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Analysis of the Impact of Margin Financing and Securities Lending on the Investment Behavior of the Sci-Tech Innovation Board—Based on the Var Model

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Abstract: *According to the Science and Technology 50 Index, the trading volume and the two financial data of its constituent stocks, and the weighted average turnover rate, empirical analysis is carried out through the construction of VAR model and ADF unit root test, AR root test, Granger causality test and impulse response test. The sci-tech innovation board trader's investment behavior is quantitatively analyzed, the impact of margin trading and securities lending on the investment behavior of the Sci-tech innovation board is studied, and countermeasures for my country's STAR market margin trading and securities trading are proposed from both investors and supervisory levels.*

Keywords: *Margin trading; Sci-tech Innovation Board (STAR); VAR model*

1. Introduction

Under the background that the country encourages the development of scientific and technological innovation enterprises and strengthens the function of the capital market, the Sci-tech Innovation Board is listed on the Shanghai Stock Exchange, and its margin trading system has undergone drastic changes compared with the main board: all Sci-Tech Innovation Board stocks will start from the first day of listing That is, they are allowed to conduct margin trading and securities lending transactions; at the same time, they also encourage shareholders and strategic investors of listed companies on the Science and Technology Innovation Board to put their shares on the market through the securities companies' securities lending business channels in the form of refinancing and other forms. Provide more securities sources for the securities lending business on the Science and Technology Innovation Board, and provide investors with more space for short-selling transactions. [1]

Since all stocks on the Sci-tech Innovation Board do not have a price limit for the first 5 days after they are listed, and the price limit after 5 days is 20%, which is much larger than the 10% limit of the main board, the intraday stock price amplitude of the Sci-tech Innovation Board is significantly higher. On the main board, this has to a large extent stimulated the enthusiasm of risk-preferences represented by leveraged investors to participate in margin trading and securities lending transactions. China is more able to play a role in active investment behavior, price discovery, and aiding ups and downs. Taking the first trading day on July 22, 2019 as an example, the investment market for 25 stocks on the Sci-tech Innovation Board was booming, with an average increase of nearly 140%. The total turnover was 48.5 billion yuan, the financing balance was 1.275 billion yuan, and the securities lending balance was 797 million The securities lending balance accounted for 38.46% of the sci-tech innovation board's two financing balances, compared with less than 2% of the securities lending balance after the main board excluding the sci-tech innovation board that day. This article will establish a VAR model based on time series data to analyze the impact of margin financing and securities lending on the investment behavior of the Sci-tech Innovation Board.

2. Data testing and Empirical Analysis

2.1 Sample Interval and Data Source

Since the base point of the Science and Technology 50 Index is December 31, 2019, this article selects December 31, 2019 to January 3, 2020 as the first week, and postponed 50 weeks as a complete market cycle. Research samples Including the Science and Technology 50 Index, the trading volume, and the financial data of its constituent stocks, and the weekly data of the weighted average turnover rate. Among

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them, the Science and Technology 50 Index, the trading volume and the weighted average turnover rate of its constituent stocks can effectively reflect the science and technology. Board investment behavior. [2]

2.2 ADF Unit Root Test

This article studies the impact of margin financing and securities lending on the investment behavior of the Sci-tech Innovation Board. All data in the entire research process are time series, and the time series requires that the sample itself must be a stationary series. The response test also requires the study sample to be a stationary series. If the research sample is a non-stationary sequence, it will cause "pseudo-regression" in the sample data, and make the VAR model established by the sample data appear statistically biased. In this paper, the ADF test is adopted to test the stationarity of the sample, which is used to test whether the sequence with time trend is a stationary sequence. ADF unit root test is performed on all data before modeling. The relevant results show that all variables have no unit roots. All variables in this market cycle are stationary series, and the VAR model shown below can be directly established for the next step of testing, as shown in the following table.

