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Foreign (Europe and the United States) High-frequency Trading Strategy and Regulatory System to the Domestic Revelation

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Abstract: With the continuous progress of technology and economic development, high-frequency trading has become one of the most important trading methods in the securities market of various countries. This paper mainly analyzes the trading strategy and regulatory system of foreign high-frequency trading, and obtains some enlightenment from it. In terms of trading strategy, domestic high-frequency traders should strengthen technology research and development, improve the level of algorithms; Enhance data analysis capabilities to build a reliable data foundation; Strengthen computer hardware to provide a solid guarantee. In terms of the supervision system, China should set up independent supervisory bodies, strengthen transaction data supervision, limit high-frequency trading, enhance market transparency, and active make the application of regulatory technologies.

Keywords: high-frequency trading, trading strategy, regulatory system, domestic revelation

1. Introduction

High-frequency Trading (HFT) is a form of trading that uses computer technology and algorithmic models to trade at very high speeds. It is a new trading mode that has emerged in recent years. In the global financial market, high-frequency trading has become a very important trading mode, which is widely used in the stock, futures, foreign exchange and other markets. However, there is a certain gap in the development of high-frequency trading at home and abroad, and foreign high-frequency trading started early and developed fast. Therefore, the relative development of high-frequency trading law in our country can obtain some enlightenment by summarizing and analyzing foreign high-frequency trading strategies and regulatory systems.

This paper mainly studies the trading strategies and regulatory systems of foreign high-frequency trading markets, compares the development status at home and abroad in related aspects, and sums up experience from the excellent trading strategies and regulatory systems of foreign high-frequency trading, so as to obtain some enlightenment and provide certain references for the development direction and measures of domestic high-frequency trading in related aspects.

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2. High-Frequency Trading

2.1. Definition of High-Frequency Trading

According to the United States Securities and Exchange Commission (SEC), high-frequency traders are "professional traders acting in a proprietary capacity that engage in strategies that generate a large number of trades on a daily basis" [1]. In high-frequency trading, traders use computer programs to complete the tedious process of trading, quickly identify market changes and transactions, and participate in the market to achieve rapid trading operations. High-frequency trading is not only a fast transaction speed, but also a high transaction decision-making ability, high transaction efficiency, low transaction costs, and has become one of the mainstream trading methods in the international financial market.

High-frequency trading usually has the following characteristics: First, the use of ultra-high-speed and sophisticated computer programs to generate, transmit and execute orders; The use of custodial services and personal data feeds provided by exchanges and other institutions to minimize network and other types of latency; Third, the time to establish a peace warehouse is very short; Fourth is many orders are cancelled shortly after they are submitted [2].

High-frequency trading is a fast and efficient way of trading. Its trading decisions are based on massive market data and a variety of model algorithms, which can quickly and accurately capture trading opportunities in the market and improve trading efficiency and profitability. However, high-frequency trading, due to its characteristics of fast trading and large amounts of data processing, has very high technical requirements for trading systems and requires a high degree of technical and talent support. At the same time, high-frequency trading also poses a huge challenge to regulators because of its impact on the market and its dynamic nature.

2.2. Development Status of Domestic High-Frequency Trading

The development of high-frequency trading in China is limited, but there are still broad prospects for development In foreign countries, high-frequency trading has become the mainstream form of securities and futures trading markets, accounting for the vast majority of trading volume. In recent years, with the continuous maturity of China's market and the increasing demand for diversification of financial instruments, China International Conference in Finance (CICF) has also begun to lay out the large-scale development of stock index futures. The continuous relaxation of stock index futures will certainly attract more high-frequency traders to enter. Therefore, in the short term, China's futures market is not conducive to the development of high-frequency trading because of its small scale, technology lag and other reasons. But in the long run, high-frequency trading in our country has very broad development soil. Although the development of high-frequency trading in China is limited, from the perspective of industrial development, high-frequency trading is closely linked to the financial market, and the two sides promote each other. With the continuous development of China's economy and the deepening of the financial market, there are still great opportunities and space for high-frequency trading [3]. In the Chinese market, high-frequency trading is mainly used in the trading of financial products such as stocks, stock index futures and Exchange Traded Funds (ETFs). Among them, stock index futures and ETFs are the main tools used for arbitrage by high-frequency trading. In recent years, with the launch of T0 trading stock index futures and ETFs, high-frequency trading has been used in the trading of these products. This will also effectively promote the development of high-frequency trading in the Chinese market [4].

