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Does Investor Sentiment Affect the Momentum and Reversal Effect ?-- Based on Chinese SSE A-share Market

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Abstract: The momentum and reversal effect are two of the common “anomalies” in the stock market. However, whether they exist in Chinese stock market and how they influence investor sentiment have not been determined, and the empirical research on them is not deep enough. Based on this, the paper uses the monthly returns of SSE A-share from April 2014 to April 2020 and divides this sample period into optimistic period and pessimistic period through the Comprehensive Sentiment Index CICSI and empirically tests the influence of investor sentiment on these two effects. Considering the potential influence of stock market turbulence, the sample period is divided into stable period and turbulent period to further explore. The results are as below. Firstly, SSE A-share has significant reversal effect, but it only exists in the short term. Secondly, the state of the stock market plays an important role in generating the reversal effect and it appears more frequently in turbulent period. Thirdly, these two effects are closely related to investor sentiment. The probability of the momentum strategy and reversal strategy’s excess returns in optimistic period is greater than that in pessimistic period. Lastly, investor sentiment has heterogeneous influence on the momentum effect and reversal effect under different market states. Based on the empirical results, the paper introduces turnover rate as a classification indicator to construct a new portfolio and further explores the possibility of using the momentum and reversal strategy under the influence of two sentiment periods to obtain stable excess returns.

1. Introduction

The momentum effect proposed by Jegadeesh (1993) and the reversal effect proposed by Thaler (1985) are the most studied securities market anomalies. The momentum effect refers to the tendency that stock prices will continue the past performance, while the reversal effect is the opposite. Abundant studies on mature markets in Europe and the United States show that the momentum effect is significant. However, the existence and causes of the momentum effect and reversal effect in Chinese stock market are still controversial. Chinese stock market has a short

development time, low maturity of investors and high volatility. Therefore, it is of great importance to study the two effects from the perspectives of market state and sentiment to improve the influence mechanism and investment strategy.

The paper uses monthly returns of SSE A-share from April 2014 to April 2020 and CICSI sentiment index to conduct the following researches: (1) Test the existence and characteristics of the momentum effect and reversal effect in Chinese stock market; (2) Divide the whole sample into stable period and turbulent period to study the influence of investor sentiment on the two effects under different stock market states; (3) Introduce the turnover rate as an indicator to construct an investment strategy, and explore the possibility of obtaining stable excess returns by using the momentum strategy and reversal strategy under the influence of two sentiment periods.

The innovations of this paper are as follows: (1) The influence mechanism of the momentum effect and reversal effect is studied from the perspectives of market state and sentiment in terms of the characteristics of Chinese market, which enriched the practical significance of behavioral finance theory in China. (2) Focusing on the heterogeneous results brought by stock market turbulence partly makes up for the limitation that most existing literatures only test for a specific period. (3) Explore the possibility of composing a portfolio by one stock indicator that can acquire stable excess returns by using the momentum strategy and reversal strategy under the influence of two sentiment periods.

2. Literature Review

The momentum effect and reversal effect conflict with the efficient market hypothesis, which is an important basis of classical financial theory. Market efficiency means that all information will be fully reflected in stock prices in time, so there is no arbitrage opportunity in the market. Therefore, investors cannot make abnormal returns because prices are adjusted before they trade. The hypothesis assumes that people are perfectly rational, while the momentum effect and reversal effect suggest that investors are not.

Jegadeesh and Titman (1993) were the first to discover the momentum effect. They found that the momentum effect exists in the financial markets of all countries in the world. The stock portfolios that did well in the early stages returned more over the next 3 to 12 months than portfolios that did poorly. The reversal effect was proposed by De Bondt and Thaler (1985). They found that the returns of the 35 best-performing stocks (winner portfolios) and the 35 worst-performing stocks (loser portfolios) in the past five years reversed in the following three years. The average cumulative returns of “loser portfolios” was 25% higher than that of “winner portfolios”. However, Chinese scholars have different opinions about whether the momentum effect and reversal effect exist in Chinese stock market. Xuejun Zhao and Yonghong Wang (2002) found that the reversal effect was significant but the momentum effect was not. Li Pan (2011) indicated that as the market environment changes, investors' behaviors may also change, which causes the momentum effect and reversal effect to appear in different periods. Gaoming Qiu (2014) and Rong Chen (2014) found that Chinese stock market has a middle or short term momentum effect.

