

The Impact of Shadow Banking on China's Monetary Policy Objectives

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Abstract: On the basis of summarizing the development of shadow banking in China, we analyze the influence of shadow banking on the ultimate goals of China's monetary policy from both theoretical and empirical aspects. We find that the shadow banking in China has a positive impact on the change of prices, which reaches the maximum in the third stage and then declines. The contribution of shadow banking to GDP fluctuates, with a maximum close to 20%. China's economic development has been inseparable from the support of shadow banking.

Keywords: shadow banking, monetary policy, price level, economic development

1. Introduction

The occurrence of the subprime mortgage crisis in the United States in 2008 brought shadow banking into people's vision and aroused widespread attention from the whole society. All parties agreed that shadow banking was the culprit leading to the subprime mortgage crisis. However, after experiencing the impact of the subprime mortgage crisis, shadow banking in the United States subsequently emerged from the trough and developed rapidly, and now the scale of some shadow banking products has reached or even exceeded the level before the subprime mortgage crisis.

In China, shadow banking is also growing, its influence continues to increase. The hidden risks of shadow banking, such as bank wealth management, trust products, and Internet financial products, are constantly exposed, which has attracted great attention from financial regulatory authorities and widespread concern from all walks of life.

As a financial system that is parallel to the traditional financial system and continuously cross-integrated, shadow banking accounts for an increasing proportion of social financing, and its impact on monetary policy is becoming more and more significant. Monetary policy authorities only rely on traditional monetary policy tools and rely on the original monetary policy framework to achieve the established monetary policy goals. Therefore, in order to improve the macro-control A detailed investigation of the impact of shadow banking on monetary policy, the mechanism for unlocking the currency policy channel and the achievement of the monetary policy objectives, is required.

This Article focuses on the impact of shadow banking on the final goal of monetary policy based on an analysis of the mechanism of generation and the development status of shadow banks within China and abroad and then proposes appropriate counter-measures.

2. Literature review

Studies believe that the existence of shadow banking has to some extent affected the ultimate goal of regulation of monetary policy.

Some researchers believe that shadow banking departs from traditional banks, which in turn affects the final aim of monetary policy. De Rezende (2011) believes that shadow banking enhances investment and finance options, decreases capital supply / demand dependency on commercial banking, has an impact on the transmission of monetary policy via banking channels and consequently affects monetary policy regulation.

Some scholars think that shadow banking is expanding money supply through lending, addressing the funding difficulties of SMEs and promoting economic growth. Li Bo and Wu Ge (2011) found that creating shadow banking lending boost financial asset demand and foster a higher asset price, thus easily creating bubbles of assets and affecting central bank price monitoring. The SVAR model for analysing the impact of sub-banks on economic growth was established by Chen Jian and Zhang Xiaolong (2013). By financing SMEs, shadow banks were in some way able to solve the financial difficulties of SMEs and to increase jobs. The SVAR model provided exports and investment,

and promoted economic growth. At the same time, Shadow banking was found not to have any apparent price impact. They think the reduction in the supply of money is an important driver for shadow banks and economic growth has also been instrumental in boosting demand for money. Li Cun (2019) believes that the shadow banking sector has improved capital supplies, has solved some businesses' financing problems, especially small and medium-sized enterprises, and has provided real-economic development funds. Regional microfinance companies and other institutions, due to their information advantages and the geographical and personal advantages, supported the development of local small and medium size enterprises

As in the article, several small, medium-sized and micro-entities received funds from the shadow banking channels, for example, private lending. From the perspective of fund-raising, shadow banks have collected large quantities of idle funds and transformed them into effective investments to provide financial support for the real economy. In addition, shadow banking will also increase the cost of financing the real economy, divert funds from the real economy and affect the development of the real economy, whilst promoting development of the real economy. In addition, the high-growth real-estate industry has accumulated a considerable amount of shadow bank funds, which resulted in the collapse of the real economy and large numbers of risks, when the real economy's return is not high. A systemic crisis will be triggered as housing prices drop.

A drop in house prices triggered the subprime mortgage crisis in the United States. Some scientists think shadow banking affects economic growth, but has little price impact. Li Congwen (2015) used the Copula template to study shadow banking relations with monetary policy and found that the shadow banking system has no significant price impact. Due to the link between monetary policy and the credit assignments to listed companies Shen Fuping, Yuan Zhenxing et al (2019) found that the investment effectiveness of confided credit companies was lower compared to co-listed firms that did not perform the entrusted loans. Investments in the real economy have changed as listed enterprises develop the lending enterprise and are not conducive to a growth of the real economy. Simultaneously, before and after the entrusted loan was made, a comparative analysis of the investment efficiency of the listed company found that after the entrusted loan was completed,

the investment efficiency of this company had decreased in the real economy. The more loans are committed, the more obvious the drop in the efficiency of investment is.

3. The Development of Shadow Banking in China

China's shadow banking emerged and developed with the process of China's economic and social reform and opening up, and fluctuated with the adjustment of the macroeconomic and financial situation.

3.1 The Emergence Stage of Shadow Banking in China

Before 1992, China's shadow banking was born, mainly due to China's reform and opening up. Regarding the emergence of China's shadow banking, there are two channels, one is informal financial channel and the other is formal financial channel.

Regarding shadow banking in informal financial channels, it is generally believed that it originated in coastal areas such as Guangdong, Fujian and Zhejiang. In the early 1980s, there were private loans in Guangdong, Fujian and Zhejiang. This is the prototype of China's shadow banking. With the deepening of reform and opening up and the development of market economy, in the 1990s in Yiwu, Zhejiang, underground banks in the form of consignment stores, which are generally called pawn shops.

