

Reflections on the Practice and Future Prospects of Quantitative Trading in China

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Abstract: Based on experiences both in China and internationally, quantitative trading has shown certain positive effects in enhancing trading efficiency and market liquidity. However, it also poses risks of increasing market volatility under specific market conditions, necessitating guided and regulated development. This paper briefly introduces the characteristics of quantitative trading, reviews its development within China, analyzes its advantages and disadvantages, summarizes recent regulatory requirements, and reflects on its future prospects in China. Suggestions for the next steps in the regulated development of quantitative trading are also proposed.

Keywords: Quantitative Trading; Algorithmic Trading; High-frequency Trading; Medium and Low-frequency Strategies; Investors

1. Introduction

In recent years, the widespread application of new information technologies and the continuous improvement of domestic IT capabilities have made quantitative trading a significant trading method. Data indicates that in mature international markets, algorithmic trading accounts for over 50% of total trading volume. In China, the market's alignment with international standards has been accelerating. The proportion of quantitative trading has risen from 20% in 2020 to approximately 30% currently, with high-frequency trading increasing from 10% to nearly 20%. This growth has established quantitative trading as a substantial force in the domestic capital market. However, due to the persistent market downturn, quantitative trading has become a subject of controversy, particularly regarding whether it should be restricted or halted. Over the past year, regulatory authorities have promptly addressed these concerns through the

issuance of institutional rules and responses in press conferences.

2. Introduction to Quantitative Trading

Quantitative trading is a financial investment method that leverages statistical and mathematical knowledge alongside computer technology to execute trades. This approach primarily replaces subjective human judgment with advanced mathematical and statistical models. It utilizes computer programs to analyze vast amounts of historical data, identifying various "high-probability" scenarios to formulate and implement trading strategies, aiming for higher investment returns.

In quantitative trading, both trade decisions and executions are automated by computer programs. Traders merely need to monitor the system's performance and manage risk control. This method enables faster and more accurate identification and capture of market opportunities, while minimizing the impact of human factors on decision-making and execution, thereby enhancing efficiency and stability.

Quantitative trading exhibits four distinct characteristics: **(1) Discipline:** Decisions in quantitative trading are driven by mathematical models rather than human intuition or emotions. This approach effectively mitigates human weaknesses such as greed, fear, and overconfidence, thereby addressing cognitive biases. **(2) Systematic Approach:** Quantitative trading employs a multi-layered, multifaceted, and data-intensive methodology. Models are applied at various levels, including asset allocation, sector selection, and individual asset selection. This approach incorporates a comprehensive analysis of factors such as macroeconomic cycles, market structures, valuations, growth prospects, earnings quality, analyst forecasts, and market sentiment. **(3) Arbitrage Strategy:** Through extensive and systematic scanning,

quantitative trading identifies opportunities resulting from mispricings or incorrect valuations. It profits by purchasing undervalued assets and selling overvalued ones, thereby exploiting valuation discrepancies. (4) Probability-based Success: Quantitative trading relies on extensive data analysis and model computations to develop strategies based on high-probability events. This enhances the likelihood of executing successful trades[1].

3. The Rise of Quantitative Trading and Its Practice in China

Quantitative trading emerged in the early 1970s, and despite its relatively short history of just over 40 years, it has rapidly developed into a cornerstone of global capital markets. Compared to international quantitative funds, China's quantitative funds appeared later due to the relatively recent development of its financial markets and other unique factors[2]. It is generally believed that the first batch of quantitative funds in China was established in 2004, including Hwa Bao "Fund Preferred Arbitrage", Everbright PGIM Fund's Quantitative Core Fund, and J.P. Morgan Alpha Fund. Due to policy constraints in the financial market, early Chinese quantitative products primarily employed arbitrage strategies. Given the inherent limitations of arbitrage strategies, particularly regarding scale, the issuance of quantitative funds experienced a prolonged hiatus in the subsequent years.

