

Application of a Maverick Stock Capturing Strategy in the Chinese Stock Market

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Abstract

In this paper, we propose a maverick stock trading strategy and apply it to the Chinese stock market. We use a high-frequency trade data of Chinese stock market in 2019 and apply the trading strategy every day. Data comes from the CSMAR database. Our trading strategy shows an amazingly high return. We further find that the strategy behaves better when trade in all the markets together. When trading in different markets respectively, the return is still much higher than the market index' s return, where the highest return appears in the GEM market. This paper provides a new perspective of stock trading.

Keywords: *Trading strategy; Maverick stock; Stock return; Stock market*

1. INTRODUCTION

Stock prices are affected by different factors. Among all the many factors that influence the moving of stock prices, we can usually find that the market factor with high contribution [3][8]. Under normal circumstances, the intraday trends of stocks and index are consistent with each other. However, in some special trading days, stocks can frequently move in the opposite direction of the index during the day. These abnormal price movements are called here as maverick events. This paper is to build a trading strategy based on stocks that are appearing to have maverick events.

Abnormal Returns are infected by many factors, and based on the momentum theory, the influence from these factors will last for a period of time. Momentum is a trading strategy that widely applied to the stock market and proved effective. Momentum means a stock that performs well (or poorly) recently continues to do well (or poorly) in the following period. It is a phenomenon that contradicts with "price reversal", which means that stocks perform well (or poorly) recently tends to do poorly (or well) in the following period [12]. The explanation of momentum can be basically divided into two categories: a group of scholars who suggests that momentum profit is basically the compensation for risk [6][10] and a group

of scholars who argues that this phenomenon is caused by the lagging effect – the underreaction or overreaction of traders, which can lead to momentum or reversals [5][13]. Momentum has been approved to be effective in China, since the Chinese stock market is dominated by individual investors [2][9].

Momentum also exists in the earning process. Information influence stock prices. Although stock prices are supposed to fully reflect all available information at any given time in an efficient market, stock prices tend to move over time, rather than immediately adjusting to unexpected news, in reality. This is originally called earning momentum [1]. Explanations towards this phenomenon including rational models and behavioural models are proposed. The behavioural models try to attribute the phenomena to the cognitive bias of investors, such as overconfidence and self-attribution bias [4]. Rational models, on the other hand, focus more on serial correlation attributes [7].

This paper is to build a trading strategy that trade the maverick stocks in the stock market. We assume that the earning momentum exists in the stock market, and the maverick event will last for a period of time. The maverick event's identification idea is introduced in Wei & Gao, which uses the Pearson correlation coefficient to identify the deviation between stocks and

market index [11]. This paper first filters the maverick stocks from stocks in six different stock markets (GEM, SME, SSE-A, SSE-B, SZSE-A, SZSE-B) in China, and then analyse their distribution feature to determine the number of holding positions. We then form the trading strategy and extend our approach to include the change in holding period and stock markets.

2. THE MODEL

2.1. Definition of maverick stock

Although a stock's performance was influenced a lot by the market's performance, sometimes stocks' price deviated from the market significantly. The quantitative identification of the maverick stocks is carried out from a macro perspective. To be more specific, under normal circumstances, individual stock moves synchronously with the index, and the correlation between their returns will be relatively high. But when maverick event happens, the two trends diverge from each other, and the correlation will also decrease correspondingly.

The correlation between stock S and market index i are calculated as of

$$\rho = \frac{\text{cov}(R_s, R_i)}{\sigma_{R_s} \sigma_{R_i}} \quad (1)$$

where R_s and R_i are the intraday rate of return measured at per minute intervals of stock S and index i respectively. ρ is the Pearson correlation coefficient of R_s and R_i . $\text{cov}(R_s, R_i)$ is the covariance between R_s and R_i . σ_{R_s} and σ_{R_i} are the standard deviation of R_s and R_i respectively.

