

# Research on Financial Market Risk Measurement Based on Big Data

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**Keywords:** Big data; Financial market; Risk measurement

**Abstract:** It has the dual characteristics of financial Internet and finance, which determines that Internet financial measurement is more complicated and financial risks are more difficult to measure and prevent than other risks. In order to take good defensive measures in the face of risks, risk management is necessary. An effective financial risk measurement method not only plays an important role in avoiding potential risks, reducing risk losses and costs, and winning more opportunities, but also is an important embodiment of the core competitiveness of financial institutions. At present, the era of big data is gradually entering, which has brought great impetus to the Internet financial industry, greatly changed the quantity and nature of financial variable data, changed the nature of data information in application, and promoted the change of financial risk management means and the improvement of measurement means. Big data deals with the horizontal and vertical relationship between financial data, which can make the previous troublesome detection and prediction methods clearer, give a clearer impetus to the exploration of panel data, and bring stronger support to the accuracy of financial risk measurement.

## 1. Introduction

The so-called financial risk refers to the uncertainty of the final investment result caused by several uncertain factors. With the rapid development of finance, financial risks have become a topic that we have to discuss. Finance has the dual characteristics of Internet and finance, which determines that Internet financial measurement is more complex and financial risks are more difficult to measure and prevent than other risks[1]. In order to take good defensive measures in the face of risks, it is necessary to carry out risk management. Assist the financial supervision department in risk identification, early warning and troubleshooting through risk quantification, and release risk warning and risk warning services to the public. The new regulatory thinking and means of "responding to science and technology with science and technology" fully realize the deep integration of science and technology and finance, improve and perfect financial regulatory policies, and reduce potential risks.

Scientific and effective financial risk measurement methods not only play a huge role in avoiding potential risks, reducing risk losses, costs, and gaining more revenue opportunities for economic entities, but also represent the core competitiveness of financial institutions[2]. Generally speaking, we refer to big data by comparison. Compared with small data, it does not refer to the huge amount of data. In the context of today's rapid social development, the original risk prediction and prevention measures have been unable to adapt to the progress of the financial industry. The financial industry needs to keep pace with the times and take effective measures to promote its better development. The traditional risk measurement model will be updated by advanced means to achieve the goal of gradual improvement, among which there must be the application of mathematical theory.

As China has entered the new normal track of economic development, many changes have taken place in the external environment and related conditions of economic development. At this time, the amount of data on the financial market is increasing, and emergencies are also showing an upward trend. The financial risks at this time are different from the characteristics of the previous financial

markets. Thus, it was not until to some extent that their personal property or other interests were infringed upon that they realized the seriousness of the matter[3]. Therefore, relevant government departments should regularly organize netizens to train and learn Internet knowledge, so that people can understand the advantages and disadvantages of the Internet era, and fully understand the ways of personal information leakage, so as to keep vigilant in daily life. The current era of big data is gradually entering, which has brought great impetus to the Internet financial industry, making the financial variable data have a great change in quantity and nature, making the data information have an essential change in the use, and promoting the change of financial risk management means and the improvement of measurement means[4]. These characteristics make the selection of variables more diverse and sufficient. We begin to pay attention to the correlation between variables, which brings new opportunities to the research of financial risk measurement methods.

## **2. Financial market risk measurement method under the background of big data**

With the continuous development of current big data technology, favorable conditions have been created, and the conversion and convergence of multi-model metrics have become realizable. The structural mutation of financial data is also a key factor in financial risk measurement, which can bring a key source of information for financial risk measurement. The so-called "big data" is relative to "small data", and it doesn't mean more data. Big data includes not only structured data but also unstructured data, while traditional small data often refers to two-dimensional structured data[5]. By formulating and implementing a series of strategies and means to reduce or even eliminate the impact of financial risks, that is, financial risk management. Financial risk management includes the identification, evaluation, measurement and control of financial risks. It is a series of comprehensive and complete risk management behaviors. With the advent of the era of big data and the rapid development of Internet finance, the quantity and essence of financial variable data have changed greatly, and the application of data information has made a qualitative leap, which has promoted the reform of financial risk management and the improvement of measurement methods. At the data management level, it is necessary to collect and integrate all kinds of financial data and information, further realize the use and sharing of financial industry risk information, and ensure that the financial industry can take precautions against financial risks in time[6]. Therefore, the theory of financial liberalization advocates moderate supervision, leaving sufficient room for the free development of the market. From the financial supervision centered on meeting the relevant qualifications and risk prevention, to the supervision goal centered on financial efficiency, diversified supervision structures such as functional supervision, behavior supervision, industry self-regulatory organization supervision and incentive supervision are formed. The measurement method of financial market risk under the condition of big data is gradually established on the basis of traditional measurement methods, combined with the characteristics of big data and with the development of computer technology. Although some achievements have been made in some aspects, we can see that there are still many problems to be solved urgently through the above combing and induction. The problems existing in the research of financial market risk measurement methods under the background of big data are mainly divided into four aspects, as shown in Figure 1.

