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Financial Engineering and Financial Risk Management

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Abstract

Coordinating the prevention and resolution of major financial risks is a major task to safeguard the national economic interests and the long-term interests of the people. It is of great practical significance for promoting high-quality economic development in my country and building a new development pattern. During the "13th Five-Year Plan" period, my country has firmly maintained the bottom line of no systemic financial risks, and firmly safeguarded the country's economic and financial stability and the safety of people's property. During the "14th Five-Year Plan" period, the external environment faced by my country has become more complex, instability and uncertainty have increased significantly, the problem of unbalanced and insufficient domestic development is still prominent, and there are still some persistent problems, signs and trends in the field of financial risks. sexual hazard. To make overall plans for the prevention and resolution of major financial risks, we must adhere to the general idea of focusing on prevention, addressing both symptoms and root causes, being safe and orderly, and keeping the bottom line. The foundation of financial stability, properly handle the relationship between stable growth and risk prevention, resolve systemic financial risks with high-quality economic development, and effectively prevent and resolve various possible risks.

Keywords

Financial Engineering; Financial Risk Management.

1. Introduction

In the process of sustainable development and progress, the distance between China's economy and the global economy is getting closer and closer, which provides a lot of help for China's financial development, but at the same time there are many risks. Due to the continuous development of financial activities, the development level of innovative financial models has been greatly improved, and the financial economy has also risen to a higher level. Especially under the influence of online finance, it is particularly important to implement online financial risk management. It has become an important issue of common concern for domestic researchers. China's financial market must take action quickly, reasonably and effectively. In the process of practice and experimentation, the application of financial engineering in financial management has achieved good results. management methods and measures, and play a particularly important role in the process of risk assessment and avoidance. Therefore, in order to promote the better development and further improvement of China's financial industry, it is very necessary to make better use of financial engineering, which is a continuous practice. A recognized method of financial management. Under the influence of the widespread application of financial engineering, financial market risks have been effectively analyzed and improved, and the internal risk management system of the financial system has been increasingly improved, ensuring the sustained and stable growth of the economy and society.

ISSN: 2688-9323

Financial engineering has been fully used in financial risk management, which has a positive impact on financial risk management. Through the use of financial engineering, financial risks can be effectively prevented and controlled, and large fluctuations in the financial market can be avoided. In the process of using financial engineering, we can accurately predict the direction of price changes, discover some risks in the future development process, and take measures in advance. Financial engineering has a certain liquidity, so even if the market price changes, it can completely solve the problem. This can effectively improve management efficiency. Judging from the development of the international situation, traditional financial instruments have been unable to meet the needs of the times and people's needs. Financial engineering has the characteristics of standardization and innovation. In order to reduce the cost of financial operation, financial engineering must be fully applied to financial risk management, because financial engineering has the characteristics of standardization and centralization. It can reduce information costs and transaction costs, thereby reducing the cost of the financial transaction process. Financial engineering has been fully applied in the process of financial risk management. It can prevent some risks and promote the better development of the financial industry. However, there are still some problems in the specific application of financial engineering, which have a certain impact on financial risk management. Judging from the development status of financial engineering, financial engineering has certain limitations in system risk, which is also the most important issue in the application of financial engineering. At present, most financial engineering mathematical models are based on interest rate risk and exchange rate risk. These models are only applicable to some traditional market models. If the market model goes wrong, there will be some financial problems, which will directly reduce the ability of financial engineering to control risk.

2. Theoretical Basis of Financial Risk Management

2.1. Development of Financial Risk Management

Internationally, the management theory of financial risk has gone through the following stages of development:

①Traditional risk management stage: At the beginning of risk management, the main issues to be considered are: what kind of risk is acceptable to us and what kind of risk we should avoid. Some risks that we can afford or have the capacity to deal with. For example, when we have the expertise to deal with risks and are familiar with the field of the industry, we have the confidence to easily control the risks and obtain benefits from them; at the same time, there are some risks that must be avoided. For example, companies that have been engaged in domestic trade for a long time must avoid foreign exchange risks. Faced with different types of risks, what kind of response measures should be taken requires us to choose between transfer, hedging and acceptance.

