

An Empirical Test of the Momentum Effect of China's STAR Market: The Study Based on the Listed Company's Turnover Rate

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Abstract: Momentum effect is a hot topic of research in both academia and industry, and it is also a key point of whether 'chasing the upside and downside' strategy can be adopted. Many studies in the whole Chinese A-share market show that there is no significant momentum effect, and in order to further dissect the existence of momentum effect in the Chinese stock market, this paper selects the monthly stock data of the Science and Technology Innovation Board (SSE STAR Market) from 2020 to 2022 monthly stock data to test the momentum effect based on the grouping of turnover rates on the momentum strategy construction method of Jagadeesh and Titman. The empirical study finds that: (1) there is no significant momentum effect in the monthly frequency of both high and low turnover rates in China's STAR market; while there is a significant momentum effect in the medium turnover rate; (2) the combined momentum effect of medium-term and long-term is most significant in the medium turnover rate. (3) There is no significant reversal effect in the monthly portfolio in the whole STAR market.

Keywords: Momentum effect, Reversal effect, Turnover rate.

1. Introduction

Jagadeesh and Titman found the "momentum effect" by studying the US stock market[1]. Then Rauwenhorst studied the European stock market and found that there is a significant momentum effect, which exists significantly in the stock markets of developed countries, but not in some emerging stock markets[2].

A group of scholars believe that there is no momentum effect in China's A-share market because most of the studies did not find a significant momentum effect, but found a significant reversal effect, and another group believes that there is a momentum effect in China's A-share market, for example, Kang found a significant momentum effect in weekly frequency data, and Zhen Lu and Henpu Zhou found a significant momentum effect in semi-annual data[3]. The momentum effect is the key point of whether to take the "chasing" strategy, so the study of the existence of the momentum effect is very relevant.

There are three shortcomings in the research on the momentum effect in China: (1) the sample selected for the study of the existence of the momentum effect in China is too early and does not have profound suggestions for the current investment strategy. (2) Most of the tests are focused on the momentum effect of the whole A-share market, and only a very small number of momentum effect tests are focused on market segments. (3) Few studies have examined momentum strategies by grouping market segments according to turnover rates, which represent volatility and the degree of attention to stocks, and therefore have a significant impact on momentum effects.

Although many studies have shown that there is no significant momentum effect in the whole A-share market in China, it does not mean that there is no significant momentum effect in all market segments, therefore, this paper will test the momentum effect of the newly established Science and Technology Innovation Board in 2019. This paper first selects

all stock return data and turnover rate data of China A-share market from 2020 to 2022, then groups them according to high, medium and low turnover rates and constructs momentum strategies in each portfolio using the classical momentum strategy construction method, and then tests the significance of momentum effect for each portfolio.

2. Literature Review

The momentum effect is the continuation of past trends in stocks in the future. Jagadeesh found the reversal effect by studying a portfolio of stocks with a maturity of less than or equal to one month and found that stocks that performed well in the past would deteriorate in the future[4]. Later, Jagadeesh and Titman found that stocks with higher returns in the past twelve months would also have higher returns in the next twelve months, i.e., the momentum effect was found[1].

Rouwenhorst found a significant momentum effect in European stock markets and Hou and Tonks also found a significant momentum effect in the UK market[2, 5]. significant momentum effects were found. In addition to the stock market, momentum effects are also found in the bond, commodity and foreign exchange markets, Menkhoff et al also finds momentum effect, and Asness et al found that momentum effect is significant in several stock markets with various asset classes with momentum premium[6, 7].