As for the formal channel of shadow banking, it began when the PRC was founded. In November 1949, the Shanghai Branch of the People's Bank of China set up the Trust Department to take over the trust business of the old Bank of China. Tianjin Investment Company was officially established as a public-private joint venture in June 1951. With the implementation of the planned economy, China's trust business gradually decreased and finally ceased to operate in the mid-1950s. With the beginning of the reform and the opening in October 1979, the China International Trust and Investment Corporation was set up and the Bank of China set up the Trust Consulting Department. In September 1980, the People's Bank of China issued a notice on the establishment of an active trust business and resumed the establishment of a trust business.

3.2 The Development Stage of Shadow Banking in China

1993-2004 Was Chinese shadow banking the stage of development. The main characteristics of

this stage: first, the macro-environment improves and the reform and opening processes are deeper. The South Tour speech by Deng Xiaoping opened a new chapter on the reform and opening of China and the socialist market economy in China entered a new stage of development

The second concerns further market economy improvement and growth. The stock market developed rapidly and securities management products began to emerge after the creation of Shanghai Stock Exchange and Shenzhen Stock Bursary. There is a closer relationship between different financial markets and a stage of joint development. Cooperation has continued to deepen between the trust sector and the securities sector

The third is that the market is becoming more standardized. It is mainly manifested in the rectification of the trust industry. After the rectification, the number of trust companies has decreased significantly and the operation of trust companies has become increasingly standardized. In 1993, the banking industry was separated from the trust industry in accordance with the model of "separated operation and separate management". In the environment of development zone boom, real estate boom, and fund-raising boom at the time, the phenomenon of illegal lending, high-interest deposits, and blind investment was very prominent in trust companies, disrupting the financial order. The bankruptcy of Guangdong International Trust and Investment Company put an end to the disorderly development of the trust industry. In January 1999, the company and its 4 subsidiaries applied to the court for bankruptcy liquidation. This is the first financial institution in China to be declared bankrupt by the court. It went bankrupt and liquidated in accordance with the principles of marketization, breaking the belief that investors have always believed financial institutions would not go bankrupt, causing a strong shock. In response to the problems exposed by trust companies, China has cleaned up the trust industry. At the end of 2000, according to the principle of 1-2 companies in a province, the number of trust companies has been reduced from 239 to 60. Total liabilities were 521.9 billion yuan and 420.8 billion yuan, a year-on-year decrease of 118.1 billion yuan and 109.2 billion yuan respectively.

Fourth, financial products are becoming more abundant. Financial products such as wealth management products and money market funds have been continuously launched. In the mid-1990s, foreign currency wealth management products appeared in China. In 2004, China Everbright Bank launched its first RMB wealth

management product, which was quite popular in the market. Many banks have followed suit and launched a variety of bank wealth management products. Wealth management products have attracted a large number of investors due to their low-risk and high-yield characteristics. In 2004, three fund companies including China Merchants Fund, Boshi Fund and Huaan Fund issued three money market funds. Subsequently, fund companies such as China Southern Fund and Changxin Fund also issued a variety of money market funds. In December 2004, Lion Fund issued the "Lion Money Market Fund", which was the first fund product in China with the name "Money Market Fund" in its name. Subsequently, other fund companies have successively issued various money market funds.

3.3 The Booming Stage of Shadow Banking in China

The period from 2005 to 2015 was the boom stage of China's shadow banking. During this period, the number of shadow banking entities increased, the products were abundant, and the scale grew rapidly. The main body of shadow banking is on the rise, and new main players are constantly emerging. In 2005, China's bank-based fund companies began to be established, and small loan companies began to set up pilot projects. Banking financial leasing companies were also continuously established in 2007. Asset securitization has also begun and developed rapidly. In 2005, the People's Bank of China and the China Banking Regulatory Commission jointly issued "Measures for the Management of Pilot Credit Asset Securitization" and the China Banking Regulatory Commission issued "Measures for the Supervision and Administration of Pilot Credit Asset Securitization of Financial Institutions" (Banking Regulatory Commission Order No. 3, 2005) Production shall provide policy support. In December 2005, China Development Bank successfully issued one asset-backed securities product (ABS) and China Construction Bank successfully issued one mortgage-backed securities (MBS) product. Since then, the size of the core assets of China's asset securitization has continued to expand.

Before the subprime crisis, asset securitization products managed by exchanges, for example, had grown from 4 products in 2005 with a scale of 5.808 billion yuan to 20 products with a scale of 10.939 billion yuan in 2007. After the subprime mortgage crisis, the scale of China's asset securitization products is shrinking rapidly. By 2011, there were

only 6 products with a scale of only 872 million yuan. Since then, with China's economic stimulus policy and monetary policy tightening after the large-scale currency issuance, as an important

capital supply channel, the number and scale of China's asset securitization products have

