The Influence of Financial Mathematics on Modern Financial Market

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Abstract

In the process of financial market development and reform and economic development, financial theory is constantly updated. For the financial economy, it is very important to have a position in the financial market. When studying financial economy, you need to combine the actual situation and work experience. In order to achieve a quick grasp of financial mathematics and apply it to the financial economy, financial mathematics has a relatively large impact on the financial market.

Keywords

Financial Mathematics; Financial Market; Actual Situation.

1. Introduction

At present, various industries are developing relatively rapidly. The financial economy is an important component of the economic market, and its continuous improvement requires theoretical knowledge in the financial field. In terms of financial economy, financial mathematics is a basic content and is the key to innovation and breakthroughs in financial economy. Financial mathematics can play a role in promoting financial economy. In terms of the status quo of social development, colleges and universities pay more attention to financial and economic related majors, and increase the overall emphasis on financial mathematics, which to a certain extent can create good conditions for the further development of financial economy [1].

2. Basic concepts of financial mathematics

In terms of financial economy, the main content is probability, function statistics and analysis, combined with a variety of theories to carry out analysis and checking. Then get the relevant conclusions, and apply the conclusions in the financial market. But financial mathematics is not from the beginning of the emergence of financial economics, belongs to the composition of new disciplines. Financial mathematics is different from mathematics in that it is more targeted in content rather than a broad study of mathematics [2]. The main purpose of learning mathematics is to exercise logical thinking and learn the way of mathematical checking. For financial mathematics, the study content is not only theoretical knowledge, but also can be applied in financial market [3]. Financial theory is an important support for financial market. When dealing with problems related to financial economy, mathematical models can be used to solve problems at the same time as raising problems. The application of financial model can promote the continuous development and innovation of financial economy.

3. Theoretical composition of financial mathematics

3.1. Portfolio selection

Portfolio theory appeared in 1952, was put forward by the economist Markowitz. He elaborated in detail in the paper, and the theory proposed has obvious guiding significance, demonstrating

that the investment risk generated by a single security is higher than that generated by multiple securities [4]. He also rejects the assumption of classical economics that investors simply seek to maximize returns. In the case that investors want to give consideration to both investment theory and investment composition, theories related to portfolio selection can ensure the optimal selection scheme.

3.2. Capital asset pricing

The theory of capital asset pricing is mainly based on the theory of portfolio. Although the theory proposed by Markowitz elaborates and studies the relationship between return risks, it cannot fully cover the relationship between return risks, and it is difficult to explain the specific sources of value at risk in detail. For this situation, Sharp conducted relevant research and built a pricing model of capital assets [5]. In terms of pricing model, income belongs to independent variable, and risk belongs to dependent variable. In this process, it can be found that the excess return and excess return generated by securities are evidence-related. Although asset pricing related models can simulate the actual income structure of the financial market, they are similar to static models and cannot be flexibly changed in combination with the actual situation. When the dynamic problem is encountered, it needs to be carefully analyzed and studied.

3.3. B-S option related pricing model

Option pricing is a complex problem in financial mathematics. In the long-term research, it is concluded that the price of options is closely related to current forecast and future forecast, not because investors like to change, and relevant formulas have also been obtained. The formulation can provide an effective basis for risk prediction and can be used in the development and pricing of financial securities.

4. The influence of financial mathematics on modern financial market

4.1. Martingale theory

Martingale theory is a very important part of financial market, which is in an advanced position in the financial market. As for financial market, innovation should be carried out in combination with national system and national economy. Therefore, financial theories will adapt to the development of market economy based on the characteristics of The Times [6]. In order to better adapt to the development and change of market economy, the theory of martingale is put forward in the financial field. This theory can solve the emerging problems in the financial market and efficiently deal with the specific price positioning of commodities in the market. At the same time, this theory also occupies a very important position in the world economy.

