition

The variance decomposition is used to indicate the amount of information each variable contributes to the other variables in the auto regression model. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables (Lütkepohl, H., 2007).

Table 4-3: Variance decomposition of CPI

| Period | S.E. | CPI | RATE | RGDP | RM1 | RSB |
|--------|----------|----------|----------|----------|----------|----------|
| 1 | 0.005703 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 0.006388 | 82.58632 | 2.375307 | 1.931509 | 12.29731 | 0.809561 |
| 3 | 0.006826 | 72.39445 | 2.778977 | 1.844913 | 18.22597 | 4.755691 |
| 4 | 0.006848 | 71.93324 | 2.935547 | 1.873258 | 18.13966 | 5.118298 |
| 5 | 0.006854 | 71.83196 | 2.958708 | 1.918537 | 18.11446 | 5.176340 |
| 6 | 0.006860 | 71.73833 | 2.974771 | 1.996495 | 18.09850 | 5.191903 |
| 7 | 0.006864 | 71.67801 | 2.984592 | 2.055007 | 18.08897 | 5.193422 |
| 8 | 0.006866 | 71.63724 | 2.987146 | 2.103908 | 18.07968 | 5.192032 |
| 9 | 0.006868 | 71.60563 | 2.986466 | 2.146034 | 18.07184 | 5.190020 |
| 10 | 0.006869 | 71.58022 | 2.985251 | 2.180982 | 18.06545 | 5.188103 |

Data source: EIU country database, Wind database

As shown in Table 4.3, the impact of the shadow banking system on the changing of CPI can be ignored in the first two months. From Period-3, the impact significantly rises to 4.75% and reaches the highest value of 5.19% in the Period-7. It can be seen that although the shadow banking system has a certain impact on CPI movements, the influence is limited.

Table 4-4: Variance decomposition of RGDP

| Period | S.E. | CPI | RATE | RGDP | RM1 | RSB |
|--------|----------|----------|----------|----------|----------|--------------|
| 1 | 0.012288 | 1.737806 | 1.362522 | 96.89967 | 0.000000 | 0.000000 |
| 2 | 0.017424 | 4.699414 | 3.514789 | 90.36018 | 0.456973 | 0.968644 |
| 3 | 0.020881 | 5.876912 | 4.704836 | 88.27124 | 0.445227 | 0.7017803... |
| 4 | 0.023444 | 6.581331 | 4.644092 | 87.55690 | 0.660955 | 0.556720 |
| 5 | 0.025285 | 6.888169 | 4.220911 | 87.60462 | 0.807651 | 0.478645 |
| 6 | 0.026649 | 7.019166 | 3.801718 | 87.85745 | 0.890692 | 0.430971 |
| 7 | 0.027693 | 7.034794 | 3.626190 | 88.00553 | 0.934388 | 0.399098 |
| 8 | 0.028521 | 6.969952 | 3.819768 | 87.87894 | 0.954868 | 0.376474 |
| 9 | 0.029203 | 6.848203 | 4.435226 | 87.39871 | 0.957956 | 0.359901 |
| 10 | 0.029791 | 6.688628 | 5.474557 | 86.54069 | 0.948505 | 0.347620 |

Data source: EIU country database, Wind database

As shown in Table 4.4, there is no impact of the shadow banking system on the growth rate of GDP in the period-1 but since period-2 the impact is noteworthy, and then it has a decline trend as shown. However the figure is still much lower than that of other variables which implies that the development of the shadow banking system has a positive effect on growth of GDP but is not clearly evident one..

Table 4-5: Variance decomposition of RM1

| Period | S.E. | CPI | RATE | RGDP | RM1 | RSB |
|--------|----------|----------|----------|----------|----------|----------|
| 1 | 0.020180 | 3.425118 | 1.659643 | 9.394984 | 85.52025 | 1.60E-30 |
| 2 | 0.021227 | 3.211555 | 1.658936 | 12.07558 | 81.47113 | 1.582800 |
| 3 | 0.021528 | 3.175953 | 1.847525 | 11.74120 | 80.60349 | 2.631835 |
| 4 | 0.021567 | 3.169303 | 2.044786 | 11.72275 | 80.40856 | 2.654600 |
| 5 | 0.021581 | 3.175509 | 2.143103 | 11.71643 | 80.30280 | 2.662154 |
| 6 | 0.021596 | 3.177862 | 2.256235 | 11.70916 | 80.19740 | 2.659352 |
| 7 | 0.021609 | 3.180612 | 2.357625 | 11.70484 | 80.09998 | 2.656950 |
| 8 | 0.021621 | 3.183213 | 2.447455 | 11.70381 | 80.01106 | 2.654461 |
| 9 | 0.021632 | 3.186030 | 2.525641 | 11.70598 | 79.93018 | 2.652173 |
| 10 | 0.021642 | 3.188943 | 2.593036 | 11.71071 | 79.85725 | 2.650060 |

Data source: EIU country database, Wind database

As shown in Table 4.5, the percentage of changing in the shadow banking system reach edits the maximum value in period-5, about 2.66%. It then remains at around 2.65% until period-10 implying that development of the shadow banking system has affected the national macro-monetary policy to some extent.

Table 4-6: Variance decomposition of RSB

| Period | S.E. | CPI | RATE | RGDP | RM1 | RSB |
|--------|----------|----------|----------|----------|----------|----------|
| 1 | 0.012006 | 0.291261 | 1.859790 | 3.674746 | 2.701795 | 91.47241 |
| 2 | 0.012102 | 0.303062 | 2.059273 | 3.805346 | 2.668097 | 91.16422 |
| 3 | 0.012252 | 0.865994 | 2.200666 | 3.747681 | 2.616211 | 90.56945 |
| 4 | 0.012299 | 0.981201 | 2.591260 | 3.892639 | 2.632412 | 89.90249 |
| 5 | 0.012345 | 1.058054 | 2.862482 | 4.040883 | 2.712643 | 89.32594 |
| 6 | 0.012372 | 1.095277 | 3.074826 | 4.159752 | 2.714208 | 88.95594 |
| 7 | 0.012394 | 1.127766 | 3.217372 | 4.289602 | 2.712641 | 88.65262 |
| 8 | 0.012411 | 1.153654 | 3.317569 | 4.414443 | 2.711207 | 88.40313 |
| 9 | 0.012426 | 1.174374 | 3.385222 | 4.529228 | 2.709956 | 88.20122 |
| 10 | 0.012437 | 1.190904 | 3.428374 | 4.632311 | 2.708761 | 88.03965 |

Data source: EIU country database, Wind database

To sum up the variance decomposition of RM1 and CPI, it can be seen that the development of shadow banking did indeed impact on the amount of money supply to some extent, but the impact on the effectiveness of monetary policy (CPI) is not obvious. From Table 4.6, it can be seen that all of the impacts from other variables on the development of shadow banking system are not obvious, only 3-5% in RGDP, around 3% in RATE, 2.7 % in RM1 and about 1% in CPI.

4.1.4 Discussion of the above results

From the impulse responses of CPI, GPD, and M1 to the development of the shadow banking system, it is noted that the shadow banking system indeed has impacts on these variables. However, the impacts on RM1 and CPI are antilogous during the period 2-4. Although, it still can be said that the development of shadow banking could promote the amount of money supply in a long term (about 3 months later) and increase the growth rate of CPI in the first 2 months, this implies that the easy monetary policy would be promoted by the activities of shadow banking, and conversely the tight monetary policy would be ruined by the activities of the shadow banking system too. However, the results of the variance decomposition RM1 and CPI are not satisfactory; the changing in RM1 and CPI can be explained by shadow banking at only around 5% and 2.5% respectively. Therefore, the impacts of shadow banking on monetary policy and the amount of money supply are not so strong. Additionally, the impulse response also shows that the shadow banking system could promote economic growth in the long term but the variance decomposition suggests than the impact is not obvious.

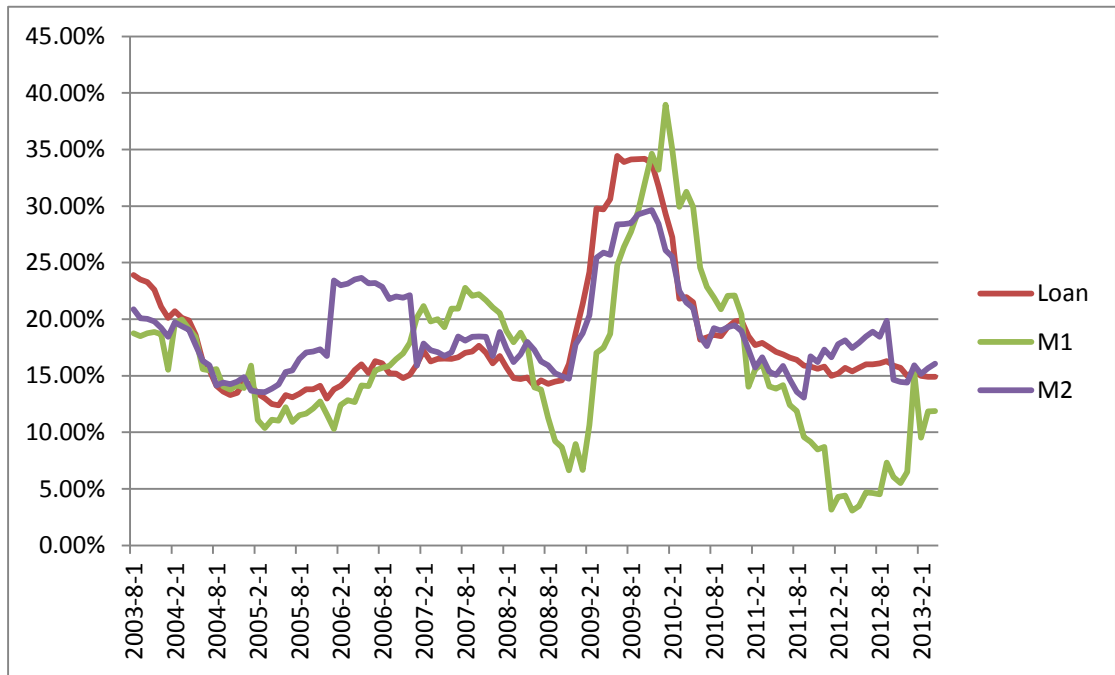
From the impulse responses of shadow banking, it is noted that the shadow banking system would be promoted in growth by the increase of GDP and implementation of easy monetary policy, but it would be reduced in growth rate due to the high cost of financing. In addition, the variance decomposition of shadow banking system indicates the impacts from GDP, M1, CPI, RATE are weak. All in all, there are impacts of the shadow banking system on other variables. The impacts are however, as the results shown are weak; may be due to the collection of data. The shadow banking system is indicated by the total loans collected from the Wind database which includes entrusted loans, trust loans and bank loans, etc. but only trust loans and entrusted loans could be counted into the shadow banking system. Furthermore, the amount of entrust loans and trust loans is just a part of the shadow banking system, which in China should also include private loans, non-banking financial institutions such as trust companies and pawnshops, etc. Therefore the actual value of shadow banking should be bigger than the chosen data of total loans which implies the impacts might not as weak as shown in the variance decomposition.

4.2 The outcomes from OLS regression, correlation analysis and underlying trend analysis

4.2.1 The relationship between shadow banking and money supply

As the purpose of this study is to analyze the impacts of the shadow banking system on monetary policy, in this section OLS regression, correlation analysis and underlying trend analysis will be used to find out the relationship between the credit scale and the amount of money supply from August, 2003 to April, 2013. The data will be collected as a growth rate year on year.

Figure 4-5: The growth rate of total loans and M1 and M2 (year on year)



Data source: EIU country database, Wind database

From Figure 4.5, it can be seen that the movements of the growth rate of M1 and M2 are almost the same as that of the total loans. That they have a positive relationship implies that when total loans go up, the M1 and M2 will go up too, and vice versa. It can be simply concluded that the shadow banking system, indicated by total loans has an impact on the money supply.