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3. Foreign High-Frequency Trading Strategies and Inspirations

3.1. Quantitative Trading

Quantitative trading, also known as algorithmic trading, is the trading of securities based strictly on the buy/sell decisions of computer algorithms. Computer algorithms are designed or programmed by the traders themselves, based on the historical performance of coded strategies tested against historical financial data [5].

It is different from the traditional trading method, which makes trading decisions through artificial subjective analysis, but uses algorithms and technical indicators to explore market rules and achieve more accurate and effective trading. There are many quantitative trading cases in foreign high-frequency trading, among which the more typical one is the trading strategy based on machine learning. This strategy trains machine learning algorithms on historical market data, so that the machine can autonomously predict the volatility trend of stock prices, and then make trading decisions. For example, Renaissance Technologies, a Us-Based quantitative trading company, uses a trading strategy based on machine learning. By collecting and analyzing large amounts of historical market data, they build and train a series of machine-learning models and apply them to actual trading. The firm's trading strategy was so successful that it became one of the best in the industry.

Some algorithm-based trading strategies have also emerged in China, such as the trading platform UQER, which takes quantitative trading as its main business. Through its self-developed quantitative platform and algorithm model, UQER provides users with automated trading services based on historical market data. However, in contrast, domestic quantitative trading started late, and there are still large gaps in technology, talent and market, which need to be further developed and improved.

3.2. Deep Learning

The concept of deep learning comes from scholars of artificial neural network (ANN) research, proposed in 2006 by Hinton [6]. Deep learning is a sub-field of machine learning that uses the structure and algorithms of neural networks to build models that can efficiently handle multidimensional data and complex non-linear relationships. Deep learning transforms raw data into higher-level abstract representations through multi-layer nonlinear transformations to achieve efficient feature extraction and classification [7].

With the continuous development of machine learning and deep learning theory and technology, more and more scholars begin to use machine learning and deep learning algorithms to establish quantitative trading models and predict securities prices. In the financial field, deep learning has been widely used in stock price prediction, trading decisions and other aspects. In foreign high-frequency trading, trading strategies based on deep learning are very common. Two Sigma Investments and Point72 Asset Management in the US, for example, use deep learning to make trading decisions. They used a series of deep neural network models to train algorithms to identify market trends and predict stock prices. In actual trading, these models will autonomously make trading decisions and realize automated trading. In China, the application of deep learning in the financial field is also more and more extensive. For example, OneConnect, a fintech company owned by Ping An of China, has developed an AI quantitative trading system using deep learning technology to provide intelligent investment decisions, trade execution and risk management services. In addition, Tianyancha Technology, which has one of the most influential teams of big data and artificial intelligence experts in China, has also developed a financial data analysis and prediction platform based on deep learning. However, compared with the late start of deep learning at home and abroad, the relevant technology and influence still need to be further optimized and developed.

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Although China is already developing related areas of quantitative trading and deep learning in high-frequency trading, it is still a relatively late start compared with foreign countries. Therefore, this paper gives the following two suggestions for the development status of this trading strategy mainly based on algorithms and data.

3.3. Revelation

First, strengthen technology research and development to improve the level of algorithms. The core of high-frequency trading is the algorithm, and the performance of the algorithm determines the success or failure of high-frequency trading strategy. Therefore, strengthening technology research and development and improving algorithm level is the core competitiveness of the high-frequency trading. First of all, domestic high-frequency trading companies need to increase investment in algorithm research and development, attract more high-end technical talents to join the high-frequency trading field, master the core technology of high-frequency trading, and improve the level of algorithms. Second, domestic high-frequency trading companies need to strengthen cooperation with universities and research institutions, carry out joint research and development, and jointly overcome the technical problems in the field of high-frequency trading. At the same time, domestic high-frequency trading companies need to accelerate the application of new technologies such as cloud computing and big data, improve the efficiency and performance of algorithms, and achieve more accurate trading decisions.

The second is to enhance data analysis capabilities and build a reliable data foundation. Another key factor in high-frequency trading is data, and the quality and reliability of data are an important guarantee for the success of high-frequency trading strategies.

Although there are many data providers in China, the quality and reliability of data are difficult to be guaranteed, which poses a greater threat to the stability and profitability of high-frequency trading. Therefore, domestic high-frequency trading companies need to strengthen their data analysis capabilities, establish a reliable data foundation, and ensure the real-time, accuracy and integrity of data. In addition, domestic high-frequency trading companies also need to expand data acquisition channels, through independent collection, social media, public data and other channels to obtain data, to provide a more reliable data basis for high-frequency trading.