② Portfolio theory stage: The contribution of portfolio theory is to consider the interaction between different financial risks. Using variance (or standard deviation) as a measure of portfolio risk, other things being equal, portfolio investors want to choose a portfolio with a smaller variance and a larger expected return. The risk of an asset can be very high, but given the correlation, the risk of the portfolio can be reduced accordingly. Portfolio theory can be widely used in various financial asset portfolios, and the main problem of its application is the dependence on data.

③Use the derivative model to manage the derivative risk stage: The risk management of financial derivatives relies on a unique pricing model, such as the Black-Schol-es option pricing model, which is used to determine the market risk exposure and risk size. The choice of parameters will affect the accuracy of the significant model. The use of quantitative models must be based on a deep understanding of the market. Any estimator of a parameter is biased,

ISSN: 2688-9323

especially when markets are volatile. When these models are used in dynamic hedging strategies, they should not be considered insured.

④VaR management stage: As the debate in risk management practice continues to intensify, especially the rapid development of financial derivatives and the continuous expansion of trading volume, people are more and more concerned about the concealment, suddenness and leverage of risks. The problem. Practitioners urgently need more accurate risk measurement methods and risk management tools to address different types of risk management problems.

2.2. The Theoretical Basis of Financial Risk Management

Why financial risk management is necessary. Because in early financial theory, financial risk management was unnecessary. Mil1er and Modigliani (1958) pointed out earlier that in a perfect market, neither hedging nor other financial operations can significantly affect the value of financial firms. A perfect market here means that there are no risks such as taxes and bankruptcy costs, and market participants have complete information. From this point of view, there is no need for corporate managers to conduct financial risk management to supervise and control risks. Similar theories also believe that even in the short term, there will be small fluctuations, but in the long run, the economic operation will run along an equilibrium state, so the use of risk management to prevent the loss of short-term economic fluctuations will only cause resource losses. of waste. This view holds that, in the long run, there is no financial risk, so short-term financial risk management will only offset company profits and reduce the company's value. However, in real economic life, financial risk management has been paid more and more attention in practical application and academic research. The need for risk management theories and methods is unprecedented for both financial market regulators and financial market participants. The needs of risk management are mainly based on the following theoretical foundations:

The actual economic and financial markets are not perfect, and the use of risk management can greatly improve the value of the company and demonstrate the strength of the company. The imperfections of the real financial market are mainly reflected in the following aspects: First, there are various taxes in the real market. These taxes affect the value of the company. Therefore, the theoretical assumptions of Mil1er and Modigliani do not apply to real economic conditions. Second, there are a lot of transaction costs in the real market. Finally, in real markets, it is impossible for financial participants to obtain complete information, so there is a lot of risk.

2.3. Theoretical Steps of Financial Risk Management

The process of financial risk management generally requires three steps: establishment of management objectives, risk assessment, risk control and disposal:

(1) The objective of financial risk management. The ultimate goal of financial risk management is to establish on the basis of risk identification and measurement, to stabilize and control possible financial risks, and to formulate countermeasures to prevent and reduce economic losses, to ensure the preparation of monetary funds and the stability of business activities. conduct.

(2) Assessment of financial risks. Financial risk assessment refers to the assessment of countermeasures such as financial risk measurement, financial risk identification, selection of various risk disposal tools and financial risk management.

(1) Risk identification. Financial risk identification is realized on the basis of field investigation and research, using a variety of methods to systematically classify and comprehensively analyze potential and obvious risks.

(2) Risk measurement. It is to quantitatively analyze and describe risks on the basis of identifying risks, that is, on the basis of analyzing past loss data, using probability and mathematical statistics methods to determine the probability of occurrence of risk accidents

ISSN: 2688-9323

and the seriousness of losses that may be caused after the occurrence of risk accidents. Quantitative analysis and forecasting.

