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Chinese Private Lending Risk and Monetary Policy Operating

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Abstract

The private lending risk was more likely expressed as the forms of various funding raising disputes, which originated from the borrowers' solvency problems. Whether the change of monetary policy had an impact on the civil financial risk and how much of the influence were worth of consideration. Based on the analysis of how monetary policy operated on the private lending risk, we took some key data, such as the amount, the involved number and the interest rates deprived from the private lending disputes cases happened in our country from 2003 to 2014, to construct the model between the index of private lending risk and the monetary policy variables. Also we need to explore the inner relationship between them. The empirical results show that the monetary policy tools do have an impact on the private lending risk to some different degree. More specifically, the implication for the monetary policy operations is that we should not use the deposit reserve policy and the credit policy more frequently, while the rediscount policy and the open market operation have more advantage on the balance of macroeconomic regulation and the private lending risk control.

Keywords: monetary policy, private lending, risk index

1. Introduction

In recent years, with the development of petty loan companies, guarantee companies, investment companies, asset management companies and other financial institutions, private lending in China has broken the traditional form of ROSCA (Rotating Savings and Credit Association), and has gradually formed a new shadow credit market. The market is parallel to the traditional commercial bank lending market and is less regulated, including private lending manifested by internet technology, such as the Internet lending platform P2P (Peer to Peer lending). Private lending is an old financial category, mainly refers to loan relationships built between individuals in the form of mutual cooperation. At present, in the judicial practice of our country, the lending activities between natural persons as well as between natural persons and non-financial institutions are called private lending. The Rule I of "Several Opinions About Cases of Borrowing Heard by People's Court a number of opinion" issued by Supreme People's Court in 1991 stipulates: the lending disputes between citizens, between citizens and legal persons, and between citizens and other organizations should be accepted as a case of lending. This is the scope of private lending given by juridical practice.

The development of formal banking and other financial institution services has been limited due to financial repression for a long time, while private lending enjoyed a rapid development and played a positive role in the national economic system. For the past few years, the emergence of private financial institutions, such as investment companies, asset management companies, factoring companies, pawn shops have developed rapidly. Private lenders are no longer restricted to natural people. Instead, they are gradually institutionalized or legalized. In this trend, petty loan companies become a transitional form between formal finance and private finance. In rural areas, ROSCA and other mutual co-financing institutions are gradually replaced by the investment community and cooperation fund[1], which are the main supply of private lending. As capital providers, natural people are known as "Yin Bei", "Qian Zhong", "capital brokers", "money brokers" and so on. Those capital providers with a large scale are called "private banks ", or"

[1] Although the CBRC is responsible for cooperation funds, but the fact is that these institutions have few impacts on traditional financial cooperation and it is actually mutual assistance, similar to quasi-financial institutions.

underground banks"[2]. The demand side of the funds is usually consisting of natural people, individual industrial and commercial households, small and medium enterprises, etc. In some developing countries, the Savings and Credit Association (SCA), specialized lenders, part-time lenders (including real estate agents, traders, grain millers, small farmers, relatives and friends, etc.), mobile banking providers, credit unions and cooperatives are major lenders in private lending (Aryeetey，2005). Similar to the expansion speed of formal finance, that of private lending also grows rapidly. According to an investigation of CICC, in 2009 China's private lending scale reached 2.1 trillion yuan, in 2010 it reached 3.2 trillion yuan, and in mid-2011 about 3.8 trillion yuan, accounting for some 33% of China's shadow banking loans, and equals to 7% of total bank loans (Mao Junhua, Luo Jing, 2011). Private lending is generally divided into three forms, namely friendship lending, grey lending and black lending which is usually called usury (Qian Sisi, 2010). The interest rates of different type of lending are different. Wenzhou branch of the people's Bank of China illustrated that the average of local private lending rate is about 15%; Guangzhou Financial Street showed that the petty loan rate is around 20%. Usually, the monthly interest rate is approximately 3%-5%, which is equal to around 36% -60% per year. According to "The Notice of Ban on Underground Banks and Acts Against Usury" issued by the People's Bank of China, the interest rate of private lending shall not exceed 4 times of the interest rate (floating rate not included) of the loans made by financial institutions which is during the same time period and have same amount level with the private lending. However, private lending funds are generally used to solve temporary cash flow problems, so the time period is relatively short, and the interest burden can be affordable.

As a traditional form of credit, private lending in China has a long history. Compared with regular bank loans, private lending is more flexible (Jiang Xuzhao, 1996). Private lending provides basic financial support for small and medium economic activities during the opening up and the procedure of forming socialist market economy. Similar to China, in some developing countries, private lending is the main financing channel for small businesses (Rosemary, 2001). However, during the change of economic cycle and policy regulation, the default of private lending has occurred occasionally; in some areas there even occurs local systemic risk. Since 2008, several typical events which lead to regional impacts have occurred. For example, the “disappear” of Wenzhou business owners triggered private lending crisis; the break of private lending money chain in Liulin in Shanxi[3], Shenmu in Shaanxi[4], Erdos in Inner Mongolia[5] and other places has led to social instability. Such regional private lending risk caused central government’s concern. In recent years, private lending has become the main channel for private capital investment (Cai Xiaoyang, 2012), most of them use some legal person such as nominally investment company or investment management consulting firm to manage lending funds centrally in an entrusted investment way. To this end, the central government introduced initiatives intended to guide private capitals, regulate private lending, prevent and control local systemic risks. The final goal is to improve the financial environment system and promote financial stability through standardizing private capital operation.

