Report - Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency

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Abstract

The article examines investment strategies that involve buying stocks with strong past performance and selling those with poor past performance. These strategies consistently deliver significant returns over short to medium-holding periods of 3 to 12 months. The research finds that the success of these strategies cannot be attributed to systemic risk or delayed reactions in stock prices to standard factors. However, while the strategies generate substantial abnormal returns in the first year after portfolio creation, these returns gradually diminish over the following two years. A similar trend is observed in returns surrounding earnings announcements for previously top-performing and under-performing stocks.

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Article summary

In this first part we summarize the article *Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency* written by N. Jegadeesh and S. Titman.

1 Introduction

We often hear the phrase "When we hear the news, we respond." It's a phrase that's been used by journalists and psychologists as well as economists ([KT82, DBT85, Shi81]). It's also a phrase used by economists (e.g., De Bondt, Thaler, 1985) to explain why stock prices tend to overreact to information. The idea is that if you buy stocks that are doing poorly and sell stocks that are doing well, you'll make more money in the long run than you would if you bought them all at the same price. De Bondt et al. (1985) showed that stocks that haven't done well in the last 3-5 years tend to do better than stocks that have done well over the past 3-5 years. People are still debating what this means. Some argue that we can understand the findings by looking at their opposing portfolios' risk and the effect of size ([CLS88, BB89, Zar90]).

The article explores the profitability of contrarian investment strategies, which involve buying stocks that have recently fallen in price, despite short-term price increases. It suggests that the apparent success of these strategies may be influenced by temporary price pressures or liquidity constraints, rather than genuine overreactions. Furthermore, evidence indicates that short-term returns reverting to pre-recession levels are linked to bid-ask spreads, suggesting a slow response of stock prices to normal factors rather than overreactions.

In contrast, relative strength strategies, focusing on buying stocks with recent price increases, have been historically successful. Despite academic research favoring contrarian approaches, many investors, including mutual funds and Value Line rankings, still utilize relative strength strategies. This disparity raises questions about the discrepancy between academic findings and real-world investment practices.

The article suggests that the success of relative strength strategies in practice may stem from factors such as differing time frames used in trading rules, with real-world strategies focusing on shorter-term returns over 3 to 12 months. Overall, the study highlights the complexity of investment strategies and the need for nuanced analysis when interpreting their effectiveness.

2 Trading Strategies

The authors investigates the effectiveness of various stock-picking strategies in the market. They examine 16 different approaches based on past quarterly earnings and holding periods ranging from 3 to 12 months. Additionally, they explore another 16 strategies with a one-week delay between selection and holding to mitigate market pressures.

To strengthen the analysis, investment accounts are structured with assets having identical time-frames. Each month, portfolios are selected based on past performance over J months and held for K months. The trading strategy involves purchasing the best-performing portfolio, selling the worst-performing one monthly, and adjusting investments accordingly while maintaining previous month allocations.

Returns are evaluated for buy-and-hold portfolios and rebalanced portfolios with monthly adjustments. Given the comparable returns favoring buy-and-hold, only rebalanced returns are showcased.

3 The Returns of Relative Strength Portfolios

This section examines the performance of investments from 1965 to 1989, utilizing data sourced from the CRSP daily returns file. All stocks with available return data for the J months preceding portfolio formation are utilized to construct both buy and sell portfolios.

The average profits of the 32 strategies mentioned are compared, encompassing buy and sell portfolios, along with the winners-minus-losers portfolio without additional costs. Profits from all cost-free

portfolios are favorable. Noteworthy results are observed across all strategies, except for the 3-month/3-month strategy which maintains continuity without a week's gap. Despite conducting 32 different tests, many individual t-statistics attain significance. For instance, achieving a t-statistic of 4.28 with 32 observations using the 12-month/3-month strategy (with a week's gap) is highly improbable, less than 0.0006 according to the Bonferroni inequality.

It is showed that the most effective cost-free strategy involves selecting stocks that have performed well in the past year and holding them for three months. This strategy yields a 1.31% monthly return without any delay between stock selection and holding, and a 1.49% monthly return with a one-week delay between selection and holding.

4 Sources of Relative Strength Profits

Two simplified models for generating returns are then introduced. These models serve to elucidate the source and mechanism behind the additional profits discussed earlier.

The first model allows portfolio returns to be correlated over time while requiring individual stocks to promptly react to changes in factors. This model dissects the portion of profits derived from relative strength, distinguishing between contributions from broader market trends and specific company attributes. In an efficient market, the majority of profits stem from general market trends, whereas in an inefficient market, a larger proportion arises from specific company qualities.

The second model posits that stocks do not always react immediately to identical factors. This framework enables an examination of whether profits from strength result from interconnections between stock prices, akin to what Lo and MacKinlay (1990) proposed as a rationale for short-term contrarian profits.

