



# Internet Finance Risk Warning Based on Big Data Analysis from the Perspective of Personal Consumption Finance

Shuzhen Ke<sup>(✉)</sup>

School of Public Administration, Southwest Jiaotong University, Chengdu, China  
yuban1184983652@163.com

**Abstract.** Since the early 2020s, China's Internet financial market has suffered huge losses due to the ravages of the novel coronavirus. Repeated and localized outbreaks make the Internet financial market prone to financial risks under the influence of adverse factors led by the novel coronavirus. Therefore, the corresponding Internet financial security issues need to be paid attention to. In this regard, a financial risk early warning system should be established based on the existing developed Internet ecology to prevent the occurrence of various financial risks. From the perspective of big data, this paper introduces the characteristics of Internet finance and the development status of Internet finance risk warning. By analyzing the existing mature research and combining with the special situation in the new era, it gives corresponding suggestions. In order to ensure the healthy and stable development of the Internet financial market, to avoid the economic superstructure - politics is threatened by unstable financial risks.

**Keywords:** Internet finance · Big data · Financial risks · warning

## 1 Introduction

### 1.1 Research Background

Internet finance is not just a simple combination of the Internet and the financial industry, but an emerging financial model that integrates the traditional financial industry, Internet technology and mobile communication technology. While users and enterprises enjoy the advantages of Internet finance in cloud service, high efficiency, low cost and integration of multi-channel information flow, they will also expose the sum of risks of Internet and traditional finance. The virtuality and inauthenticity of the Internet increase the risk of problems such as borrowing by false identity information, and the inability to repay overdue online lending is difficult to enforce. In the context of the excessively strict implementation of the dynamic zero clearance policy in various regions of China and the repeated outbreaks of the epidemic in many places, almost all enterprises are difficult to start and resume production stably for a long time, which seriously reduces the expectation of employees for future income. Many enterprises with offline consumption scenarios (catering, education, rental, decoration, tourism, leisure, etc.) cannot resume

work, and it is difficult for consumers to go out and consume, so it is easy to impact the asset end of Internet consumer finance (consumption scenario). The decline of social demand, the reduction of consumption channels, the increase of personal consumption loan repayment pressure, the increase of enterprise capital flow resistance, all the above factors to a certain extent increase the probability of financial risks.

## 1.2 Research Significance

Since the reform and opening up, the financial industry, as the backbone of the economy and society, has vigorously promoted the continuous progress of China's economy. The financial industry has also accumulated a large number of risks in the process of long-term integrated development, especially in the context of economic slowdown and the global COVID-19 pandemic, hidden financial risks have emerged disadvantages and new financial risks have co-existed [1], and hidden risks in the financial sector urgently need to be nipped in the bud [2], "firmly hold the bottom line of no systemic or regional risks" [3], Ensure the sound operation of the financial ecosystem. The development of Chinese financial industry has promoted the economic growth, and the development of the financial industry has a certain positive and negative effect on the development of the financial industry, but the development of the financial industry has a greater influence on the growth of Chinese economy [4] the political stability of the superstructure is determined by its economic foundation. In the historical turning point without great changes in a century and the transition period from the "first Centenary Goal" to the "second Centenary Goal", it is particularly important to do a good job in the early warning of financial risks and guard against financial accidents that may shake the political construction.

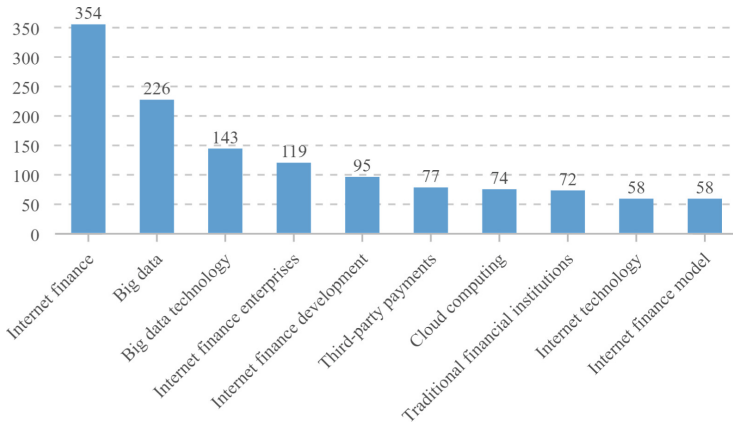
In the context of repeated outbreaks of COVID-19 and repeated stoppage and production due to the dynamic zeroing policy, research on financial risk early warning can not only play a certain role in the early warning of possible financial risks in the future, but also prevent political risks derived from financial risks on this basis. A suitable scheme to deal with the secondary financial risk and political risk induced by such large-scale public events is discussed.