After discovering these two effects, many scholars studied the causes of the momentum effect and reversal effect from the perspectives of risk, scale and ratio of book value to market value and so on. For instance, from the perspective of risk, Johnson (2002) pointed out that according to the relationship between the expected dividend growth rate and risk, the discounted cash flow model with price standards can explain the momentum effect with the expected dividend growth rate changing over time. From the perspective of trading volume, Robert and Stivers (2003) found that abnormally high trading volume meant a significant overreaction of successive weekly returns, and the adjustment to the overreaction led to the reversal of stock prices. However, Lee and

Swaminath(2000) found that buying the winner portfolios with high trading volume and selling the loser portfolios with high trading volume in the medium term had higher excess returns. It indicates that high trading volume means the emergence of the momentum effect. Fangbiao Zheng, Chaopeng Wu and Shinong Wu (2007) found that stock returns with high trading volume would show a reversal effect in subsequent trading days. However, these studies did not consider the influence of irrational characteristics such as investor sentiment on the momentum effect and reversal effect.

In recent years, more researchers have found that investors' investment behavior is influenced by their psychological and emotional factors. From the perspective of cognitive bias, Barberis, Shleffer and Vishny (BSV,1998) put forward a model of investor sentiment. It is based on two findings of cognitive psychology: conservation and representativeness heuristic. Investors tend to underreact to individual changes in earnings and overreact to successive changes in earnings in the same direction. Conservation means that people change their beliefs slowly. Conservatives may ignore a benefit or other public information. Then they react inadequately to the information. Representativeness heuristic means that when evaluating an uncertain event or a sample, people will depend on the degree to which the basic characteristics are similar to the total group and to what extent it reflects the significant characteristics of the process that produces the event. Meanwhile, Daniel, Hirshleifer and Subrahmanyam (DHS,1998) put forward another behavioral model about overreaction and underreaction. The psychological basis of this model is overconfidence and biased self-attribution. It divides investors into the informed and the uninformed, who determine share prices but are susceptible to both cognitive biases above. Finally, the result is that there is an overreaction to private information and an underreaction to public information.

From the perspective of sentiment bias, Antonius (2013) proved that optimism has an impact on the momentum effect. Yongdong Shi (2015) also found that stock price changes are affected by investor sentiment. Moreover, to better measure investor sentiment in China, Zhigao Yi (2009) improved BW index built by Baker (2006) and constructed a monthly Comprehensive Sentiment Index CICSI. At present, Chinese stock market is in an emerging stage with individual investors dominating the market. Investor sentiment may affect stock trading to a large extent. Meanwhile, most Chinese researchers study the momentum effect and the reversal effect from the objective factors of stock and cognitive bias (such as overconfidence, underreaction and other psychological characteristics), and rarely demonstrate their influence from the perspective of emotional bias.

Therefore, based on the monthly returns of SSE A-share from April 2014 to April 2020, this paper uses the Comprehensive Sentiment Index CICSI to divide the sample period into optimistic period and pessimistic period, and empirically tests the influence of investor sentiment on the momentum effect and reversal effect. Considering the potential effects of stock market turbulence, the sample period is divided into stable period and turbulent period to further explore.

3. Methodology

3.1 Data Sources

The research sample in this paper is the SSE A-share from April 2014 to April 2020, which has a total sample period of 72 months. In terms of stock performance, monthly stock return rate (MONRET) from RESSET database is selected as the ranking index. In terms of investor sentiment index, the investor optimism and pessimism are selected as a measurement, and CICSI, a Comprehensive Sentiment Index excluding macro factors collected from CSMAR database, is adopted as the measurement index. This paper uses the following principles to select samples: (1) Delete financial and insurance stocks; (2) Delete ST and PT stocks; (3) Only select stocks that have listed for six months before the sample start time. Finally, a total of 811 stocks with 58392 data were screened out.