4.1 A Simple One-Factor Model

The simple one-factor model describing stock returns is the following:

$$\begin{aligned} r_{it} &= \alpha_i + \beta_i f_t + e_{it} \\ E(f_t) &= 0 \\ E(e_{it}) &= 0 \\ Cov(e_{it}, f_t) &= 0, \quad \forall i \\ Cov(e_{it}, e_{jt-1}) &= 0, \quad \forall i \neq j \end{aligned} \tag{1}$$

where α_i is the unconditional expected return on security i, r_{it} is the return on security i, f_t is the unconditional unexpected return on a factor-mimicking portfolio, e_{it} is the firm-specific component of return at time t, and β_i is the factor sensitivity of security i. For instance, for a 6-month/6-month strategy the length of a period is 6 months.

The high results showcased in the previous section regarding relative strength strategies suggest that stocks with returns above the average in one timeframe tend to continue outperforming with above-average returns in the subsequent period. Essentially, this evidence can be reformulated as:

$$E(r_{it} - \bar{r}_t | r_{it-1} - \bar{r}_{t-1} > 0) > 0$$

and

$$E(r_{it} - \bar{r}_t | r_{it-1} - \bar{r}_{t-1} < 0) < 0$$

where a bar on a variable is its cross-sectional average.

Hence,

$$E((r_{it} - \bar{r}_t)(r_{it-1} - r_{t-1})) > 0. \tag{2}$$

The cross-sectional covariance, as mentioned earlier, represents the anticipated profits from a cost-free trading strategy. This strategy evaluates stocks' past returns relative to the overall market's past returns, resembling closely to the described strategy. The WRSS (Weighted Relative Strength Strategy) generates a profit of 4.5 % for every dollar invested every six months. Remarkably, the correlation between the returns of this strategy and those from the preceding section is notably high,

standing at 0.95. While we predominantly utilize equally weighted decile portfolios in our tests for their informative value, the closely aligned WRSS offers a convenient avenue to scrutinize the origins of relative strength profits and evaluate the significance of each source.

With the one-factor model delineated above, the WRSS profits expressed in equation (2) can be broken down into the following three components:

$$E(r_{it} - \bar{r}_t)(r_{it-1} - \bar{r}_{t-1}) = \alpha + \beta Cov(f_t, f_{t-1}) + \overline{Cov}_i(e_{it}, e_{it-1}) \tag{3}$$

where α and β are the cross-sectional variances of expected returns and factor sensitivities respectively.

The breakdown outlined above elucidates three potential factors contributing to the robust profits. The initial component of this equation assesses the variability in expected returns. Put simply, if a security exhibits high returns in one period, it is likely to sustain higher returns in the subsequent period. The second term pertains to the predictability of timing. If the returns of the factor portfolio follow a discernible pattern of fluctuation, the relative strength strategy will select stocks with high beta when the factor portfolio returns are anticipated to be high. The expression indicates that the profitability of relative strength strategies is influenced by changes in the factor portfolio returns over time and discrepancies in beta values. The final part of the expression represents the average relationship between the distinct aspects of security returns.

Determining whether profits derived from relative strength imply market inefficiency requires understanding their source. If gains stem from the first or second term of equation (3), they could signify compensation for assuming certain types of risk and may not necessarily indicate market inefficiency. However, if relative strength strategies outperform due to the third term, it suggests market inefficiency.

4.2 The Average Size and Beta of Relative Strength Portfolios

Strategies based on relative strength and their potential inclination towards selecting riskier stocks are studied here, potentially benefiting from the initial component of equation (3). Risk estimates for various investments are provided, considering factors such as company size and recent performance compared to peers. Notably, the betas of long-standing investment portfolios exceed the average beta across all investments. Additionally, it is shown that the risk associated with portfolios comprised of under-performing stocks surpasses that of portfolios with outperforming stocks, resulting in a negative risk for portfolios simultaneously buying winners and selling losers. Both the best and worst-performing portfolios consist of smaller-than-average stocks, with the latter exhibiting even smaller sizes. This data suggests that observed profit increases are not solely attributable to the first profit generation method outlined in formula (3).

4.3 The Serial Covariance of 6-Month Returns

Furthermore, relationship between investment returns over a six-month period in a series are then studied, in order to assess the impact of the second and third sources of profit. Equation (1) illustrates that the combined variance of a portfolio composed of numerous stocks remains constant.

$$cov(r_t, r_{t-1}) = \beta^2 Cov(f_t, f_{t-1})$$

If relative strength profits stem from the serial covariance of factor-related returns, then, according to the above expression, the in-sample serial covariance of equally weighted index returns must be positive.

5 Profitability of Relative Strength Strategies Within Size- and Beta-Based Subsamples

In this section, the profitability of the 6-month/6-month strategy across various groups of companies, categorized by size and predicted betas, is examined. The analysis aims to determine whether the strategy is more effective for certain types of stocks and to provide insights into the origins of profits from relative strength.