## 2 The Second Chapter Summarizes the Development Status of Interconnected Financial Risk Warning

### 2.1 Hotspot Analysis

By visiting famous literature databases such as CNKI and using the literature review method to collect the early warning and intervention methods of risks in the Internet finance and traditional financial field, and at the same time to summarize the existing research at home and abroad with certain academic influence.

The data sources of the literatures analyzed in this section are all the periodical literatures that can be retrieved by the China National Knowledge Network (CNKI) document database in the past 10 years. In the advanced search of CNKI website, the keyword search is set as "Internet finance" and "big data". In order to cover a more comprehensive and accurate scope, the search scope includes "Chinese and English extension".



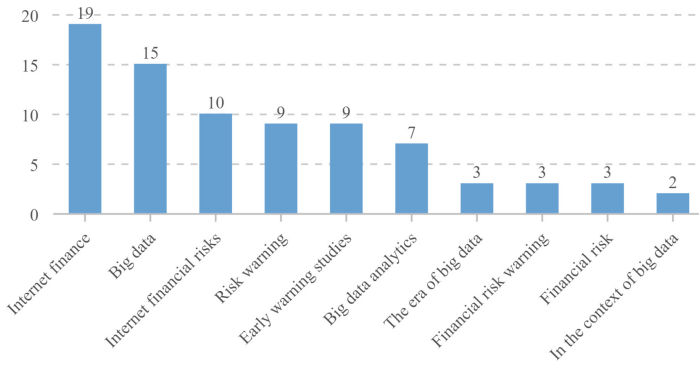
**Fig. 1.** Visualization analysis of CNKI Metrology -- distribution of secondary topics [Self-drawn]

A total of 2936 literatures were retrieved, among which 2285 journals accounted for more than 77%. As can be seen from the visualization results of retrieval data metering, the research popularity of Internet financial risks peaked in 2016, and then saw a sharp decline in academic popularity. It was not until the outbreak of COVID-19 in 2020 that people began to pay more attention to Internet financial security. As can be seen from the distribution of secondary topics in Fig. 1, "big data" and "big data analysis" occupy a large proportion in the research on Internet financial risks in the past decade, except for the subject word "Internet significantly more popular.

After setting the keyword retrieval as "Internet finance", "big data" and "risk warning", only 26 qualified literatures were retrieved. As shown in Fig. 2, excluding the subject words Internet finance, "Big data", "big data analysis", "big data era" and "under the background of big data" among the top nine subject words are related to big data, and more than half of the literature is related to big data. To some extent, it reflects that the research hotspot of Internet financial risk warning in recent ten years lies in big data analysis.

## 2.2 Review of Traditional Financial Risks

An appropriate early warning model is more efficient and accurate than a complex one. According to the literature data retrieved by CNKI, although the number of direct studies on the risk warning of Internet finance has decreased significantly after 2016, most scholars have constructed their own research models. And compared with the early model construction, we can find that its computing methods are constantly evolving towards complexity and intelligence. That is, the evolution from the traditional econometric model to the machine learning model based on artificial intelligence [5]. Traditional econometric models based on signal method (KLR), Logistic regression, vector autoregression (VAR) and other traditional econometric models occupied the majority of early Internet financial risk warning research. Many scholars focused on these methods and constantly improved the econometric models, and VAR was the "star" among the three.



