

Research on Overreaction of CHINA GEM

– Based on Investor Sentiment

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Abstract: As countries and regions become more interconnected through the Internet, the impact of infectious public health events is no longer confined to the local area, and it can also spread to other regions through the Internet. The COVID-19 broke out in early 2020 and soon formed a major public health event. Overreaction, one of the common anomalies in the financial market, often occurs after major events, so it is necessary to explore whether there is an overreaction during the epidemic. This paper studies the phenomenon of overreaction in the GEM market in the short, medium and long term. It compares the characteristics of overreaction in the GEM market before and after the epidemic. This paper finds an overreaction phenomenon in China's GEM market before and after the epidemic.

Keywords: Overreaction, Investor sentiment, CARs model, GEM market.

1. Introduction

Overreaction, one of the common anomalies in the financial market, often occurs after major events[1], so it is necessary to explore whether there is an overreaction during the epidemic. This paper conducted an empirical analysis using monthly data of GEM stocks from July 2017 to June 2022 to investigate whether there was overreaction during epidemic events and to explain this phenomenon from the perspective of investor sentiment. The research methods used in this paper are empirical analysis and comparative analysis method. This paper aims to supplement the overreaction research of the GEM market. Previously, on the GEM market overreaction research, most scholars still from the specific event impact perspective, less consider the condition of sudden events persist, a market overreaction characteristic. Therefore, in the context of the COVID epidemic, this paper again studies the phenomenon of overreaction in the GEM market.

This paper has theoretical and practical significance for studying stock market overreaction. This paper supplements the GEM market overreaction research. Previously, in the GEM market overreaction research, most scholars still, from the specific event impact perspective, less consider the condition of sudden macro events persist, a market overreaction characteristic. Therefore, in the context of the COVID, this paper again studies the phenomenon of overreaction in the GEM market. Also, this paper gives investors advice on investing, and provides a reference for investors in the face of the above problems and helps investors (incredibly individual investors) to make reasonable investment behavior.

2. Empirical Testing Process

2.1. Sample Selection

The sample selected in this chapter is the monthly data of GEM stocks from January 2020 to June 2022, with a total of 779 stocks. At the same time, monthly samples during the non-epidemic period from July 2017 to December 2019 were selected for comparison. For the selection of stock samples, this paper follows the following principles :

- (1) Stocks typically listed during the whole research period;
- (2) Excluding ST and ST* stocks;
- (3) GEM stocks listed as A.

At the same time, this paper selects the GEM index in the above period as the benchmark index of market return. The stock data used in this chapter are from the RESSET Financial research database and the CSMAR database.

2.2. Define the formative period and the testing period

When conducting the monthly test for the phenomenon of overreaction, the formation period and test period were set as 6 months, 9 months and 15 months, forming nine monthly combination models, and the sample period was divided into two stages, pre-epidemic and post-epidemic, according to whether they were in the epidemic period. July 2017 to December 2019 was the pre-epidemic period. The period from January 2020 to June 2022 is after the epidemic[2].

2.3. Construct winner group and loser group

2.3.1. Calculate AR of individual stocks in the formation period

Refer to the calculation method adopted by Thaler and DeBond. The excess return calculated by this model is relatively stable. It will not change systematically due to changes in dividend distribution, stock market value and other factors, and is more concise and closer to China's stock market for the stock market with greater systemic risk and more frequent rapid rise and fall. The specific calculation method is as follows [3]:

$$AR_{i,t} = R_{i,t} - R_{m,t} \quad (1)$$

Among them, $R_{i,t}$ are the return rate of individual stock i on the t trading day during the formation period. $R_{m,t}$ is the benchmark yield rate of the t trading day of the GEM index during the formation period.

2.3.2. Calculate CARS of individual stocks in the formation period

There are three main methods to calculate the cumulative excess return of individual stocks in the formative period.