4.2. Emblem subgame theory

In the process of development, modern financial market needs to combine the development of national system and national economy with continuous innovation. Therefore, the financial theory will adapt to the market economy continuously with the characteristics of the development of The Times. From the core point of view, the financial market is not in an immutable state, and the internal market will show instability [7]. When there are big changes in the financial market, the financial market will be greatly affected, such as stocks and securities. At the same time, economic changes in financial markets are harder to predict. Whether financial theory is a dynamic model for financial mathematics or a pricing theory, it cannot fully adapt to the fluctuations in the market. As for the emblem sub-strategy theory, it can effectively grasp the market economy. We can make assumptions based on the macro level for the financial society and economy, and use the relevant hypothesis models of financial mathematics to find out the measures that are suitable for the market fluctuations. For the market, theory has high value and obvious status.

4.3.   Optimal stop time theory

For the optimal stop time theory, this is a component of probabilistic learning content, and it's a new theory that's emerging now, and it's a branch of probabilistic learning. However, this theory is not indispensable, nor is it widely used [8]. The main reason for this situation is that the relevant theoretical research in China is still not deep enough, so the relevant achievements are relatively few. The enterprise industry cannot make clear the main aspects in which this theory is applied, but the feasibility of using this theory is obvious. In terms of its development prospect, the theory has a broad development prospect.

4.4.   Stochastic optimal control theory

The theory mainly refers to the combination of mathematical theory and practical situation. Theory holds that financial markets have boundaries and rules, and there are big differences between them and the reality.

4.5.   Empirical method and intelligent method

In the process of the continuous development of information technology, The Times are constantly changing, which to a certain extent creates good conditions for the continuous development of financial mathematics. Wavelet analysis, genetic algorithm and other computational methods can complement each other with traditional financial mathematics. They can be integrated with each other, which is relatively high achievement in the financial field. With regard to the specific application of the theory and its practical application in the financial market, as well as the data index and the construction of relevant data models, the rules of the financial market are summarized. Whether it is feasible is demonstrated by the way of verification. In the process of social development, the empirical method has been applied and recognized by more experts.

In general, in the financial field, financial mathematics plays a very important role. The effective application of financial mathematics can optimize the financial structure and promote the overall efficiency of financial work. Financial mathematics can also produce a clear and clear understanding of the specific trend of financial development, seize the development opportunities, and then provide effective guidance for the continuous development of financial undertakings through financial mathematics.

5.   The current state of financial markets

China's economy is currently in a state of stable development, and its economic strength is constantly improving. The financial market has also been developed and improved to a certain extent. Financial markets have become an important force in the world economy and have an impact on many countries [9]. For financial mathematics, its most important role is to predict the financial trend, and the key to prediction lies in the construction of mathematical model. Model simulation and model analysis can be used to predict financial market fluctuations and development trends, seize opportunities in time and avoid risks.

6.   Problems in financial mathematics

For traditional financial and economic models, they can be divided into two categories. One is the decision theory model generated when the relevant operating mechanism and initial conditions of financial economy are determined, the other is the random walk. The two models are in fact at odds with each other, which has led to different camps of academics in the field of finance. Some camps point out that financial markets operate in their own way, and analyze them technically. The other camp believes that there is no regularity in financial markets and

that quantitative analysis is needed. The problems of financial mathematics are mainly reflected in the following aspects:

1. There are changes in financial economy, so it is necessary to have a clear and comprehensive understanding of its fuzziness and randomness. Then, the specific change mechanism, law, deduction process and final result are determined, and at the same time, the realized currency in the financial market is determined.

2. On the basis of the research and analysis of the relevant systems of currencies of various countries, a comprehensive analysis should be carried out on the specific direction of global money supply and demand as well as capital flow. Then, the currency model is constructed to ensure the rationality of the model. Only through the study of the currency model can the financial market be further studied to obtain data support.

3. It is necessary to carry out multi-level analysis on the financial market and make financial theoretical achievements serve the financial field by integrating production resources.

7. Prospect of the development of financial mathematics

4. If financial mathematics wants to play a full role in financial market, we should pay attention to the construction of mathematical model. Models are based primarily on assumptions. In this case, there will be inconsistent with the actual situation, and even deviate from the reality between the situation. The main reason for this is that each country has certain differences in its financial situation. Therefore, it is difficult to ensure the accuracy of the model construction, which needs to be combined with the actual situation of the model expansion, modification and improvement. At the same time, under the influence of uncertainty and diversification of the financial system, the financial industry occupies a very important position in all countries, which in fact requires a higher level of financial mathematics.