(3) The choice of financial risk management strategies. That is, on the basis of the completion of the first two stages, according to the goals set by financial risk management, various financial risk management tools are selected and optimized to combine, so as to put forward reasonable suggestions for financial risk management. This is the most important stage in financial risk assessment.

Financial risk control and disposal. The control and disposal of financial risk is the coping category of financial risk management, and it is a short way and effective method to solve financial risk. Generally divided into control method and financial method (1) control method. It refers to an effective method to implement various available control methods before economic losses occur, and strive to reduce and eliminate various hidden risks, thereby reducing financial risk factors and minimizing the serious consequences of losses. The main ways are loss control, risk aversion and risk diversification (2) financial law. It refers to the use of financial tools to compensate for the inevitable economic losses that have been caused after financial risk events in a timely manner, and to make up for it after a long time, so as to promote an effective method for economic recovery as soon as possible.

2.4. Summary of This Chapter

The theoretical basis of modern financial risk management is the "efficient market hypothesis", which holds that the financial market is a linear equilibrium system. In this system, financial investors operate completely rationally, they make investment decisions through rational expectations and planning, and respond to information in a linear form in a timely manner, thereby increasing or decreasing the amount of investment. This theoretical assumption shows that future changes in financial asset prices have nothing to do with historical information, because market information has been digested and absorbed in a timely and comprehensive manner, and asset returns should obey a normal distribution.

However, according to the new financial theory, the financial market is a complex nonlinear system, which has the characteristics of non-equilibrium. At the same time, the theoretical study of "behavioral finance" shows that investors are not completely rational when making decisions, often cannot fully understand their environment and the situation they are facing, and usually have "overreaction", "underreaction" and other irrational phenomenon, resulting in losses. Therefore, how to improve the existing financial risk management theories and tools, especially how to introduce the research results of nonlinear science and behavioral finance into financial risk measurement methods, so as to make financial risk management more in line with the psychology and behavior of financial market participants It is undoubtedly a very important and meaningful exploration direction for the development and research of risk management theory in the future.

3. Find the Problem

3.1. The Lack of Ideological Awareness of Financial Risk Discovery

In the current development process of China's financial industry, China's financial industry is at the current stage of development, my country's financial industry has not experienced serious bankruptcy and bankruptcy accidents in the development process, lack of awareness of financial risk prevention, coupled with excessive pursuit of high Interest income is an important factor leading to high financial risks. In addition, in the process of market-oriented development, most enterprises lack financial risk awareness and blindly expand the scale of production and operation, which inadvertently increases the possibility of financial risks. Although enterprises have formulated financial risk prevention and management systems, these systems are

ISSN: 2688-9323

superficial, with no substantial financial risk supervision content and lack of strong enforcement methods. At the same time, the market supervision function of the relevant management departments has also been relatively weakened, which has led to the increasing probability of financial risks and the overall development of the financial market has seriously lagged behind.

3.2. The Credit System of Commercial Banks and Other Financial Institutions is not Perfect

At present, the management and supervision of financial credit funds are still carried out in accordance with the credit risk management model, and more emphasis is placed on the management and control of credit content, so that the problems existing in the operation of the financial market under the new conditions and the new environment are ignored. This is a prominent manifestation of the imperfection and imperfection of my country's credit system. Under the imperfect and imperfect internal management system, commercial banks and other financial institutions have generated a large number of non-performing creditor's rights, which leads to the continuous increase of the credit risk of financial institutions. Due to the unsound and imperfect policy system, the daily business activities of commercial banks and other financial institutions cannot be effectively controlled and the uncertainty of credit risk increases, and the reform and development of banks cannot keep up with the rapid development of the financial market. bad debts of banks. Non-performing loans of banks will directly lead to the occurrence of financial risks. At the same time, the asset quality of financial trust companies will also be seriously affected, and the possibility of financial risks is also increasing.