At present, China’s financial system is still bank-dominated. The effect of monetary policy mainly spreads through the credit channel of banks. The emergence of private lending risk, on the one hand, reflects the irrationality of the structure of the credit market. Banks and other formal financial institutions provide financial services mainly to large or medium-sized enterprises while small and micro economic agents are confronted with a high threshold to obtain loans, so they have to appeal to private lending market. On the other hand, illegal fund-raising activities in the name of private lending are concealed and their scale is usually very large. Once the economic condition changes, the market is prone to face risks. Since the change of economic environment and the economic cycle has something to do with the macro-control policy, there might be some relationship between the risk of private lending and monetary policies. How monetary policies affect private lending risk is the main problem explored in this paper.

Different from the financial risk assessment in formal banking, risk assessment cannot be effectively conducted since private lending is not regulated in the financial supervision system and there is a lack of statistics of private lending (Zhang Qiang, 2013). Because of the difficulty in measuring private lending, we need to look for signals that can reflect

[2] From the judicial point of view, "underground banks" are mostly illegal organization, illegally absorbing public deposits, usury, cross-border currency exchange and other business. Their organization form is usually "family" or "clique style."

[3] In early 2013, "Wang Fenglian private lending case" caused regional panic in Liulin, Shanxi; in the end of the same year, Xing Libin in Lend Lease faced a financial crisis because he involved in private lending and excessive lending from banks.

[4] In early 2013, "Gong Aiai" surfaced private lending crisis in Shenmu, but it is the tip of the iceberg of private lending crisis in Shenmu.

[5] A typical case is "Su Yenv" fund-raising case in 2011.

lending risks and find out useful information. We believe that private lending disputes can manifest private lending and are the most important risk signals. In the cases of private lending disputes, the amount of default, number of people involved, the borrowing rate and other basic information is very valuable for the analysis of the risks. Therefore, we use the information gathered from the cases of private lending disputes to build up an index which can reflect the level of private lending risk. On this basis, we find out the relationship between monetary policy indicators and private lending risk indices using econometric models, and then propose recommendations of using monetary policy and tools to control private lending risk.

2. Literature Review

Domestic and foreign scholars have already down many researches on private lending, the development, risk types and causes of the risks of informal finance. Most of the researches are based on the microscopic mechanism of private lending and some macro perspective such as regulatory regulations.

2.1 Functions, Risks and Economic Effects of Private Lending

Is private lending market efficient? What kind of role does private lending play in economy development? Financial deepening theory holds the view that the trait of concealing of private lending activities actually disrupts the financial credit order does harm to the public interest and hinders the implementation of monetary policy and the efficiency of allocating financial resource (Shaw, 1973). As an informal way of financing, private lending is free from supervision and macro-control, so it may break local financial stability and undermine the effects of macro-control and monetary policy (Bi Defu, 2005; Zhi Feng Yin, 2008). However, private lending, as a supplement to formal finance, eases the inhibitory effect of formal finance. Abnormal and spontaneous conducts of private financing usually lead to social disputes, affecting the stable operation of commercial banks. The cost of it is very high and it leaves great pressure on the real economy, so potential risks is considerably high. In terms of banks, private lending shunts active savings and accelerates the rise of loan to deposit ratio, trigging potential risks to payments and settlements in banks. At the same time, private financing increases the difficulty to manage money and recover loans (Yu Mingchun, Yu Zhiming, 2008). In a microscopic view, private loans are mostly short-term, which goes against the long-term stable of the enterprises and local economy (Li Shixin, Zhang Yaomou, Zhen Lincai, 2009). Private lending not only lacks supervision, but also has blindness in the capital investment. Moreover, the lending period is short-term, so it is easy to give birth to a capital vicious cycle. Once the capital strain breaks, the market will have to face a situation that huge amounts of money cannot be recovered (Zhou Maoqing, 2011). The negative effects of private lending are mainly reflected in the disruption of economic and financial order, undermining macro-economic control, leave impact on credit operation of banks and resulting in bad mood of society (Cai Xiaoyang, 2012; Chen Mingheng, 2012; Zhang Qiang, 2013). In the empirical study of private lending risk, few scholars make analysis in a quantitative perspective. On contrary, most of them use qualitative methods to describe the cause of risks and their impacts as well as prevention measures.

