

# Analysis of Factors Influencing the Development of China's Shadow Banking Industry Based on VAR Model

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**Abstract**—Since the financial crisis in 2007, shadow banking system has caught the attention of the world. The shadow banking system of China manifests itself in a pattern and influence that are different from the Western ones. As a “double-edged sword” to economy, shadow banking has its positive and negative effects. With the backing of quarterly date from year 2007 to 2014, analysis on the relations between China's economy and development of shadow banking is carried out from angles of financing demander, supplier and bank based on VAR model and impulse response analysis method, so that policy reference for the development of shadow banking in China.

**Keywords**—shadow banking; social financing; economic development; VAR

## I. INTRODUCTION

Since the financial crisis in 2007, reflection and discussion on financial innovation and regulation has started to prevail. Shadow banking system is one of the subjects. In 2007, Paul McCully, board director of Pacific Investment Management Company (PIMCO), put forward the concept of shadow banking system for the first time. Later in 2008, Geithner who was the president of Federal Reserve Bank of New York at that time also gave his definition of shadow banking system. Geithner considered it as financing arrangement outside the traditional banking system but parallel to banks. Pozsar (2010) and Morgan Ricks (2010) further enriched the definition of shadow banking. Finally in 2011, the Financial Stability Board (FSB) proposed that shadow banking shall refer to credit intermediate system consisting of all activities and entities outside the traditional banking system, which brought systematic risk and regulatory arbitrage through short-term debit & long-term credit, bad credit transformation and leveraged trading. This definition has summarized the characteristics of shadow banking in a comprehensive way and therefore provided guidance for the regulation of shadow banking industry.

In the 1930s to 1970s, under the influence of factors such as disintermediation of bank debit, wide spread of short-term instruments in monetary market and innovation of macroscopic system, shadow banking system started to sprout and develop

in the U.S.. But the real rapid growth and mature of shadow banking system came at the period between 1980s to the eve before the financial crisis of 2008. The characteristic feature of this period was the explosive increasing of bank asset securitization. The balance of Mortgage Backed Securities (MBS) had surpassed the balance of U.S. Treasury Securities during 1999 to 2010, and become the second largest securities after corporate ones (as shown in Fig. 1). There from arose the Western shadow banking system with asset securitization as its core (Zoltan and Hayley, 2010; Gorton and Metrick, 2011).

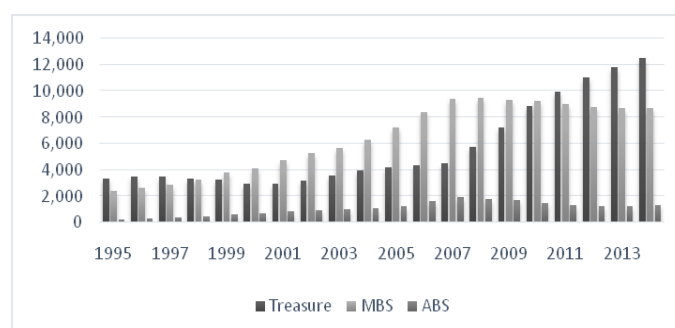


Fig. 1. Market Balance of Three Types of Securities in the U.S. from 1995 – 2014. Unit: \$ Billions

The development of China's shadow banking industry is different from the Western one. For quite some time, social financing in China relied mainly on traditional banking industry. However in recent years, shadow banking gradually takes its shape under the impetus of high inflation rate, deposit interest rate control, separate operation and high threshold in traditional financing industry. The shadow banking industry of China is dominated by credit intermediation and there is no involvement of complex derivatives. It is an evolution and supplementary of off-balance-sheet financing outside the banking system, which is rather oriented towards substantial economy with more innovation in institution other than in product.