3.3. The Information Transparency of the Capital Market is Low and the Information Disclosure is not Perfect

At present, in the risk management and control of the financial market in my country, due to the lack of a complete information disclosure system, the financial market information disclosure is very serious. Although the relevant departments of our country have issued the "China Financial Market Information Release Guidelines" for the risk management of the financial industry, and the relevant departments of our country have issued the information release standards for the financial market early, which has improved the information release situation to a certain extent, but still There are some thorny issues. Whether the relevant information published by financial institutions is reasonable or not needs to be discussed. Therefore, the status quo of whether the information provided by the financial market industry is true or not needs to be further studied, which leads to the frequent occurrence of information asymmetry. . For example, there are doubts about the objectivity and authenticity of the relevant financial information published by a considerable number of relevant institutions, whether there is gray trading, behind-the-scenes manipulation and market manipulation, etc., whether the internal trading process is fair and impartial, and whether the authenticity of the published information can be guaranteed. The information is fair and objective, and the situation cannot be improved very well in a short period of time.

4. Analysis of the Problems Existing in My Country's Financial Risk Management

4.1. Why are Financial Institutions' Awareness of Risk Management Strengthened?

Risk management is an important method to reduce the risk of other financial institutions such as commercial banks, and it is a method used by financial market participants or other financial

ISSN: 2688-9323

institutions to reduce risks and improve the security of their own transactions to a certain extent. The business scope of the financial market is no longer limited to the domestic market, but is developing towards the international market. The business scope of financial institutions has covered the global market, and the connection with other industries has gradually become closer, and cross-industry business has developed by leaps and bounds. While developing, enterprises must take into account the content of risk management, establish a scientific and reasonable risk management system, and formulate long-term development strategic plans, so as to ensure that the development of enterprises can be more benign and healthy. In the context of the environment proposed by big data in the Internet economy, although the services of the financial industry are gradually diversified, the scope of business coverage and content are becoming more and more diverse, but this also brings greater challenges to financial institutions themselves. The complexity and difficulty of risk management has increased. In view of this situation, relevant financial institutions should improve their own capabilities, but also strengthen their ability to predict, prevent and respond to risks, continuously improve their cognition and understanding of risks, and establish awareness of risk prevention. Only by being aware of risk issues and improving the importance of risk issues can we practice risk management awareness in daily activities or important transaction links, and at the same time, we must be able to recognize some loss problems in risk management, etc. other problems. In addition, financial institutions should also actively build their own risk early warning systems, make full use of the advanced technologies of the Internet and related technologies of big data, design risk management systems, and establish data management databases to unify and centrally manage data, and conduct risk data analysis. Comprehensive measurement, so as to carry out targeted risk management work to improve the effectiveness of risk management. At the same time, it is necessary to continuously strengthen the supervision and management of the business of financial institutions, create a favorable market environment for the development of the financial market, and ensure that every market participant can conduct fair and just transactions, so that the financial market can develop in an orderly and healthy manner. So as to promote the stable development and operation of the macro economy. In addition, while carrying out financial risk management work, the awareness of financial risk management should be regarded as the fundamental starting point of risk management work, and a good financial environment should be created to promote innovation in the financial industry. Regarding the actual situation of financial risks at this stage, it is necessary to Seek truth from facts, analyze specific problems in detail, adopt corresponding measures for different situations, and continuously improve them. We must have reasonable response measures to each problem, promote the development of the financial market towards a virtuous circle, and realize the rationalization of financial resources. allocation and utilization to promote economic development.