2.2 The Causes of Private Lending Risk

Traditional private lending is mostly credit loans, with a small amount of mortgage, guarantee, pledge or other ways (Zhou Rongjun, 2010). With the expansion of private capital scale, its ways of lending show diversity. Some of them doing matchmaking between borrowers and lenders, charging agency fees; others lend money after they borrowed funds to earn spreads. (An Qilei, 2012). The vulnerability of private lending is readily converted to financial risks because of its diversified forms, secluded lending practices and a lack of external regulatory constraints. Local and systematic private lending risk can destroy the stability of socio-economy and finance. So what are the causes of private lending risk? The irregularity and a lack of supervision is the main reason for the risks (Bi Defu, 2005; Chen Mingmin, 2012). As for types of risks, there are mechanism risks caused by asymmetric information, operational risks resulting from irregularities behaviors of private lending, transferable risks caused by relending funds borrowed from banks and market risks triggered by blind pursuit of investment hot spot (Zhou Hongyan, Zeng Liping, Li Wenzheng, 2008). From the perspective of the foundation of maintaining credit, "trust within the community" of private lending has its boundary, If the scale boundary and the geographical boundary are broken, "collapse" is highly likely to happen, leading to risks (Sun Qixiang, Wang Shuguang, 2011). The mismatch of macroeconomic policy and the needs of the real economy is the direct cause of risks, but the vulnerable spot of financial supervision is the external cause of private lending risk. Continuous tightening of financial policies, continuous rising of the cost of funds (Fan Jianjun, 2011) and the financial system with high cost but low efficiency (Zhao Yong, 2012) is also an important cause of private lending risk. New forms of private lending P2P also has a feature of high cost, it's features of the object, credit and regional factors have a significant effect on the cost of borrowers (Chen Xiao, 2014). The existing researches conclude the sources of private lending risk from multiple perspectives such as internal factors, external influences, legal and regulation. However, macro-genetic mechanism of systemic risk is still not deeply revealed. There are too many qualitative analyses while too few quantitative researches for the causes of risks. Monetary policy had an limited impact on private lending risk

which was originated from Internet lending platform P2P (Jin Qianbao, 2015). To be specific, the positive interest rate pounds would cause the expansion of the shadow banking system, and the high risky enterprise would raise their leverage ratio, by contrast, the negative interest rate pounds had an adverse impact. (Qiu Xiang, Zhou Qianglong, 2014). This paper attempts to explore the relationship between policy implementation and private lending risk from the monetary policy point using measurement methods.

The main purpose of this paper is to explore the relationship between private lending risk and monetary policies. We quantify private lending risk and build the relation model between private lending risk and monetary policy variables based on the time period from January 2003 to December 2014 (144 months). We take all the available private lending disputes cases around the country and dig out vital information such as borrowing rate, the number of people associated. Then we construct the index of private lending risk and examine the degree of influence monetary policy operations can make on the private lending risk.

3. Design and Application of the Index of Private Lending Risk

Private lending is usually hidden and cannot be measured, so it's impossible to make risk assessment using public statistics. If we want to accurately judge the risk of private lending, we still need open, real data. Such data are mostly hidden in the private lending disputes cases. Those cases usually will provide the number of people, the amount of money and the borrowing rate involved. The number of people illustrates the scale of the influence the risk leads, the amount of money conveys the level of the impact and the borrowing rate reflects the size of credit risk. These data provide us with basic information to judge whether the private lending risk is systematic, regional or with social nature. Therefore, this article tries to use these data to make up an index of Chinese private lending risk which can be used to measure the size of private lending risk. The information about default risk, the level of risk premium and the sphere of influence of private lending are included in the index.

3.1 The Design Principle of the Index of Private Lending Risk

The major information private lending cases disputes reflect is default risk. The total amount of money involved in a given period reflects the absolute scale of default risk, so it represents the absolute value of systemic risk. The number of people involved reflects the degree of infection of private lending risk. Lending rate can directly reflect in the level of private credit risk in a certain point of time. These three main indicators are different in nature. The amount of money and the number of people involved are absolute figures. The larger the value is, the greater the overall impact of private lending risk is. Nevertheless, interest rate is a relative index. The higher the rate is, the greater the credit risk is. Therefore, these three indicators data move in the same direction when private lending risk changes. We need only standardize all three data to make them have the same numeric nature, and then we can use them to make up an index. The key to compose the index is to determine the weight of three indicators. Factor analysis is an appropriate way to determine the weight because it measures their impacts by the degree of change of each variable.

3.2 Raw Data Processing

In this paper, we gathered 510 private lending cases with public data occurred during January 2003 to December 2014 in mainland China. The information is collected from mainstream news media and the court system. Firstly, calculate the arithmetic average of the number of people and the amount of money involved during a specific month as the very amount of money and the very number of people in that month. As for the data processing for monthly interest rate, we use the ratio of the money involved in each case to the total amount of money in that month as weight, and calculate the arithmetic average value of the lending rates in that month. Then, separate the long-term growth trends and short-term fluctuation components using HP filter method, therefore making the statistics with more sense.

