

Does Internet Finance Impact the Effectiveness of China's Monetary Policies?

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Abstract:

The rapid development of the world's financial industry today is due to the development of Internet technology, and monetary policy has been continuously optimized with its rapid development. As a new field of China in the 21st century, Internet finance, with its characteristics of convenience, efficiency, information and attention to the experience of network users, provides people with very convenient and fast financial services and diversified financial products, and meets the demand of "long tail market" which is not valued by traditional finance. At the same time, although the rapid development of Internet finance accelerates financial disintermediation to a certain extent, it also affects the traditional monetary creation process, which makes the people's Bank of China's ability to control the money supply weaken, and the effectiveness of monetary policy is also affected to a certain extent. By describing the influence of Internet finance on the effectiveness of monetary policy, taking Yu'e Bao's seven-day annualized rate of return as the representative, taking the interbank lending rate and the total money supply as variables to represent different types of monetary policy, this paper makes an empirical study on the selected topics through the establishment of VEC model, analyzes the influence of the two effects, and concludes that: first one is Internet finance has a long-term negative impact on the interbank lending rate, forcing banks to lower the lending rate; The second is Internet finance will have a certain impact on the money supply, but not stable and low intensity. Finally, it is suggested that China should pay more attention to the role of interest rate transmission channels; give full play to the role of reloan and rediscount; strengthen the ability of the legal deposit reserve policy to regulate the amount of money supply; classify supervision, clarify the supervision responsibility of Internet finance, and strengthen supervision.

Keywords: *Internet finance, Effectiveness of monetary policy, VEC model.*

I. INTRODUCTION

After the 18th National Congress of the Communist Party of China, the State Council included "Internet + inclusive finance" in China's key areas of construction and development. The report on government work at the 19th National Congress also pointed out that under the background of the new era, new economy, and new finance, China will continue to strive to build a new financial system in line with the development of the times. Also, the 19th Congress report added that China will continue to build a new financial system in line with the acceleration of China's financial return to the source and serve the development process of the entity, play a good role in the allocation of resources in the financial market, and strive to reduce the cost of the real economy. In recent years China's indirect financial model has been dominated by traditional banks and is inefficient and expensive. Compared with the new financial model, it is not in line with the development requirements of the new era of finance, and therefore it is imperative to change the traditional backward financial model. Internet finance is inclusive and convenient, so it is more in line with the new economic format advocated by today's society. In this context, Internet finance will begin to flourish.

However, the internet upsurge in China, which is responsible for the conversion of online financial products into people's vision, is becoming more and more popular among the Chinese population. The post-80s and 90s have become the main market force in the purchase of online financial products, which translates into a reduced amount of savings deposits in banks. The reduced saving culture will, in turn, affect the interbank lending rate and ultimately affect China's price-based monetary policy. It is apparent from the analysis that Internet finance has the potential to stimulate economic development, it will, however also impact monetary policy and its transmission channels to a certain extent, for instance, the effective implementation of the monetary policy.

As the convenience of Internet transactions is slowly gaining acceptance by the public, it is unconsciously changing people's traditional way of production and life. It ushered in a new internet era of mobile long-distance communication lines and the ease of financial accessibility and flexibility with the mobile phone at hand, thus causing an impact on the monetary circulation and demand to a particular degree. The convenient and quick payment function of network transaction reduces the demand of transactional money, introduces a highly dynamic and easily transactional monetary form, weakens the demand of preventive money, and eventually leads to the loss and reduction of bank cash leakage, speeding up monetary circulation, and impacting the monetary policy. Therefore, this study aims to analyze the significance of the study of Internet theory and its practical economic effect.

II. LITERATURE REVIEW

Based on the scholarly scientific research literature in western countries, it is evident that Western countries study Internet finance earlier than China: the vast majority of these studies revolve around electronic finance such as Bitcoin. In the history of economics, the Bank for

International Settlements and the World Computer Expert Group first focused on electronic finance. They (1996) preliminarily studied the influence of electronic money (virtual currency) on the monetary multiplier and found that the former would cause some expansion effect on the latter [1]. Then, Willem C. Boeschoten and Hebbink (1996) set up a new model to explore and analyze the influence of the development of electronic money on currency demand. The result showed that the speed of electronic money development was negatively correlated with the central banks' ability to regulate the money multiplier is [2] Nathali (2003) and Owen (2004) by studying the impact of e-money on the multiplier and underlying currencies respectively, argue that as e-money continues to grow and progress, it will weaken central banks' control over principle currencies in the financial markets [5,6].