5. For financial mathematics, in the research process, its field mainly includes two aspects. On the one hand, it carries out risk management for investment portfolio, and on the other hand, it carries out pricing theory for assets. Both of them belong to relevant models of discrete financial markets and qualitative statistical analysis, but their effectiveness is obvious and their time is continuous. In the process of upgrading analysis tools, continuous time model is more possible to build. First of all, the current computer and mathematical software are widely used. Relevant technologies can be applied to financial mathematics, and big data can be used to carry out regulation and control, while electronic computers can be used to carry out auxiliary calculation. This change will form a model database, and then create a good condition for the continuous development of financial mathematics. Secondly, the world economy is in the stage of recovery, the overall degree of economic globalization is gradually deepening, and the financial sector will continue to expand in its business field. This will increase the demand for high-quality talents, and financial mathematics will be relatively strong in terms of professional requirements, and the practical application scope is relatively wide. Including securities, stocks mainly. Secondly, mathematical model construction, which can be applied to the insurance industry. The application of mathematical model can simplify the operation mode and improve the quality and efficiency of operation. Finally, the application of mathematical modeling in the field of securities can simulate the financial dynamics in the market, analyze the financial development trend, and evaluate the economic risks. In addition, it also includes strengthening the comprehensive research on its sustainable development. In the operation of financial market, it is often difficult to find out the specific law, which is randomness and non-linearity. In this case, it is more demanding for financial mathematics. Especially in the case of large fluctuations in the financial market, the randomness will be more obvious, which will lead to the problem of information not piling up in the financial market and increase the difficulty in the application of financial mathematics. In the analysis of financial market, it is necessary to

strengthen the application of theory and promote the sustainable development of financial mathematics.

8. Countermeasures for the effective development of financial market

8.1. Set up a department to supervise the financial market

Financial markets have been in an unstable state in terms of economic development. In addition, for modern finance, the market is still in its initial stage, so it needs to face many professional problems, and the problems are relatively complex. Therefore, it is necessary to pay attention to the construction of financial market supervision system. In this process, the government should actively carry out management work, put forward specific measures for management, can set up a supervisory department. The department needs to regulate and supervise financial markets and ensure rationality. At the same time, the government needs to stipulate the specific functions of the financial market and clearly delineate the industry category, so as to realize the construction of management measures and industry standards, and strictly implement the specific development of regulations. Financial markets need to be regulated with transparent information. Both institutions and enterprises need to obtain market certificates to ensure the standardized operation of the financial market, and make the industry reflect the rigor and science in the development.

8.2. Pay attention to the protection of consumers' rights and interests

For the financial market, its core is not always in a constant state. The internal instability of the market also exists. In the case of defense in the financial market, many parties will be affected by the financial market. Therefore, it is necessary not only to ensure the scientific and standardized development of the financial market, but also to fully protect the rights and interests of consumers to avoid losses suffered by consumers in the case of market fluctuations. At the same time, it is necessary to pay attention to the protection of consumer information in the aspect of security, attach importance to the improvement of consumer protection system, so that consumer privacy can be fully protected. It also protects consumers from being harmed.

8.3. Enact financial market laws

In terms of the current situation of social development, the law of financial market is still in an imperfect state. The relevant laws are not sound enough in legislation, and the current financial market management laws are difficult to effectively solve the problems existing in the financial market. Therefore, its legislation needs to be improved continuously, including consumer rights and interests protection, consumer information protection and so on. At the same time, we also need to improve the laws of the online financial market. The industry needs to formulate mandatory laws and unify the laws, so as to create good management for the stable development of the financial market and facilitate the implementation of the management work.

9. Conclusion

In general, The Times are in constant development and change, and the financial market should also keep pace with The Times. When dealing with problems in the economic field, it is necessary to pay attention to the application of information technology, and carry out effective calculation and integration for data. The application of financial mathematics in the financial market can meet the specific needs of the development of The Times. Combined with big data, the mathematical model is accurately constructed to promote the improvement of the quality and efficiency of financial work processing, provide sufficient theoretical basis for the continuous development of the financial market and promote the better development of the financial market.