First, the additive accumulation method, which was first applied by Thaler and DeBondt and is the most commonly used method in the early research literature, is calculated as follows[3]:

$$CAR_i = \sum AR_{i,t} \quad (2)$$

In some cases, the ranking of stock returns is inconsistent with the reality, which will affect the construction of winner/loser group, so the applicability of this method in the study of overreaction phenomenon is questionable.

Second, logarithmic accumulation method[4]:

$$R_{i,t} = 1 + (\ln P_{i,t} - \ln P_{i,t-1}) \quad (3)$$

The calculated result of this method is still smaller than the actual cumulative excess return, which will cause a large discrepancy between the research conclusion and the actual conclusion. Therefore, this method is also not very suitable for the study of overreaction phenomenon.

Third, multiplicative accumulation method. In view of the shortcomings of the above two methods, Gishan Dissanaiké proposed the method, the calculation formula of which is as follows[5]:

$$CAR_i = \prod (R_{i,t} + 1) - \prod (R_{m,t} + 1) \quad (4)$$

2.3.3. Construct the Winner and Loser

According to the CAR size of each stock in the formative period, the top 30 stocks were selected to build the winner group W, and the bottom 30 stocks were selected as the loser group L. A portfolio that buys a loser portfolio and sells a winner portfolio is called a reversal strategy group P, and a portfolio that buys a winner portfolio and sells a loser portfolio is called a momentum strategy group D[6].

3. Empirical Result Analysis

3.1. The Short-term Overreaction Test

Table 1: The ACAR of the winner/loser group during the period(short-term)

	Before COVID-19			After COVID-19		
T6	6 months	9 months	15 months	6 months	9 months	15 months
ACARL	-0.0106	-0.0592	-0.0799	0.0775	-0.0309	0.1578
ACARW	0.1357	0.0731	0.0356	-0.0534	-0.0882	0.1305
L-W	-0.1464	-0.1323	-0.1156	0.1309	0.0573	0.0273
Tt	1.9073*	1.9436*	1.2375	1.6814	0.5621	0.0801
	under-reaction	under-reaction	not significant	not significant	not significant	not significant

It can be seen from Table 1 that there was overreaction in the GEM market before the epidemic. The GEM market did not show obvious overreaction characteristics.

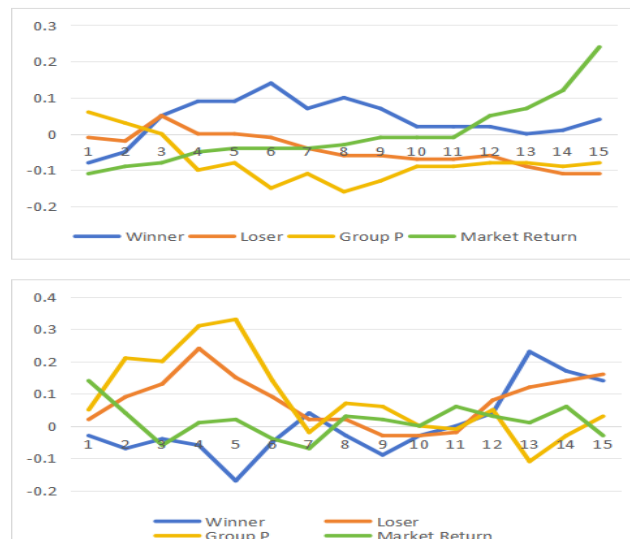


Figure 1: Short-term performance of GEM portfolios before and after the epidemic

As shown in Figure 1, the winner group outperformed the market as a whole during the whole test period, while the loser group's returns were negative and continued to decline. This indicates that the GEM market showed only a short period of irrational behavior during the epidemic[7].