The above findings differ from those of Chinese scholar Zhang Hui (2016) who deeply studied and analyzed the concept of Internet finance and the meaning of monetary policy effectiveness. In this, he analyzed the three aspects of the total money supply, total money demand, and the transmission effectiveness of China's monetary policy as reference variables, and finally concluded that Internet finance does have a certain degree of influence on the effectiveness of the monetary policy [9]. By constructing the VAR model, Zhang Yunzhi concluded that Yu'e Bao's seven-day annualized rate of return was affected by the interbank offered rates of Shanghai, that is, the sensitivity to the above two variables was high, and the positive correlation between the two variables was present [10] Zhang Wenqing et al. (2015), based on Third-Party Payment data, pointed out that the incorporation of Internet into the financial field will affect the manner and speed of currency circulation, and the since the central bank formally implements the monetary policy by controlling both, the emergence of Internet finance will, therefore, affect the total supply and total demand of money market, and overall, the effectiveness of the monetary policy [14] Liu Lanbiao et al. (2016) analyzed the effectiveness of China's price-based monetary policy and the quantitative monetary policy from the perspective of microeconomics. They used the data from Internet finance resources, the People's Bank of China, and the inter-bank market to verify the conclusion that internet finance will have an impact on monetary policy. Recent research by [15] Zhang Jingzhi (2016) proposes that that Internet finance increases the endogeneity of policy effect through its influence on money supply and demand, thus weakening the controllability of monetary policy implementation [16] Gu Haifeng et al. (2018) however points out that there are different measures to assess the effectiveness of monetary policy in different economic parties; most scholars expound the influence of Internet finance on the effectiveness of monetary policy from the aspects of money supply and demand and policy efficiency only [17].

III. STATUS ANALYSIS

3.1 Analysis of Monetary Policy Effectiveness

Monetary policy effectiveness refers to whether the final effect of monetary policy implementation can reach the level expected by the monetary authorities. Influencing factors on

the effectiveness of monetary policy include the time lag of monetary policy, the psychological expectation of microeconomic subjects, and the reform of the financial system. Judging whether monetary policy is effective or not is mainly based on the following three conditions: the first, the currency's ability to systematically affect output; second, the presence of a stable link between money and output, and finally, the presence of effective monetary authority control of currency. Taking China as an example, the supply side of China's money market is the Central People's Bank of China, and in recent years, the central bank of China has been increasing its regulation of the total money supply.

3.2. Current Situation of Internet Finance

Internet finance, as the name implies, refers to the organic combination of Internet technology and the financial industry, and relies on cloud computing and substantial data and other network tools to form a new financial service model with inclusiveness, fragmentation, and platform. At this stage, more and more financial enterprises and institutions believe that the Internet and technology are gradually maturing, and have been optimistic about the future development of the Internet. As a result, the enterprises began to turn to the reform of the enterprise structure, injected more elements of the Internet into the financial industry, and also promoted the combination of the Internet and finance. Take the most representative commercial banks in the financial industry for instance, after the emergence of Internet technology, commercial banks have also begun to promote the digital intelligent business service model, leading the Internet service to change in a stronger and more convenient direction, thus further promoting the functional upgrading of the trading banking service system. In order to make a more detailed and specific division of the form of Internet finance, Chinese scientists conducted in-depth research on Internet finance by visiting enterprises and interpreting relevant information, and finally summed it up into the following forms; third party payment, Big data finance, P2P net loan, crowd funding, Internet finance portal, information financial institutions, and other six forms.

3.3 Impact of Internet Finance on the Effectiveness of Monetary Policy

Through the co-integration test of quarterly non-performing loan rate (NPL) and economic growth rate (GDP), it is possible to determine whether there is a cointegration relationship between the two aspects; one is the weakening of the central bank's control of the money supply to a certain extent, and the other is the expansion effect of the money multiplier. The Keynesian school defines the interest rate as an important index connecting money and products. They believe that the effectiveness of monetary policy is that the interest rate can change in time and effectively under the change of monetary policy. The development of Internet finance reduces the degree of control of the money supply by the central bank of China, which will raise the interest rates of the banks. But Internet lending can still provide financing channels for enterprises with its convenience, low-interest rate, and low threshold.

