

Is There a Momentum Effect in Chinese STAR MARKET? An Empirical Analysis based on 223 Stocks in 2019-2021

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Abstract: With the deepening of the reform and opening-up process, China's capital market has gradually become mature. Established in 2019, the SSE STAR MARKET (written below as SSE) is a special board in China specifically for high-tech enterprises to solve the problem of the high threshold for listing on the mainboard, and to promote the development of innovative enterprises. The characteristics of the SSE are quite different from those of the mainboard, so this paper use Python with weekly trading data for 223 Stocks in SSE to investigate whether there is a momentum effect in the SSE by constructing a winner's portfolio and a loser's portfolio for the first time. What's more, this paper investigates the relationship between the turnover rate and the momentum effect. The study finds that there is no momentum effect in the SSE STAR MARKET in the short term. However, there is a momentum effect within the long term and the extent of the momentum effect deepens in the market with low monthly turnover rates.

1 INTRODUCTION

The momentum effect refers to the recent good performance of monetary assets in the forthcoming period will also maintain its better performance. In some mature securities markets, investors have started to buy and hold the financial assets of the winning portfolio for a period of time, while selling the financial assets of the losing portfolio to achieve the momentum effect of investment strategy. In recent years, domestic investors have also begun to look for traces of the momentum effect in China's stock market.

SSE, one of the components of China's stock market, was established in July 2019, and it promotes the process of technology-based and innovative enterprises, and solves their concentration of financing problems. As a place of innovation and reform in the progress of China's capital market, the SSE has promoted the development of Chinese innovation into a golden age and brought historic development opportunities for relevant high-tech enterprises. At the same time, most of the listed companies in the SSE have characteristics of high potential, high return and high risk, and more and more investors are focusing their attention on this area and naturally thinking about whether they can

construct momentum effect strategies in the SSE to gain the excess returns. The existing literature mainly focuses on the analysis of the A-share market as a whole, mostly using monthly and annual frequency data, while the findings would not be the same if the results were directly covered for the whole A-share market due to the different sample subjects and periods. Moreover, there are just a few papers that refine the Chinese stock market and study the momentum effect of a particular sector separately. Considering that the price elasticity of the board is greater than that of the mainboard, this paper adopts the weekly data related to listed companies in the SSE during 2019-2021 for empirical analysis to examine the existence of the momentum effect and explore the influencing factors for the first time, providing investment strategy suggestions and references for relevant investors.

2 LITERATURE REVIEW

2.1 Existence of Momentum Effects in The Stock Market

The momentum effect has been examined and analyzed by scholars around the world in both

established and emerging stock markets to provide evidence for its existence. In foreign research, Jegadeesh & Titman (Jegadeesh, 1993), the originators of the momentum effect study, concluded that stock returns are short-run persistent by studying daily frequency data of individual stocks in the U.S. stock market from 1965 to 1989. Later Fama & French (Fama, 2012) on stock markets in the Asia-Pacific region confirmed the existence of the momentum effect to be different.

On the domestic side, the researches on the momentum effect have been considered in different directions due to the complexity of the A-share market. Firstly, in terms of whether there is a short-term momentum effect in the A-share market, the conclusions of domestic scholars are more uniform, led by Gao Qiuming, Hu Conghui, and Yan Xiang (Gao, 2014), and Song Guanghui, Dong Yongqi, and Chen Yang Yang (Song, 2017), who use weekly frequency data and conduct a study based on the overlap method, conclude that there is a significant short-term (within 1 month) momentum effect in the A-share market.

2.2 Influencing Factors of Momentum Effects in The Domestic Stock Market

Most of the analyses of the factors influencing the momentum effect in Chinese stock markets have mainly focused on two points. Firstly, the impact of the domestic short selling mechanism: Qiuming Gao, Conghui Hu, and Xiang Yan (Gao, 2014) find that restrictions on short selling promote short-term momentum effects; Tianhui Zheng (Zheng, 2017) distinguishes whether the underlying can be financed and finds that the underlying stocks that can be financed and financed have more significant momentum effects than those that cannot be financed and financed. Secondly, the effect of turnover rate: Li, Jiangping (Li, 2020) first used daily frequency data of Land Stock Exchange from 2017 to 2019 and concluded that Land Stock Exchange still has significant momentum effect in the case of low turnover rate.