The momentum factor has also been questioned, with some researchers suggesting that excess returns from momentum come from exposure to other factors, with Liu arguing that this is caused by the low volatility factor and Novy-marx arguing that excess returns are caused by surplus momentum[8, 9]. Most scholars in China's stock market disagree on the existence of momentum factors, and it is difficult to directly observe significant momentum effects in our market as in Europe, and the U.S. market, due to too many retail investors, the high speculative nature of retail investors, and the low quality of public information. Zhen Lu. Heng

Zhou argues through his study that this is due to the fact that there is too much noise in the Chinese market and there is more severe overtrading, and therefore the reversal factor is more significant compared to the momentum factor[3]. Xi Zhu compares different formation and holding periods in Shanghai and Shenzhen stock markets and finds that both markets show a short-term momentum effect, a medium-term reversal effect, and a long-term momentum effect, but few scholars have studied the momentum effect of the STAR in Shanghai[10]. In a study on the existence of the momentum effect of turnover rate and Chinese stock market, Hanyu Zhu et al. found that the momentum effect of stock portfolio with low turnover rate was significant by studying the data of Chinese A-share market from 1994 to 2001, and this finding is the same as that obtained by Zhibing Li's study on the momentum effect of Shanghai market. This finding is the same as that obtained in the study of momentum effect in Shanghai market by Zhibing Li[11, 12]. However, this paper finds that the momentum effect is significant in the portfolio of medium turnover rate in the science and technology board.

3. Sample Data and Research Methodology

3.1. Sample and Data

The monthly closing data of about 400 stocks on the STAR from January 2020 to March 2022 were selected, and the data were obtained through python's akshare library. And all stocks with IPO time less than 100 days were excluded. Since most of the stocks in STAR are better-performing stocks, there is no need to exclude stocks that are Special Treatment here as in many studies.

3.2. Research Methodology

The research methodology of this paper is based on the classical method of momentum strategy construction and the introduction of turnover rate to group the momentum strategies. In examining the monthly data, we selected formation periods J as 1, 3, 6 and holding periods K as 1, 3, 6. Here, 1 month is considered as short-term, 3 months as medium-term, and 6 months as long-term, and grouped the momentum portfolios according to high, medium, and low turnover rates, thus constituting a total of 27 momentum portfolios. The steps for constructing the momentum portfolios in this paper are as follows.

First, the turnover rates of all stocks within n months are arranged in descending order, and the top 30% are selected as the high turnover portfolio, the middle 40% as the medium

turnover portfolio, and the bottom 30% as the low turnover portfolio. Using the closing price P_i of the stock at the end of period n and the closing price p at the beginning of period n can calculate the stock's return R_{it} in period n, and the formula is

$$R_{it} = P_i/P - 1$$

The excess return AR_{it} of the stock in period n can be calculated by using R_{it} with the market return R_{mt} , and the formula is

$$AR_{it} = R_{it} - R_{mt}$$

In the low turnover rate, the excess returns of all stocks are ranked in descending order and the top 30% of stocks are selected as the winning portfolio and the bottom 30% as the losing portfolio. Similarly for both medium turnover rate and high turnover rate follow the same method to construct a winner portfolio and a loser portfolio, from which 6 portfolios can be obtained: low turnover rate winner portfolio, low turnover rate loser portfolio, medium turnover rate winner portfolio, medium turnover rate loser portfolio, high turnover rate winner portfolio, and high turnover rate loser portfolio. Six portfolios were obtained, and these six portfolios were back-tested according to four holding periods to calculate the excess return AR_{it} for each stock i in the portfolio over the four holding periods, followed by calculating the average excess return AAR in a portfolio, assuming X stocks in each portfolio, with the formula

$$AAR = AR_{it}/X$$

AARW and AARL are used to denote the average excess return of the winning portfolio and the average excess return of the losing portfolio, respectively. When $AARW - AARL > 0$, the portfolio exhibits the momentum effect, and when $AARW - AARL < 0$, the portfolio exhibits the reversal effect, thus we can obtain the momentum effect (reversal effect) of the portfolio in the period J x K. Finally the significance of the momentum effect (reversal effect) of this portfolio is measured by the t-statistic value.

Since the establishment of STAR is less than three years, the sample size is insufficient if the non-overlapping period sampling method is adopted to test the momentum effect, so this paper adopt the overlapping period sampling method when conducting backtesting.

