Research on the Innovation of Internet Financial Supervision Based on the Perspective of International Comparison

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Abstract:
Internet finance, as a new type of financial management model, has the characteristics of low cost and high efficiency, making it familiar and acceptable to the masses of users. However, due to the imperfect development of the Internet financial system and the lack of relevant supervision, there are still many risk problems in its development. This article will focus on these existing problems, deeply analyze the international financial supervision situation, and use other countries as a mirror to propose ideas that are applicable to the current development of Internet finance in China.

Keywords: Internet finance; risk; financial supervision; countermeasures

1. Introduction
In recent years, with the continuous deepening of China’s "Internet +" strategic model and the continuous improvement of financial innovation requirements, Internet finance has emerged and has been booming. Currently, Internet finance has formed relatively standardized product types, including financing, payment and settlement, and investment and financial management. Its Internet financial products include third-party payment, investment and wealth management products, P2P online lending platforms and online crowdfunding platforms, etc., which have profoundly affected and changed people's lives. However, while Internet finance brings great convenience to people's lives, it also presents more risk problems. Therefore, the regulatory innovation for Internet finance is particularly important.

2. Overview of Internet Finance
2.1 Definition of Internet Finance
It refers to a new financial business model in which traditional financial institutions and Internet companies use Internet technology and information and communication technology to realize financial communication, payment, investment and information intermediary services.

2.2 Features of Internet Finance
2.2.1 Low cost and high efficiency
There is no need for traditional intermediaries in the transaction process, which saves the operating cost and time cost of offline outlets, the problem of information asymmetry is improved, and the efficiency of business processing is greatly improved.

2.2.2 Digitization and Long Tail
Internet financial services rely on the analysis, processing, and application of data. In addition, Internet financial services are mainly to solve the individual needs of customers.

2.2.3 High risk
Internet finance faces greater technical risks such as credit risk and data risk.

3. Empirical Research on the Necessity of Internet Financial Supervision
This article chooses to use the ARMA-GARCH model for empirical research. The ARMA-GARCH model has strong operability, more accurate calculation results, and higher confidence in the conclusions.

3.1 Select data

The CSI 500 index is selected for modeling analysis. The CSI 500 index data is fair, and the index data is convenient for subsequent data processing. Select the opening and closing data from July 2, 2012 to December 3, 2020, with a daily frequency.

3.2 Basic statistics

![Figure 1](image)

Figure 1 shows the price series from 2012 to 2020. From the figure, we can see that the price series from 2012 to 2015 showed an overall upward trend. It experienced a sharp increase around 2015 and then a sharp decline; after 2016, the price gradually showed a trend of sideways oscillation, rising and falling repeatedly between 2000 points and 3,500 points.

3.3 Data processing

One of the prerequisites for establishing the ARMA-GARCH model is that the data is a stationary series. In terms of stability, it can be divided into strict stability and wide stability. In this article, wide stability is used, namely:

1. For \( t \in T \), \( E[X_{t}] \) and \( E((X-E[X])^2) \) both exist
2. For \( t \in T \), \( E[X_{t}]=E[X_{T}] \), that is, the mean value of the series does not change with time
3. For \( t \in T \), the autocorrelation coefficient is only related to the time difference between these two time points, and does not change over time

The traditional data stabilization process difference, logarithmic, logarithmic difference and other methods. In order to make the data meet the requirements of model stabilization, and at the same time enhance the readability of the processed data, and reduce the waste of information caused by excessive processing, this paper deals with the logarithmic difference of the data, eliminates null values and outliers, and find the logarithmic rate of return is \( \log(P_t/P_{t-1}) \). Draw the logarithmic rate of return as shown below:
Figure 2
From the figure, it can be basically judged that the sequence is stable, so the next step of modeling analysis is carried out.

3.4 Build ARMA-GARCH model

Generally, the ARMA-GARCH model consists of a mean value equation and a volatility equation, where the mean value equation ARMA(p, q) can be written as

$$ r_t = \phi_0 + \sum_{i=1}^{p} \phi_i r_{t-i} + \alpha_t - \sum_{i=1}^{q} \theta_i \alpha_{t-i} $$

p and q respectively represent the order of autoregressive and moving average, which are white noise sequences.

