Asymmetric reactions to news?

The influence of investor sentiment on the effectiveness of long-short strategies

Abstract

During this research, I looked into the effect of investor sentiment upon the reaction to news, and what this implies for long-short trading strategies. The strategies used in this research are the momentum strategy and return reversal strategy. As a proxy for an optimistic sentiment, a bull market phase is used, while for a pessimistic sentiment, a bear market phase is used. Within those sentiment conditions, I look into the asymmetric reactions to news, meaning that during pessimism investors overreact to bad news, but underreact to good news, while the opposite holds for optimism. My findings are that while in a bear market the evidence is suggesting an asymmetrical reaction, this does not hold in a bull market. Furthermore, there is evidence supporting that a bull market is beneficial for momentums strategy. The bear market is inconclusive.

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Section 1: Introduction

Malkiel and Fama (1970) formulated the efficient market hypothesis. This hypothesis states that stock prices are a reflection of all information. There are several forms of the hypothesis that state the extent to which information is reflected in the price. The strong efficient market hypothesis states that all information is incorporated into the stock price, while the weak form states that current stock prices reflect the information of all historical prices. The semi-strong hypothesis states that all publicly known information is reflected in the price of a stock. What all forms of the hypothesis have in common, is that they conclude that active trading strategies cannot beat the market systematically.

There is however evidence that investors have the tendency to either under- or overreact to new information (Barbaris, Shleifer & Vishny, 1998). This tendency violates the efficient market hypothesis (Malkiel, Fama, 1970) because all information, or al publicly known information depending on the form of the hypothesis, should be reflected in the stock price.

Due to those under- and overreactions, active trading strategies have been developed, which in some cases do beat the market. Two of those strategies are the momentum strategy (Jegadeesh, Titman, 1993) and the return reversal strategy (Jegadeesh, 1990). Momentum strategy is a strategy where the stocks of an index need to be monitored for six months, which is the formation period. After this period the best performing 25% will be used to construct a "winner" portfolio, while the worst performing 25% will be contained in a "loser" portfolio. The momentum strategy assumes that while the winners will continue their trend in outperforming, the losers continue to underperform. Therefore the investor purchases the winner portfolio while shorting the loser portfolio. The total zero-investment strategy should then generate abnormal returns.

Return reversal has the first six months in common with the momentum strategy, meaning that the stock performance is monitored first and the portfolios are constructed in the same manner. However this strategy assumes that the winners of the first six months, will become losers in the next two to three years. Therefore the investor will short the initial winner portfolio, while purchasing the loser portfolio.

Some studies find that investor sentiment might have an influence upon how investors react to news, this could be a cause for the over- and underreactions upon which the strategies are based. This could lead to some degree of over- and underreaction to news. Investor sentiment is a condition that varies over time. For example when markets are in decline, or in a bear phase, investors tend to be more pessimistic, while when the market is increasing, or in a bull phase, investors tend to be more optimistic. Pagan and Sossounov (2003) state that in the financial literature we speak of a bear or a bull market when there is a 20% decrease or 20% increase respectively over a certain period of time.

Berger and Turtle (2015) found that when investors are in high sentiment, or optimistic, asset price bubbles tend to form. This means that during this period an overpricing is result to optimism. My expectations are that those over-pricings are resulting from an asymmetric reaction to news in a sentiment condition. This asymmetric reaction means that when investors are optimistic, they tend overreact to good news and underreact to bad news. This leads to the stock price becoming too high

after the initial news, for both the winners as for the losers. This means that the overall reaction expected in the stock market is a downturn afterwards. This tendency has some relation to return reversal, but it is different. Return reversal expects an initial overreaction to news which is symmetrical. This means that both the reaction to good news and that to bad news is an overreaction. This means that winners are pushed above fundamental value, while the losers are pushed below the fundamental value. This leads later on to return reversal.

When investors are pessimistic they tend to underreact to good news, and overreact to bad news. Due to this underreaction, the fundamental value of the stock is higher than the perceived stock price, therefore it will slowly move to its fundamental value. This however, is an asymmetrical reaction to news, which leads to an overall underpricing of the asset. This is different from momentum strategy. Momentum strategy is dependent upon a symmetrical reaction to news in the stock market. This symmetric reaction that needs to occur is an overall underreaction to news, meaning that the winners are below their fundamental value, while the losers are above their fundamental value.

If there is a correlation between a bear market and a pessimistic investor sentiment, we can assume that investors exhibit underreaction to good news and overreaction to bad news. This would then mean that a bear market phase has no potential for both momentum or return reversal strategy. If there is a correlation between a bull market and an optimistic investor sentiment, we can assume that investors exhibit overreaction to good news, and underreaction to bad news. Therefore neither momentum nor return reversal strategy can be expected to generate returns.

The case however, could also be that during positive sentiment, investors only overreact to good news, while during pessimism they only overreact to bad news. In those cases the response to bad news during optimism and to good news in pessimism would be normal. This would mean that one of the portfolios in the zero-investment strategies is overpriced, which could imply that the return reversal strategy can thrive during both sentiment conditions.

The last possible asymmetric reaction to news, could be a situation where an optimistic sentiment, leads to an underreaction to bad news, but a normal reaction to good news. During a pessimistic sentiment, this could mean an underreaction to good news, while there is a normal reaction to bad news. This would lead to an underpricing of one of the portfolios, which would be beneficial for the momentum strategy.

This leads to the following question: Can the market phase predict the effectiveness of either the momentum or the return reversal strategy through investor sentiment?

My hypotheses are as follows:

- H1: During high sentiment conditions, investors tend to overreact to good news and underreact to bad news. During low sentiment, investors tend to underreact to good news and overreact to bad news. This leads to an ineffectiveness of the return reversal and momentum strategies.

- H2; During high sentiment conditions, investors overreact to good news, but react correctly to bad news. During low sentiment conditions, investors overreact to bad news, but react correctly to good news. This allows for the return reversal strategy to be effective.
- H3: During high sentiment conditions, investors tend to react correctly to good news, but underreact to bad news. During low sentiment conditions, investors react correctly to bad news, but underreact to good news. This allows for the momentum strategy to be effective.

During this research I look whether or not market phases have an influence upon the effectiveness of the momentum and return reversal strategies. The market phases are a proxy for investor sentiment in this research, meaning that a high sentiment condition would be a bull market, and a low sentiment, or pessimistic sentiment would mean a bear market. As hypothesized, I expect an asymmetrical reaction to news events in both high and low sentiment. This means that when sentiment is high, people are optimistic, which leads to the investors to overreact to good news, while they underreact to bad news. The opposite holds for a pessimistic sentiment. Thus investors underreact to good news, while they overreact to bad news in this condition.

During my research I find that these sentiment reactions only occur most of the pessimistic sentiment, while there is an overall underreaction in the high sentiment condition. In accordance to the momentum strategy and return reversal strategy, a symmetrical reaction, such as I have found in the high sentiment condition, is required. This overall underreaction that was evident, suggests for momentum strategy to thrive in the bull market climate. My findings support this claim, since positive autocorrelation was evident, and positive returns were earned by the momentum strategy in the bull market condition. In order to see whether or not these findings hold during different time horizons, this research has looked into the returns made during a six month formation and six month holding period, a three month formation and three month holding period, and a three month formation and a six month holding period. All evidence points towards a symmetrical reaction in high sentiment and a good climate for momentum strategy.

In the case of the bear market condition however, the returns made by the individual portfolios are in most cases below the predicted value, predicted by the Fama-French three factor model. This suggests towards the asymmetrical reaction within the sentiment condition. It suggest that during low sentiment, people overreact to bad news, and underreact to good news. This however is not supported by statistics. Furthermore, in this bear market, the 3-3 and 3-6 month horizon treatments show a positive return when applying the momentum strategy, and a positive return for the return reversal strategy in the 6-6 month horizon treatment. Therefore, it is not possible to conclude whether or not a single strategy can thrive in a bear market phase.

While there is a lot of research on the asymmetric reaction between sentiment conditions, I found little literature on the reaction within a sentiment condition. The purpose of this research is

therefore to give a better overview of the reaction to news events within a sentiment condition, to support the application of, and find the effectiveness of, long-short trading strategies.

The next section will give an overview of relevant literature. Section 3 will describe the methodology and the data that is used, this section includes the constructed portfolios. Section 4 contains the analysis and results. Section 5 will discuss the paper and the last section will conclude.

Section 2: Literary review

The efficient market hypothesis (Malkiel, Fama, 1970) states that all information available is incorporated into the stock prices, and therefore the price of a stock should reflect the stock's fundamental value. The degree of information that is reflected in a stock price depends on the strength of the hypothesis. The strong form assumes that all information is incorporated in the stock price, while the semi-strong form states that all publicly known information is reflected. All forms however agree upon the fact that an active trading strategy should not be able to gain abnormal returns. Fama (1965) finds that there is no evidence that historical stock price movements can be used to generate abnormal returns.

However, there is some evidence that stock markets are not as fully efficient as the Market efficiency hypothesis (Malkiel, Fama, 1970) assumes, and not all information is processed properly. De Long, Shliefer, Summers and Waldmann (1990) state that the basic idea on efficient markets is that rational traders counter irrational movements in stock prices. Therefore deviations from the fundamental value will be arbitraged away by rational investors. They however argue that in the signs originating from rational speculation can lead to the opposite of efficient markets. If they expect irrational investors to buy the asset, which will push up the price, it is rational to speculate on increasing prices. This rational speculation is a sign which will lead to even greater deviations from the fundamental value. Therefore assuming that markets are efficient due to rational traders can be a wrong assumption.

Barbaris, Shleifer and Vishny (1998) have found that the stock market exhibits overreaction and underreaction to news. They found that over a twelve month horizon stock prices tend to underreact to news, and therefore the price change happens over a longer period of time. They also found that in a three to five year horizon, stocks tend to overreact to news. They state that when an asset has a string of good performance, it gets an extremely high valuation. They state that the expectations on future earnings are influenced by the investor sentiment.

Brown and Cliff (2005) found that investor sentiment, either optimistic or pessimistic, drives the value of the asset from its fundamental value. In the case of optimism this leads to an overvaluation. Those mis-pricings take a couple of years to revert to the fundamental value. They also find evidence that prices underreact in the short run, and overreact in the long run.

Baker and Wurgler (2007) define investor sentiment as a belief about the future cash flows which cannot be justified by the facts at hand. They find that stocks that are more difficult to value or gain arbitrage profits with, are more subjected to investor sentiment.

Momentum strategy (Jegadeesh, Titman, 1993) and return reversal (Jegadeesh, 1990) are based upon those mis-pricings in the market. Those strategies are dependent upon the fact that during a pessimistic state of mind, investors tend to underreact to good news (Antoniou, Doukas, Subrahmanyam, 2011), which induces momentum, while during optimistic periods, they tend to overreact to good news. This leads to return reversal.

However, momentum strategy (Jegadeesh, Titman, 1993) and the return reversal strategy (Jegadeesh, 1990) are dependent upon a symmetric reaction to news. This means for momentum to be effective, the market should exhibit an overall underreaction to news, meaning that the winners are below their fundamental value, while the losers are overvalued.

As stated before, the momentum strategy (Jegadeesh & Titman, 1993) and the return reversal strategy (Jegadeesh, 1990) are based upon mis-pricings. Momentum strategy (Jegadeesh & Titman, 1993) is a strategy that is based upon the situation where investors underreact to good news, news (Antoniou, Doukas, Subrahmanyam, 2011) which then leads to a deviation from the fundamental price. The stock will continue to follow its reaction to the news until the fundamental value is reached. In the strategy a "winner" portfolio is constructed, which contains the best performing 10% of stocks in an index. The second portfolio is a "loser" portfolio, which contains the worst performing 10% of stocks in the index. The assumption is that those stocks will continue to outperform and underperform respectively. This means that the strategy advocates the acquiring of the winner portfolio, and shorting the loser portfolio. This strategy should generate an abnormal return compared to the passive investing strategy, which means acquiring the index.

For this strategy, in order to determine which portfolio belongs to what category, either winners or losers, there is an initial formation period. This is a period of six months, in which the stock returns are observed. This is the formation period. After the formation the portfolio's will be held on to for six months during which the winners from the formation period are continuing to outperform the market, while the initial losers will continue to underperform, this is the holding period. Because you short the loser portfolio and use those proceeds to purchase the winner portfolio the total strategy should generate a zero-cost positive return.

The return reversal strategy (Jegadeesh, 1990) is based upon a market situation where investors overreact to good news. Therefore, the price of stocks that have had a positive news announcement will deviate to a price above the fundamental value. Eventually the stock price will move back to its fundamental value. Therefore the initial winners will then become the losers, while the initial losers become the eventual winners. The process of building the portfolios is the same as with the momentum strategy, the only difference is that the initial winners are shorted, while the initial losers are acquired. If return reversal occurs, there should also be evidence of negative autocorrelation between the portfolio returns.

Stambaugh, Yu and Yuan (2011) found that during high sentiment periods, or optimistic periods, long-short trading strategies exhibit a higher profitability. They state that this is due to overvaluation during high sentiment periods. However, this is only exhibited during short term strategies. They argue however that those findings don't hold during pessimistic sentiment, due to restrictions on short selling.

However, Berger and Turtle (2015) found that due to optimism price asset bubbles tend to form, which can be interpreted as an overvaluation of an asset during an optimistic sentiment condition. This however leads to a question whether or not a pessimistic sentiment condition will lead to an overall

undervaluation of assets. This asymmetric reaction may render the momentum and return reversal strategies ineffective, because they are based upon symmetric reactions to news.

Baker and Wurgler (2006) see investor sentiment as the optimism or pessimism about a certain asset. They find that when sentiment is high, certain stocks are overpriced. This is the opposite in a situation where sentiment is low, thus an underpricing. These mis-pricings revert later on, they state. Given these findings, their research supports the assumption that during low sentiment, or pessimism, the stocks have a tendency to be undervalued, while during high sentiment, or optimism, they have a tendency to be overvalued. This is in line with the findings of Brown and Cliff (2005).

Yang and Zhou (2015) find that the Fama-French three factor model (Fama & French, 1993) is not suitable to explain the excess returns in small stocks. They find that investor sentiment and trading behavior are determining factors on the excess returns of a stock. Thus investor sentiment and trading behavior explain parts of the excess return that the Fama-French three factor model (Fama & French, 1993) cannot explain. They find that the relation between sentiment and excess return is positive, therefore a high sentiment leads to an overvaluation while low sentiment leads to undervaluation. Kim and Ha (2010) support these findings and conclude that investor sentiment systematically effects stock prices. In both cases however they conclude that the stocks that are most affected are stocks that are difficult to price, such as small stocks and small cap stocks.