The study finds that abnormal returns remain consistent across different groups of stocks compared to the entire dataset, indicating that relative strength strategies are profitable across all types of stocks, not limited to specific categories. However, company size and risk level appear to influence profits, with larger companies tending to yield lower abnormal returns, while returns increase with higher risk levels. These findings suggest that relative strength profits are not primarily driven by differences in the systematic risk of stocks within the group but rather by serial relationships in company returns.

Moreover, risk-adjusted performance of relative strength strategies across different groups based on size and beta is analyzed, revealing consistent profitability even when accounting for risk. Overall, the results underscore the robustness and universality of relative strength strategies in generating profits across diverse market segments. The following regression is used to estimate the risk-adjusted returns (intercepts):

$$r_{pt} - r_{ft} = a_p + \beta_p(r_{mt} - r_{ft}) + e_{it}$$

where r_{pt} is the return on the portfolio p, r_{mt} is the return on the value-weighted index, and r_{ft} is the interest rate on 1-month Treasury Bill.

Similar to the negative betas observed in zero-cost strategies, the additional returns of relative strength strategies, as calculated from these measurements, slightly surpass the actual returns.

The findings in indicate that the zero-cost portfolio tends to perform better when buying stocks rather than selling them. Specifically, the past winners' portfolio earns significantly higher returns compared to the market average, whereas the past losers' portfolio exhibits relatively modest returns in this comparison. However, in unreported tests utilizing the equally weighted index as the benchmark, both the unusually high and low returns of successful and unsuccessful portfolios were statistically significant. Notably, the abnormal returns of the winners minus losers portfolio were slightly higher when using the equally weighted index instead of the value-weighted index.

Assessing the profitability of relative strength strategies must consider the associated trading costs. Typically, the relative strength trading rule incurs a turnover of 84.8% every six months. After factoring in a 0.5% transaction cost, the return of the relative strength trading rule amounts to 9.29% per year, significantly deviating from zero. These profits after considering costs remain robust across investments of varying sizes.

6 Subperiod Analysis

6.1 Seasonal Patterns in Relative Strength Portfolio Returns

The authors investigate then if the relative strength portfolios exhibit varying performance across different months of the year. The results confirm this notion, indicating a discernible difference in performance, with January exhibiting lower average earnings compared to other months.

The relative strength strategy exhibits poor performance in January, with losses averaging around 7%. However, it consistently generates positive returns in other months, with profits realized in 67% of all months, or 71% when January is excluded. On average, the monthly return in non-January months amounts to 1.66%. Notably, this lower performance in January appears to be linked to the size of the company.

Further analysis reveals varying patterns throughout the year, beyond just January. For example, while earnings are relatively modest in August, they tend to be higher in April, November, and December. Specifically, the relative strength strategy boasts a success rate of 96% in April, coinciding with a strong performance of the stock market, which saw a rise of 3.33%. This may be attributed to companies needing to allocate funds into their pension accounts by April 15 to benefit from tax incentives for the previous year. Consequently, if pension fund managers invest in strong companies, the portfolios investing in these companies may witness price appreciation during this month. Similarly, the increased profits observed in November and December might be due to portfolio managers selling under-performing stocks for tax purposes or to improve the appearance of their investments.

6.2 Portfolio Returns Over 5-Year Subperiods

The performance of the 6-month/6-month zero-cost strategy in each 5-year period from 1965 to 1989 is now examined. Analysis reveals that when the strategy is applied to all stocks, it typically yields profits,

with the exception of the five-year period from 1975 to 1979. Further investigation into this period indicates that the poor results are primarily attributed to the underperformance of small companies in January.

Subsequent studies utilizing this strategy on smaller groups of stocks demonstrate that it generates profits when applied to large and medium-sized companies over five-year periods. Moreover, profits remain consistent across every 5-year period and every size-based group when excluding the month of January.

7 Performance of Relative Strength Portfolios in Event Time

The performance of the relative strength portfolio over different time-frames are analyzed here, specifically calculating its average monthly returns over a span of three years. The study aims to assess the riskiness of the strategy and determine whether profits stem from overreactions or under-reactions in the market.

The findings reveal that the zero-cost portfolio typically generates favorable returns in the first year, with positive returns observed in each month except for the initial month. However, in the second year, the average return is poor across all months, and the first half of the third year also exhibits subpar performance, albeit improving slightly thereafter. The total returns peak at 9.5% after 12 months but decline to approximately 4% by the end of 36 months.

Following the first 12 months, the relative strength strategy tends not to select stocks expected to yield high returns. The fluctuating performance of the zero-cost portfolio, initially positive and then negative, suggests that price changes within the first 12 months may not persist. Consequently, predicting future profitability over the subsequent two years becomes challenging. While the portfolio experiences limited gains in the second and third years, these results are deemed statistically insignificant. Similarly, as the additional earnings over the entire three-year period do not significantly deviate from zero, it remains uncertain whether the promising profits observed in the first year will endure.