Pearson correlation coefficient can measure the degree to which an individual stock deviates from the market, but there are still problems if only use the original Pearson correlation coefficient as a criterion for selecting maverick stocks. The historical performances of individual stocks are different. For example, stocks with large market capitalization will have a higher correlation with market index, which leads to the skewness of stock selection. Therefore, the original Pearson correlation coefficient will be improved by taking into account the historical level of the correlation coefficient between individual stocks and the market. For this purpose, the vertical standardization of the correlation coefficient will be carried out in the following way,

$$\rho_{\text{new}} = \frac{\rho - \bar{\rho}}{\sigma_{\rho}} \quad (2)$$

where ρ_{new} is the standardized correlation coefficient, $\bar{\rho}$ and σ_{ρ} are the mean and standard deviation of correlation coefficient ρ over the past 40 trading days.

We consider ρ_{new} less than threshold λ as the sign of appearing maverick event. Here, we set the value of threshold λ as -3, which means to select the stock whose correlation coefficient is deviated more than 3 times of standard deviations of the historical average level.

2.2. Filter maverick stocks

The maverick stocks' selection is based on the deviation of the stock from the market, but there are no restrictions on the deviation direction of the stock. The stocks that deviate from the market in the way of falling are not what we want to focus on since it decreases the whole return, so we will only extract the stocks that rising deviate from the market. The judgment of rising stocks will be based on the excess return rate of the day. If the excess return rate of individual stocks on the day is greater than 0, the stock will be defined as a stock that rises against the trend. The definition of excess return is as follows,

$$\alpha = R_s - R_i \quad (3)$$

where α is the excess return of stock S on that day, R_s , R_i are the return on stock S and market index i respectively.

The information's impact will fade away as time passing by. Therefore, if an individual stock's price has risen largely recently, it may mean that the information of the stock has already been largely reflected and the information's driving power will be lesser, where a rebound force may take the dominant position and lead the stock price to another direction based on the contrarian trading strategy's theory. Therefore, we will eliminate the stocks that have gone up too much recently. The definition of the stocks that have gone up too much is as follows,

$$\sum_{m=1}^{10} \alpha_{t-m} > 0.2 \quad (4)$$

which means the cumulative excess return of individual stock S in the past 10 trading days is greater than 20%. In order to avoid distortion of the results, we also carried out the de-polarizing process. We deleted stocks that rose or fell by their daily limit, because the up or down limit is an extreme reflection of optimistic or pessimistic sentiment, which tends to distort the technical indicators.

3. EXPERIMENTAL APPLICATION IN CHINESE STOCK MARKET

3.1. Datasets and descriptive statistics

In this work, we focus on the A-shares in the SSE stock market, A-shares in the SZSE stock market, stocks in the small and medium enterprises (SME) market and Growth Enterprise Market (GEM) in 2019. Data are obtained from the China Stock Market and Accounting Research (CSMAR) database. The original dataset is tick data with a data slicing frequency of 3

seconds. The main reason for adopting such high-frequency data is to reduce data missing as much as possible. Considering that the highest frequency of data we need is minute data, we first fill in the missing values in the original data by filling downward, that is filling in the missing values of stock s in time t with the data in $t-1$. We then lower the data frequency by first grouping each stock by each minute and then retained the first data in each group. We then calculated the return of each stock at each minute, and the statistical characteristics of returns in different markets are shown in Table 1.

Table 1: Summary statistics of original daily returns in different stock markets

Market	N Obs	Mean	Min	Max	Skewness	Std	1st Pctl	25th Pctl	50th Pctl	75th Pctl	99th Pctl
GEM	191529	0.00	-0.53	0.10	-0.84	0.03	-0.09	-0.01	0.00	0.02	0.10
SME	225265	0.00	-0.58	0.12	-0.49	0.03	-0.08	-0.01	0.00	0.01	0.10
SSE-A	359345	0.00	-0.35	0.49	-0.17	0.03	-0.07	-0.01	0.00	0.01	0.10
SZSE-A	111129	0.00	-0.54	0.10	0.04	0.03	-0.07	-0.01	0.00	0.01	0.10