While most research concludes that positive sentiment leads to a higher stock return, Yu and Yuan (2011) argue that investors in high sentiment are accepting of a lower risk premium for a stock. Therefore they argue that the returns of a stock are negatively influenced during high sentiment. However, they also find that in low sentiment the influence of investor sentiment reduces.

Chen, Chen and Lee (2013) do find the asymmetric reaction of investor sentiment to stock returns. They find that during optimistic periods stocks tend to sell at a premium, therefore making higher returns. They sell at a discount during low sentiment periods. They however also state that the effect of pessimism looms greater than that of optimism, as is in line with the prospect theory (Tversky & Kahneman, 1992), where losses have a greater effect than equally sized gains. These findings are supported by the research of Lutz (2013). This would suggest that even though there is an overvaluation due to optimism, and an undervaluation due to pessimism, which are asymmetric reactions on their own, also is not linear when compared. Thus pessimism is expected to have a greater impact than optimism.

Shifts in market sentiment are negatively correlated with market volatility according to Lee, Jiang and Indro (2002). Or to state more general, a bearish market phase, which is characterized by an increased volatility, is correlated with a negative, or pessimistic investor sentiment.

There is an agreement within the financial literature that bull market phases are associated with rising stock prices, a strong investor interest, and financial wellbeing (Gonzales, Powell, Shi & Wilson, 2005). They make use of a turning point procedure to identify the different market phases. This procedure requires the identification of the peaks and throughs in the historical data, which indicate the start and the end of the market phase. They require the market cycle to last for at least fifteen months,

meaning that from peak to through and back to peak happens during a period of at least fifteen months. The contraction or expansion phase needs to last for at least five months within this cycle to be identified as either bear or bull market phase. The five month minimum is set because shorter periods generally have little to no economic and statistical significance.

This is in line with the approach of Pagan and Sossounov (2003), which sets the minimum length for the business cycle at sixteen months, and the minimum length of either a contraction or expansion at four months. The approach stays in line with the common description in the literature, where a decline or increase of 20% or more is also viewed as a bear, in case of a decline, or bull, in case of an increase, phase. Even if the contraction or expansion has a duration below four months. Lunde and Timmermann (2004) find that there is no need for the minimum length restriction, but they make use of the size of the price changes.

Bull market phases are associated with high stock returns and a low variance, whereas bear market phases are associated with low stock returns and a high volatility (Maheu & McCurdy, 2000). Those characteristics are not enough to determine the individual market phases, however it does allow for a robustness check when the different phases have been identified. There is some evidence that over the last years the idiosyncratic risk of individual stocks has increased, meaning that the variance of individual stocks has increased (Campbell, Lettau, Makhiel & Xu, 2001). Therefore in order to test for the volatility of the market phases, the index returns will have to be used.

The Capital asset pricing model (later on CAPM) (Sharpe, 1964) is a model that explains the relation between the asset return and the amount of market risk that the asset is exposed to. Jegadeesh (1990) uses this model in order to determine whether or not a portfolio generates an abnormal return. It states that the only explanatory variable for the return of an asset is its relation to the market movements. This model therefore predicts the return a stock should generate during a period, based upon it's market risk. The equation is as follows:

$$R_a = r_f + \beta(R_m - r_f)$$

Therefore in order to determine the abnormal returns of the portfolios the following equation should hold according to the CAPM.

$$R_p \neq r_f + \beta(R_m - r_f)$$

However, Fama and French (1993) found evidence that the CAPM does not capture all explanatory variables, therefore they developed the Fama-French three factor model. The model states that the market risk is not the only explanatory variable, but that the book-to-market ratio and the market capitalization of an individual stock also explain part of the returns. The model follows the following equation:

$$R_p - r_f = \alpha_{pt} + \beta_1(R_m - r_f) + \beta_2 SMB_t + \beta_3 HML_t + \epsilon_{it}$$

This model generates the expected return on an asset, thus if this model does not hold, abnormal returns are realized. This model will also be used to determine whether or not the portfolios are over- or undervalued during the sentiment conditions. This means that the outcome of the Fama-French three factor model will be used to predict the theoretical value, which will be compared to the perceived value.

As can be seen above, most literature agrees upon the findings that pessimism leads to an undervaluation, while optimism leads to an overvaluation. This however suggests the asymmetric reaction during sentiment conditions to news that is hypothesized in this research. Stambaugh, Yu and Yuan (2011) found that his only holds during optimistic periods, however they look into a situation where short selling is restricted. This is not the case in the data used in this research, therefore I have the tendency to agree with the majority.

For the remainder of this research I will take into account the definition of bear and bull markets in line with that of Pagan and Sossounov (2003), and use the volatility approach of Maheu and McCurdy (2000) as a robustness check. The bear market condition is used as a proxy for a low sentiment condition, as is supported by the findings of Lee, Jiang and Indro (2002). The bull market condition will then represent the high sentiment condition. The effectiveness of the momentum strategy (Jegadeesh & Titman, 1993) and the return reversal strategy (Jegadees, 1990) will be determined by whether or not those strategies manage to generate a positive return.

However, in order to see whether or not the portfolios follow the tendency as suggested by Berger and Turtle (2015), the Fama-French three factor model (Fama & French 1993) will be used to check whether or not the portfolios generate abnormal returns during the holding period. This is to check whether or not the individual portfolios are statistically different from the market portfolio, to determine whether or not active trading does generate an abnormal return and to test whether or not overpricing and underpricing are phenomena associated with the market conditions, as is the case when the predicted asymmetric reaction occurs.

Section 3: Methodology and data

In order to find out whether or not an asymmetrical reaction to news occurs during sentiment periods, which would render both the momentum strategy (Jegadeesh & Titman, 1993) and the return reversal strategy (Jegadeesh, 1990) ineffective, the following methodology will be used.

First the different market phases will be determined in line with the definition by Pagan and Sossounov (2003). They make use of peaks and throughs just as Gonzales, Powell, Shi and Wilson (2005), but require the business cycle to last for at least sixteen months. However, the minimum length of either a contraction or expansion period should last for at least five months. Shorter periods show less economic significance (Gonzales, Powell, Shi & Wilson, 2005). A bear market or a bull market will require a decline or increase of at least 20% respectively. As a robustness check the definition of Maheu and McCurdy (2000) will be used, meaning that the volatility of the bear market phase should be higher than that of the bull market phase.

Therefore a bull market will be defined as a period in a business cycle of at least five months during which the market has had an increase of at least 20%. A bear market will be defined as a period in a business cycle of at least five months during which the market has experienced a decline of at least 20%. The volatility during the bear phase should be higher than the volatility of the bull phase. A business cycle is defined as a period of at least sixteen months from peak to through to peak, or from through to peak and back to through. These market phases will serve the function of a proxy to sentiment, where a bear market is the proxy for low sentiment, and the bull market the proxy for high sentiment, as is supported by the findings of Lee, Jiang and Indro (2002).

In order to test for the effectiveness of the strategies under different time periods this research will make use of three time horizon treatments. The first treatment is the treatment where the formation period takes six months and the holding period as well. This treatment is depicted as 6-6. The second treatment consists of a three month formation and a three month holding period, depicted as 3-3. The last treatment has a formation period of three months, and a holding period of six months, depicted as 3-6.

During the defined market phases, the stocks of the index will be tracked for six months or three months, starting at the turning point that commences the phase. During those periods, the daily stock returns will be observed. At the end of each period, each of the stocks will have a cumulative absolute return over the last period. Those cumulative absolute returns will be ranked from high to low. The top 10% of the stocks, will form the “winner” portfolio, and the worst performing 10% will form the “loser” portfolio in line with Jegadeesh (1990) and Jegadeesh and Titman (1993). Stocks that are removed from or added to the index during the formation period or the holding will be excluded from the research, due to the bad accessibility of the data. The weights of each stock in the portfolio will be equal to its share price at formation. However, due to the fact that some stocks take up a weight of a portfolio greater than 50%, the same analysis will be done in a situation where all the stocks have an equal weight. In order to create a winner and loser portfolio with the same size, the smallest portfolio will be multiplied by a

factor that will make the portfolios equal. This is necessary in order to make sure the strategy is zero cost.

The formed portfolios will then be tracked for the next three or six months after formation, depending upon the time horizon treatment. During this period, the holding period, the daily returns will again be observed, and after six months, the cumulative absolute returns will be registered. From these individual stock returns, the portfolio returns will be derived. From those portfolio returns, the effectiveness of the strategies will be derived. For each market phase both strategies will be compared. This means that for the momentum strategy, the returns will be calculated by subtracting the returns from the loser portfolio from that of the winner portfolio. For the return reversal strategy the returns of the winner portfolio will be subtracted from the returns of the loser portfolio.

Jegadeesh (1990) finds evidence for a negative first order autocorrelation and a higher order positive autocorrelation for the return reversal strategy. This means that the portfolio returns after six months are negatively correlated with the portfolio returns during the formation period. This means that the momentum strategy must exhibit a positive autocorrelation on both the first order and higher order. Therefore a Durbin-Watson test will be used to derive whether or not the portfolio returns exhibit autocorrelation. If either of those strategies generates a positive return and exhibits the correct form of autocorrelation, we can assume that it is an effective strategy during that market phase.

Jegadeesh (1990) used the CAPM (Sharpe, 1964) to test whether or not the initial separate portfolios generated abnormal returns. A test for abnormal returns will be used in order to determine whether or not active portfolio management generates abnormal returns over a passive index investment. This will be done as a robustness check, because the strategies advocate that they generate an abnormal return compared to passive investment. This test will also predict the returns a stock is supposed to have made over a period. Therefore the outcome of the test is the predicted value, which we can then compare to the realized returns. If the returns on the portfolio are lower than the predicted returns, this shows an undervaluation of the portfolio, while the opposite holds for perceived returns which are higher than predicted.

However the CAPM (Sharpe, 1964) is not complete, therefore I will make use of the Fama-French three factor model (Fama & French 1993) in order to determine whether or not the separate portfolios generate an abnormal return. The test for abnormal returns will be used to determine whether or not the active trading can outperform passive trading, but furthermore it shows whether or not there is overpricing in a bull market, and underpricing in a bear market due to asymmetric reactions to news.

The test that will be used to test for autocorrelation is the Durbin-Watson test. Since this research is conducted by the means of time series data, a Dickey-Fuller test needs to be used to determine whether or not the data is stationary. The reason that daily returns are used for this research instead of stock prices is due to the fact that it reduces the chances of non-stationarity. Both of the tests will be run over the twelve-month data, thus both the formation and the holding period.

The index that will be used in this research will be the S&P 500 index, meaning that the portfolios will consist of about 50 stocks each. The choice for this index is due to the fact that it is sufficiently large to be able to exclude stocks that are either added to or removed from the index during the formation and holding periods. This will be done since the S&P 500 index will be used to determine whether or not abnormal returns are generated by the active strategies. If the data allows for it, I will make use of data from 2000 until the present, in order to have conditions that are most comparable to the present.

From this data two twelve-month periods, the bull market phase and the bear market phase, worth of stock prices and returns will be used to determine the portfolios and the returns generated on both strategies. The data has been retrieved from Thomson Reuter's Eikon. Data on the Fama-French three factor model is retrieved from the website of Kenneth French[1].

In order to identify the bull and bear market phase, first the twenty year index prices have been plotted, this graph is found in the appendix under Graph 1. This price data is the total return data, thus meaning that the dividends are reinvested in the index. The choice for this data over the quoted index price is because in my opinion the reinvestment of dividends gives a better overview of the total returns made on the index. From this graph, first the turning points of the market phases are determined. From the graph I have selected March 11th 2003 as the first turning point. At this point, the bull market phase commences. The S&P500 price at that point is documented to be $1152.15. The bull market continues until the second turning point, which is at January 1st 2008, thus a period longer than the minimum of five months. From this point the bear market starts. This turning point is a peak at which the S&P500 price was quoted at $2306.41. The bear market continues from this point until March 9th 2009, at this point the through is reached, where the S&P500 index is quoted at $1095.04, which is a period of fourteen months, therefore above the minimum set in the definition. As stated before, this data assumes the reinvestment of dividends. From these quoted prices we can see that in both cases the price increase and decrease have been above the 20% minimum set in the definition.

The business cycle thus runs from March 11th 2003 up and until March 9th 2009, which more than the minimum length of sixteen months. As a robustness check the average monthly volatility of the market phases has been compared, where the volatility of the bull market phase is supposed to be lower than that of the bear market phase. The bull phase has an average thirty-day volatility of 12.33%, while the monthly volatility of the bear market is on average 36.39%.

The formation period for the strategies started in both market phases at the turning point, thus March 11th 2003 for the bull market, and January 1st 2008 for the bear market. The formation periods end six or three months from the starting point, meaning September 11th 2003 and June 11th 2003 for the bull market, and for the bear market July 1st 2008 and April 1st 2008. The total returns made on each stock are then ordered from high to low, and from this list the top 10% is combined in a winner portfolio,

[1] https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

while the bottom 10% is combined into a loser portfolio. Tables 1 up and until 4 in the appendix give an overview of the stocks that are selected for the 6-6 month horizon treatment, the returns made during the formation period, the stocks' portfolio weights and the returns made during the holding period. Tables 5-8 depict the same information for the 3-3 month horizon treatment portfolios. Tables 9, 10, 11 and 12 show this information for the 3-6 month horizon treatment.

In the bull winner portfolios 6-6, Monster Worldwide has been excluded due to the fact that it day not stay listed in the S&P500 index during the twelve-month period. In the bull loser portfolio Jefferson Pilot has been excluded, due to missing observations and Mirant due to the fact that it did not stay listed in the S&P500 index during the twelve-month period.

In the bear winner portfolios 6-6, the following companies have been excluded because they did not remain listed in the S&P500 index during the formation and holding periods: Anheuser-Busch Cos., Electronic Data Systems, Safeco and William Wrigley Jr. In the bear loser portfolios 6-6 the following companies have been excluded because they did not remain listed in the S&P500 index during the tracking period: Ambac Financial Group, Bear Sterns, Brunswick, Circuit City Stores, Dillards 'A', Fanny Mae, Freddy Mac, Lehman Bros. HDG. Merrill Lynch & Co. Mgic Investment, Wachovia and Washington Mutual.

For the 3-3 month horizon treatment period the following companies have been excluded: In the bull market winner portfolios: Mirant because it didn't stay listed in the S&P500 index. For the bull market loser portfolios Jefferson Pilot has been excluded due to missing observations. For the bear market winner portfolios no companies have been excluded, while for the bear market loser portfolios Ambac Financial Group, Bear Stearns and Countrywide Finl. Have been excluded due to the delisting of those companies.