3 RESEARCH HYPOTHESIS

It has been practically two years since the start-up of the SSE, experiencing impacts such as the epidemic and changes in the international political environment

on the way. The SSE showed an overall trend of high growth and achieve dazzling results. This undoubtedly reflects the huge potential and upside of SSE and attracts a large number of investors to buy into it, causing the share prices of these listed companies to rise in a longer time, thus easily leading to the momentum effect in a long-term perspective. However, the investor structure of SSE is special, mainly institutional investors and investors with superior professional levels. The long holding time of such investors solves to a certain extent the problem of massive selling when encountering a bear market, which leads to a sharp fall in stock prices and stabilizes the market price, making it difficult to form a momentum effect in the short term. In the actual market environment, there is also the same herding effect that retail investors are prone to form at the initial stage of buying in the SSE, i.e., the stock price climbs up one after another. Based on the above analysis, the first hypothesis of this paper is proposed.

Hypothesis 1: There is no short-term momentum effect but a long-term momentum effect for SSE stocks.

As mentioned earlier in this paper, most domestic scholars revolve around the mechanism of our stock (difficult to short) and turnover rate. As a measure of stock liquidity, low turnover rate responds to low liquidity, and according to the explanation for the creation of momentum effect in behavioral finance: the lack of response from investors causes, which means that the information dissemination in the market is slower, easily causing information bias and asymmetry, resulting in stock price deviation from its own true value. Therefore, based on the finding of scholar Li Jiangping (Li, 2020) that Land Stock Exchange long position stocks have momentum effect despite low turnover rate, this paper explores whether the turnover rate affects the existence of momentum effect in SSE and proposes the second hypothesis of this paper.

Hypothesis 2: With the low turnover rate, stocks in the SSE still have a significant medium-term momentum effect.

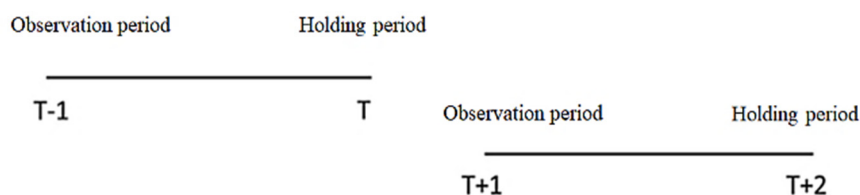


Figure 1: Momentum effect strategy construction method.

4 RESEARCH METHODOLOGY AND DATA SOURCES

4.1 Research Methodology

The model used throughout this paper is the overlapping sampling method used by Jegadeesh & Titman (Jegadeesh, 1993), finding whether there is a momentum effect in the SSE. In this paper, the period is divided into two periods, the first period A is the observation period and the second period B is the holding period. The holding period of 1-2 weeks is defined as short term, 4 weeks as medium term, and 8 weeks as long term. Also, the time lengths of A and B are taken as 1 week, 2 weeks, 4 weeks and 8 weeks respectively, i.e., 16 different groups of portfolios are paired, and the stocks with the top 10% returns in the observation period are recorded as winners' portfolios, while the bottom 10% stocks are recorded as losers' portfolios. The stocks in each group are bought according to the same weight, and then the average return of the winner portfolio and the loser portfolio are calculated separately during the holding period, and finally, the difference between the winner portfolio and the loser portfolio (W-L) is calculated. Also, a one-week space between the observation period and the holding period is used to prevent the occurrence of the overrun-lag effect, which becomes the form of (A, 1, B) strategy.

In addition, in order to study the effect of turnover rate on the emergence of momentum effect of SSE stocks, this paper mimics the overlapping sampling method model by this following: First, the turnover rate period C, i.e. (C, A, B), is set before the observation period and the position period, considering the short length of SSE establishment, which will result in too small a study sample, so no space-time is set here. The first 30% of stocks are the high turnover rate portfolio, and the last 30% are the low turnover rate portfolio. Then in the low turnover

portfolio in the observation period for the returned ranking from the largest to the smallest, take the top 10% return stock portfolio as the winner portfolio, on the contrary, the lowest 10% return stock portfolio as the loser portfolio. Finally, the difference in return between winner and loser portfolio in the holding period is measured. In this paper, the value of C is fixed for one month, and A and B are taken for 1 week, 2 weeks and 4 weeks, respectively, to construct 9 groups of strategies to judge the impact of turnover rate.

4.2 Data Sources

This paper uses the Choice financial data platform of Oriental Wealth to obtain the return and monthly turnover data of the stocks of the CoC, with the sample time range from October 2019 to May 2021, i.e., starting from the second month of the inception of the CoC. In this paper, we analyze the existence of the momentum effect of the Cochrane Board in terms of weekly time. Each strategy has a fixed observation period and holding period. There are 16 portfolio strategies, stocks with missing data and historical returns of less than 1 month removed. Depending on the above data criteria, a total of 223 stocks of SSE is derived for research and analysis in this paper.