3.2 Research Methods

3.2.1 Division of Market State

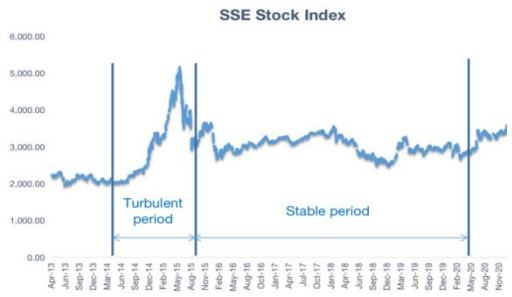

Fig.1 Division of Market State

SSE A-share has both bull and bear markets with sharp rises and sharp falls since August 2014. To determine whether the market state has heterogeneous influence on the momentum effect and reversal effect, this paper divides the whole sample into turbulent period (from April 2014 to August 2015) and stable period (from September 2015 to April 2020) to test the existence of the momentum effect and reversal effect in the two subsamples respectively.

3.2.2 Division of Emotional Period

To study the influence of investors' optimistic and pessimistic emotion on the momentum effect and reversal effect, 72 months' data from April 2014 to April 2020 are sorted according to the Comprehensive Sentiment Index (CICSI). To avoid the effects of unclear demarcation of emotional boundaries, the first 50% of the time is regarded as optimistic period and the second 50% is regarded as pessimistic period, and then the paper discussed the existence of the momentum effect and reversal effect in optimistic period and pessimistic period. After that, the subsamples of turbulent period and stable period are divided in the same way to explore the heterogeneous effects of investor sentiment on the momentum and reversal in different market states.

3.2.3 Construction of Momentum Portfolio

The paper uses the momentum effect test method proposed by Jegadeesh and Titman(1993) to divide the selected sample period into formative period J and holding period K. To eliminate the effects of the market microstructure, the interval between the formative period and holding period is usually a month. According to the size of the average return on the SSE A-share, take the top 10% of the shares in formative period J as "winning portfolio", which are equally weighted, and take the last 10% of the shares in formative period J as "loser portfolio". Then calculate the average return of "winner portfolio" and "loser portfolio" in holding period K. If the strategy of buying "winner portfolio" and selling "loser portfolio" produces significant excess returns, it proves that the momentum effect exists. If the strategy of buying "loser portfolio" and selling "winner portfolio" produces stable excess returns, it proves that the reversal effect exists. We construct the (J,K) portfolio by overlapping sampling method and test the significance of momentum gains and reversal gains using T statistical magnitude adjusted by Newey-West method.

In this paper, J and K selected in the analysis are March, June, September and December, forming a total of 16 (J,K) portfolios. According to the division of investor sentiment above, the paper stipulates that if the number of the optimistic period is larger, the (J, K) portfolio is regarded as a portfolio under the optimistic period. Otherwise, the (J, K) portfolio is under the pessimistic period. Based on this, test the significance of the momentum and reversal gains during different

sentiment periods. Combined with market state and sentiment index, the empirical analysis results of the momentum effect and reversal effect are obtained.

4. Results

For the existence of the momentum and reversal effect in Chinese stock market, the empirical results show that no significant momentum effect is found in SSE A-share. The tables below show that most of the winner portfolio returns minus the loser portfolio returns are negative. However, SSE A-share has a significant reversal effect. Besides, the longer the formative period or holding period is, the more significant the reversal effect is.

For the influence of different stock market periods on the momentum and reversal effect, the empirical results show that in the stable period, the momentum effect appears in the short term and the reversal effect appears in the long term; In the turbulent period, there is a significant reversal effect. Only one portfolio shows a weak momentum effect during the turbulent period and 6 portfolios show a weak momentum effect during the stable period. Except for the portfolios mentioned above, all the other portfolios show the reversal effect.

For the influence of investor sentiment on the momentum and reversal effect, the tables below show that the two effects are more significant in the optimistic period than in the pessimistic period.