For the 3-6 month horizon treatment the following companies have been excluded: In the bull market winner portfolios: Mirant because it didn't stay listed in the S&P500 index. For the bull market loser portfolios Jefferson Pilot has been excluded due to missing observations. For the bear market winner portfolios no companies have been excluded, while for the bear market loser portfolios Ambac Financial Group, Bear Stearns and Countrywide Finl., Fannie Mae, Freddie Mac, Lehman Bros. HDG., Mgic investment and Washington Mutual have been excluded due to the delisting of those companies.

Section 4: Analysis and results

As stated in the previous section, the time periods were determined by making use of Graph 1 in the appendix. This graph gave visual aid to the price movements of the S&P500 total return price. From this graph the bull phase was identified as the period starting March 11th 2003 and ending December 31st 2007. At January 1st 2008 the turning point occurred, and from there the bear phase commenced. This period ended on March 9th 2009. This means that the business cycle had a duration of almost six years, which is more than the minimum of fifteen months stated in the definition. Also both the expansion and contraction period were longer than five months, therefore in line with the definition.

In line with the theory of Maheu and McCurdy (2000), the volatility was higher during the bear phase than in the bull phase. The average thirty-day volatility for the bull market was 12.33%, while that of the bear market was 36.39%.

In order to determine whether or not the active trading strategy does generate an abnormal return, opposed to the efficient market hypothesis (Malkiel & Fama, 1970), the Fama-French three Factor model was used to determine the cost of equity that each portfolio should generate. The regression analysis determined the $\beta's$ of the three factors excess market return, Small minus Big and High minus Low, in accordance to the Fama and French (1993) theory. The results show the $\beta's$ and daily values for the factors.

This analysis was done over the six-month formation and a six-month holding period, stated as 6-6, as well as a three-month formation period and a three-month holding period, stated as 3-3, and a three-month formation period with a six-month holding period, stated as 3-6, in order to test whether or not the time horizon of the strategy has an influence on the effectiveness. For each portfolio within a strategy it was done twice, once for a portfolio where the weight of a stock was determined by the stock price, and once in a situation where all stocks had an equal weight. This generated the following costs of equity that should be achieved by the portfolios shown in the table below, together with the actual generated returns:

Figure 1 Fama French predicted returns, components and generated returrns

Portfolio	β1	β2	β3	Benchmark return holding period	Generated return holding period
Bull winner price weight 6-6	1.345634	0.4445166	0.675279	25.35%	13.42%
Bull winner equal weight 6-6	1.36133	0.6886921	0.867899	28.48%	15.11%
Bull Loser price weight 6-6	0.6179852	0.0296091	0.2157669	10.18%	14.82%
Bull loser equal weight 6-6	0.6705481	-0.063747	0.1015626	9.34%	14.85%
Bear winner price weight 6-6	0.0193831	-0.0031557	-0.0144656	-0.12%	-69.87%
Bear winner equal weight 6-6	0.0142192	-0.0012887	-0.0071346	0.09%	-44.17%
Bear Loser price weight 6-6	0.0133864	-0.0046262	0.0136959	0.29%	-50.62%
Bear loser equal weight 6-6	0.0119149	-0.0001262	0.010403	0.31%	-31.31%
Bull winner price weight 3-3	1.436888	0.4256915	0.6957773	13.29%	8.02%
Bull winner equal weight 3-3	1.594718	0.60109	0.9443665	16.33%	7.78%
Bull Loser price weight 3-3	0.7723226	-0.0505114	-0.030932	-0.88%	2.92%
Bull loser equal weight 3-3	0.7683735	-0.0631834	0.0934491	-1.49%	4.19%
Bear winner price weight 3-3	0.4066073	-0.603492	-0.2920195	-0.38%	38.61%
Bear winner equal weight 3-3	1.134936	0.1342564	0.1592544	-1.94%	-0.49%
Bear Loser price weight 3-3	1.712203	0.1133679	1.02024	-6.47%	-15.79%
Bear loser equal weight 3-3	1.539919	0.1857977	1.002978	0.64%	-9.59%
Bull winner price weight 3-6	1.383606	0.4018018	0.613128	13.20%	10.98%
Bull winner equal weight 3-6	1.487281	0.5395767	0.8288559	28.93%	12.35%
Bull Loser price weight 3-6	0.7707991	-0.376257	-0.0324742	3.83%	9.45%
Bull loser equal weight 3-6	0.7796113	-0.0296222	0.0821967	9.17%	13.06%
Bear winner price weight 3-6	0.0124027	-0.012505	-0.114573	-0.92%	-24.26%
Bear winner equal weight 3-6	0.0111528	0.0019795	0.0001955	0.84%	-13.13%
Bear Loser price weight 3-6	0.0163542	-0.0039533	0.0096124	0.89%	-35.17%
Bear loser equal weight 3-6	0.0134672	0.000101	0.0053012	0.88%	-19.56%

The regression tables can be found in the appendix tables 13, 14, 15 and 16 for the 6-6 bull market portfolios and tables 17, 18, 19 and 20 for the 6-6 bear market portfolios. Tables 21 up and until 24 show the regression outcomes for the 3-3 bull market portfolios, and 25 up and until 28 show the outcomes for the 3-3 bear market portfolios. Tables 29 up and until 32 show the outcomes for the 3-6 bull market portfolios, and tables 33 up and until 36 show the outcomes for the 3-6 bear market portfolios.

The figure above shows that in all the bull market portfolio constructs the bull market winner portfolios in both the price weighted as the equal weighted conditions did not perform as was expected with the Fama-French three factor model, while the loser portfolios were outperforming the expectations. This would mean an underreaction to both good and bad news in this sentiment. This thus shows that a symmetrical reaction is present during the bull market phase. The bear winner and loser portfolios drastically underperformed to the benchmark derived with the Fama-French three factor model in the 6-6 and the 3-6 horizon conditions. The 3-3 bear market portfolios show in some cases an outperformance to the Fama-French three factor model derived benchmark. We can see that in most of the bear market conditions sentiment has led to an underperformance of the portfolios, or an asymmetric reaction within the sentiment condition. An asymmetrical reaction occurs when news is not reacted to

in the same way, within a sentiment condition. This means that in this case there is an overreaction to bad news, which pushes the value of the portfolio below the predicted value, but also an underreaction to good news, which leads to an undervaluation of the winner portfolio when compared to the predicted value, this leads to an overall underperformance in the market. When the reaction is an underreaction to bad news and an overreaction to good news, this leads to an overall overperformance of the portfolios, compared to the market. A symmetrical reaction is a situation where on both the good and bad news the reaction is either an overreaction or an underreaction. When a symmetric reaction occurs, one of the portfolios should be undervalued, while the other is overvalued.

These findings are somewhat in line with the findings of Yu and Yuan (2011) whom find that during high sentiment stocks are sold at a discount due to optimism. People are accepting lower risk premia during those sentiment conditions. It could be argued that the winners are the stocks people are optimistic about, and therefore they are the ones that generated a lower return than predicted.

During the bear market condition we see that the asymmetric reaction occurs in most cases as predicted. In this case it means that the 6-6 and the 3-6 bear market portfolios show an underreaction to good news, and an overreaction to bad news. This means that the winners are underpriced, but so are the losers. Thus, both the 6-6 and the 3-6 portfolios underperform to the benchmark. We can argue that the difference between the high and low sentiment conditions is in line with the findings of Chen, Chen and Lee (2013), Lutz (2013) whom state that during low sentiment conditions stock returns are influenced more strongly through sentiment. They argue that there is evidence for an asymmetric reaction between sentiment conditions.

In order to test whether or not the portfolios generated statistically significant abnormal returns during the holding periods, the Fama-French three factor model were tested with a One-sample T-test. The outcomes of these regressions can be found in the appendix tables 37 up and until 60. However as the tables show, the mean of each of the residuals is within the 95% confidence interval, therefore the individual portfolios have not generated an abnormal returns. Thus we cannot statistically support the claim that pessimism has led to underperformance, nor that optimism has led to overperformance.

Because this research makes use of a time series data, the data has been tested on stationarity. This is done by the Dickey-Fuller test to determine whether or not an unit root is present. This was in none of the portfolio returns the case. The results of the Dickey-Fuller tests can be found in the appendix tables 85 up and until 108.

However, to see whether or not the momentum and return reversal strategy were effective, the return of the winner portfolio over the holding period will be subtracted with returns of the loser portfolio over the holding period for momentum strategy, and the returns of the loser portfolio over the holding period will be subtracted with the returns of the winner portfolio over the holding period for the return reversal strategy. When the outcome of the subtraction is positive, the strategy has been effective since it generated a zero cost return. The figure below will show the returns of the momentum strategy and

the return reversal strategy for each possibility, a positive final return means that the strategy has been effective.

	Winner holding period return	Loser holding period return	Momentum strategy return	Return reversal strategy return
Bull market price weighted 6-6	13.42%	14.82%	-1.40%	1.40%
Bull market equal weighted 6-6	15.11%	14.85%	0.26%	-0.26%
Bear market price weighted 6-6	-69.87%	-50.62%	-19.25%	19.25%
Bear market equal weighted 6-6	-44.17%	-31.31%	-12.86%	12.86%
Bull market price weighted 3-3	8.02%	2.92%	5.10%	-5.10%
Bull market equal weighted 3-3	7.78%	4.19%	3.59%	-3.59%
Bear market price weighted 3-3	38.61%	-15.79%	54.40%	-54.40%
Bear market equal weighted 3-3	-0.49%	-9.59%	9.10%	-9.10%
Bull market price weighted 3-6	10.98%	9.45%	1.53%	-1.53%
Bull market equal weighted 3-6	12.35%	13.06%	-0.71%	0.71%
Bear market price weighted 3-6	-24.26%	-35.17%	10.91%	-10.91%
Bear market equal weighted 3-6	-13.13%	-19.56%	6.43%	-6.43%

Figure 2 Strategy returns

As can be seen in the figure above, during the bull market a portfolio that used the stock price as the stocks individual weight in the 6-6 month portfolio managed to make a return when the return reversal strategy was applied. However, when all stocks had an equal weight in the portfolio and a 6-6 month horizon, the return reversal strategy made a small loss, while it made a small return when momentum strategy was applied. These findings are also occurring in the 3-6 month portfolios, while in the 3-3 month condition, the bull market shows evidence of an ideal climate for momentum strategy. As stated before, the bull market portfolios show the tendency of underreacting to news in general, or exhibiting a symmetrical reaction, of which the momentum strategy would benefit.

For the bear market the generated returns on the 6-6 condition are pointing towards the return reversal strategy. Here we see a return of 19.25% and 12.86% for the price weighted and equally weighted portfolios respectively when the return reversal strategy was applied. However, in a shorter time horizon, the evidence points towards the effectiveness of momentum strategy. As the figure above shows, the bear market 3-3 condition generate a return of 54.40% and 9.10% for the price weighted and equally weighted portfolios respectively when applying momentum strategy. In the case of the 3-6 month horizon, the momentum strategy generated 10.91% and 6.43% in the price weighted and equally weighted portfolio constructions respectively. This however, could imply that returns exhibit short term momentum, but longer term return reversal, as suggested by Jegadeesh and Titman (2001). They

however, only find statistical evidence for this phenomena after four years after formation. Furthermore, this finding is not supported by a negative autocorrelation, as would be expected.

In order to stay in line with the initial research of Jegadeesh (1990), the portfolio returns need to be tested for autocorrelation. A first order negative autocorrelation and a higher order positive autocorrelation, would assume that the return reversal strategy is statistically proven. A first order positive autocorrelation would statistically prove that momentum is effective.

In order to test for autocorrelation, the Durbin-Watson test was used. For the 6-6 month horizon, the critical values of dl and du are 1.643 and 1.704 respectively for both the bull and the bear market, since they have above 200 observations and the regression uses 3 regressors. The values of dl and du were 1.482 and 1.604 respectively for both the bull and the bear market, since they have above 100 observations and below 150 observations, and the regression uses 3 regressors. In the case of the 3-6 month horizon, the value for dl is 1.584 and for du 1.665, due to the fact that the regression uses 3 regressors, and the observations are between 150 and 200. Tables 61 up and until 84 in the appendix show the Stata output.

Most of the statistics show no autocorrelation among the portfolio return data, however, the bear market loser price weighted portfolio 6-6 shows evidence of positive autocorrelation. However, as we see in figure 3 above, the bear market price weighted portfolio generates a positive return in the return reversal strategy, which does not align with the findings of a positive autocorrelation.

Furthermore, in the 3-3 time horizon condition, a positive autocorrelation was evident in the cases of the bull market loser price weighted, the bull market loser equally weighted portfolios and the bear market winner equally weighted portfolio. In the case of the bull market, this would partially support the findings of a positive return in the momentum strategy. As stated before, there was also evidence of an overall underreaction when comparing the benchmark returns to the overall returns in the 3-3 month horizon bull market portfolios. Combined with the findings of the autocorrelation, this would support the effectiveness of the momentum strategy in the bull market.

In the 3-6 month horizon treatment, a positive autocorrelation was evident in the Bull market loser portfolios, both price weighted and equally weighted, the bear market winner equally weighted portfolio, and the bear market loser price weighted portfolio. In this treatment, the bull market again showed a symmetrical underreaction to news, which together with the autocorrelation, would be ideal for momentum strategy.

In the case of the bear market however, there is evidence of an asymmetrical reaction to news, since both portfolios are undervalued to the prediction. Furthermore, there is evidence of a positive autocorrelation, which would imply effectiveness of the momentum strategy. This is in both weight treatments one of the portfolios, however it does generate a positive return with the momentum strategy in that period.

The hypotheses as stated in section 1 are:

- H1: During high sentiment conditions, investors tend to overreact to good news and underreact to bad news. During low sentiment, investors tend to underreact to good news and overreact to bad news. This leads to an ineffectiveness of the return reversal and momentum strategies.
- H2; During high sentiment conditions, investors overreact to good news, but react correctly to bad news. During low sentiment conditions, investors overreact to bad news, but react correctly to good news. This allows for the return reversal strategy to be effective.
- H3: During high sentiment conditions, investors tend to react correctly to good news, but underreact to bad news. During low sentiment conditions, investors react correctly to bad news, but underreact to good news. This allows for the momentum strategy to be effective.

