Prevention and Supervision of Internet Financial Risk in the Context of Big Data

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Abstract
Due to the late coming of Internet finance in China, there is no comprehensive legal system and supervision model, which leads to certain financial risks in its rapid development. In order to improve its development, this study analyzes the current situation of the Internet finance in China and summarizes its characteristics based on which the importance of supervision is proposed. Concerning this aspect, the principles of legal supervision, appropriate supervision and classification supervision should be adopted. Then the optimization of macro supervision system, adoption of micro supervision system and improvement of anti-risk ability should be strengthened to improve the supervision of Internet finance in China.

Keywords: Internet Finance, Supervision Pattern, Important Role.

1. RESEARCH BACKGROUND

1.1 Literature review
Internet finance is not clearly defined but simply summarized as a way to provide financial-related services based on Internet technology and as a combination of Internet and finance. According to its different foundations, Internet in China has two models: the extension of traditional financial institutions and the new Internet finance. Currently, Internet finance in China has four business models: Firstly, the third party payment platforms led by Alipay are the most widely used Internet financial products (Yao and Zhao, 2015). Secondly, Internet financial products of client’s currency such as Yu Ebao become the mainstream. Thirdly, there are many online crowd funding platforms such as AngelCrunch. Finally, P2P Internet credit as an Internet financial model occupies a high market share. Although the single transaction volume is not that large, its consumer quantity at social level is abundant. There is urgent need to supervise Internet financial institutions and financial industry properly in the development of Internet finance in China. However, the supervision approach and access to business information are limited. Some laws and regulations have not been implemented which results in business fraud and hence does harm to the security of Internet finance.

1.2 Research purpose
The financial structure has undergone great changes and is turning into a new one due to the continuous growth and development of Internet finance. Making good use of the advantages of the Internet, such as its excellent network platform, the new Internet finance model has developed from mobile banking in the initial stage to mobile phone app of money management and investment (Gu, 2015). Its product range is in the continuous expansion which shows a good prospect of future development. At the same time, the new type of Internet finance is faced with challenges. Due to the economic habits of Chinese inhabitants, it is hard for them to accept virtual financial institutions which have no physical branch. Traditional Internet financial institutions have obvious advantages in ensuring the quality of customer. In contrary, new Internet financial institutions lag behind on this aspect (Qiang, 2015). Therefore, it should give play to its own advantages, seize opportunities for breakthrough innovation, focus on its advantages in product design, expand its network services, promote e-products as well as explore and attract potential customers. Its efficient operation can help to expand the scale and market share as well as lead the future development of the industry.

2. TYPE ANALYSIS OF INTERNET FINANCE

2.1 Third party payment
Third party payment is one of the Internet payment methods and an important part of the modern financial payment market. Third party payment means that non-financial institutions provide payment services. Its business model can be divided into two types: One type is the third party payment which does not rely on e-commerce site. For example, YeePay can only provide products but not guarantee. The other type provides guaranteed payment, such as Alipay (Liu and Luo, 2013). At the initial stage of the third party payment, it meant only payment on the Internet. As the third party payment platform applies in more and more financial fields, it has gradually covered online and offline payment. It began to cooperate with banks to solve some of the problems including account failure and payment failure and at the same time reduce the risk of transaction fraud. As it continues to develop, payment and settlement can be realized not only in banks. In recent years, third party payment has been expanded to cover more than one third of the entire Internet transaction market, forming a relatively independent industry chain.

2.2 P2P financing

P2P is a direct credit model from individual to individual, from point to point, which makes up the weaknesses of formal financial institutions. PPDAI is the first online P2P credit website in China. It opened in August, 2007 and has showed an explosive growth (Qin and Ni, 2015). As a way of private lending, P2P is characterized with a wider range, shorter period and higher cost compared with traditional financial institutions. Due to the lack of relevant regulatory authority, the P2P model has not yet fully developed so that it is not strictly defined. Money borrowing is completed online without offline review. In this way, P2P reduces the asymmetry of market information, expands the social financing channels and offers great helps to many small businesses and individuals. But at present, P2P is unable to shake banks’ position in credit and loan (Chen and Qiao, 2015). Many of P2P users are those rejected by banks who in most cases have a poor credit or lack guarantee so that P2P is characterized with customers of low quality, low loan review efficiency and high bad debt rate.

2.3 Crowd funding

In 2008, the Kick starter in the United States initiated crowd funding while in China, similar platforms didn’t exist until 2011. They have different directions and characteristics. Some platforms show the requests after the review of the initiator. Each request has its financing goals and time limit; the request is successful if the targeted amount is obtained within the time limit where the initiator can then get the corresponding amount of money and move to the next step; if the amount obtained does not reach the requirement, the money will be returned to donors (Zhao, 2015). However, the current model of crowd funding in our country is in the initial stage characterized with single financing mode, small scale and possibility of illegal fund-raising due to the lack of legal guidance. In addition, HP finance has become popular in recent years. Its close relationship with traditional Internet banking is shown in Figure 1.