In January 2014, the General Office of the State Council of China issued Announcement Concerning Issues of Strengthen the Regulation and Supervision of Shadow Banking

(Document No. 107), and officially defined the connotation of China's Shadow Banking. The document divided shadow banking into three types: type one are credit intermediaries with no financial service license and under completely no regulation, which includes new breed of e-finance companies and third party financial advisors; type two are credit intermediaries with no financial service license and under insufficient regulation, which includes financing guarantee companies and microfinance companies; type three are those with financial service licenses but providing services that are under insufficient regulation or beyond regulations, which includes money market fund, asset securitization and a part of financial services. Document No. 7 issued by the State Council has given an authoritative guidance to the determination of China's shadow banking industry and kicked off Chinese government's regulation and supervision on shadow banking industry.

## II. SHADOW BANKING'S IMPACT ON ECONOMIC DEVELOPMENT

Despite of the wide criticism on shadow banking since the occurrence of financial crisis in 2008, its facilitating impact on economic development is undeniable. Feng and Wang (2011) believe that from the overall perspective, shadow banking has promoted the development of economy. Chen Jian and Zhang Xiao Long (2012) have verified this view with empirical analysis based on SVAR model. Claessens et al. (2012) also think that shadow banking has played an important part as financial intermediary and for this reason its scale keeps increasing, which is actually beneficial judging from the point of view of economics. The facilitating impact of shadow banking on economics displays mainly in the following aspects:

- It is the need of regulatory arbitrage. Banking regulation with minimum capital ratio stipulated by Basel Accord gradually increased the operating cost of banks (Pozsar, 2010; Schwarcz, 2012). Facing the competition against financial institutions like investment banks, traditional banks transfer their loan off balance sheet through loan securitization, which greatly lowers the requirement of regulatory capital and improves their profitability (Calmès and Théoret, 2011).
- It is the need of enhancing assets liquidity. Via method like asset securitization, commercial banks transform loans of relatively long-terms into highly liquid bonds, which can be re-priced and traded in the capital market. Therefore funds are obtained and the liquidity of assets are greatly improved (Langevoort, 2010).
- It is the need of financial innovation. Traditional banking business pattern of attracting deposit and granting loans has no longer advantages over the current economic system, whereas shadow banking came into being in response to the need of the market, centering at the core of financial service (Rydstrom, 2007). The diversified financial instruments and business patterns of earning intermediate income has greatly improved the operation efficiency of traditional banking and satisfied various investment demands (Fein, 2013)

- It is a benign supplementary to traditional banking industry. Traditional banking industry in China tends to grant more loans to large scale enterprises and state-owned ones, however small scale financing institutions like Microfinance Company and pawnshop fill the financing blank for medium and small-sized enterprises and provide references for interest rate marketization.

Nevertheless, shadow banking has its vulnerability and risk. Baily et al. (2008) thinks that the highly leveraged operation of shadow banking industry aggravates its inherent vulnerability. Reinhart and Rogoff (2008) also believe that under the condition of financial turbulence, shadow banking is going to generate comparatively high liquidity risk. Yi Xian Rong (2009) suggests that along with the infinite extension of chains in shadow banking, the risk is being amplified infinitely. On the problem of shadow banking credit intermediary's influence on monetary policy, Sheng (2010) holds the opinion that shadow banking has magnified the monetary aggregates, which adds more difficulty for the central bank to regulate and control. Li Bo and Wu Ge (2011) indicate that due to its independence outside the traditional monetary policy control, shadow banking has created many challenges for the theory and practice of monetary policy.

After all, financial development shall not be put off easily by slight risks. In the face of shadow banking which is an opportunity as well as a challenge, we shall seek from the mist of economy the nature of shadow banking that gives rise to its development and expansion as well as the influencing factors that has prospered shadow bank. It will provide certain policy reference to no matter the regulation of shadow banking or the utilization of it for developing economy. For this very purpose, this essay analyzes the development principles and interaction factors of shadow banking in China from multiple angles based VAR model, and provides suggestions for the management of shadow banking and the effective utilization of it in economic development.

