



Shadow Bank Scale and Financial Risk Prevention and Control Ability

An Empirical Study Based on Principal Component Analysis

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Abstract

This paper explores the impact of shadow banking scale on China's financial risk prevention and control capabilities, which is of great significance to the stability and development of the financial system. This paper starts with the literature on the definition of shadow banking in China and its impact on financial risk prevention and control. We first select 9 indicators that reflect the ability of financial risk prevention and control. Meanwhile, we build a financial risk prevention and control capability system, and use principal component analysis to obtain comprehensive indicators of financial risk prevention and control capabilities. Then, we divide the components of China's shadow banking into entrusted loan balance, trust loan balance, undiscounted bank acceptance bill, loan balance of small loan companies, etc., to measure the scale of China's shadow banking. Finally, we establish a regression model to analyze the impact of the development of shadow banking on financial risk prevention and control, and based on this, combine with the actual situation, we put forward policy recommendations for strengthening China's financial risk prevention and control capabilities.

Keywords-shadow banking; financial risk prevention and control capability; principal component analysis method; index system construction

1. Introduction

As a product of financial innovation, shadow banking provides diversified financing channels, facilitates the financing of small and medium-sized enterprises. Meanwhile, it also makes financial activities more diversified and stimulates the "activity" of the market. However, the high leverage ratio, lack of supervision, and maturity mismatch of shadow banking have also increased the fragility of the financial system and impacted the stability of the financial system. In 2007, the subprime mortgage crisis in the United States broke out and quickly swept the world, which not only brought heavy losses to the financial industry in the United States, but also made the world's economic development hesitate. When foreign scholars studied the causes of the outbreak of the financial crisis, they first proposed the concept of "shadow banking" and considered it as the fuse of the crisis. Since then, scholars from all over the world began to attach

importance to and conduct in-depth research on shadow banking.

2. Literature review

2.1. Definition of shadow banking

The concept of shadow banking was first proposed by Paul Mcculley at the Fed's annual meeting in 2007. He believes that shadow banking refers to financial institutions that have a business model similar to traditional commercial banks, but are not within the traditional commercial banking system and are difficult to supervise^[16]. Acharya, P Schnabl (2008) reveal how bank risks are transferred or hidden within the shadow banking system. It carries out unlimited credit expansion through the securitization of bank loans, which brings potential risks to the financial system. The specific content of shadow banking varies according to the

different political and financial mechanisms of each country^[13].

Shadow banking in western countries is generated in the context of financial disintermediation, and it usually participates in financial activities in the form of securitization. The birth of shadow banking in China originated from the background of credit crunch, while credit assets carry on regulatory arbitrage in order to evade financial regulation. It relies on traditional banks, crosses with traditional banks' capital chain, and has similar business model and capital source with traditional banks. Relevant institutions and scholars generally define and divide shadow banking from three perspectives: institution, supervision and social financing.

In 2011, Li Jianjun and Tian Guangning proposed that China's shadow banking institutions include: Non-bank financial institutions approved by regulatory authorities (trust and investment companies, financial asset management companies, financial leasing companies, etc.) , quasi-financial institutions approved by government functional departments (private equity investment funds, pawnshops, etc.) and other financing intermediaries (private lending). Other business activities include asset securitization and financial derivatives, bank-trust financing, investment and financing, and private lending^[5]. In 2013, Ba Shusong believes that shadow banking is a financial innovation with infinite possibilities, which should be regulated and guided to better serve the real economy^[1].

In 2012, from the perspective of supervision, Li Wei and Su Zhentian believe that the business model of shadow banking is similar to that of traditional commercial banks, but the shadow banking is a non-bank financial institution subject to completely different levels of supervision^[9]. In 2012, Miao Xiaoyu believed that most shadow banks in China were difficult to be supervised or even unsupervised, which greatly reduced the function of monetary policy and other macro-control tools^[7]. In 2013, Ba Shusong divided shadow banking into 4 levels according to the statistical caliber from small to large. The first level is the narrowest caliber, which only includes bank financial products and trust business. The second level also includes financial companies and consumer finance companies. The third level also includes the off-balance sheet business of banks and quasi-financial institutions such as micro-loan companies. The fourth level has the broadest coverage, including private lending, and the operation process of this kind of shadow banking is highly hidden and extremely difficult to measure^[1].