In 2010, the launch of the CSI 300 stock index futures and the introduction of margin trading and securities lending provided quantitative funds with hedging tools. This allowed various quantitative investment strategies, such as alpha strategies (shorting stock index futures while going long on a basket of stocks to achieve market neutrality and eliminate systemic risk for excess returns) and stock index futures arbitrage strategies, to truly flourish. Thus, 2010 is often regarded as the inaugural year of quantitative investing in China.

From 2013 to September 2015, Chinese quantitative funds experienced their most prosperous period. The bull market of the ChiNext board in 2013 resulted in substantial profits for alpha strategy quantitative funds. In 2014, the Asset Management Association of

China implemented a registration and filing system for private fund managers and products, promoting full transparency in private funds and accelerating the issuance of private fund products, including quantitative hedge private products. From the end of 2014 to June 2015, the A-shares market underwent a booming bull market for over half a year, followed by several rounds of severe declines from mid-June to August 2015. Due to quantitative investing's proficiency in profiting from market volatility, almost all quantitative investment products yielded significant returns during this period. As a result, numerous Chinese quantitative investment institutions emerged, leading to rapid development in the field and increasing public awareness of quantitative investing.

During the stock market crash from June to August 2015, stock index futures were widely blamed as the "culprit", with many believing that financial institutions were "maliciously shorting" these futures. In response to the crash, on September 2, 2015, the China Financial Futures Exchange introduced stringent intraday trading restrictions on stock index futures, leading to a significant drop in market liquidity. Consequently, numerous alpha strategy quantitative funds were forced to seek alternative profit strategies. They began transitioning from low-risk, low-reward arbitrage hedge strategies to long-short and long-only equity strategies, and from stock hedging to commodity futures, treasury futures, and other CTA strategies.

From the end of 2015 to 2018, the scale of quantitative trading gradually recovered and grew, beginning to show rapid growth starting in 2019. Both the number and scale of billion-yuan quantitative private funds significantly increased. By the first half of 2024, the number of billion-yuan quantitative private funds further expanded to 33, with the total scale of quantitative investments reaching approximately 1.5 trillion yuan[3].

4. Analysis of the Pros and Cons of Quantitative Trading

The existence and development of quantitative trading are inevitable. According to regulatory practices and international experiences, quantitative trading presents both advantages and disadvantages. Therefore, it is essential to evaluate its roles and impacts with rationality

and objectivity. Adopting a balanced approach—leveraging its benefits, mitigating its drawbacks, and promoting its regulated development—represents a more logical and coherent attitude towards quantitative trading[4].

On one hand, quantitative trading positively impacts the market. **Firstly**, it helps enhance market liquidity and activity. Quantitative trading typically operates with full or high positions, providing the market with additional liquidity, thereby facilitating price discovery. Statistics show that quantitative trading currently contributes approximately 200 billion yuan in daily trading volume, making it a significant source of market activity. By monitoring over 5,000 stocks and trading in 1,000 to 2,000 stocks, quantitative trading can cover some low-liquidity micro-cap stocks. In stocks with a market cap under 1.5 billion yuan, quantitative trading accounts for nearly 40% of transactions, thereby improving the liquidity of these stocks. **Secondly**, quantitative trading enhances asset pricing efficiency. In the open market of standardized contract trading, the continuous quoting and order withdrawal by market participants can bring asset prices closer to their intrinsic value. Generally, the more participants and the more active the trading, the faster the convergence speed. **Thirdly**, the involvement of computer programs increases trading efficiency. The automated nature of quantitative trading ensures higher efficiency compared to manual trading. Nowadays, even the most basic stock trading software clients come equipped with some level of automated trading functionality[5].