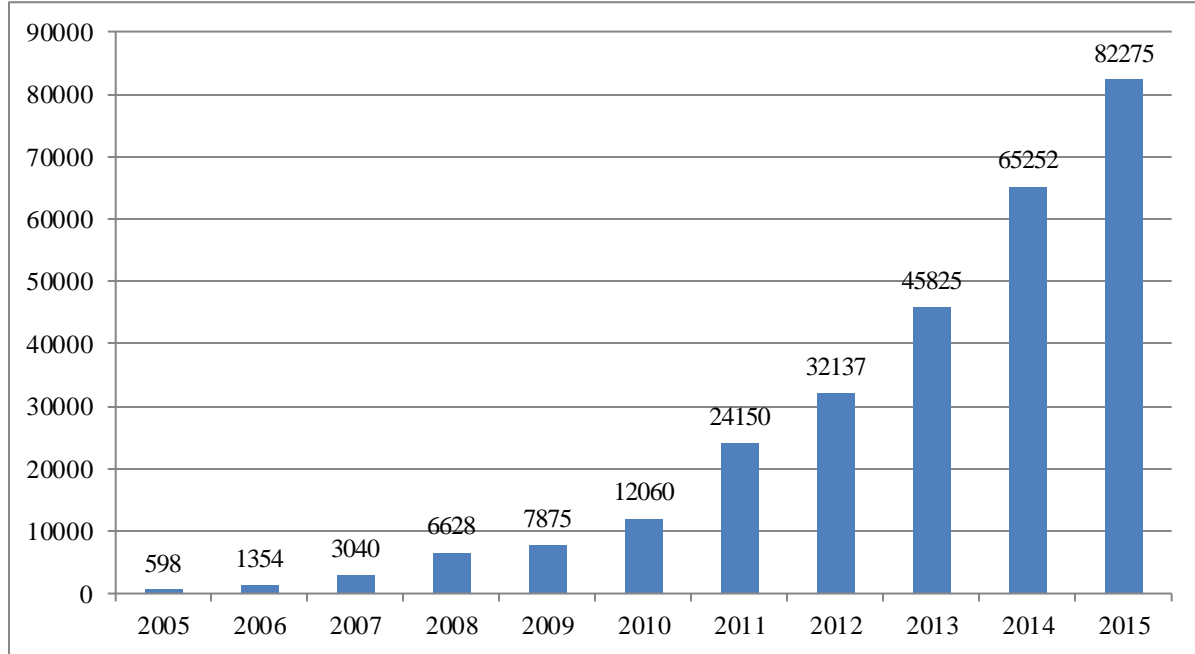


Figure 1. The Number of Financial Products Issued by China's Banking Sector

Note: The data is from Wind.

increased rapidly. Products increase. Taking bank wealth management products as an example, for example, the number of financial products issued by Banks exceeded 10,000 in 2010, reaching 12,060. In 2011, it more than doubled to 24,150. In 2015, the circulation reached 82,275, and in December 2015 alone, the number exceeded 5,000, reaching 5,453.

In terms of product types, there are both RMB financial products and foreign currency financial products. From the perspective of linked products, there are both products linked to stock index and

Asset securitization products have been resumed. In Shanghai the first asset securitization product to be listed on the exchange was Ping A Bank No. 1 Small Consumer Loans Asset-Backed Securities issued by Ping A Bank on 25 June 2014. Only a few of them were registered. The product is divided into three classes: O1 and O2 and B.

Laws and rules have been improved continuously. The China Banking Regulatory Commission has issued a series of provisions covering the management of the human resources management products of commercial banks, guidelines for the risk management of the personal asset management products of commercial banks,

financial products linked to exchange rate and gold. From the perspective of income types, there are both capital break-even fixed type, capital break-even floating type and fully floating type. A large number of financial products of various types provide people with abundant choices and raise a large amount of funds for shadow banking. By the end of 2015, the total stock of wealth management products of Chinese banks exceeded RMB 20 trillion.

From 2005 to 2015, the issuance of financial products of Chinese Banks is shown in Figure 1.

management measures for websites of commercial banks and the Notice on the regulation of the Chinese Commonwealth. Chinese Banking Regulatory Commission A number of rules and regulations regulate the financial management business of commercial banks and clarify the rights and obligations of business banks and investments.

The legal basis offers a strong guarantee for the standardized, healthy and orderly growth of the financial products market. In order to regulate the operation and product sales of trust companies, the China Banking Regulatory Commission issued 'Maßnahmen für Trust Corporation and

Administrative Measures für Trust Trust Fund Trust Pläne,' on 23 January 2007.

The size of the shadow banking industry has increased rapidly. In the Shadow Banking System in India, the non-Traditional credit financing scope is about 27 trillion Yuan, representing 19 per cent of bank assets, according to a report published by the Chinese Academy of Social Sciences' Finance Institute (2014). Barclays Bank (2014) estimated China's Shadow Banking to reach approximately 38.8 trillion yuan in the research report. Moody estimates Chinese shadow-banking assets in 2014 at 45 trillion yuan and in 2015 at 53 trillion yuan. From the point of view of asset securitization products controlled by China's stocks, the number of products has increased rapidly and the scale of these products has increased quickly as a result of

the effects of the subprime mortgage crisis. The total market value increased from 4 in 2005 to 795 in 2015, to 142,398 million yuan, from 5,808 billion yuan.

3.4 The Regulatory Phase of China's Shadow Banking

After 2015, China's shadow banking has entered a new stage of governance and regulation, various rectification efforts have gradually increased, and the scale of some shadow banks has begun to shrink rapidly. Take entrusted loans as an example. Since 2017, the scale of entrusted loans has dropped significantly. The scale in December 2016 reached 401.1 billion yuan, while the scale in December 2018 was 221 billion yuan. The trend of entrusted loans is shown in Figure 2.