In 2015, from the perspective of social financing, Li Jianjun, Qiao Bo, Hu Fengyun and others believed that the scale of shadow banking could be obtained by removing the following contents from the scale of social financing: RMB loans, foreign currency loans, corporate

bonds, domestic stock financing of non-financial enterprises^[6]. Wang Zhen and Zeng Hui (2014) believe that the scale of shadow banking can be composed of trust loan balance, entrusted loan balance and undiscounted banker's acceptance bill^[11]. Gong Guan, Jiang Zhenlong, Xu Dashi, and Li Cheng (2021) point out that shadow banking of non-financial enterprises can help improve the efficiency of resource allocation in the short term, but it pushes up labor and financing costs^[2].

2.2. Literature review on the relationship between shadow banking and financial risk prevention and control

When most scholars explore the issue of shadow banking, they analyze the relationship with financial stability. This paper combs the literature by selecting indicators to measure the country's financial risk prevention and control capabilities (non-performing loan ratio of commercial banks, inflation rate, house price volatility, price-earnings ratio, local government debt, etc.).

In the study of shadow banking in China, Li Bo and Wu Ge (2011) believed that shadow banking has the function of credit creation but is unregulated. Therefore, when the scale of shadow banking exceeds the appropriate range, it will impact on traditional credit channels and make monetary policy ineffective^[4]. In 2016, Wei Yanzi established VAR model to solve the financing problem of the real estate industry and temporarily curb the rise of housing prices^[12]. In 2021, Wang Zhao, Zheng Jianxia and Liu Junqi proposed that the adjustment mechanism of macro monetary policy environment showed that moderately loose monetary policy environment weakened the effect of digital inclusive finance on reducing the size of shadow banking^[10].

In 2012, MAO Zesheng and Wan Yalan found that there is a threshold effect between the size of shadow banking and the stability of the banking system. When the size of shadow banking is lower than the threshold, the development of shadow banking is conducive to improving the stability of the banking system, while on the contrary, it reduces the stability of the banking system^[8]. Due to the restrictions of national policies on traditional lending channels and the lack of supervision of shadow banking, local governments began to turn to shadow banking for borrowing, which led to the expansion of shadow banking and promoted the growth of local government debt. In 2021, Huang Xianhuan and Yao Rongrong believed that the opening of capital market could restrain the shadow banking of non-financial enterprises through increasing the transparency of enterprise information, improving the external supervision and governance of enterprises, alleviating the financing constraints of enterprises, and improving the investment of main business^[3].

To sum up, shadow banking is a beneficial supplement to China's existing financial market, which can play a positive role in optimizing resource allocation and promoting financial innovation. When its development exceeds the safety threshold, it will lead to the emergence of crisis and greatly impact the ability of financial risk prevention and control. The traditional banking supervision model does not apply to shadow banking. Due to the unique nature of shadow banking, we should formulate a more appropriate regulatory approach. We can build a complete index system of financial risk prevention and control, select an appropriate way to calculate the scale of shadow banking and indicators of financial risk prevention and control, and then comprehensively evaluate the impact of shadow banking on financial risk prevention and control.

3. Analysis of Processes Affecting Financial Risk Prevention and Control Capability

Combined with the literature research results and the particularity of shadow banking in China, this paper screens the target data. Finally, 9 variables were screened out to construct the financial risk prevention and control system, including foreign debt balance (x_1), foreign exchange reserve (x_2), local government debt balance (x_3), non-performing loan ratio of commercial banks (x_4), GDP growth rate (x_5), Shanghai Stock Exchange composite index (x_6), Shanghai Stock Exchange Price Earnings ratio (x_7), real estate investment growth rate (x_8) and housing price growth rate (x_9).

We use principal component analysis to reduce dimension, transform these 9 variables into 3 more representative comprehensive indicators, and calculate the final comprehensive index, namely the comprehensive index of financial risk prevention and control capability (Y). As can be seen from Table 1, the first 3 principal components explain 87.698% of the total variance, covering most of the information. This indicates that the 3 principal components extracted can represent 87.698% of the original 9 variables, and can also represent the original 9 variables to analyze the financial risk prevention and control ability. Thus, 3 principal components can be extracted, which are Y_1 , Y_2 , Y_3 . Among them, variance of Y_1 is 44.475%, variance of Y_2 is 29.848% and variance of Y_3 is 13.375%.