Table 1 ADF unit root test

Variable	Test Value	5% Significant Level	P	Conclusion
STAR	-4.711	-1.956	0.000	stability
tv	-2.918	-1.956	0.000	stability
tr	-3.926	-1.956	0.000	stability
bf	-5.882	-1.956	0.000	stability
ms	-8.964	-1.956	0.000	stability

2.3 Regression Model and AR Root Test

This article focuses on the impact of margin financing and securities lending on the investment behavior of the Sci-tech Innovation Board, so the regression model is established as follows:

$$Yt=\alpha 0+\alpha 1STARt+\alpha 2tvt+\alpha 3trt+\varepsilon 1t$$

$$Yt=\beta 0+\beta 1bft+\beta 2mst+\varepsilon 2t$$

Among them, Yt is the explained variable, using the Science and Technology 50 Index (STAR), trading volume, and the weighted average turnover rate of its constituent stocks to represent the investment behavior of the Science and Technology Innovation Board, and bf and ms are the explanations. Variables represent data on financing and securities lending. After establishing the vector autoregressive model, the stability of the model needs to be tested. The following figure is the AR root test diagram. The AR roots of the built model are evenly located in the unit circle. Therefore, the built model is a stable VAR model, which can be directly tested in the next step.

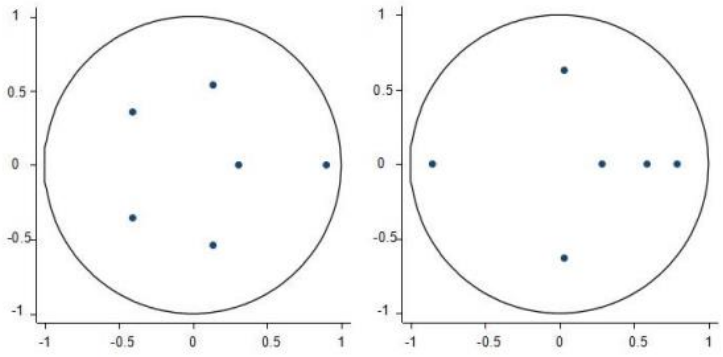

Figure. 1 AR root test

2.4 Granger Causality Test

This article needs to test whether margin trading and securities lending have a one-way impact on the investment behavior of the Sci-tech Innovation Board. The results show that at the 10% confidence level,

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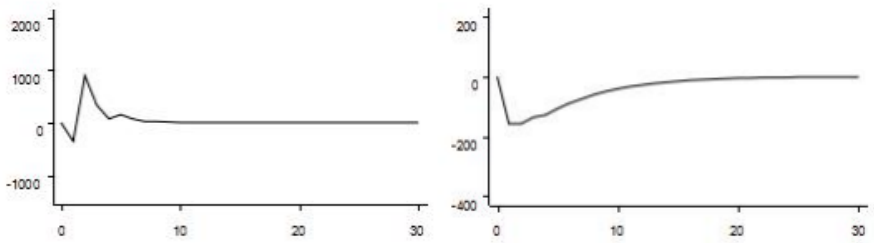
bf is the Granger reason of Y, and ms is not the Granger reason of Y. It shows that during this market cycle, financing transactions on the Science and Technology Innovation Board have a significant impact on investment behavior, while securities lending transactions have no significant impact on investment behavior, as shown in the following table.

Table 2 Granger causality test

Variable	Null hypothesis	F	P	Conclusion
Y and bf	Bf is not a Granger causality for Y	4.114	0.032	Refuse
Y and ms	Ms is not a Granger causality for Y	1.880	0.179	Accept