## III. EMPIRICAL ANALYSIS

### A. Feature Selection and Variable Screening of Shadow Banking of China

Unlike in Europe and America, the basic type of shadow banking was not defined in China until 2014 in a document issued by the State Council. However due to elusive behaviors such as business cooperation between banks and trust companies, private financing and underground financing in shadow banking, data are difficult to obtain. The People's Bank of China was not able to announce to the public the scale of social financing until 2011. From this sense, it is quite difficult to measure the development status of shadow banking in a direct way. In recent 5 years, the shadow banking system of China can be classified into trust loan, entrust loan, financing lease, and so on, the figures of which are as shown in Table 1. Domestic scholars take various methods and angles to measure the scale of shadow banking system. Zhou Li Ping (2011) uses the natures of primary deposit and derivative deposit to estimate the credit creation scale of shadow banking system. Through method of direct sorting, Wang Bo-li (2013) estimates that by the end of 2012, the capital scale of shadow

banking industry in China is around CNY 25 trillion. Liu Chao (2014) adopts the total scale of monthly entrust load and trust

loan as repetitive data for the study of shadow banking system.

TABLE I. MAIN TYPE AND AMOUNT OF SHADOW BANKING IN CHINA FROM 2010-2014. UNIT: CNY100 MILLION

	Credit Assets Securitization	Money Market Fund	Securities Repos	Short-term Financing Bills	Ultra-short-term Financing Bills	Non-guaranteed Financial Products	Trust Loan	Entrust Loan	Undiscounted Bank Acceptance Bill	Financing Lease	Petty Loan
2010	0	1533	11634	6650	—	—	3865	8748	23346	23682	1975
2011	13	2949	14350	6995	1360	—	2034	12962	10271	42100	3915
2012	224	7075	18599	8034	2805	40200	12845	12838	10499	62511	5921
2013	232	8832	24249	9127	7378	65327	18404	25466	7755	83731	7535
2014	3229	21914	26790	9931	9205	100900	5174	25069	-1286	106578	9420

<sup>a1</sup>. Date Source: Statistical Yearbook of China, Wind Information

This essay takes reference from the research method of Li Jian Jun (2012), whose measuring logic is the corresponding relation between GDP realized by social economy entities within a certain period of time and all credit support within this period from financing institutions. RYL is used to refer to level of support regular financial institutions provide to economic activities,  $RYL = \text{total society outstanding} / \text{GDP}$ ; RIL is used to refer to ratio between the loans shadow banking borrowers achieved from regular financing institutions and the GDP realized from these loans; RIL can be subdivided into RFL of farmers and REL of economic units like private enterprises and individual business. The calculation formula of shadow banking scale would be:  $\text{Shadow Bank} = (RYL - RFL) \times \text{GDPP} + (RYL - RFL) \times \text{GDPE}$ . The quarter-on-quarter growth rate is represented as “shabank”.

“Pinve” stands for personal investment, the part of personal income excluding life necessity consumptions. It reveals the contribution of people’s investment demand on China’s shadow banking industry. It represents the investor in shadow banking products.

“Ginve” stands for government investment, it is the fixed asset investment volume of infrastructure construction and so on; real stands for real estate investment, it is the annual investment increasing volume in real estate sector. These two indicators represent the demand level of financiers in shadow banking. The thriving demand of shadow banking in China is inextricably related with factors such as the financing

demands of real estate companies and local government since 2009. All aforementioned four indicators will be displayed in quarter-on-quarter ratio.

“Npl” stands for non-performing load ratio, it is the gravity of non-performing loan in the total outstanding loan of financing institutions. Normally loans are divided into five categories based on their risks – regular, concerned, secondary, suspected and lost, the later three of which are commonly known as non-performing loans. NPL ratio is one of the important indicators to evaluate the credit asset safety conditions of financing institutions.

“Roe” stands for ROE (Rate of Return on Common Stockholders’ Equity), an important indicator to reflect the profitability of a bank. This essay adopts the weighted average ROE from the start to the end of the year, namely.

This essay takes data from 32 quarters from the first quarter in 2007 to the fourth quarter of 2014 as samples. All data are seasonally adjusted with Census-X12 method to eliminate the impact of season factor.

#### B. Unit Root Test

ADF test is carried out to observe the stationarity of variables and unit root test is carried out under the standard of AIC. Test results are as shown in Table 2. We can see from “Table II” that variables below 1% significance level are in stationary sequence and integrated of order 1, therefore regression model is feasible on the vectors.