3.3 Constructing the Index of Private Lending Risk

After a series of raw data processing described above, we get private lending statistics from January 2003 to December 2014, including the amount, the lending rate, and the number of people involved. Using factor analysis and set 3 as the number factors. Use F1 as the number of people involved, F2 as the amount of money involved, F3 as lending interest rate. Using the variance contribution of three factors as weight, we can get a private lending risk indicator FR:

$$FR=62.199\%\ F1+\ 33.319\%\ F2\ +4.483\%\ F3 \quad (1)$$

Since the indicator scores should not be negative, we have to make a translation to it in order to match the economic sense. Risk index itself is calculated after the expression of private lending risk, so the numbers reflect the risk that has already occurred. In this article, we set the minimum to be 1 instead of 0, because the data is already related to risks. More specifically, we pan the number up a unit after adding the minimum number to each statistic value. The minimum value of risk index is 1. The higher the risk is, the larger the index is. Figure 1 is the change of private lending risk index.

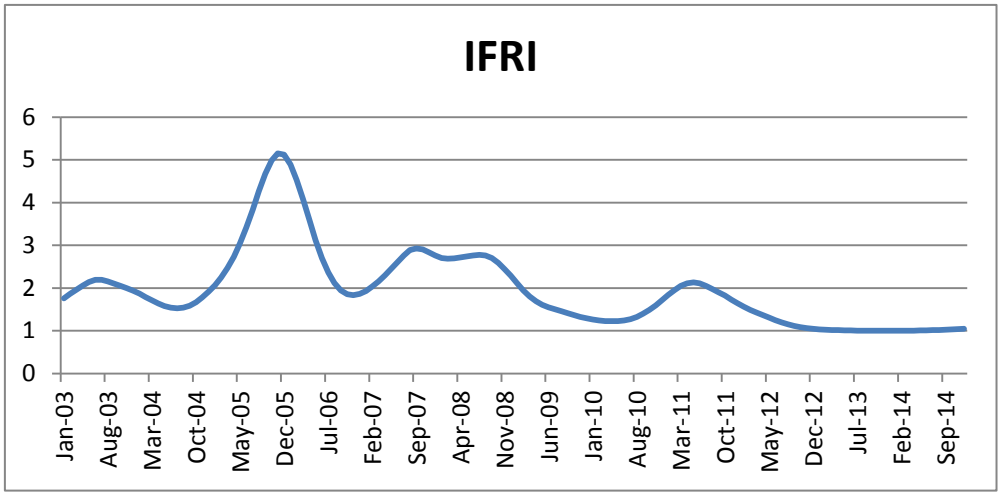

Figure 1. Changes of Private Lending Risk Index from January 2003 to December 2014

3.4 The Application of Private Lending Risk Index

After calculating the index of private lending risk of the whole observation period, we did some statistical analysis; the result is shown in Table 1.

Table 1. Descriptive Statistics of Private Lending Risk Index

Year	N	Min	Max	Average	Stdev
2003	12	1.758000	2.189900	2.032242	0.135190
2004	12	1.523600	1.915800	1.679042	0.134346
2005	12	2.066300	5.147800	3.666858	1.159355
2006	12	1.830600	4.887700	2.906483	1.115213
2007	12	1.932800	2.926200	2.545050	0.360742
2008	12	2.286100	2.774900	2.654800	0.146914
2009	12	1.291200	2.111100	1.587633	0.255831
2010	12	1.222000	1.715000	1.350908	0.164751
2011	12	1.641600	2.134500	1.943158	0.159377
2012	12	1.046100	1.560900	1.253450	0.175728
2013	12	1.000000	1.033600	1.009117	0.011030
2014	12	1.000100	1.042200	1.014858	0.014540
2003-2014	144	1.000000	5.147800	1.970300	0.925400

The average and standard deviation of private lending risk index is foundation to divide the level of risk. Firstly, take the 144 months as time window, we can plus minimum and standard deviation as the upper boundary, dividing the risk into four intervals according to table 1: take (minimum, minimum+ standard deviation) as low risk interval, (minimum+ standard deviation, minimum+2 times the standard deviation) as moderate risk interval, (minimum+2 times the standard deviation minimum+3 times the standard deviation) as the upper risk interval, and (minimum+3 times the standard deviation minimum+4 times the standard deviation) as the high risk interval. According to this standard, the distribution of private lending risk is in Table 2.

Table 2. Time Distribution of Private Lending Risk

Year	Risk Intervals		
	Low Risk	Medium Risk	High Risk
2003	Jan.,Feb.	Mar.-May.,Aug.-Dec.	Jun.,Jul.
2004	Apr.-Sep.	Jan.-Mar.,Oct.-Dec.	None
2005	Jan.-May.	Jun.-Dec.	None
2006	Jun.-Dec.	Jan.-Mar.	None
2007	Jan.-Mar.	Apr.-Dec.	None
2008	Dec.	Jan.-Apr.， Dec.-Nov.	Mar.-Aug.
2009	Jun.-Dec.	Feb.-Mar.	Jan.
2010	Jan.-Aug.	Sep.-Dec.	None
2011	Nov.,Dec.	Jan.-Apr.,Jun.-Oct.	Mar.
2012	Jul.-Dec.	Jan.-Jun.	None
2013	Mar.-Dec.	Feb.-Apr.	Jan.
2014	Jan.-Jul.	Aug.-Dec.	None

From Table 2, we can find that in the observation period, the distribution of private lending risk shows the following characteristics: the private lending risk was higher during 2003–2008. Among these years, it increased during

2003-2005 and reached the peak at the end of 2005. Then, the risk decreased. Previous studies showed that there is a mechanism in private lending which can adjust according to the changes of macroeconomic environment. At different stages of economic development, private funds and bank funds compensate for each other. This shows that the changes of private lending risk index are closely related to the changes of macroeconomic policies.

