

The Application and Performance of Momentum Strategy in A-shares and U.S. Stocks

Yuhuan Mai *

College of Science and Technology, Beijing Normal University - Hong Kong Baptist University
United International College, Zhu Hai, China

* Corresponding Author Email: S230018054@mail.uic.edu.cn

Abstract. Momentum strategy, a widely accepted approach in the investment field, is the focus of this study. This paper selected the constituent stocks of the Shanghai and Shenzhen 300 Index and the S&P 500 Index as representatives of their respective stock markets. The study found that the cross-sectional factor momentum strategy performs poorly in the A-share market, while it exhibits better performance in the U.S. stock market. This study summarized the potential reasons for the observed results, such as the different trading rules, the U.S. stock market operates on T+0, while the A-share market operates on T+1. This indicates that the factor momentum strategy can be better implemented in the U.S. stock market, and also reveals the necessity and importance for investors to choose different strategies in two different stock markets. This research can provide beneficial references for investors to make more informed investment decisions in different market environments and achieve a better return.

Keywords: Momentum strategy, A-shares, U.S. Stocks.

1. Introduction

Momentum strategy is an investment strategy where investors make long or short trades based on the market trend, following the rise or fall of an investment. This strategy is also known as trend following. Momentum strategy can be divided into two types: time-series momentum and cross-sectional momentum. In time-series momentum, investors go long on investments that have shown a significant uptrend and short on those that have shown a significant downtrend. In cross-sectional momentum, investors go long on investments that have performed relatively well in the past and short on those that have performed relatively poorly. The positive correlation of stock return series, i.e., stocks that have performed well (or poorly) in the past are likely to continue to perform well (or poorly) in the future, is known as the "momentum effect". [1] Jegadeesh and Titman used U.S. stock return data found that by buying the top 10% of stocks with the highest cumulative returns and selling the bottom 10% of stocks with the lowest cumulative returns based on performance over the past 3-12 months, an average of about 1% excess return can be achieved each month [1]. In fact, all developed stock markets except Japan can achieve significant returns through momentum strategy, while the overall profitability in emerging markets is lower, especially in Asian emerging stock markets such as Taiwan and South Korea [2]. Momentum strategy is easy to understand, and retail investors are likely to adopt this strategy [3]. Overall, the academic community generally believes that momentum strategy can produce strong effects and considerable profits across various asset classes and globally [4]. Moreover, the profits are robust to adjustments for standard risk factors and can be achieved through various construction methods. However, there is little research on how this strategy performs in the two largest stock markets in the world - the A-share and U.S. stock markets. This paper aims to fill this gap by simulating the momentum strategy in these two stock markets and conducting a detailed comparison and analysis of their performance. This research has important practical significance for investors. Through this research, it can provide useful guidance for investors in making cross-market investment decisions.

2. Research Design

2.1. Data Source and Momentum Factor Selection

The data is collected from Yahoo Finance and the Baostock library in Python. The sample includes the constituent stocks of the Shanghai and Shenzhen 300 Index and the S&P 500 Index, which represent the general trends and developments of the A-share and U.S. stock markets, respectively. We have processed and selected data from 2018 to 2022, a span of 5 years, and analyzed the constituent stocks of the S&P 500 Index and the Shanghai and Shenzhen 300 Index. By calculating the rise and fall as an index reflecting the rate of return, we calculate the momentum factor. According to Arnott et al., who linked stock momentum, factor momentum, and industry momentum, a study of 43 U.S. stock factor portfolios from 196 to 2020 demonstrated the effectiveness of momentum. We calculate the daily momentum indicator for each stock by applying weights to the return rate of each stock over the past month [5]. This research is expected to provide useful guidance for investors in making cross-market investment decisions.

$$w[i] = e^{(i-n+1)} \quad (1)$$

In terms of the computation of momentum indicators, we adopt an exponential weight decay function, which assigns greater weight to more recent data, in line with the principle that the closer the momentum is to the present, the greater it is. After the computation of the momentum indicators, we use a ranking method to sort the momentum indicators and identify the top 10% of stocks, preparing for the next step of simulated trading in the market [6].