TABLE 1. ILLUSTRATED TOTAL VARIATION

Element	Initial eigenvalue			Retrieves squares and loads		
	Total	Variation of %	Cumulative %	Total	Variation of %	Cumulative %

1	4.003	44.475	44.475	4.003	44.475	44.475
2	2.686	29.848	74.323	2.686	29.848	74.323
3	1.204	13.375	87.698	1.204	13.375	87.698
4	.907	10.074	97.772			
5	.172	1.915	99.687			
6	.028	.313	100.000			
7	-5.868E-17	-6.520E-16	100.000			
8	-2.021E-16	-2.246E-15	100.000			
9	-9.257E-16	-1.029E-14	100.000			

Through Table 2, according to the three principal component coefficients, the linear combination of Y_1 , Y_2 , Y_3 is obtained.

TABLE 2. ELEMENT MATRIX^a

	Element		
	1	2	3
x8	-.955	.062	.284
x6	.845	-.489	.030
x4	.826	.557	.038
x7	.817	-.574	-.006
x2	-.680	-.662	.258
x1	.627	.348	.602
x5	-.413	.390	-.040
x9	-.018	.788	-.581
x3	-.018	.686	.594

$$Y_1 = 0.312x_1 - 0.339x_2 - 0.009x_3 + 0.412x_4 - 0.206x_5 + 0.421x_6 + 0.417x_7 - 0.476x_8 - 0.009x_9$$

$$Y_2 = 0.212x_1 - 0.404x_2 + 0.419x_3 + 0.340x_4 + 0.238x_5 - 0.298x_6 - 0.350x_7 + 0.038x_8 + 0.481x_9$$

$$Y_3 = 0.549x_1 + 0.235x_2 + 0.541x_3 + 0.035x_4 - 0.036x_5 + 0.027x_6 - 0.005x_7 + 0.038x_8 + 0.481x_9$$

As can be seen from the above formula, in the principal component Y_1 , the absolute value of the coefficient of non-performing loan ratio of commercial banks (x_4), Shanghai Stock Exchange Composite Index (x_6), Shanghai Stock Exchange average price-earnings ratio (x_7) and real estate investment growth rate (x_8) is greater than the absolute value of the coefficient of other variables, so the principal component Y_1 is the comprehensive reflection of these 4 variables.

In the principal component Y_2 , the absolute values of the coefficients of foreign exchange reserves (x_2) and GDP growth rate (x_5) are greater than those of other variables, so the principal component Y_2 is a comprehensive reflection of these 2 variables.

In the principal component Y_3 , the absolute value of the coefficient of foreign debt balance (x_1), local government debt balance (x_3) and housing price growth

rate (x_9) is greater than the absolute value of other coefficients, so the principal component Y_3 is the comprehensive reflection of these 3 variables.

The summary is shown in Table 3.

TABLE 3. CLASSIFICATION OF PRINCIPAL COMPONENTS

Primary indicator	Secondary indicator
Principal component Y_1	Commercial bank non-performing loan ratio (x_4) ; Shanghai Stock Exchange Composite Index (x_6); Shanghai Stock Exchange average price-earnings ratio (x_7) real estate investment growth rate (x_8)
Principal component Y_2	Foreign exchange reserves (x_2) ; GDP growth (x_5)
Principal component Y_3	External Debt Balance(x_1); Local government debt balance (x_3); house price growth (x_9) ;

After standardizing the initial variables, this paper can substitute the obtained standardized data into Y_1, Y_2, Y_3 respectively to obtain the scores of each principal component. Then, we multiplied the scores of each principal component by the corresponding principal component variance and added them together to obtain the comprehensive score, as shown below:

$$Y=0.4448Y_1+0.2985Y_2+0.1338Y_3$$

Based on Table 4 and the actual situation, it can be seen that the index of China's financial risk prevention and control ability was negative from 2013 to 2014. This is because the government's 4 trillion yuan plan in 2008 spurred an increase in local government debt, much of which was short-term debt, and local governments have had to repay bank loans since 2012. While the program has been somewhat positive for the economic recovery, it has greatly increased the vulnerability of our financial system. From 2018 to 2019, the indicators of China's financial risk prevention and control ability have been greatly improved, mainly due to the promulgation of the Guiding Opinions on

Regulating the Asset Management Business of Financial Institutions in 2018. Guiding Opinions on Regulating the Asset Management Business of Financial Institutions takes breaking the exchange and standardizing the capital pool and channel business as the focus of financial work, which has played a normative role in China's financial market to a large extent.