IV. EMPIRICAL ANALYSIS

4.1 Data Selection and Basic Statistics Description

First of all, based on the internal logic of theoretical research, taking into account the need for data availability and measurement sample size, this paper divides the indicators into two categories: Internet finance indicators and monetary policy indicators. Li Mingxuan, Meng Zan, Zhang Wenqing (2015) selected the total amount of third-party payment as the agent variable to study Internet finance resulting from third-party payment financing [14]. Based on reference to similar topics by other scholars, this paper captures and incorporates data of the most representative financial products in the field of Internet finance into the model. After screening of the available published works, the Yu' e Bao seven-day annualized income from November 2015 to December 2019 (data source: Daily Fund Network), recorded as ER was selected. Zhang Kui (2015) selected the total amount of credit in the economic market to represent credit transmission, the interbank lending rate of Shanghai to represent interest rate transmission, the Shanghai Stock Exchange index of the securities market to represent asset transmission, and used the empirical research method to explore the effectiveness of the monetary policy. [15] Zhang Jingjia, Qi Yanlong, Liu Lanbiao (2016), from the micro-level of banking, empirically analyzed the impact of Internet finance on the effectiveness of monetary policy using Internet finance, People's Bank of China, and interbank market data [16].

Given the central bank's important position in the economic market and its important role in formulating and implementing monetary policy, this paper utilizes the money supply in the same sample range as Yu' e Bao's annual income as a measure of quantitative monetary policy (data source: Oriental Wealth Network), which is recorded as M1. Meanwhile, this paper adopts interest rate transmission is one of the main channels of money transmission, and therefore the Shanghai interbank seven-day interbank lending rate is used as the measure index of price-based monetary policy (data source: Dongfang Wealth Network), which is recorded as SHIBOR, the calculation process in this paper is completed by using Eviews10.0, see TABLE I for details.

TABLE I. Selection and Source of Sample Data

Internet finance		A 7-day annualized Earning Rate for Yu' e Bao, recorded as ER
Monetary policies	Price	A 7-day Shanghai Interbank Offered Rate, recorded as SHIBOR
	Quantity	China's money supply, recorded as M1

Note: The sample intervals of the three groups of variables in the table are all the latest data from November 2015 to December 2019 after the official website is updated.

4.2 The Empirical Analysis of VEC Models

4.2.1 Statistical Test

Because the data selected in this paper has strong timeliness, it is necessary to test its stability first. This paper selects the most commonly used ADF in the Eviews to carry out unit root tests. The results are shown in TABLE II:

TABLE II. ADF unit root test results of series and difference series

Variables	ADF values	Significant level			P values	Conclusions
		1%	5%	10%		
ER	-2.134	-3.581	-2.927	-2.601	0.2329	Uneven
Δ ER	-4.037	-2.614	-1.948	-1.612	0.0001	Smooth
M1	-2.285	-3.571	-2.922	-2.599	0.1809	Uneven
Δ lnM1	-9.208	-3.574	-2.924	-2.600	0.0000	Smooth
SHIBOR	-0.245	-2.613	-1.948	-1.613	0.5930	Uneven
Δ SHIBOR	-6.451	-4.161	-3.506	-3.183	0.0000	Smooth

Note: K, T, C represents the adopted lag order and trend term, respectively, and with the constant term; Δ represents the first-order difference.

The three groups of variables, such as Yu' e Bao's 7-day annualized earning rate (ER) model, are tested in turn. It can be seen from the above table that the p values of the first step are all greater than 0.05 and fail to pass the stationarity test. Therefore, after the first-order difference is carried out, the test results are in three series. The p values of these three series are all less than 0.05; the sequence ER, ln (m1), and SHIBOR are all subject to the above process. Because there are three variables in the system, the cointegration test can be used to test the cointegration relationship between them under the conditions of conformity.

4.2.2 Johansen Cointegration Test

From the test results in TABLE III, the First line shows reject "None ", the Johansen cointegration test rejects the original hypothesis that there is no cointegration relationship; there is a cointegration relationship between ER and SHIBOR and money supply M1. The second line accepts the "At most 1" hypothesis; which shows that there is indeed a cointegration relationship between ER and SHIBOR. The third line accepts the "At most 2" hypothesis, which shows that there is indeed a cointegration relationship between Yu' e Bao's seven-day annualized yield ER and the M1 of the money supply. From the above analysis Johansen the cointegration test accepts the assumption that there is a cointegration relationship, we therefore have to choose a cointegration equation in the error correction model.