The volatility equation GARCH(m,s) can be written as

$$ \alpha_t = \sigma_t \epsilon_t, \quad \alpha_t^2 = \alpha_0 + \sum_{i=1}^{m} \alpha_i \alpha_{t-i}^2 + \sum_{j=1}^{s} \beta_j \sigma_{r-j}^2 $$

It is usually assumed that $\epsilon$ is the standard normal distribution or the standard Student's t distribution. The restriction on $a_0 > 0, a_i \geq 0, \beta_j \geq 0, \sum_{i=1}^{\max(m,s)} \alpha_i + \beta_i < 1$ is to ensure that the unconditional variance of the sequence is finite, and its conditional variance is constantly changing with time.

When establishing the ARMA-GARCH model, this paper uses the method of minimizing information criterion for the selection of the ARMA order of the mean equation. The result is as shown in the figure below. Finally, the model ARMA(0,1) is selected.

In the GARCH part of the volatility equation, in general, GARCH(1,1) is enough to reflect most information.
so this article uses GARCH(1,1) as the volatility equation.

Finally, this article establishes ARMA(0,1)-GARCH(1,1), and the parameter estimates are as follows:

\[
\begin{align*}
    u_t &= 0.000337 + 0.498417 a_{t-1} \\
    \sigma^2 &= 0.000001 + 0.067067 a_{t-1}^2 + 0.929424 \sigma_{t-1}^2
\end{align*}
\]

From the perspective of the model's own parameters, the sum of the alpha and beta terms in the volatility equation is

\[\gamma = \sum_{i}^{\max(m,s)} a_i + \beta_i\]

Among them, \(\gamma\) can reflect the response degree of the return rate of the underlying asset to external information. The larger the value, the more sensitive the market is. For the model built in this article, the \(\gamma\) value of 0.996491 is higher than that of other assets, so the market's response to subtle information is also higher, and the volatility is relatively large.

In order to express the market risk situation more intuitively, this article will extract the volatility value fitted by ARMA-GARCH and draw the following time series chart:
Figure 3

The volatility in the figure reflects the level of risk. The larger the value on the vertical axis of each year, the higher the volatility, the greater the risk of financial assets; conversely, the lower the risk. As can be seen from the above figure, the volatility in 2014-2016 was relatively high and then declined, but overall, the volatility after 2012 was significantly higher than that in 2012, which means that the risk of financial assets has increased in recent years.

To further compare the characteristics of volatility over time, the volatility is divided here, and the sample is divided into two groups before July 13, 2015 and after July 13, 2015, and the volatility box chart is drawn as follows. The chart shows that the volatility rate after July 13, 2015 was significantly higher than before July 13, 2015, which further reflects the characteristics of the market's rising risk.

Through the above-mentioned research, it is very necessary to strengthen the supervision of Internet finance as the risks of Internet finance continue to increase. However, there are still many problems in China’s Internet financial supervision system.

4. Existing problems in China’s Internet financial supervision

4.1 Unsound supervision system

4.1.1 Inadequacy of the regulatory model

China’s current financial supervision model adopts separate supervision, that is, traditional financial risk supervision is coordinated and handled by the China Banking Regulatory Commission, the China Securities Regulatory Commission and the China Insurance Regulatory Commission. However, Internet finance has obvious characteristics of mixed operation. If the traditional financial separate supervision model is applied
to Internet financial supervision, it will cause coordination difficulties between the supervisory body and the supervisory object, and it is difficult to meet the development needs of the Internet financial industry.

4.1.2 Unclear division of supervision

Although China’s Internet financial regulatory framework has basically taken shape, in many regulatory platforms, there are still many regulatory entities and their responsibilities are not clear, resulting in repeated overlaps or regulatory gaps, resulting in many behaviors of Internet financial institutions that cannot be accurately controlled and reasonable supervision. In addition, due to the rapid update and change of Internet finance, the financial supervision of government departments cannot keep up with the development of Internet finance, leading to the emergence of Internet financial supervision problems.