2.5 Impulse Response Test

In order to further explore the impact of margin trading and securities lending on the investment behavior of the Sci-tech Innovation Board, impulse response tests on related variables are also needed. The results show that in the Sci-tech innovation board market in this market cycle, both the variable bf and the variable ms have an impulse response effect on investment behavior in the short term, and the impulse response effect of the bf variable is positive, the impulse response of the ms variable is negative, and the bf variable is negative. The peak value of the impulse response function is greater than the peak value of the ms variable impulse response function, indicating that during this market cycle, margin trading and securities lending have an impact on the investment behavior of the Sci-tech Innovation Board, and in contrast, the impact of financing transactions on the investment behavior of the Sci-tech Innovation Board is greater than Securities lending transactions. At the same time, the impulse response graph of the ms variable is more stable than that of the bf variable, while the impulse response graph of the bf variable shows a trend of first decline, then a sharp rise, and finally a decline in fluctuation, indicating that securities lending transactions have invested in the science and technology innovation board during this market cycle. The instantaneous impact of is more obvious, while the effect of financing transactions is longer, as shown in the figure below. [3]



bf ms

Figure. 2 Impulse response test

3. Conclusions and Recommendations

This paper adopts the science and technology 50 index, the trading volume and its constituent stocks' two financial data, and the weighted average turnover rate. Based on the time series data, the VAR model is established to empirically test the influence of margin financing and securities lending on the investment behavior of the science and technology innovation board, and the following are obtained Three conclusions. First, through the Granger causality test, it can be seen that the impact of financing transactions on the Sci-tech Innovation Board on investment behavior is significant, while the impact of securities lending transactions on investment behavior is not significant. Second, through the impulse response test, it can be found that compared with securities lending transactions, the impact of financing transactions on the Sci-tech Innovation Board investment behavior is significant; at the same time, the instantaneous impact of securities lending transactions is more obvious, while financing transactions have a longer effect. It shows that in this market cycle, there are more short-term speculators in securities trading on the Sci-tech Innovation Board than in financing transactions. Third, on the whole, the volatility of the Sci-tech Innovation Board investment behavior in this market cycle has a significant relationship with margin trading and securities lending transactions, and both margin trading and securities lending transactions can effectively activate and expand the investment behavior of the Sci-tech Innovation Board. The impact of margin trading and securities lending transactions on the Science and Technology Innovation Board on investment behavior is mainly positive. The purpose of establishing the Science and

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Technology Innovation Board (optimizing the mechanism of margin financing and securities lending and the refinancing platform) has basically been achieved.[4]

The research results of this article have reference significance for individual investors to participate in the two financial transactions on the Sci-tech Innovation Board and for the supervisors to improve the system and policies of the Sci-tech Innovation Board margin trading and securities lending. For individual investors, first of all, before participating in the two financial transactions of the Ministry of Science and Technology, they should learn relevant knowledge, fully understand the individual stocks of the Sci-tech innovation board and the two financial transaction mechanisms and their risks, and reasonably evaluate their own asset allocation capabilities and risk tolerance; second, When participating in two financial transactions on the Sci-tech Innovation Board, you must continuously improve your investment analysis capabilities and risk control capabilities, and trade with mature and rational investment concepts; finally, you should rationally diversify assets, diversify investment, and learn to control positions and leverage Proportion, controlling the proportion of high-risk investment assets. Regarding the supervisory authority, firstly, a risk monitoring system for the two financial transactions on the Sci-tech Innovation Board should be established to monitor the abnormal trading behaviors of individual stocks on the Sci-tech Innovation Board and the two financial accounts, so as to reduce the risk of liquidation and forced liquidation; secondly, strict market access and optimization should be implemented. Investor structure, and guide more institutional investors to participate in the two financial transactions on the Sci-tech Innovation Board; finally, the two financial systems should continue to be improved, so that financing and securities lending can develop in a balanced manner, and provide checks and balances for both the long and short sides of the market, and give full play to their price discovery, Stabilize the role of the stock market and improve market efficiency; at the same time, it is necessary to improve the supervision, disclosure, punishment and compensation mechanism for short selling, strengthen the disclosure of short selling information, protect reasonable short selling transactions, punish malicious short selling, and effectively protect the legality of investors rights and interests.[5]

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