![Figure 1. HP Finance and Internet Banking](image)

3. IMPORTANCE OF INTERNET FINANCE SUPERVISION

Due to the virtual environment of Internet, many financial projects have no real goods as mortgage, which raises the risk of financial transactions. Most online financial practitioners are not so professional that their clients may fail to understand the risk of online finance. Or there is no accurate risk assessment which leads to increasing trade conflicts and risks. Most Internet financial firms do not attach importance to the industry norms and legal practice which intensifies the chaos in Internet financial markets (Tian, 2016). Previously, the illegal financing
through Internet caused extremely harsh social impact and clearly reflected the problems of China’s Internet finance: First, the lack of Internet financial supervision and the low efficiency of Internet financial companies. Even though companies are checked strictly in the initial registration, it is difficult to verify the validity of financing channel during operation. Chinese Internet users have not been effectively guided in using network credit so that they show a tendency to follow the trend and buy online financial products blindly (Wang and Liu, 2016). In addition, China has no strict standard for people to enter the industry and there are few financial companies with rich experience. The lack of proficiency leads to the collapse of Internet financial enterprises. Major Internet financial security issues are shown in Figure 2.

Figure 2. Examples of Internet Financial Security Issues

4. PRINCIPLES OF RISK PREVENTION AND SUPERVISION OF INTERNET FINANCE

4.1 Correspondent laws and regulations

The strengthening of supervision and refinement of regulatory model should be in accordance with corresponding laws and regulations. In the process of supervising Internet finance, it is the basic condition to promote a healthy development of Internet finance to comply with laws and regulations. In addition, corresponding laws and regulations should be implemented to guarantee the security of Internet finance users. Therefore, it is necessary to clearly point out the legal liabilities born by Internet financial products as well as to strengthen the crackdown of illegal funding. Then the ability to implement laws and regulations is critical to protect the legitimate rights and interests of consumers. If regulatory authorities only focus on supervision but ignore law enforcement and punishment of illegal behavior, their supervision function will be weakened, which will lead to a failure of the control of Internet finance (Wu, 2016). Therefore, appropriate enforcement power should be given to regulatory authorities according to their responsibilities and supervision scope. This power should be ultimately used in supervision for the protection of consumers and the supervision of illegal acts.

4.2 Appropriate supervision

Suppression always exists in the financial industry in China but the flexibility of the Internet financial platform provides great convenience to rural, agricultural, farmer and small businesses. Then if the control is excessively strong, it is likely to weaken the credit market function of P2P which is not beneficial to the overall development of China’s financial market. It will also lead to inefficient allocation of social resources. But due to the high risk of private landing based on Internet credit, it is urgent to improve the security model of Internet finance. Then the major problem is the appropriateness of supervision of Internet finance. It should be efficient without limiting the development of Internet finance (Yang and Zhang, 2014). It is necessary to increase the strength and scope of security as well as maintain regulatory effectiveness; otherwise, the importance of supervision will be weakened.

5. SUGGESTIONS ON STRENGTHENING INTERNET FINANCE

5.1 Optimize macro supervision system

First of all, in order to prevent Internet financial risks, the macro supervision system should be optimized. At present, China has not set up an independent supervision department for Internet finance. The Financial Stability Board under the National Security Commission of the Communist Party of China is not clear of its regulatory function. The supervision should be implemented by specific department. In particular, the supervision
concerning resources and the proportion of investment should be specifically assigned to the relevant regulatory authority. Secondly, the Chinese government should develop an assessment mechanism for the Internet financial system to assess the ability to take financial risks of certain department as a qualification for its expansion of financial services (Li and Lv, 2014). A sound macro supervision system can show the early warning and judgment of financial risks so that the improvement of the framework can reduce the possibility of financial crisis and avoid the adverse consequences. The Internet security management system is shown in Figure 2.

![Internet Security Management System](image)

Figure 3. Internet Security Management System

5.2 Implement micro regulatory mechanism

Under China’s regulatory framework, The People’s Bank of China, China Securities Regulatory Commission, China Banking Regulatory Commission and China Insurance Regulatory Commission together have conducted efficient supervision of Internet finance. Its standard supervision can effectively analyze the regulatory information and coordinate the supervision and efficiency of corresponding departments on a micro perspective. However, with the experience of supervision of some shadow banking in the world scope, China should conduct a micro and prudential supervision of P2P Internet credit and its financial products. For example, the Financial Stability Committee implemented a supervision model similar to banking which could control the concentration of Internet financial assets and the risk ration of related institution based on the limitation of a leverage ratio (Yang and Ho, 2014). Then such a micro supervision system should be widely implemented in China where financial institutions based on the credit intermediary business model put forward real-time disclosure of issuance and transaction according to their own asset flows so as to improve the financial system accountability system and improve their anti-risk ability. In a relatively transparent market environment, when Internet users choose financial products, they can apply related information as a reference to investment in order to improve the safety of their investment.