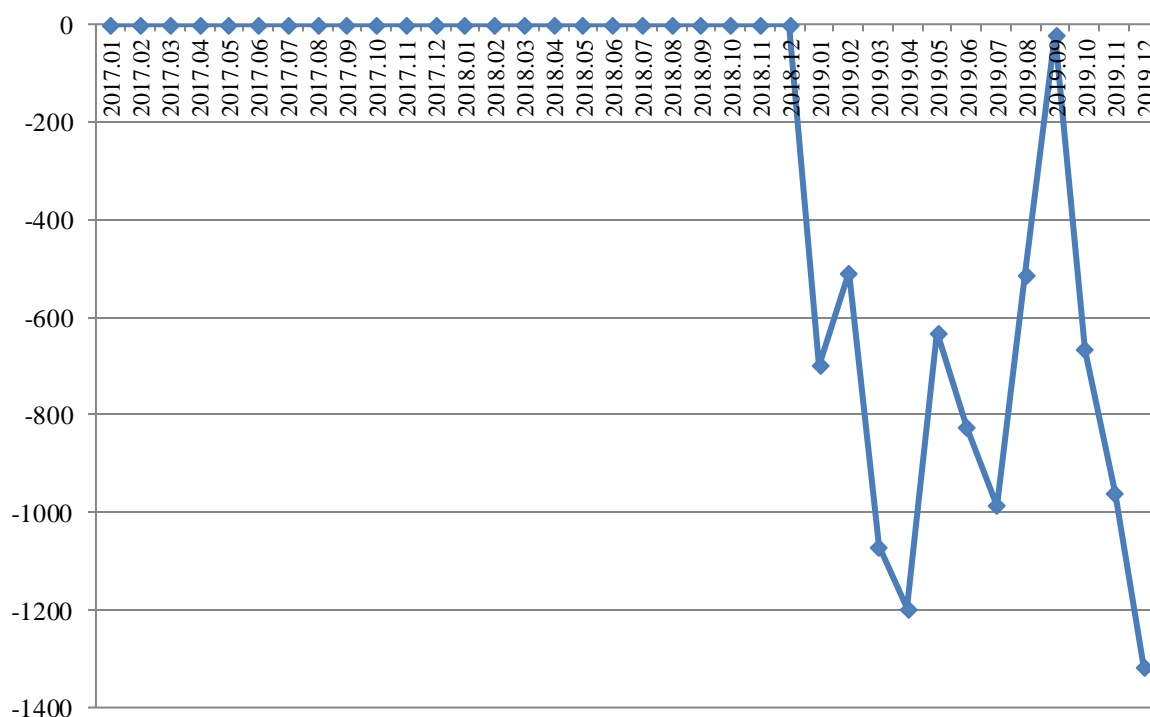


Figure 2. China's entrusted loans from 2007 to 2019 (unit: 100 million yuan)

Note: The data is from the website of the People's Bank of China.

The size of the trust has also fallen sharply. For example, under the influence of the "de-channel" policy in 2018, in the first four quarters of 2018, the scale of China's trust assets decreased by RMB 632.235 billion, RMB 1,344.617 billion, RMB 1,129.233 billion, and RMB 437.947 billion, respectively. They were 2.41%, 5.25%, 4.65% and 1.89%. In 2019, real estate trusts experienced two extremes. In the fourth quarter of 2019, real estate trusts raised only 141.062 billion yuan, the lowest

quarterly amount since 2018.141.062 billion yuan, a record low in a single quarter since 2018.

The relevant rules and regulations for shadow banking, especially those relating to Internet finance, are continually improving. In order to promote a standardized, orderly and healthy development of Internet finance, the People's Bank of China and the other ten departments jointly issued "Guiding Opinions on the Promotion of Healthy Development of Internet Finance" in line with the requirements of "encouraging innovation,

preventing risks, seeking benefits and avoiding disadvantages and healthy development" The guidance clearly stipulates that the development of Internet finance should be market-oriented, pursue the overall objectives of serving the real economy, complying with macro-control and maintaining financial stability, effectively protecting the legitimate rights and interests of consumers and maintaining a fair and competitive market order¹. In response to the problems arising from the development of Internet finance, the General Office of the Council of State issued in April 2016 the "Implementation Plan for the Special Remediation of Internet Financial Risks." The plan limits the operating limits of Internet finance business and regulates the development of various Internet finance trends. In the same month, the former China Banking Regulatory Commission issued an "Implementation Plan for the Special Rectification of P2P Online Lending Risks" to make special corrections for P2P online lending that seriously infringe the rights and interests of investors.

The People's Bank of China has issued a series of work plans such as the "Implementation Plan for the Special Rectification of Risks in Non-bank Payment Institutions", and the "Implementation Plan for the Special Rectification of Risks in Asset Management and Cross-border Financial Business through the Internet". For the financing guarantee industry, the "Regulations on the Supervision and Administration of Financing Guarantee Companies" came into effect on October 1, 2017.

On April 2, 2018, the China Banking and Insurance Regulatory Commission, the National Development and Reform Commission, the State Administration for Market Regulation and other departments jointly issued the "Measures for the Management of Financial Guarantee Business License", "Measures for the Measurement of the Balance of Financing Guarantee Liability", and "Asset Proportion of Financing Guarantee Companies" Four supporting systems including the Administrative Measures and the Guidelines on Business Cooperation between Banking Financial Institutions and Financing Guarantee Companies. A series of systems regulate the operation of the financing guarantee industry and point out the direction for the development of the financing guarantee industry.

