



Financial Technology Risk Supervision Method Based on Big Data

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Abstract. In order to promote the stable development of economy and avoid the risk of economic recession, the risk supervision of financial technology is very important. The traditional financial technology risk supervision methods are not comprehensive in risk early warning, and the accuracy of financial risk supervision is not high, which can not effectively supervise the financial technology risk. Therefore, this paper puts forward the supervision method of financial technology risk based on big data. This method obtains the performance index of financial risk by constructing the early warning system of financial technology risk; LSSVM financial technology risk calculation based on big data can minimize and maximize the structural risk. According to the structural risk, improve the classification and prevention of financial technology risk, and finally achieve the effective supervision of financial technology risk. Experiments show that: compared with the traditional methods, this risk supervision method has higher risk supervision efficiency, and can more effectively supervise the risks brought by financial technology.

Keywords: Financial technology · Risk supervision · Accuracy

1 Introduction

With the rapid development of information technology, the application of big data is becoming more and more common. The use of big data can promote the development of informatization and achieve the purpose of improving service quality [1]. Data analysis technology plays an irreplaceable role in the development of financial technology industry. All kinds of financial technology risk regulators supervise financial technology risk through a large amount of data provided by regional financial institutions. Financial technology risk supervision method based on big data, according to the extensive role of big data in the financial industry, effectively supervise the risks brought by financial technology [2]. Financial technology enterprises are information intensive industries, which record a large amount of enterprise information in the form of data, such as customer's personal information, business information data of loan enterprises, asset liability data, etc. The relevant analysis of big data is the basis of financial supervision department for financial technology risk supervision. Accurate risk supervision methods provide security for the stable development of the economy [4]. With the development of financial

technology enterprises, the business risks of various enterprises vary greatly, and there are problems such as imperfect supervision of financial risks in enterprises [5]. In the current stage of economic development, the risks of financial technology industry are gradually increasing, and a single financial regulatory agency can not meet the development needs of financial and economic supervision at this stage. Therefore, it is very important to establish a financial technology risk supervision method based on big data, which is of great significance to reduce the corresponding financial technology risks [6]. The integration of risk supervision with big data as the core content can promote the development of financial technology, and make the financial risk supervision method based on big data bring advantages to the efficiency and efficiency of the financial industry [7]. The supervision method of financial technology risk based on big data is of great significance to the stable development of financial economy. Effective supervision of financial technology risk can reduce the cost of financial enterprises and improve the security of financial enterprises.

2 Financial Technology Risk Supervision Methods

2.1 Establish and Improve the Legal System of Personal Information Protection

By establishing a legal system for personal information protection, the big data industry can develop in accordance with the law in many links such as data collection, processing, integration and use. When formulating laws and regulations on personal information protection, we should systematically consider and solve the following problems: first, we can fully consider the actual development of big data on the basis of existing laws and regulations, and broaden the business norms of existing laws and regulations applicable to big data industry as far as possible; Second, we should clarify the regulators of big data, especially the regulators of financial big data, define their functional scope and give them sufficient regulatory power; Third, protect the rights of big data subjects, such as the right to know, the right to choose, the right to access and the right to carry personal data; Fourth, it is necessary to strictly define the behavior boundary of data controllers in processing data. Data controllers must conduct data processing in accordance with laws and regulations, and standardize the transfer from Internet application scenarios to big data in the financial field; Fifth, we should make clear punishment provisions for the relevant acts of illegal use of data by data controllers and other subjects.

2.2 Speed Up the Construction of Information Sharing Mechanism

Promote government information disclosure and information sharing among industries, break data barriers, give play to the role of big data in promoting the upgrading and transformation of various industries, promote the reduction of information and other costs, and improve economic efficiency and social welfare. First, further improve the laws and regulations on personal information protection, so as to avoid data security and personal privacy disclosure caused by information sharing. Second, break the data monopoly, carry out hierarchical management of big data, define the big data mastered by the government as public goods, and open it to the public in accordance with laws

and regulations; Define the big data related to public interests held by institutions as quasi public goods, and institutions holding such big data must share their data under the conditions of protecting personal privacy; Big data mainly related to commercial interests is defined as non-public goods, and such big data should also be promoted to be traded within the scope of legal use. Third, we also need to promote the standardization of big data, so that government information and data between different industries can be used interactively, and break the technical barriers faced in the process of information sharing.