Table 4-7: Correlation coefficient of total loans, M1 and M2

| | Loans | M1 | M2 |
|------|----------|----------|----|
| Loan | 1 | | |
| M1 | 0.656802 | 1 | |
| M2 | 0.802205 | 0.597651 | 1 |

Data source: EIU country database, Wind database

Furthermore, Table 4.7 shows the correlation coefficient of total loans with M1 and M2. The correlation value of the total loans and M1 is 0.656802 implying that they have positive relationship, and 1 unit change in the growth rate of loans would lead to 0.656802 change in the growth rate of M1. What is

more, the correlation between total loans and M2 is 0.802205 which indicates that the 1 unit point increase in the growth rate of total loans will lead to 0.802205 change in the growth rate of M2. This is positive too and illustrates that there are more impacts of the shadow banking system on the M2 compared to M1, because the relationship between total loans and M2 is stronger than the relationship between total loans and M1.

Table 4-8: Outcomes of OLS regression of total loans(X) and M1 and M2

| | M1 | | M2 | |
|-----------|--------------|-------------|--------------|-------------|
| | Coefficients | P-value | Coefficients | P-value |
| Loan | 0.891249581 | 8.91989E-16 | 0.589686078 | 1.60506E-27 |
| Intercept | -0.0008419 | 0.96279068 | 0.080571446 | 2.47645E-18 |

Data source: EIU country database, Wind database

As shown in Table 4.8, the coefficient value of loans in the equation between total loans and M1 is 0.891249581, which indicates that they have a positive relationship and the one percentage change in the growth rate of total loans will result in 0.891249581 changes in the growth rate of M1. The p-value of 8.91989E-16 indicates the chance of the coefficient equal to zero, therefore 8.91989E-16 is much lower than 0.05 implying that the null hypothesis ($H_0: \beta_1 = 0$) should be strongly rejected. Then it can be concluded that there is significant impact of shadow banking system on the M1.

Furthermore, the coefficient value of loan in M2 is 0.589686078 which means that there will be 0.5896860789 changes in the growth rate of M2 if the growth rate of total loans changed by one percentage, and they have a positive relation. In addition, its p-value is 1.60506E-27 indicates that the coefficient value equal to or higher than the estimated coefficient will be expected to occur 1.60506461863783E-25% of the time by random. So the null hypothesis ($H_0: \beta_1 = 0$) should be rejected. Then it can be said that there is a significant impact of shadow banking system on the M2.

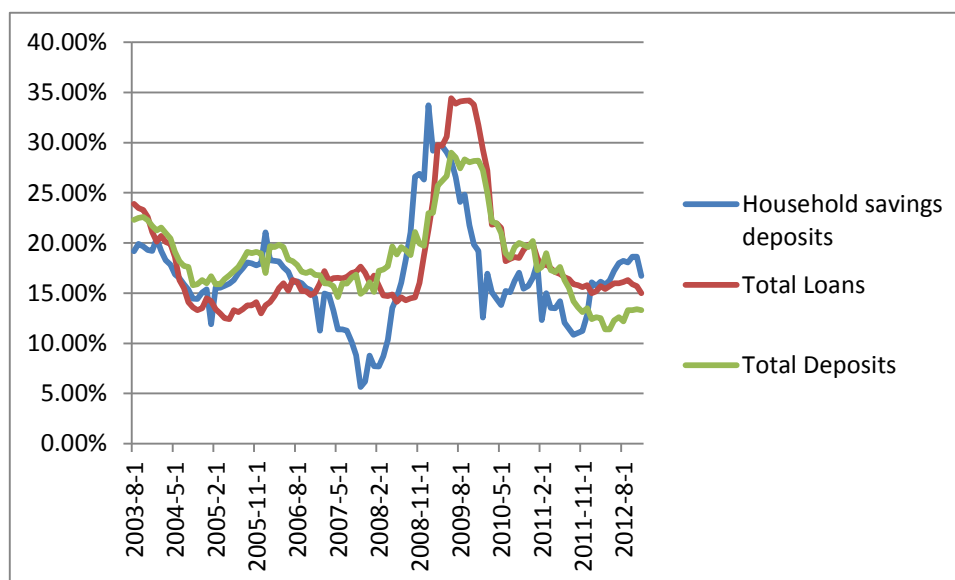
As a consequence from the analysis of the relationship between shadow banking and money supply by applying OLS regression, correlation analysis and underlying trend analysis, it can be seen that there is indeed an impact of

shadow banking on the amount of money supply. According to the Methodology, M1 is cash currency in circulation plus checkable demand deposit and M2 is M1 plus savings deposits including household saving, fixed deposits and money-market deposit. From the results of correlation coefficient, it can be clearly seen than the impact of shadow banking system on the M2 should be higher than the impact on M1. However the results of OLS regression suggest that M1 should be easier influenced by the shadow banking system compared to M2, and the intercept in the equation of total loans and M1 should equal zero and the intercept in the equation of total loans and M2 should be 0.08. It can be concluded therefore that the shadow banking system could impact not only on the amount of cash in circulation but also on the amount of deposits in the banks.

4.2.2 The relationship between the shadow banking system and deposits

To analyze the impact of shadow banking system on the monetary policy, in this section the relationships among total loans, household savings and total deposits will be measured.

Figure 4-6: The growth rate of total deposits, total loans and household savings deposits



Data source: EIU country database, Wind database, PBC

As shown in Figure 4.6, the movements of these three indicators are similar although the growth rate of household saving deposits dropped rapidly from November 2005 to January 2008, and there is upward trend in the growth

rate of total loans and total deposits in the same period. It can be concluded that the growth of total deposits relied upon the other deposits such as deposits of non-financial enterprises and trust deposits, etc. From this one could determine that the money transfer from household saving deposits to the deposits of non-financial enterprises and trust deposits, etc. might be due to the activities of the shadow banking system. Additionally, the upward trend of the growth rate of total loans implies that people prefer to invest their money in wealth management products issued by the shadow banking system instead of deposits.

Table 4-9: Correlation coefficient of total loans, total deposits and household savings deposits

| | Total Deposits | Total Loans |
|-------------------|----------------|-------------|
| Total Deposits | 1 | |
| Total Loans | 0.834017255 | 1 |
| Household savings | 0.593068246 | 0.513448204 |

Data source: EIU country database, Wind database, PBC.

From Table 4.9, one can see that the correlation between total deposit and total loans is 0.834017255 which implies that there would be a 0.834017255 change in the growth rate of total deposits if the growth rate of total loans changes by 1 point. Furthermore, the correlation value of 0.513448204 between total loans and household savings deposits implies that 1 point unit change in the growth rate of total loans would lead to 0.513448204 change in the growth rate of household saving deposits which is much lower than the correlation value between total deposits and total loans.

Table 4-10: Outcomes of OLS regression of total loans, total deposits and household saving deposits

| | Total deposit | | Household savings deposits | |
|-----------|---------------|------------|----------------------------|-------------|
| | Coefficients | P-value | Coefficients | P-value |
| Intercept | 0.0703568 | 1.6673E-16 | 0.079862073 | 2.0048E-07 |
| Loan | 0.630469284 | 1.0093E-31 | 0.477953613 | 6.04667E-09 |

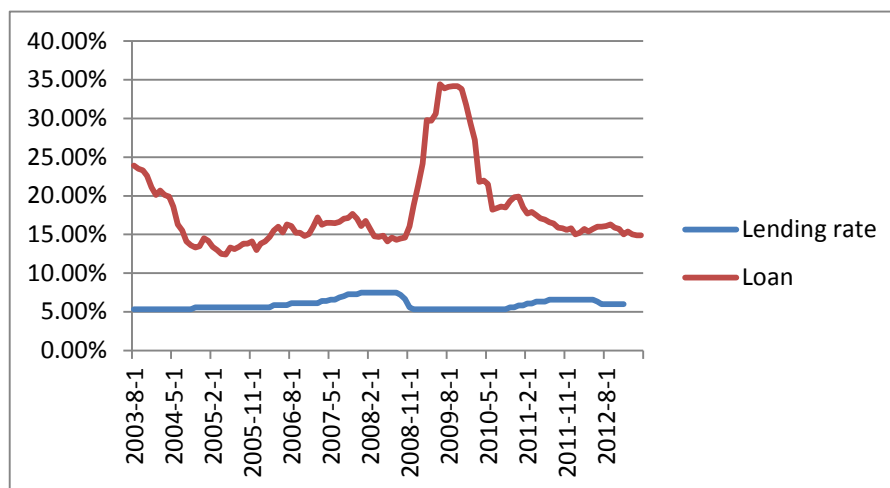
Data source: EIU country database, Wind database, PBC.

As shown in Table 4.10, the coefficients of total loans in the equation between total loans(X) and total deposit (Y) is 0.630469284 which implies that they have a positive relationship and 1 point unit change in the growth rate of total loans would lead to 0.0630469284 change in the growth rate of total deposits. Additionally, the p-value of 1.0093E-31 means the chance of coefficients equals zero, which is much lower than 0.05, implying that the null hypothesis ($H_0: \beta_1 = 0$) should be rejected. Thus it can be noted that the total loans has an impact on total deposits. Moreover, the coefficient between total loans and household saving deposits is 0.477953613 which implies that they have a positive relationship there would be 0.477953613 change in the growth rate of household savings deposits if the growth rate of total loans changes 1 percentage. In addition, the p-value of 6.04667E-09 implies that a value equal to or higher than the estimated coefficient will be expected to occur 6.04666878594798E-07% of the time by random, thus the null hypothesis ($H_0: \beta_1 = 0$) should be rejected when the sample coefficient is not equal to zero if the p-value is greater than 0.05. So, it can be concluded that the total loans would have an impact on the household deposits.

From the results above, it can be seen than the total loans have impacts on the total deposits and household saving deposits. However it has different impacts in different periods. From the trend analysis it can be seen that during the period from November 2005 to January 2008, the relationship between household saving deposits and total loans is negative and implies that the activities of the shadow banking system have an impact on household savings deposits. However from the analysis of OLS regression and correlation, the relationships among total loans, total deposits and household savings deposits are all positive during the whole sample period of August 2003 to December 2012. This may be due to the data collection, because the total loans not only include the trust loans and entrusted loans issued by the shadow banking system but also include the loans issued by conventional banks. Therefore it can be concluded that the amount of total loans has a positive impact on total deposits and household savings deposits but the negative impacts of total loans on household saving deposits during the same period would be as a result of the activities of shadow banking, because the higher interest rate of products issued by the shadow banking system would attract people to invest in wealth management products instead of saving deposits in banks.

4.2.3 The relationship between total loans and benchmark lending interest rate, total deposits and deposit interest rate

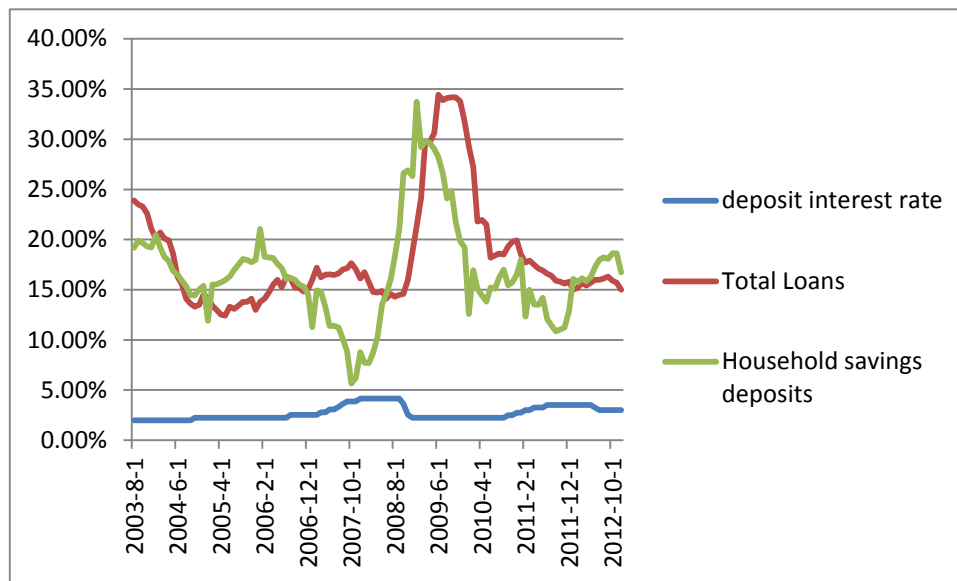
Figure 4-7: Lending interest rate and the growth rate of total loans



Data source: EIU country database, Wind database

As shown in Figure 4.7, it can be seen that both lending interest rate and total loans have an upward trend in the period from November 2005 to February 2008. This implies that even if the central bank implement the tight monetary policy by increasing the lending interest rate to reduce the credit scale, the loans balance of financial institutions will still have an upward trend during this period. It might be due to the activities of the shadow banking system, because the fund demanders would borrow money from the shadow banking system rather than conventional banks due to the limited credit scale caused by the high lending rate. Moreover, the same situation occurred in the period from November 2011 to August 2012.