Asset securitization products have entered the track of standardized development. With the break of rigid redemption, the scale of asset securitization has expanded and its role has become more and more important, and supervision has gradually relaxed. In February 2017, the Shenzhen Stock

Exchange promulgated the "Notice on Promoting the Asset Securitization Business of Government and Social Capital Cooperation (PPP) Projects in the Field of Traditional Infrastructure", and established a PPP project asset securitization working group to clarify specific personnel to implement corresponding responsibilities. Report and review immediately, and special personnel will be responsible for the job to improve review efficiency. In August 2018, the General Office of the China Banking and Insurance Regulatory Commission issued the "Notice on Further Doing a Good Job in Credit Work and Improving the Quality and Efficiency of Services to the Real Economy", which clearly proposed that "we should actively utilize asset securitization and credit asset transfer to revitalize existing assets and improve the efficiency of capital allocation and use".

The National Development and Reform Commission, China Banking Regulatory Commission, China Securities Regulatory Commission and other departments have issued multiple documents to promote PPP and other projects. Asset securitization, and launched a pilot program for the securitization of intellectual property assets. On June 17, 2019, the China Banking and Insurance Regulatory Commission issued the "Notice on Matters Concerning the Registration of Asset-backed Plans", which followed the path of "initial issuance review and subsequent registration" for insurance asset securitization For supervision, the China Insurance Assets Registration and Trading System Co., Ltd. was responsible for registration matters, and the control on the securitization of insurance assets was relaxed. In terms of the products and scale of asset securitization, by 2017, the number of issuances of asset securitization products in China had reached 2,787, with a scale of 748.243 billion yuan. By October 2019, the asset securitization products issued by Trust companies in China alone reached 756.332 billion yuan, three times the scale of the same period in 2016. In 2019, 1,473 asset-backed securitization products were issued in China, with the issuance scale reaching 2343.941 billion yuan, up 17% year-on-year. At the end of the year, the stock was 4,196.119 billion yuan, a year-on-year increase of 36%. Among them, the issuance of credit ABS reached 963.459 billion yuan, up 3% year on year and accounting for 41% of the total issuance. The stock was RMB 2012.763 billion yuan, up 32% year-on-year, accounting for 48% of the total market. The issuance of ABS reached RMB 1,091.746 billion yuan, up 15% year-on-year and accounting for 47% of the total issuance. The stock is 1780.148 billion yuan, up 28% year on year,

accounting for 42% of the total market. Among them, the scale of personal residential mortgage-backed securities (RMBS) was 516.271 billion-yuan, accounting for 54% of the credit ABS.

In terms of the proportion of total social financing, statistics from the People's Bank of China show that the proportion of traditional bank loans in total social financing has been declining year by year, from 73.8% in 2006 to 51.35% in 2013. In 2002, RMB loans accounted for as high as 91.9%, and RMB and foreign currency loans accounted for 95.5% in total. Traditional bank loans are very prominent. With the development of shadow banking business, the proportion of bank loans declines, while the proportion of entrusted loans, trust loans and other shadow Banks keeps rising.

With the advancement of deleveraging, starting from 2017, the total scale of shadow banking has begun to shrink, and its proportion in the scale of social financing has gradually declined. Take the asset management business as an example. According to data released by the China Association of Funds Industry, as of the end of 2018, the total asset management business scale of fund, securities, futures and private fund management institutions was approximately 50.5 trillion yuan, a year-on-year decrease of 5.78%. Among them, the scale of assets managed by securities companies, their subsidiaries, and private equity funds decreased by about 20% year-on-year, the most significant decline. The growth rate in 2019 was not high. As of the end of 2019, the total asset management business of fund companies and their subsidiaries, securities companies, futures companies, and private equity fund management institutions was approximately 52.23 trillion yuan⁴, a year-on-year increase of only 3.43%. At the end of 2018, the balance of trust assets in China's trust industry was 22.70 trillion yuan, a year-on-year decrease of 13.50%. The quarter-on-quarter growth rates for the first four quarters of 2018 were -2.41%, -5.25%, -4.65%, and -1.89%.

4. The Impact of China's Shadow Banking on the Ultimate Goal of Monetary Policy

Generally speaking, economic growth, price stability, full employment and balance of payments are the ultimate objectives of monetary policy. The Law of the People's Bank of China stipulates that the objective of China's monetary policy is to maintain the stability of the value of the currency and thus promote economic growth. A stable currency means a stable price at home. Economic growth is mainly reflected in GDP and industry growth. This paper mainly analyses the influence of shadow banking on prices and growth. In particular,

this article analyses the impact of shadow banking on prices and economic growth.

4.1 The impact of shadow banking on price levels

The existence of shadow banking has an impact on price monitoring by monetary policy authorities. When central banks tighten monetary policies, money supply decreases and increases interest rates, affects investment, consumption, and exports and decreases economic growth. However, shadow banks provide new funding channels for enterprises which can hardly obtain money from formal financial channels such as banks, compensating for their effects.

For example, in the process of China's regulation of the real estate market, even though the central bank tightened loans to the real estate industry, the real estate industry issued a large number of shadow banking products through trust companies and raised a large amount of money, ensuring a rapid development of the industry and weakening the effect of the state regulation. The long speed is slowing down. However, the existence of shadow banking and its functions have provided new funding channels for companies that have difficulty in obtaining funds from banks and other formal financial channels, thereby offsetting the effects of tightening monetary policies by monetary policy authorities. For example, in the process of China's real estate market regulation, although the central bank has tightened lending to the real estate industry, the real estate industry has produced a large number of shadow banking products through trust companies, etc., and has raised a large amount of money, ensuring rapid industrial development and weakening the impact of national regulation and containment.