3.2. Detect and filter maverick stocks

We exhibit the result of quantitative identification and screening of maverick stocks. The scheme for identification and screening was described in 2.1 and 2.2. The distribution of maverick stocks in each month is shown in table 2, from which we can see that the occurrence of maverick stocks increased significantly in May and August, with 812 and 802 maverick stocks extracted respectively, when the occurrence in other months were relatively flat. Figure 1 shows the distribution of maverick stocks in May and August. The number of maverick stocks is stable on most of the days but increases sharply on a few days. From table 3, we can see the summary statistics of maverick stocks selected daily. The average value of maverick stocks is 21, but the mode is 1 and the median is 4. The results from table 3 and figure 1 indicate that the result is affected by extreme values. Therefore, it is necessary to limit the number of stocks traded each day, since if the stock is too much, the money might not be enough to buy stocks, and therefore trading strategy failed. Considering the 75th percentile's value, we decided to set the number as 15, which could contain all the stocks appeared in most of the days. For the other days, we selected the top 15 stocks with the highest , which

means they are more “maverick” than the other stocks (higher market deviations). The number of stocks selected before and after screening are shown in figure 2. We can see that the after-screening curve becomes a lot smoother. Table 4 shows the monthly statistics of the screened stocks.

Table 2: Summary statistics of maverick stocks' distribution

Month	N Dates of Trading	N stocks
1	18	248
2	7	109
3	13	306
4	15	117
5	16	812
6	14	240
7	16	291
8	14	802
9	10	76
10	12	160
11	16	160
12	16	210

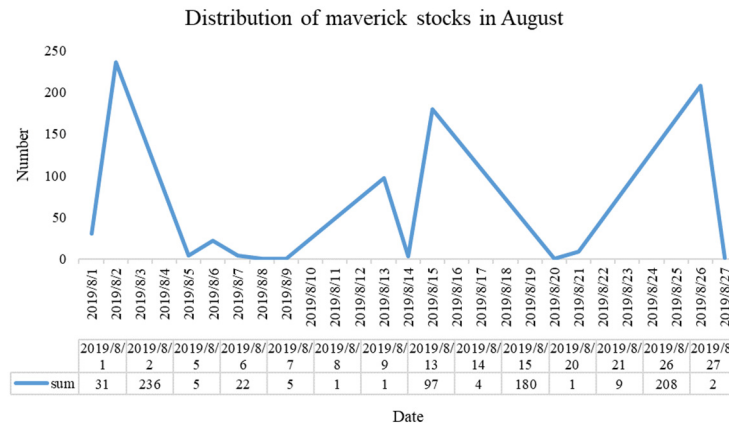
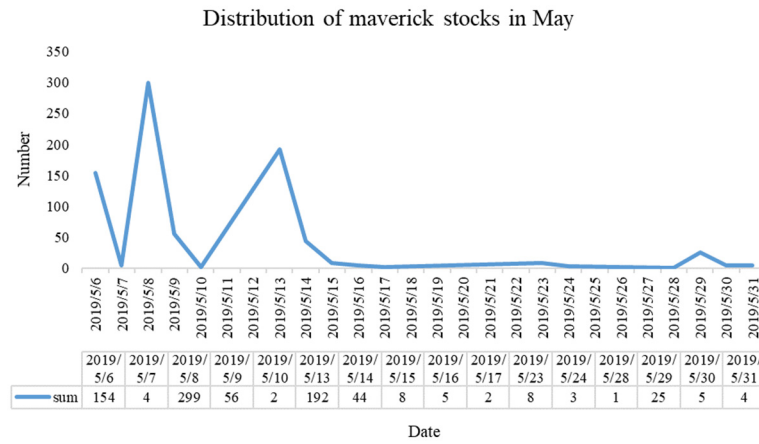