One potential explanation for the observed upside-down U shape in cumulative returns could be fluctuations in the risk associated with the strategy over time. It's conceivable that the strategy initially selects highly risky stocks, but as time progresses, the risk decreases. To investigate this possibility, we calculate the betas for each month using both the value-weighted index and the equally weighted index.

The analysis reveals that the zero-cost portfolio's beta for the value-weighted index starts at -0.20 (-0.41) and gradually increases to 0.02 (-0.08) over time. While these results indicate that the risk of the free portfolio changes, the manner in which the risk changes doesn't align with what would be necessary to explain the shift in average returns. Therefore, while fluctuations in risk may contribute to the observed pattern, they don't fully account for the change in average returns over time.

8 Back-Testing the Strategy

The authors also determined whether the relative strength profits observed in the years 1965 to 1989 were also present before 1965. To assess this, they replicated the test to evaluate the performance of the 6-month relative strength portfolio during two distinct time periods: 1927 to 1940 and 1941 to 1964.

They computed the profits of the 6-month relative strength strategy during 36 events between 1927 and 1940 are presented. During this period, although the total earnings are notably lower than in the years 1965 to 1989, the monthly earnings pattern is similar. Returns in the first month are substantially negative, averaging around -5%. While there isn't a significant difference in profits from months 2 to 10, earnings in subsequent months are considerably lower, with the total extra return reaching -40.81% by month 36.

The overall poor returns during this period are likely due to two main factors. Firstly, many companies, particularly those at the bottom, were highly unstable and at risk of going out of business, resulting in very high betas over the holding period. Additionally, during this time, the market exhibited frequent fluctuations, reverting back to its average level often. This market volatility and lack of predictability pose challenges for relative strength strategies, especially when the market undergoes sudden shifts in direction. For example, during the 1930s, there were several instances where

the 6-month/6-month strategy experienced losses exceeding 40%, coinciding with significant market upswings.

The profits or losses incurred during the 36 special months between 1941 and 1964 are then used. The strategy's returns from this period closely resemble those from the more recent period (1965 to 1989). However, unlike the consistent profits observed in the first 12 months of the 1965-1989 period, the good overall returns in the first 12 months of this earlier period diminish substantially by month 24.

9 Stock Returns Around Earnings Announcement Dates

Finally, the performance of companies following their earnings announcements are considered, aiming to determine if the market's predictions are biased. Specifically, it investigates whether stock prices fully respond to news about a company's future performance by analyzing how stocks perform after important company announcements.

The authors examine the changes in value for winners and losers stocks in the three days leading up to and including the day a company announces its earnings, based on data from January 1980 to December 1989. Companies are divided into ten groups based on their returns over the last six months, and returns are calculated for the three days before and after their earnings announcements, within three years of when the stocks were ranked based on their past returns.

During the first six months, the announcement date returns of previous winners were, on average, more than 0.7% higher than those of previous losers, with this difference being statistically significant each month. These earnings announcements typically comprise about 25% of the overall profits during this period.

However, the trend changes in subsequent months, aligning with the declining performance of the investment portfolio after the first year.

These findings suggest that stock returns can be predicted around quarterly earnings announcements, which is consistent with the findings of Bernard and Thomas (1990). Bernard and Thomas observed that companies tend to make more money after announcing positive earnings, matching the positive news observed in the first seven months. However, they also found that the average return tends to be lower four quarters after a positive earnings surprise, correlating with the significant drop in stock prices around the time of earnings reports in the 11th to 18th months.

Part II
Our experiments on S&P 500 data

1 Experimental Setup

We implement long-only and long-short momentum strategies on sectors and compare it with the market benchmark in terms of performance, risk, and maximum drawdown. The strategy involves selecting sectors based on their past momentum and constructing a portfolio with equal allocation to the selected sectors. We use S&P 500 historical data. Our dataset contains the history since 1989 of the S&P 500 and all the level 2 sector indices (24 in total). Since the indices S5REDPIG and S5REAL started later (2001 and 2023), we only take them into account after these dates.

1.1 Long-Only and Long-Short Momentum Strategy

The long-only and long-short momentum strategies are implemented as follows:

1. **Data Acquisition:** Data for sector weights and returns are obtained from Excel files.
2. **Momentum Calculation:** Momentum indicators are computed using a rolling window of 63 days, representing approximately 3 months of trading data.
3. **Sector Selection:** The sectors with the highest momentum are chosen for investment (positive or negative for long and short respectively). In this case, we select the top 3 sectors with the strongest momentum.
4. **Portfolio Construction:** The portfolio is constructed with equal allocation to the selected sectors for uniform weights and using specialized weights depending on the sectors for refinement.
5. **Performance Evaluation:** Performance metrics such as annualized return, annualized risk, maximum drawdown, and Sharpe ratio are calculated.