4. The Impact of Monetary Policy on Private Lending Risk

4.1 Model and Test

Private lending is a part of the shadow credit market, also an important form of the shadow banking sector. Changes of monetary policies directly affect the amount of loans and lending interest rates of shadow banks. Quantitative monetary policy rules have stronger impacts on output than priced monetary policy rules (Liu Xihe, Hao Yi, Tian Ye, 2013). Changes in monetary policy do affect the time feature of the change of private lending risk index them exists. So, how to assess the impact? We can look back at the monetary policies during three financial crises over the past 15 years. After the Asian financial crisis in 1997, in response to the severe economic situation at that time, China began to implement more prudent monetary policies. During 1998 to 2002, China began to face deflation pressure, and the prudent monetary policy at that time was to increase the money supply. In 2003, new loans, investments, and foreign exchange reserves grew very fast, and therefore the connotation of prudent monetary policy began to change. People's Bank of China raised the statutory deposit reserve ratio and interest rates several times and tightened money supply. This kind of monetary policy continued until 2007. During the period when monetary policy was very tight, private lending risk increased year by year, and reached the highest value in the second half of 2007. Since July 2008, in the face of intensified international financial crisis and domestic inflationary pressures, People's Bank of China adjusted the financial macro-control measures, lowered deposit and lending rates three times, cut the deposit reserve ratio twice, abolished the constraints of commercial banks' credit, and guided commercial banks to expand the total amount of loans, taking measures of a more relaxed monetary policy. As a result, private lending risk began to decline. Thus, there is a certain mutual linkage between the monetary policy and private lending risk. At present, the operation of private lending in our country lacks standardization with poor internal controls. Once there is a social liquidity shortage, the probability of borrowers' default will increase, therefore break the financial chain, increasing the risk. The central bank uses monetary instruments to influence the market liquidity, regulate and control macro economy. These actions will have an impact on private lending and change private lending risk. Therefore, building a model of private lending risk index and monetary policy variables and measuring the impact of monetary policy on private lending risk will have practical significance in the control of private lending risk accumulation.

4.2 Quantitative Indicators of Monetary Policy

Monetary policy tools are generally statutory deposit reserve, the discount rate and open market operations. In China, the central bank also uses credit control policies. Required reserve is the sum of statutory deposit reserve and excess deposit reserve institutions deposit in the central bank. The ratio of required reserve to the deposits of broad money is the required reserve ratio. The central bank adjusts the size of available deposit reserve by adjusting the statutory reserve ratio, therefore change the credit expansion capacity of financial institutions. Statutory deposit reserve is adjusted from time to time, and cannot effectively reflect the dynamic changes of the reserve in the banking system. Therefore, we choose deposit reserve ratio as a reflection of the tightness of monetary policies. The rediscount rate is one of the benchmark interest rates formulated by the central bank. It is the interest rate which commercial banks and other financial institutions use when they discount notes to the central bank. The interbank offered rate is the closest indicator to the discount rate, which reflects the changes in the rediscount rate. If we use the inter-bank offered rate (overnight) to replace the rediscount rate, the tightness of monetary policies will be reflected more sensitively. In the open market operations, the central bank repurchases bonds to regulate the amount of base money, thereby affecting the ability of credit expansion of financial institutions. We use the net position of central bank bills, bonds, repurchase and reverse repurchase operations (central bank bills - treasury + repo - reverse repo) of People's Bank of China to represent the open market operations. Position is an absolute indicator and it need to be transformed into a relative index (ratio) by dividing the position of open market operations by the deposits in other depository corporations as a quantitative indicator of open market operations. Because the deposits in other depository corporations is the operating target of open market operations, when the ratio of open market operations positions to the deposits in other depository corporations rises, the monetary policy tends to be tight, vice versa. We use the growth of the size of loans as the indicator of credit policies. If the growth is fast, the monetary policy is loose; if the growth is slow, the monetary policy is tight. The index is the natural logarithm of the loan balance of domestic and foreign currencies in financial institutions. The quantitative indicators of monetary policies are shown in Table 3.