For H1, we can see that during the bull market, or the high sentiment condition, in the 6-6 month horizon treatment, a symmetric underreaction to news occurs. The t-test however, does not support the claim that the returns are statistically different from the predicted returns. This would mean that the bull market would be ideal for the momentum strategy (Jegadeesh & Titman, 1993). There is however no positive autocorrelation to support this claim, therefore we cannot attribute the returns to the momentum strategy. Furthermore, as can be seen in figure 2, the strategy has made only a small return in the situation that the portfolio consisted of equally weighted stocks, but not in the case where the price of the stock represented the portfolio weight.

In the 3-3 month horizon treatment, there is again a symmetrical reaction to news, meaning that both the winner and the loser portfolios exhibiting an underreaction to news. This time, there is evidence of positive autocorrelation in both the price and equally weighted portfolios. This would suggest that momentums strategy is effective. This is supported by the generated returns shown in figure 2.

For the 3-6 month horizon treatment, there is evidence of a positive autocorrelation, and an overall underreaction to news. This would suggest a symmetrical reaction. Given those findings, one can assume that momentum strategy would be effective, however, this is not supported by the generated returns depicted in figure 2.

For the bear market, or the low sentiment condition, we can see an undervaluation of both the winner and the loser portfolio of the 6-6 month horizon condition. This undervaluation however does not seem statistically different from the predicted values from the Fama-French three factor model (Fama & French, 1993). However, the asymmetrical reaction, while not statistically different from zero, seems to have occurred. This would mean that during the bear market, or low sentiment conditions, the strategies would be ineffective, since the strategies are built upon the assumption of a symmetrical reaction. We can see in figure 2 that the return reversal strategy (Jegadeesh, 1990) would have generated a positive return, in both portfolio constructs in the 6-6 month horizon treatment. These findings however, are not supported by evidence of a negative autocorrelation, therefore have to be attributed to luck.

Furthermore, there is evidence of a positive autocorrelation in the 3-3 month horizon bear market winner equally weighted portfolio. This would be evidence for an effectiveness of the momentum strategy, which as shown in figure 2, has generated a positive return during the period. During this treatment, the bear market winner price weighted portfolio managed to generate returns above the predicted value, while the bear market loser price weighted portfolio underperformed, this is contrary to the findings of a positive return of the momentum strategy. The 3-6 month horizon treatment shows evidence of a positive autocorrelation and a positive return of the momentum strategy, even though the portfolios generate an overall lower return than expected. Since we find no evidence of an asymmetrical reaction in the bull market condition, H1 needs to be rejected.

For H2, during the 6-6 month horizon treatment in the bull market phase, the results show that the reaction to news was symmetric, an underreaction to both good and bad news. This can be seen in the values of figure 2 above. However, this is in line with the conditions required for momentum strategy (Jegadeesh, Titman, 1993). The t-test however showed no statistical difference from 0.

For the 3-3 month horizon treatment, there again is an underreaction to news in both good and bad news cases. The same holds for the 3-6 month horizon treatment. This would be ideal for a momentum strategy, which is supported by the findings of positive autocorrelation in some of the bull market portfolios of both time horizon treatments.

During the bear market, the evidence suggests an underreaction to good news and an overreaction to bad news, therefore leads to an overall undervaluation. This however is not statistically supported by the t-tests. Furthermore, only one portfolio in the bear market showed a positive autocorrelation, this would hint towards the effectiveness of momentum strategy (Jegadeesh, Titman, 1993) during the bear market. In the 3-3 month horizon treatment, the returns of the individual portfolios show evidence of an overreaction to both good and bad news, this would suggest a symmetrical reaction in this treatment. In the case of the equally weighted portfolios, we see a normal reaction to good news, and an overreaction to bad news, which would be supportive of H2.

However, this evidence is found in the 3-3 month horizon treatment, while in the 3-6 month horizon treatment, the evidence shows an asymmetrical reaction to news in the bear market. The positive autocorrelation that is evident there however, would suggest an effectiveness of the momentum strategy, which is the case according to the strategy's return depicted in figure 2. This means that H2 must be rejected.

For H3, we see that during all the time horizon treatments during the bull market phase, the results are hinting to a symmetrical reaction. However the bear market shows an asymmetrical reaction in the 6-6 and the 3-6 month horizon treatments, while it shows an overreaction to good news and an overreaction to bad news in the price weighted treatment, while it shows a good reaction to good news and an overreaction to bad news in the equally weighted treatment. As stated before, the evidence has no statistical support that the returns are statistically different from zero.

However, there is positive autocorrelation evident in the bull market and bear market portfolios of the 3-3 month horizon treatment, and the 3-6 month horizon treatment. This would suggest a positive climate for momentum strategy. Still H3 needs to be rejected, due to the suggestion of a symmetrical reaction during the bull market in all three time horizon treatments.

Section 5: Discussion and conclusion

During this research, several assumptions and implications that have been made could have had an impact upon the results. Those will be discussed in this section.

First of all, during this research I have taken the findings of Lee, Jiang and Indro (2002), and combined those with the definition of bear and bull markets of Maheu and McCurdy (2000). Lee, Jiang and Indro state that during high volatility, sentiment decreases. The definition of Maheu and McCurdy states that during a bear market volatility increases. Therefore I have assumed that a bear market phase, through its increased volatility, leads to a decrease of sentiment. Thus a bear market is a proxy for low sentiment. A different approach would have been to make use of the Baker and Wurgler sentiment index (Baker & Wurgler, 2006). The make use of several proxies and combine those into a sentiment index. The main reason to make use of the market phases however, was to derive whether or not the phase that the market is in has any predictive value of the effectiveness of active trading strategies. Further research might benefit from the use of this index.

A second issue could have been that true to the findings of Yang and Zhou (2015) and Kim and Ha (2010) that sentiment has most influence upon small stocks which difficult to properly price based upon fundamentals. During my research I have taken only S&P500 stocks, which do not fit the definition given by those two papers. This could lead to less influence of the sentiment conditions. Further research might benefit from the use of less traded indices, or small cap indices.

Thirdly, during this research, I have excluded several stocks from the analysis. The main reason for doing so was because the data was not available after delisting, in most cases. However, during the long-short strategies, the portfolios benefit from for example bankruptcy. If this were to occur in the loser portfolio during a momentum strategy construct, this would lead to great profits on the portfolio. Especially during the bear market phase, a lot of companies were excluded, and some due to bankruptcy during the twelve-month observation period. I however found that the exclusion of those stocks would allow for the excess of better data, and that argument weighted more heavily.

Furthermore, during the research the periods that have been chosen as market conditions were for the bull market from March 11th 2003 up and until December 31st 2007, during which the index had an increase of 100,18% in a period of over 57 months. During the bear market phase, which ran from Januari 1st 2008 up and until March 9th 2009, the index decreased with 52.52%, over a period of 14 months. To clarify, at the end of the bear market, all the returns of the complete bull period and some more, have been lost. Therefore, one could argue that the period of 2008 was not representative of a "normal" bear phase, since it was a complete recession. The phase however, did fit the definition as was derived from the literature, with the volatility check of Maheu and McCurdy (2000) taken into account. Other than that, my aim was to have data from the last two decades because I feel this was more representative of today's market. The main reason for this argument are the findings of Chesney and Jondeau (2001) whom state that over the last years the stock market has shown increasing volatility, therefore I assume that data from too long ago is not completely representative.

Due to the fact that this research is constrained to the duration of the bear and bull market phases, this research has looked into the effectiveness of the return reversal strategy in a time frame that is too short according to the initial strategy, since the strategy assumes the reversal occurs two to three years after formation. There was however a constraint by the duration of the bear market phase due to which the longest time frame to be taken into account was the 6-6 month horizon. The bear market phase that was identified for this research, had a total duration of less than fifteen months, therefore a longer horizon would in my opinion have biased the research. This could however explain why there was no evidence of any negative autocorrelation.

Another issue is that there was no statistical evidence supporting the findings of abnormal returns in the portfolio constructs. I have used daily data in order to derive the benchmark returns. It could have been the case that because of the use of daily data, the daily differences were too small to be significant. The high volatility of daily data could have been a second problem, however this should have been countered by the use of portfolio returns compared to individual stock returns. However, the generated return, compared to the benchmark return, seems to be much lower in the bear market. A possibility could have been to use weekly or monthly data to derive the abnormal returns, but that would have led to few observations, therefore I decided to make use of daily data.

The last issue to be discussed, are implications suggested by Chen, Chen and Lee (2013) and Lutz (2013). They state that the asymmetric reaction that occurs through sentiment is not within the condition, but between the conditions. That said, they argue that the value function of stocks, represents the function that is proposed in prospect theory (Tversky & Kahneman, 1992). This would suggest that while there are some positive abnormal returns to be generated in a high sentiment condition, most of the effect can be found during a low sentiment condition, in the sense of an undervaluation. As can be seen in our data, but is not statistically supported, the low sentiment condition has much higher negative abnormal returns, and the effect is not even evident in the high sentiment condition.

During this research the main topic was to find a relation to the reaction to news within a sentiment condition, for which the market phase is a proxy, and the returns on active trading strategies. The relation between investor sentiment and the returns on active trading strategies, could help investors with the application of the right strategy during the proper market conditions. The main strategies taken into account were the momentum strategy (Jegadeesh, Titman, 1993) and the return reversal strategy (Jegadeesh, 1990). I tried to determine the effect that the market phase would have upon individual portfolios, and the combined strategies, through sentiment. I tried to find out whether or not an asymmetrical reaction to news events would influence the effectiveness of the strategies, which are based upon symmetrical reactions. In order to do so, I took into account three time horizon treatments, which were 6-6, 3-3 and 3-6.

During the research I have looked into the business cycle running from March 11th 2003 up and until March 9th 2009, in which the turning point from bull to bear market occurred on January 1st 2008. At the start of each market phase the formation period commenced. During this period the stock prices

were followed for six months, and afterwards ordered from high to low based upon the cumulative abnormal returns. From the top 10% and the bottom 10% the winners and losers respectively were constructed, with the exception of stocks that did not remain in the index for the full twelve months.

Those stocks were used to construct the winner and loser portfolios, where they each had two constructs. The first was a construct where stock prices determined the weight in the portfolio, and the second was a construct where all stocks had an equal weight.

The portfolios were held on to for three or six months, depending on the time horizon treatment. The total portfolio returns during the periods are mentioned above. From these returns, I could determine whether or not the strategies would have been effective. Furthermore, I predicted the returns of the portfolios by making use of the Fama-French three factor model (Fama & French, 1993) in order to determine whether or not there was an under- or overreaction to news for each portfolio.

The main finding was that during the bull market, the evidence hints towards a climate that supports the implications of momentum strategy (Jegadeesh, Titman, 1993). This means that there was hinting towards a symmetrical reaction to news, where there was an underreaction to both good and bad news. This was supported by the finding of positive autocorrelation in the 3-3 and 3-6 month horizon treatments.

For the bear market, the evidence hints towards an asymmetrical reaction to news. Both the winner and the loser portfolios made a return that was lower than the predicted return. This again was not statistically different according to the t-test. It however did hint towards an underreaction to good news, and an overreaction to bad news. This would have been a climate that was not suitable for either strategy, therefore the returns that were made with the return reversal strategy over this period, would have been through luck. Contrary to those beliefs however, in the 3-3 and the 3-6 month horizon treatments, the momentum strategy did make a positive return, which switched to a positive return for the return reversal strategy in the 6-6 month horizon treatment. This could hint towards a short term momentum which later switches to a longer term return reversal profit. This however I cannot absolutely claim, due to the slight differences amongst the portfolios that were used.

The findings, although not supported statistically, have hinted towards an asymmetrical reaction between sentiment conditions. Meaning that the low sentiment condition does not generate the same effect as the high sentiment condition. This is one of the findings of Chen, Chen and Lee (2013) and Lutz (2013), and they find that the effect is also in line with prospect theory (Tversky & Kahneman, 1992).

In the end I must conclude that although there have been hints, I was not able to find support for an actual asymmetrical reaction, that would render the long-short strategies ineffective. Nor could I find supporting evidence that return reversal is the ideal strategy in a bear market. I did however find some evidence for the effectiveness of momentum strategy. In the bull market, the conditions were ideal for momentum strategy. It showed a positive return, a positive autocorrelation in some portfolios, and it hinted towards a general underreaction to news events. However, this was not bound by the sentiment

condition, since there was a short term positive return in the bear market phase as well. This was however not supported by a general underreaction to news, but it was supported by the findings of positive autocorrelation.