Figure 1: Number of maverick stocks appeared each trading day in May and August

Table 3: Summary statistics of maverick stocks' daily appearance

Max	Min	Mean	Mode	Median	25th Pctl	75th Pctl	Skewness
299	1	21.1437126	1	4	2	16	3.6818071

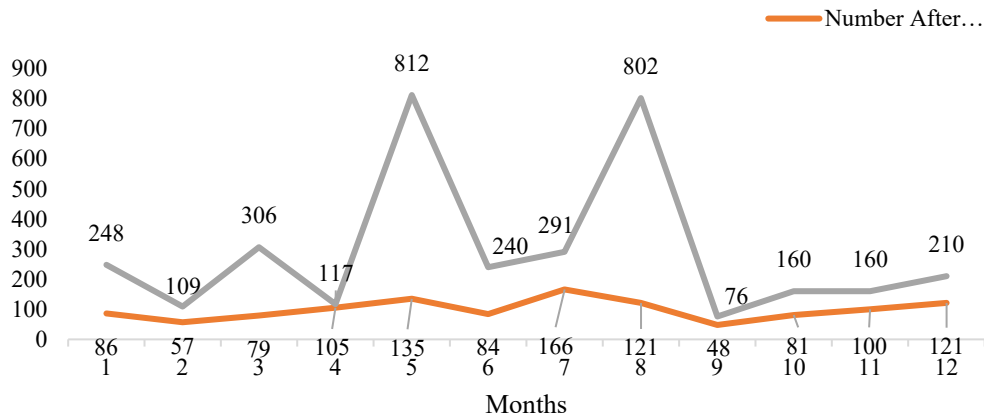


Figure 2: Number of maverick stocks appeared each month before and after screening

Table 4: Summary statistics of maverick stocks' monthly appearance after filtering

Month	N Obs	Sum	Max	Min	Mean
1	18	86	15	1	4.777778
2	7	57	15	1	8.1428571
3	13	79	15	1	6.0769231
4	16	105	15	1	6.5625
5	16	135	15	1	8.4375
6	15	84	15	1	5.6
7	17	166	15	1	9.7647059
8	15	121	15	1	8.0666667
9	11	48	15	1	4.3636364
10	13	81	15	1	6.2307692
11	16	100	15	1	6.25
12	17	121	15	1	7.1176471

4.EXPERIMENTAL APPLICATION IN CHINESE STOCK MARKET

4.1. Portfolio formation

In this chapter, a maverick stock trading strategy is introduced to buy and sell stocks. The initial fund is set as 15000000 RMB, and the trading strategy is detailly shown in Figure 3. We compare the stocks' maverick degree each day, and sells the holding stocks that has lower maverick degree than the newly appeared one. We then equally divided the useable money to buy newly appeared stock.

We conducted the trading strategy each trading day between January 2, 2019 and December 31, 2019, and the results of the trading strategy are shown in Table 5. The return rate of the entire portfolio in one year is 6024.4%, while the return rate of holding the market factor for the whole year is about 22%. The return rate of the portfolio is about 274 times of the return rate of the market factor. The average return per trading date of each month is 36.07%, among which the highest value is 8.69% in February and the lowest value is 1.45% in July. The abnormally high return rate might be caused by high frequency trading.

Figure 4 shows the strategy's monthly return. The monthly return's moving tendency is similar with the

market index, which is perceivable because although we select stocks moving deviate from the market's movement each day, its performance is still infected by the market performance since market performance is the benchmark. The deviation is caused by stocks' powerful abnormal return, but the abnormal return's power will also be influenced by investor's confidence infected by the market performance.