Figure 4-8: Deposit interest rate and the growth rate of total loans and household saving deposits



Data source: EIU country database, Wind database, PBC.

From Figure 4.8, it can be seen that there is a negative relationship between the household savings deposits and deposit interest rate during the period from February 2006 to October 2007. This implies that even if the central bank tries to attract the money in circulation to deposit in banks by increasing the deposit interest rate, the growth rate of household savings deposits will still have a downward trend which might be due to the activities of the shadow banking system because people would rather invest in the high return rate products than deposits, and the products of the shadow banking system are more liquid and profitable than a deposit.

4.3 Summary of the data analyses

The results of impulse response and variance decomposition illustrate that the shadow banking system has impacts on the monetary policy and economic growth by influencing the indicators of CPI, M1 and GDP, but these impacts are not strong which might be as a result of the data collection methods. Total loans include trust loans and entrusted loans which belong to the activities of the shadow banking system. However it also includes loans issued by the conventional banks. Therefore the results might be not correct but can still reflect the role of shadow banking in the economic world to some extent. Because, as a part of the loans balance, the amount of trust loans and

entrusted loans would reflect the trend of the loans balance, and vice versa. Moreover, the results of OLS regression, trend analysis and correlation illustrate that the shadow banking system would affect the deposits and money supply to some extent which implies that the effectiveness of monetary policy could be influenced by the shadow banking system.

5. Conclusions and Recommendation

This paper has investigated the role of the shadow banking system in China's financial system from the perspective of its differences with conventional commercial banks and foreign shadow banking systems. It has shown clearly that the shadow banking system in China has its own characteristics compared to the more conventional commercial banks or the foreign shadow banking system. In China, the shadow banking system is mainly composed of 1) off-balance sheets activities of commercial banks, such as wealth management products 2) non-banking financial institutions, such as trust companies, micro-credit companies and mortgage companies and 3) informal finance. Moreover, from the view of the cause of emergence of the shadow banking system, it can be seen that this system has played a significant role in the China's economy.

The present study was designed to determine the effect of the shadow banking system on monetary policy and to identify its role in China's monetary and financial system. Therefore to achieve the goal of this paper, the proposed variances and methodologies were investigated from by researching previous studies about the shadow banking system carried out by different scholars, for instance Chen & Zhang (2012), Li & Wu (2011), Wang (2010), Yu & Zhang (2011), Borst (2013), Xu and Zhou (2011) and Maddaloni & Peydró (2011), etc. Finally the SVAR model was selected to analyze the contemporaneous relationship among related variables in the dynamic system. Based on economic theory, the applied variables in the SVAR model are presented as growth rate month-on-month including total loans (indicating the shadow banking system), CPI (indicating the effectiveness of monetary policy), GDP, M1 (indicating the money supply) and short-term interest rate (indicating the cost of borrowing and lending). In addition, OLS regression, correlation analysis and underlying trend analysis were applied to supplement the analysis of the linear relationships between each pair of variables (growth rate year-on-year) which included total loans, total deposits, household saving

deposit, M1 and M2, and the index of lending interest rate and deposit interest rate.

This paper was designed to answer:

1. How does the shadow banking system affect the monetary policy?

The results from the SVAR model suggest that the shadow banking system would affect the monetary policy by increasing the growth rate of money supply (M1) and the growth rate of CPI. It can be concluded that when in the condition of easy monetary policy, activities of the shadow banking system would enhance the effectiveness of easy monetary policy by promoting the growth rate of CPI and M1 (see the results of impulse response and variance decomposition from the section of results and discussion) .However, if there was an implementation of tight monetary policy, activities of the shadow banking system would reduce the effectiveness of tight monetary policy by promoting the growth rate of CPI and M1. Furthermore, the results of trend analysis suggest that there is a positive relationship between the growth rate of total loans and lending interest rate during the period from November 2005 to February 2008. It seems that activities of the shadow banking system would reduce the effectiveness of implementation of a tight monetary policy by increasing the lending interest rate to limit the loan scale. Moreover, it also indicates that the relationship between deposit interest rate and the growth rate of household savings deposits is negative during the period from February 2006 to October 2007 implying that the implementation of tight monetary policy by increasing the deposits interest rate did not achieve the goal of attracting deposits. It can be concluded that activities of the shadow banking system would affect the monetary policy instrument to some extent owing to its high interest rate compared to the benchmark interest rate set by the central bank, such as deposit interest rate and lending interest rate.

2. Is it related to economic growth?

The results of the SVAR model indicate that an increase in the growth rate of the shadow banking system would promote the growth rate of GDP. However, the results also suggest that the impact is not obvious (see the results of impulse response and variance decomposition). On the other hand, the increase in the growth rate of GDP would also promote the growth rate of shadow banking system slightly.

3. What is the relationship between the shadow banking system and money supply?

The results of trend analysis suggest that there are positive relationships between the shadow banking system and money supply including M1 and M2. Moreover, the results of correlation analysis suggest that the impact of shadow banking on M2 is stronger than the impact on M1. However OLS regression analysis indicates a contrary result. In general, therefore, it seems that there are indeed impacts of shadow banking on the M1 and M2 which implies that the shadow banking system could affect the amount of cash in circulation and the amount of deposits in the banks.

4. What is the relationship between the shadow banking system and deposits?

The results of OLS regression analysis and correlation analysis indicate that there are positive relationships between the shadow banking system, total deposits and household savings deposits during the whole sample period. However, the results of trend analysis suggest that there is a negative relationship between the shadow banking system and household savings deposits during the period from November 2005 to January 2008. Therefore, it seems that the increase in the growth rate of the shadow banking system would reduce the growth rate of household savings deposits in the same period but the impact on total deposits is positive.

5.2 Recommendation

The regulatory authorities should remain objective with respect to the shadow banking system. They should make an effort to provide a sound regulatory environment and strengthen regulation on the shadow banking system. In addition, to amplify its ability of reallocation of resources, it is also necessary to take advantage of the impacts of the shadow banking system on economic growth and money supply.

First, owing to high thresholds in the lending operations set by commercial banks, financing difficulty of small-medium enterprises now become the main obstacle of entrepreneurial economic development in China. Therefore, regulatory authorities should take full advantage of entrusted loans, trust loans and private lending and guide the development of the shadow banking system under a restricted monetary environment, applying these methods as a way of allocating resources to contribute to the development of China's small and

medium enterprises. Secondly, for such high interest rates of the shadow banking system, the regulatory authorities should limit the maximum interest rate value of the shadow banking system, such as private lending. Finally, the regulatory authorities should strengthen power on the control of the amount of entrusted loans and private lending. Overall, as the shadow banking system has a significant role in the monetary and financial system, the shadow banking system should be regulated into the scope of the commercial banks' supervision system as soon as possible.

Reference

Adrian, Tobias and Ashcraft, Adam B., (April 2012), Shadow Banking Regulation, Staff Report NO.559, retrieved from:

http://www.newyorkfed.org/research/staff_reports/sr559.pdf

BIS, (July 2008), Credit Risk Transfer Developments from 2005 to 2007, The Joint Forum, Bank for International Settlements, bis.org,.From:

<http://www.bis.org/publ/joint21.pdf>

Blackburn, R., (2008), The Subprime Crisis, The New Left Review, newleftreview.org, pp. 63 et seq.

Blanchard, O.J. and D. Quah(1989). The Dynamic Effects of Aggregate Demand and Supply Disturbances. American Economic Review 79, 655-673

Blanchard, O.J. and R. Perotti 2002. An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output. Quarterly Journal of Economics 117, 1329-1368.

Borst, N., (May, 2013), Shadow Deposits as a Source of Financial Instability: Lessons from the American Experience for China, Peterson Institute for International Economics, retrieved from:
file:///C:/Users/hs/Desktop/pb13-14.pdf

Caijing.com.cn, (May, 2012), "China's Shadow Banking Revisited: Size, Implications, Risks, and Reforms", Retrieved from:

<http://english.caijing.com.cn/2012-12-05/112336663.html>

Cao, W. and Lin, Y., (2005), Research on the Effectiveness of Monetary Policy in China: 1984-2004[J]. Journal of Finance and Economics, 2005, (7):57-59.

Chen, J. and Zhang, X., (2012), The Impact of Shadow banking System on the China's Economic Development – based on the analysis of quarterly data from 2000-2010 [J], Journal of Research on Financial and Economic Issues, 2012, (8): 66-72.

Chen, J. and Zhang, X., (August, 2012), The Impact of Shadow Banking System on the Economic Development in China, Research on Financial and Economic Issues, No.8 (General Serial No.345), retrieved from:

<http://wenku.baidu.com/view/967913ce9ec3d5bbfd0a7481.html>

China Daily, November 28, 2012, "Shadow Banking: Hidden from View," retrieved from:

www.chinadaily.com.cn/bizchina/2012-11/28/content_16029112.htm.

Chinaview.cn, (November 09, 2008), China's 4 trillion yuan stimulus to boost economy, domestic demand, retrieved from:

http://news.xinhuanet.com/english/2008-11/09/content_10331324.htm

Enders, W., (2003). Applied Econometric Time Series (2nd ed.). John Wiley & Sons. ISBN 0-471-23065-0.

Feng, L. and Wang, D., (2011), Shadow Banking Exposure less than Feared and more than Priced [R]. Tokyo: Nomura Securities, 2011

Financial Stability Board, (November 18th, 2012), Global Shadow Banking Monitoring Report 2012, retrieved from

http://www.financialstabilityboard.org/publications/r_121118c.pdf

Financialpost.com, (July 12, 2012), "Should we be worried about China's \$ 2.2-trillion shadow banking system?", Retrieved from <http://business.financialpost.com/2012/07/19/should-we-be-worried-about-chinas-2-2-trillion-shadow-banking-system/>

Freixas, X., Giannini, C., Hoggarth, G., and Soussa, F. (2000). "Lender of Last Resort: What Have We Learned Since Bagehot?". Journal of Financial Services Research 18: pp. 64.

Galí, J., (1999). Technology, Employment, and the Business Cycle: Do Technology Shocks Explain Aggregate Fluctuations? American Economic Review 89, 249-271.

Gao, T., (2009), Econometric Analysis Method and Modeling (second edition) [M]. Beijing: Tsinghua University Press, 2009.p301.

Ge, S., (2010), The Role of Shadow Banking System in the Financial Crisis and its Risk Prevention [J]. Journal of Finance and Economics, 2010, (7):22-25.

Gottschalk, J. (August, 2001), "An Introduction into the SVAR Methodology: Identification, Interpretation and Limitations of SVAR models", Kiel Institute of World Economics, Kiel (Germany), Kiel Working Paper No. 1072, retrieved from

<http://www.ifw-members.ifw-kiel.de/publications/an-introduction-into-the-svar-methodology-identification-interpretation-and-limitations-of-svar-models/kaip1072.pdf>

Griffith, J., (September 6, 2012), "7 Things You Need to Know About Fannie Mae and Freddie Mac", Retrieved September 15, 2013 from <http://www.studymode.com/essays/2008-Financial-Crisis-Lehman-Brothers-1102989.html>

Hou, J., (2012), Research on the Impact of the Development of Shadow Banking System on the Financing of Small Medium Enterprises [J], Journal of South China Finance, 2012, (6):84-86.