Table 3. Quantization of Monetary Policies in China

	Tools	Measure Methods
Monetary Policy	Deposit Reserve	required reserve / the deposits of broad money
	Rediscount Rate	the inter-bank offered rate (overnight)
	Open Market Operations	(central bank bills - treasury + repo - reverse repo) / deposits in other depository corporations
	Loan Balance of Domestic and Foreign Currencies in Financial Institutions	the natural logarithm of the loan balance of domestic and foreign currencies in financial institutions

4.3 Empirical Test of the Relationship between Private Lending Risk and Monetary Policy Variables

4.3.1 The Mechanism of Monetary Policy Adjustments Changing Private Lending Risk

Monetary policies effect economy operation of a country. The change of the economic situation also changes the debtor's debt paying ability, rising private lending risk. This is the basic transmission mechanism through which monetary policies affect private lending risk. More specifically, on the one hand, the central bank adjusted money supplies through policy tools to urge commercial banks to make adjustments on lending activities, in order to change the relation of market supply and demand, and the financing entity might turn to private lending market. This will change the original balance of private lending, and the risk changes correspondingly; on the other hand, the central bank changes the cost of financing by adjusting lending interest rates, thereby leading to significant fluctuations of private lending interest rate, the risk then rises. According to this mechanism, we can build a multiple regression model to estimate the impact factor of monetary policy tools to private lending risk.

4.3.2 Model Test of the Relationship between Private Lending Risk and Monetary Policies

Before creating a multiple linear regression model, we should first test the stationary of data, and then make Granger causality analysis to determine the independent variables and the dependent variable.

(1) Stationary Test and Cointegration Test

Firstly, we do stationary test on variables to determine the order of integration. It should be noted that the original value of open market operations (OM) is not stable. The stable values are moving averages of the original value. The result is in Table 4.

Table 4. Unit Root Test (ADF)

Variable	T-statistic	1% level	5% level	10% level	P value	Stability
Rd	-1.167258	-3.476805	-2.881830	-2.577668	0.6876	N
D（Rd)	-13.22456	-3.476805	-2.881830	-2.577668	0.0000	Y***
OM	-1.100161	-3.476805	-2.881830	-2.577668	0.7149	N
D(OM)	-9.671489	-3.476805	-2.881830	-2.577668	0.0000	Y***
Shibor	-2.503785	-3.476805	-2.881830	-2.577668	0.1167	N
D(Shibor)	-12.73210	-3.476805	-2.881830	-2.577668	0.0000	Y***
Ln_loan	-0.398656	-3.476805	-2.881830	-2.577668	0.9051	N
D(Ln_loan)	-8.838277	-3.476805	-2.881830	-2.577668	0.0000	Y***
Risk	-2.065024	-3.476805	-2.881830	-2.577668	0.2592	N
D(Risk)	-4.248786	-3.476805	-2.881830	-2.577668	0.0008	Y***

As can be seen from the results of ADF unit root test, the reserve ratio (Rd), open market operations (OM), Shibor, loans (Ln_loan), the index of risk (Risk), all these five variables meet the first-order integration, so they meet the conditions to do co-integration test.

The following is the way to do cointegration test: use the least squares method to estimate two variables in the model, set up the single-variable regression model and test the stability of residuals. If the residual series is stationary, there is a cointegration relationship between variables, and vice versa. Firstly, estimate 4 models using least squares method to get the residual sequence. Then use the ADF unit root test to make parallel test (no intercept, no trend) for five models. The result is shown in Table 5.

Table 5. Private Lending Risk Index (Risk) and Cointegration Test

Variable	T-statistic	1% Level	5% Level	10% Level	P Value	Stability
Rd	-4.624717	-2.585050	-1.943612	-1.614897	0.0002	Y***
OM	-3.641525	-2.585226	-1.943637	-1.614882	0.0061	Y***
Shibor	-1.871931	-2.585050	-1.943612	-1.614897	0.3447	N
Ln_loan	-3.543553	-2.585226	-1.943637	-1.614882	0.0082	Y***

As can be seen from the results of the stationary test of residual sequence, residual series of 3 models are stationary except for Shibor and Risk. So the inter series of 3 single variable model are cointegrated. That is, there is a long-term

stable equilibrium relationship between them.

(2) Granger Causality Test

After passing the stationary test, we need to use Granger causality test to verify whether there is a causal relationship between the variables. We take the risk index (Risk) as the dependent variable, and test the causal relationships between the risk index and deposit reserve (Rd), the open market operations (OM), Shibor, loans balance (Ln_loan) respectively. The result is shown in Table 6.

Table 6. Granger Causality Test Between Private Lending Risk and Monetary Policy Variables

Variable	Null Hypothesis	F Statistic	P Value	Result
Rd	Rd does not Granger Cause Risk	14.1654	3.E-06	Reject
	Risk does not Granger Cause Rd	0.72179	0.4877	Accept
OM	OM does not Granger Cause Risk	5.64424	0.0044	Reject
	Risk does not Granger Cause OM	1.75529	0.1767	Accept
Shibor	Shibor does not Granger Cause Risk	3.53308	0.1959	Accept
	Risk does not Granger Cause Shibor	0.91129	0.4044	Accept
Ln_loan	Ln_loan does not Granger Cause Risk	11.3951	4.E-07	Reject
	Risk does not Granger Cause Ln_loan	2.22101	0.2701	Accept

Based on the above results, the deposit reserve (Rd), open market operations (OM), loans (Ln_loan) are the causes of the changes of risk index (Risk), there are logical relationships among the variables.

(3) Building Multiple Linear Regression Models

We build multivariate linear regressions using the risk index and monetary policy variables. The risk index is the dependent variable, and the remaining indicators are independent variables. The result is shown in Table 7.