When the central bank expands monetary policy, money supply increases, interest rates fall, income increases, and investment, consumption, and export increases. Formal financial channels have had an impact on shadow banking, slowing or even lowering the regulated growth rate of shadow banking. In recent years, China has made great efforts to correct Internet finance. One obvious result is that the scale of shadow banking is declining, and the growth rate of entrusted loans and trust loans is falling sharply, or even becoming negative. Thus, the contraction of shadow banking compensates for the effect of expansionary monetary policy by the monetary authorities and reduces price increases. Therefore, the impact of shadow banking on prices is opposite to the effect of monetary policy authorities.

4.2 Theoretical Analysis of the Influence of Shadow Banking on the Economic Growth

The existence of shadow banking has affected the effectiveness of monetary policy authorities in regulating economic growth. When the central bank implemented a tightening monetary policy, the money supply fell, causing interest rates to rise, affecting investment, consumption and exports, and slowing economic growth. However, the existence of shadow banking and its functions have provided new financing channels for enterprises that have difficulty obtaining funds from banks and other formal financial channels, thereby offsetting the effects of monetary policy authorities' implementation of tightening monetary policies. For example, in the process of China's regulation of the real estate market, although the central bank has tightened lending to the real estate industry, the real estate industry has issued a large number of shadow banking products through trust companies, etc., and raised a lot of funds, thus ensuring the rapid development of the industry and weakening the effect of national regulation and control.

When the central bank has an expansionary monetary policy, the money supply increases, interest rates decrease, income increases, and investment, consumption, and exports increase. Formal financial channels have a crowding-out effect on shadow banking, which slows down or even decreases the growth rate of shadow banking. China's vigorous rectification of Internet finance in recent years has produced an obvious result that the scale of shadow banking has shrunk, and the growth rate of entrusted loans and trust loans has dropped sharply or even negatively. Therefore, the contraction of shadow banking offsets the effect of the monetary policy authority's expansionary monetary policy and slows down economic growth. Therefore, the impact of shadow banking on economic growth is opposite to the effect of monetary policy authorities' regulation and control.

4.3 An Empirical Analysis of the Impact of Shadow Banking on the Price Level

4.3.1 Data selection

Select monthly data from January 2007 to December 2019 for empirical analysis to test the impact of shadow banking on prices. Taking into account the representativeness and availability of data, this paper takes the items other than RMB loans and foreign currency loans in the scale of social financing as proxy variables of shadow banking, denoted as SB; consumer price index is used to represent the price level, denoted as CPI; *Table 1. The Result of stationary test*

since the price level and the money supply are also related, the money supply is introduced, which is represented by M2. Relevant data comes from wind information, using EViews10 for measurement analysis.

4.3.2 Stationary test

Perform first-order difference processing on the variables, and the stationary test results obtained are shown in Table 1. The result shows that the model is stable.

4.3.3 Establish the VAR model of the optimal lag order

The results show that the lag 1 order is optimal. Therefore, a VAR model with lag 1 order is established. As shown in Table 2

4.3.4 Impulse response

The results of the impulse response show that shadow banking has a positive impact on price changes. It reached its maximum and then showed a downward trend, as shown in figure 4.

4.3.5 Variance decomposition

The variance decomposition of price changes shows that as the number of period increases, the degree of explanation of shadow banking increases, and it stabilizes after 15 periods, as shown in Table 3.

4.4 Research on the impact of shadow banking on economic growth

4.4.1 Data selection

Select quarterly data from the first quarter of 2010 to the fourth quarter of 2019 for empirical analysis to test the impact of shadow banking on economic growth. GDP is used to express economic growth; given the representativeness and availability of data, this article considers items other than RMB loans and foreign currency loans in the scale of social financing as proxy variables for shadow banking and records them as SBs. This section provides quarterly data; bank loans, including RMB loans and foreign currency loans, are recorded as BL loans. Relevant data is derived from wind information, using EViews10 for measurement analysis.

4.4.2 Stationary test

Take the logarithm of the variable and perform first-order difference processing. The test results show that the model is stable, as shown in Table 4.

variable	t statistic	P	Smooth or not
dsb	-10.71448	0.0000***	yes
dm2	-4.25416	0.0053***	yes
dcpi	-13.51223	0.0000***	yes

Table 2. Model of optimal lag order

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-400.8832	NA	0.272143	7.212201	7.285018	7.241745
1	91.27077	949.1542	4.87e-05*	1.415550*	1.124282*	1.297373*
2	99.98360	16.33654	4.90e-05	-1.410421	-0.900703	-1.203612
3	104.9746	9.090679	5.27e-05	-1.338831	-0.610662	-1.043390
4	112.5378	13.37076	5.42e-05	-1.313175	-0.366555	-0.929101
5	123.2754 *	18.40736	5.26e-05	-1.344204	-0.179133	-0.871498
6	129.8719	10.95483	5.52e-05	-1.301284	0.082238	-0.739945
7	134.2086	6.969702	6.03e-05	-1.218011	0.383962	-0.568039
8	144.5023	15.99208	5.94e-05	-1.241113	0.579310	-0.502510

Perform stationary on the model of the optimal lag order and find that all points are in the circle, and the model is stable. As shown in Figure 3.