Li, B. and Wu, G., (2011), The Credit Creation Functions of Shadow Banking System and the Challenge on the Monetary Policy [J]. Journal of Financial Research, 2011, (12):77-84.

Li, J., (2013) The Impact of Shadow Banking System on the China's Monetary Policy, retrieved from:

<http://wenku.baidu.com/view/d6ba715bad02de80d4d840f9.html>

Lütkepohl, H. (2007) New Introduction to Multiple Time Series Analysis, Springer. p. 63.

Lütkepohl, H., (2005). New Introduction to Multiple Time Series Analysis. Berlin: Springer. ISBN 3540401725.

Maddaloni, A. and Peydró, J.-L. (2011), Bank Risk-Taking, Securitization, Supervision, and Low Interest Rates: Evidence from the Euro-Area and the U.S. Lending Standards, from <http://rfs.oxfordjournals.org>

Melanie L. Fein, (February 15, 2013), "The Shadow Banking Charade", available at SSRN: <http://ssrn.com/abstract=2218812>

Michelle Martin, (7 February 2012). "Q+A - What is shadow banking and why does it matter?". Reuters. Retrieved 19 September 2012 from: <http://www.reuters.com/article/2012/02/07/shadow-banking-idUSL5E8D60YI20120207>

Murphy, Elizabeth, ed. (June 30, 2009), "Money Market Fund Reform", Securities and Exchange Commission: Proposed Rules, Securities and Exchange Commission, pp. Release No. IC-28807; File No. S7-11-09, retrieved from: <http://www.sec.gov/rules/proposed/2009/ic-28807.pdf>

News.cn, (January 09, 2012), The Central Bank: New loans of RMB7.47billin in 2011, retrieved from: http://news.xinhuanet.com/fortune/2012-01/09/c_122555481.htm

Pbc.gov.cn, (December, 2012), Money Supply, retrieved from http://changsha.pbc.gov.cn/publish/changsha/3997/2012/20121227152819029985421/20121227152819029985421_.html

Pfaff, B., (July, 2008), VAR, SVAR and SVEC Models : Implementation Within R Package vars, Journal of Statistical Software Volume 27, Issue 4, retrieved from :<http://www.jstatsoft.org/v27/i04/paper>

Pozsar, Z., Adrian, T., Ashcraft, A. and Boesky, H., (February, 2012), "Shadow Banking", Federal Reserve Bank of New York Staff Reports, Retrieved from http://www.ny.frb.org/research/staff_reports/sr458.pdf

Schlegel, G., (1985), Vector Autoregressive Forecasts of Recession and Recovery: Is Less More? Retrieved from: <http://www.clevelandfed.org/research/review/1985/85-q2-schlegel.pdf>

Sims, C.A. and Zha, T., (2005), Does Monetary Policy Generate Recessions? *Macroeconomic Dynamics*, forthcoming.

Sina.com.cn, (February 11, 2010), The Central Bank: Leading the Rational Growth of Money and Credit Supply, retrieved from: <http://finance.sina.com.cn/roll/20100211/17527410774.shtml>

The Financial Crisis Inquiry Commission, (January, 2011) Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States, p.127, retrieved from: <http://www.gpo.gov/fdsys/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf>

Turner, A., (April 16, 2012), "Shadow Banking and Financial Instability", Retrieved from <http://blogs.law.harvard.edu/corpgov/2012/04/16/shadow-banking-and-financial-instability/>

Wang, Z., (2010), The Impact of Shadow Banking System on the China's Money Supply [J]. *Journal of China Finance*, 2010, (23):30-31.

Wen, W. and Chen, R., (2010), Value the Trend of Shadow Banking System, to Avoid Potential Risks [J], *Journal of Southwest Finance*, 2010(2): 19-21

Wordpress.com, (June 23, 2009), "What is the parallel banking system?", Retrieved from <http://syntheticassets.wordpress.com/2009/06/23/what-is-the-parallel-banking-system/>

Xu, H., (2012), The Monetary Policy in China: Analysis and Prospect [J], *Journal of China Market*, 2012, (11): 3-7.

Xu, Y. and Zhou, E., (2011), the Extension Mechanism of Financial Instability of Shadow Banking System and Research on the Monetary Policy of FED [J], *Journal of Shanghai Finance*, 2011, (7):95-99.

Xu, Y., (2009), Analyzing the Impact and Challenge of Financial Securitization on Monetary Policy [J], *Journal of World Economy Study*, 2009 (12)

Yi, X., (2009), Analyzing the Credit Crisis of Shadow Banking System [J], *Journal of Jianghai Academic*, 2009(3):70-76

Zhang, J., (2012), Financial Innovation and the Rise of Shadow Banking System, *Journal of Hexun.com*, retrieved from <http://data.book.hexun.com/chapter-17896-1-14.shtml>

Appendix

Appendix 1: Data for the SVAR model

| Date | loans (hundred millio | GR (%) | CPI | CPI GR | GDP %change | M1 | M1 GR (%) | Intere |
|------------|-----------------------|--------|---------|--------|-------------|-----------|-----------|--------|
| 2001-1-31 | 96553.21 | | 95.67 | | 10.20% | 5,605.40 | | 5.85% |
| 2001-2-28 | 97196.92 | 0.67% | 95.772 | 0.11% | 10.20% | 5,374.40 | -4.12% | 5.85% |
| 2001-3-31 | 98130.53 | 0.96% | 95.282 | -0.51% | 12.10% | 5,478.50 | 1.94% | 5.85% |
| 2001-4-30 | 98991.94 | 0.88% | 95.485 | 0.21% | 11.50% | 5,506.80 | 0.52% | 5.85% |
| 2001-5-31 | 99768.21 | 0.78% | 94.836 | -0.68% | 10.20% | 5,446.40 | -1.10% | 5.85% |
| 2001-6-30 | 101343.22 | 1.58% | 93.813 | -1.08% | 10.10% | 5,726.20 | 5.14% | 5.85% |
| 2001-7-31 | 101710.9 | 0.36% | 93.27 | -0.58% | 8.10% | 5,580.80 | -2.54% | 5.85% |
| 2001-8-31 | 102148.09 | 0.43% | 93.357 | 0.09% | 8.10% | 5,817.00 | 4.23% | 5.85% |
| 2001-9-30 | 103364.36 | 1.19% | 94.286 | 1.00% | 9.50% | 5,903.50 | 1.49% | 5.85% |
| 2001-10-31 | 103370.42 | 0.01% | 94.638 | 0.37% | 8.80% | 5,873.70 | -0.50% | 5.85% |
| 2001-11-30 | 104372.76 | 0.97% | 94.427 | -0.22% | 7.90% | 5,898.40 | 0.42% | 5.85% |
| 2001-12-31 | 106565.31 | 2.10% | 94.425 | 0.00% | 8.70% | 6,168.90 | 4.59% | 5.85% |
| 2002-1-31 | 106959.43 | 0.37% | 94.714 | 0.31% | 10.90% | 6,057.60 | -1.80% | 5.85% |
| 2002-2-28 | 107486.12 | 0.49% | 95.772 | 1.12% | 10.90% | 5,870.30 | -3.09% | 5.31% |
| 2002-3-31 | 109926.01 | 2.27% | 94.52 | -1.31% | 10.90% | 5,947.50 | 1.32% | 5.31% |
| 2002-4-30 | 110627.07 | 0.64% | 94.243 | -0.29% | 12.10% | 6,046.10 | 1.66% | 5.31% |
| 2002-5-31 | 111703.09 | 0.97% | 93.793 | -0.48% | 12.90% | 6,124.70 | 1.30% | 5.31% |
| 2002-6-30 | 114155.91 | 2.20% | 93.063 | -0.78% | 12.40% | 6,314.40 | 3.10% | 5.31% |
| 2002-7-31 | 114626.67 | 0.41% | 92.431 | -0.68% | 12.80% | 6,348.80 | 0.54% | 5.31% |
| 2002-8-31 | 116055.88 | 1.25% | 92.704 | 0.30% | 12.70% | 6,486.90 | 2.18% | 5.31% |
| 2002-9-30 | 118516.42 | 2.12% | 93.626 | 0.99% | 13.80% | 6,680.00 | 2.98% | 5.31% |
| 2002-10-31 | 119,207.66 | 0.58% | 93.881 | 0.27% | 14.20% | 6,710.10 | 0.45% | 5.31% |
| 2002-11-30 | 120,498.12 | 1.08% | 93.766 | -0.12% | 14.50% | 6,799.30 | 1.33% | 5.31% |
| 2002-12-31 | 122,889.94 | 1.98% | 94.047 | 0.30% | 14.90% | 7,088.20 | 4.25% | 5.31% |
| 2003-1-31 | 125,582.27 | 2.19% | 95.092 | 1.11% | 17.50% | 7,240.60 | 2.15% | 5.31% |
| 2003-2-28 | 126,489.47 | 0.72% | 95.964 | 0.92% | 17.50% | 6,975.60 | -3.66% | 5.31% |
| 2003-3-31 | 129,749.86 | 2.58% | 95.37 | -0.62% | 16.90% | 7,143.90 | 2.41% | 5.31% |
| 2003-4-30 | 131,105.16 | 1.04% | 95.186 | -0.19% | 14.90% | 7,132.10 | -0.17% | 5.31% |
| 2003-5-31 | 133,109.97 | 1.53% | 94.449 | -0.77% | 13.70% | 7,277.80 | 2.04% | 5.31% |
| 2003-6-30 | 137,303.46 | 3.15% | 93.342 | -1.17% | 16.90% | 7,592.30 | 4.32% | 5.31% |
| 2003-7-31 | 138,130.48 | 0.60% | 92.893 | -0.48% | 16.50% | 7,615.30 | 0.30% | 5.31% |
| 2003-8-31 | 153,025.17 | #### | 93.538 | 0.69% | 17.10% | 7,703.30 | 1.16% | 5.31% |
| 2003-9-30 | 156,059.89 | 1.98% | 94.656 | 1.20% | 16.30% | 7,916.40 | 2.77% | 5.31% |
| 2003-10-31 | 156,676.17 | 0.39% | 95.571 | 0.97% | 17.20% | 7,968.80 | 0.66% | 5.31% |
| 2003-11-30 | 157,701.12 | 0.65% | 96.579 | 1.05% | 17.90% | 8,081.50 | 1.41% | 5.31% |
| 2003-12-31 | 158,996.23 | 0.82% | 97.057 | 0.49% | 18.10% | 8,411.90 | 4.09% | 5.31% |
| 2004-1-31 | 161,730.64 | 1.72% | 98.135 | 1.11% | 16.60% | 8,365.70 | -0.55% | 5.31% |
| 2004-2-29 | 163,810.61 | 1.29% | 97.979 | -0.16% | 16.60% | 8,345.60 | -0.24% | 5.31% |
| 2004-3-31 | 167,442.53 | 2.22% | 98.232 | 0.26% | 19.40% | 8,570.10 | 2.69% | 5.31% |
| 2004-4-30 | 169,434.99 | 1.19% | 98.803 | 0.58% | 19.10% | 8,498.10 | -0.84% | 5.31% |
| 2004-5-31 | 170,566.13 | 0.67% | 98.605 | -0.20% | 17.50% | 8,617.30 | 1.40% | 5.31% |
| 2004-6-30 | 169,905.22 | -0.39% | 98.009 | -0.60% | 16.20% | 8,776.10 | 1.84% | 5.31% |
| 2004-7-31 | 169,884.39 | -0.01% | 97.816 | -0.20% | 15.50% | 8,794.30 | 0.21% | 5.31% |
| 2004-8-31 | 171,040.15 | 0.68% | 98.496 | 0.70% | 15.90% | 8,903.00 | 1.24% | 5.31% |
| 2004-9-30 | 173,473.07 | 1.42% | 99.578 | 1.10% | 16.10% | 9,029.40 | 1.42% | 5.31% |
| 2004-10-31 | 173,728.97 | 0.15% | 99.68 | 0.10% | 15.70% | 9,065.90 | 0.40% | 5.58% |
| 2004-11-30 | 175,224.01 | 0.86% | 99.283 | -0.40% | 14.80% | 9,227.20 | 1.78% | 5.58% |
| 2004-12-31 | 177,363.49 | 1.22% | 99.386 | 0.10% | 14.40% | 9,581.50 | 3.84% | 5.58% |
| 2005-1-31 | 181,082.96 | 2.10% | 100 | 0.62% | 16.90% | 9,696.00 | 1.20% | 5.58% |
| 2005-2-28 | 182,042.30 | 0.53% | 101.8 | 1.80% | 16.90% | 9,269.80 | -4.40% | 5.58% |
| 2005-3-31 | 185,461.32 | 1.88% | 100.884 | -0.90% | 15.10% | 9,459.00 | 2.04% | 5.58% |
| 2005-4-30 | 186,889.10 | 0.77% | 100.581 | -0.30% | 16.00% | 9,443.40 | -0.16% | 5.58% |
| 2005-5-31 | 186,274.10 | -0.33% | 100.38 | -0.20% | 16.60% | 9,567.80 | 1.32% | 5.58% |
| 2005-6-30 | 186,178.70 | -0.05% | 99.577 | -0.80% | 16.80% | 9,847.90 | 2.93% | 5.58% |
| 2005-7-31 | 185,859.75 | -0.17% | 99.577 | 0.00% | 16.10% | 9,755.30 | -0.94% | 5.58% |
| 2005-8-31 | 187,756.60 | 1.02% | 99.776 | 0.20% | 16.00% | 9,926.50 | 1.75% | 5.58% |
| 2005-9-30 | 190,941.90 | 1.70% | 100.475 | 0.70% | 16.50% | 10,080.50 | 1.55% | 5.58% |
| 2005-10-31 | 191,168.27 | 0.12% | 100.876 | 0.40% | 16.10% | 10,163.90 | 0.83% | 5.58% |
| 2005-11-30 | 193,416.93 | 1.18% | 100.574 | -0.30% | 16.60% | 10,400.30 | 2.33% | 5.58% |
| 2005-12-31 | 194,690.39 | 0.66% | 100.976 | 0.40% | 16.50% | 10,690.30 | 2.79% | 5.58% |
| 2006-1-31 | 199,492.05 | 2.47% | 101.9 | 0.92% | 16.20% | 10,695.00 | 0.04% | 5.58% |
| 2006-2-28 | 201,020.25 | 0.77% | 102.716 | 0.80% | 16.20% | 10,421.30 | -2.56% | 5.58% |
| 2006-3-31 | 206,394.59 | 2.67% | 101.691 | -1.00% | 17.80% | 10,673.70 | 2.42% | 5.58% |
| 2006-4-30 | 209,555.78 | 1.53% | 101.788 | 0.10% | 16.60% | 10,638.90 | -0.33% | 5.85% |
| 2006-5-31 | 211,649.97 | 1.00% | 101.785 | 0.00% | 17.90% | 10,921.90 | 2.66% | 5.85% |
| 2006-6-30 | 215,302.59 | 1.73% | 101.071 | -0.70% | 19.50% | 11,234.20 | 2.86% | 5.85% |
| 2006-7-31 | 216,935.55 | 0.76% | 100.573 | -0.49% | 16.70% | 11,265.30 | 0.28% | 5.85% |
| 2006-8-31 | 218,836.14 | 0.88% | 101.073 | 0.50% | 15.70% | 11,484.60 | 1.95% | 6.12% |
| 2006-9-30 | 221,035.86 | 1.01% | 101.982 | 0.90% | 16.10% | 11,681.40 | 1.71% | 6.12% |
| 2006-10-31 | 221,205.32 | 0.08% | 102.289 | 0.30% | 14.70% | 11,836.00 | 1.32% | 6.12% |
| 2006-11-30 | 223,141.55 | 0.88% | 102.485 | 0.19% | 14.90% | 12,164.50 | 2.78% | 6.12% |
| 2006-12-31 | 225,285.28 | 0.96% | 103.803 | 1.29% | 14.70% | 12,603.50 | 3.61% | 6.12% |