4.2. Why is the Technical Level of Financial Risk Management Improved?

In the current situation, with the continuous expansion of the business coverage of the financial market, the financial risk pressure faced by financial institutions is gradually increasing. Under the complex financial environment of internal and external factors, the probability of financial risks is increasing. Under this circumstance, financial risks are diversified and complicated. For financial institutions, it is necessary to have a new understanding of the requirements of financial customers, information security issues and the changing market environment. Improve its own risk management level to continuously adapt to the changing financial risks under the new environment and conditions. It explains why the risk management level of financial institutions has improved from the following three aspects: First, financial institutions should continuously improve their own management systems, and in the Internet environment, they should make full use of AI, big data and other related technologies to fully understand the financial market. In order to improve the ability to judge financial risks, you can also consult

ISSN: 2688-9323

experts related to financial risk management, so as to discover your own financial risks and avoid them effectively; secondly , Under the new environment and new conditions, the way for financial institutions to obtain relevant data is more convenient and faster. When we use big data technology to collect and analyze financial risk management data, we must start from the financial market as a whole, and have financial risk management. The overall understanding is to be familiar with and master the measurement methods of financial risks. We must use the measurement methods of financial risks in a practical and reasonable manner according to local conditions, continuously improve the management of financial institutions' own risks, and promote financial risk management towards a scientific, effective and high-quality direction. development; finally, the risks existing in the financial market are most easily disturbed by external uncertainties, so we must always understand financial risks from a developmental, relational, and dialectical perspective, and face them with a scientific attitude. Risks existing in the financial market, which can adopt the dynamic VaR method, VaR is the value-at-risk model, with the continuous transformation of the financial market, the risk measurement of the combination of relevant financial industry sectors, etc., through the VaR model, it can be Risks are calculated in advance, thereby reducing the probability of risk occurrence, and at the same time providing a theoretical basis for the supervision and management of financial risks by relevant departments, and continuously promoting the improvement of the financial risk management system.

4.3. How to Improve the Financial Risk Management System

In the new era, with the development of the times, financial institutions have gradually adopted Internet + technology, big data technology, cloud computing technology, artificial intelligence technology, etc. These technologies jointly serve the prevention of financial risks. For these technologies in the new era and new environment The use of the resulting advanced technology and methods can be obtained, financial institutions have gradually paid more attention to risk management, and risk management has gradually become more convenient with the help of these advanced technologies. It will be more optimized and improved, and will play a positive role in promoting the healthy development of the elements of the financial industry. At the same time, it is necessary to continuously optimize and improve the risk management system in combination with the development of the financial market and the changes in the financial market environment at home and abroad, so as to make risk management more professional, reduce the probability of risk to a certain extent, and be relatively effective. of avoiding risks. In the continuous development of financial institutions themselves, it is necessary to build a management system that conforms to their own development, continuously optimize internal management and control work, and at the same time combine the risk management mechanism to propose effective countermeasures for financial risks, and always adhere to the risk management mechanism throughout the business. process and fall into practice. The powers and responsibilities of the positions set up in each department should be clearly defined, and at the same time, internal risk control and risk management should be strengthened. In addition, it is necessary to ensure the enforceability of the system and strengthen supervision to ensure that the system can be effectively implemented. The evaluation of financial risk management strategies by relevant departments is also an important basis for the efficient implementation of the system and an effective way to detect whether the strategy is feasible. At the same time, it is necessary to continuously strengthen the ability to predict financial risk management and strengthen the construction of early warning system, so as to promote the more efficient, healthy and benign development of financial risk management, so that the system can better serve the risk management work and control financial risks. in the controllable range.

ISSN: 2688-9323

5. Strategies to Improve Financial Risk Management

5.1. Strengthen the Risk Management of Information Technology

With the advent of the new era, science and technology have developed rapidly, and Internet technology has been widely used in all walks of life. In the context of "Internet +", the financial industry should use big data information technology, AI intelligence and other technologies reasonably and effectively when managing risks, so as to promote the healthy and reasonable development of the financial industry. Under these conditions, in the process of reforming the financial risk management system, relevant departments and personnel should make full use of Internet technology when avoiding and preventing financial risks. Recognize the benefits and drawbacks brought by new technologies so as to improve the financial industry's ability to resist informatization risks.

5.2. Change the Misunderstanding of Risk Management and Establish a Scientific and Correct Corporate Management Culture

The business development and risk management of financial enterprises can be carried out at the same time, and the significance of risk management is to create value. As long as the business in the financial industry has certain risks, the task of risk management is to discover the uncertain factors in the development of financial business, and to evaluate the degree of risk of the business, so as to take targeted risk prevention measures , while preventing risks, it also creates economic benefits for itself.

