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Interpretation of the Influence of Financial Mathematics on Modern Financial Market

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ABSTRACT. *The rapid change of the times has promoted the rapid development of China's economic field, and the status of the contemporary normalized financial market is increasingly important. In the continuous study of financial theory, it began to gradually infiltrate into mathematical ideas. Therefore, financial mathematics came into being. In the current stage of financial market development, financial mathematics, as an integral part, mainly makes use of the advantages of computer and mathematics to further explore the securities and market equilibrium in the financial market, so as to provide strong data support for the normal operation of financial institutions. Based on the current development situation and trend of financial mathematics, this paper analyzes the influence and promotion of financial mathematics on China's modern financial markets in order to promote the orderly development of them.*

KEYWORDS: *Financial Mathematics, Financial markets, Influence*

1. Introduction

Financial mathematics is a topic that meets the needs of the development of the times. It is a new concept that combines financial knowledge with mathematical concepts. It is mainly a product of capital investment and asset integration in a financial environment which is abnormal, and the relationship between capital flow and effective utilization is fully mathematicized. After decades of historical development, financial mathematics has ushered in a good opportunity for development. The development of financial mathematics has also prompted the financial market to become more and more large and develop towards more rational, diversified and diversified development. And the development opportunities of the world's finance, coupled with China's practical policy guidance, have promoted the rapid economic development after China's reform and opening up.

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2. Financial Mathematics Development Status and Prospects

2.1 The meaning of financial mathematics

Financial mathematics, short for mathematical finance, analytical finance, mathematical finance and other disciplines, mainly uses mathematical tools as a carrier to conduct in-depth research in the financial field and establish corresponding mathematic models to guide and practice based on the internal theories and laws of finance. In other words, financial mathematics is also an organic combination of modern technology and theoretical knowledge of mathematical models. It has been skillfully applied to financial markets and has played an important role. Therefore, financial mathematics can be said to be a discipline with strong cross-cutting, complicated knowledge and advanced theory, and it can also be said to be a discipline that has been laid out in advance in frontier fields.

2.2 Analysis of the Development of Financial Mathematics Talents

2.2.1 Analyze the employment prospects

1) Engaged in stock industry asset evaluation and financial analysis.

With the recovery of the world economy and regional capitalization of international markets, the stock market has become an important territory of the capital market in the process of social development. As an indispensable technology of stock analysis, financial mathematics has played a decisive role, and has had a “flutter of a butterfly's wing" impact on the overall financial market.

2) Insurance industry

The effective combination of financial mathematics and actuarial science and the application of functional models and dynamic micro-simulation methods have been widely used in pension insurance and life insurance. This application simplifies the calculation process, effectively improves the overall efficiency and provides support for promoting social development.

3) Securities field

The database is used as a model for the system design, and professional knowledge such as mathematical model is used to operate XBRL, CRM and other aspects. The database system is managed, and the overall trend and the development trend of modern financial market are emphatically analyzed.

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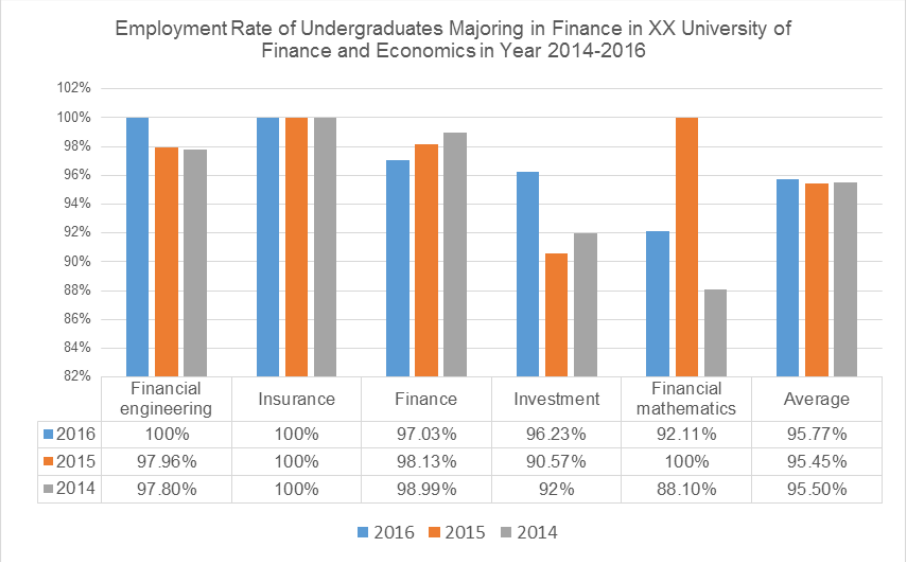