1.2 Long-Short momentum Strategy 2

Following what was done in the article we also computed the average returns from 1992 to 2024 of the following strategies:

1. **Varying J and K**: a strategy that looks at the J preceding months to invest immediately in the next K months (Long best assets - Short worst assets in terms of historical return over the J months). And to invest each month in this way. We varied J and K (3, 6, 9, 12 months) to see how this affected how it impacts the returns.
2. **Adding a week lag**: same strategy but with a week lag before investing for K months.

1.3 Comparison with Market Benchmark

To compare the performance of these strategies with the market benchmark, we consider the S&P 500 index returns. We calculate similar performance metrics for the S&P 500 index and compare them with those of the momentum strategy.

2 Results and Discussion

In this section we discuss about the results we obtained after implementing the previous strategies.

2.1 Results

2.1.1 Long-Only Momentum Strategy Results

In the 2 first strategies, we will only use the 3 months before last year for our moving averages and momentum calculations, and will see how well we do on a one-year timeframe until today.

- **Annualized Return:** The annualized return of the long-only momentum strategy is calculated to be 59.46% with uniform weights and 64% with specialized sector weights.
- **Annualized Risk:** The annualized risk of the long-only momentum strategy is 24.51% with uniform weights and 23.18% with specialized sector weights.
- **Maximum Drawdown:** The maximum drawdown of the long-only momentum strategy is -2.12% with uniform weights and 2.00% with specialized sector weights.
- **Sharpe Ratio:** The Sharpe ratio of the long-only momentum strategy is 1.15 with uniform weights and 1.43 with specialized sector weights.

2.1.2 Long-Short Momentum Strategy Results

- **Annualized Return:** The annualized return of the long-short momentum strategy is calculated to be 26.18% with uniform weights and 73.87% with specialized sector weights.
- **Annualized Risk:** The annualized risk of the long-short momentum strategy is 24.79% with uniform weights and 32.98% with specialized sector weights.
- **Maximum Drawdown:** The maximum drawdown of the long-short momentum strategy is -2.24% with uniform weights and -1.84% with specialized sector weights.
- **Sharpe Ratio:** The Sharpe ratio of the long-short momentum strategy is -0.205 with uniform weights and 1.94 with specialized sector weights

The performance metrics of the two previous momentum strategies are compared with those of the S&P 500 index as the market benchmark:

- **Annualized Return:** The annualized return of the S&P 500 index was 31% in the last year.
- **Annualized Risk:** The annualized risk of the S&P 500 index was 12% in the last year.
- **Maximum Drawdown:** The maximum drawdown of the S&P 500 index was -1.94% in the last year.

The long-short momentum strategy using specialized sectors weights exhibits promising performance with a high annualized return and Sharpe ratio, indicating favorable risk-adjusted returns. However, further analysis is needed to understand the strategy's behavior under different market conditions and its potential drawbacks.

2.1.3 Long-Short strategy varying K and J

Here we adopt a more global view over the dataset, and use all the history of it. We first implemented the strategy from 1992 to 2024 with J = 3 and K = 3: for each month we compute the return of each asset over the last 3 months to get the optimal portfolios (long best/short worst), then we compute the return over the next 3 months when holding this portfolio. We obtained the following annual returns per month (1):

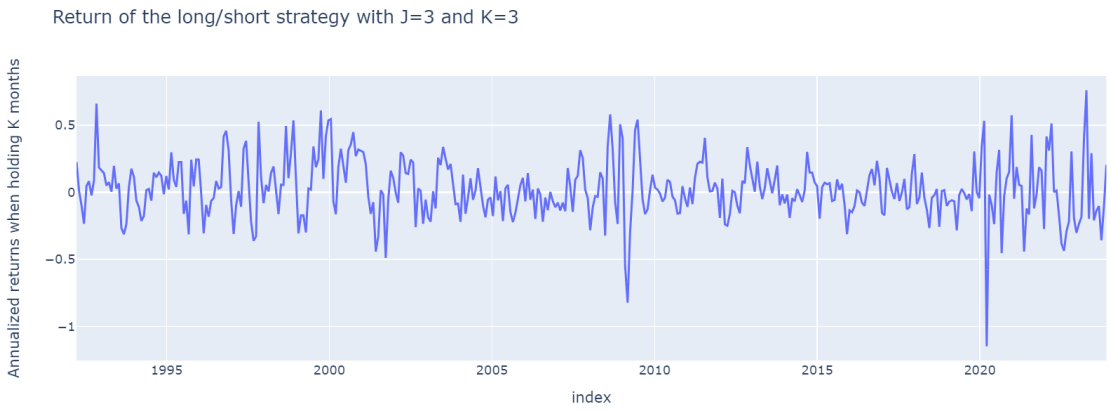

Figure 1: Return of the long/short strategy with J=3 and K=3.