TABLE II. TEST RESULT OF UNIT ROOT TEST

Variables	ADF Test Value	Critical Value (1%, 5%, 10%)	Stationarity Conclusion
shabank	-1.146	-3.709, -2.983, -2.623	Non-stationary
dshabank	-4.749	-3.716, -2.986, -2.624	Stationary
pinve	-3.916	-3.709, -2.983, -2.623	Non-stationary
dpinve	-4.931	-3.716, -2.986, -2.624	Stationary
ginve	-1.669	-3.709, -2.983, -2.623	Non-stationary
dginve	-3.743	-3.716, -2.986, -2.624	Stationary
real	-1.447	-3.709, -2.983, -2.623	Non-stationary
dreal	-4.252	-3.716, -2.986, -2.624	Stationary
npl	-2.343	-3.709, -2.983, -2.623	Non-stationary
dnpl	-4.839	-3.716, -2.986, -2.624	Stationary
roe	-1.193	-3.716, -2.986, -2.624	Non-stationary
droe	-6.672	-3.723, -2.989, -2.625	Stationary

From the AIC and SC tests we know that the optimal lag variable is a first derivative, therefore the model is built as follow:

In which,

$$Y_t = [slabank_t, pinve_t, ginve_t, real_t, npl_t, roe_t]$$

Stationarity test is carried out on the model, and judging from “Fig.2”, the reciprocals’ modules of all roots of the characteristic equations in this VAR model are less than 1, which is also to say the reciprocals of all roots are within the unit circle. Therefore, this VAR model is stationary and it provides the basic conditions for impulse response function analysis.

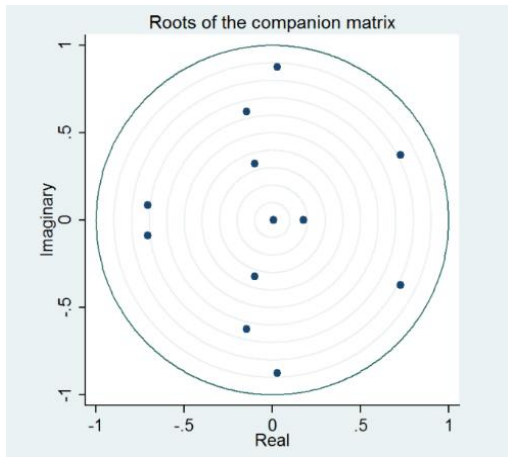


Fig. 2. VAR Model Stationarity Test Result (Graph Form)

### C. Impulse Response Function Analysis and Conclusion

The basic idea of Impulse response function is to inspect through time sequence model how the disturbance term brought by the variation of one certain variable spread over to each other variable. The impulse response function can be used to examine the short-term dynamic impact relation between variables, as well as to investigate the interaction between shadow banking and its relevant factors.

As shown in “Fig.3”, shadow banking has a fluctuation pattern of impact on personal investment. After encountered one unit positive impact from shadow banking, personal investment experienced a brief tumble and reached its valley value at around phase 1. Afterwards, it vibrated around the value of 0, which shows that the impact effect still lingers but it is not more obvious.

As shown in “Fig. 4”, after encountered impact from shadow banking, the NPL ratio of banks took on a negative effect, which vanished slowly towards zero as time went by. It means that shadow banking has negative impact on NPL ratio.