3.2. The Mid-term Overreaction Test

Table 2: The ACAR of the winner/loser group during the period(mid-term)

Before COVID-19				After COVID-19		
T9	6 months	9 months	15 months	6 months	9 months	15 months
ACARL	0.0105	0.0040	0.0256	-0.1516	-0.1702	-0.0564
ACARW	-0.0193	-0.0533	-0.0633	0.0132	0.1413	0.0986
L-W	0.0298	0.0572	0.0889	-0.1648	-0.3115	-0.1551
Tt	0.5694	1.3212	1.0595	-1.7826*	-1.9097*	-0.5735
	Not significant	not significant	not significant	under-reaction	under-reaction	Not significant

Table 3: Mid-term overreaction characteristics of winner and loser group

Before COVID-19					After COVID-19			
Formation	Loser	Winner	P group	t-statistic	Loser	Winner	P group	t-statistic
6	0.0105	-0.0193	0.0298	0.5694	-0.1516	0.0132	-0.1648	-1.7826*
7	-0.0040	-0.0563	0.0523	1.2132	-0.1646	0.0996	-0.2641	-2.2662**
8	-0.0106	-0.0515	0.0409	0.8756	-0.1841	0.1048	-0.2889	-2.2179**
9	0.0040	-0.0533	0.0572	1.3212	-0.1702	0.1413	-0.3115	-1.9097*

As can be seen from Table 2, when the pre-epidemic formative period was 9 months, the return of the reversal strategy combination was positive. However, the statistical test results were not significant, so it did not show obvious overreaction characteristics[8]. In addition, it can be seen from Table 3 that the momentum effect during the epidemic lasted only a few months, that is, a relatively significant underreaction was shown.

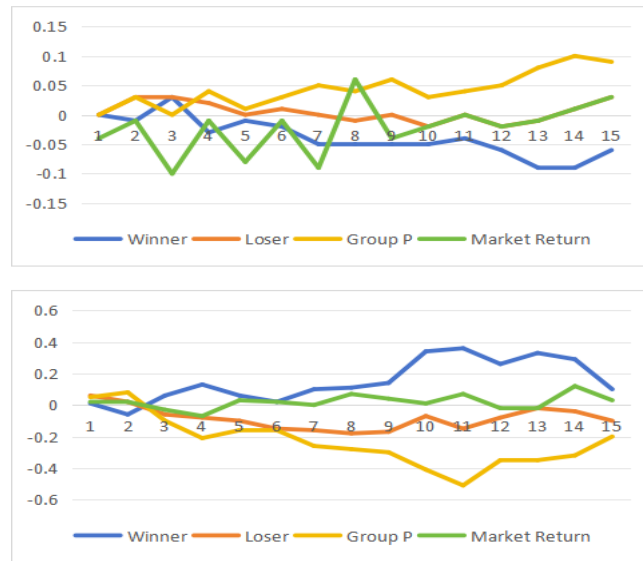


Figure 2: Mid-term performance of GEM portfolios before and after the epidemic

As shown in Figure 2, the overall performance of the winner group was significantly better than that of the GEM market during the whole test period, indicating that there was a relatively significant under-reaction in the GEM market during the epidemic.

3.3. The Long-term Overreaction Test

Table 4: The ACAR of the winner/loser group during the period(long-term)

Before COVID-19				After COVID-19		
T15	6 months	9 months	15 months	6 months	9 months	15 months
ACARL	0.0126	0.0557	0.1260	0.0084	0.1539	0.0410
ACARW	-0.1642	-0.1651	-0.0549	0.1598	0.0221	-0.0360
L-W	0.1767	0.2208	0.1808	-0.1524	0.1310	0.0777
Tt	2.7200**	2.5965**	1.1202	-1.0908	0.7621	0.4619
	over-reaction	over-reaction	not significant	not significant	not significant	Not significant