Inverse Roots of AR Characteristic Polynomial

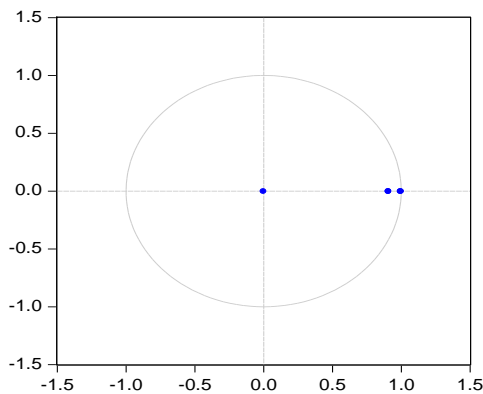


Figure3. Stationary test

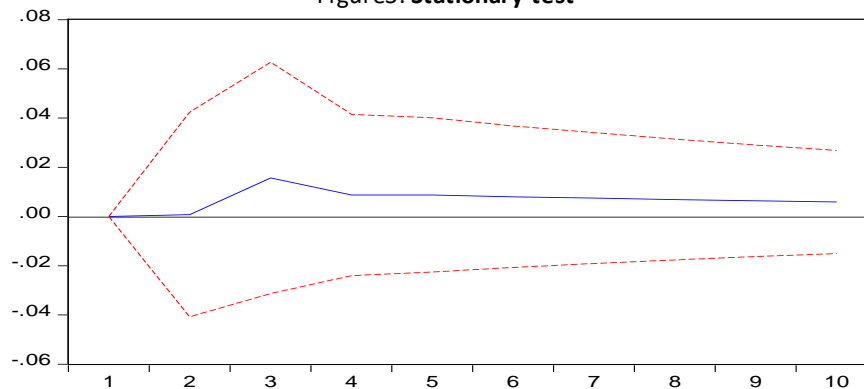


Figure 4: Impulse response

Table 3. Model of optimal lag order

Period	Variance Decomposition of CPI:			
	S.E.	SB	CPI	M2
1	0.471066	0.172153	99.07081	0.757034
2	0.641392	1.304831	97.91657	0.778597

3	0.752563	1.661282	97.53258	0.806141
4	0.832546	1.833061	97.33161	0.835325
5	0.892674	1.931909	97.20285	0.865243
6	0.939016	1.994634	97.10984	0.895525
7	0.975304	2.036912	97.03713	0.925959
8	1.004031	2.066554	96.97705	0.956393
9	1.026951	2.087895	96.92540	0.986708
10	1.045345	2.103532	96.87966	1.016803
11	1.060174	2.115120	96.83829	1.046595
12	1.072170	2.123758	96.80023	1.076014
13	1.081904	2.130208	96.76479	1.104999
14	1.089822	2.135011	96.73149	1.133502
15	1.096276	2.138561	96.69996	1.161484
16	1.101546	2.141151	96.66993	1.188915
17	1.105858	2.143002	96.64122	1.215774
18	1.109393	2.144282	96.61367	1.242046
19	1.112295	2.145121	96.58716	1.267723
20	1.114682	2.145618	96.56158	1.292802

Table 4. Stationary test

	ADF value	1%	5%	10%	P value
DLNBL	-19.62	-2.63	-1.95	-1.61	0.00
DLNGDP	-2.35	-2.63	-1.95	-1.61	0.02
DLNSB	-9.00	-2.62	-1.94	-1.61	0.00

4.4.3 Granger test

Perform Granger test on the variables and find that $\ln SB$ is the Granger cause of $\ln GDP$. The results are shown in Table 5.

4.4.4 Model to determine the optimal lag order

The optimal lag order test is carried out, and the results are shown in Table 6. The optimal lag order is order 7. The model is shown in Table 7.

Table 5. Granger test

Null Hypothesis:	Obs	F-Statistic	Prob.	Result
DLNBL does not Granger Cause DLNGDP	32	0.86111	0.5551	accept
DLNGDP does not Granger Cause DLNBL		1.72512	0.1694	accept
DLNSB does not Granger Cause DLNGDP	32	2.39149	0.0673	refuse
DLNGDP does not Granger Cause DLNSB		0.98796	0.4718	accept
DLNSB does not Granger Cause DLNBL	32	0.84280	0.5678	accept
DLNBL does not Granger Cause DLNSB		0.43770	0.8650	accept

Table 6. Determination of the optimal lag order

Lag	LogL	LR	FPE	AIC	SC	HQ
0	34.38611	NA	0.000483	-1.960394	-1.775363	-1.900079
1	40.70279	11.00325	0.000417	-2.109858	-1.739796	-1.989227
2	44.21435	5.663809	0.000433	-2.078345	-1.523254	-1.897399
3	73.72790	43.79430	8.47e-05	-3.724381	-2.984258	-3.483119
4	94.35729	27.94949	2.97e-05	-4.797245	-3.872092	-4.495668
5	97.67806	4.070625	3.22e-05	-4.753423	-3.643240	-4.391531
6	109.3560	12.80806	2.07e-05	-5.248774	-3.953560	-4.826567
7	125.0542	1.05e-05*	15.19184*	-6.003499*	-4.523254*	-5.520976*
8	127.1958	1.796191	1.33e-05	-5.883603	-4.218328	-5.340765

Table 7. Optimal lag order model

	DLNGDP	DLNSB
LNGDP (-1)	-0.285102 (0.21288) [-1.33926]	-5.029687 (9.23009) [-0.54492]