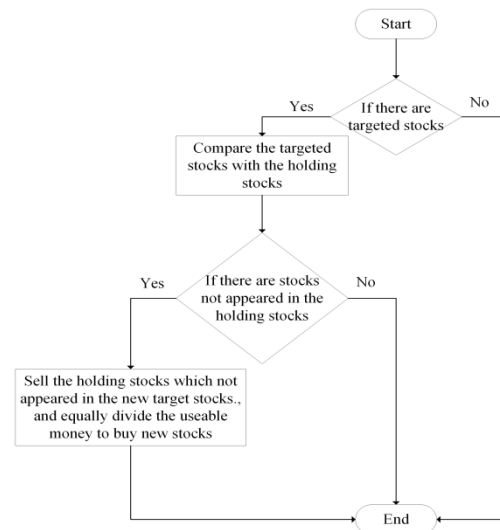


Figure 3: The maverick stock trading strategy

Table 5: Trading strategy's performance

Date	Start	(End of) Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maverick stock Portfolio													
Asset(100k)	150.00	220.24	354.24	659.26	952.23	1314.76	170.035	209.58	2662.44	312.934	451.010	6751.05	918.660

								8					
Return (Each Month)	0.00	0.47	0.61	0.86	0.44	0.38	0.29	0.23	0.27	0.18	0.44	0.50	0.36
Cum Return	0.00	0.47	1.36	3.40	5.35	7.77	10.34	12.97	16.75	19.86	29.07	44.01	60.24
Number of trading date	-	18.00	7.00	13.00	15.00	16.00	14.00	16.00	14.00	10.00	12.00	16.00	16.00
Avg Return per trading Day (Each Month)	-	0.03	0.09	0.07	0.03	0.02	0.02	0.01	0.02	0.02	0.04	0.03	0.02
Avg Return per trading Day (Total)		0.03	0.05	0.09	0.10	0.11	0.12	0.13	0.15	0.16	0.22	0.29	0.36
Index													
Asset(100k)	150.11	155.23	176.63	185.63	184.89	174.10	178.91	176.13	173.35	174.49	175.92	172.49	183.19
Return	0.00	0.03	0.14	0.05	0.00	-0.06	0.03	-0.02	-0.02	0.01	0.01	-0.02	0.06
Cum Return	0.00	0.03	0.18	0.24	0.23	0.16	0.19	0.17	0.15	0.16	0.17	0.15	0.22