In this paper, the return calculation of the winner portfolio, the loser portfolio and the difference between the two are done through the WindQuant platform by introducing the WindPy for python quantitative back testing, and calculating the return of the stock portfolio under different parameter settings respectively. Using a strategy with a 1-week observation period and a 1-week holding period (1, 1, 1) as an example, Figure 2 shows the average yield of the winner's portfolio, the loser's portfolio and the difference between the two over different periods. (If you need the code of this paper, please feel free to contact the author by email).

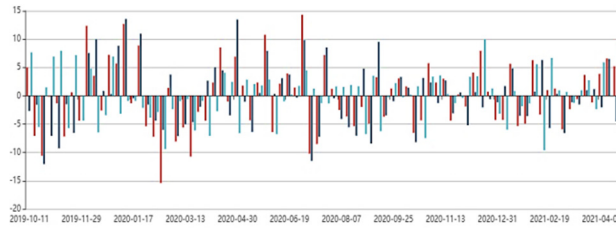


Figure 2: (1, 1, 1) Strategy grouping returns.

Table 1: Returns of different strategy combinations of SSE.

Observation period	Holding period	1 week	2 weeks	4 weeks	8 weeks
		1 week	Winning Combinations: -8.49%	9.67%	36.73%
	Loser combination	-4.96%	16.25%	41.75%	-3.74%
	Combined Difference	-3.53%	-6.58%	-5.02%	10.60%
	t-test	-0.630	-0.253	-0.949	1.902**
2 weeks	Winning Combinations	2.08%	-53.15%	21.36%	21.13%
	Loser combination	2.53%	11.83%	22.56%	20.12%
	Combined Difference	-0.45%	-64.98%	-1.20%	1.01%
	t-test	0.136	-1.861*	-0.064	-1.116*
4 weeks	Winning Combinations	40.58%	20.63%	0.06%	-1.39%
	Loser combination	29.40%	-1.41%	0%	-6.53%
	Combined Difference	11.18%	22.04%	0.06%	5.14%
	t-test	0.852	1.552	0.510	-1.403*
8 weeks	Winning Combinations	-6.24%	-8.23%	-16.48%	26.04%
	Loser combination	3.89%	13.23%	4.31%	44.35%
	Combined Difference	-10.13%	-21.46%	-20.79%	-18.31%
	t-test	-1.879*	-1.92*	-1.793*	-1.251

4.3 Description of Variables and Definition of Indicators

The average return of the winner's portfolio over each holding period is:

$$R_w = \frac{\sum_i^{0.1xN} \Pi_1^T (1 + r_{wit}) - 1}{0.1xN} \quad (1)$$

The average return of the loser portfolio over each holding period is

$$R_L = \frac{\sum_i^{0.1xN} \Pi_1^T (1 + r_{Lit}) - 1}{0.1xN} \quad (2)$$

The cumulative average return of the portfolio over the sample time period is:

$$CR_{L/W} = \sum_1^Y \frac{R_{W/L}}{Y} \quad (3)$$

Difference between winner's and loser's portfolios:

$$Spread_{W-L} = \sum \left(\frac{\sum \Pi_1^T (1 + r_{wit}) - 1}{0.1xN} - \frac{\sum \Pi_1^T (1 + r_{Lit}) - 1}{0.1xN} \right) \quad (4)$$

5 EMPIRICAL RESULTS AND ANALYSIS

5.1 Exploring the Existence of Momentum Effects under Different Strategies in the SSE Market

In Table 1 below, the average return results of the winning portfolio, the losing portfolio, and the portfolio difference under 16 different observation and holding periods are presented, and a one-sample t-test is conducted on the portfolio difference, i.e., the zero-cost momentum portfolio, for each set of strategies, with the original hypothesis that the mean value of the return on the difference portfolio is zero, as a test of whether the momentum effect is significant. A positive return means that the momentum effect exists, while the opposite is not true. The following information can be consulted on the table.

As shown in Table 1 (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

$p < 0.1$), the maximum return on portfolio spread is 22.04% for the (4,2) strategy and the minimum return is -64.98% for the (2,2) strategy. In these 16 strategies, the (1-1), (1-8), (2-8), (4-1), (4-2), (4-4), and (4-8) spreads perform positively, most of which are concentrated in the medium to long-term holding period and the observation period of 4 weeks. To address the issue of significance, the T-statistics of the above portfolios with positive returns on difference is significant at the 90% confidence level for strategies (2, 8) and (4, 8), and at the 95% confidence level for strategies (1, 8), while strategies (2, 2), (8, 1), (8, 2) and (8, 4) show insignificant momentum effects. When the observation period is 1 to 2 weeks, only the (1, 1) portfolio shows a momentum effect and both the winner portfolio and the loser portfolio have negative average returns, i.e., the momentum effect arises from the lower returns of the loser portfolio; when the observation period is 4 weeks, the reason comes from the high returns of the winner portfolio and the low returns of the loser portfolio, indicating that the stock rally in the SSE has some sustainability. It is worth noting that when the observation period is 8 weeks, the portfolio spreads are all negative, and after a longer period of better performance, there is a significant pullback during the holding period, indicating a probability of "momentum collapse" in the SSE market.