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Appendix

Graph 1 S&P 500 Index price

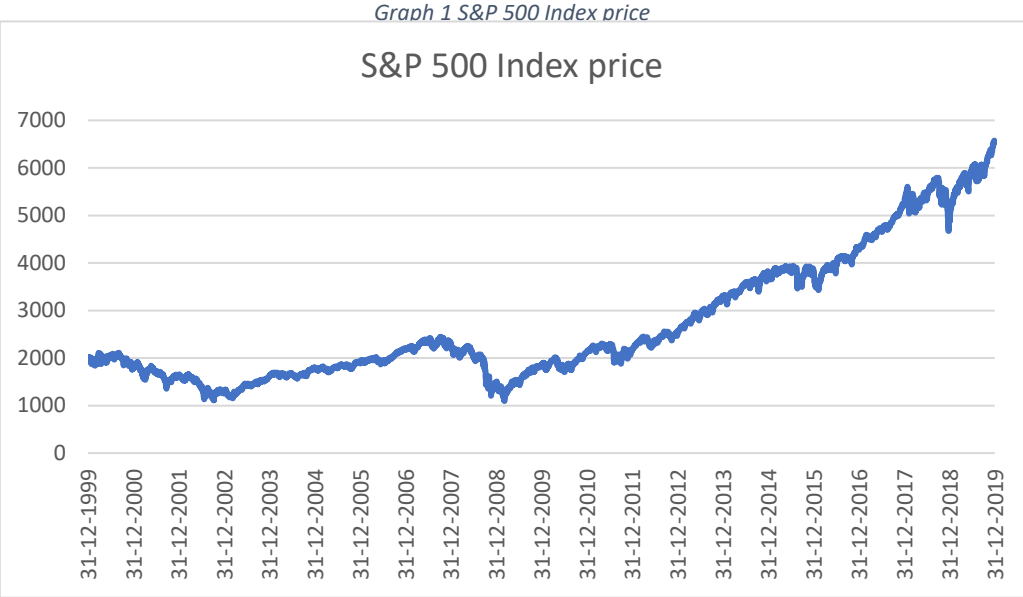

Table 1 Bull market winner portfolio 6-6

Company	ISIN	Return formation period	Portfolio weight	Return holding period
ADVANCED MICRO DEVICES	US0079031078	117,14%	0,011219528	23,36%
AES	US00130H1059	128,08%	0,006670821	12,03%
AGILENT TECHS.	US00846U1016	98,80%	0,015522807	26,75%
ALLEGHENY EN. DEAD - DELIST.28/02/11	US0173611064	94,90%	0,008811389	31,83%
ALLEGHENY TECHS.	US01741R1023	169,39%	0,006089546	73,79%
ALTERA DEAD - DELIST.28/12/15	US0214411003	88,25%	0,020252354	-3,96%
ANDREW DEAD - DELIST.07/01/08	US0344251089	89,69%	0,012898766	24,96%
AVAYA DEAD - MERGER	US0534991098	377,03%	0,009198905	63,29%
BEST BUY	US0865161014	87,42%	0,031333483	-3,22%
BROADCOM 'A' DEAD - ACQD.SEE 54332K	US1113201073	91,80%	0,01661708	46,42%
CA DEAD - DELIST.06/11/18	US12673P1057	93,66%	0,023942989	1,97%
CALPINE DEAD - DELIST.04/02/08	US1313471062	102,31%	0,004853184	4,56%
CAPITAL ONE FINL.	US14040H1059	131,17%	0,054132375	25,28%
CIRCUIT CITY STORES DEAD - DELIST.28/09/11	US1727371080	114,44%	0,00945725	5,37%
CITRIX SYS.	US1773761002	86,75%	0,015216669	-5,36%
CMS ENERGY	US1258961002	116,62%	0,006975298	20,11%
CUMMINS	US2310211063	115,62%	0,011051142	12,54%
DANA DEAD - DELIST.01/02/08	US2358111068	134,55%	0,014282754	30,23%
DELTA AIR LINES DEAD - DELIST.30/04/07	US2473611083	118,22%	0,01359076	-39,99%
DOLLAR GENERAL DEAD - DELIST.12/07/07	US2566691026	111,23%	0,019606494	-5,32%
DYNEGY DEAD - DELIST.02/10/12	US26817G3002	85,50%	0,017115316	3,77%
EMC DEAD - DELIST.07/09/16	US2686481027	95,21%	0,012409757	-1,93%
FREEPORT-MCMORAN	US35671D8570	94,75%	0,014536485	33,10%
GATEWAY DEAD - MERGER	US3676261080	190,09%	0,00567435	-8,94%
GEORGIA PACIFIC DEAD - DELIST.23/12/05	US3732981085	86,95%	0,022595907	30,95%
GOODRICH DEAD - DELIST.27/07/12	US3823881061	83,90%	0,02307569	9,04%
GOODYEAR TIRE & RUB.	US3825501014	108,36%	0,007362815	-1,00%
HUMANA	US4448591028	96,17%	0,01656172	16,04%
INTERPUBLIC GROUP	US4606901001	85,77%	0,013729159	5,44%
LSI DEAD - ACQD.BY 54332K	US5021611026	178,08%	0,010416815	-16,39%
MBNA DEAD - DELIST.18/01/06	US55262L1008	94,49%	0,021802421	15,07%
MCDONALDS	US5801351017	88,29%	0,021664022	23,55%
NATIONAL SEMICON. DEAD - DELIST.26/09/11	US6376401039	105,04%	0,015777461	18,30%
NAVISTAR INTL.	US63934E1082	96,36%	0,037828999	9,10%
NETAPP	US64110D1046	135,35%	0,020455339	-6,90%
NOVELL DEAD - DELIST.28/04/11	US6700061053	132,90%	0,004963903	89,59%
PERKINELMER	US7140461093	96,50%	0,014485739	23,57%
PMC-SIERRA DEAD - DELIST.19/01/16	US69344F1066	161,01%	0,012907993	29,88%
POWER-ONE DEAD - ACQD.BY 922924	US73930R1023	156,99%	0,011025769	2,51%
PROVIDIAN FINL. DEAD - DELIST.20/10/05	US74406A1025	109,33%	0,010140017	11,92%
SANMINA	US8010561020	124,05%	0,048993167	28,47%
SCIENTIFIC ATLANTA DEAD - DELIST.15/03/06	US8086551046	182,38%	0,030899834	-4,57%
SEARS ROEBUCK DEAD - MERGER W/27020T	US8123871084	133,23%	0,040154099	3,40%
SOLECTRON DEAD - MERGER	US8341821077	97,71%	0,005582084	-0,50%
SUPERVALU DEAD - DELIST.23/10/18	US8685363017	96,35%	0,159786002	12,53%
TERADYNE (XSC)	US8807701029	90,50%	0,018877593	11,68%
UNITED STATES STEEL	US9129091081	84,50%	0,018010294	78,07%
UNUM GROUP	US91529Y1064	152,26%	0,013895237	-4,05%
VERITAS SOFTWARE DEAD - DELIST.05/07/05	US9234361098	110,23%	0,030918287	-7,46%
WILLIAMS	US9694571004	137,84%	0,006630132	6,59%

Table 2 Bull market loser portfolio 6-6

Company	ISIN	Return formation period	Portfolio weight	Return holding period
AFLAC	US0010551028	5,33%	0,006702623	25,42%
AMSOUTH BANC. DEAD - DELIST 16/11/06	US0321651020	8,69%	0,009125181	14,93%
ANADARKO PETROLEUM DEAD - DELIST.09/08/19	US0325111070	-4,26%	0,009002893	19,39%
APACHE	US0374111054	7,42%	0,014227523	22,35%
AVERY DENNISON	US0536111091	-3,47%	0,022391271	15,46%
BAKER HUGHES A	US05722G1004	6,60%	0,009153054	13,64%
BALL	US0584981064	4,95%	0,0027715	25,28%
BIOMET DEAD - 26/09/07	US0906131000	9,36%	0,013696205	17,76%
BJ SVS. DEAD - DELIST.30/04/10	US0554821035	4,89%	0,007147496	26,02%
BMC SOFTWARE DEAD - DELIST.11/09/13	US0559211000	-14,12%	0,006232448	27,88%
BURLINGTON RES. DEAD - MERGER 901666	US1220141030	0,08%	0,009964327	26,75%
CARDINAL HEALTH	US14149Y1082	5,76%	0,017410204	16,09%
CLOROX	US1890541097	6,87%	0,019022039	7,29%
COCA COLA EUROPEAN PARTNERS	GB00BDCPN049	1,30%	0,005670431	24,27%
CONAGRA BRANDS	US2058871029	7,66%	0,007560153	19,10%
CONSOLIDATED EDISON	US2091151041	5,99%	0,017010619	8,58%
DEVON ENERGY	US25179M1036	1,12%	0,010478778	13,02%
DTE ENERGY	US2333311072	-9,56%	0,01568654	11,24%
EASTMAN KODAK DEAD - DELIST.03/09/13	US2774611097	-3,38%	0,01169322	-5,41%
EOG RES.	US26875P1012	-2,28%	0,004300094	9,54%
EXXON MOBIL	US30231G1022	9,14%	0,015910031	11,40%
FIRST HORIZON NATIONAL	US3205171057	6,96%	0,014034056	16,50%
FOREST LABS. DEAD - DELIST.01/07/14	US3458381064	5,08%	0,021181046	41,03%
FREDDIE MAC	US3134003017	5,79%	0,022871988	12,41%
GILLETTE DEAD - DELIST.20/10/05	US3757661026	5,45%	0,013784758	15,63%
GT.LAKES CHM. DEAD - MERGER 921448	US3905681033	-1,55%	0,008842655	16,17%
H&R BLOCK	US0936711052	8,93%	0,008669765	28,62%
HCA DEAD - DELIST 20/11/06	US4041191093	-9,19%	0,015412448	13,08%
HILLSHIRE BRANDS DEAD - DELIST.28/08/14	US4325891095	2,95%	0,009580597	15,32%
INTUIT	US4612021034	-0,19%	0,009882099	-8,92%
JOHNSON & JOHNSON	US4781601046	-5,23%	0,0217714	-1,78%
LEXMARK INTL. DEAD - DELIST.29/11/16	US5297711070	8,09%	0,027725539	30,45%
LOEWS	US5404241086	-0,12%	0,005778424	48,41%
MATTEL	US5770811025	-1,88%	0,008349288	-8,48%
NABORS INDUSTRIES	BMG6359F1370	-3,32%	0,396485532	18,05%
NEW YORK TIMES 'A'	US6501111073	1,42%	0,018709995	2,14%
NEWELL BRANDS (XSC)	US6512291062	-5,01%	0,010078181	4,14%
NEXTERA ENERGY	US65339F1012	9,25%	0,013194405	6,89%
NOBLE CORPORATION	GB00BFG3KF26	0,03%	0,006366037	14,87%
REEBOK INTL. DEAD - DELIST.01/02/06	US7581101000	1,51%	0,013632953	22,49%
REYNOLDS AMERICAN DEAD - DELIST.25/07/17	US7617131062	-8,84%	0,001783711	73,29%
SAFECO DEAD - DELIST.03/10/08	US7864291007	8,19%	0,014927514	25,31%
SCHERING-PLOUGH DEAD - 04/11/09	US8066051017	1,76%	0,006814368	3,96%
SLM	US78442P1066	9,05%	0,005706949	8,21%
SOUTHERN	US8425871071	3,63%	0,01228779	3,47%
TENET HEALTHCARE	US88033G4073	-8,35%	0,025739378	-34,80%
TRANSOCEAN	CH0048265513	-5,25%	0,009157144	40,59%
TRIBUNE DEAD - DELIST.22/12/07	US8960471071	8,07%	0,01924553	10,34%
WILLIAM WRIGLEY JR. DEAD - DELIST.17/10/08	US9825261053	6,23%	0,018406384	7,42%
WINN-DIXIE STRS. DEAD - REORG.SEE41408P	US9742801098	-12,58%	0,004423436	-32,22%

Table 3 Bear market winner portfolio 6-6

Company	ISIN	Return formation period	Portfolio weight	Return holding period
AFFILIATED CMP.SVS.'A' DEAD - DELIST.18/02/10	US0081901003	16,16%	0,002683189	-8,76%
ANADARKO PETROLEUM DEAD - DELIST.09/08/19	US0325111070	13,37%	0,003814031	-45,45%
APACHE	US0374111054	32,14%	0,007277746	-44,22%
BIG LOTS	US0893021032	98,75%	0,001627634	-54,28%
BJ SVS. DEAD - DELIST.30/04/10	US0554821035	32,52%	0,001646584	-61,34%
BURL.NTHN.SANTA FE C DEAD - DELIST.26/02/10	US12189T1043	17,29%	0,004999673	-19,64%
CAMERON INTERNATIONAL DEAD - DELIST.04/04/16	US1334281052	19,82%	0,002953608	-61,73%
CELGENE DEAD - DELIST.21/11/19	US1510201049	49,91%	0,001773599	-18,45%
CHESAPEAKE ENERGY	US1651677437	71,84%	0,652633055	-74,36%
CNX RESOURCES	US12653C1080	56,53%	0,004782278	-71,28%
CSX	US1264081035	38,54%	0,00104019	-43,18%
DARDEN RESTAURANTS	US2371941053	15,63%	0,001469367	-7,80%
DEVON ENERGY	US25179M1036	38,34%	0,006299527	-44,32%
DYNEGY DEAD - DELIST.02/10/12	US26817G3002	22,69%	0,002243246	-72,83%
EL PASO DEAD - MERGER.74500P	US28336L1098	25,12%	0,001104722	-61,47%
EOG RES.	US26875P1012	47,38%	0,003368454	-46,49%
FIRSTENERGY	US3379321074	14,22%	0,004231951	-39,90%
FLUOR	US3434121022	31,35%	0,004901595	-49,96%
FREEPORT-MCMORAN	US35671D8570	12,80%	0,002958985	-76,86%
GILEAD SCIENCES	US3755581036	13,39%	0,001335961	0,02%
H&R BLOCK	US0936711052	16,16%	0,001104722	4,36%
HALLIBURTON	US4062161017	42,21%	0,002761037	-63,92%
HASBRO	US4180561072	38,23%	0,001810986	-16,29%
HESS	US42809H1077	25,58%	0,006486976	-54,80%
HUDSON CITY BANC. DEAD - DELIST.02/11/15	US4436831071	12,92%	0,000868618	-10,26%
LSI DEAD - ACQD.BY 54332K	US5021611026	15,07%	0,000312928	-41,57%
MURPHY OIL	US6267171022	18,97%	0,004460946	-52,99%
NABORS INDUSTRIES	BMG6359F1370	79,45%	0,125862503	-73,00%
NATIONAL OILWELL VARCO	US6370711011	23,10%	0,004173913	-70,33%
NOBLE CORPORATION	GB00BFG3KF26	16,40%	0,002943329	-63,89%
NOBLE ENERGY	US6550441058	29,26%	0,002632229	-49,04%
NORFOLK SOUTHERN	US6558441084	21,15%	0,003129789	-19,70%
NORTONLIFELOCK	US6687711084	22,30%	0,000584115	-25,02%
NUCOR	US6703461052	21,97%	0,003699308	-33,13%
OCCIDENTAL PTL.	US6745991058	18,77%	0,004492275	-32,02%
PEABODY ENERGY DEAD - DELIST.04/04/17	US7045492037	39,34%	0,065983705	-70,82%
QUALCOMM	US7475251036	16,44%	0,002346702	-19,14%
QUESTAR DEAD - DELIST.19/09/16	US7483561020	35,69%	0,001211251	-53,40%
RANGE RES.	US75281A1097	30,69%	0,003437596	-44,76%
ROWAN COMPANIES CL.A DEAD - DELIST.11/04/19	GB00B6SLMV12	17,00%	0,002364627	-62,64%
RYDER SYSTEM	US7835491082	45,48%	0,003502639	-40,90%
SMITH INTL. DEAD - DELIST.30/08/10	US8321101003	15,72%	0,004376891	-70,71%
TECO ENERGY DEAD - DELIST.01/07/16	US8723751009	25,22%	0,001103698	-41,02%
UNION PACIFIC	US9078181081	17,26%	0,001886017	-31,93%
UNITED STATES STEEL	US9129091081	45,03%	0,008980667	-77,47%
VALARIS A	GB00BJVJZD68	34,03%	0,016370571	-62,04%
WALMART	US9311421039	19,99%	0,00292083	0,26%
WASTE MANAGEMENT	US94106L1098	13,44%	0,001898053	-8,85%
WEATHERFORD INTL. DEAD - DELIST.14/01/20	IE00BLNN3691	32,95%	0,001605611	-75,73%
XTO EN. DEAD - DELIST.08/07/10	US98385X1063	34,66%	0,003542076	-45,66%