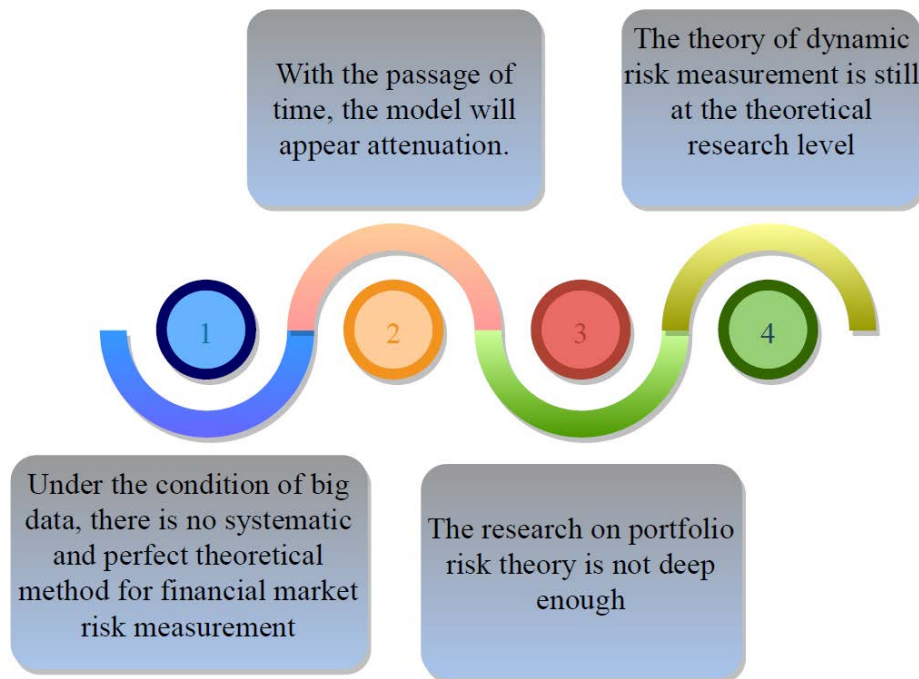


Figure 1 Problems in financial market risk measurement methods in the context of big data

With the continuous deepening of financial innovation and technology, risks have become more complex. Early financial risk management theories such as Markowitz's portfolio selection, Harlow's asset allocation theory, Sharp's and Lintner's capital asset pricing model theory are difficult to adapt to the development needs of the times[7]. When obtaining the development context information and general outline information of financial risks, it is necessary to make full use of big data and timely analyze and research the hybridity and integrity of financial data information. Due to the universal existence of time-varying factors in financial markets, structural mutation of financial data is also an important problem in the process of financial risk measurement, and mutation can provide an important source of information for financial risk measurement[8-9]. Build a financial risk data information sharing platform to break data restrictions. To ensure that all departments and links can monitor and obtain financial risk data information in a timely manner, providing a prerequisite for their correlation analysis. At the same time, they can review customers' own risks, avoid financial risks to the greatest extent, and deal with the horizontal and vertical correlation between financial data, which can make the detection and estimation methods of many previous troubles clearer, Let the exploration of panel data have a clearer impetus, and bring more powerful support to the accuracy of financial risk measurement.

### 3. Effective measures of financial risk measurement under the background of big data

#### 3.1. Build a financial risk data sharing mechanism.

Build a financial risk data sharing mechanism and develop a unified standard, so that the financial data information independent of various departments and institutions can be managed in a unified way, and the problem of data isolation can be avoided. The management of financial risks belongs to a systematic whole, so the exploration of risk measurement means should be carried out within the scope of this system, rather than separately. There are many overlapping parts in our financial business model, which involve different regulatory authorities. Each department should clarify its own business scope, clarify its detailed responsibilities of supervision, and at the same time, strengthen coordination, cooperation and overall supervision among departments to jointly safeguard the financial order of the whole industry. Recently, the financial supervision has undergone profound changes from comprehensive investigation to special rectification, from the promulgation of new asset management regulations, the establishment of macro-prudential policy

framework, to the governance of shadow banking chaos. The main policy and regulation documents and related contents of financial supervision are summarized in Table 1.