**Fig. 2.** Visualization analysis of CNKI Metrology -- distribution of secondary topics [Self-drawn]

ValueatRisk, short for VAR, is a classic value-at-risk forecasting method commonly used in traditional financial institutions. The domestic research on VAR model started from Zheng Wentong (1997) [6] Zheng Wentong. VAR method and its application in financial risk management [J]. *International Finance Research*,1997(09):58–62.] Then Niu Ang (1997) [7], Liu Yufei (1999) [8], Du Haitao (2000) [9], based on the brief description of VAR, briefly described the application of VAR model in bank risk management, financial risk management and securities risk management, and expressed their own views on the wide application of VAR model in the future. [10] Scholars at this stage mainly introduced VAR model, with few innovative achievements. Then domestic scholars went through roughly three stages. In the early stage of empirical analysis (1999–2003), most of them only studied the simple application of VAR model, and the conclusions were still at the level of the good and bad judgment of the model, and there was a certain distance from in-depth study. In the research stage of distribution characteristics (2003–2005), scholars began to introduce GARCH model for empirical research. Gong Rui, Chen Zhongchang, Yang Dongrui (2005) [11] targeted the Shanghai Composite Index and Shenzhen Composite Index with a long time period and the Shanghai 180 Index with a short time. In addition to GARCH, EGARCH and PARCH, the corresponding ARCH-M model is used to calculate VAR values respectively under the assumption of normal distribution, T-distribution and GED distribution. Finally, the results are compared and tested by return test. At this stage, scholars began to have a deep understanding of VAR model and found that the data in many empirical studies did not conform to the characteristics of normal distribution in theoretical assumptions, and were accompanied by the characteristics of sharp peaks and thick tails. Application in Comprehensive financial risk (2006–2008). Inspired by the new concept of comprehensive financial risk in Basel II, scholars at this stage were no longer confined to the concept of financial risk management that only considered market risk at that time, but turned to a more comprehensive depiction of the connection between market risk, application risk, operational risk and other financial risks. For example, Ye Wuyi, Miao Boqi and Wu Zhenxiang (2006) used the Copula dependent structure to estimate the conditional distribution under the conditions of joint distribution and intraday amplitude, and then got the estimation of conditional VAR [10].

But in general, different from foreign countries such as Roxana Halbleib and Winfried Pohlmeier (2012) [12], who developed the data-driven VAR model based on the principle of optimal combination for more stable, accurate and stable financial crisis prediction. The focus of domestic scholars basically follows the path of “analyzing risk characteristics -- screening index system -- building early warning model” [13].

From 2009 to 2016, with the improvement of computational power algorithm brought by breakthroughs in computer hardware and software, computers can be compatible with more and more complex scientific calculations, and it has become a new trend to introduce machine learning into risk warning of Internet finance.

Compared with traditional econometric statistics methods, machine learning has shown obvious advantages in nonlinear and non-stationary data processing and feature extraction. Cause of these advantages machine learning techniques such as SVM, KNN (K-NearestNeighbor), RF (RandomForest) and NN (Neural networks) widely used in the construction of risk warning model. This directly contributed to the innovation and breakthrough in the research methods of the scholars at this stage. Yang Qing et al. (2010)[14] proposed that financial market risk is measured by the volatility of corresponding financial assets, and financial asset price fluctuations can effectively express financial risk information. Therefore, scholars at this stage mostly measure risks by revealing the volatility characteristics of financial markets. For example, Niu Runsheng (2013) combined with the characteristics of Guangdong’s development, selected indicators reflecting regional financial risks, used factor analysis to find out the main risk factors, and used bp neural network for risk prediction and early warning to provide quantitative decision-making basis for preventing regional financial risks. [15] The final simulation results show that the relative error is in an acceptable range, which proves that the neural network early warning model has high prediction accuracy and is feasible.

