Short-term Reversal and FSCORE

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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. We will first give the reasons for combining short-term reversal and FSCORE, follow by our trading strategy in detail. Finally, we will discuss the performance of our algorithm and propose possible improvements.

Introduction:
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.

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.

Core of this 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. Thus, in our research, we would use past data to testify this hypothesis.

Trading Strategy:
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.

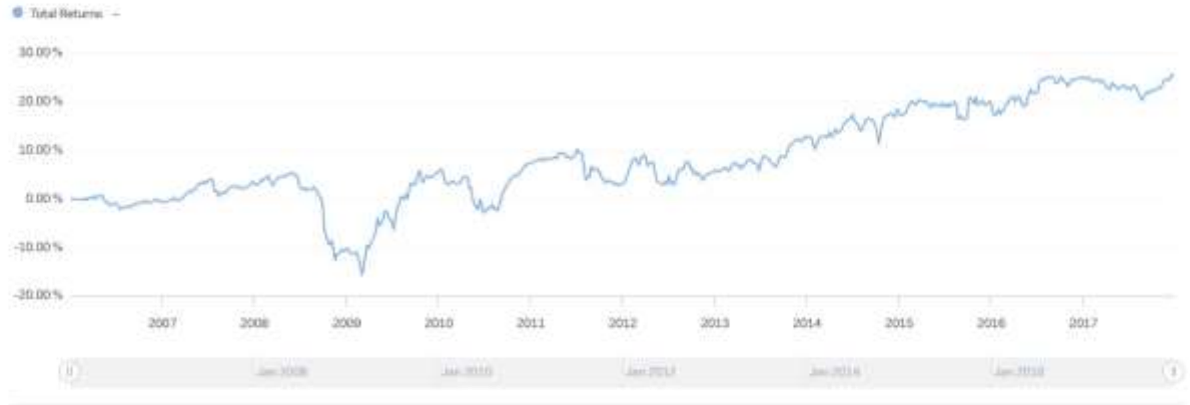
A company gets 1 point for each met criteria. Summing up of all achieved points gives FSCORE (number between 0-9). Company with FSCORE 7-9 is regarded as high FSCORE firm, and company with FSCORE 0-3 is regarded as low FSCORE firm.

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).

Data & Result:

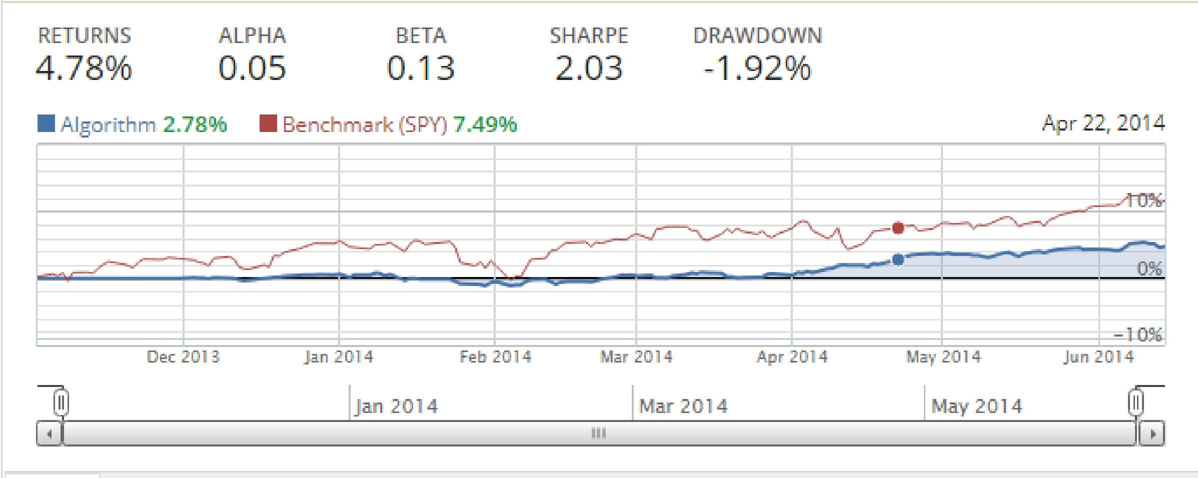
We chose the built-in universe on Quantopian, QTradableStocksUS as our universe for stock selection and filter out penny stocks whose values are less than $5.

A full backtest of strategy with all tradable US non-penny stocks from year 2006 to year 2017 gives the overall return rate presented below. 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.



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

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.



Conclusion:

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.

References:

Piotroski, J. D. (2001). *Value Investing: The use of Historical Financial Statement Information to Separate Winners from losers*. Journal of Accounting Research.

Zhu, Z. B., Sun, L. C., & Chen, M. (2018). *Noise Trading, Slow Diffusion of Information, and Short-Term Reversals: A Fundamental Analysis Approach*. Available at SSRN: https://ssrn.com/abstract=3097420