TABLE 4. PRINCIPAL COMPONENT SCORE AND COMPREHENSIVE SCORE

Year	Principal component Y_1	Principal component Y_2	Principal component Y_3	Principal component Y
2013	-4.25	-0.05	-0.35	-1.95
2014	-0.23	-2.56	1.18	-0.71
2015	1.73	-1.37	-0.78	0.26
2016	1.03	0.09	-1.6	0.27
2017	0.68	0.12	-0.01	0.34
2018	-0.06	2.4	-0.04	0.68
2019	1.11	1.37	1.59	1.12

4. Model construction and empirical analysis

4.1. Construction of the model

The purpose of this study is to explore the shadow banking scale effect on the financial risk control ability, so be explained variables for the financial risk control ability of comprehensive index Y, variable selection in social financing stock entrust loan balances (X_1) the trust loan balances (X_2), undiscounted bank acceptance bill(X_3), and micro-credit company loan balances (X_4). The sum of the 4 is the total size of shadow banking, and the optimal combination of multiple independent variables is used to estimate the independent variables. Therefore, the selected model is multiple linear regression model, and the set linear regression model is:

$$\hat{Y} = \beta_1 + \beta_2X_1 + \beta_3X_2 + \beta_4X_3 + \beta_5X_4 + \mu$$

4.2. Parameter estimation

Using Eviews7.2 to estimate the parameters of the model, the regression results are shown in Table 5.

TABLE 5. REGRESSION RESULTS

Dependent Variable: Y				
Method: Least Squares				
Date: 03/12/21 Time: 14:16				
Sample: 2013 2019				
Included observations: 7				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.938632	5.341865	-0.175713	0.0087
X1	0.006406	0.336535	0.019035	0.0145

X2	-0.008940	0.411076	-0.021748	0.0254
X3	-0.589067	0.441604	-1.333926	0.0128
X4	4.276520	6.636869	0.644358	0.0273
<hr/>				
R-squared	0.876224	Mean dependent var	0.001429	
Adjusted R-squared	0.828671	S.D. dependent var	1.023025	
S.E. of regression	0.738656	Akaike info criterion	2.407840	
Sum squared resid	1.091226	Schwarz criterion	2.369204	
Log likelihood	-3.427440	Hannan-Quinn criter.	1.930311	
F-statistic	53.77263	Durbin-Watson stat	2.137436	
Prob(F-statistic)	0.000175			

Combined with ordinary least square method:

$$\hat{Y} = -0.938632 + 0.006406X_1 - 0.008940X_2 - 0.589067X_3 + 4.276520X_4$$

(5.341865) (0.336535) (0.411076) (0.441604)
(6.636869)

4.3. Regression analysis

From the results of regression estimation, the coefficient of determination $R^2 = 0.876224$, the degree of model fitting are relatively high. This indicates that the change of China's financial risk prevention and control capability index from 2013 to 2019 can be explained by the change of 4 variables, namely, entrusted loan balance (X_1), trust loan balance (X_2), undiscounted bank acceptance bill (X_3) and micro-credit company loan balances (X_4).

Judging from the coefficients before each variable, micro-credit company loan balances (X_4) has the greatest impact on the ability of financial risk prevention and control, followed by undiscounted bank acceptance bills (X_3), trust loan balance (X_2) and entrusted loan balance (X_1). However, micro-credit company loan balances accounts for less than 5% of the shadow banking scale, which can be temporarily excluded. Therefore, undiscounted bank acceptance bills (X_3) has the greatest impact on the ability of financial risk prevention and control.