2.2. Simulated Market Trading

To realistically reflect the trading conditions of investors in the stock market, we simulate market trading through algorithms and programming. In both the A-share and U.S. stock markets, we set the cost of a single trade to be 0.1% of the trading price. We impose restrictions such as a cooling-off period for buying and selling A-shares, and the requirement that shares can only be purchased in multiples of 100. These measures aim to simulate the different characteristics and conditions of various stock markets as closely as possible. In terms of capital, we understand from Moskowitz and Grinblatt that they have constructed a profitable industry momentum strategy [7]. This strategy demonstrates that momentum strategies are profitable in the short and medium term and largely explain stock momentum. Therefore, our planned momentum strategy focuses on short-term momentum, with settlements occurring once a year and an initial capital of 100,000 USD each year.

2.3. Trading Strategy

Regarding the trading strategy, we conduct trades once a month. The buying policy is to sort the stock pool according to the momentum indicators each month and go long on the top 10% of the stock pool, with funds evenly invested. As for the selling policy, we calculate the returns of each stock every month. The construction of the momentum portfolio is based on the cumulative returns over the past 6 months (skipping the most recent month), dividing the stocks into 10 groups, and constructing an equal-weighted portfolio. For the selling strategy, we adopt Han Zhou's simple stop-loss strategy. For example, in a long portfolio, for each stock [8]:

$$P_U = P_0 \times (1 - L) \quad (2)$$

In this case, P_0 represents the closing price at the end of last month (i.e., the most recent portfolio construction price). For instance, if we set $L=15\%$, then the stop-loss price would be calculated accordingly to $0.85P_0$

The maximum daily drop indicator is calculated as follows:

$$R_{t,L} = \frac{P_{t,L} - P_0}{P_0} \quad (3)$$

If $R_{t,L} \geq L$, a stop-loss signal is triggered. In practice, investors often sell stocks to stop loss at this time. A delayed stop-loss strategy is adopted to avoid unnecessary stop losses due to random price fluctuations and short-term inertia. That is, if a stop-loss signal is issued on day t , the stock price is observed on day $t+1$ to see if it falls further below,

$$P_f = (1 - \frac{L}{2})P_U \tag{4}$$

If the stock price falls below P_f , a stop loss is triggered and the funds returned are invested in risk-free assets. If no exit signal is triggered, the stop-loss signal is tracked continuously until the end of the month on day $t+2$. For short portfolios, the process is similar, except that the stop-loss price becomes,

$$P_D = P_0 \times (1 + L) \tag{5}$$

3. Experimental Results

The comparative analysis of the Shanghai and Shenzhen 300 Index and the S&P 500 Index constituent stocks reveals a complex interplay of risk and return metrics. As shown in table 1, the lower Maximum Drawdown of the Shanghai and Shenzhen 300 Index (31528.7741) compared to the S&P 500 Index (40525.8042) suggests a lower potential for extreme losses in the former, which could be appealing for risk-averse investors. However, the higher Sharpe Ratio of the S&P 500 Index (0.849498) indicates that it offers a better risk-adjusted return, which is further supported by its higher Annualized Return (9.53%). This suggests that the S&P 500 Index may be more suitable for investors seeking higher returns, despite the associated risk. The Information Ratio, which measures the risk-adjusted return relative to a benchmark index, is higher for the Shanghai and Shenzhen 300 Index (0.439), indicating its potential for outperformance.

Table 1. Experimental results.

	Component stocks of the Shanghai and Shenzhen 300 Index	S&P 500 Index constituent stocks
Maximum Drawdown	31528.7741	40525.8042
Sharpe Ratio	0.727133	0.849498
Annualized Return	7.41%	9.53%
Information Ratio	0.439	0.374
Sortino Ratio	1.16	1.33