Table 4 Bear market loser portfolio 6-6

Company	ISIN	Return formation period	Portfolio weight	Return holding period
AMERICAN INTL.GP.	US0268747849	-54,15%	0,257970121	-93,68%
ANDEAVOR DEAD - DELIST.14/11/18	US03349M1053	-61,91%	0,007222761	-24,80%
ANTHEM	US0367521038	-46,88%	0,026840563	-5,90%
AUTONATION	US05329W1027	-36,65%	0,005713699	7,26%
BANK OF AMERICA	US0605051046	-42,29%	0,01371403	-39,82%
CENTEX DEAD - DELIST.19/08/09	US1523121044	-45,65%	0,007908174	-20,83%
CIGNA	US1255231003	-34,95%	0,020130422	-49,10%
CINCINNATI FINL.	US1720621010	-36,27%	0,014514639	14,96%
CIT GROUP DEAD - DELIST.10/12/09	US1255811085	-63,25%	0,005085883	-48,13%
CITIGROUP	US1729674242	-41,81%	0,098664987	-58,32%
CME GROUP	US12572Q1058	-47,61%	0,041400071	-40,85%
COCA COLA EUROPEAN PARTNERS	GB00BDCPN049	-34,65%	0,007041558	-27,34%
COMERICA	US2003401070	-37,93%	0,015562919	-22,46%
COVENTRY HEALTH CARE DEAD - ACQD.BY 255956	US2228621049	-48,86%	0,017452126	-49,54%
EASTMAN KODAK DEAD - DELIST.03/09/13	US2774611097	-34,66%	0,008230722	-51,92%
EXPEDIA GROUP	US30212P3038	-42,38%	0,009869436	-51,76%
FIFTH THIRD BANCORP	US3167731005	-57,78%	0,006111124	-19,04%
FIRST HORIZON NATIONAL	US3205171057	-56,47%	0,003790682	48,80%
GOODYEAR TIRE & RUB.	US3825501014	-36,11%	0,010384879	-63,89%
HARMAN INTL.INDS. DEAD - DELIST.13/03/17	US4130861093	-46,85%	0,022566808	-53,55%
HUMANA	US4448591028	-46,79%	0,023079428	-6,99%
HUNTINGTON BCSH.	US4461501045	-59,15%	0,003473146	32,34%
INTERCONTINENTAL EX.	US45866F1049	-40,13%	0,013276287	-26,62%
INTERNATIONAL GAME TECH. DEAD - ACQD.BY 9437JT	US4599021023	-44,73%	0,01398474	-47,28%
JUNIPER NETWORKS	US48203R1041	-34,49%	0,012527516	-15,45%
KEYCORP	US4932671088	-51,51%	0,006548867	-21,99%
LEGG MASON	US5249011058	-43,61%	0,023759082	-44,85%
MANITOWOC	US5635714059	-35,41%	0,015356373	-69,91%
MARSHALL & ILSLEY DEAD - DELIST.06/07/11	US5718371033	-41,09%	0,008985253	-11,67%
MBIA	US55262C1009	-77,03%	0,002465185	5,14%
MEREDITH	US5894331017	-50,13%	0,01579331	-35,67%
MONSTER WORLDWIDE DEAD - DELIST.01/11/16	US6117421072	-39,85%	0,011225806	-35,40%
MOTOROLA SOLUTIONS	US6200763075	-54,05%	0,017385197	-36,63%
NEWELL BRANDS (XSC)	US6512291062	-35,01%	0,009687946	-37,46%
NVIDIA	US67066G1040	-44,89%	0,010799583	-53,55%
NYSE EURONEXT DEAD - MERGER.30730Q	US6294911010	-43,59%	0,028516658	-42,60%
PRINCIPAL FINL.GP.	US74251V1026	-40,49%	0,023597808	-42,40%
QWEST COMMS.INTL. DEAD - DELIST.01/04/11	US7491211097	-44,79%	0,002229034	-4,65%
REGIONS FINL.NEW	US7591EP1005	-50,99%	0,006675582	-25,71%
ROCKWELL AUTOMATION	US7739031091	-37,06%	0,024997434	-21,57%
SANDISK DEAD - DELIST.13/05/16	US80004C1018	-46,88%	0,010148728	-37,12%
SUN MICROSYSTEMS DEAD - ACQD.BY 719618	US8668102036	-40,76%	0,006186001	-60,71%
SUNOCO DEAD - DELIST.05/10/12	US86764P1093	-43,82%	0,019502606	7,83%
SUNTRUST BANKS DEAD - DELIST.09/12/19	US8679141031	-42,31%	0,020763998	-17,00%
TEGNA	US87901J1051	-46,56%	0,006148678	-58,83%
TITANIUM METALS DEAD - ACQD.BY 997350	US8883392073	-48,32%	0,007873616	-32,26%
UNITEDHEALTH GROUP	US91324P1021	-55,96%	0,01476231	7,65%
VALERO ENERGY	US91913Y1001	-42,34%	0,021245515	-42,45%
WHOLE FOODS MARKET DEAD - DELIST.29/08/17	US9668371068	-42,01%	0,006813817	-58,24%
XL GROUP DEAD - DELIST.12/09/18	BMG982941046	-58,54%	0,012014896	-81,35%

Table 5 Bull market winner portfolio 3-3

Company	ISIN	Return Formation period	Portfolio weight	Return holding period
AES	US00130H1059	150.47%	0.008430369	-8.94%
ALLEGHENY EN. DEAD - DELIST.28/02/11	US0173611064	78.78%	0.009301012	9.02%
ALLEGHENY TECHS.	US01741R1023	197.14%	0.007729608	-9.34%
APPLIED MICRO CIRCUITS DEAD - DELIST.27/01/17	US03822W4069	86.57%	0.026543984	-8.96%
AVAYA DEAD - MERGER	US0534991098	234.93%	0.007432315	42.43%
BROADCOM 'A' DEAD - ACQD.SEE 54332K	US1113201073	87.54%	0.018697582	2.27%
CA DEAD - DELIST.06/11/18	US12673P1057	73.06%	0.024622199	11.90%
CALPINE DEAD - DELIST.04/02/08	US1313471062	134.62%	0.006476732	-13.77%
CAPITAL ONE FINL.	US14040H1059	109.54%	0.056464363	10.32%
CENTEX DEAD - DELIST.19/08/09	US1523121044	76.06%	0.040527355	-14.25%
CHARLES SCHWAB	US8085131055	72.26%	0.011997881	0.09%
CITRIX SYS.	US1773761002	105.05%	0.019227188	-8.93%
CMS ENERGY	US1258961002	135.24%	0.008717044	-7.92%
COMPUWARE DEAD - DELIST.16/12/14	US2056381096	83.23%	0.006381174	-4.16%
COMVERSE TECH. DEAD - ACQD.BY 25519F	US2058624022	70.57%	0.009290394	1.37%
CONCORD EFS DEAD - MERGER 325518	US2061971055	100.88%	0.017062473	-11.01%
CUMMINS	US2310211063	75.92%	0.010376043	22.56%
DANA DEAD - DELIST.01/02/08	US2358111068	71.21%	0.011997881	36.99%
DELTA AIR LINES DEAD - DELIST.30/04/07	US2473611083	125.93%	0.01619183	-3.41%
DOLLAR GENERAL DEAD - DELIST.12/07/07	US2566691026	87.77%	0.020056634	12.49%
DYNEGY DEAD - DELIST.02/10/12	US26817G3002	110.00%	0.022296946	-11.67%
EL PASO DEAD - MERGER.74500P	US28336L1098	97.84%	0.009704481	-15.32%
FORD MOTOR	US3453708600	71.67%	0.012029734	2.38%
GATEWAY DEAD - MERGER	US3676261080	82.08%	0.004098391	59.33%
GOODYEAR TIRE & RUB.	US3825501014	80.42%	0.007336757	15.48%
INTERPUBLIC GROUP	US4606901001	78.65%	0.015193776	3.98%
JANUS CAPITAL GP. DEAD - DELIST.30/05/17	US47102X1054	68.70%	0.01791188	-14.05%
JP MORGAN CHASE & CO.	US46625H1005	66.46%	0.036673168	-1.56%
LSI DEAD - ACQD.BY 54332K	US5021611026	76.11%	0.007591579	57.90%
MBNA DEAD - DELIST.18/01/06	US55262L1008	81.07%	0.023358706	7.41%
MCDERMOTT INTL.	PAL1201471A1	76.47%	0.003288269	-9.84%
MCDONALDS	US5801351017	73.54%	0.022976472	8.50%
MICRON TECHNOLOGY	US5951121038	71.35%	0.014100164	2.79%
MONSTER WORLDWIDE DEAD - DELIST.01/11/16	US6117421072	183.05%	0.022689797	28.73%
NAVISTAR INTL.	US63934E1082	67.77%	0.03719343	17.04%
NETAPP	US64110D1046	84.61%	0.018463995	27.49%
NOVELL DEAD - DELIST.28/04/11	US6700061053	66.67%	0.004087774	39.74%
NVIDIA	US67066G1040	111.28%	0.009145252	-25.12%
PERKINELMER	US7140461093	71.46%	0.014546103	14.60%
PMC-SIERRA DEAD - DELIST.19/01/16	US69344F1066	126.87%	0.012910994	15.05%
PROVIDIAN FINL. DEAD - DELIST.20/10/05	US74406A1025	88.57%	0.010511418	11.01%
SABRE HDG. DEAD - DELIST 12/04/07	US7859051002	65.93%	0.02642719	-0.12%
SCIENTIFIC ATLANTA DEAD - DELIST.15/03/06	US8086551046	84.49%	0.023231295	53.06%
SEARS ROEBUCK DEAD - MERGER W/27020T	US8123871084	77.97%	0.035261028	31.04%
SUN MICROSYSTEMS DEAD - ACQD.BY 719618	US8668102036	68.85%	0.023018943	-27.68%
SUPERVALU DEAD - DELIST.23/10/18	US8685363017	73.02%	0.162024478	13.49%
TOYS R US HOLDINGS DEAD - DELIST.08/08/05	US8923351006	65.06%	0.013792254	0.23%
UNUM GROUP	US91529Y1064	134.51%	0.014864631	7.57%
VERITAS SOFTWARE DEAD - DELIST.05/07/05	US9234361098	78.11%	0.030143348	18.03%
WILLIAMS	US9694571004	137.03%	0.007603683	0.34%

Table 6 Bull market loser portfolio 3-3

Company	ISIN	Return Formation period	Portfolio weight	Return holding period
3M	US88579Y	5.74%	0.046674987	8.03%
AFLAC	US001055	5.67%	0.011632271	-0.31%
ALBERTO CULVER DEAD - DELIST.11/05/11	US013078	3.98%	0.00933062	14.78%
ALBERTSONS DEAD - DELIST.07/07/06	US013104	9.65%	0.014429998	11.12%
ANADARKO PETROLEUM DEAD - DELIST.09/08/19	US032511	4.08%	0.016932267	-8.01%
APACHE	US037411	8.48%	0.024858552	-0.98%
APARTMENT INV.& MAN.'A'	US03748R	4.47%	0.01814729	5.83%
AVERY DENNISON	US053611	2.62%	0.041181667	-5.93%
BALL	US058498	-2.86%	0.004438209	8.03%
BAXTER INTL.	US071813	-4.69%	0.010482686	15.92%
BIOMET DEAD - 26/09/07	US090613	2.15%	0.022133778	7.05%
BMC SOFTWARE DEAD - DELIST.11/09/13	US055921	7.09%	0.013445139	-19.80%
CLOROX	US189054	6.40%	0.032762952	0.45%
COCA COLA EUROPEAN PARTNERS	GB00BDCF	2.22%	0.009899212	-0.90%
CONOCOPHILLIPS	US20825C	9.03%	0.015374221	2.17%
DANAHER	US235851	9.72%	0.009593103	9.42%
DILLARDS 'A'	US254067	7.92%	0.009936126	11.31%
DTE ENERGY	US233331	0.00%	0.030005349	-9.56%
EASTMAN CHEMICAL	US277432	10.14%	0.01192408	8.11%
EASTMAN KODAK DEAD - DELIST.03/09/13	US277461	8.64%	0.022746579	-11.06%
EOG RES.	US26875P	8.34%	0.008247276	-9.80%
FREDDIE MAC	US313400	-2.48%	0.036476233	8.48%
GILLETTE DEAD - DELIST.20/10/05	US375766	6.03%	0.023979475	-0.55%
GT.LAKES CHM. DEAD - MERGER 921448	US390568	3.94%	0.016151676	-5.28%
HCA DEAD - DELIST 20/11/06	US404119	-20.27%	0.023410446	13.90%
HEALTH MAN.ASSOCS. DEAD - DELIST.27/01/14	US421933	3.77%	0.013437844	17.81%
HILLSHIRE BRANDS DEAD - DELIST.28/08/14	US432589	-0.14%	0.016078723	3.09%
INTL.FLAVORS & FRAG.	US459506	4.66%	0.022797645	4.58%
INTUIT	US461202	1.64%	0.017410106	-1.80%
JC PENNEY CO.	US708160	-0.65%	0.01347432	16.08%
JOHNSON & JOHNSON	US478160	-2.72%	0.038664806	-2.58%
JONES GROUP DEAD - DELIST.09/04/14	US48020T	8.08%	0.021375072	7.06%
KOHL'S	US500255	1.68%	0.037606996	13.35%
MATTEL	US577081	1.83%	0.014991732	-3.65%
MAXIM INTEGRATED PRDS.	US57772K	8.66%	0.026634945	15.67%
MICROSOFT	US594918	9.17%	0.018150573	13.91%
NEW YORK TIMES 'A'	US650111	9.28%	0.034878574	-7.20%
NOBLE CORPORATION	GB00BFG3	8.22%	0.011915326	-7.57%
NORTONLIFELOCK	US668771	10.00%	0.004902989	27.83%
PACTIV DEAD - DELIST.17/11/10	US695257	1.66%	0.013401368	9.42%
PEPSI BOTTLING GP. DEAD - DELIST.11/03/10	US713409	8.02%	0.014736398	3.22%
QUALCOMM	US747525	-2.64%	0.012263309	27.36%
REEBOK INTL. DEAD - DELIST.01/02/06	US758110	4.36%	0.024249399	-2.74%
REYNOLDS AMERICAN DEAD - DELIST.25/07/17	US761713	-3.02%	0.003282861	-6.00%
SAFECO DEAD - DELIST.03/10/08	US786429	8.65%	0.025934601	-0.42%
STARBUCKS	US855244	8.52%	0.004439157	19.80%
SUNOCO DEAD - DELIST.05/10/12	US86764P	5.84%	0.011759937	3.91%
TENET HEALTHCARE	US88033G	-2.70%	0.047273124	-5.80%
WILLIAM WRIGLEY JR. DEAD - DELIST.17/10/08	US982526	8.74%	0.032595161	-2.31%
ZIMMER BIOMET HDG.	US98956P	5.07%	0.033550839	13.89%

