FSCORE and Short-term Reversal or Momentum

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Abstract:

Zhu, Sun, & Chen (2018) introduces the short-term reversal anomaly and a metric of a firm's fundamental strength FSCORE. On the other hand, there are articles that suggest the momentum phenomenon and support strategy that long last winners and short past losers (Segal, 2019). We will first give the reasons for combining FSCORE and short-term reversal or momentum, follow by our trading strategy in detail. Finally, we will discuss the performance of our algorithm and propose possible improvements.

Introduction:

FSCORE, namely Piotroski Score, is used to determine the financial position of a company based on discrete scores 0-9 which reflect nine fundamental aspects of a company. Higher FSCORE gives us stronger confidence that the firm is able to perform better in the long run compared to firms with low FSCORE. There are three reasons to use FSCORE. Firstly, it is comprehensive, as it synthesizes information from nine signals along three dimensions of a firm's financial performance.

Secondly, the information used in this method is gathered directly from the financial statements, which obviates the measurement error problem.Thirdly, FSCORE is a nonparametric measure, it helps to reduce concerns over potential estimation biases.

Short-term reversal is the phenomenon that stocks with relatively low returns over the past short period of time earn positive abnormal returns in the following month or week and stocks with high returns earn negative abnormal returns. Many stocks and stock portfolios tend to demonstrate

stationarity with mean 0, as we often call ‘mean-reverting’ character. Different from the usual momentum strategy, this type of strategy takes a contrarian view on the stock performance to long past losers and short past winners.

Momentum is the phenomenon that stocks with relatively high returns over the past short period of time earn positive abnormal returns in the following months and stocks with low returns earn negative abnormal returns. There are several articles researched on similar strategy that combined fundamental performance and momentum, including Yu & Webb (2016) and Walkshäusl (2019).

Momentum investing believes the continuance of an existing market trend. It suggest the opposite strategy of short-term reversal investing. This might because the time length they considered are different and different stocks have different characteristics.

Core of our strategy is to capture the difference in fundamental strength and historical stock performance of the companies. At the intersection between FSCORE and equity short-term reversals, there should be significant returns if we long recent losers with strong fundamental strength and short recent winners with weak fundamental strength. At the intersection between FSCORE and momentum, on the contrary, there should be significant returns if we long recent winners with strong fundamental strength. Thus, in our research, we would use past data to testify these hypothesis while setting the time-length as one month. As the research only investigates monthly trading, the result of the comparison of these two strategies shall not be generalized to other time frames and it does not conclude which hypothesis is better.

Trading Strategies:

In this paper, we compared the performance of two different trading strategies, namely FSCORE and Short-term reversal trading strategy and Momentum trading strategy.

Strategy 1: (FSCORE and Short-term reversal)

Our strategy is to equally long past losers with high FSCORE and equally short past winners with low FSCORE. We choose to calculate FSCORE with quarterly financial statements and rebalance our portfolio every month based on the newly calculated weights of stocks.

To determine whether an equity is past loser or past winner, we compare its current price to the price a month ago. It is a past winner if the return is higher than certain threshold, and a past loser if the return is lower than certain other threshold.

To compute FSCORE of an equity, we use data from the company's financial statements, check 9 criteria and sum up the scores. The 9 criteria can be divided into 3 groups.

Profitability

1. Return on Assets (ROA=NI/TA) is positive in the current year;
2. Operating Cash Flow is positive in the current year;
3. Change in Return of Assets (ROA) is higher in the current year compared to the previous year ;
4. Accruals: Operating Cash Flow/Total Assets is higher than ROA in the current year;

Leverage, Liquidity and Source of Funds

5. Change in Leverage (long-term) ratio[Debt ratio (Debt to asset ratio; Debt to equity ratio)] is lower this year compared to the previous year;

6. Change in Current ratio (current assets / current liabilities) is higher in the current year compared to the previous one;

7. Change in the number of shares: no new shares were issued during the last year;

Operating Efficiency

8. Change in Gross Margin [Revenue – COGS]/Revenue is higher in the current year compared to the previous one;

9. Change in Asset Turnover ratio (sales/average total asset) is higher in the current year compared to the previous one.

A company gets 1 point for each met criteria. Summing up of all achieved points gives FSCORE (number between 0-9). Company with FSCORE 7-9 is regarded as high FSCORE firm, and company with FSCORE 0-3 is regarded as low FSCORE firm.