	Financial engineering	Insurance	Finance	Investment	Financial mathematics	Average
2016	100%	100%	97.03%	96.23%	92.11%	95.77%
2015	97.96%	100%	98.13%	90.57%	100%	95.45%
2014	97.80%	100%	98.99%	92%	88.10%	95.50%

Figure. 1 Employment rate of Undergraduates Majoring in Finance

2.2.2 The analysis of the development prospect

Since the end of the 19th century, financial mathematics has been widely used in the economic field and has received special attention from people from all walks of life. On one hand, exploring the practical significance of financial mathematics can infiltrate mathematical knowledge into people's lives and raise people's high attention to the development trend of national economy and financial market, on the other hand, it can guide economists and economic researchers to use mathematical models and other tools to accurately analyze data, which is conducive to promoting the orderly development of modern economy. The author firmly believes that in the next decades, the application of financial mathematics will be more extensive and more economic benefits will be created.

3. Exploring the status and trend of the development of current financial market

3.1 Analysis of the development of current financial market

From a global perspective, the development of China's modern financial market is steady and its scale is constantly expanding, which has gradually rationalized the division of labor in China's market and has become the " leader" of the socialist market economy. Moreover, China's financial market is moving towards the

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direction of high efficiency, transparency, the improvement of the information and the mechanism.

3.2 Forecasting the development trend of financial market

Firstly, we should improve the financial supervision mechanism and promote the safe and orderly development of the market economy. Secondly, the main body of the securities market should be regulated and investment should be taken as a key project to improve the market development. Thirdly, we also need to improve the development mechanism of the insurance market and pay attention to endowment insurance and life insurance from multiple perspectives. Last but not least, we ought to promote financial globalization and actively carry out the "going out" strategy, as well as achieve integration with the world, also absorb the essence, together with making up the short board, and promote the construction of a community of destiny.

4. Exploring the influence and promotion of financial mathematics on modern financial markets

4.1 Analysis of New Developments in Financial Mathematics Theory

4.1.1 Theoretical Analysis of Basic Stochastic Optimal Control

Stochastic optimal control theory is a kind of theoretical knowledge in dealing with stochastic problems developed by famous foreign experts in the 1960s through the combination of mathematical theory and practice and the continuous improvement. In the 1970s, the famous expert Morton studied and analyzed the stochastic optimal control theory to explore the optimal consumption theory under the long-term effect, and then a new impulse theory came into being. This new theory holds that all kinds of transactions in the financial market have certain scope and regularity, which are quite different from the actual situation. Finally, some famous experts and scholars of domestic market have made breakthroughs in backward stochastic differential equations through continuous efforts of research, analysis and exploration, so that this theory can walk in the front of the world.

4.1.2 Analysis based on the martingale theory

The martingale theory came into being when the general investment of finance was pursuing the minimum cost. The core of martingale theory is to study the time increasing of investment options and investment returns. The curve of investment options is tangent to the curve of investment returns and the cost of investment opportunity is the lowest at the tangent point. Therefore, this moment is the theory of the best investment. The martingale theory is a kind of theory that walks at the front end of today's financial market and integrates and defines the financial theory.