Table 1 Main policies and regulations of financial supervision

Promulgation time	Laws and regulations	Main content
April 2016	Implementation Plan for Special Remediation of Internet Financial Risks in the State Council	Remediation of illegal and illegal risk events such as P2P online lending platform, third-party payment industry, equity crowdfunding and asset management platform.
August 2016	Interim Measures of CBRC for the Management of Business Activities of Information Intermediaries in peer-to-peer lending	A negative list is adopted to draw the red line of the border, and the corresponding regulatory system and business rules are determined.
November 2016	Banking Regulatory Commission's Guidelines for Deposit and Management of Funds in peer-to-peer lending	Clarify the basic definition, principles and conditions of online loan fund depository business.
June 2017	Notice of CBRC, Ministry of Education and Ministry of Human Resources and Social Security on Further Strengthening the Standardized Management of Campus Loans	Carrying out loan business for students in school has broken through the bad loan chaos of the bottom line of campus online loan.

It can be seen from the above regulations that China's attitude towards Internet financial supervision has changed from the initial wait-and-see to encouragement and support, and now it has gradually strengthened supervision, improved the Internet financial supervision framework system, issued relevant access regulations, information disclosure, and strengthened in-process supervision. The theory involved has been discussed at a deeper level, so big data thinking has increasingly penetrated into every link of financial risk management. In areas where the law is not yet sound, technical support undoubtedly plays a complementary role in the protection of personal information data. When estimating the financial risk measurement function, the semi parametric estimation method and the non parametric estimation method can be combined to create more guaranteed factors for the realization of the model.

### 3.2. Cultivate professional talents

The financial industry also needs to strengthen the construction of professional talent team for financial risk prevention. Only by ensuring that the relevant staff can have strong professional skills and comprehensive quality can they ensure that in the actual work process, the staff can carry out all work in strict accordance with the work process and take each link seriously. At present, most financial enterprises still solve the compliance problem by means of manual review, and in this process, they are equipped with professional talents to operate the whole process. However, this traditional operation mode can no longer meet the requirements of the current regulatory policy. In addition, some financial enterprises hope to increase the number of professionals and improve the quality of talents to meet the requirements of daily compliance review. Financial risk management is a systematic project, so the research on risk measurement methods cannot exist independently of the research on the whole risk management. In reality, when measuring financial risk, the investment proportion of the portfolio is dynamically optimized when it is constantly changing. In the future, more consideration should be given to dynamic portfolio to obtain the optimal portfolio before risk measurement.

Financial enterprises can learn, analyze and master the latest regulatory provisions and cases, and analyze the risks they may encounter in their own business process after comparing the differences in the independent learning process of regulatory cases, so as to comprehensively grasp their own compliance process. The existing measurement methods can no longer meet the needs of Internet financial innovation and development. Although there are some mature theories and methods to assess financial risks in the traditional financial industry, in the field of Internet finance, various innovations are unique, which may lead to incorrect conclusions when traditional theories and methods are applied to the field of Internet finance. Have strong ability to find problems, analyze and interpret. And combine their own capabilities with the actual work, improve the quality and efficiency of work, while giving full play to their own value and role in financial risk prevention, to achieve better development of the financial industry.

#### 4. Conclusions

The advent of the era of big data has brought many opportunities to the research of financial risk measurement methods. At the same time, due to the completeness and sufficiency of data, it has put forward higher requirements for the accuracy of financial risk measurement, thus making the research of financial risk measurement methods develop in a dynamic and real-time direction. As the financial assets in the market can't be risk-free, and are usually accompanied by multiple risks, it is often necessary to adopt a comprehensive risk management approach. However, balancing costs and benefits and adopting various management methods need to be based on the specific situation of asset risks, and the implementation of all risk management schemes is based on the theoretical model of risk assessment. It is necessary to effectively predict its own financial risks and give corresponding preventive measures in combination with the actual situation. Ensure the authenticity and accuracy of data information, and contribute to the better development of the financial industry. There are stricter criteria for judging the accuracy of financial risk measurement, and the influence of many factors makes the exploration of financial risk measurement methods present dynamic and real-time characteristics, which is conducive to realizing efficient supervision and control of financial risks, bringing powerful reference to policy makers and great support to the steady development of the financial industry. Establishing an optimal risk measurement theory is still an important issue that we need to study and explore continuously in the future and need to further develop and improve.

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