For the influence of investor sentiment on the two effects in different market states, the results indicate that in the turbulent period, all portfolios in the optimistic period show the reversal effect, while only one portfolio in the pessimistic period shows the momentum effect. In the stable period, 6 portfolios in the optimistic period show the momentum effect, while all the portfolios in the pessimistic period show the reversal effect. Therefore, investor sentiment has a greater impact on the two effects in the stable period.

Table 1 Empirical Results Of Sse a-Share in the Complete Period

		Optimistic				Pessimistic			
	(J,K)	3	6	9	12	3	6	9	12
3	WML	-1.2080	0.1259	-0.9595	-0.9381	0.4911	0.3989	0.0138	-0.1287
		-96.8927	***9.9037	-83.4342	-78.4761	***28.0881	***25.6844	0.7686	-9.2765
6	WML	0.3285	0.5197	-0.5575	-0.4490	0.8108	0.5943	0.4157	0.1625
		***18.9236	***29.5641	-28.3264	-24.0583	***44.6511	***28.8187	***20.4557	***6.4740
9	WML	-0.1453	-0.2301	-0.2037	-1.0453	0.6274	-0.7152	-0.4081	0.0611
		-7.4573	-8.9988	-7.7732	-35.1029	***28.2129	-32.9675	-14.7969	**2.3893
12	WML	0.1832	0.0767	-0.3211	-0.6751	-0.7548	-0.5654	-0.4552	-0.4339
		*** 7.0110	**2.5467	-9.2505	-23.1273	-33.4818	-14.3941	-15.1508	-13.1062

Table 2 Empirical Results of Sse a-Share in the Turbulent Period

		Optimistic				Pessimistic			
	(J,K)	3	6	9	12	3	6	9	12
3	WML	-3.6176	-0.3333	-1.0000		-2.7067	-1.6404	-1.5000	-1.3333
		-14.4082	-1.2121			-24.4795	-17.2374	-8.2704	-7.5593
6	WML	-4.7500				-2.1250	0.0556		
		-12.6923				-11.2728	0.2929		
9	WML					-2.8571			
						-13.4349			
12	WML								

Table 3 Empirical Results of Sse a-Share in the Stable Period

		Optimistic				Pessimistic			
	(J,K)	3	6	9	12	3	6	9	12
3	WML	0. 4372	0.3956	-0.1407	-0.0459	-1.1172	-0.9899	-1.5147	-1.0205
		***25.8201	***17.67	-8.8218	-2.6158	-70.6728	-66.6058	-87.6052	-50.3825
6	WML	-0.4927	0.1706	-0.3236	-0.6319	-1.0529	-1.6176	-2.7899	-2.5832
		-19.0182	***6.8409	-12.7398	-22.7906	-52.3150	-66.0861	-120.0000	-93.7347
9	WML	0.2777	0.0503	-0.4326	-0.8749	-0.9544	-3.3809	-2.6449	-1.5540
		***10.1199	1.3888	-11.7280	-23.1855	-29.2169	-93.4385	-61.9314	-45.7482
12	WML	0.1845	-0.2644	-0.5676	-1.8595	-0.0040	-0.7814	-1.3327	-1.5009
		***4.6891	-6.4698	-12.0867	-48.2236	-0.1138	-12.3126	-29.9044	-41.9680

5. Discussion

5.1 The impacts of investor sentiment on the momentum effect and the reversal effect

Firstly, by observing the returns in the optimistic period and pessimistic period under different market states, the authors find that SSE A-share has a significant reversal effect, but the momentum effect only exists in some short-term investment strategies. This is also consistent with the conclusion that scholars have found in recent years that the momentum effect is not significant in emerging Chinese stock market but the reversal effect is relatively obvious, which is different from European and American markets. On the one hand, it can be considered that investors in different capital markets have heterogeneity in psychological bias and behavioral characteristics, leading to the difference in the performance of the momentum and reversal effect in Chinese stock market. On the other hand, Chinese stock market has greater volatility, so the stock index fluctuates significantly and reversals are more frequent, which provide evidence to support the authors' findings.