Table 7 Bear market winner portfolio 3-3

Name	ISIN	Return Formation period	Portfolio weight	Return holding period
AFFILIATED CMP.SVS.'A' DEAD - DELIST.18/02/10	US008190	11.11%	0.004043026	4.55%
ALLERGAN DEAD - DELIST.11/05/20	IE00BY9D5	8.03%	0.002365626	-7.13%
ALTABA DEAD - DELIST.12/10/19	US021346	24.38%	0.00233416	-30.18%
APACHE	US037411	12.35%	0.009748123	17.61%
APPLIED MATS.	US038222	9.85%	0.001574126	-1.18%
BIG LOTS	US089302	39.46%	0.001799231	42.51%
BIOGEN	US09062X	8.38%	0.004584619	-3.81%
BJ SVS. DEAD - DELIST.30/04/10	US055482	17.52%	0.002300273	12.77%
BOSTON SCIENTIFIC	US101137	10.66%	0.001038391	-5.28%
BURL.NTHN.SANTA FE C DEAD - DELIST.26/02/10	US12189T	10.80%	0.007440589	5.86%
CATERPILLAR	US149123	7.90%	0.006316674	-5.36%
CELGENE DEAD - DELIST.21/11/19	US151020	32.64%	0.002472128	13.02%
CHESAPEAKE ENERGY	US165167	17.73%	0.704397819	45.96%
CSX	US126408	27.49%	0.001507966	8.67%
D R HORTON	US23331A	19.59%	0.001270758	-29.14%
DARDEN RESTAURANTS	US237194	17.47%	0.002351628	-1.57%
DEVON ENERGY	US25179M	17.34%	0.00841766	17.90%
DISCOVER FINANCIAL SVS.	US254709	8.55%	0.001320781	-14.48%
DYNEGY DEAD - DELIST.02/10/12	US26817G	10.50%	0.003182945	11.03%
E TRADE FINANCIAL	US269246	8.73%	0.003114365	-17.36%
EOG RES.	US26875P	34.45%	0.004840981	9.62%
EQUITY RESD.TST.PROPS. SHBI	US29476L	13.76%	0.003347539	-7.95%
FOREST LABS. DEAD - DELIST.01/07/14	US345838	9.77%	0.003228128	-13.85%
GILEAD SCIENCES	US375558	12.00%	0.002078798	1.24%
H&R BLOCK	US093671	11.79%	0.00167498	3.90%
HASBRO	US418056	9.07%	0.002251056	26.74%
HUDSON CITY BANC. DEAD - DELIST.02/11/15	US443683	17.71%	0.001426476	-4.07%
JOHNSON CONTROLS INTL.	IE00BY7QL	11.10%	0.00163626	-9.15%
KB HOME	US48666K	14.49%	0.001995291	-29.60%
NABORS INDUSTRIES	BMG6359F	23.29%	0.136233206	45.54%
NEW YORK TIMES 'A'	US650111	7.70%	0.001523296	-17.16%
NORFOLK SOUTHERN	US655844	7.69%	0.004382702	12.50%
NUCOR	US670346	14.39%	0.005465468	6.63%
PUBLIC STORAGE	US74460D	20.72%	0.00715013	-8.23%
PULTEGROUP	US745867	38.05%	0.001173938	-32.51%
QLOGIC DEAD - DELIST.17/08/16	US747277	8.10%	0.001238484	-5.80%
RANGE RES.	US75281A	23.54%	0.005119338	5.78%
RYDER SYSTEM	US783549	29.57%	0.004914403	12.28%
SEALED AIR	US81211K	9.12%	0.002037246	-25.43%
SIGMA ALDRICH DEAD - DELIST.19/11/15	US826552	9.25%	0.004812742	-9.66%
SITE CENTERS (NYS)	US82981J1	9.38%	0.00557819	-17.91%
STARWOOD H&R.WORLDWIDE DEAD - DELIST.23/09/16	US85590A	17.54%	0.003903445	-25.28%
TENET HEALTHCARE	US88033G	11.42%	0.001826664	-0.18%
TERADYNE (XSC)	US880770	20.12%	0.001002083	-9.42%
TJX	US872540	15.11%	0.000667047	-3.48%
V F	US918204	12.89%	0.001471586	-2.92%
WALMART	US931142	10.84%	0.004250382	8.26%
XILINX	US983919	8.60%	0.001916222	2.27%
XTO EN. DEAD - DELIST.08/07/10	US98385X	20.44%	0.004991052	11.80%
ZIMMER BIOMET HDG.	US98956P	17.70%	0.00628198	-13.07%

Table 8 Bear market loser portfolio 3-3

Name	ISIN	Return Formation period	Portfolio weight	Return holding period
AETNA DEAD - DELIST.29/11/18	US00817Y	-27.09%	0.016211128	-5.16%
ALPHABET A	US02079K	-36.30%	0.084906642	21.40%
AMERICAN INTL.GP.	US026874	-25.81%	0.279116423	-38.20%
ANDEAVOR DEAD - DELIST.14/11/18	US03349M	-43.92%	0.007109941	-32.07%
ANTHEM	US036752	-49.70%	0.016996842	5.60%
APOLLO EDUCATION GP.'A' DEAD - DELIST.02/02/17	US037604	-38.42%	0.016638649	7.08%
APPLE	US037833	-27.55%	0.007895655	21.73%
AUTODESK	US052769	-36.74%	0.012124645	10.04%
BROADCOM 'A' DEAD - ACQD.SEE 54332K	US111320	-26.28%	0.007421916	40.94%
CHARLES SCHWAB	US808513	-26.30%	0.007252448	10.89%
CIT GROUP DEAD - DELIST.10/12/09	US125581	-50.69%	0.004564074	-25.49%
CITIGROUP	US172967	-27.24%	0.082499969	-20.03%
CME GROUP	US12572Q	-31.62%	0.036135102	-23.39%
CONSTELLATION BRANDS 'A'	US21036P	-25.25%	0.00680567	17.43%
COVENTRY HEALTH CARE DEAD - ACQD.BY 255956	US222862	-31.90%	0.015540961	-24.91%
CUMMINS	US231021	-26.48%	0.018032906	39.02%
EXPEDIA GROUP	US30212P	-30.77%	0.00792901	-16.77%
FANNIE MAE	US313586	-34.17%	0.010137251	-25.57%
FREDDIE MAC	US313400	-25.68%	0.009752097	-35.98%
HARMAN INTL.INDS. DEAD - DELIST.13/03/17	US413086	-40.93%	0.016769602	-10.01%
HUMANA	US444859	-40.43%	0.017278005	-10.68%
HUNTINGTON BCSH.	US446150	-27.17%	0.004140405	-43.91%
INTERCONTINENTAL EX.	US45866F	-32.21%	0.010052517	-11.69%
JABIL	US466313	-38.05%	0.003643556	74.31%
JANUS CAPITAL GP. DEAD - DELIST.30/05/17	US47102X	-29.16%	0.008962532	13.06%
JUNIPER NETWORKS	US48203R	-24.70%	0.009628848	-13.00%
LEHMAN BROS.HDG. DEAD - DELIST.06/03/12	US524908	-42.48%	0.014497193	-44.31%
MARATHON OIL	US565849	-25.07%	0.010661831	15.75%
MBIA	US55262C	-34.41%	0.004706581	-64.98%
MERCK & COMPANY	US58933Y	-34.69%	0.014616591	1.08%
MEREDITH	US589433	-30.43%	0.014732137	-28.31%
MGIC INVESTMENT	US552848	-53.05%	0.004055671	-37.89%
MONSTER WORLDWIDE DEAD - DELIST.01/11/16	US611742	-25.28%	0.009324576	-19.50%
MOTOROLA SOLUTIONS	US620076	-42.02%	0.014669819	-20.75%
NATIONAL CITY DEAD - DELIST.12/01/09	US635405	-39.55%	0.003832281	-53.77%
NVIDIA	US67066G	-41.83%	0.007622196	-5.26%
NYSE EURONEXT DEAD - MERGER.30730Q	US629491	-29.69%	0.023767848	-19.77%
PREC.CASTPARTS DEAD - DELIST/01/02/16	US740189	-26.40%	0.039316512	-3.48%
QWEST COMMS.INTL. DEAD - DELIST.01/04/11	US749121	-35.38%	0.001744747	-14.57%
SANDISK DEAD - DELIST.13/05/16	US80004C	-31.96%	0.008692924	-21.93%
SCHERING-PLOUGH DEAD - 04/11/09	US806605	-45.91%	0.005550068	36.78%
SPRINT NEXTEL DEAD - DELIST.11/07/13	US852061	-49.05%	0.00257668	31.99%
SUNOCO DEAD - DELIST.05/10/12	US86764P	-27.58%	0.016811969	-22.43%
TEGNA	US87901J1	-25.51%	0.00573136	-28.26%
TITANIUM METALS DEAD - ACQD.BY 997350	US888339	-43.10%	0.005796566	-9.17%
UNITEDHEALTH GROUP	US91324P	-40.96%	0.013233889	-25.41%
VALERO ENERGY	US91913Y	-29.87%	0.017278236	-17.78%
WACHOVIA DEAD - DELIST.12/01/09	US929903	-29.00%	0.010399156	-40.26%
WATERS	US941848	-29.56%	0.021453073	17.63%
XL GROUP DEAD - DELIST.12/09/18	BMG9829	-41.26%	0.011381298	-29.41%

Table 9 Bull market winner portfolio 3-6

Company	ISIN	Return Formation period	Portfolio weight	Return holding period
AES	US00130H1059	150.47%	0.008430369	-0.76%
ALLEGHENY EN. DEAD - DELIST.28/02/11	US0173611064	78.78%	0.009301012	19.52%
ALLEGHENY TECHS.	US01741R1023	197.14%	0.007729608	47.12%
APPLIED MICRO CIRCUITS DEAD - DELIST.27/01/17	US03822W4069	86.57%	0.026543984	-5.12%
AVAYA DEAD - MERGER	US0534991098	234.93%	0.007432315	67.71%
BROADCOM 'A' DEAD - ACQD.SEE 54332K	US1113201073	87.54%	0.018697582	28.45%
CA DEAD - DELIST.06/11/18	US12673P1057	73.06%	0.024622199	2.76%
CALPINE DEAD - DELIST.04/02/08	US1313471062	134.62%	0.006476732	-28.20%
CAPITAL ONE FINL.	US14040H1059	109.54%	0.056464363	5.28%
CENTEX DEAD - DELIST.19/08/09	US1523121044	76.06%	0.040527355	24.44%
CHARLES SCHWAB	US8085131055	72.26%	0.011997881	-2.12%
CITRIX SYS.	US1773761002	105.05%	0.019227188	-0.31%
CMS ENERGY	US1258961002	135.24%	0.008717044	-4.63%
COMPUWARE DEAD - DELIST.16/12/14	US2056381096	83.23%	0.006381174	-6.99%
COMVERSE TECH. DEAD - ACQD.BY 25519F	US2058624022	70.57%	0.009290394	7.66%
CONCORD EFS DEAD - MERGER 325518	US2061971055	100.88%	0.017062473	-20.04%
CUMMINS	US2310211063	75.92%	0.010376043	19.24%
DANA DEAD - DELIST.01/02/08	US2358111068	71.21%	0.011997881	49.91%
DELTA AIR LINES DEAD - DELIST.30/04/07	US2473611083	125.93%	0.01619183	-24.26%
DOLLAR GENERAL DEAD - DELIST.12/07/07	US2566691026	87.77%	0.020056634	7.20%
DYNEGY DEAD - DELIST.02/10/12	US26817G3002	110.00%	0.022296946	-5.00%
EL PASO DEAD - MERGER.74500P	US28336L1098	97.84%	0.009704481	-25.71%
FORD MOTOR	US3453708600	71.67%	0.012029734	21.27%
GATEWAY DEAD - MERGER	US3676261080	82.08%	0.004098391	14.25%
GOODYEAR TIRE & RUB.	US3825501014	80.42%	0.007336757	-5.64%
INTERPUBLIC GROUP	US4606901001	78.65%	0.015193776	-0.91%
JANUS CAPITAL GP. DEAD - DELIST.30/05/17	US47102X1054	68.70%	0.01791188	-15.95%
JP MORGAN CHASE & CO.	US46625H1005	66.46%	0.036673168	1.27%
LSI DEAD - ACQD.BY 54332K	US5021611026	76.11%	0.007591579	22.24%
MBNA DEAD - DELIST.18/01/06	US55262L1008	81.07%	0.023358706	11.50%
MCDERMOTT INTL.	PAL1201471A1	76.47%	0.003288269	82.00%
MCDONALDS	US5801351017	73.54%	0.022976472	19.22%
MICRON TECHNOLOGY	US5951121038	71.35%	0.014100164	-9.64%
MONSTER WORLDWIDE DEAD - DELIST.01/11/16	US6117421072	183.05%	0.022689797	4.49%
NAVISTAR INTL.	US63934E1082	67.77%	0.03719343	23.21%
NETAPP	US64110D1046	84.61%	0.018463995	16.62%
NOVELL DEAD - DELIST.28/04/11	US6700061053	66.67%	0.004087774	131.43%
NVIDIA	US67066G1040	111.28%	0.009145252	-18.92%
PERKINELMER	US7140461093	71.46%	0.014546103	17.45%
PMC-SIERRA DEAD - DELIST.19/01/16	US69344F1066	126.87%	0.012910994	59.87%
PROVIDIAN FINL. DEAD - DELIST.20/10/05	US74406A1025	88.57%	0.010511418	16.26%
SABRE HDG. DEAD - DELIST 12/04/07	US7859051002	65.93%	0.02642719	-19.20%
SCIENTIFIC ATLANTA DEAD - DELIST.15/03/06	US8086551046	84.49%	0.023231295	24.36%
SEARS ROEBUCK DEAD - MERGER W/27020T	US8123871084	77.97%	0.035261028	39.63%
SUN MICROSYSTEMS DEAD - ACQD.BY 719618	US8668102036	68.85%	0.023018943	-21.68%
SUPERVALU DEAD - DELIST.23/10/18	US8685363017	73.02%	0.162024478	17.94%
TOYS R US HOLDINGS DEAD - DELIST.08/08/05	US8923351006	65.06%	0.013792254	-16.32%
UNUM GROUP	US91529Y1064	134.51%	0.014864631	5.36%
VERITAS SOFTWARE DEAD - DELIST.05/07/05	US9234361098	78.11%	0.030143348	29.52%
WILLIAMS	US9694571004	137.03%	0.007603683	11.52%