It shows that the return of the strategy varies strongly depending on the month on which we start the strategy. Additionnaly, during crisis periods, it can be seen that there is a strong variability of the return of the strategy. To have a benchmark, we also computed similar returns on the S&P 500 over the same period (2):

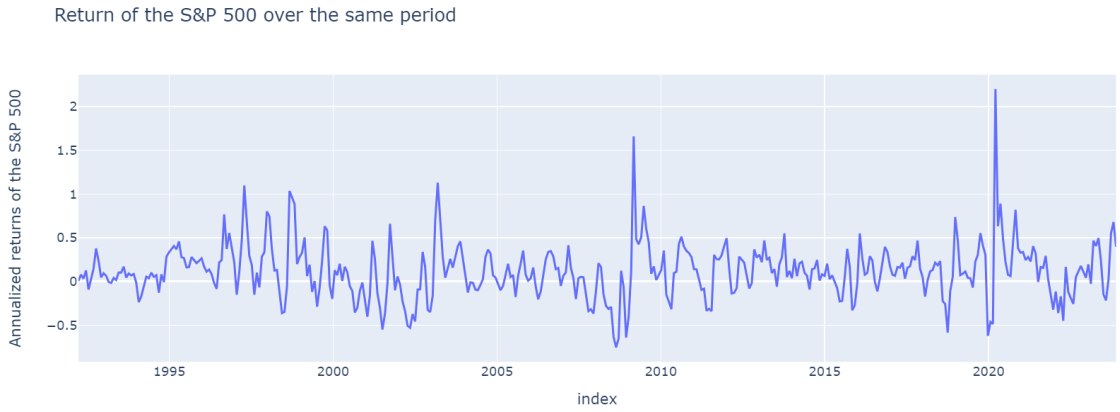

Figure 2: Return of the S&P 500 over the same period.

We then computed a few statistics (3) to assess this strategy and to compare it with the S&P over the same period:

Statistic	Value
Average return of the strategy	0.0248
Average return of the s&p	0.1194
Risk strategy	0.2175
Risk S&P	0.3121
Strategy Sharpe ratio (regarding S&P)	-0.2324
Maximum drawdown strategy	-1.0095
Maximum drawdown S&P	-0.9994

Figure 3: Statistics of the strategy and comparison with S&P 500.

With this strategy, we obtain an average return of 2.48% with a risk of 22%. This is much lower than the S&P 500, hence a negative Sharpe ratio. However, it is to be noted that the risk of the strategy is lower than the risk of the S&P.

We then changed the value of K and J to see if we could obtain better results. The average returns are summarized in the following table (4):

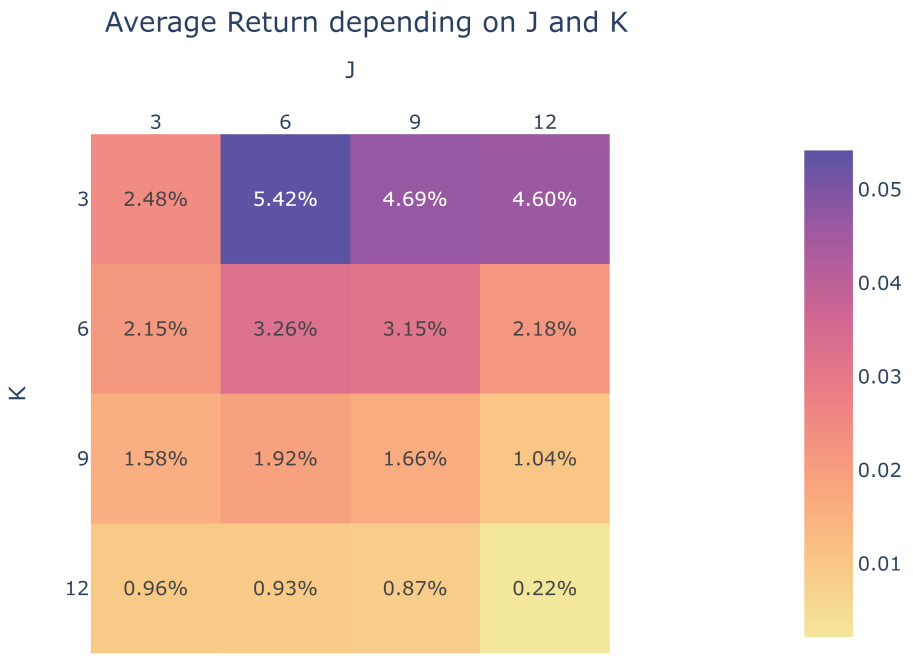

Figure 4: Average return of the strategy depending on J and K.