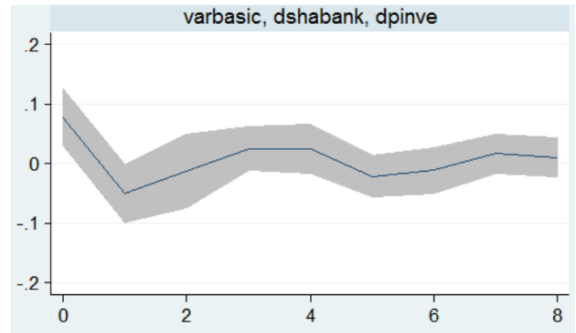


Fig. 3. Shadow Banking's Impact on Personal Investment

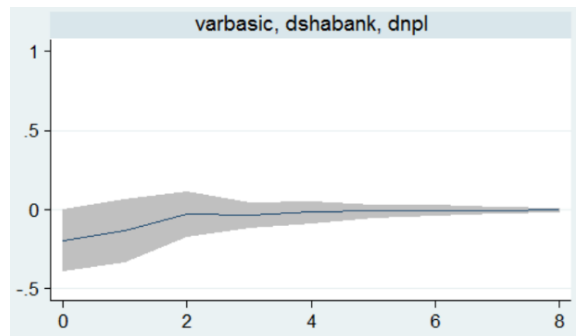


Fig. 4. Shadow Banking's Impact on NPL Ratio

The relation between shadow banking and government investment are as shown in “Fig. 5”. We can see that as time went by, the positive impact shadow banking had on government investment vanished towards zero, which also verified that government investment was one of the factors that had propelled the scaling up of shadow banking.

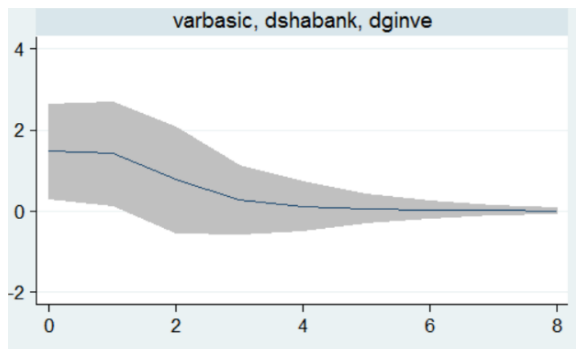


Fig. 5. Shadow Banking's Impact on Government Investment

Shadow positive banking impact had brought increase for real estate industry “Fig. 6”, and the impact vanished towards zero afterwards, which matches with the financing situation of real estates through shadow banking in reality.

When a unit of positive impact was given to shadow banking, ROE dropped accordingly and then ascended soon afterwards. It means that in the preliminary stage of shadow banking business, banks may not experience the advantage

of profitability, but then in later stages, it will witness enhancement effect from shadow banking.

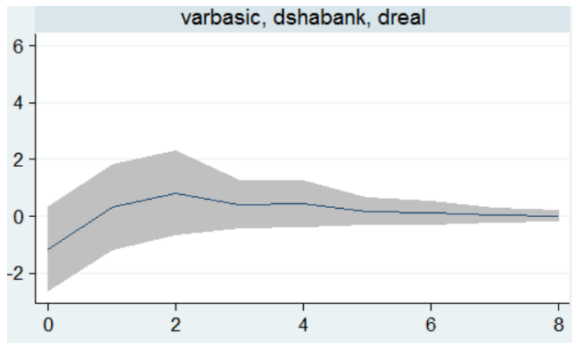


Fig. 6. Shadow Banking's Impact on Real Estate

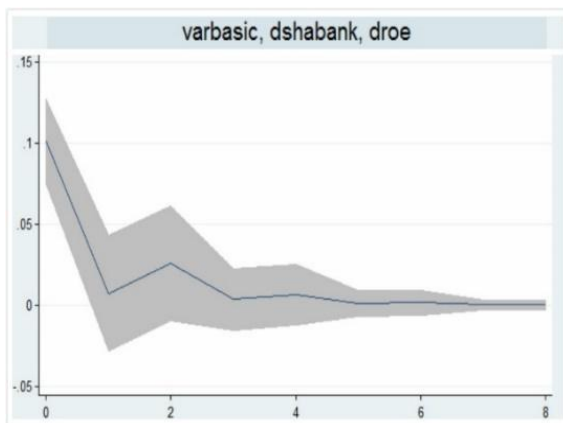


Fig. 7. Shadow Banking's Impact on ROE

#### IV. POLICY SUGGESTION

From the angle of indicators such as personal & household investment, government & real estate investment, NPL ratio in banking industry, as well as bank ROE, this essay has verified the synergic relation between shadow banking and economic development. It can be seen through the VAR model and impulse response analysis that shadow banking has function of facilitating financing for substantial economy like real estates. It also provides certain level of helps to banks on managing NPL rate and improving profitability. Meanwhile, shadow banking is prone to take influences from interaction of personal investment and from government investment.