TABLE III. Cointegration test of ER, M1, SHIBOR

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.490574	41.01764	29.79707	0.0017
At most 1	0.136039	9.317512	15.49471	0.3368
At most 2	0.050688	2.444824	3.841466	0.1179
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

4.2.3 Establishment of Vector Error Correction (VEC) Model

From the results of the data stationarity test mentioned above, we can see that the data selected in this paper are all first-order single-integral sequences. Therefore, is vector error correction model (VEC) model the most appropriate model for empirical research on the data. The model formula is as follows:

$$\Delta y_t = aecm_{t-1} + \sum_{t=1}^{p-1} \Gamma \times \Delta y_{t-1} + \varepsilon_i$$

Among them, the ecm represents the error correction term reflecting the long-term equilibrium relationship between the variables. When Yu' e Bao's seven-day annualized yield ER is the intermediary variable, the y in the model represents ln M 1, ln SHIBOR.

4.2.4 VEC Model Stability Judgment

For the VEC model to be constructed next, this paper utilizes a AR root graph to test the stability of the model, and the test results are shown in Fig. 1. The results show that, except VEC characteristic roots set by the model itself, the modules of the other characteristic roots are all less than 1, and no root falls outside the unit circle; the model to be constructed next in this paper is therefore stationary, credible, and the same is true.

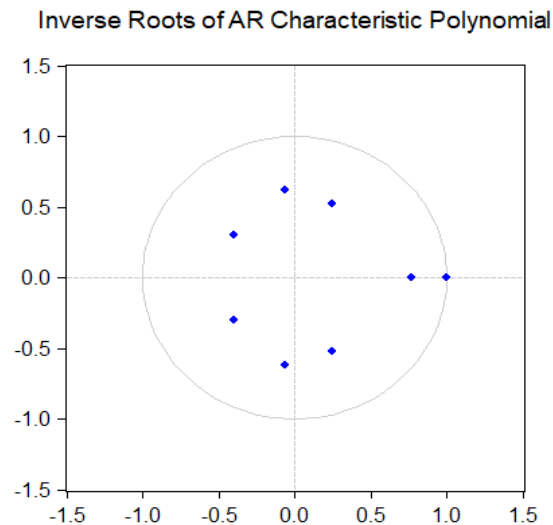


Fig 1: Result of AR root test

4.2.5 Granger Causality Test

The cointegration test shows that there is a long-term positive correlation between variable ER, SHIBOR and M1. To further clarify the causal relationship between variables, a causality test is needed. The results are shown in TABLE IV.

TABLE IV. Granger test result

Null Hypothesis:	Obs	F-Statistic	Prob.
LNM1 does not Granger Cause ER	47	0.94631	0.4274
ER does not Granger Cause LNM1		0.49710	0.6864
SHIBOR does not Granger Cause ER	47	3.37937	0.0274
ER does not Granger Cause SHIBOR		5.52489	0.0029
SHIBOR does not Granger Cause LNM1	47	0.55844	0.6455
LNM1 does not Granger Cause SHIBOR		0.55199	0.6498

At a significant level of 10%, Rejecting the original assumption that "the Shanghai interbank offered rate SHIBOR is not the Granger cause of Yu' e Bao's seven-day annualized yield ER", Rejecting the original assumption that "Yu' e Bao's seven-day annualized rate of return ER not the Granger reason SHIBOR the Shanghai interbank offered rate ", That SHIBOR

is ER Granger cause, ER is SHIBOR Granger reason. (as seen in $P < 0.1$)

4.2.6 Impulse Response Function

An impulse response function describes the impact of an intrinsic particular variable in the VEC model on other variables. It can be seen directly from the model that the different variables change over time. The results are shown in Fig. 2.