To better assess, we also computed the Sharpe ratio for each (J,K) (5):

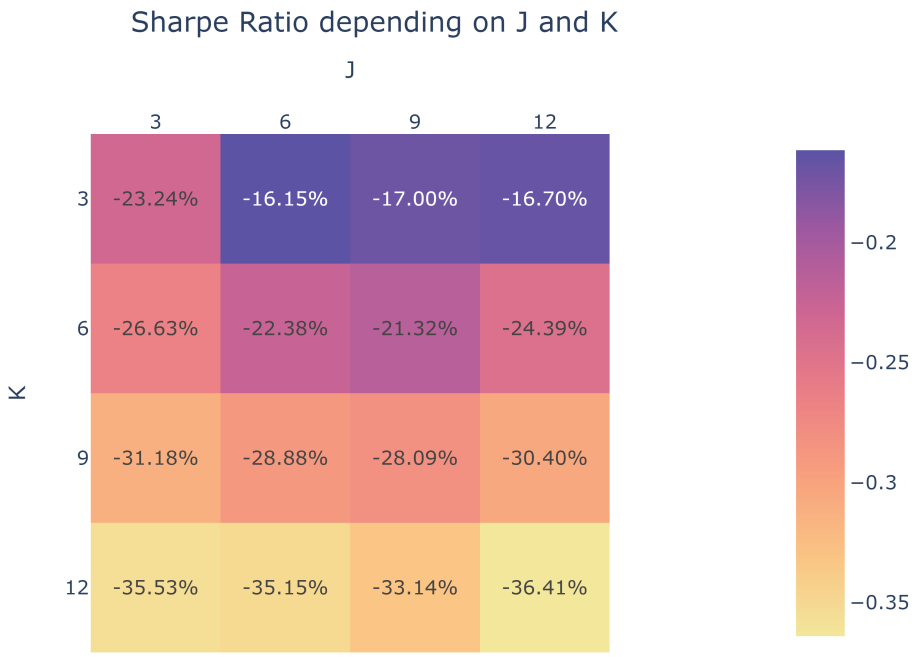

Figure 5: Sharpe ratio of the strategy depending on J and K.

It can be seen that the optimum is reached for K = 3 months and J = 6 months: meaning looking at the returns of the last 6 months to long the best, short the worst and hold the position for 3 months. In this case we obtain an average return of 5.42%, which is still lower than the S&P return, hence a Sharpe ratio of −0.16.

2.1.4 Long-Short strategy adding a week lag

We now implement the same strategy, but after determining the optimal portfolio, we wait one week before buying/selling the assets and then we hold it for K months. We also started with J = 3 months and K = 3 months, and we obtained the following statistics (6):

Statistic	Value
Average return of the strategy	0.0230
Average return of the s&p	0.1165
Risk strategy	0.2049
Risk S&P	0.3017
Strategy Sharpe ratio (regarding S&P)	-0.2433
Maximum drawdown strategy	-0.9923
Maximum drawdown S&P	-0.9988

Figure 6: Statistics of the strategy with a week lag and comparison with S&P 500.

With this strategy we obtain a slightly lower average return of 2.30%, and still a negative Sharpe ratio since the return is the lower than the S&P return.

Then, as we did before, we changed the values of J and K in the range [3, 6, 9, 12], and looked for the optimal couple in terms of average return over 1992-2024 (7):

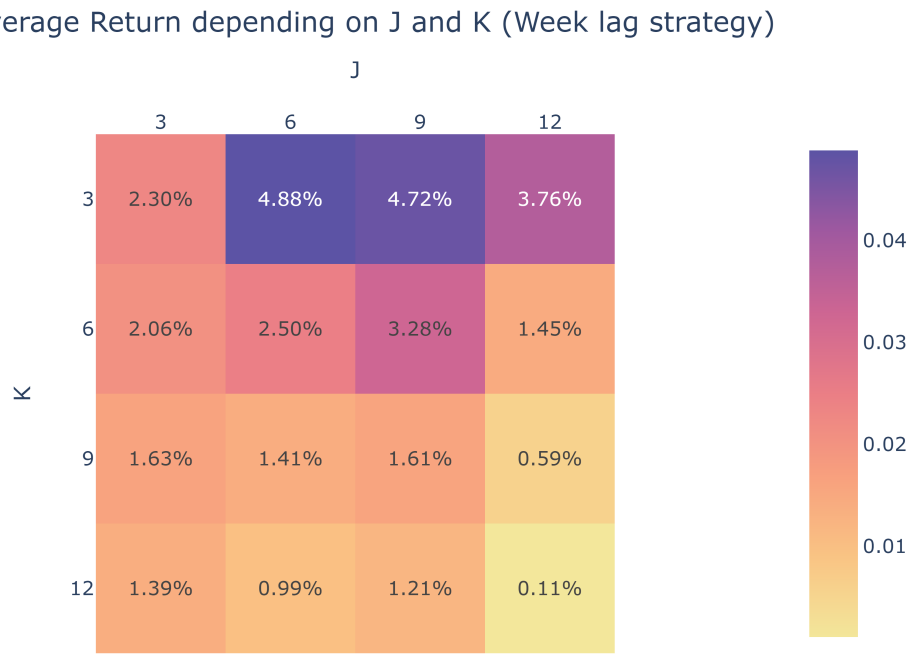

Figure 7: Average return of the strategy (week lag) depending on J and K.