Table 7. The Regression Results of Private lending risk index (Risk) and Monetary Policy

Model overview					
Model	R2	Adj.R2	Standard error		
1	0.485	0.473810	0.671276		
ANOVA					
	df	F	Sig.		
Regression	4	43.92173	0.000		
Residual	139				
Total	143				
Dependent Variable	Independent Variables	B(coefficient)	Standard error	t	Sig.
Risk	Rd	10.42	2.737748	3.804330	0.000
	OM	0.029	0.00528	5.45503	0.000
	ln_loan	-1.99	0.297142	-6.688879	0.000
	（Constant）	25.114	3.319173	7.566385	0.000

The independent variables of the model are deposit reserve(Rd), open market operations (OM), interest rate (Shibor), loans (ln_loan), the dependent variable is the private lending risk index (Risk). The test results show that R2 is 0.798, the fitting degree is high. Moreover, the sum of squares of the regression is 28.949, the sum of squares of residuals is 7.331, the total sum of squares is 36.280, F value is 113.527, sig value is 0.000, less than 0.05, indicating that each variable has significant effect on the dependent variable risk index (Risk); T values of all variables are greater than 2 with each sig. equals to zero, which indicates that the regression model is very effective. Complete the expression of the model is:

$$Risk=25.114+10.42Rd+0.029OM-1.99ln\_loan \quad (2)$$

From the above test result, we can see the basic relationship the risk of private lending and monetary policy operations. Deposit reserve, open market operations and other variables have positive relationship with the risk of private lending while loans show an inverse relationship with the risk. That is to say, when monetary policy is tight, private lending risk rises and vice versa. Among them, the deposit reserve (Rd) has the greatest impact. A 1% increase of deposit reserve rate will raise the private lending risk index by 10.42%. If the open market operations are tightening, the 1% increase of the ratio of the position of open market operations to the deposits in other depository corporations will force the index of risk to rise 0.029%. The impact of the credit policy on private lending risk is opposite. When the loan size increase and monetary policy is loose, private lending risk will decrease, and vice versa. The impact factor is 1.99. It indicates that a loose credit policy can help decrease private lending risk. Now, further see the coefficients of multivariate linear regression, we can see the constant term is 25.114, far higher than the coefficient of variables, indicating that the effect of non-monetary factors on private lending risk cannot be ignored, especially real economic variables such as economic growth, exports, investment, consumption, etc.

5. Conclusions and Policy Recommendations

From the perspective of monetary policy mechanisms, it can be argued that the use of different monetary policy tools can influence private lending risk to some extent, and prove this inference using empirical tests. As for the calculation of private lending risk, we use data mining techniques to dig out the number of people, the amount of money, lending interest rates and other basic involved in private lending in the number of cases, involving and lending rates and other basic data involved in private lending cases. Then, we use factor analysis method to determine the weight of three factors and make up indicators reflecting private lending risk. In the window period of 144 months, private lending risk index showed portraits of regularity and interval, which have close relationship to monetary policy operations. After Granger Causality test, we determine that there does exist causality between the private lending risk index and monetary policies, and monetary policy variable is indeed the reason why private lending risk index changes. After testing the model of private lending risk and monetary policy variables, we find that the statutory reserve policy has the greatest impact on private lending risk, the impact of credit control policies ranks the second, followed by the open market operations, and the rediscount policy is the least effective tool.

Different monetary policy tools have different influence in the risk of private lending. The underlying reason is that the market operation mechanism of monetary policy is still not perfect, and the credit market is still in a separated equilibrium (Ayyagari, Demirgüç-Kunt, Maksimovic, 2010). The statutory reserve policy has become a policy tool which is often used by People's Bank of China Since 1998. The adjustment of statutory reserve ratio directly affects the commercial banks' reserves position in the central bank, changes their lending and credit expansion capability. In the case that the credit is tight, corporate financing may be squeezed out, so they turn into the private lending market, resulting in the rise of civil lending rates. Open market operations are motivated and flexible. However, during the macro-control, the impact of the tool is limited to the bank's internal system, and generally do not have announcement effect, so that the effect on the social finances and private lending risk is very subtle. Rediscount policy mainly affects market interest rates, and the change of overnight interest rate can reflect the tightness of rediscount policy to some extent. Because of the limit of interest rate liberalization, this policy has weak impact on private lending risk, and as the benchmark interest rate, interbank interest rate is not strong enough. The degree of interest rate liberalization, however, is high in private lending market and the rates are relatively independent. Private lending interest rates and interbank interest rates are in separating equilibrium situation, and the difference between their benchmark interest rates is relatively high.