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It integrates and shows the laws in financial markets better, and defines stochastic martingales and equivalent martingales conceptually. It effectively solves the derivative problem of products in the financial market and scientifically, reasonably and efficiently locates the prices of products that are not perfect in the market. Therefore, this theory occupies a very important position in the financial theory of the world. I have to say that many relationships of investments income in the market are directly related to the martingale theory.

4.1.3 Analysis based on the optimal neighborhood theory

The neighborhood effect refers to the way in which the characteristics of local social environment can affect people's thoughts and behaviors. The reason is that people generally have a kind of expectation to establish harmonious interpersonal relationship. When people look at each other, they also tend to see more positive aspects. In the process of interaction, people are always involuntarily trying to exchange the minimum price for maximum reward. The theory of optimal neighborhood is similar to what we called " the phenomenon of following the trend" in our daily life. It belongs to a new theory in probability. At present, its position in financial mathematics theory is relatively small, and the research on this theory is relatively shallow, but there is still much room for development and potential..

4.1.4 Theoretical analysis based on the differential game

The financial market is unstable. When the financial market fluctuates, it will affect the securities, stock and futures markets to some extent. At present, the existing theories cannot completely control this change. However, if the theory of differential game assumes some macro assumptions, it assumes unstable factors such as market disruption as one side, and then integrates and optimizes the other side, so as to obtain two kinds of financial data theory with relative function. Because the theory is relatively simple to apply, it has certain research value and potential in the development of financial markets.

4.2 Analysis of new challenges faced by financial mathematics

The determinism model and random walk model are the two main types of traditional financial market economy model. From a certain point of view, they are two opposite states, which makes the financial industry believe that the financial market has two different views. One view holds that financial markets have their own laws, which are laws in motion and technical analysis. Another view is that financial markets do not have the certain regularity, which is only a quantitative analysis. There are also data showing that some experts and scholars have developed non-linear systems through the study of physics, and this theory holds that the inherent law in financial market economy is the only one among these two views. Then there is a new problem in financial mathematics, that is, the economy of financial market itself is changeable, so it is almost impossible or very difficult to

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fully understand and master its random and fuzzy characteristics. Only according to the relevant knowledge of probability theory, statistics or sampling statistics can be made on the laws that have already appeared, and then the laws, changes and playing processes in the economy of financial market can be determined and the final results can be obtained.

On the basis of studying the monetary systems of different countries in the world, this paper focuses on the world's circulation, money supply and demand, as well as the direction and volume of the world's working capital to do research and analysis, and then simulates the construction of a monetary model, and conducts in-depth research on this model, so as to better support the financial system with data. At present, all countries in the world are pushing forward the digitalization of currency. Using the influence of financial mathematics and financial markets, the impact of digital currency on the current economic system and its advantages and disadvantages are studied to facilitate the maximum promotion of digital currency.

We need to pay attention to the comprehensive analysis of interest rate, the tax rate, the exchange rate and other relevant economic data systems in the financial system so as to construct a relatively perfect and feasible "three-rate" model of financial markets. Through various " rate" relationships, we can adjust and balance the economic system and promote the healthy and steady development of the economy. Using the comprehensive and multi-level research results of the financial system, it can be applied to different productions.

In the integrated management of source allocation, the theoretical results of financial research provide better data and technical support for financial markets. The data analysis of financial markets is timely fed back to the financial theory research department to promote the relationship between financial research and financial markets.

5. Conclusion

The world is bustling, all for profit. The hustle and bustle of the world are all for profit. " Capital", " income" and " finance" has become the weight of the economic era. They have not only brought incentives for market pricing, but also brought worries for seeking profits. Although the financial market is different from the ancient battlefields, it is still " full of smoke and flames of war." In the information age, economic development has long been inseparable from big data and computer technology. Financial mathematics will be based on a complex database to establish a mathematical model with high accuracy, involving many industries in the financial market, such as securities, insurance and stock. It would lay a solid foundation for the deep development of the financial market and also it would help promote the development of the financial market.

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