4. Empirical Analysis

4.1. Empirical results for the entire sample interval

Table 1. Low turnover portfolio

Formation period (J)/Holding period (K)	1	3	6
	T-statistic value		
1	0.10478	1.38	-0.45
3	0.427	0.62	-0.94
6	-0.2524	-0.61	-1.39
	P-value		
1	0.9176	0.19	0.66
3	0.6738	0.55	0.36
6	0.803	0.55	0.19

Table 2. Medium turnover portfolio

Formation period (J)/Holding period (K)	1	3	6
	T-statistic value		
1	0.6828	1.65	1.07
3	1.963	2.22	1.73
6	1.709	3.52	1.60
	P-value		
1	0.502	0.12	0.30
3	0.064	0.04	0.11
6	0.10	0.00	0.13

Table 3. High turnover portfolio

Formation period (J)/Holding period (K)	1	3	6
	T-statistic value		
1	-0.36	0.11	-0.35
3	-0.391	-0.56	0.96
6	-1.2674	0.34	0.51
	P-value		
1	0.721	0.91	0.73
3	0.700	0.59	0.35
6	0.2203	0.74	0.62

According to the empirical results in Table 1, even if all the portfolios have no momentum effect or reversal effect, the momentum effect or reversal effect can still be analyzed in the low turnover portfolio.

Based on the analysis of the empirical results in Table 2, it is concluded that in the medium turnover portfolio, all portfolios show momentum effect in general, and the (1, 6) (1, 3) (3, 3) (3, 6) portfolio momentum effect is significant. At the formation period of 3 months, the momentum effect increases as the holding period becomes longer, suggesting that stocks that have outperformed in the past 3 months in the medium turnover portfolio will be more consistently favored by investors in the future, and at the formation periods of 1 and 6 months, the momentum effect at the holding period of 3 months is the most significant among all holding period portfolios for the respective formation periods.

Based on the analysis of the empirical results in Table 3, it is concluded that among the high turnover portfolios, all portfolios with a formation period of 1 month exhibit the reversal effect, and the reversal effect becomes more significant in their portfolios as the holding period becomes longer. The overall momentum effect is exhibited in all portfolios.

In the low turnover rate, medium turnover rate and high turnover rate, there is no significant reversal effect but there is a significant momentum effect, while the momentum effect is most obvious in the medium turnover rate portfolio, and the

medium turnover rate as a whole shows a momentum effect, this conclusion is different from Zhanyu Zhu's research on the A-share market which found a significant momentum effect in the low turnover rate portfolio, for the following two reasons: Firstly, Zhanyu Zhu studied the whole A-share market, while this paper studies one of the segments of the A-share market, i.e., STAR market, and secondly, the time chosen for the study is different. In this paper, we believe that the low turnover rate shows that investors in the market have poor expectations for this stock, so the liquidity is poor, while the high turnover rate is too volatile, investors are more divided, and the stock trend is not sustainable, but the medium turnover rate is not too volatile, and the liquidity is sufficient, and investors have better expectations for this stock, so the probability of the momentum effect is also greater, and The momentum effect will also be more pronounced.

5. Conclusion and Implication

The momentum effect is a hot topic of research in both academia and industry, and it is also a key point for the ability to adopt a 'catch-up' strategy. In this paper, we studied the existence of momentum effect in the Chinese A-share market of STAR. Firstly, high and low turnover rates are grouped, then the winning and losing portfolios are constructed according to the traditional method, and finally back-tested by the overlapping period sampling method and t-statistical tests are performed. The study reveals that among all the

portfolios, only the medium turnover portfolio has a significant momentum effect, and the most significant portfolio is (3, 6), while the high and low turnover portfolios do not have significant momentum or reversal effects, but some of them have stronger overall momentum effects than reversal effects.

The empirical findings of this paper have some implications for stock investment. For investors, they can pay attention to the medium turnover rate of STAR and the formation period of the portfolio is 3 months, and the recommended best holding period is 6 months, followed by 3 months is also a better choice, these portfolios are more suitable for investors to 'chase up and down' in STAR.

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