In terms of how to control private lending risk through monetary policy operations, we make following recommendations: Firstly, for the long-term, the central bank should not maintain tight of monetary policy and credit policy for the sake of current economic situation. When choose policy instruments, the central bank should reduce the use of statutory reserve policy and insist to macro-prudential principle when raise the deposit reserve ratio, so that the changes of the risk in private lending market can be detected, thereby preventing the formation and accumulation of regional, systemic risks of private lending. Because the impact of open market operations on private lending risk is relatively small, we recommend to further optimize the open market operations, increase operational tools to effectively control money supply and regulate the level of liquidity of commercial banks, further promote interest rate liberalization and find out the benchmark interest rate in credit market. The rediscount rate has gradually become the core of the benchmark interest rate in credit market, and we recommend using the weighted interest rate of representative of commercial banks as the main benchmark interest rate in credit market. Thus, the interbank interest rate will be more sensitive to rediscount policy. Furthermore, market interest rates will affect the private lending interest rate, reducing private lending interest rate to a reasonable level, controlling the cost of financing in the real economy and reduce the risk of private lending. In addition, interest rate liberalization can achieve the goal not only to make economic growth but also keep the stability of the currency (Li Cheng, 2013), increase the degree of freedom of policies and indirectly control of private lending risk. The credit policy is usually guidance. The central bank may consider combine the goal of the loan control and macro-prudential regulation and decide the size of loans by banks themselves during the dynamic adjustment process of the basic monitoring indicators. In this way can we indirectly prevent the accumulation of private lending risk, reduce the probability of systemic risk of private lending, thereby safeguarding the stability of economy and finance.

Reference

An, Q. L. (2012). Discussions and Suggestions to Private Lending. *Macroeconomic Management*, *2012*(1).

Aryeetey, E. (2005). Informal finance for private sector development in Sub-Saharan Africa. *Journal of Microfinance/ESR Review, 7*(1), 13-38.

Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2010). Formal versus informal finance: Evidence from China, *Review of Financial Studies, 23*(8), 3048-3097. http://dx.doi.org/10.1093/rfs/hhq030

Bide, F. (2005). Correlation of Macroeconomic Regulation and Private Lending. *Journal of Financial Research, 2005*(8).

Cai, X. Y. (2012). Considerations of Private Lending. *Research on Financial Education, 2012*(1).

Chen, M. H. (2005). The Mechanism of Private Lending and Effects of Macro-control to Private Lending in Wenzhou. *Chinese Finance, 2005*(17).

Chen, M. M. (2012). Oringins and Countermeasures of Private Lending in China. *Market Modernization, 2012*(9).

Chen, X. (2014). Cost of Private Lending - Empirical Analysis Based on P2P Internet Lending. *Financial Economics, 2014*(1).

Fan, J. J. (2011). Oringins and Countermeasures of Private Lending in China [N]. China Economy Times, 2011-12-23(5).

Jiang, X. Z. (1996). Civil Finance in China [M]. Jinan: Shandong People's Publishing House, 1996.

Lee, C. (2013). Mitigate the Dilemma of Interest Rate Liberalization and Monetary Policy–Analysis Based on the Framework of Monetary Flows. *Financial Economics, 2013*(5).

Li, S. X, Zhang, Y. M., & Zhen, C. L. (2009). Genesis of the Current Private Lending, Problems and Countermeasures. *Hebei Finance, 2009*(4).

Liu, X. H., Hao, Y., & Tian, Y. (2014). Rules of Chinese Monetary Policy Under Both Shadow Banking and Formal Finance. *Financial Economics, 2014*(1).

Mao, J. H., & Luo, J. (2011). The Analysis of Private Lending in China. *Capital Market, 2011*(11).

Qian, J. B. (2015). Effectiveness Study of Monetary Policy on Private Lending Market. *Southern Finance, 2015*(11).

Qian, S. (2010). Risk Analysis of Civil Finance. *Managers, 201*0(3).

Qiu, X., & Zhou, Q. L. (2014). Shadow Banking and Monetary Policy Transmission. *Economic Research Journal, 2014*(5).

Rosemary, A. (2001). Formal and informal institutions' lending policies and access to credit by small-scale enterprises in Kenya: an empirical assessment，African Economic Research Consortium, Vol.111. Nairobi: The Regal Press Kenya, Ltd.

Shaw, E. S. (1973). Financial deepening in economic development, *New York: Oxford University Press*.

Sun, Q. X., & Wang, S. G. (2011). Regional Financial Crisis and Prevention Private Lending Risk. *Chinese Finance, 2011*(23).

Yu, M. C., & Yu, Z. M. (2008). Civil Financing Under the Tight Monetary Policy. *Chinese Finance, 2008*(4).

Zhang, Q. (2013). Development Status risk analysis and legal regulations of private lending. *Financial Aspect, 2013*(1).

Zhao, Y. (2012). Chinese Private Lending Risk: Risk Performance, *Causes and Countermeasures, 2012*(2).

Zhi, F. Y. (2008). Private Financing Under Tight Monetary Policy. *Chinese Finance, 2008*(13).

Zhou, H. Y., Zeng, L. P., & Li, W. Z. (2008). New Characteristics and Countermeasures of the Potential Risks of Private Lending. *Financial Aspect, 2008*(1).

Zhou, M. Q. (2011). Discussion on the Issue of Private Lending. Modern Economic Management, 2011 (10).

Zhou, R. J. (2010).The Development of Private Lending Under Different Monetary Policy. *Shanghai Finance, 2010*(1).

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