After the financial crisis, western countries have implemented certain level of regulation measures such as the Dodd-Frank Act on shadow banking system. Nevertheless, none of them intend to prohibit any business of the shadow banking system. All they want is rather to dispel its faultiness in operation.

Gennaioli (2011) believes that under rational expectation hypothesis, shadow banking system is beneficial to the improvement of social welfare; however under the circumstance of participants underestimating tail risks, shadow banking activities will trigger financial vulnerability and therefore regulation and supervision are highly

indispensable. Ba Shu Song (2012) points out that despite of all the existing problems, the “shadow banking” of China may help to realize the reform targets which have been the tough cookies in China’s financial system all along in aspects such as interest rate marketization and financing channel diversification. For all that matters is to regulate its development rather than crack down on it. This essay hereby proposes the following suggestions for the development of shadow banking:

First of all, shadow banking is a “double-edged sword” which can lead the development of national economy but shall be regulated by corresponding policy. For the sectors of shadow banking system under high risk exposure, attentions shall be paid and severe regulations shall be applied, and for low risk sectors with facilitating effects, proper policy encouragement shall be given.

Secondly, effective resource allocation shall be given to orient the financing flow of shadow banking. At the moment, financing difficulty for medium and small size enterprises is the main barrier of entrepreneurial economic development in China (Chen Jian & Zhang Xiao Long, 2012); besides commercial banks have set up relatively high thresholds in loan business for medium and small size enterprises. Under the current economic environment with pressure on deflation, proper encourage and guidance shall be given to the development of shadow banking to facilitate the financing of medium and small size enterprises in China.

Finally, China shall speed up its financial reform and lower the existing incentive for shadow banking, by promoting reform of interest rate marketization, altering market segmentation structure, propelling market integration and liquidity, as well as accelerating the construction of super-ministry system to alter the current separate supervision pattern, to improve supervision system and to eliminate regulatory vacuum and space for regulatory arbitrage. To realize these goals, the flexibility and marketization degree of regulation shall be improved, and transformation shall be made from passive management to active one.

Like Rome, financial reform can’t be built in a day. Every dynamic change of the market is the process that propels reform and progress. The shadow banking system of China is the product under the framework of specific financial environment and regulation institution, whose characteristic features, operation mechanism and influential effects are quite different from western ones. Therefore it is required that relevant management authorities and all scholars shall pay more attention to shadow banking, utilize and guide its direction properly so that China can make constantly progress on the sound development of financial system.

#### REFERENCES

- [1] Ba Shu Song. Objective Assessment Shall be Given on Shadow Banking from the Angle of Financial Structure Evolution [J]. Economic Review, 2013 (4): 27-30

- [2] Chen Jian, Zhang Xiao Long. Shadow Banking's Impact on Economic Development of China – Empirical Analysis Based on Quarterly Data from 2000-2011 [J]. Research on Financial and Economic Issues, 2012 (8): 66-72
- [3] Yi Xian Rong. Financial Analysis on Credit Crisis of Shadow Banking System [J]. Jianghai Academic Journal, 2009 (3): 70-76
- [4] Zhou Li Ping. Discussion on the Progress, Shortcoming and Way out of International Regulations on Shadow Banking System [J]. Studies of International Finance, 2012 (1): 44-53
- [5] Claessens, S., Pozsar, Z., Ratnovski, L., Singh, M. Shadow Banking : Economics and Policy [R]. IMF Staff Discussion Note, 2012 (12)
- [6] Gennaioli, N., Shleifer, A., Vishny, R. A model of Shadow Banking[J]. The Journal of Finance, 2013, 68 (4) : 1331-1363
- [7] Gorton, G., Metrick, A. Regulating the Shadow Banking System[J]. Brookings Paper on Economic Activity, 2011 : 261-312