Third, strengthen the computer hardware to provide a solid guarantee. Foreign high-frequency trading strategies need fast and stable computer hardware support. In high-frequency trading, time is a very precious, quick response to the market, as soon as possible to obtain market information, fast order requires fast and stable computer hardware support. Domestic high-frequency trading strategies still need to be further improved in terms of hardware, especially in terms of independent research and development. At present, most high-frequency trading strategies use imported hardware, and independent research and development can effectively reduce costs and improve technical strength.

4. The Regulatory System and Enlightenment of High-Frequency Trading

4.1. Status Quo of Domestic and Foreign High-Frequency Trading Regulatory Systems

Worldwide, there is no consensus on how to regulate high-frequency trading. On the one hand, the rapid development and complexity of high-frequency trading make regulators face huge challenges, that is, how to ensure the fairness and security of the market; On the other hand, high-frequency trading is an important driver of market liquidity and efficiency, which can improve market capacity and liquidity. Therefore, how to formulate appropriate regulatory policies on the premise of ensuring market fairness and liquidity has become a difficult problem for regulators.

At present, there are diversified forms of regulatory policies for high-frequency trading around the world. For example, the regulation of high-frequency trading in the European market is mainly

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implemented through the MiFID II (Markets in Financial Instruments Directive II). In the United States, the CFTC and the SEC are the main regulators of high-frequency trading, and they mainly ensure the fairness and liquidity of the trading market by amending rules and policies, and strengthening market supervision.

Although many domestic scholars have conducted research on the financial investment issues of high-frequency trading, there are relatively few researches on the legal supervision issues. Some scholars have divided the legal supervision of high-frequency trading into three categories: risk supervision, behavior supervision and competition supervision. These three types of supervision are based on information supervision, so as to build a universal high-frequency trading regulatory framework [8]. Some scholars also believe that high-frequency trading has drawbacks such as amplification of market volatility, trading for the sake of trading, and manipulation behaviors that abuse market trading advantages. Supervision of high-frequency trading should be strengthened, a transparent, timely and open market quotation mechanism should be established, and a judgment index system involving high-frequency trading manipulation should be clearly defined [9]. Due to the lack of a scientific and unified definition of the concept of high-frequency trading by financial industry insiders and scholars for a long time, the domestic supervision of high-frequency trading has more or less taken some get corners.

Although from the current point of view, the trading rules of China's financial market still have certain restrictions on high-frequency trading, this trading method is not possible in China as developed financial markets such as Europe and the United States as unimpeded, but similar to procedural trading, algorithmic trading and other trading means in China's futures market warrant trading and stock index futures trading. The scope of application is growing rapidly. According to the data of the China Futures Margin Monitoring Center, the number of investors using high-frequency trading or quasi-high-frequency trading in China's futures market has reached 3%, and the average daily turnover accounts for about 8% to more than 10% of the total turnover [10]. Therefore, it is very necessary to improve the supervision system.

4.2. Specific Regulatory Systems of Foreign High-Frequency Trading

Next, this article introduces the relatively specific regulatory measures for high-frequency trading markets in Europe and the United States.

One is to set up regulatory agencies. Depending on the country's regulatory authority, some use an independent regulator, while others are composed of multiple agencies that form a collective regulator. For example, the CFTC and SEC in the United States assume responsibility for the supervision of the futures and Securities Markets respectively, while the European Union has established the European Securities and Markets Authority (ESMA) to coordinate the supervision of the securities and futures markets within the EU.

Second, strengthen the supervision of transaction data. Transaction data is the foundation for market fairness and transparency. Regulators need to collect, manipulate, analyze and monitor this data. For example, the UK's Financial Conduct Authority (FCA) has introduced Transparency and Reporting Rules, which requires all market participants to submit detailed trading reports, including high-frequency trading reports.

The third is to limit high-frequency trading strategies. Because high-frequency trading strategies are so complex, they often involve market manipulation and other malfeasance. Therefore, regulators need to develop and enforce policies to limit HFT strategies. For example, the SEC and CFTC learn from the restrictions imposed by different market players on high-frequency trading, such as limiting the number of order insertions and limiting the number of order cancellations.

Fourth, we will strengthen market transparency. Regulators will manage and improve market transparency on the basis of the need to ensure market fairness, justice and transparency. For example,

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the Financial Industry Regulatory Authority (FINRA) in the United States has established regulations such as restricting unconventional trading strategies and restricting buying and selling algorithms.