| | | | | | | | | |
|------------|------------|--------|---------|--------|--------|-----------|--------|-------|
| 2007-1-31 | 231,031.18 | 2.55% | 104.142 | 0.33% | 18.50% | 12,848.40 | 1.94% | 6.12% |
| 2007-2-28 | 235,168.74 | 1.79% | 105.49 | 1.29% | 18.50% | 12,625.80 | -1.73% | 6.12% |
| 2007-3-31 | 239,585.58 | 1.88% | 105.047 | -0.42% | 17.60% | 12,788.10 | 1.29% | 6.39% |
| 2007-4-30 | 243,805.22 | 1.76% | 104.842 | -0.20% | 17.40% | 12,767.80 | -0.16% | 6.39% |
| 2007-5-31 | 246,277.96 | 1.01% | 105.246 | 0.39% | 18.10% | 13,027.60 | 2.03% | 6.57% |
| 2007-6-30 | 250,792.59 | 1.83% | 105.518 | 0.26% | 19.40% | 13,584.70 | 4.28% | 6.57% |
| 2007-7-31 | 253,106.67 | 0.92% | 106.205 | 0.65% | 18.00% | 13,623.70 | 0.29% | 6.84% |
| 2007-8-31 | 256,135.41 | 1.20% | 107.643 | 1.35% | 17.50% | 14,099.30 | 3.49% | 7.02% |
| 2007-9-30 | 258,970.33 | 1.11% | 108.305 | 0.61% | 18.90% | 14,259.20 | 1.13% | 7.29% |
| 2007-10-31 | 260,331.44 | 0.53% | 108.937 | 0.58% | 17.90% | 14,464.90 | 1.44% | 7.29% |
| 2007-11-30 | 261,205.40 | 0.34% | 109.556 | 0.57% | 17.30% | 14,801.00 | 2.32% | 7.29% |
| 2007-12-31 | 261,690.88 | 0.19% | 110.551 | 0.91% | 17.40% | 15,256.00 | 3.07% | 7.47% |
| 2008-1-31 | 269,695.58 | 3.06% | 111.536 | 0.89% | 15.40% | 15,487.00 | 1.51% | 7.47% |
| 2008-2-29 | 272,165.99 | 0.92% | 114.667 | 2.81% | 15.40% | 15,017.80 | -3.03% | 7.47% |
| 2008-3-31 | 275,000.21 | 1.04% | 113.766 | -0.79% | 17.80% | 15,086.80 | 0.46% | 7.47% |
| 2008-4-30 | 279,690.16 | 1.71% | 113.753 | -0.01% | 15.70% | 15,169.50 | 0.55% | 7.47% |
| 2008-5-31 | 282,875.17 | 1.14% | 113.35 | -0.35% | 16.00% | 15,334.50 | 1.09% | 7.47% |
| 2008-6-30 | 286,199.38 | 1.18% | 113.009 | -0.30% | 16.00% | 15,482.00 | 0.96% | 7.47% |
| 2008-7-31 | 290,016.98 | 1.33% | 112.896 | -0.10% | 14.70% | 15,499.30 | 0.11% | 7.47% |
| 2008-8-31 | 292,732.36 | 0.94% | 112.917 | 0.02% | 12.80% | 15,689.00 | 1.22% | 7.47% |
| 2008-9-30 | 296,477.09 | 1.28% | 113.287 | 0.33% | 11.40% | 15,574.90 | -0.73% | 7.20% |
| 2008-10-31 | 298,295.65 | 0.61% | 113.295 | 0.01% | 8.20% | 15,719.40 | 0.93% | 6.66% |
| 2008-11-30 | 295,749.55 | -0.85% | 112.185 | -0.98% | 5.40% | 15,782.70 | 0.40% | 5.58% |
| 2008-12-31 | 303,394.64 | 2.58% | 111.877 | -0.27% | 5.70% | 16,621.70 | 5.32% | 5.31% |
| 2009-1-31 | 319,921.84 | 5.45% | 112.651 | 0.69% | 3.80% | 16,521.50 | -0.60% | 5.31% |
| 2009-2-28 | 330,637.71 | 3.35% | 112.832 | 0.16% | 3.80% | 16,615.00 | 0.57% | 5.31% |
| 2009-3-31 | 349,554.82 | 5.72% | 112.4 | -0.38% | 8.30% | 17,654.10 | 6.25% | 5.31% |
| 2009-4-30 | 355,472.82 | 1.69% | 112.047 | -0.31% | 7.30% | 17,821.40 | 0.95% | 5.31% |
| 2009-5-31 | 362,141.69 | 1.88% | 111.763 | -0.25% | 8.90% | 18,202.60 | 2.14% | 5.31% |
| 2009-6-30 | 377,446.12 | 4.23% | 111.088 | -0.60% | 10.70% | 19,313.80 | 6.10% | 5.31% |
| 2009-7-31 | 381,137.61 | 0.98% | 110.864 | -0.20% | 10.80% | 19,588.90 | 1.42% | 5.31% |
| 2009-8-31 | 385,241.19 | 1.08% | 111.562 | 0.63% | 12.30% | 20,039.50 | 2.30% | 5.31% |
| 2009-9-30 | 390,407.85 | 1.34% | 112.38 | 0.73% | 13.90% | 20,170.80 | 0.66% | 5.31% |
| 2009-10-31 | 392,937.64 | 0.65% | 112.728 | 0.31% | 16.10% | 20,754.60 | 2.89% | 5.31% |
| 2009-11-30 | 395,885.31 | 0.75% | 112.859 | 0.12% | 19.20% | 21,249.30 | 2.38% | 5.31% |
| 2009-12-31 | 399,684.82 | 0.96% | 114.003 | 1.01% | 18.50% | 22,144.50 | 4.21% | 5.31% |
| 2010-1-31 | 413,679.60 | 3.50% | 114.341 | 0.30% | 20.70% | 22,958.90 | 3.68% | 5.31% |
| 2010-2-28 | 420,678.38 | 1.69% | 115.879 | 1.35% | 20.70% | 22,428.70 | -2.31% | 5.31% |
| 2010-3-31 | 425,785.27 | 1.21% | 115.098 | -0.67% | 18.10% | 22,939.80 | 2.28% | 5.31% |
| 2010-4-30 | 433,525.27 | 1.82% | 115.184 | 0.07% | 17.80% | 23,391.00 | 1.97% | 5.31% |
| 2010-5-31 | 440,018.15 | 1.50% | 115.228 | 0.04% | 16.50% | 23,649.80 | 1.11% | 5.31% |
| 2010-6-30 | 446,045.62 | 1.37% | 114.31 | -0.80% | 13.70% | 24,058.00 | 1.73% | 5.31% |
| 2010-7-31 | 451,372.55 | 1.19% | 114.522 | 0.19% | 13.40% | 24,066.40 | 0.03% | 5.31% |
| 2010-8-31 | 456,818.62 | 1.21% | 115.467 | 0.83% | 13.90% | 24,434.10 | 1.53% | 5.31% |
| 2010-9-30 | 462,822.64 | 1.31% | 116.426 | 0.83% | 13.30% | 24,382.20 | -0.21% | 5.31% |
| 2010-10-31 | 468,699.94 | 1.27% | 117.689 | 1.08% | 13.10% | 25,331.30 | 3.89% | 5.56% |
| 2010-11-30 | 474,389.23 | 1.21% | 118.614 | 0.79% | 13.30% | 25,942.00 | 2.41% | 5.56% |
| 2010-12-31 | 479,195.55 | 1.01% | 119.247 | 0.53% | 13.50% | 26,662.20 | 2.78% | 5.81% |
| 2011-1-31 | 483,493.87 | 0.90% | 119.944 | 0.58% | 14.10% | 26,176.50 | -1.82% | 5.81% |
| 2011-2-28 | 488,870.98 | 1.11% | 121.557 | 1.34% | 14.10% | 25,920.10 | -0.98% | 6.06% |
| 2011-3-31 | 494,740.70 | 1.20% | 121.313 | -0.20% | 14.80% | 26,625.60 | 2.72% | 6.06% |
| 2011-4-30 | 502,170.76 | 1.50% | 121.289 | -0.02% | 13.40% | 26,676.70 | 0.19% | 6.31% |
| 2011-5-31 | 507,686.31 | 1.10% | 121.565 | 0.23% | 13.30% | 26,929.00 | 0.95% | 6.31% |
| 2011-6-30 | 514,025.54 | 1.25% | 121.626 | 0.05% | 15.10% | 27,466.30 | 2.00% | 6.31% |
| 2011-7-31 | 518,941.36 | 0.96% | 121.966 | 0.28% | 14.00% | 27,054.60 | -1.50% | 6.56% |
| 2011-8-31 | 524,425.79 | 1.06% | 122.626 | 0.54% | 13.50% | 27,339.40 | 1.05% | 6.56% |
| 2011-9-30 | 529,118.34 | 0.89% | 123.528 | 0.74% | 13.80% | 26,719.30 | -2.27% | 6.56% |
| 2011-10-31 | 534,986.76 | 1.11% | 124.161 | 0.51% | 13.20% | 27,655.30 | 3.50% | 6.56% |
| 2011-11-30 | 540,616.20 | 1.05% | 123.596 | -0.46% | 12.40% | 28,141.60 | 1.76% | 6.56% |
| 2011-12-31 | 547,946.69 | 1.36% | 124.136 | 0.44% | 12.80% | 28,984.80 | 3.00% | 6.56% |
| 2012-1-31 | 555,253.05 | 1.33% | 125.341 | 0.97% | 11.40% | 27,001.00 | -6.84% | 6.56% |
| 2012-2-29 | 562,360.40 | 1.28% | 125.447 | 0.08% | 11.40% | 27,031.20 | 0.11% | 6.56% |
| 2012-3-31 | 572,474.82 | 1.80% | 125.681 | 0.19% | 11.90% | 27,799.80 | 2.84% | 6.56% |
| 2012-4-30 | 579,292.11 | 1.19% | 125.413 | -0.21% | 9.30% | 27,498.40 | -1.08% | 6.56% |
| 2012-5-31 | 587,224.43 | 1.37% | 125.212 | -0.16% | 9.60% | 27,865.60 | 1.34% | 6.56% |
| 2012-6-30 | 596,422.59 | 1.57% | 124.461 | -0.60% | 9.50% | 28,752.60 | 3.18% | 6.31% |
| 2012-7-31 | 601,823.80 | 0.91% | 124.585 | 0.10% | 9.20% | 28,309.10 | -1.54% | 6.00% |
| 2012-8-31 | 608,863.25 | 1.17% | 125.333 | 0.60% | 8.90% | 28,573.90 | 0.94% | 6.00% |
| 2012-9-30 | 615,089.48 | 1.02% | 125.709 | 0.30% | 9.20% | 28,678.80 | 0.37% | 6.00% |
| 2012-10-31 | 620,143.19 | 0.82% | 125.583 | -0.10% | 9.60% | 29,331.00 | 2.27% | 6.00% |
| 2012-11-30 | 625,363.56 | 0.84% | 125.709 | 0.10% | 10.10% | 29,688.30 | 1.22% | 6.00% |
| 2012-12-31 | 629,909.64 | 0.73% | 126.714 | 0.80% | 10.30% | 30,866.40 | 3.97% | 6.00% |
| 2013-1-31 | 640,766.52 | 1.72% | 127.982 | 1.00% | 9.90% | 31,122.90 | 0.83% | 6.00% |
| 2013-2-28 | 646,966.40 | 0.97% | 129.389 | 1.10% | 9.90% | 29,610.30 | -4.86% | 6.00% |
| 2013-3-31 | 657,591.82 | 1.64% | 128.225 | -0.90% | 8.90% | 31,089.80 | 5.00% | 6.00% |
| 2013-4-30 | 665,514.79 | 1.20% | 128.481 | 0.20% | 9.30% | 30,764.80 | -1.05% | 6.00% |