Sharpe ratios of this week-lag strategy were also computed (8):

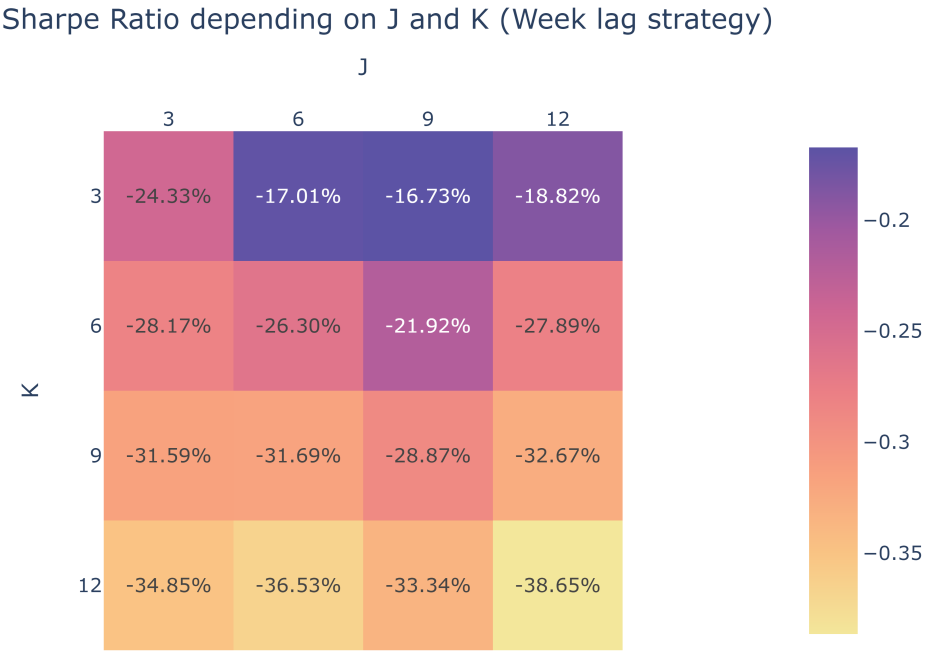

Figure 8: Average return of the strategy (week lag) depending on J and K

In this case, the best strategy in average is also obtained for J = 6 months and K = 3 months. We

obtained an average return of 4.88%, for a Sharpe ratio of -0.17.

2.2 Discussion

The long-short momentum strategy using specialized sectors weights exhibits promising performance with a high annualized return and Sharpe ratio, indicating favorable risk-adjusted returns. However, further analysis is needed to understand the strategy's behavior under different market conditions and its potential drawbacks.

Computing the returns of long-short momentum strategies (with uniform sector weights) over a longer period (1992-2024) allowed us to mitigate the previous outstanding results. Indeed the best average return of the strategy "looking back at the previous J months to invest in the next K months" is 5.42% (obtained for J = 6 months and K = 3 months). This result is in line with what was obtained in the article, but over a different period in their case. It is to be noted that we obtained worse results when adding a week lag.

3 Conclusions

The article scrutinizes a momentum investment strategy focused on buying stocks that have shown strong past performance and selling those with weak performance. The strategy consistently generates profits across various market sizes and periods, especially when excluding January. This pattern highlights the strategy's effectiveness but also points to diminishing returns over time, underscoring the market's capacity to adjust to inefficiencies.
Our investigation extends these insights by applying the strategy to S&P 500 data for a different period (1992-2024), revealing that optimal returns are achievable with specific timing and sector selection. The results underline the strategy's potential for exploiting market inefficiencies, albeit within the constraints of market dynamics and the necessity for strategic adaptability. In essence, our findings confirm the relative strength strategy's viability in navigating stock market inefficiencies, while also emphasizing the critical role of timing, market conditions, and risk management in maximizing investment returns.

References

[BB89] R. Ball and P. Brown. An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 27(2):159–178, 1989.

[CLS88] L. K. C. Chan, J. Lakonishok, and T. Sougiannis. Earnings yield and equity returns: Are earnings forecasts more accurate than dividents forecasts? *Journal of Accounting and Economics*, 11(1):95–112, 1988.

[DBT85] W. F. M. De Bondt and R. Thaler. Long horizon overreaction and underreaction in the stock market. *The Journal of Finance*, 40(4):793–808, 1985.

[KT82] D. Kahneman and A. Tversky. The psychology of preferences. *Scientific American*, 246(1):160–173, 1982.

[Shi81] R. J. Shiller. Do stock prices move too much to be justified by subsequent changes in dividends? *The American Economic Review*, 71(3):421–436, 1981.

[Zar90] P. Zarowin. Corporate disclosure policy and the informativeness of stock prices. *Review of Accounting Studies*, 1(2):175–208, 1990.