Table 5: Long-term overreaction characteristics of winner and loser group

Before COVID-19					After COVID-19			
Formation	Loser	Winner	P group	t-statistic	Loser	Winner	P group	t-statistic
2	0.0114	-0.0997	0.1111	4.0303***	0.0703	0.1042	-0.0339	-0.4063
3	0.0105	-0.0768	0.0874	2.3480**	0.1725	0.1342	0.0383	0.4074
4	-0.0294	-0.1042	0.0748	1.7262*	0.1540	0.2311	-0.0771	-0.5654
5	0.0149	-0.1311	0.1460	3.0885***	-0.0369	0.2352	-0.2722	-1.8797*
6	0.0126	-0.1642	0.1767	2.7200**	0.0084	0.1598	-0.1514	-1.0908
7	0.0425	-0.2157	0.2582	3.6385***	0.0868	0.2298	-0.1431	-0.8984
8	0.0277	-0.1982	0.2258	2.8750***	0.2189	0.1635	0.0554	0.2864

Table 5: (continued)

9	0.0557	-0.1651	0.2208	2.5965**	0.1539	0.0221	0.1319	0.7621
10	0.0307	-0.1645	0.1952	2.2539**	0.1040	0.0613	0.1653	1.2015

As can be seen from Table 4, when the pre-epidemic period was 15 months, and the test period was 6 months and 9 months, the GEM market showed a relatively obvious overreaction phenomenon. In addition, according to Figure 3 and Table 5, the GEM market showed significant overreaction characteristics in the first 10 months of the test period.

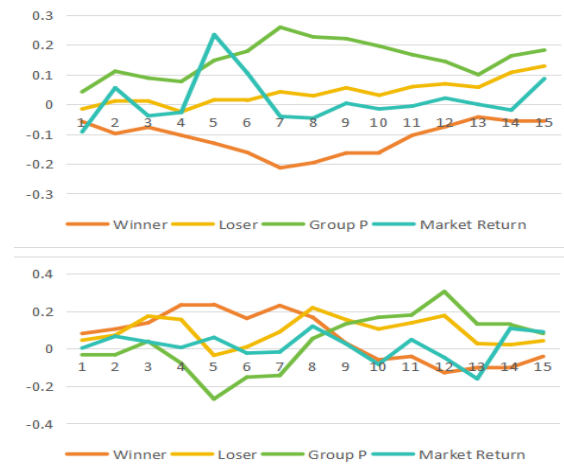


Figure 3: Long-term performance of GEM portfolios before and after the epidemic

In combination with Table 5 and Figure 3, it can be seen that there was no long-term overreaction in the GEM market during the epidemic period, but the performance of the winners in the first 9 months of the test period was significantly better than that of the market as a whole.

3.4. Test Results

In the short term ($J=6$), before the epidemic, the GEM market showed a relatively obvious underreaction during the test periods, while after the epidemic, the GEM market did not have an overreaction.

In the medium term ($J=9$), the GEM market did not show the characteristics of overreaction before the epidemic. After the epidemic, there was a relatively obvious under-reaction phenomenon in the test period.

In the long term ($J=15$), there is a significant overreaction in the GEM market before and after the epidemic in the test period.

The ACAR of group P before the epidemic shows a continuous decline, while the ACAR of the group P after the epidemic increases first and then decreases. The ACAR of the group P after the epidemic is higher than before.

4. Conclusion

In general, according to existing literature studies and the results of this paper, the existence and strength of overreaction can reflect the effectiveness of the market. Suppose the market has no significant "reverse correction" or "original momentum" trend. In that case, investors will not be able to outperform the market only based on the "winner group" and "loser group" determined by past data. Therefore, when the market in the test period does not show apparent overreaction, it tends to

accept the assumption of the current market efficiency. And during the epidemic period, the effectiveness of the GEM market was improved compared with that before the epidemic

However, this study still has some shortcomings. The period of the data is not long enough. This is limited by the context of the COVID-19 pandemic, which prevents more data from being available for study. The selected model is relatively simple, and the amount of data is small. Limited by the amount of data, this paper only constructs a simple multiple regression model. In later studies, more complex models can be designed to test.

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