Appendix 2: VAR model

Vector Autoregression Estimates

Date: 09/06/13 Time: 21:52

Sample (adjusted): 3 147

Included observations: 145 after adjustments

Standard errors in () & t-statistics in []

| | CPI | RATE | RGDP | RM1 | RSB |
|----------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| CPI(-1) | 0.250997 (0.08387) [2.99280] | 0.006631 (0.01896) [0.34985] | 0.384008 (0.18071) [2.12495] | -0.189305 (0.29676) [-0.63790] | 0.026377 (0.17656) [0.14939] |
| CPI(-2) | 0.065818 (0.08326) [0.79052] | 0.009988 (0.01882) [0.53076] | -0.091303 (0.17940) [-0.50892] | -0.130448 (0.29461) [-0.44278] | -0.162652 (0.17528) [-0.92793] |
| RATE(-1) | 0.464223 (0.36684) [1.26547] | 1.322420 (0.08291) [15.9499] | 1.283180 (0.79045) [1.62334] | 0.261050 (1.29804) [0.20111] | -0.494912 (0.77230) [-0.64083] |
| RATE(-2) | -0.359607 (0.36925) [-0.97389] | -0.356737 (0.08346) [-4.27459] | -1.769163 (0.79565) [-2.22356] | -0.880863 (1.30657) [-0.67418] | 0.265398 (0.77737) [0.34140] |
| RGDP(-1) | 0.005197 (0.04145) [0.12537] | 0.010387 (0.00937) [1.10880] | 0.923371 (0.08931) [10.3386] | -0.181620 (0.14666) [-1.23833] | -0.055614 (0.08726) [-0.63732] |
| RGDP(-2) | 6.00E-07 (0.04064) [1.5e-05] | -0.003998 (0.00919) [-0.43521] | -0.017185 (0.08758) [-0.19623] | 0.162086 (0.14382) [1.12702] | 0.025697 (0.08557) [0.30031] |
| RM1(-1) | 0.114751 (0.02662) [4.31048] | 0.000544 (0.00602) [0.09043] | 0.078910 (0.05736) [1.37563] | -0.208064 (0.09420) [-2.20878] | -0.018025 (0.05605) [-0.32160] |
| RM1(-2) | 0.107828 (0.02651) [4.06754] | 0.000758 (0.00599) [0.12646] | -0.067196 (0.05712) [-1.17637] | -0.168383 (0.09380) [-1.79508] | -0.021988 (0.05581) [-0.39398] |
| RSB(-1) | 0.050056 | 0.004479 | -0.149340 | -0.232568 | 0.112354 |

| | | | | | |
|---|------------|------------|------------|------------|------------|
| | (0.04231) | (0.00956) | (0.09117) | (0.14971) | (0.08907) |
| | [1.18311] | [0.46837] | [-1.63812] | [-1.55349] | [1.26138] |
| RSB(-2) | -0.112381 | -0.006806 | 0.178120 | 0.154917 | 0.111795 |
| | (0.04217) | (0.00953) | (0.09086) | (0.14920) | (0.08877) |
| | [-2.66523] | [-0.71420] | [1.96044] | [1.03831] | [1.25937] |
| C | -0.007318 | 0.001103 | 0.040443 | 0.057621 | 0.028859 |
| | (0.00532) | (0.00120) | (0.01146) | (0.01882) | (0.01120) |
| | [-1.37589] | [0.91782] | [3.52911] | [3.06189] | [2.57741] |
| R-squared | 0.317183 | 0.963313 | 0.890381 | 0.135881 | 0.076030 |
| Adj. R-squared | 0.266227 | 0.960575 | 0.882200 | 0.071395 | 0.007077 |
| Sum sq. resid | 0.004358 | 0.000223 | 0.020235 | 0.054567 | 0.019316 |
| S.E. equation | 0.005703 | 0.001289 | 0.012288 | 0.020180 | 0.012006 |
| F-statistic | 6.224596 | 351.8496 | 108.8412 | 2.107128 | 1.102641 |
| Log likelihood | 549.1566 | 764.7943 | 437.8420 | 365.9212 | 441.2108 |
| Akaike AIC | -7.422849 | -10.39716 | -5.887476 | -4.895464 | -5.933942 |
| Schwarz SC | -7.197028 | -10.17134 | -5.661655 | -4.669643 | -5.708120 |
| Mean dependent | 0.002086 | 0.058793 | 0.140883 | 0.012188 | 0.013358 |
| S.D. dependent | 0.006658 | 0.006492 | 0.035804 | 0.020941 | 0.012049 |
| Determinant resid covariance (dof adj.) | | 3.61E-22 | | | |
| Determinant resid covariance | | 2.43E-22 | | | |
| Log likelihood | | 2579.380 | | | |
| Akaike information criterion | | -34.81903 | | | |
| Schwarz criterion | | -33.68993 | | | |

Appendix 3: SVAR model

Structural VAR Estimates

Date: 09/08/13 Time: 23:07

Sample (adjusted): 2 147

Included observations: 146 after adjustments

Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 8 iterations

Structural VAR is just-identified

Model: $Ae = Bu$ where $E[uu'] = I$

Restriction Type: short-run text form

$$@e1 = C(1)*@u1$$

$$@e2 = C(2)*@e1 + C(3)*@u2$$

$$@e3 = C(4)*@e1 + C(5)*@e2 + C(6)*@u3$$

$$@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4$$

$$@e5 = C(11)*@e1 + C(12)*@e2 + C(13)*@e3 + C(14)*@e4 + C(15)*@u5$$

where

@e1 represents CPI residuals

@e2 represents RATE residuals

@e3 represents RGDP residuals

@e4 represents RM1 residuals

@e5 represents RSB residuals

| | Coefficient | Std. Error | z-Statistic | Prob. |
|----------------|-------------|------------|-------------|--------|
| C(2) | 0.021546 | 0.018464 | 1.166910 | 0.2432 |
| C(4) | 0.126732 | 0.170789 | 0.742038 | 0.4581 |
| C(5) | 1.598447 | 0.761958 | 2.097814 | 0.0359 |
| C(7) | -0.869079 | 0.255651 | -3.399470 | 0.0007 |
| C(8) | 1.271729 | 1.155449 | 1.100636 | 0.2711 |
| C(9) | 0.493912 | 0.123650 | 3.994434 | 0.0001 |
| C(11) | 0.102704 | 0.163765 | 0.627147 | 0.5306 |
| C(12) | 0.515925 | 0.715444 | 0.721126 | 0.4708 |
| C(13) | 0.129330 | 0.080306 | 1.610473 | 0.1073 |
| C(14) | 0.111094 | 0.051033 | 2.176894 | 0.0295 |
| C(1) | 0.006020 | 0.000352 | 17.08801 | 0.0000 |
| C(3) | 0.001343 | 7.86E-05 | 17.08801 | 0.0000 |
| C(6) | 0.012366 | 0.000724 | 17.08801 | 0.0000 |
| C(10) | 0.018475 | 0.001081 | 17.08801 | 0.0000 |
| C(15) | 0.011393 | 0.000667 | 17.08801 | 0.0000 |
| Log likelihood | 2553.487 | | | |

Estimated A matrix:

| | | | | |
|-----------|-----------|-----------|-----------|----------|
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| -0.021546 | 1.000000 | 0.000000 | 0.000000 | 0.000000 |
| -0.126732 | -1.598447 | 1.000000 | 0.000000 | 0.000000 |
| 0.869079 | -1.271729 | -0.493912 | 1.000000 | 0.000000 |
| -0.102704 | -0.515925 | -0.129330 | -0.111094 | 1.000000 |

Estimated B matrix:

| | | | | |
|----------|----------|----------|----------|----------|
| 0.006020 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.000000 | 0.001343 | 0.000000 | 0.000000 | 0.000000 |
| 0.000000 | 0.000000 | 0.012366 | 0.000000 | 0.000000 |
| 0.000000 | 0.000000 | 0.000000 | 0.018475 | 0.000000 |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.011393 |