2.3 Construction of Financial Technology Risk Supervision System

Financial technology risk, with financial technology product risk as the main body and risk supervision index system as the basis, constructs specific financial technology product risk supervision index system. In order to strengthen the in-depth analysis of individual early warning indicators, each level of early warning indicators is divided into several levels. The financial technology risk supervision system constructed in this paper is shown in Fig. 1.

There are many risks of financial technology products, including internal and external risks of financial institutions, asset risks, operational risks, credit risks and so on. From the perspective of regulatory mechanism of specific types of risks, operational risks are mainly managed and controlled through the establishment and implementation of rules and regulations; the liquidity risk in financial technology is mainly monitored through the proportional relationship in bank books; For credit risk, quantitative measurement and supervision are mainly carried out through risk management measurement model;

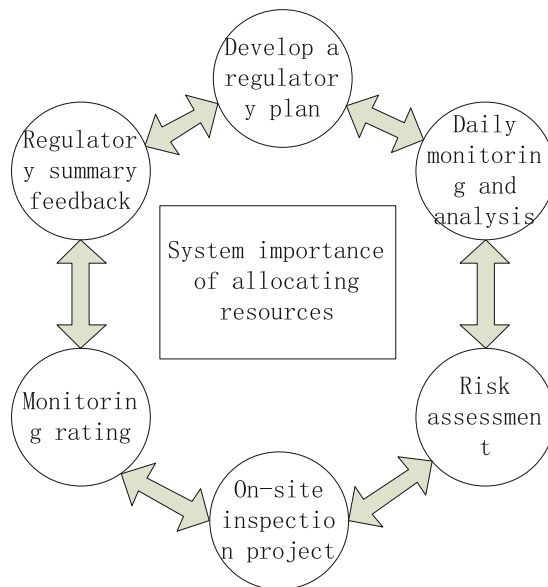


Fig. 1. Financial technology risk early warning system

The research on systemic risk is in the initial state, and there is a strong correlation between systemic risk and other risks. Therefore, the construction of regulatory system for systemic risk is shown in Fig. 1. This paper divides the basic early warning index system of financial innovation product risk into three levels, namely, early warning index of financial economy macro system, early warning index of financial industry development meso system, early warning index of financial institutions and financial products micro system. The macro system index includes the early warning index contents of economic growth, financial system development, monetary policy, etc., the medium system includes the early warning index contents of financial industry development, financial market development, etc., and the micro system includes the early warning index contents of internal risk management of financial institutions, financial management, default disposal management of financial products, etc.

The risk of financial innovation products is closely related to the continuous changes of financial and economic policies. The external shock risk early warning indicators include the impact of global financial integration, the coordination of financial business internationalization system, the impact of other countries' economic recession and global economic recession, the impact of related countries' currency devaluation and stock market turbulence and other factors. The analysis of the middle level early warning indicators and individual early warning indicators of the macro system is shown in Table 1.

From the perspective of the source and correlation of the risk of financial innovation products, combined with the theoretical analysis and empirical analysis of the influencing factors of the risk of financial innovation products in this paper, among the early warning indicators of the macro financial risk system, the middle-level early warning indicators with high correlation with the risk of financial innovation products are the early warning indicators of economic growth and monetary policy level risk, However, the correlation

Table 1. Analysis of middle level early warning indicators of macro system

Economic warning indicators	Early warning indicators of income and expenditure	Currency warning indicators	External shock
GDP growth rate	Difference of each item	Inflation rate	Financial internationalization shock
Fixed asset investment growth rate	Short-term foreign debt	base currency	Currency devaluation shock
Economic growth volatility	Account deficit	Inflation rate	International coordination of financial services
Industrial growth rate	Broad money	Domestic credit	

between the balance of payments and fiscal policy level risk early warning indicators is not high.

