The Application of Financial Engineering in Internet Financial Risk Control

*By **Junhe Hu**,*

4th Year Student, University of Queensland, Australia

Abstract

This paper discusses the key applications and latest research of financial engineering in Internet financial risk control. Firstly, this paper introduces the basic concepts of financial engineering, and secondly, it describes the risks existing in the development of Internet finance, and explains the practical application of financial engineering in Internet financial risk control. Finally, the risk prevention measures of Internet finance from the perspective of financial engineering are given. The article points out that with the development of Internet finance, financial engineering will continue to play an important role in dealing with emerging risks.

Keywords: Financial Engineering, Internet Financial Risk, Risk Management And Control, Financial Risk

Financial engineering is a comprehensive discipline that applies mathematics, statistics, computer science, and financial theory to solve specific problems in financial markets. This field focuses on the design and innovation of financial products, especially the pricing and risk management of derivatives. The main goal of financial engineering is to build mathematical models and computational tools to analyze market risks, formulate investment strategies, and optimize the allocation of financial assets[1]. Based on the advantages of the application of financial engineering technology in network financial supervision, this paper deeply discusses the practical application of financial engineering in its risk control, in order to improve the level of operational risk control of network financial institutions.

The development of online finance has brought unprecedented changes to people's lives and work. Despite China's clean-up and regulatory efforts to tighten regulations on online lending platforms, there are still some subtle risks. Therefore, the development of financial engineering

technology, solving the risk problems in the process of Internet financial innovation, strengthening the supervision of online platforms, and improving the quality of services are of great importance for the effective and healthy development of Internet finance.

1. Risks of Internet financial innovation

（1）Regulatory risk

With the development of network technology, online financial services continue to evolve. The government has introduced a number of restrictive policies in response to market changes, but these policies may also cause certain policy risks. Although online financial services are developing rapidly, the regulation still needs to be further standardized as the relevant legislation is still in the process of being improved. The current regulatory system is relatively lagging behind, which makes it possible for some online financial companies to take advantage of the gap in compliance qualifications to operate, resulting in an increased risk of illegal activities such as money laundering and an increasingly serious problem of information theft. Therefore, online financial institutions need to further improve their standards in terms of stabilizing their service systems and improving after-sales services[2].

（2）Trading Risks

In the development of Internet finance, systemic risks mainly arise from the characteristics of using online platforms for transactions. Due to the virtuality of the network, risks such as system intrusion and operational failures may occur. In addition, financial transactions often rely on third-party professional platforms, resulting in asymmetry in information acquisition between the two parties to the transaction, which in turn increases the transaction risk. For example, errors in transaction timing and amount can lead to bad debts, which can lead to liquidity risks and losses to businesses[3].

（3）Technical Risks

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With the continuous development of Internet information technology, traditional Internet financial services are undergoing continuous changes. But the risks of these technologies can have a negative impact on the industry. For example, if security measures are not in place, these technical vulnerabilities can be exploited by bad actors to launch attacks, resulting in significant losses for financial services institutions. In the context of the rapid development of Internet financial services, the risk of leakage and theft of personal information is also increasing. Failure of authentication for both parties to a transaction can lead to serious losses. In addition, the non-standard operation of industry practitioners may also bring potential operational risks to the Internet financial system, endanger the safety of customer funds, and cause customer losses.

（4）Policy risk

Although the internet finance industry started late and is still in the early stages of development, the main challenges it faces include imperfect laws and regulations and the lack of specialized regulatory authorities. At present, there are institutional and regulatory deficiencies that fail to effectively respond to market risks and violations. At present, the policy in the field of Internet finance is mainly the real-name system, but the scope of implementation is not comprehensive, and there are still loopholes that are exploited by criminals. Therefore, it is not enough to rely on the real-name system alone. In order to reduce the risks of Internet finance, China needs to continuously improve relevant laws and policies and improve its regulatory system.

2. The practical application of financial engineering in Internet financial risk management and control

The practical application of financial engineering in Internet financial risk management mainly includes the use of quantitative analysis and models to predict and evaluate risks. These tools and techniques enable financial institutions to more accurately identify and quantify potential market risks, design risk hedging strategies, and effectively manage asset portfolios. In addition, financial engineering also involves the development of innovative financial

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products, such as derivatives, to help diversify and manage risk. This paper takes Ant Financial as an example to analyze its application in Internet financial risk control.

2.1. Optimize financial engineering technology

In order to effectively control the risks of Internet finance, timely optimization of financial engineering technology is the key. These technologies are widely used in the field of internet finance, especially in trading operations, although they are often associated with activities such as speculation and arbitrage. Due to the uncertainty of speculative risks in Internet finance and the difficulty of quantitative assessment, optimizing financial engineering techniques and tools can activate the market and achieve a balance between profitability and risk transfer. In the financial market, arbitrage risks arise from the buying and selling of similar or similar assets in different markets, but the use of financial engineering techniques can effectively avoid such risks.

2.2. Build a credit risk model

Combining Internet financial engineering technology with the development trend of online financial services is helpful to build an effective credit risk model and analyze the internal credit risk of online financial enterprises. Before providing credit services, a lending company needs to carefully assess the operating conditions, scale, financial strength and collateral of the borrower to better grasp its development trend and set the corresponding credit rating. In the risk-ridden financial market, accurate and effective credit risk models are crucial for Internet financial companies. The credit assessment of an enterprise should be based on key information elements such as its network operation, post-investment asset status, the ability of financial professional operators, and the borrower's ability to repay the loan[4].