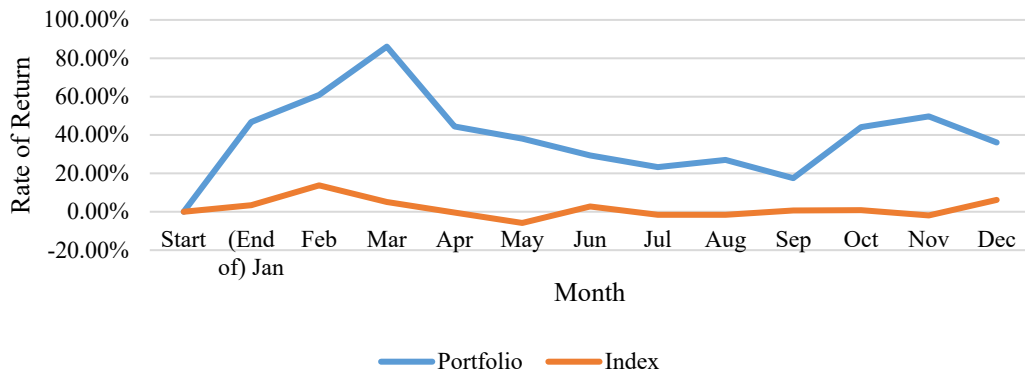


Figure 4. The maverick stock trading strategy’s return in each month

4.2. Performance in different stock markets with and without reselection

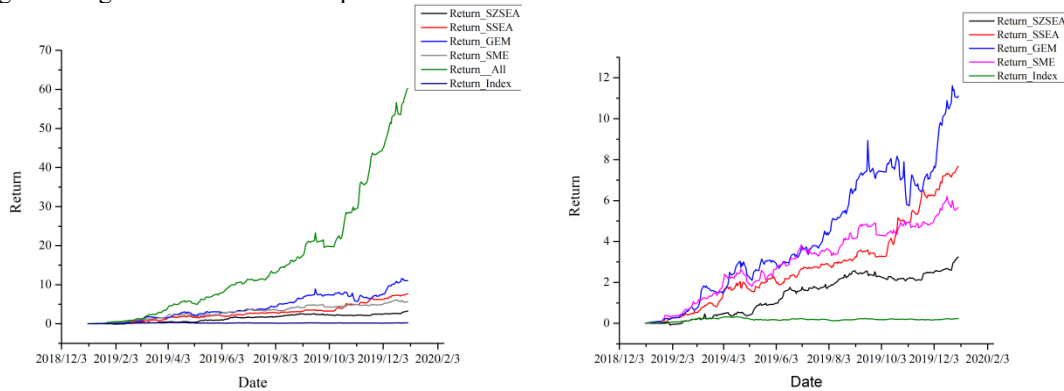
We further analyze the contribution from different stock markets. We first analyze the strategy’s performance with the stocks selected before. We first group the selected stocks according to their markets and apply the trading strategy respectively. Results are exhibited in Figure 5b. The strategy exhibits the highest return in the GEM market, as well as showing the lowest return in the SZSE A-share market. Figure 5a adds the performance of trading all the stocks together in all the four markets (results from chapter 4.1), from which we could see that the whole market’s behavior

was much better than the other single-market’s behavior. It shows 5.4 times of returns than the GEM market’s behavior, which is the market with highest return among single markets. The performance of the strategy in all the markets are better than the market index’s behavior.

We then reselect the top 15 stocks appeared each day in different stock markets, respectively. Results are exhibited in Figure 6b. The strategy exhibits the highest return in the GEM market, as well as showing the lowest return in the SZSE A-share market, which is consistent with the results without reselection. Figure 6a adds the performance of trading all the stocks together in all the four markets. We could see that the

performance of trading in all markets was much better than trading in a single market. All of the performances

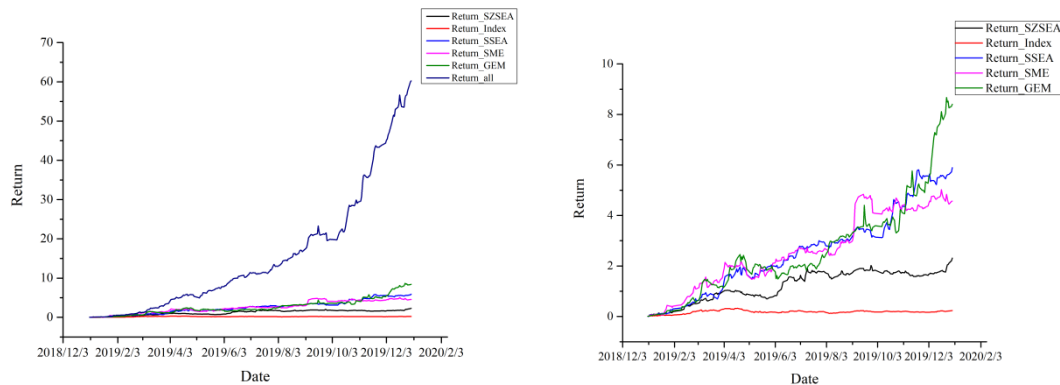
are better than the market index's behavior.



a) Compare with all markets' performance

b) Single markets' performance

Figure 5: Performance in different stock markets without reselection



a) Compare with all markets' performance

b) Single markets' performance

Figure 6: Performance in different stock markets with reselection

5. CONCLUSION

In this paper, we propose a maverick stock trading strategy and apply it to the Chinese stock market. We use the high-frequency stock data of Chinese stock market in 2019 from the CSMAR database and trade every day. The trading strategy shows an amazingly high return. During our further analysis, we find that the strategy behaves much better when trading in all the markets together. When trading in different markets respectively, the return is still much higher than the market index's return. The highest return appears in the GEM market, where the GEM market also behaves the best without our trading strategy. This paper provides a new perspective of stock trading.

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