The undiscounted bank acceptance is inversely related to the index of financial risk prevention and control ability, that is to say, every 1% increase of undiscounted bank acceptance, the index of financial risk prevention and control ability will decrease by 0.589067%, while the undiscounted bank acceptance is the off-balance sheet business of commercial banks. It can be seen that in China, when the off-balance sheet business of commercial banks increases, the ability of financial risk prevention and control will decrease accordingly. The off-balance sheet business of commercial banks is the majority of factors affecting the ability of financial risk prevention and control, which also reflects the feature of "the shadow of banks" in China.

There is a positive correlation between entrusted loan balance (X_1), micro-credit company loan balances (X_4) and the index of financial risk prevention and control ability. If the entrusted loan balance increases by 1%, the index of financial risk prevention and control ability increases by 0.006406%. If micro-credit company loan balances increase by 1%, the index of financial risk prevention and control ability increases by 4.27652%. This shows that the development of shadow banking has enhanced the ability of financial risk prevention and control to a certain extent.

Although the development of shadow banking is a double-edged sword for financial risk prevention and control, it has more disadvantages than benefits. The coefficient of entrusted loan balance (X_1) and micro-credit company loan balances (X_4) are 0.006406 and 4.27652 respectively, which are positively correlated with financial risk prevention and control ability.

Analyzing from the coefficients alone, the micro-credit company loan balances play a great role in financial risk prevention and control ability. However, considering that it accounts for too low a proportion in shadow banking, the impact on financial risk prevention and control is more about the balance of undiscounted commercial bank acceptance bills and trust loans. In other words, the development of shadow banking has more disadvantages than benefits for financial risk prevention and control ability.

5. Conclusions and suggestions

5.1. Conclusions

5.1.1. The control of bank risks and shadow banking has achieved remarkable results

Through the calculation of each component of China's shadow banking, this paper obtains the size of China's overall shadow banking. Through calculation, it is found that entrusted loans and trust loans showed explosive growth before 2017. But after 2017, it began to decrease obviously, while the undiscounted bank acceptance bill is decreasing year by year. It can be seen that China has achieved remarkable results in

controlling bank risks and shadow banking in recent years.

5.1.2. Strengthen the supervision

Micro-credit company loan balances has fluctuated and stabilized in recent years. In this regard, we can speculate that although the relevant policies for shadow banking have an impact on commercial banks, they have little binding force on micro-credit company and private lending. While the supervision of off-balance sheet business of commercial banks cannot be relaxed, the supervision of small loan companies and private lending should also be strengthened.

5.1.3. The development of shadow banking should be viewed dialectically

The development of shadow banking has both positive and negative effects on the ability of financial risk prevention and control. On one hand, the increase of undiscounted commercial bank acceptance bill and trust loan balance has a negative effect on financial risk prevention and control ability. On the other hand, the increase of entrusted loan balance and micro-credit company loan balance has a positive effect on financial risk prevention and control ability. Therefore, the shadow banking issue should not be completely negate, but should not only use the advantages of shadow banking to promote the economy, but also curb or control the negative impact of shadow banking.

5.2. Policy Suggestions

5.2.1. Strengthen management of commercial banks' off-balance sheet business

According to the empirical analysis of this paper, the off-balance sheet business of commercial banks is the most important factor affecting the ability of financial risk prevention and control. Off-balance sheet business of commercial banks refers to the fact that commercial banks cooperate with other non-bank financial institutions to evade regulation. They package assets in the form of wealth management products or trust plans and transfer them to off-balance sheet to expand credit business. When the off-balance sheet business of commercial banks increases, the ability of financial risk prevention and control will decrease accordingly.

In this process, the risks of leveraged operations continue to expand through transactions in the financial market one after another, and are transmitted between various institutions and individual investors. Once a problem occurs in one link, all parties involved will be affected. Therefore, it is suggested to strengthen the supervision of bank-enterprise cooperation. At the same time, there should be special institutions to supervise the

off-balance sheet business of commercial banks and establish a prudent authorization management system.