5.3. Improve the Risk Management Mechanism

In order to improve the level of risk management in the financial industry and increase its resistance to risks, financial enterprises must establish and develop their own risk early warning management system in the process of development, and at the same time clarify the rights and responsibilities of personnel in various departments, so as to ensure daily financial business. Or the normal operation of other services provides a good guarantee. The organizational system of bank risk management is mainly adjusted in the following two aspects: first, the composition of equity of commercial banks and other financial institutions should be used as the basis for the reform of the organizational system to build a risk management organizational structure under the management of the board of directors; When conducting risk management work, it should change its administrative management mode and promote the horizontal and vertical integration of the risk management system. In addition, relevant financial institutions should also speed up the establishment of an information disclosure system to make internal information open and transparent to ensure the sound and healthy development of the financial industry.

5.4. Raising the Level of Risk Management

An important part of risk management work is internal rating and portfolio management. Through the understanding of the development of the financial market, the internal rating, as one of the important components, plays an important role in the profitability, reserve extraction, risk pricing, asset portfolio analysis and economic capital of the enterprise. Conduct assessment, and then diversify its risks through the close connection between regions, industries and products. When managing assets and liabilities, securitization and derivative instruments can be used to operate, thereby reducing the bank's risk exposure. Authorization management is the most important part of risk management and control. Authorization management can choose different authorization methods according to the characteristics of different businesses.

ISSN: 2688-9323

5.5. Strengthen the Application of Financial Engineering Theory in Risk Management

In the management and control of financial risks, the use of financial engineering can introduce more creative methods into risk management work, use the available data to rationally model according to the models in financial engineering, conduct data analysis and analyze other financial Risks are identified. Objectively speaking, the continuous updating of new technologies properly avoids some hidden risks. Under the current development of the financial market, the main method of financial engineering for risk management is quantification and modeling, which can directly show the roughness of people's assessment of financial risk management. By applying financial engineering technology to business processes and risk management, and at the same time being able to find risks in the transaction process, the products using the financial engineering technology can be used for risk management. Products with risk management capabilities can flexibly respond to market changes and show strong anti-risk capabilities, so that they can better cope with market fluctuations caused by previous risk management methods.

5.6. Making Sound Financial Decisions

Financial engineering is one of the main products of China's modern finance. It occupies an important position in the entire financial system, laying an important foundation for China's financial market system to move towards a more modern and internationalized path. Through financial engineering technology, we can make our decisions on financial risk management more reasonable, and we need to have an understanding of the relevant legal systems and market processes that exist in financial engineering. Discover the problems existing in the rules and mechanisms in my country's financial market. In order to give full play to the role of financial engineering in managing and controlling financial risks, we need to make scientific decisions. It is necessary to have a full understanding of the impact of the models in the financial engineering used, and avoid uncontrollable risks caused by over-reliance on the standards and indicators in the models.

5.7. Improve the Financial Risk System

In order to give full play to the functional value of financial engineering tools, it is necessary to establish a risk management and control system first, so as to better manage and control risks in the financial industry, and combine high-level design principles to carry out diversified management and control of financial risk management. For example, when using financial engineering technology, it is necessary to study the various functions of tools more deeply, and scientifically identify the existence of risks, so as to ensure the steady improvement of the level of risk management and control. We must also demonstrate the value of the product to every financial market participant and work together to solidify risk management and control.

5.8. Chapter Summary

The rational development of the financial market is very important to my country's economy. However, when managing financial risks, due to the influence of the current economic environment and related systems, there are certain financial risks. At the same time, the financial industry itself is relatively risky. Therefore, it is necessary to do a good job in identifying financial risks. Through in-depth analysis of the enterprise's asset and liability structure, bank credit situation and profitability, etc., financial risk assessment can be carried out, which is of great significance to the scientific development of financial risk management.

ISSN: 2688-9323

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