Fifth, strengthen supervision of the application of technology. The application of regulatory technology can help regulators better understand, monitor and analyze the high-frequency trading market. For example, the European Union's ESMA has established a Center for Technical Regulation, which uses mathematical models and technical tools to regulate the high-frequency trading market in Europe.

4.3. Revelation

The supervision system of high-frequency trading in foreign countries has enlightenment and reference significance for the high-frequency trading market in China. On the one hand, regulators can learn from foreign regulatory systems, strengthen market supervision and liquidity management, and ensure market justice, fairness and transparency. On the other hand, combined with the actual situation in the country, regulators should also formulate some regulatory policies that meet the actual needs of the market.

The first is to set up an independent regulator. Establish an independent regulatory body to monitor and coordinate the HFT market in real time and issue relevant policies, rules, systems, etc. Second, strengthen the supervision of transaction data. Collect, process and monitor high-frequency trading data to ensure market transparency and fairness. Third, limit high-frequency trading strategies, formulate and implement appropriate policies and regulations to limit illegal trading activities. Fourth, strengthen market transparency, enhance the transparency and fairness of the market through various means. Fifth, actively apply regulatory technology. In actual supervision, technical means such as big data and artificial intelligence can be used to improve the efficiency and accuracy of supervision.

In short, the development of the high-frequency trading market has put forward higher requirements for regulators. Only by strengthening market supervision and ensuring market justice, fairness and transparency can the healthy and orderly development of the high-frequency trading market be achieved.

5. Conclusion

This paper mainly aims at the trading strategies and regulatory systems of high-frequency trading in foreign countries, and combines the development of high-frequency trading markets at home and abroad to obtain some enlightenment from it to provide some references for the development of domestic high-frequency trading in terms of trading strategies and regulatory systems. First of all, in terms of trading strategy, domestic high-frequency traders should strengthen technology research and development and improve the level of algorithms; enhance data analysis capabilities to build a reliable data foundation; strengthen computer hardware to provide a solid guarantee. In terms of supervision system, China should set up independent supervisory bodies; strengthen transaction data supervision; limit high-frequency trading; enhance market transparency; make active applications of regulatory technologies.

Then this paper summarizes and analyzes foreign high-frequency trading strategies and regulatory systems, but there are few specific empirical studies. Therefore, in the future, it is necessary to deeply explore the impact of various trading strategies and regulatory systems on market efficiency and fairness through empirical analysis. And this paper puts forward corresponding suggestions for the current domestic high-frequency trading strategy and regulatory system. However, these recommendations need to be continuously refined and optimized in practice.

Finally, this paper analyzes and discusses more from the perspective of trading strategy and regulatory system, and less on specific mathematical models and specific behavior analysis of high-

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frequency traders. Therefore, future research can further explore the behavioral characteristics of high-frequency traders, so as to better understand and deal with the challenges and problems of high-frequency trading. At the same time, it can also explore the influence and role of high-frequency trading on market efficiency and fairness by establishing models and simulation experiments.

References

[1] *Securities U. S. (2010) Exchange Commission. Part III: Concept release on equity market structure; Proposed Rule, 17 CFR Part 242 [J]. Federal Register, 75(13): 3594-3614.*

[2] *Jones C. M. (2013) What do we know about high-frequency trading? [J]. Columbia Business School Research Paper, (13-11).*

[3] *Huixin Qiu, Jing Li. (2019) Research on development and regulation of high-frequency trading [J]. Northern Finance, (3): 51-55.*

[4] *Yu Ming. (2015) Enlightenment of high-frequency trading regulation in Europe and America to China [J]. Hainan Finance, (12): 55-56.*

[5] *Chan E. P. (2021) Quantitative trading: how to build your own algorithmic trading business [M]. John Wiley & Sons.*

[6] *Hinton G. E., Osindero S., Teh Y. W. (2006) A fast learning algorithm for deep belief nets [J]. Neural computation, 18(7): 1527-1554.*

[7] *Dachang Sun, Xiuchun Bi. (2018) High-frequency trading strategies based on deep learning algorithms and their profitability [J]. Journal of University of Science and Technology of China, 48(11): 923.*

[8] *Huiqiang Xing. (2016) Research on the legal and regulatory framework of high-frequency trading in Securities and Futures markets [J]. Chinese Law, (5).*

[9] *Xiao Kai. High-frequency Trading and Market Manipulation [J]. Law of Jiaotong University, 2016(2).*

[10] *Guitang Wang. (2013) Panpan Yan. High-frequency trading and regulation in financial markets [J]. Finance Teaching and Research, (5): 42-45.*