

Assignment 1 FINE 452

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1 Introduction

This report analyzes stock momentum and evaluates cumulative returns for a long-short momentum portfolio using CRSP data from 2004 to 2008. The goal is to identify patterns in stock performance and assess the profitability of a momentum-based investment strategy.

2 Methodology

2.1 Data Preparation

We imported the CRSP dataset containing daily stock data using the "readtable" function. We then converted the DateofObservation variable into MATLAB's datenum format for easier manipulation, and then extracted year and month components to facilitate the analysis.

```
date2str = num2str(crsp.DateOfObservation); % Convert numbers to strings
crsp.datenum = datenum(date2str, 'yyyymmdd'); % Convert strings to datenums
crsp.year = year(crsp.datenum); % Extract year
crsp.month = month(crsp.datenum); % Extract month
```

2.2 Function for Momentum

We then developed a function, getMomentum, to compute momentum for individual stocks. We used stock identifier, year, month and the dataset as inputs. We were able to determine the start and end prices, and then compute the momentum values. Therefore, the function allows to calculate the cumulative gross return over 11 months.

2.3 Calculate Momentum

Using our getMomentum function, we were able to calculate momentum for each stock and month in a for-loop as shown below.

```
% Initialize crsp.momentum with NaN values
crsp.momentum = NaN(height(crsp), 1);
permnos = unique(crsp.PERMNO);

% Loop to calculate momentum for each stock
for i = 1:height(crsp)
    thisPermno = crsp.PERMNO(i);
    thisYear = crsp.year(i);
    thisMonth = crsp.month(i);
    crsp.momentum(i) = getMomentum(thisPermno, thisYear, thisMonth, crsp);
end
```

2.4 Momentum Portfolio Construction

We sorted stocks into deciles based on momentum values for each date. The bottom decile represents the lowest 10% of momentum values, and the top decile represents the highest 10% of momentum values.

Then we derived `mom1` and `mom10`, respectively the equal weighted return on the stock in the bottom momentum decile and in the top momentum decile.

With those values, we were able to obtain the returns of the portfolio that longs winners and shorts losers (stored in "mom").

2.5 Cumulative Returns

Finally, we were able to calculate the cumulative returns, setting the initial value to zero, and for each subsequent date, compounding the portfolio return to derive the cumulative performance.

3 Results and Discussion

We plot the cumulative returns and obtain the following graph:

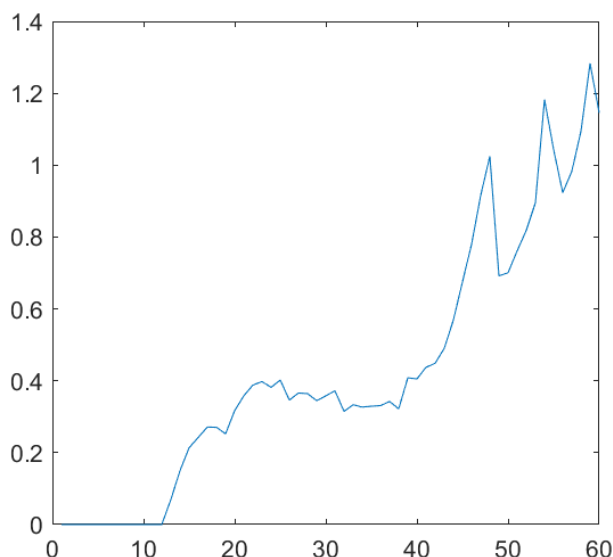


Figure 1: Cumulative Returns

The momentum strategy appears to capitalize on market trends by rebalancing regularly. However, during periods of high volatility, such as the 2008 financial crisis, the risk associated with a long-short momentum portfolio—based on an 11-month momentum window—can increase significantly. This is because sudden market shifts driven by rapid news events may render the strategy ineffective or outdated. Additionally, the monthly rebalancing schedule may fail to adequately account for critical information that emerges within the same month, potentially exposing the portfolio to unforeseen risks. Therefore this can explain the high drops we saw between 2007 and 2008. Of course, it is to note that the strategy has shown its efficacy because in the same time-frame the SP500 dropped by 26%.

We can also argue that with today this strategy might not prove itself as being as effective. Indeed, with the fact that more people might be aware of the strategy and that the flow of information between individuals is much faster than in the early 2000s, the returns might have been diminished.