2.4 LSSVM Financial Technology Risk Calculation Based on Big Data

Through the construction of financial technology risk early warning system, the performance index of risk early warning in big data is obtained, and the LSSVM financial technology risk calculation based on big data is carried out. LSSVM based on big data is a regression method based on nonlinear kernel. It is a calculation method of least squares support vector machine. It can locate the regression hyperplane with minimum risk in the feature space of high-dimensional big data.

Given the training sample set $\{y_k, x_k\}_{k=1}^N$ based on big data, $x_k \in R^n$ represents the k -th input sample and $y_k \in R$ represents the k -th output sample. The LSSVM method based on big data calculates the financial technology risk as follows:

$$f(x) = \varpi \cdot \varphi(x) + b \tag{1}$$

where $\varphi(\cdot) : R^n \rightarrow R^{nh}$ is a nonlinear mapping function, which maps the input sample space into a high-dimensional space. $\varpi \in R^n$ is the weight vector and $b \in R$ is the offset term. In the original feature space, LSSVM based on big data has equality constraints. According to the performance index conditions, kernel function $k(x_i, x_j)$ can be defined as the inner product of nonlinear mapping.

$$k(x_i, x_j) = \varphi(x_i)^T \cdot \varphi(x_j), i, j = 1, 2, \dots, N \tag{2}$$

Then, the classification function is obtained

$$f(x) = \sum_{i=1}^N \lambda_i k(x, x_i) + b \tag{3}$$

N is the number of training samples; k is the financial risk index; φ is a constant term; T is the risk interference item; i is the vector of risk regulatory variables.

Finally, we get the minimum and maximum structural risk, and find out the maximum inner product of risk regulation through classification interval. LSSVM based on big data uses the mapping function to map the financial technology samples to the specified high-dimensional space. Finally, we get the scope of risk regulation through linear regression. LSSVM financial high-tech risk value calculation based on big data has certain advantages for solving all kinds of data problems in financial high-tech risk.

2.5 Improve the Classified Prevention and Control of Financial Technology Risks

Through the LSSVM financial technology risk calculation based on big data, the scope of minimizing structural risk is obtained. Due to the diversification of Internet financial enterprises and products, the risk performance is also different and the degree is different, and the unified risk supervision method is not effective. For the supervision of

financial technology risk, risk classification prevention and control is also of great significance. Through the prevention and control of risk classification, the relevant financial technology risks are targeted. For the supervision of financial technology intermediary risk, it mainly supervises information technology risk and operational risk. Financial technology risk has higher requirements on technical risk and more complex operation. All kinds of financial technology risks will eventually turn into liquidity risk and credit risk.

There are many kinds of risks in financial technology enterprises. Therefore, the capital transaction mode of financial technology enterprises is mainly decentralized, and the financing amount of the main body is strictly controlled to ensure that the financing amount can not be too large. Through the strict setting of the borrower's relevant conditions, such as the credit line, the maximum proportion of its capital transaction should not exceed the maximum proportion of its own assets. In the process of financial acquisition, we should strictly control every link and implement the implementation management. The supervision of financial technology risk should have a certain focus, focusing on the responsibility or business type, requiring financial indicators to achieve universal risk supervision. Relevant regulatory authorities shall provide risk preparation for financing platform financial technology enterprises and formulate information audit. Strengthen the key management of assessment of financial technology practitioners through risk plan measures, and finally realize the risk supervision focusing on financial technology.