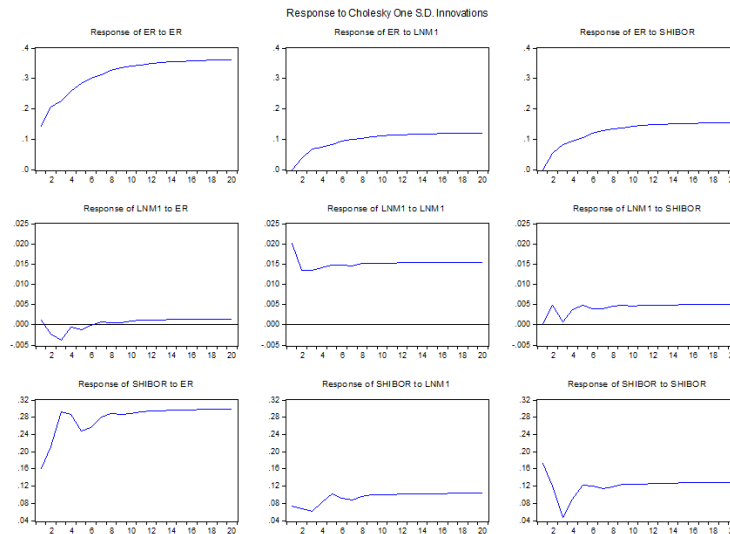


Fig 2: Impulse response function

The relationship between ER, $\ln(m1)$, and SHIBOR in the VEC model can be seen intuitively from the impulse response function curve (figure 4-2). ER there is a positive impact on the SHIBOR, it can be seen that the intensity of the positive impact gradually increased in the first three periods, the impact began to slow down from 11, slowly stabilized, and then turned negative, it can be seen that Internet finance has a long-term negative impact on the SHIBOR, that is, can force banks to reduce their lending rates. ER has a positive impact on $\ln(M1)$ in the first six periods and then slows down, indicating that Internet finance will cause a certain degree of impact on the money supply, but the impact is not stable and weak.

4.2.7 Variance Decomposition

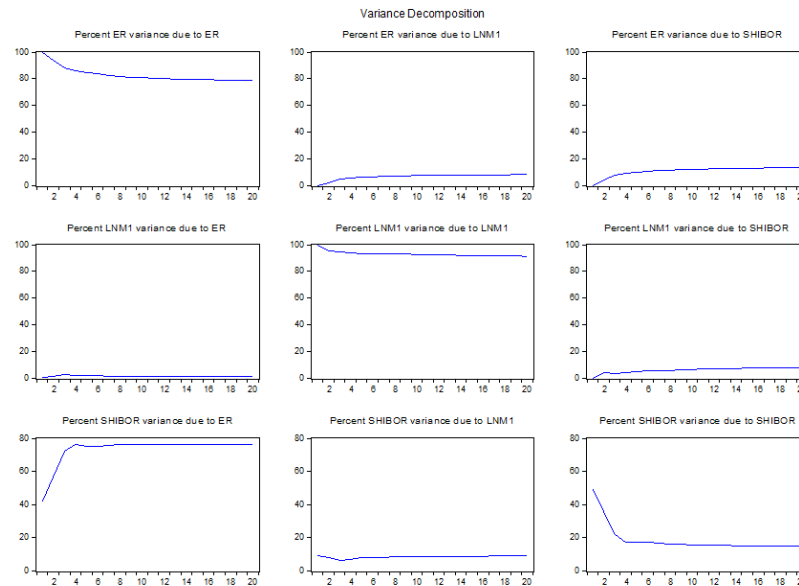


Fig 3: Variance decomposition

Through the variance decomposition of Fig. 3, it can be concluded that about 78.8% of the ER expected fluctuations are explained by the variables ER their fluctuations, about 8.0% by the fluctuations of the variable $\ln(M1)$, and the remaining 13.2% of the information is explained by the fluctuations in SHIBOR variables. About 0.8% of the expected fluctuations in $\ln(m1)$ are explained by the fluctuations ER the variables, while about 91.3% by the fluctuations of the variables themselves- $\ln(m1)$, and 7.9% of the remaining information is explained by the fluctuations SHIBOR the variables. About 76.4% of the expected fluctuations in the SHIBOR are explained by the fluctuations ER the variables, while about 8.8% by the fluctuations $\ln$ the variables ($m1$), and the remaining 14.8% of the information is explained by the fluctuations of the variables SHIBOR themselves.