2.3. Scientific management and control of financial engineering and technical risks

In order to enhance the risk management capabilities of financial engineering technology, relevant personnel must have a deep understanding of its potential risk indicators, such as price fluctuations in financial markets and the complexity of capital structures. When facing price volatility in the financial markets, it is critical to monitor market volumes in real-time and

adjust your risk exposure accordingly. For portfolio management, the scale of the investment structure should be expanded to diversify the risks brought about by the financial engineering instruments themselves, so as to improve the efficiency of online financial enterprises in terms of overall operational risk management.

2.4. Reasonably prevent internal risks of financial projects

Financial risks mainly include market risk and credit risk. Market risk stems from the instability of financial markets, which leads to price fluctuations. Financial instruments may not be sufficiently effective in dealing with these fluctuations, so risk assessment is required before using these instruments to accommodate market risks and reduce uncertainty in financial markets. Effective management and application of tools in financial engineering can also help to reduce risks within the market. Credit risk, on the other hand, is often closely related to the creditworthiness of market participants and may stem from or have a ripple effect as a result of a default. Therefore, when conducting market and credit assessment, it is necessary to comprehensively consider the market development status and actual value, grasp the key factors affecting the market in a timely manner, prevent potential risks, and ensure the scientific nature of market risk management. In addition, it is also important to implement credit assessment in the transaction process, and it is necessary to pay attention to the assessment venue and guarantee method, understand the possible transaction credit risk in detail, and set the corresponding credit risk level, usually the participants with higher credit ratings have less transaction risk.

3. Preventive measures for Internet finance from the perspective of financial engineering

3.1. Establish an internet credit management system

The construction of the credit evaluation system involves three main stages: the initial establishment of the credit system, the improvement of the credit evaluation method in the medium term, and the management after the credit grant. In the financial market, credit assessment is very important for the risk evaluation of credit enterprises, helping financial

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institutions to accurately grasp the risks when lending. Financial engineering combines the methods and tools of multiple disciplines to be able to select the appropriate means according to different financial phenomena. For example, investors and money users can understand each other before investing and reduce credit risk, while after investing, financial instruments such as hedging can be used to protect investors' assets. The application of financial engineering helps to diversify risks throughout the investment process and protect the interests of all parties [5].

3.2. Intensify fund management

In the financial market, risk control and capital management are closely related, and the application of financial technology aims to improve the efficiency of capital operation. There is a wide variety of techniques and methods for financial projects, and payment methods include early payment, mid-term payment, and late payment. When the customer recognition of the funds is high, the smooth payment of funds can be guaranteed by agreeing on the deadline. Part of the high risk of financial markets is due to the high liquidity of financial factors, so when making investment decisions, it is important to take into account current market changes and traditional financial conditions, and to compare the performance of capital under different levels of openness. In this way, the application of techniques and methods in financial management will be improved to help avoid risks in the process of capital flows.

3.3. Reasonable use of financial derivatives

Financial derivatives, such as futures, options, swaps, etc., hedge risks by providing hedging mechanisms. These instruments allow investors to protect their portfolios from price fluctuations. For example, with futures contracts, investors can hedge against the risk of a falling market by buying contracts in the opposite direction to their portfolio. Options contracts provide the right to buy or sell an asset at a fixed price, thereby reducing the risk of price fluctuations. In this way, investors can effectively manage and control the impact of market fluctuations on their portfolios[6].

3.4. Improve the supervision and management system

In the process of controlling Internet financial risks, the management of an enterprise should complete the supervision and management system in a timely manner according to the actual situation of its operation. Internet financial enterprises can set up risk monitoring institutions in a timely manner, and use financial engineering tools to accurately handle and identify various financial risks, so as to prevent such risks from causing economic losses to investors and enterprises. At the same time, enterprises can build an early warning system in combination with financial engineering technology, and give corresponding control measures to reduce risks through detailed analysis of internal risks. For employees of Internet financial enterprises, they need to continuously strengthen their risk awareness and risk perception when performing their daily business, clarify the division of labor of each department, and improve the level of enterprise risk management and control on the premise of ensuring that each performs its own duties. Regulators of the Internet finance industry also need to pay attention to the continuous improvement of the regulatory system and reduce the overall risk of the Internet financial market through comprehensive supervision. For example, according to the application effect of financial engineering technology, the entry threshold is set up, the access qualification of enterprises is improved, and the risks are reduced through the optimization of the internal operation of enterprises. At the same time, as mobile payment has become a popular financial payment method in China, the relevant departments need to improve laws and regulations in a timely manner to gradually improve the fairness and effectiveness of the mobile payment system and the electronic evidence generated by it.

4. Conclusion

As a new model of financial development, Internet finance has brought new impetus to the financial market. However, due to its emerging attributes and the characteristics of the Internet, Internet finance is exposed to various risks. In this context, the application of financial engineering technology has become an effective means to monitor and prevent these risks. Through scientific regulation and control, financial engineering can effectively monitor systemic risks, provide guarantee for the healthy development of Internet finance, and promote the comprehensive construction and development of the financial market.

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