On the other hand, the drawbacks of quantitative trading are equally notable. **Firstly**, market conditions are inherently complex and unpredictable, meaning that historical data cannot always accurately forecast future trends. This limitation can lead to issues such as model bias, overfitting, and reliance on incomplete data, which in turn can affect the decision-making process in quantitative trading. **Secondly**, the lack of human oversight in quantitative trading introduces the risk of erroneous trades. This risk is particularly pronounced in high-frequency trading, where the low latency can prevent timely human intervention in case of a malfunction. Such scenarios can result in

the rapid and extensive issuance of incorrect orders, potentially disrupting the trading system, disturbing market order, and even causing systemic risks[6]. **Thirdly**, quantitative trading can facilitate market manipulation. Certain institutions may exploit these strategies to influence stock prices by placing and canceling large numbers of orders, thereby creating the illusion of heavy trading activity and manipulating market trends. **Fourthly**, the inherently short-term focus of quantitative trading is a concern. The tendency towards excessive trading activity can undermine the principles of long-term value investing. **Fifthly**, the advanced technology, superior processing capabilities, and use of artificial intelligence in quantitative trading give these systems significant advantages over the average investor. Moreover, some quantitative strategies, particularly in micro-cap stocks, may exhibit convergence in strategy, trading patterns, and even timing, which can amplify individual stock volatility and lead to broader market resonance[7].

5. Strengthened Chinese Regulation of Quantitative Trading

Drawing from international experience, countries such as the United States, the European Union, Germany, Japan, and South Korea have implemented rules and regulatory guidelines specifically targeting quantitative trading, especially high-frequency trading, without imposing outright bans. In fact, quantitative trading accounts for approximately 50% of market transactions in Europe and the United States, making it a vital component of their market ecosystems. In China, efforts to enhance the regulation of quantitative trading are ongoing. Specific measures addressing the drawbacks of quantitative trading reflect a regulatory philosophy of “maximizing benefits while minimizing harms and promoting orderly development”. These measures include incorporating quantitative trading into securities regulations, establishing data collection mechanisms for leading quantitative institutions, enhancing monitoring and analysis of quantitative trading, instituting a reporting system for algorithmic trading, and strengthening the regulation of private equity short selling[8].

From a legislative perspective, the newly

revised Securities Law of 2019 includes specific provisions for quantitative trading in Article 45. It stipulates that “algorithmic trading, where trading orders are automatically generated or executed by computer programs, must comply with the regulations set by the State Council’s securities regulatory authority and report to the stock exchange. Such trading must not jeopardize the security or orderly operation of the stock exchange system”. This legal acknowledgment of quantitative trading also imposes regulatory requirements.

From the perspective of business rules, as early as February 2010, the trading rules and their implementation details by the China Financial Futures Exchange required members and clients engaging in algorithmic trading to report in advance. The stock exchanges issued notices related to the management of algorithmic trading in stock options in 2015 and 2019.

On the departmental regulation level, at the end of December 2020, the China Securities Regulatory Commission (CSRC) issued the *Management Measures for Convertible Corporate Bonds*. Article 3, Clause 3, stipulates that “algorithmic trading of convertible bonds must comply with CSRC regulations and report to the exchange, without affecting the security or normal trading order of the exchange system”. On February 5, 2021, the stock exchange issued a notice on reporting algorithmic trading of convertible bonds, specifying the scope of algorithmic trading investors, reporting methods, and content requirements.

These regulatory arrangements primarily target algorithmic trading in futures, options, and convertible bonds. The formal establishment of algorithmic trading reporting systems and corresponding regulatory arrangements in the Chinese stock market occurred in September 2023. The stock exchange issued the *Notice on Matters Related to the Reporting of Stock Algorithmic Trading* and the *Notice on Strengthening the Management of Algorithmic Trading*, responding to market demands and advancing institutional innovation in critical areas[9].

In April 2024, the released “Nine New Guidelines” explicitly proposed the introduction of regulations for algorithmic trading and the strengthening of oversight on high-frequency quantitative trading[10]. On

May 15, 2024, the departmental regulation for the stock market, titled *Regulations on the Management of Algorithmic Trading in the Securities Market (Trial)*, was officially published. This regulation delineates a series of oversight arrangements, including trading regulation, risk prevention, system security, and specific provisions for high-frequency trading. Within this regulatory framework, the Shanghai, Shenzhen, and Beijing Stock Exchanges formulated the *Implementation Rules for the Management of Algorithmic Trading*, and solicited public opinions on June 7[11].