4.1.3 Regulatory loopholes caused by technology

Blockchain technology in China started late, and the current technology is still not mature enough. Blockchain technology has high requirements for processing data, information, risks, etc. However, due to the backwardness of regulatory technology and regulatory policies, regulatory authorities still face serious challenges.

4.2 Too much inclusiveness of regulation

In recent years, the speed of Internet financial innovation has accelerated, Internet financial products have emerged one after another, and financial chaos has emerged. However, the innovation of Internet financial supervision is difficult to keep up with the pace of Internet financial products. Paying too much attention to financial efficiency and indulging illegal Internet financial behavior will bring security risks to the financial market.

4.3 Insufficient supervisory staff

The integration of the Internet industry and the financial industry puts forward higher requirements on the professional competence of supervisors, but many practitioners are still in the traditional financial supervision work mode, have short exposure to Internet finance, and lack of sensitivity to differences in Internet financial supervision not only fail to bring benefits to enterprises, but also easily lead to risks caused by inadequate supervision.

4.4 Missing and unclear laws

First, there are gaps in the legal supervision of Internet finance. In recent years, the speed of the promulgation of Internet finance-related laws has been far behind the development speed of Internet finance. This has led to legal gaps in many areas of Internet finance, and many businesses cannot be supervised by law. Internet finance businesses are incompatible with current laws. The asymmetry between the Internet financial business and the current law will also lead to the asymmetry of rights and obligations between transaction subjects and there is also a phenomenon of unclear laws. For Internet financial services such as P2P lending and third-party payment due to imperfect laws and regulations, relevant financial behaviors cannot be followed.

Second, there is the phenomenon of legal side-balls in fund-raising. At present, the financing environment of China's Internet finance is not very good, and there are situations in which criminals use Internet financial platforms to carry out illegal financing. They are based on "loan usury" as their essence and use emerging Internet financial platforms to try to blur the legal boundaries.

5. Mirror of Internet Financial Supervision in Other Countries

5.1 Foreign Internet Financial Supervision
(1) United States

After the 2008 financial crisis, the United States carried out major reforms to its Internet financial regulatory system. Regarding the regulatory model, the United States mainly adopts a government-led Internet financial regulatory model with coordinated supervision of multiple departments. The U.S. Internet financial supervision has multiple regulatory bodies, which can avoid financial chaos caused by excessive concentration of power.

At the same time, the United States has a relatively complete self-discipline mechanism. By establishing self-regulatory associations and giving them supervision initiative, the self-regulatory associations can play a role in coordinating supervision. Through this supervision mode, it is hoped that all-round and multilevel Internet financial supervision can be realized.

In addition, in terms of regulatory legislation, the United States has relatively complete and strict laws and regulations on Internet finance, and the penalties for violators are also enormous. In order to meet the development requirements of the emerging Internet finance, the United States introduced the JOBS Act, which to a certain extent reduces the legal risks that may be faced in the development of Internet finance. The US legislative system has also made relevant requirements for the regulatory thresholds and market access mechanisms for financial products.

Moreover, the credit system in the United States is relatively complete. Since Internet financial services no longer retain traditional offline transactions, most transactions are completed online. Therefore, the construction of the credit system is crucial to the development of Internet financial services. Credit rating systems such as Standard & Poor's, Moody's, and Fitch in the United States can reduce fraud and injustice in Internet financial transactions to a certain extent, and protect the interests of consumers.

(2) United Kingdom

Like the United States, the United Kingdom has also reformed its Internet financial system after the financial crisis. Regarding the regulatory model, the United Kingdom has adopted a combination of macro-prudential and micro-prudential supervision, with a view to effectively reducing risks and achieving full control over financial risks. What is different from the United States is that the supervision of the United Kingdom focuses on the joint effect of government supervision and the supervision of industry self-regulatory organizations. To a certain extent, the supervision of industry self-regulatory associations is higher than government supervision. Through the coordinated supervision of industry associations and the government, it hopes to improve industry standards and reduce new risks brought about by the development of Internet finance.