5.3 Improve anti-risk ability of Internet finance

It is the ultimate goal of improving supervision and model to promote the healthy development of Internet finance as well as ensure the overall development of the industry. Then financial institutions, as the pillar of Internet finance, can survive better and improve their anti-risk ability if they avoid physical risks on the Internet. For P2P Internet credit, it is necessary to evaluate the risk according to the operation model of traditional financial institutions while it is not a long-term strategy to pass on financial risk (Cao, 2016). According to the Notice of the Risk of Peer-to-Peer Lending put forward by China Banking Regulatory Commission, it is clearly emphasized that Internet financial company must build its own firewall to prevent the business risks arising from the banking system and the non-performing loan institutions. It is a necessary way to reduce risks to take certain business isolation in the Internet financial institutions. From the long-term perspective, it can be used as a long-term effective measure.

covaR model is often applied in studying Internet financial risks where the value at risk is represented by VaR and its formula is $\text{prob}(\Delta A^i < -VaR^i) = 1 - x$. $\Delta A^i$, $x$ and $VaR$ represent the loss of assets, the confidence level and the possible maximum loss of certain financial institution or certain portfolio in holding period. It is assumed that when Internet financial industry $ij$ has a loss $VaR$, the maximum loss of banking industry $yh$ is covaR.
\[
\text{prob}(\Delta A^y h < \text{CoVaR}_x^{y h} | A^m = VaR_x^{ij}) = x, \\
\text{prob}(\Delta A^y m < \text{CoVaR}_x^{y m} | A^y = VaR_y^{ij}) = x
\] (1)

Calculate the conditional value at risk of the banking and financial market, then the risk spillover of the two by Internet can be obtained.

\[
\Delta \text{CoVaR}_x^{y ij} = \text{CoVaR}_x^{y h ij} - VaR_x^{y h}, \\
\Delta \text{CoVaR}_x^{y sym ij} = \text{CoVaR}_x^{y sym ij} - VaR_x^{y sym}
\] (2)

\text{CoVaR}_x^{y ij} and \text{CoVaR}_x^{y sym ij} represent the range of financial risk. The results after normalized process are as follows:

\[
\% \text{CoVaR}_x^{y h ij} = \frac{\Delta \text{CoVaR}_x^{y h ij}}{VaR_x^{y h}}, \\
\% \text{CoVaR}_x^{y sym ij} = \frac{\Delta \text{CoVaR}_x^{y sym ij}}{VaR_x^{y sym}}
\] (3)

The model used in the evaluation is ARMA-GARCH. This model has advantages in solving the non-linear risk relationship between financial institutions. First, ARMA is applied to the modeling of Internet financial banking (bk) and capital market. The model is shown as follows:

\[
m_a = C + \beta_1 m_{a-1} + \beta_2 m_{a-2} + \ldots + \beta_p m_{a-p} + \epsilon_1 + \eta_1 \epsilon_{1-1} + \ldots + \eta_q \epsilon_{a-q}
\]

In GARCH, the variance of EGARCH (1,1) is

\[
\ln(\theta_d^2) = \var + a \frac{[e_{x-1}]^2}{\theta_d^2 - 1} + \xi \ln(\theta_d^2 - 1) + v \frac{\epsilon_{x-1}^2}{\theta_d^2 - 1}
\]

In PARCH, it is

\[
\theta_d^2 = \var + a (|e_{x-1}| - v e_{x-1})^2 + \xi \theta_d^2 - 1. \text{ In this formula, } \omega > 0 \text{ and } 0 < \var \leq 1, \text{ then the conditional variance is: } \theta_d^2 = \var + a (|e_{x-1}| - v e_{x-1})^2 + \xi \theta_d^2 - 1. \text{ Based on ARMA-GARCH model, the CoVaR is obtained by: } \text{CoVaR}_x^{ij m} = \mu_0 + \mu_0 \text{VaR}_m^x + W(K) \text{CoVaR}_x^{ij} + E(K) \epsilon_a^x.
\]

\text{CoVaR}_x^{ij m} = \text{CoVaR}_x^{ij}, \text{ shows the relationship between Internet financial index, banking and the market.}

6. CONCLUSIONS

The comparative analysis of the Internet financial model shows that in recent years the rise of third party payment P2P Internet loans, crowd funding and so on as new Internet financial models have a strong impact on the financial market. Since Internet finance continues to grow and forms a new future financial pattern, both traditional and new Internet financial institutions have to explore appropriate development strategies so as to jointly promote the development of Internet financial markets (Lu and Yu, 2017). In addition to the development of Internet finance, China must strengthen the supervision of Internet financial institutions and market environment. Otherwise, it is likely to increase financial risks. In order strengthen the supervision, legal supervision, appropriate supervision and classification supervision should be conducted. In implementation, the macro supervision system should be optimized while a micro regulatory mechanism should be gradually implemented. At the same time, the anti-risk ability should be enhanced. The measures mentioned above as a whole should be adopted for an effective supervision and healthy development of the overall Internet finance.

REFERENCES