6. Conclusions

With the continuous advancement of computer technology and the ongoing refinement of the market, Chinese quantitative trading is poised for further development. However, it is essential to remain vigilant about the potential risks and issues it may pose and adopt corresponding policy measures for regulation and management. Through this review, several insights and considerations for the future development of domestic quantitative trading emerge:

6.1 A Blanket Ban on Quantitative Trading is Neither Scientific nor Rational

From a developmental perspective, quantitative trading is an inevitable outcome of the integration of new-generation information technology with capital market development, representing an advanced trading methodology. In an era where information technology permeates every aspect of life, there is no justification for hindering its expansion in the intricate securities trading field, especially when dealing with vast amounts of data and information. Manual monitoring and ordering will not suffice indefinitely.

6.2 Quantitative Trading will Face Increased Regulation

As the scale and influence of quantitative trading expand, regulatory authorities will impose stricter and more detailed oversight. Quantitative institutions will be required to enhance their information disclosure and risk control levels to prevent market manipulation and disruption. Going forward, regulatory bodies need to refine relevant rules and measures, clearly defining regulatory

standards and scopes to avoid ambiguity and disputes[12].

6.3 Full Protection of the Interests of Small and Medium Investors is Necessary

In trading regulation, it is crucial to consider the national context, which primarily consists of small and medium investors. Upholding the political and populist nature of capital market regulation, limiting the excessive advantages of algorithmic trading over small investors is an essential objective. Given that small and medium investors form the majority, enhancing the monitoring and regulation of high-frequency quantitative trading and other trading tools is vital to improve regulatory focus and adaptability. Only by fully considering the market realities and the interests of investors can the sustainable development of quantitative trading and the long-term stability of the domestic capital market be achieved.

6.4 Enhancement of Investor Education and Training is Essential

Regulatory authorities and investor education institutions should strengthen the education and training of investors to improve their investment literacy. Ordinary investors, particularly small and medium investors, should enhance their professional knowledge and experience, increase risk awareness, and approach quantitative trading with objectivity and rationality. In the current market environment, it is challenging for small and medium investors to compete in speed with high-frequency quantitative and algorithmic trading strategies that possess powerful computational capabilities. To minimize potential losses, investors should “play to their strengths and avoid their weaknesses”, leveraging their advantages in research depth and focusing on uncovering the long-term growth potential of companies. In the long run, as regulatory frameworks continue to improve and investor rationality increases, the profit margin for short-term trading will diminish. Investors should recognize this trend’s objectivity and cultivate a value investment mindset.

6.5 Quantitative Trading Institutions Must Continually Adapt to New Regulatory Requirements and Market Conditions

Regulating quantitative trading is a measure that helps maintain market order and protect investors’ interests, dispelling misunderstandings and biases about quantitative trading, thereby boosting market confidence and vitality. This approach aligns with market development laws and international practices, beneficial for safeguarding market stability and fairness, promoting industry standards and development, and enhancing market efficiency and liquidity. By actively cooperating with regulatory requirements, completing relevant reporting tasks on time, and implementing appropriate risk control and contingency plans, quantitative trading institutions can maintain competitiveness and innovation in their field. With the increase in market participants and the advancement of technology, quantitative trading will face more intense competition, necessitating continuous innovation and strategy optimization, as well as strengthening risk management and internal controls to boost competitiveness and profitability.

6.6 Future Development Space for Mid-to-low Frequency Strategies and Products in Quantitative Trading Compared to High-frequency Strategies

Currently, Chinese regulatory measures vary in strictness for different frequencies of algorithmic trading. By implementing such differentiated classification regulations, high-frequency trading behaviors that may negatively impact market efficiency and fair trading, such as frequent order placements and cancellations, are restricted. Based on indicators such as the number of orders and cancellation rates, additional flow fees and cancellation fees are explicitly charged for high-frequency quantitative trading, encouraging “cost increases” to promote “speed reduction”, thereby compressing the arbitrage space within the existing system. At the same time, the stabilizing market role and liquidity provision of mid-to-low frequency quantitative strategies should be fully utilized.

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