### 2.3 Research Review Based on Big Data

In 2017, the research on financial risk early warning gradually began to turn to the new research theme of new finance combined with big data. Internet finance is a financial service industry based on big data. In the early stage of development, various risks with “Internet” attribute emerge one after another. Compared with the traditional financial regulatory system, the risk regulatory system of Internet finance still has many problems in the aspects of legality, standardization and security. These problems will produce many uncertain financial risks, which will not only affect the sustainable development of enterprises, but also affect the prosperity and stability of the country and society. To control financial risks, a perfect financial early warning mechanism is needed as a guarantee [16] Therefore, in the early stage of the study of Internet finance, it became the focus of scholars to try to build a risk early warning mechanism of Internet finance. For example, (Wang Weidu, 2019) [17] summarized and analyzed various risk problems of Internet finance in the initial stage, and put forward a certain framework scheme for the risk early warning mechanism of Internet finance. After 2018, financial auditing is faced with the difficulty of dealing with multi-department, multi-industry and multi-type data with massive growth trend. The more data quantity and data types, the greater the space for big data technology to play its role [18] Zhao Shengwei, Wu Yuheng (2018) found that the analysis and application mode of audit data under the innovative big data

environment, the comprehensive use of a variety of big data analysis, storage and other technologies, combined with the characteristics of dynamic audit, and the construction of a comprehensive system of dynamic audit early warning system is an important means for financial audit to discover and solve problems [19].

Zhang Yan (2019) [20] and summarized the design principles of Internet finance risk early warning system by summarizing the types of Internet finance data, and proposed the construction scheme of Internet finance early warning mechanism based on big data. On this basis, Yu Wangyuan and Li Jiahao (2019) [21] further proposed personalized financial services based on big data. By analyzing customers' age, preference, consumption habits, asset structure and other information, financial services are precisely positioned for customers, so as to reduce the possibility of financial risks caused by customers' failure to repay.

### 3 Conclusion

At present, our country is in a critical stage of comprehensive transformation and upgrading of economic structure [22], and economic growth has shifted from foreign trade growth to consumption growth. The role of traditional investment, import and export in China's economic development is increasingly "declining". Consumption has become the "first driving force" of economic development [23]. In order to promote the transformation of economic structure and industrial structure adjustment, our country has introduced a series of macroeconomic policies to promote consumption, among which the development of consumer finance is one of the important measures to promote consumption [24], because consumer finance is not only an important "energy" to promote consumption demand. [25] The global public health disaster caused by COVID-19 has undoubtedly brought a huge impact on China's real economy, but it is also severely scouring the capital end, asset end and platform end of the Internet finance industry, bringing huge risks to the Internet consumer finance industry. In this regard, China needs to comprehensively improve anti-risk measures of consumer finance under the COVID-19 epidemic from the perspective of big data analysis. First of all, in the hardware side, we can make use of the numerous large data centers being built in China, and rely on higher computing power and storage resources to calculate and analyze customer data in more detail in the market. Second, at the forecasting end, based on the first point, the sensitivity of Internet financial enterprises to monitor market financial data fluctuations should be improved to give early warning of possible risks in time. Third, at the policy end, big data monitoring is used to timely evaluate and flexibly adjust financial policies affected by the epidemic, and certain loose policies are given to prevent financial risks under high pressure. Fourth, at the asset side, expand scene consumer finance, deepen the integration of consumption scene and Internet consumer finance, and accelerate the recovery of Internet financial market after the epidemic. At the capital level, diversified financing channels should be expanded and securitization of Internet consumer financial assets should be promoted in an orderly manner. [26].

We will improve the early warning system for Internet financial risks in the current special period, cope well with possible risks, and help China overcome the financial pain brought by the epidemic in a relatively stable manner and return to the pre-epidemic

level of the industry or even higher. In the transition period, China's economy will perform steadily and its upper political structure will not be shaken. This will lay a solid foundation for China to firmly follow the path of socialism with Chinese characteristics and build China into a high-level modern country by the middle of this century.