Appendix 3: Data for the analysis of OLS regression, trend and correlation

| Date | Loan(100) | Loan | M1 | M2 | total det | GR | Household | Lending | deposit |
|------------|-----------|--------|--------|--------|-----------|--------|-----------|---------|---------|
| 2003-8-31 | 153025.17 | 23.90% | 18.75% | 20.89% | 197725.62 | 22.30% | 19.19% | 5.31% | 1.98% |
| 2003-9-30 | 156059.89 | 23.50% | 18.51% | 20.08% | 202869.26 | 22.50% | 19.91% | 5.31% | 1.98% |
| 2003-10-31 | 156676.17 | 23.28% | 18.76% | 20.02% | 204076.95 | 22.60% | 19.66% | 5.31% | 1.98% |
| 2003-11-30 | 157701.12 | 22.60% | 18.86% | 19.81% | 206119.57 | 22.26% | 19.30% | 5.31% | 1.98% |
| 2003-12-31 | 158996.23 | 21.10% | 18.67% | 19.24% | 208055.59 | 21.70% | 19.22% | 5.31% | 1.98% |
| 2004-1-31 | 161730.64 | 20.12% | 15.54% | 18.44% | 210248.48 | 21.25% | 20.46% | 5.31% | 1.98% |
| 2004-2-29 | 163810.61 | 20.70% | 19.64% | 19.72% | 214628.54 | 21.54% | 19.20% | 5.31% | 1.98% |
| 2004-3-31 | 167442.53 | 20.10% | 19.96% | 19.37% | 220563.25 | 21.00% | 18.30% | 5.31% | 1.98% |
| 2004-4-30 | 169434.99 | 19.90% | 19.15% | 19.05% | 222360.32 | 20.44% | 17.84% | 5.31% | 1.98% |
| 2004-5-31 | 170566.13 | 18.60% | 18.41% | 17.71% | 225048.71 | 19.10% | 16.87% | 5.31% | 1.98% |
| 2004-6-30 | 169905.22 | 16.30% | 15.59% | 16.33% | 229670.82 | 18.20% | 16.50% | 5.31% | 1.98% |
| 2004-7-31 | 169884.39 | 15.50% | 15.48% | 15.93% | 230192.75 | 17.70% | 15.89% | 5.31% | 1.98% |
| 2004-8-31 | 171040.15 | 14.10% | 15.57% | 14.14% | 232473.01 | 17.60% | 15.35% | 5.31% | 1.98% |
| 2004-9-30 | 173473.07 | 13.60% | 14.06% | 14.40% | 235029.68 | 15.80% | 14.44% | 5.31% | 1.98% |
| 2004-10-31 | 173728.97 | 13.30% | 13.77% | 14.25% | 236483.03 | 15.90% | 14.42% | 5.58% | 2.25% |
| 2004-11-30 | 175224.01 | 13.50% | 14.18% | 14.47% | 239788.54 | 16.30% | 15.05% | 5.58% | 2.25% |
| 2004-12-31 | 177363.49 | 14.50% | 13.91% | 14.89% | 240525.07 | 16.00% | 15.38% | 5.58% | 2.25% |
| 2005-1-31 | 181082.96 | 14.20% | 15.90% | 13.68% | 245368.63 | 16.70% | 11.91% | 5.58% | 2.25% |
| 2005-2-28 | 182042.3 | 13.40% | 11.07% | 13.58% | 248752.1 | 15.90% | 15.52% | 5.58% | 2.25% |
| 2005-3-31 | 185461.32 | 13.00% | 10.37% | 13.55% | 255573.32 | 15.90% | 15.54% | 5.58% | 2.25% |
| 2005-4-30 | 186889.1 | 12.50% | 11.12% | 13.87% | 258882.32 | 16.40% | 15.73% | 5.58% | 2.25% |
| 2005-5-31 | 186274.1 | 12.40% | 11.03% | 14.23% | 262848.38 | 16.80% | 15.96% | 5.58% | 2.25% |
| 2005-6-30 | 186178.7 | 13.30% | 12.21% | 15.32% | 269140.58 | 17.20% | 16.30% | 5.58% | 2.25% |
| 2005-7-31 | 185859.75 | 13.10% | 10.93% | 15.46% | 270736.45 | 17.60% | 16.98% | 5.58% | 2.25% |
| 2005-8-31 | 187756.6 | 13.40% | 11.50% | 16.49% | 275100.41 | 18.30% | 17.48% | 5.58% | 2.25% |
| 2005-9-30 | 190941.9 | 13.80% | 11.64% | 17.07% | 279882.41 | 19.10% | 18.06% | 5.58% | 2.25% |
| 2005-10-31 | 191168.27 | 13.80% | 12.11% | 17.14% | 281465.66 | 19.00% | 17.95% | 5.58% | 2.25% |
| 2005-11-30 | 193416.93 | 14.10% | 12.71% | 17.33% | 285504.74 | 19.10% | 17.76% | 5.58% | 2.25% |
| 2005-12-31 | 194690.39 | 12.98% | 11.57% | 16.74% | 287169.52 | 18.95% | 17.98% | 5.58% | 2.25% |
| 2006-1-31 | 199492.05 | 13.80% | 10.30% | 23.42% | 291436.87 | 17.00% | 21.07% | 5.58% | 2.25% |
| 2006-2-28 | 201020.25 | 14.10% | 12.42% | 23.00% | 297671.93 | 19.70% | 18.27% | 5.58% | 2.25% |
| 2006-3-31 | 206394.59 | 14.70% | 12.84% | 23.15% | 305532.64 | 19.60% | 18.23% | 5.58% | 2.25% |
| 2006-4-30 | 209555.78 | 15.50% | 12.66% | 23.52% | 310105.35 | 19.80% | 18.17% | 5.85% | 2.25% |
| 2006-5-31 | 211649.97 | 16.00% | 14.15% | 23.66% | 314347.8 | 19.60% | 17.57% | 5.85% | 2.25% |
| 2006-6-30 | 215302.59 | 15.24% | 14.08% | 23.17% | 318455.71 | 18.36% | 17.12% | 5.85% | 2.25% |
| 2006-7-31 | 216935.55 | 16.30% | 15.48% | 23.21% | 319860.35 | 18.20% | 16.07% | 5.85% | 2.25% |
| 2006-8-31 | 218836.14 | 16.10% | 15.70% | 22.85% | 323903.07 | 17.80% | 16.19% | 6.12% | 2.52% |
| 2006-9-30 | 221035.86 | 15.23% | 15.88% | 21.79% | 327775.52 | 17.15% | 15.99% | 6.12% | 2.52% |
| 2006-10-31 | 221205.32 | 15.20% | 16.45% | 22.00% | 329298.14 | 17.00% | 15.50% | 6.12% | 2.52% |
| 2006-11-30 | 223141.55 | 14.80% | 16.96% | 21.90% | 334361.41 | 17.20% | 15.32% | 6.12% | 2.52% |
| 2006-12-31 | 225285.28 | 15.07% | 17.90% | 22.12% | 335434.1 | 16.82% | 14.56% | 6.12% | 2.52% |
| 2007-1-31 | 231031.18 | 16.00% | 20.14% | 15.90% | 340137.7 | 16.80% | 11.27% | 6.12% | 2.52% |
| 2007-2-28 | 235168.74 | 17.20% | 21.15% | 17.84% | 345444.4 | 16.00% | 14.95% | 6.12% | 2.52% |
| 2007-3-31 | 239585.58 | 16.25% | 19.81% | 17.26% | 352428.28 | 15.94% | 14.81% | 6.39% | 2.79% |
| 2007-4-30 | 243805.22 | 16.50% | 20.01% | 17.09% | 358746.27 | 15.70% | 13.28% | 6.39% | 2.79% |
| 2007-5-31 | 246277.96 | 16.52% | 19.28% | 16.74% | 360327.12 | 14.63% | 11.38% | 6.57% | 3.06% |
| 2007-6-30 | 250792.59 | 16.48% | 20.92% | 17.06% | 369368.28 | 15.99% | 11.40% | 6.57% | 3.06% |
| 2007-7-31 | 253106.67 | 16.63% | 20.94% | 18.48% | 370953.81 | 15.97% | 11.25% | 6.84% | 3.33% |
| 2007-8-31 | 256135.41 | 17.02% | 22.77% | 18.09% | 377415.95 | 16.52% | 10.16% | 7.02% | 3.60% |
| 2007-9-30 | 258970.33 | 17.13% | 22.07% | 18.45% | 382981.2 | 16.84% | 8.80% | 7.29% | 3.87% |
| 2007-10-31 | 260331.44 | 17.66% | 22.21% | 18.47% | 378483.7 | 14.94% | 5.65% | 7.29% | 3.87% |
| 2007-11-30 | 261205.4 | 17.03% | 21.67% | 18.45% | 385507.14 | 15.30% | 6.18% | 7.29% | 3.87% |
| 2007-12-31 | 261690.88 | 16.10% | 21.05% | 16.74% | 389371.15 | 16.07% | 8.76% | 7.47% | 4.14% |
| 2008-1-31 | 269695.58 | 16.74% | 20.54% | 18.87% | 391551.46 | 15.12% | 7.74% | 7.47% | 4.14% |
| 2008-2-29 | 272165.99 | 15.73% | 18.95% | 17.39% | 404927.55 | 17.22% | 7.69% | 7.47% | 4.14% |
| 2008-3-31 | 275000.21 | 14.78% | 17.98% | 16.19% | 415693.11 | 17.35% | 8.70% | 7.47% | 4.14% |
| 2008-4-30 | 279690.16 | 14.70% | 18.81% | 16.88% | 422275.01 | 17.69% | 10.35% | 7.47% | 4.14% |
| 2008-5-31 | 282875.17 | 14.86% | 17.71% | 17.99% | 431273.96 | 19.64% | 13.53% | 7.47% | 4.14% |
| 2008-6-30 | 286199.38 | 14.12% | 13.97% | 17.29% | 438989.25 | 18.85% | 14.56% | 7.47% | 4.14% |
| 2008-7-31 | 290016.98 | 14.58% | 13.77% | 16.27% | 443671.51 | 19.60% | 16.05% | 7.47% | 4.14% |
| 2008-8-31 | 292732.36 | 14.29% | 11.28% | 15.92% | 450172.32 | 19.28% | 18.31% | 7.47% | 4.14% |
| 2008-9-30 | 296477.09 | 14.48% | 9.23% | 15.21% | 454941.54 | 18.79% | 21.06% | 7.20% | 4.14% |
| 2008-10-31 | 298295.65 | 14.58% | 8.67% | 14.95% | 458331.49 | 21.10% | 26.62% | 6.66% | 3.60% |
| 2008-11-30 | 295749.55 | 16.03% | 6.63% | 14.73% | 462369.22 | 19.94% | 26.91% | 5.58% | 2.52% |
| 2008-12-31 | 303394.64 | 18.76% | 8.95% | 17.78% | 466203.32 | 19.73% | 26.32% | 5.31% | 2.25% |

