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IMPACT OF THE SHADOW BANKING SYSTEM ON MONETARY POLICY IN CHINA

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Abstract

The shadow banking system in China has its own characteristics compared to conventional commercial banks and 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 impacts of the shadow banking system on monetary policy. After analysis of SVAR model, 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 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 improve the monetary policy effect.

Keywords:

Shadow Banking System, Monetary Policy, China

1. INTRODUCTION

Year 2008 was notable 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 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?

This paper will apply the structural vector auto regression (SVAR) 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).

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 include 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 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 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 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 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.

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 to 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 impels the 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 to 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 to 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. Yu and Zhang (2011) claimed that the great loss of deposits would also affect the implementation of required reserve. Xu (2009) 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 GPD, 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".

2.4 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 to 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. The Structural Vector Auto Regression model (SVAR) will be applied in order to achieve the goals of this paper, the outcomes of which are impulse response and variance decomposition and which provide a clear relationship between 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.

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:

$$B_0 y_t = C_0 + B_2 y_{t-2} + \ldots + B_p y_{t-p} + \in_t \quad (1)$$

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

The Eq.(1) can be converted to:

$$y_t = B_0^{-1}C_0 + B_0^{-1}B_1 y_{t-1} + B_0^{-1}B_2 y_{t-2} + \ldots + B_0^{-1}B_p y_{t-p} + B_0^{-1} \in_t \quad (2)$$

When $B_0^{-1}C_0 = C$, $B_0^{-1}B_i = A_i$, and $B_0^{-1} \in_t = e_t$, one obtains the reduced form VAR:

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + e_t \quad (3)$$

As a consequence, the reduced form residuals can be retrieved from a SVAR model by $e_t = B_0^{-1} \in_t$, and its covariance matrix by:

$$\sum e = E(e_t e_t') = E\left(B_0^{-1} \in_t \in_t' \left(B_0^{-1}\right)\right) = B_0^{-1} \sum \left(B_0^{-1}\right) \quad (4)$$

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.

3.2 DATA DESCRIPTION

For analyzing 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, 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.

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 GPD 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)

3.2.5 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.

3.3 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 provides validity and reliability.

3.4 SUMMARY

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 includes the shadow banking system, economic growth and the effectiveness of monetary policy.

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 and variance decomposition.

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.

4.1 OUTCOMES FROM THE SVAR MODEL

4.1.1 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.

4.1.1.1 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.

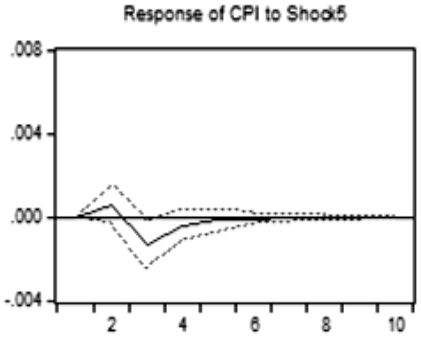

Fig.1. Response of CPI to Shock 5
(Data source: EIU country database, Wind database)

The monthly growth rate of CPI is to indicate the effectiveness of the monetary policy. From Fig.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.

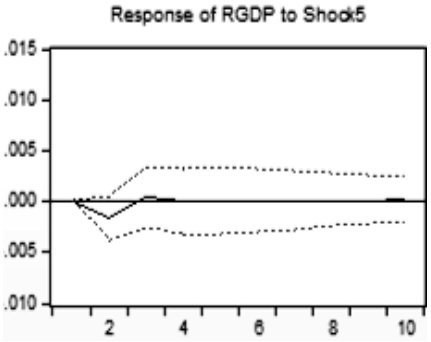

Fig.2. Response of RGDP to Shock 5
(Data source: EIU country database, Wind database)

As shown in Fig.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.

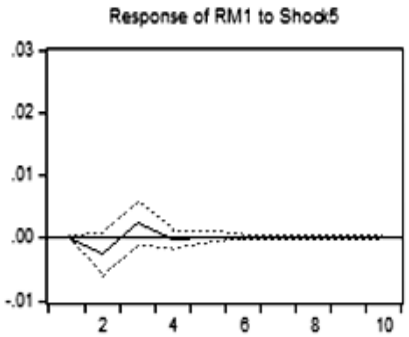

Fig.3. Response of RM1 to Shock 5
(Data source: EIU country database, Wind database)

Figure 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.

4.1.1.2 Response of the Development of the Shadow Banking System:

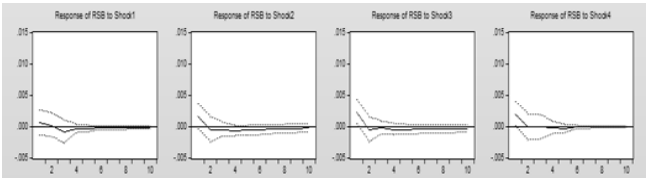

Fig.4. Response of RSB
(Data source: EIU country database, Wind database)

As shown in Fig.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.

4.1.2 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.1. Variance decomposition of CPI
(Data source: EIU country database, Wind database)

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

As shown in Table.1, 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.2. Variance decomposition of RGDP
(Data source: EIU country database, Wind database)

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

As shown in Table.2, 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.3. Variance decomposition of RM1
(Data source: EIU country database, Wind database)

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

As shown in Table.3, 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. Variance decomposition of RSB
(Data source: EIU country database, Wind database)

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	89.95594
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

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, 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.

4.2 SUMMARY OF THE DATA ANALYSES

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 activities of shadow banking, and

conversely the tight monetary policy would be ruined by activities of the shadow banking system too. However, results of variance decomposition RM1 and CPI are not satisfactory; changing in RM1 and CPI can be explained by shadow banking at only around 5% and 2.5% respectively. Therefore, impacts of shadow banking on monetary policy and the amount of money supply are not so strong. Additionally, impulse response also shows that the shadow banking system could promote economic growth in the long term but variance decomposition suggests than that 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 GPD 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 GPD, 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 results might be not so accurate but can still reflect the role of shadow banking system 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, and the actual value of shadow banking could be bigger than the chosen data of total loans which implies the impacts might not as weak as shown in the variance decomposition.

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 other 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), GPD, M1 (indicating the money supply) and short-term interest rate (indicating the cost of borrowing and lending).

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.
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 GPD. 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 GPD 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 impulse responses suggest that the development of shadow banking could promote the amount of money supply in a long term, the relationship between the shadow banking system and money supply is positive.

5.1 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 is stricted 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.

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APPENDIX

APPENDIX 1: DATA FOR THE SVAR MODEL

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