5.2.2. Control the leverage level of shadow banking

At present, China's social financing costs are relatively high, especially under the impact of the COVID-19 outbreak and the continuous downturn in the real economy. The pressure of financing costs is exacerbating the plight of small and medium-sized enterprises(SMEs) and increasing financial costs and risks. Based on the financing threshold, SMEs mostly use shadow banking to raise funds, which is not conducive to the stability of the financial system. In addition, the high-pole nature of shadow banking will make the risks greatly stacked. Therefore, the regulatory authorities should increase their efforts to control the leverage level of shadow banking in the business chain, so that the risk level of shadow banking can be restrained and controlled.

5.2.3. Establish shadow banking supervision system

The level of risk in the financial system is not a simple sum of the levels of risk in all financial institutions. In the supervision of the shadow banking system, equal attention must be paid to macroprudential and microprudential. Firstly, it is necessary to realize the micro prudence of each financial institution. Each financial institution should establish and improve its own risk internal control system, establish an effective risk monitoring and early warning mechanism, and formulate corresponding risk handling plans. Secondly, macro-prudential supervision of the shadow banking system should be realized. We should implement macro-prudential supervision of the shadow banking system. An effective risk isolation mechanism should be established between traditional commercial banks and shadow banks to prevent risks from spreading to the entire financial system. Thirdly, in order to achieve macro-prudential supervision of shadow banking system, we should pay attention to control the overall scale of shadow banking and its various components. The scale of shadow banking should be controlled within a reasonable range and the shadow banking system should be guided to play its positive role.

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REFERENCES

- [1] Ba Shusong. (2013). Shadow banking should be assessed objectively from the perspective of financial structure evolution. *Economics* (4), 4.
- [2] Gong Guan, Jiang Zhenlong, Xu Dashi & Li Cheng. (2021). The dynamic evolution of shadow banking and resource allocation efficiency of non-financial enterprises. *Economics (Quarterly)* (06), 2105-2126.
- [3] Huang Xianhuan & Yao Rongrong. (2021). Capital market opening and shadow banking of non-financial enterprises. *International Finance Research* (11), 87-96.
- [4] Li Bo & Wu Ge. (2011). The credit creation function of shadow banking and its challenges to monetary policy. *Financial Research* (12), 77-84.
- [5] Li Jianjun, & Tian Guangning. (2011). Analysis of the top-level design of the shadow banking system regulatory reform. *Macroeconomic Research* (8), 5.
- [6] Li Jianjun, Qiao Bo, & Hu Fengyun. (2015). The formation mechanism and macro effect of shadow banking in China. *Macroeconomic Research* (11), 9.
- [7] Miao Xiaoyu, & Chen Xi. (2012). The shadow banking system and its impact on commercial banks. *North China Finance*, 000(002), 32-35.
- [8] Mao Zesheng & Wan Yalan.(2012). Research on China's Shadow Banking and Banking System Stability Threshold Effect. *International Finance Research* (11), 65-73.
- [9] Su Zhentian & Li Wei.(2012). Sectoral Productivity, Exchange Rate and Structural Inflation: An Extended Study Based on the B-S Hypothesis. *Economic Issues* (04), 23-27+73.
- [10] Wang Zhao, Zheng Jianxia, Liu Junqi & Yu Weifeng. (2021). Can digital financial inclusion reduce the scale of shadow banking? . *Finance Theory and Practice* (11), 50-63.
- [11] Wang Zhen, & Zeng Hui. (2014). Theoretical and Empirical Analysis of the Impact of Shadow Banking on Monetary Policy. *International Finance Research* (12), 10.
- [12] Wei Yanzi.(2016). Research on the Interaction between Shadow Banking and Real Estate Prices in my country—Empirical Analysis Based on VAR Model. *Financial Economics* (22), 98-101.
- [13] Acharya, V. V. , & Schnabl, P. . (2009). How banks played the leverage “game”. *Financial Markets, Institutions & Instruments*.
- [14] Bremmer, I. , & N Roubini. (2011). A g-zero world: the new economic club will produce conflict, not cooperation. *Foreign affairs*, 90(2), p.2-7.
- [15] Broby, Daniel. (2021). Financial technology and the future of banking. *Financial Innovation*. 7. 10.1186/s40854-021-00264-y.
- [16] McCulley, Paul. (2010). Global Central Bank Focus: Facts on the Ground. *Levy Economics Institute, The, Economics Policy Note Archive*.

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