To get the optimal position, we long all past losers with high FSCORE (equally weighted), and short all past winners with low FSCORE (equally weighted).

Strategy 2: Momentum trading strategy

FSCORE has been calculated in the same way as mentioned in Strategy 1, however, in momentum trading strategy, we choose to long past winners with high FSCORE and short past losers with low FSCORE. Similarly, to determine whether an equity is past loser or past winner, we choose to

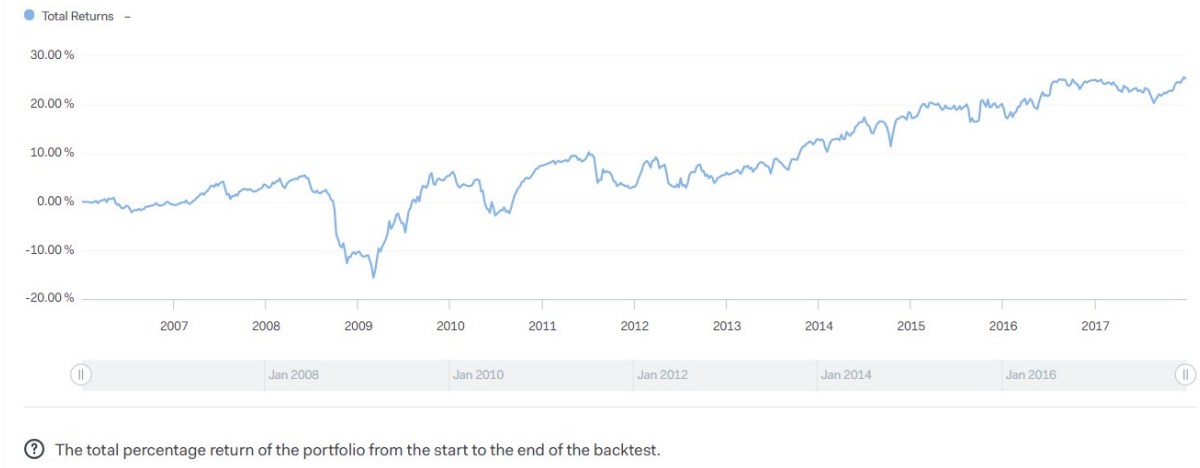
compare its current price to the price a month ago. It is a past winner if the return is higher than certain threshold, and a past loser if the return is lower than certain other threshold.

Data & Result:

We chose the built-in universe on Quantopian, QTradableStocksUS as our universe for stock selection and filter out penny stocks whose values are less than $5. All tradable US non-penny stocks from year 2006 and year 2017 has been chosen to do the full backtests of our two trading strategies. In the following part of this paragraph, we will first present the overall returns of two strategies respectively and then make a comparison between these two strategies.

Overall return of FSCORE and Short-term Reversal:

Below shows the total return of ten years:

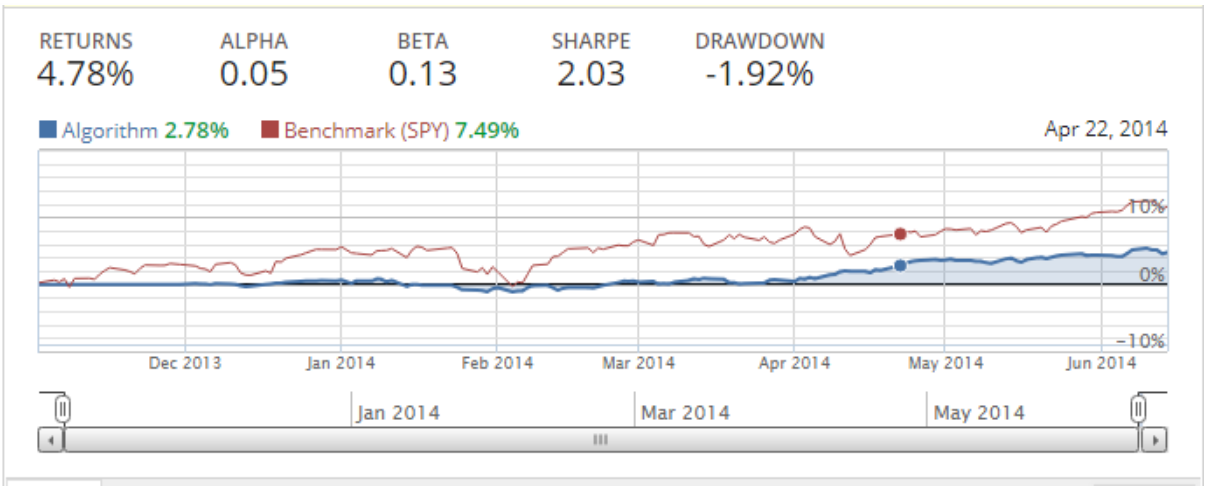


The total percentage return of the portfolio from the start to the end of the backtest.