Secondly, the state of the Chinese stock market has a certain degree of influence on the momentum effect and the reversal effect. In the stable period, the momentum effect appears in the short term and the reversal effect appears in the long term. In the turbulent period, a significant reversal effect exists. The reason for this result may be that investors' emotional reaction is more intense and the trading volume is larger in the turbulent period. Besides, the heterogeneous results brought by the turbulence of the stock market partly add up for the limitation that most existing literatures only test for the stable period or they have no division.

Thirdly, the emergence of the momentum and reversal effect is closely related to investor sentiment. In general, the probability of the occurrence of the momentum and reversal strategic excess returns in the optimistic period is greater than that in the pessimistic period. The reason for this result may be that investors are more active when they are optimistic, which results in more significant strategic returns. The pessimistic period, by contrast, weakens the strategic returns for some investors leave the market and cut back on trading.

Fourthly, investor sentiment has heterogeneous influence on the momentum and reversal effect under different market states. During the complete period, the momentum effect appears more frequently in the pessimistic period and the excess returns in the pessimistic period is significantly greater than that in the optimistic period, which partly indicates that pessimism can strengthen momentum gains. During the stable period, the excess returns of the momentum strategies all occur in the optimistic period, and almost all strategies have significant excess returns in the pessimistic period, which partly indicates that optimism tends to produce the momentum effect and pessimism

tends to produce the reversal effect in this period. Considering that investors tend to be pessimistic in the overlaping stage of the turbulent and stable period, the momentum effect is strengthened in this stage. Therefore, there are also significant momentum gains under the pessimistic period of the complete period.

Finally, when the formative period is unchanged, the return rate of momentum strategies either in the pessimistic period or in the optimistic period shows a downward trend with the holding period getting longer. For the reversal strategy, the return rate in the pessimistic period decreases obviously, and it decreases notably in the optimistic period when the formative period is short. The reason may be that with the extension of the holding period, investors' emotion fluctuates more fiercely. The traders holding the same stock may have two extreme emotions (optimism and pessimism) at the same time and this emotional conflict generates income hedging, resulting in the decline of the overall income.

5.2 Trading Strategy Construction Based on the Characteristics of Stock Style

Based on the existing empirical results, the authors try to construct a trading strategy to achieve significant holding period returns based on the characteristics of the stock style. The characteristics could include the circulation market value scale, turnover rate, market-to-book ratio and price-to-earnings ratio and so on. In this paper, the turnover rate is selected. Since the complete period is more consistent with the fluctuations of the real stock market, the authors classify the average daily turnover rate of the selected stocks in the complete period and calculate the return rate based on this. Then, the authors group them according to the emotional period and calculate the cumulative return rate of the holding period.

The results show that for stocks with a high turnover rate, (6,K) portfolio can obtain significant momentum gains in both the optimistic and pessimistic period, (12,K) portfolio can obtain significant momentum gains in the optimistic periods, and (3,K) portfolio can obtain significant momentum gains in the pessimistic periods. For stocks with a low turnover rate, (6,K) portfolio can obtain significant momentum gains in the pessimistic period. Also, (3,K) portfolio can obtain significant momentum gains in the pessimistic periods. For stocks with a low turnover rate, (6,K) portfolio can obtain significant momentum gains in the pessimistic period. Also, (3,K) portfolio can obtain significant momentum and reversal returns in the optimistic period. Besides, holding the portfolio with a relatively long holding period in the optimistic period can obtain more significant excess gains.