## References

1. Sun Yanlin, Chen Shoudong. Research on the construction of China's financial condition indicator system based on key risk factors [J]. *Southern Economy*, 2019 (5): 1-16.
2. Guo Shuqing. Preventing and Resolving financial risks and Striving to cross the major threshold [J]. *China Banking Industry*, 2018 (7): 10-13, 6.
3. Liu Shiyu. Keeping the bottom line of no systemic regional financial risks [J]. *Qiushi*, 2013 (23): 42-44.
4. Ning Z H. Basic theoretical model and statistical analysis method of empirical research on the relationship between finance and economy.] *Productivity Research*, 2013(4):18-20.
5. Zhang Pinyi, Xue Jingjing. Research on risk warning model of multi-fractal Internet financial market [J]. *Journal of Quantitative and Technical Economics*, 202,39(08):162-180.
6. Zheng Wentong. VAR method and its application in financial risk management [J]. *International Finance Research*, 1997(09):58-62.
7. Niu Ang. VALUEATRISK: A New method of bank risk Management [J]. *International Finance Research*, 1997(04):61-65.
8. Liu Yufei. VaR model and its application in financial regulation [J]. *Journal of economic science*, 1999 (01): 40-51. DOI: 10.19523 / j.j JKK. 1999.01.006.
9. Du Haitao. Application of VaR Model in Securities Risk Management [J]. *Securities Market Review*, 2000(08):57-61.
10. Huang S L. Review of the development of VaR model and its application in financial risk measurement. , 2014 (26) : 154 + 99.
11. Gong Rui, Chen Zhongchang, Yang Dongrui. Comparative Study and Review on the Calculation of Value at Risk (VaR) Risk of Chinese Stock Market by GARCH Family Model [J]. *The Journal of Quantitative and Technical Economics*, 2005(07):67-81+133.
12. Roxana Halbleib, Winfried Pohlmeier. Improving the Value at Risk Forecasts: Theory and Evidence from the Financial Crisis [J]. *Journal of Economic Dynamics and Control*, 2012 (8).
13. Sun J, Wang Jun. Hot spots and trend analysis of financial risk warning research [J]. *Jiang Han Academic*, 202,41(2):21-31.]
14. Yang Qing, Cao Ming, CAI Tianyu: Application of CVaR-EVT and BMM in extreme Financial Risk Management [J]. *Statistical Research*, No.6, 2010.
15. 16. Niu Runsheng. Research on Neural network model of regional financial risk warning [J]. *Jilin Finance Research*, 2013 (5): 9-13
16. On the construction of Internet financial risk early warning system under the background of big data. *Economic and Trade Practice*, 2016, (04):38+40.
17. Wang Weidu. Development of Internet finance and exploration of risk early warning mechanism [J]. *Marketing*, 2019(51):189+205.
18. Wang Zhicheng. Some Thoughts on deepening financial audit [J]. *Audit Research*, 2018 (4) : 7-11.
19. Zhao Shengwei, Wu Yuheng. Discussion on abnormal trading model of securities market based on financial audit Big data [J]. *Audit Research*, 2018 (5) : 17-21. (in Chinese)
20. Zhang Y. Risk warning of Internet finance based on big data. *Times Economy and Trade*, 2019(3):73-74.]

21. Yu Wangyuan, Li Jia-hao. New situation of financial development in the era of Big Data [J]. Operator (Automotive Business Review),2019,33(8):129-129.
22. Liu Wenwen, Zhang Chang. Current Situation and Development Bottleneck of Green Finance in our Country -- A break-through Approach Based on the Perspectives of Consumer Finance and Sci-Tech Finance [J]. Southwest Finance, 2020 (11) : 35-45.
23. Risk Prevention and Control of Consumer Finance in the Process of Economic Transformation [J]. Journal of Zhongzhou, 2017(11) : 25–30.
24. Huang Zhiling. The Development of Consumer Finance [J]. China Finance, 2016(11) : 24-26.
25. Li Jia, Xie Yunyun, Tian Fa. Study on the effect of Consumer Finance on Industrial Structure Adjustment [J]. Macroeconomic Research, 2020(5) : 18–27.]
26. Yin Zhentao, Cheng Xuejun. Study on the impact of COVID-19 on the industrial chain of Internet consumer Finance and countermeasures [J]. Journal of Chongqing University of Technology (Social Sciences), 201,35(03):44–55.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