DLNGDP (-2)	-0.429847 (0.18958) [-2.26734]	24.45768 (8.21991) [2.97542]
DLNGDP (-3)	-0.398342 (0.18289) [-2.17800]	-19.72593 (7.92993) [-2.48753]
DLNGDP (-4)	0.582999 (0.09947) [5.86130]	7.365707 (4.31265) [1.70793]
DLNGDP (-5)	-0.133196 (0.15928) [-0.83622]	5.919102 (6.90621) [0.85707]
DLNGDP (-6)	0.017791 (0.17107) [0.10400]	-24.32077 (7.41737) [-3.27889]
DLNGDP (-7)	-0.027674 (0.16249) [-0.17031]	21.07044 (7.04538) [2.99067]
DLNSB (-1)	0.010871 (0.00421) [2.58359]	0.032006 (0.18244) [0.17543]
DLNSB (-2)	0.008696 (0.00355) [2.44766]	-0.278651 (0.15404) [-1.80895]
DLNSB (-3)	0.008611 (0.00379) [2.27149]	-0.123502 (0.16437) [-0.75136]
DLNSB (-4)	0.012363 (0.00368) [3.35578]	-0.168103 (0.15974) [-1.05235]
DLNSB (-5)	0.010424 (0.00412) [2.53286]	-0.045473 (0.17845) [-0.25483]
DLNSB (-6)	0.008645 (0.00387) [2.23440]	-0.376056 (0.16776) [-2.24167]
DLNSB (-7)	0.011213 (0.00368) [3.04839]	0.458236 (0.15949) [2.87315]
C	0.035115 (0.00834) [4.20913]	-0.237750 (0.36171) [-0.65729]
DLNBL	0.002221 (0.01032) [0.21528]	1.923115 (0.44737) [4.29871]

4.4.5 Impulse response

The impulse result is shown in Figure 5. The impact of shadow banking changes on GDP changes

is dynamic. This corresponds exactly to the development of China's shadow banking.

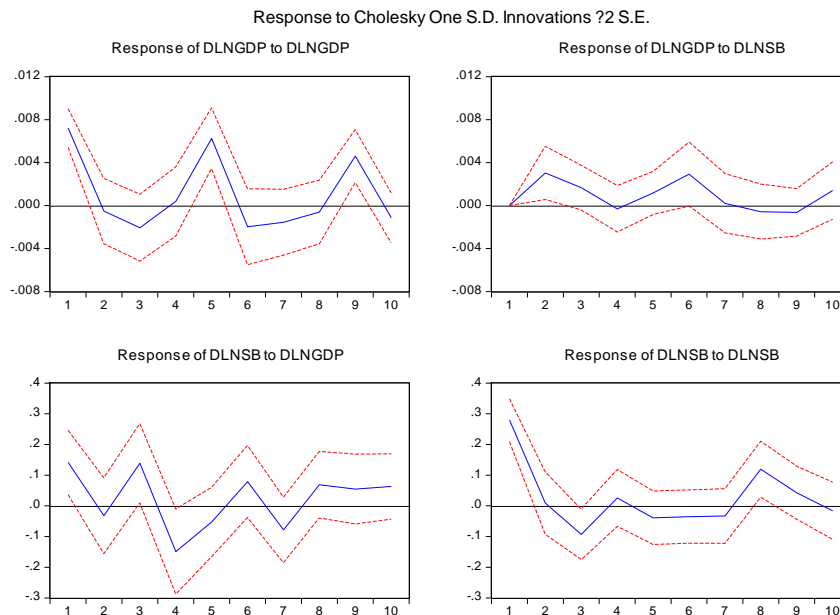


Figure 5. Impulse response

4.4.6 Variance decomposition

The variance decomposition situation is shown in Figure 6. The development of shadow banking has indeed shown a fluctuating contribution to GDP,

with the highest approaching 20%. This shows that the development of China's economy is inseparable from the support of shadow banking.

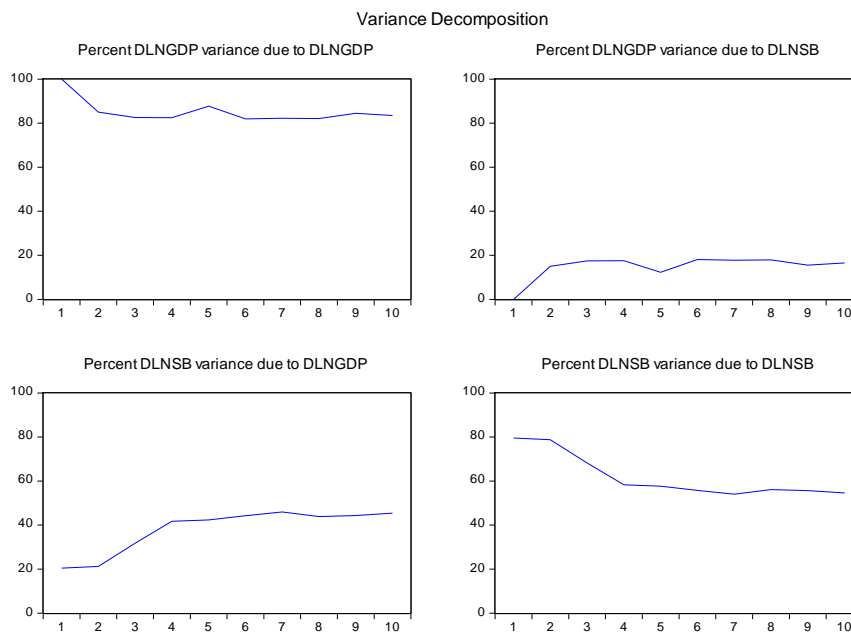


Figure 6. Variance decomposition

5. Conclusion

From an empirical analysis, it can be seen that shadow banking has an impact on both price and economic growth. The contribution of shadow banking to price changes is not high. With the increase in the number of periods, the contribution gradually increases and stabilises at around 2.14 after 15 periods. With changes in regulatory policies, the development of shadow banking

fluctuates and its effect on economic growth also fluctuates.

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