Table 4 Empirical Results of Sse a-Share Based on High Turnover Rate

High frequency of turnover rate									
		Optimistic				Passive			
	(J,K)	3	6	9	12	3	6	9	12
3	WML	-1.3032	-0.0339	-1.0384	-1.0089	0.0451	0.3311	-0.0690	0.1096
		-72.7853	-1.9702	-63.2859	-58.2867	**2.0786	***16.2573	-3.0632	***5.5822
6	WML	0.4808	1.0149	0.0387	0.0677	0.6119	0.7033	0.3150	0.1170
		***19.6433	***40.0977	*1.4082	**2.5064	***24.7544	***24.3808	***11.1507	***3.2702
9	WML	-0.2957	-0.1539	-0.0892	-0.7771	0.9891	-0.2941	0.0230	0.5087
		-10.5923	-3.9140	-2.2420	-17.5199	***34.5935	-10.0307	0.6642	***14.9423
12	WML	0.1765	0.1993	0.2198	-0.3245	-0.8428	-0.5356	-0.4175	-0.5680
		***4.6861	***4.7121	***4.6266	-8.1141	-28.6945	-10.0487	-10.0721	-11.5541

Table 5 Empirical Results of Sse a-Share Based on Low Turnover Rate

Low frequency of turnover rate									
		Optimistic				Passive			
	(J,K)	3	6	9	12	3	6	9	12
3	WML	-1.1387	0.2855	-0.7580	-0.8935	1.2573	0.2708	-0.1907	-0.5638
		-66.9397	***16.3987	-49.5524	-55.1757	***48.0241	***12.0867	-6.8676	-28.9945
6	WML	-0.0322	-0.3258	-1.5064	-1.4015	0.9322	0.5654	0.4688	0.2628
		-1.3699	-14.1294	-59.2785	-58.7376	***36.3784	***19.563	***16.0764	***7.2031
9	WML	0.0118	-0.5022	-0.4491	-1.3692	-0.0456	-0.8988	-0.6377	-0.2946
		0.4580	-14.4686	-12.7908	-32.8552	-1.4609	-29.5025	-15.2672	-7.8507
12	WML	-0.0299	-0.2841	-1.2609	-1.4565	-0.7198	-0.5789	-0.4853	-0.4176
		-0.8269	-6.7596	-25.6352	-36.8547	-21.3887	-10.7657	-11.4657	-10.1591

5.3 Limitations and Directions for Future Research

As for the sentiment index, the comprehensive comparison of the existing investor sentiment measurement methods shows that the construction of the composite sentiment index based on multiple indirect sentiment proxy variables to measure the emotion of investors is more widely recognized. However, the framework of the sentiment index construction represented by CICSI index still has the following shortcomings: First, the constructed monthly sentiment index can only discretely show the level of investor sentiment at a specific time point, but investor sentiment should be measured continuously according to market signals by dynamic adjustment. Secondly, there is a lack of a quantitative test on the effectiveness of the sentiment index.

In view of the momentum and reversal effect, this paper pays more attention to the existence and performance characteristics of the momentum effect in Chinese stock market, but lacks a deep analysis of reasons. In addition, the paper applies the strategy construction method that is suitable for foreign markets without deeply considering the characteristics of trading mechanism and shareholders characteristic of Chinese stock market. In the future, the authors hope to find a more suitable strategy construction method for Chinese stock market and to achieve more significant excess returns in the holding period.

6. Conclusion

This paper uses monthly stock returns of SSE A-shares from April 2014 to April 2020 to test the existence and characteristics of the momentum effect and reversal effect through zero-cost investment strategy of buying and holding winner portfolios and selling loser portfolios. In addition to all the samples, the authors study the turbulent and stable period of the momentum effect and the reversal effect using CICSI sentiment index to distinguish between the optimistic and pessimistic period and examine the existence of the momentum and reversal effect to study the influence of investor sentiment on these two effects.

The results show that: Firstly, SSE-A shares have a significant reversal effect and only have a significant momentum effect in the short term; Secondly, the state of the stock market plays an important role in the generation of the reversal effect. Thirdly, the occurrence of the momentum effect and reversal effect is strongly correlated with investor sentiment. The excess returns of the momentum and reversal strategy in the optimistic period is greater than those in the pessimistic period. Fourthly, investor sentiment has a heterogeneous influence on the momentum effect and reversal effect under different market states. The above conclusions indicate that investor sentiment does affect the change of stock returns, which is a factor that must be considered in the process of reasonable stock pricing.

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