2.6 Improve the Classified Prevention and Control of Financial Technology Risks

The supervision based on big data is a comprehensive information service analysis platform for the whole process of credit supervision and risk early warning of financial enterprises. It is mainly for the local financial regulatory institutions, which is a comprehensive information service analysis platform for the whole process of credit supervision and risk early warning. It is a comprehensive information service analysis platform mainly for local financial institutions to carry out the whole process of credit supervision and risk early warning. It is mainly for local financial regulatory institutions to provide accurate decision support for preventing and reducing financial risks and industry supervision, and provide strong guarantee for timely discovering the risks of financial institutions and improving the effectiveness of government supervision. The credit index system of financial institutions can reflect the credit status of different financial institutions, so as to provide reference for financial regulators.

The risk supervision of financial technology based on big data serves the stable development of financial market and has certain significance for the development of risk supervision of financial technology industry.

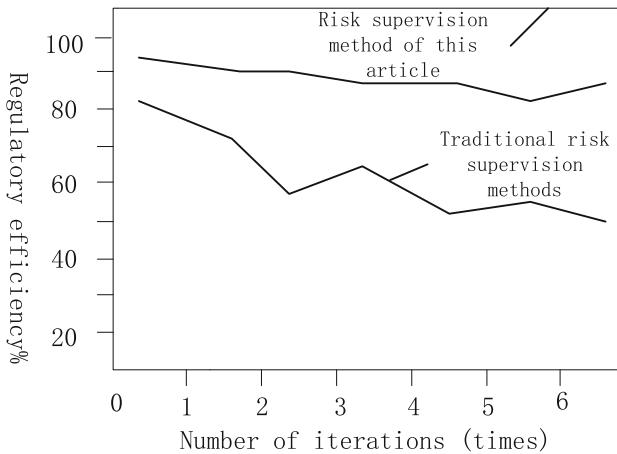
3 Experimental Analysis

3.1 Experimental Preparation

In this experiment, 60 training samples are used to establish the financial technology risk model, and 40 test samples are used for the experiment. In the experiment, both the

Table 2. Comparison of output values of two risk supervision methods

Performance	Method of this article	Traditional method
Accuracy%	90.24	75.36
Accuracy%	89.15	70.03
Type 1 error rate%	10.14	40.34
The second type of error rate%	15.02	46.62

**Fig. 2.** Comparison of test set accuracy of two financial technology risk supervision methods

proposed method based on LSSVM and the traditional method have 17 inputs and one output, and RBF is used as the kernel function. The optimal parameter combination of LSSVM and SVM is obtained by PSO. The maximum number of iterations of training parameters is 500. The number of neurons in the input layer, hidden layer and output layer is 17, 10 and 1 respectively. The accuracy and precision of the two methods in the supervision of financial technology risk are shown in Table 2.

According to Table 2, the proposed financial technology risk supervision method shows better performance in the accuracy and precision of output value.

3.2 Analysis of Experimental Results

Based on the output value results of the above two financial technology risk supervision methods, the efficiency comparison chart of the two methods in the iteration of risk supervision is drawn, as shown in Fig. 2.

It can be seen from Fig. 2 that the supervision efficiency of the financial technology risk supervision method based on big data proposed in this paper is quite different from that of the traditional supervision method. When the number of iterations is 1, the supervision efficiency of the risk supervision method proposed in this paper can reach

86%, and the supervision efficiency of the traditional supervision method is less than 80%, the overall regulatory efficiency of the regulatory methods in this paper is higher than that of the traditional risk regulatory methods.

Through the experiment, we can see that the financial technology risk supervision method based on big data proposed in this paper has higher efficiency in risk supervision, can show relatively better performance, and is more suitable for the supervision of financial technology risk.

4 Conclusion

For the risks of financial technology, this paper puts forward the supervision method of financial technology risk based on big data. Through the construction of financial technology risk early warning system, the risk early warning index is obtained, and the financial technology risk is calculated based on LSSVM to minimize and maximize the structural risk. Finally, the classification prevention and control of financial technology risk is improved to realize the effective supervision of financial technology risk. Compared with the traditional methods, this method has higher efficiency and accuracy in the supervision of financial technology risk, and can effectively supervise financial technology risk.

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