4.3 VEC Empirical Conclusions

This paper analyzes the inter-bank seven-day interbank lending rate, Yu' e Bao's seven-day annualized rate of return, the total money supply and the ADF unit root test, the Johansen co-integration test after confirming the stability of the sequence, the Granger causality test based on the previous steps, and the stability of the VEC model based on the previous paving, and then establishes the corresponding model. According to the model and the above analysis can be summarized as the following two empirical conclusions:

4.3.1 ER Has a Positive Impact on the SHIBOR, and Less Impact on the Long-Term

Empirical evidence shows that Yu' e Bao's seven-day annualized rate of return will have a positive impact on the interbank lending rate, especially in the first three periods, the intensity of the impact gradually increased, but gradually stabilized after the 11 periods, indicating that Internet finance has a long-term negative impact on the interbank lending rate, that is, it can force banks to reduce the lending rate.

4.3.2 ER Has Impacted M1 Instability

The empirical results show that the seven-day annualized rate of return of Yu' e Bao has a positive impact on the money supply in the first six periods and then a negative impact, which indicates that Internet finance will cause a certain impact on the money supply, but the impact is not stable and the impact intensity is relatively weak.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 The Development of Internet Finance will Make the Total Money Supply become much Difficult to Control and Forecast than before.

After empirical findings of this paper hold that in a relatively short period, Internet finance has opened up new financing channels and sources of funds for banks, resulting in the equilibrium of the interbank market and the fluctuation of interbank lending rate, which in turn affect the transmission channel and the stability of interest rate. But in the long run, the development of Internet finance will fluctuate the money supply M1, however, when sustained for a significant amount of time, it will eventually push interest rates back to normal levels.

5.1.2 Short-term Price-Based Monetary Policy is Vulnerable to the Development of Internet Finance, but the Long-Term Impact is Weak.

From the previous empirical analysis, it can be proved that the seven-day annualized rate of return of Yu' e Bao has a positive impact on the interbank lending rate. Therefore, in extrapolation, Internet finance has a long-term negative impact on the interbank lending rate, that is, it can force banks to lower the loan rate. The development of Internet finance will increase the supply of money, which will cause interest rates to fall in the short term, but the economic market can self-regulate: so as long as it is long enough, the lowered interest rate will slowly return to a reasonable level over time, in other words, in the long run, whether liquidity is strongly or weakly affected by Internet finance, interest rates will not be ultimately unable to recover from the impact of Internet finance.

5.2 Recommendations

5.2.1 Pay more Attention to the Role of Interest Rate Transmission Channels

The empirical results show that although Internet finance will have a certain impact on it in a short period of time, from a long-term point of view, the impact is very limited or even negligible. It can be seen that compared with Internet finance, interest rate transmission is more stable, more effective in the long run, and can provide a more valuable reference for the formulation of central bank monetary policy. Therefore, based on the long-term, the central bank should pay more attention to the role of interest rate transmission channels, mainly price-based regulation and quantitative regulation as a supplement; a more effective play of the role of monetary policy on the market economy.

5.2.2 Give Full Play to the Role of Reloan and Rediscount

The central bank should play its function of regulating the range of benchmark interest rate,

reduce the re-loan interest rate of enterprises and the re-discount rate between banks in time, to reduce the difficulty and cost of raising funds for enterprises in the financial industry, to realize the purpose of monetary policy to support the real economy in the financial industry. The central bank should also pay more attention to the role of the re-loan and re-posted base currency, through the regulation of its interest rate, timely meet the reasonable borrowing needs of financial institutions, and promote economic restructuring;

5.2.3 Strengthen the Ability of the Legal Deposit Reserve Policy to Regulate the Amount of Money Supply

At a time when China is still facing downward economic pressure, coupled with the impact of the new crown epidemic, and the Chinese economy will face a further decline, the central bank should continue to play its role and function of regulation and control, reduce the statutory reserve requirement ratio to a more reasonable level suitable for the market, and properly collect the reserves of some network financial products in the bank to consolidate the regulation of the legal reserve policy on the money supply.

5.2.4 Classify Supervision, Clarify the Supervision Responsibility of Internet Finance, and Strengthen Supervision.

While supporting the development of this field, the central bank should also speed up the improvement of laws and regulations related to Internet finance, and work with other financial regulators to create a healthy Internet finance environment and jointly maintain a green network environment. The People's Bank of China should also improve its information disclosure and risk warning system, guard against network fraud, illegal absorption of public deposits, and use the network to carry out illegal private lending and lending, to ensure the stable operation of financial markets and provide a favorable environment for the transmission of monetary policies.

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