The findings of this paper on whether there is a momentum effect in the SSE market are different from those of other scholars on China's A-share market but are more consistent with the findings of scholars on SECOND BOARD. In summary, hypothesis 1 is correct that there is no momentum

effect for stocks in the SSE in the short term (1-2 weeks holding period) and medium term (4 weeks holding period), but there is a momentum effect for the long term (8 weeks holding period).

5.2 Exploring the Effect of Monthly Turnover rate on the Momentum Effect in the SSE Market

In order to investigate whether there is an effect of turnover rate on the momentum effect in the SSE market, this paper presents the average return results of winning portfolios, losing portfolios, and portfolio spreads under the influence of monthly turnover rate for nine different observation and holding periods in Table 2 below, and performs a one-sample t-test on the portfolio spreads for each group of strategies with the following results.

As shown in Table 2, among the three medium-term strategy portfolios with a four-week holding period, the return on the difference between the (1, 4) and (4, 4) long-term portfolios is significantly positive at the 90% confidence level, but unlike the normal situation, the short-term strategy portfolios also show a momentum effect under the low turnover condition, with positive returns on the portfolios (1, 1), (1, 2), (2, 1), (2, 2), and (4, 1). And the t-statistics of (1, 2), (2, 1), (2, 2) are significant at 90% confidence level. This is a good indication that the SSE market has a significant medium-term momentum effect despite the low turnover rate and a short-term momentum effect that do not exist in the normal situation. The reason for this phenomenon

Table 2: Returns of different strategies in SSE under low turnover rate.

		Holding period		
		1 week	2 weeks	4 weeks
1 week	Winning Combinations	0.2091	-1.01	36.43
	Loser combination	-3.08	-13.38	35.87
	Combined Difference	3.2891	12.37	0.56
	t-test	0.201	1.717*	-1.748*
2 weeks	Winning Combinations	2.96	11.73	-15.2
	Loser combination	-16.88	-12.57	31.88
	Combined Difference	19.84	24.3	-47.08
	t-test	1.686*	1.914*	-1.414
4 weeks	Winning Combinations	-25.41	-17.59	29.03
	Loser combination	-29.59	-1.68	10.01
	Combined Difference	4.18	-15.91	19.02
	t-test	0.272	-0.837	1.777*

maybe because the low turnover rate implies that the information transmission rate in the SSE market is slow, investors' response is insufficient, and stock prices cannot return to their intrinsic value level quickly enough to eliminate the noise problem in a short period, thus leading to a short-term momentum effect in the SSE market. In summary, hypothesis two holds and stocks in the SSE still have significant medium-term momentum effects in the presence of low turnover rates.

6 CONCLUSIONS AND RECOMMENDATIONS

In this paper, we study 233 stocks in the period from October 2019 to May 2021 in the SSE, finding that there is no momentum effect in the SSE market in the short (1-2 weeks) and medium term (4 weeks), and a significant momentum effect in the long term (8 weeks); using low turnover as a precondition, the SSE market shows momentum effects in the short, medium, and long term. The findings in this paper are different from those of the mainboard of China, which are related to the differences in the listed companies, investor structure and policies of the board. This paper also demonstrates that the market is still not efficient in China. Therefore, this paper suggests the following recommendations to both regulators and the investors.

For the regulators, it is important to improve the information disclosure system and increase the transparency of trading in the SSE market. It is the existence of asymmetric information and slow delivery that leads to the momentum effect. Therefore, regulators should supervise the timeliness of information disclosure of listed companies and establish mechanisms to ensure the authenticity and validity of the information provided by listed companies.

For the investors, to strengthen investment learning, reduce excessive speculation and other irrational behavior. China's retail investors are not well educated in investment, easy to form a herd effect and follow the herd behavior, affected by the noise information. Investors should look at the market volatility rationally, do not blindly select stocks, while building a portfolio of momentum strategies under different circumstances, such as the results of the empirical analysis of this paper, in the case of low turnover rate, good risk management, and in line with their investment plan, constitute a portfolio of momentum strategies to obtain a market

excess return.

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