Furthermore, the United Kingdom adheres to the principle of appropriate prudence in regulatory legislation, with a view to creating a healthy and fair legal environment to protect the interests of consumers.

The United Kingdom also has a relatively complete credit system, and its information disclosure system is extremely strict.

(3) France

The Internet financial supervision model adopted in France is separate supervision. The Financial Prudential Supervision Bureau and the Financial Market Supervision Bureau respectively supervise financial markets and financial institutions. In addition, France pays attention to behavioral supervision and centralized supervision. According to whether the crowdfunding institution is engaged in payment and credit issuance at the same time, it is determined whether the Financial Prudential Supervision Bureau, which is responsible for supervising payment behavior, participates.
Japan

In terms of regulatory legislation in Japan, the main manifestation is that relevant laws and regulations are implemented and formulated by the Japanese government, and the government's regulatory powers are highly concentrated. These laws and regulations have clearly stipulated corresponding sanctions for various illegal activities such as money laundering and fraud that may exist in the Internet financial industry. Japan strives to achieve innovation in Internet finance through continuous revision and improvement of regulatory laws. Japan's supervision of Internet finance strives for comprehensive and multilevel supervision, with a view to realizing the rapid and healthy development of Internet finance and guaranteeing the rights of financial consumers.

5.2 The Enlightenment of Foreign Internet Financial Supervision

By comparing the Internet financial supervision systems of the United States, Britain, France, and Japan, China can learn from its excellent experience in regulatory models, regulatory legislation, and regulatory systems, and based on China's basic national conditions, innovatively strengthen Internet financial supervision.

6. Innovating countermeasures for China's Internet financial supervision

(1) Improve relevant laws and regulations, and reasonably raise barriers to entry

Establishing and improving relevant policies and legal systems are of great significance to promoting the healthy development of Internet finance. It is necessary to keep pace with the times, constantly update the concept of Internet financial supervision, extend the existing regulatory system, ensure that the business and behavior of the Internet financial industry can be followed by laws and eliminate gaps.

(2) Improve the credit reporting system and strengthen information disclosure

China should build a government-led credit investigation system for the whole society, and strive to build an honest and trustworthy economic environment. Building a credit investigation system can realize credit supervision, improve the transparency and efficiency of financial supervision, and thus promote the stability of the Internet financial system. In addition, it is necessary to strengthen the information disclosure of Internet financial institutions, measure and disclose the credit status of Internet financial institutions through credit rating agencies, improve industry transparency, prevent fraud in the industry, and protect consumer rights.

(3) Pay attention to behavioral supervision and improve the efficiency and transparency of supervision

The speed of Internet financial innovation is accelerating, and the characteristics of mixed industries are obvious. It is obvious that simply improving regulatory performance through institutional supervision can no longer meet the development needs of Internet financial supervision. At this time, reasonable use of behavioral supervision can achieve the effect of effectively responding to the ever-evolving Internet finance, and can better avoid the occurrence of regulatory arbitrage. In addition, behavioral supervision can effectively and timely incorporate newly-emerging financial instruments into corresponding supervisory responsibilities according to their functions, and can respond well to the rapid development of Internet finance.

(4) Establish a self-discipline mechanism for the Internet finance industry

By combining the industry self-regulatory associations established by developed countries such as the United Kingdom and the United States and the current development of China’s Internet financial supervision,
it is recommended that China’s main regulatory agencies and industry self-regulatory organizations coordinate and cooperate with each other, actively promote inter-industry supervision. Fully develop the self-regulatory institutions of the Internet financial industry, making the supervision methods more flexible and more self-conscious.

(5) Technological innovation to strengthen supervision

It is necessary to strengthen the research of financial technology, embed it organically in the supervision system of Internet finance, and facilitate the acquisition of data and information through Internet technologies such as "Internet +", cloud computing, etc., and effectively improve the efficiency of financial supervision.

References