| | | | | | | | | | |
|------------|-----------|--------|--------|--------|-----------|--------|--------|-------|-------|
| 2009-1-31 | 319921.84 | 21.33% | 6.68% | 18.74% | 481592.11 | 22.98% | 33.72% | 5.31% | 2.25% |
| 2009-2-28 | 330637.71 | 24.17% | 10.64% | 20.35% | 498100.3 | 23.01% | 29.20% | 5.31% | 2.25% |
| 2009-3-31 | 349554.82 | 29.78% | 17.02% | 25.43% | 522618.72 | 25.73% | 29.76% | 5.31% | 2.25% |
| 2009-4-30 | 355472.82 | 29.72% | 17.48% | 25.89% | 532941.05 | 26.21% | 29.65% | 5.31% | 2.25% |
| 2009-5-31 | 362141.69 | 30.60% | 18.70% | 25.68% | 546300.02 | 26.67% | 29.05% | 5.31% | 2.25% |
| 2009-6-30 | 377446.12 | 34.44% | 24.75% | 28.38% | 566288.11 | 29.02% | 28.20% | 5.31% | 2.25% |
| 2009-7-31 | 381137.61 | 33.90% | 26.39% | 28.39% | 570390.73 | 28.54% | 26.59% | 5.31% | 2.25% |
| 2009-8-31 | 385241.19 | 34.11% | 27.73% | 28.49% | 573939.55 | 27.43% | 24.08% | 5.31% | 2.25% |
| 2009-9-30 | 390407.85 | 34.16% | 29.51% | 29.26% | 583987.21 | 28.35% | 24.81% | 5.31% | 2.25% |
| 2009-10-31 | 392937.64 | 34.19% | 32.03% | 29.46% | 586884.01 | 28.05% | 21.77% | 5.31% | 2.25% |
| 2009-11-30 | 395885.31 | 33.79% | 34.64% | 29.64% | 592719.76 | 28.19% | 19.85% | 5.31% | 2.25% |
| 2009-12-31 | 399684.82 | 31.74% | 33.23% | 28.42% | 597741.1 | 28.21% | 19.21% | 5.31% | 2.25% |
| 2010-1-31 | 413679.6 | 29.31% | 38.96% | 26.10% | 612877.26 | 27.26% | 12.58% | 5.31% | 2.25% |
| 2010-2-28 | 420678.38 | 27.23% | 34.99% | 25.53% | 622436.84 | 24.97% | 16.93% | 5.31% | 2.25% |
| 2010-3-31 | 425785.27 | 21.81% | 29.94% | 22.49% | 638090.42 | 22.11% | 15.11% | 5.31% | 2.25% |
| 2010-4-30 | 433525.27 | 21.96% | 31.25% | 21.48% | 649915.56 | 21.95% | 14.42% | 5.31% | 2.25% |
| 2010-5-31 | 440018.15 | 21.50% | 29.93% | 20.99% | 660756.78 | 21.00% | 13.83% | 5.31% | 2.25% |
| 2010-6-30 | 446045.62 | 18.20% | 24.56% | 18.46% | 674098.03 | 19.00% | 15.22% | 5.31% | 2.25% |
| 2010-7-31 | 451372.55 | 18.40% | 22.86% | 17.61% | 675706.88 | 18.50% | 15.08% | 5.31% | 2.25% |
| 2010-8-31 | 456818.62 | 18.60% | 21.93% | 19.21% | 686463.53 | 19.60% | 16.20% | 5.31% | 2.25% |
| 2010-9-30 | 462822.64 | 18.50% | 20.88% | 18.97% | 701024.48 | 20.00% | 17.02% | 5.31% | 2.25% |
| 2010-10-31 | 468699.94 | 19.30% | 22.05% | 19.29% | 702793.71 | 19.80% | 15.44% | 5.56% | 2.50% |
| 2010-11-30 | 474389.23 | 19.80% | 22.08% | 19.46% | 708784.3 | 19.60% | 15.74% | 5.56% | 2.50% |
| 2010-12-31 | 479195.55 | 19.90% | 20.40% | 18.95% | 718237.93 | 20.20% | 16.52% | 5.81% | 2.75% |
| 2011-1-31 | 483493.87 | 18.50% | 14.02% | 17.31% | 712828.05 | 17.30% | 18.01% | 5.81% | 2.75% |
| 2011-2-28 | 488870.98 | 17.70% | 15.57% | 15.73% | 726017.64 | 17.60% | 12.33% | 6.06% | 3.00% |
| 2011-3-31 | 494740.7 | 17.90% | 16.07% | 16.65% | 752838.4 | 19.00% | 15.01% | 6.06% | 3.00% |
| 2011-4-30 | 502170.76 | 17.50% | 14.05% | 15.36% | 756262.39 | 17.30% | 13.53% | 6.31% | 3.25% |
| 2011-5-31 | 507686.31 | 17.10% | 13.87% | 15.08% | 767339 | 17.10% | 13.50% | 6.31% | 3.25% |
| 2011-6-30 | 514025.54 | 16.90% | 14.17% | 15.86% | 786432.56 | 17.60% | 14.19% | 6.31% | 3.25% |
| 2011-7-31 | 518941.36 | 16.60% | 12.42% | 14.67% | 779731.73 | 16.30% | 12.08% | 6.56% | 3.50% |
| 2011-8-31 | 524425.79 | 16.40% | 11.89% | 13.58% | 786797.56 | 15.50% | 11.45% | 6.56% | 3.50% |
| 2011-9-30 | 529118.34 | 15.90% | 9.59% | 13.06% | 794100.44 | 14.20% | 10.86% | 6.56% | 3.50% |
| 2011-10-31 | 534986.76 | 15.80% | 9.17% | 16.73% | 791884.98 | 13.60% | 11.03% | 6.56% | 3.50% |
| 2011-11-30 | 540616.2 | 15.60% | 8.48% | 16.21% | 795113.97 | 13.10% | 11.22% | 6.56% | 3.50% |
| 2011-12-31 | 547946.69 | 15.80% | 8.71% | 17.32% | 809368.33 | 13.50% | 12.86% | 6.56% | 3.50% |
| 2012-1-31 | 555253.05 | 15.00% | 3.15% | 16.63% | 801385.32 | 12.40% | 16.10% | 6.56% | 3.50% |
| 2012-2-29 | 562360.4 | 15.20% | 4.29% | 17.80% | 817398.08 | 12.60% | 15.74% | 6.56% | 3.50% |
| 2012-3-31 | 572474.82 | 15.70% | 4.41% | 18.13% | 846931.7 | 12.50% | 16.14% | 6.56% | 3.50% |
| 2012-4-30 | 579292.11 | 15.40% | 3.08% | 17.46% | 842275.28 | 11.40% | 15.84% | 6.56% | 3.50% |
| 2012-5-31 | 587224.43 | 15.70% | 3.48% | 17.90% | 854499.67 | 11.40% | 16.29% | 6.56% | 3.50% |
| 2012-6-30 | 596422.59 | 16.00% | 4.68% | 18.46% | 883068.72 | 12.30% | 17.23% | 6.31% | 3.25% |
| 2012-7-31 | 601823.8 | 16.00% | 4.64% | 18.91% | 878062.3 | 12.60% | 17.99% | 6.00% | 3.00% |
| 2012-8-31 | 608863.25 | 16.10% | 4.52% | 18.45% | 883106.28 | 12.20% | 18.21% | 6.00% | 3.00% |
| 2012-9-30 | 615089.48 | 16.30% | 7.33% | 19.85% | 899647.06 | 13.30% | 18.05% | 6.00% | 3.00% |
| 2012-10-31 | 620143.19 | 15.90% | 6.06% | 14.64% | 896846.62 | 13.30% | 18.64% | 6.00% | 3.00% |
| 2012-11-30 | 625363.56 | 15.70% | 5.50% | 14.46% | 901585.93 | 13.40% | 18.64% | 6.00% | 3.00% |
| 2012-12-31 | 629909.64 | 15.00% | 6.49% | 14.39% | 917554.77 | 13.30% | 16.71% | 6.00% | 3.00% |
| 2013-1-31 | 640766.52 | 15.40% | 15.27% | 15.92% | 929345.33 | 16.00% | 13.13% | 6.00% | 3.00% |
| 2013-2-28 | 646966.4 | 15.00% | 9.54% | 15.16% | 937065.14 | 14.60% | 17.44% | 6.00% | 3.00% |
| 2013-3-31 | 657591.82 | 14.90% | 11.84% | 15.67% | 979300.53 | 15.60% | 16.53% | 6.00% | 3.00% |
| 2013-4-30 | 665514.79 | 14.90% | 11.88% | 16.07% | 978299.69 | 16.20% | 16.02% | 6.00% | 3.00% |

Appendix 4: OLS regression of total loans and M2

| SUMMARY OUTPUT | | | | | | | | |
|------------------------------|--------------|----------------|----------|---------|----------------|-----------|-------------|-------------|
| Regression Statistics | | | | | | | | |
| Multiple R | 0.802204624 | | | | | | | |
| R Square | 0.643532259 | | | | | | | |
| Adjusted R Square | 0.64043254 | | | | | | | |
| Standard Error | 0.023725102 | | | | | | | |
| Observations | 117 | | | | | | | |
| ANOVA | | | | | | | | |
| | df | SS | MS | F | Significance F | | | |
| Regression | 1 | 0.116859526 | 0.11686 | 207.61 | 1.60506E-27 | | | |
| Residual | 115 | 0.064731256 | 0.000563 | | | | | |
| Total | 116 | 0.181590781 | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
| Intercept | 0.080571446 | 0.007723563 | 10.4319 | 2.5E-18 | 0.065272553 | 0.09587 | 0.06527255 | 0.09587034 |
| Loan | 0.589686078 | 0.040925775 | 14.40867 | 1.6E-27 | 0.508619995 | 0.670752 | 0.50861999 | 0.67075216 |

Appendix 5: OLS regression of total loans and M1

| SUMMARY OUTPUT | | | | | | | | | |
|-----------------------|--------------|----------------|----------|---------|----------------|-----------|-------------|-------------|--|
| Regression Statistics | | | | | | | | | |
| Multiple R | 0.656801513 | | | | | | | | |
| R Square | 0.431388228 | | | | | | | | |
| Adjusted R Squar | 0.426443778 | | | | | | | | |
| Standard Error | 0.05531404 | | | | | | | | |
| Observations | 117 | | | | | | | | |
| ANOVA | | | | | | | | | |
| | df | SS | MS | F | Significance F | | | | |
| Regression | 1 | 0.266944543 | 0.266945 | 87.247 | 8.91989E-16 | | | | |
| Residual | 115 | 0.351858952 | 0.00306 | | | | | | |
| Total | 116 | 0.618803496 | | | | | | | |
| | | | | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% | |
| Intercept | -0.0008419 | 0.018007151 | -0.04675 | 0.96279 | -0.0365106 | 0.034827 | -0.0365106 | 0.0348268 | |
| Loan | 0.891249581 | 0.095416657 | 9.340608 | 8.9E-16 | 0.702247547 | 1.080252 | 0.70224755 | 1.08025162 | |

Appendix 6: OLS regression of total loans and total deposits

| SUMMARY OUTPUT | | | | | | | | | |
|------------------------------|--------------|----------------|-------------|-------------|----------------|-----------|----------------|-------------|-------------|
| Regression Statistics | | | | | | | | | |
| Multiple R | 0.835777456 | | | | | | | | |
| R Square | 0.698523956 | | | | | | | | |
| Adjusted R Square | 0.695902425 | | | | | | | | |
| Standard Error | 0.022390405 | | | | | | | | |
| Observations | 117 | | | | | | | | |
| ANOVA | | | | | | | | | |
| | df | SS | MS | F | Significance F | | | | |
| Regression | 1 | 0.13358271 | 0.133582706 | 266.4565111 | 1.00926E-31 | | | | |
| Residual | 115 | 0.05765298 | 0.00050133 | | | | | | |
| Total | 116 | 0.19123568 | | | | | | | |
| | | | | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Standard Error | Lower 95.0% | Upper 95.0% |
| Intercept | 0.0703568 | 0.00728906 | 9.652382146 | 1.66731E-16 | 0.055918574 | 0.084795 | 0.055919 | 0.084795 | |
| Loan | 0.630469284 | 0.03862342 | 16.32349568 | 1.00926E-31 | 0.553963716 | 0.7069749 | 0.553964 | 0.706975 | |

Appendix 7: OLS regression of total loans and household savings deposits

| SUMMARY OUTPUT | | | | | | | | |
|------------------------------|--------------|----------------|------------|-----------|----------------|-----------|----------------|------------|
| Regression Statistics | | | | | | | | |
| Multiple R | 0.513448204 | | | | | | | |
| R Square | 0.263629059 | | | | | | | |
| Adjusted R Square | 0.256995086 | | | | | | | |
| Standard Error | 0.04369988 | | | | | | | |
| Observations | 113 | | | | | | | |
| ANOVA | | | | | | | | |
| | df | SS | MS | F | Significance F | | | |
| Regression | 1 | 0.075889 | 0.07588922 | 39.739245 | 6.05E-09 | | | |
| Residual | 111 | 0.211974 | 0.00190968 | | | | | |
| Total | 112 | 0.287864 | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Standard Error | Upper 95.0 |
| Intercept | 0.079862073 | 0.0144 | 5.54580235 | 2.005E-07 | 0.051327 | 0.108398 | 0.051327 | 0.108398 |
| Loan | 0.477953613 | 0.075819 | 6.30390715 | 6.047E-09 | 0.327714 | 0.628193 | 0.327714 | 0.628193 |