4. Discussion

There could be many reasons for the observed results, among which the trading rules play a significant role. The U.S. stock market operates on a T+0 trading system, meaning that stocks bought on the same day can be sold, while the A-share market operates on a T+1 trading system, meaning that stocks bought on the same day can only be sold the next day. This system could potentially lead to higher momentum in the U.S. stock market, thereby affecting the stock market and real economic activities. A study using Environmental, Social, and Governance (ESG) data to measure the degree of controversy faced by companies and building portfolios based on these data found that in Europe and the United States, stocks of companies facing serious controversies often perform below the market benchmark, as well as stocks of companies with low or no controversy[9]. This suggests that a company's ESG controversy level may affect its stock performance. Zhou's research indicates that style momentum is related to industry momentum research, so it is very likely that the degree of controversy of companies in the Shanghai and Shenzhen 300 Index is high, affecting themselves[10]. In terms of return rate, using daily return rate series, we find that the lagged U.S. return rate is a superior predictive indicator of future return rates in the international market, including the lagged

domestic return rate, and considering the U.S.'s negative return rate or extreme return rate [11]. Furthermore, the trading costs of the U.S. stock market and the A-share market are quite different. The U.S. stock market has slightly higher trading costs, but the method is different. The U.S. stock market generally charges commissions, while the A-share market charges a transaction cost per transaction. Compared with securities with lower trading costs, securities with higher trading costs have a lower frequency of price fluctuations and a higher zero return rate, which instead represents the stability of the U.S. stock market. In terms of experiment optimization, there are indeed many aspects that could be improved. For instance, the transaction costs during trading could be more detailed, and the buying policy could be better. Other strategies could also be adopted likeby sorting the industries according to the correlation coefficient of industry historical returns and evaluating the momentum effect after sorting, the strategy can be better optimized [12].

5. Conclusion

After considering various risk and return indicators, our research results show that although the constituent stocks of the Shanghai and Shenzhen 300 Index perform better in terms of maximum drawdown, the constituent stocks of the S&P 500 Index outperform in terms of risk-adjusted return, annualized return rate, and Sortino ratio. This suggests that when employing a momentum strategy, for investors seeking high returns and willing to take on certain risks, the U.S. stock market may be a better choice. However, the information ratio of the constituent stocks of the Shanghai and Shenzhen 300 Index is higher, indicating that its risk-adjusted return relative to the benchmark index may be better. Therefore, for risk-averse investors, the A-share market may be a worthwhile investment option. In general, when investors choose investment targets, they need to consider various risk and return indicators based on their own risk tolerance and return expectations, and make the most suitable investment decisions for themselves.

References

- [1] Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *The Journal of Finance*, 48(1), 65-91
- [2] Chui, A. C. W., Titman, S., & Wei, K. C. J. (2010). Individualism and Momentum around the World. *The Journal of Finance*, 65(1), 361-392
- [3] Fama, E. F., & French, K. R. (2012). Size, value, and momentum in international stock returns. *Journal of Financial Economics*, 105(3), 457-472
- [4] Wiest, T. Momentum: what do we know 30 years after Jegadeesh and Titman's seminal paper? *Financ Mark Portf Manag* 37, 95–114 (2023). <https://doi.org/10.1007/s11408-022-00417-8>
- [5] Arnott, R. D., Clements, M., Kalesnik, V., Linnainmaa, J.T.: Factor momentum. Working Paper (2021)
- [6] Valeriy Zakamulin & Javier Giner (2020) Trend following with momentum versus moving averages: a tale of differences, *Quantitative Finance*, 20:6, 985-1007,
- [7] Moskowitz, T.J., Grinblatt, and M.: Do industries explain momentum? *J. Finance* 54(4), 1249–1290 (1999)
- [8] Han, X., Zhou, G., & Zhu, Y. (2016). A trend factor: Any economic gains from using information over investment horizons? *Journal of Financial Economics*, 122(1), 222-248.
- [9] De Franco, C. (2020). ESG Controversies and Their Impact on Performance. *The Journal of Investing*, 29(2), 33-45
- [10] Chou, P.-H., Ko, K.-C., Yang, N.-T.: Asset growth, style investing, and momentum. *J. Bank. Finance* 98,108–124 (2019)
- [11] Lesmond, D. A., Ogden, J. P., & Trzcinka, C. A. (1999). A New Estimate of Transaction Costs. *The Review of Financial Studies*, 12(5), 1113-1141
- [12] Ehsani, S., & Linnainmaa, J. T. (2022). Factor Momentum and the Momentum Factor. *The Journal of Finance*, 77(3), 1877-1919