Compared to the performance of SPY, this return is unsatisfactorily low, indicating that in the long term this strategy does not always generate positive alpha over the market portfolio.Yet we are able to calibrate thresholds for determining winners and losers and arrive at acceptable

performance for some periods, demonstrating the strategy's ability to outperform the market portfolio on some occasions.

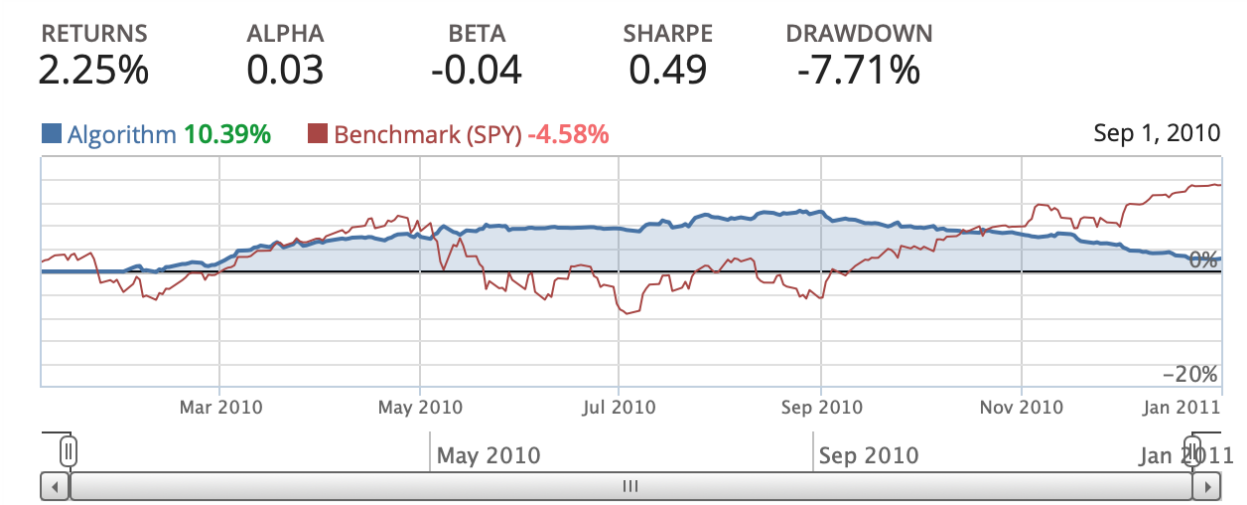
Below shows the total return of one year period:



Overall return of Momentum trading strategy:

Below shows the overall return of ten years:

Below shows the overall return of one year period:



As shown above, the ten years' return of momentum trading strategy is unsatisfactorily low. However, compared to the performance of SPY, this return is somewhat satisfying. This indicated that momentum trading strategy may perform well in some specific periods, whereas, if we look at the overall long-term return, it is unsatisfying.

Comparing these two strategies, the second strategy which combines momentum and FSCORE is able to outperform SPY in certain time periods (e.g. 2013 - 2014), while the return of the first strategy is always less than SPY's return in this 10 year period. This suggests that the second strategy is more profitable than SPY under specified scenarios and in short term. As for performances in long term, both of these two strategies perform unsatisfactorily with low returns which cannot even cover the inflation rate.

Conclusion:

The first part of our research is a revisit of the idea proposed by Zhu, Sun, & Chen (2018), and a confirmation that the strategy can be profitable under specified scenarios, but also suggested the impracticability of this strategy to work in long-term. Although justified economically, crossover of stationarity and fundamental strength does not always guarantee positive alpha over time. The

second part of our research investigates the trading strategy that combines FSCORE and momentum. The result suggests that trading strategy that combines FSCORE and momentum is more profitable than SPY in certain short term periods. In long term, both of these two strategies have low returns and improvements are required if one want to apply them. Possible improvements includes adjusting the trading periods as well as the benchmarks for winner-loser and long-short decisions.

References:

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