Table 10 Bull market loser portfolio 3-6

Company	ISIN	Return Formation period	Portfolio weight	Return holding period
3M	US88579Y	5.74%	0.046674987	26.98%
AFLAC	US001055	5.67%	0.011632271	11.19%
ALBERTO CULVER DEAD - DELIST.11/05/11	US013078	3.98%	0.00933062	20.48%
ALBERTSONS DEAD - DELIST.07/07/06	US013104	9.65%	0.014429998	2.22%
ANADARKO PETROLEUM DEAD - DELIST.09/08/19	US032511	4.08%	0.016932267	3.40%
APACHE	US037411	8.48%	0.024858552	12.08%
APARTMENT INV.& MAN.'A'	US03748R	4.47%	0.01814729	-6.24%
AVERY DENNISON	US053611	2.62%	0.041181667	-0.43%
BALL	US058498	-2.86%	0.004438209	19.29%
BAXTER INTL.	US071813	-4.69%	0.010482686	13.23%
BIOMET DEAD - 26/09/07	US090613	2.15%	0.022133778	22.31%
BMC SOFTWARE DEAD - DELIST.11/09/13	US055921	7.09%	0.013445139	-6.84%
CLOROX	US189054	6.40%	0.032762952	6.92%
COCA COLA EUROPEAN PARTNERS	GB00BDCF	2.22%	0.009899212	15.57%
CONOCOPHILLIPS	US20825C	9.03%	0.015374221	10.26%
DANAHER	US235851	9.72%	0.009593103	23.24%
DILLARDS 'A'	US254067	7.92%	0.009936126	15.20%
DTE ENERGY	US233331	0.00%	0.030005349	-7.66%
EASTMAN CHEMICAL	US277432	10.14%	0.01192408	16.98%
EASTMAN KODAK DEAD - DELIST.03/09/13	US277461	8.64%	0.022746579	-23.44%
EOG RES.	US26875P	8.34%	0.008247276	-0.24%
FREDDIE MAC	US313400	-2.48%	0.036476233	9.58%
GILLETTE DEAD - DELIST.20/10/05	US375766	6.03%	0.023979475	5.93%
GT.LAKES CHM. DEAD - MERGER 921448	US390568	3.94%	0.016151676	16.40%
HCA DEAD - DELIST 20/11/06	US404119	-20.27%	0.023410446	30.45%
HEALTH MAN.ASSOCS. DEAD - DELIST.27/01/14	US421933	3.77%	0.013437844	28.99%
HILLSHIRE BRANDS DEAD - DELIST.28/08/14	US432589	-0.14%	0.016078723	11.43%
INTL.FLAVORS & FRAG.	US459506	4.66%	0.022797645	7.58%
INTUIT	US461202	1.64%	0.017410106	8.49%
JC PENNEY CO.	US708160	-0.65%	0.01347432	30.54%
JOHNSON & JOHNSON	US478160	-2.72%	0.038664806	-5.66%
JONES GROUP DEAD - DELIST.09/04/14	US48020T	8.08%	0.021375072	13.17%
KOHL'S	US500255	1.68%	0.037606996	-11.35%
MATTEL	US577081	1.83%	0.014991732	-5.84%
MAXIM INTEGRATED PRDS.	US57772K	8.66%	0.026634945	39.11%
MICROSOFT	US594918	9.17%	0.018150573	6.95%
NEW YORK TIMES 'A'	US650111	9.28%	0.034878574	-6.38%
NOBLE CORPORATION	GB00BFG3	8.22%	0.011915326	-2.86%
NORTONLIFELOCK	US668771	10.00%	0.004902989	41.84%
PACTIV DEAD - DELIST.17/11/10	US695257	1.66%	0.013401368	25.20%
PEPSI BOTTLING GP. DEAD - DELIST.11/03/10	US713409	8.02%	0.014736398	14.80%
QUALCOMM	US747525	-2.64%	0.012263309	49.14%
REEBOK INTL. DEAD - DELIST.01/02/06	US758110	4.36%	0.024249399	13.69%
REYNOLDS AMERICAN DEAD - DELIST.25/07/17	US761713	-3.02%	0.003282861	64.00%
SAFECO DEAD - DELIST.03/10/08	US786429	8.65%	0.025934601	4.84%
STARBUCKS	US855244	8.52%	0.004439157	32.25%
SUNOCO DEAD - DELIST.05/10/12	US86764P	5.84%	0.011759937	24.38%
TENET HEALTHCARE	US88033G	-2.70%	0.047273124	-9.01%
WILLIAM WRIGLEY JR. DEAD - DELIST.17/10/08	US982526	8.74%	0.032595161	-2.64%
ZIMMER BIOMET HDG.	US98956P	5.07%	0.033550839	43.29%

Table 11 Bear market winner portfolio 3-6

Name	ISIN	Return Formation period	Portfolio weight	Return holding period
AFFILIATED CMP.SVS.'A' DEAD - DELIST.18/02/10	US0081901003	11.11%	0.004043026	1.00%
ALLERGAN DEAD - DELIST.11/05/20	IE00BY9D5467	8.03%	0.002365626	-1.19%
ALTABA DEAD - DELIST.12/10/19	US0213461017	24.38%	0.00233416	-41.38%
APACHE	US0374111054	12.35%	0.009748123	-17.11%
APPLIED MATS.	US0382221051	9.85%	0.001574126	-23.32%
BIG LOTS	US0893021032	39.46%	0.001799231	22.33%
BIOGEN	US09062X1037	8.38%	0.004584619	-19.61%
BJ SVS. DEAD - DELIST.30/04/10	US0554821035	17.52%	0.002300273	-36.16%
BOSTON SCIENTIFIC	US1011371077	10.66%	0.001038391	-11.89%
BURL.NTHN.SANTA FE C DEAD - DELIST.26/02/10	US12189T1043	10.80%	0.007440589	-2.96%
CATERPILLAR	US1491231015	7.90%	0.006316674	-27.26%
CELGENE DEAD - DELIST.21/11/19	US1510201049	32.64%	0.002472128	3.30%
CHESAPEAKE ENERGY	US1651677437	17.73%	0.704397819	-25.68%
CSX	US1264081035	27.49%	0.001507966	-5.37%
D R HORTON	US23331A1097	19.59%	0.001270758	-15.68%
DARDEN RESTAURANTS	US2371941053	17.47%	0.002351628	-11.34%
DEVON ENERGY	US25179M1036	17.34%	0.00841766	-14.18%
DISCOVER FINANCIAL SVS.	US2547091080	8.55%	0.001320781	-15.82%
DYNEGY DEAD - DELIST.02/10/12	US26817G3002	10.50%	0.003182945	-56.53%
E TRADE FINANCIAL	US2692464017	8.73%	0.003114365	-16.32%
EOG RES.	US26875P1012	34.45%	0.004840981	-25.22%
EQUITY RESD.TST.PROPS. SHBI	US29476L1070	13.76%	0.003347539	3.86%
FOREST LABS. DEAD - DELIST.01/07/14	US3458381064	9.77%	0.003228128	-31.07%
GILEAD SCIENCES	US3755581036	12.00%	0.002078798	-12.09%
H&R BLOCK	US0936711052	11.79%	0.00167498	14.45%
HASBRO	US4180561072	9.07%	0.002251056	23.19%
HUDSON CITY BANC. DEAD - DELIST.02/11/15	US4436831071	17.71%	0.001426476	4.58%
JOHNSON CONTROLS INTL.	IE00BY7QL619	11.10%	0.00163626	-21.70%
KB HOME	US48666K1097	14.49%	0.001995291	-16.01%
NABORS INDUSTRIES	BMG6359F1370	23.29%	0.136233206	-28.93%
NEW YORK TIMES 'A'	US6501111073	7.70%	0.001523296	-21.50%
NORFOLK SOUTHERN	US6558441084	7.69%	0.004382702	19.73%
NUCOR	US6703461052	14.39%	0.005465468	-42.94%
PUBLIC STORAGE	US74460D1090	20.72%	0.00715013	11.50%
PULTEGROUP	US7458671010	38.05%	0.001173938	4.74%
QLOGIC DEAD - DELIST.17/08/16	US7472771010	8.10%	0.001238484	-0.46%
RANGE RES.	US75281A1097	23.54%	0.005119338	-34.15%
RYDER SYSTEM	US7835491082	29.57%	0.004914403	-4.01%
SEALED AIR	US81211K1007	9.12%	0.002037246	-12.95%
SIGMA ALDRICH DEAD - DELIST.19/11/15	US8265521018	9.25%	0.004812742	-10.91%
SITE CENTERS (NYS)	US82981J1097	9.38%	0.00557819	-26.46%
STARWOOD H&R.WORLDWIDE DEAD - DELIST.23/09/16	US85590A4013	17.54%	0.003903445	-47.64%
TENET HEALTHCARE	US88033G4073	11.42%	0.001826664	-7.24%
TERADYNE (XSC)	US8807701029	20.12%	0.001002083	-37.68%
TJX	US8725401090	15.11%	0.000667047	-7.41%
V F	US9182041080	12.89%	0.001471586	-1.56%
WALMART	US9311421039	10.84%	0.004250382	13.25%
XILINX	US9839191015	8.60%	0.001916222	-2.06%
XTO EN. DEAD - DELIST.08/07/10	US98385X1063	20.44%	0.004991052	-26.14%
ZIMMER BIOMET HDG.	US98956P1021	17.70%	0.00628198	-18.52%

Table 12 Bear market loser portfolio 3-6

Name	ISIN	Return Formation period	Portfolio weight	Return holding period
AETNA DEAD - DELIST.29/11/18	US00817Y	-27.09%	0.01604346	-11.07%
ALPHABET A	US02079K	-36.30%	0.084028471	-6.53%
AMERICAN INTL.GP.	US026874	-25.81%	0.27622958	-90.87%
ANDEAVOR DEAD - DELIST.14/11/18	US03349M	-43.92%	0.007036405	-36.94%
ANTHEM	US036752	-49.70%	0.016821048	7.64%
APOLLO EDUCATION GP.'A' DEAD - DELIST.02/02/17	US037604	-38.42%	0.016466559	36.62%
APPLE	US037833	-27.55%	0.007813992	-23.96%
AUTODESK	US052769	-36.74%	0.011999243	3.30%
BROADCOM 'A' DEAD - ACQD.SEE 54332K	US111320	-26.28%	0.007345153	-4.62%
CHARLES SCHWAB	US808513	-26.30%	0.007177438	29.42%
CIGNA	US125523	-24.49%	0.015464081	-16.79%
CIT GROUP DEAD - DELIST.10/12/09	US125581	-50.69%	0.004516869	-36.88%
CITIGROUP	US172967	-27.24%	0.081646689	7.38%
CME GROUP	US12572Q	-31.62%	0.035761364	-15.21%
CONSTELLATION BRANDS 'A'	US21036P	-25.25%	0.00673528	22.41%
COOPER INDUSTRIES DEAD - ACQD.BY 903749	IE00B40K9	-24.07%	0.01530399	-4.71%
COVENTRY HEALTH CARE DEAD - ACQD.BY 255956	US222862	-31.90%	0.015380224	-21.44%
CUMMINS	US231021	-26.48%	0.017846396	-8.65%
EXPEDIA GROUP	US30212P	-30.77%	0.007847002	-31.70%
HARMAN INTL.INDS. DEAD - DELIST.13/03/17	US413086	-40.93%	0.016596157	-24.35%
HUMANA	US444859	-40.43%	0.017099302	-8.02%
HUNTINGTON BCSH.	US446150	-27.17%	0.004097581	-8.84%
INTERCONTINENTAL EX.	US45866F	-32.21%	0.009948546	-34.92%
JABIL	US466313	-38.05%	0.003605872	-3.07%
JANUS CAPITAL GP. DEAD - DELIST.30/05/17	US47102X	-29.16%	0.008869834	8.12%
JUNIPER NETWORKS	US48203R	-24.70%	0.009529259	-20.04%
MARATHON OIL	US565849	-25.07%	0.010551558	-14.89%
MBIA	US55262C	-34.41%	0.004657902	-2.45%
MERCK & COMPANY	US58933Y	-34.69%	0.014465415	-15.44%
MEREDITH	US589433	-30.43%	0.014579766	-27.45%
MERRILL LYNCH & CO. DEAD - DELIST.15/01/09	US590188	-24.11%	0.01552888	-34.46%
MONSTER WORLDWIDE DEAD - DELIST.01/11/16	US611742	-25.28%	0.009228134	-37.92%
MOTOROLA SOLUTIONS	US620076	-42.02%	0.014518093	-20.00%
NATIONAL CITY DEAD - DELIST.12/01/09	US635405	-39.55%	0.003792645	-70.95%
NVIDIA	US67066G	-41.83%	0.007543361	-47.40%
NYSE EURONEXT DEAD - MERGER.30730Q	US629491	-29.69%	0.023522022	-34.58%
PREC.CASTPARTS DEAD - DELIST/01/02/16	US740189	-26.40%	0.03890987	-25.02%
QWEST COMMS.INTL. DEAD - DELIST.01/04/11	US749121	-35.38%	0.001726702	-25.83%
SANDISK DEAD - DELIST.13/05/16	US80004C	-31.96%	0.008603015	-11.39%
SCHERING-PLOUGH DEAD - 04/11/09	US806605	-45.91%	0.005492665	28.24%
SLM	US78442P	-23.78%	0.002090453	-45.60%
SPRINT NEXTEL DEAD - DELIST.11/07/13	US852061	-49.05%	0.00255003	-2.24%
SUNOCO DEAD - DELIST.05/10/12	US86764P	-27.58%	0.016638086	-33.79%
TEGNA	US87901J1	-25.51%	0.005672082	-41.31%
TITANIUM METALS DEAD - ACQD.BY 997350	US888339	-43.10%	0.005736614	-29.70%
UNITEDHEALTH GROUP	US91324P	-40.96%	0.013097013	-27.01%
VALERO ENERGY	US91913Y	-29.87%	0.017099531	-40.38%
WACHOVIA DEAD - DELIST.12/01/09	US929903	-29.00%	0.0102916	-86.85%
WATERS	US941848	-29.56%	0.021231189	3.52%
XL GROUP DEAD - DELIST.12/09/18	BMG9829	-41.26%	0.011263584	-41.56%

Table 13 Fama French regression bull winner price weighted portfolio 6-6

```
. regress Bullwinweightedrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	127
				F(3, 123)	=	275.35
Model	.019062708	3	.006354236	Prob > F	=	0.0000
Residual	.002838431	123	.000023077	R-squared	=	0.8704
				Adj R-squared	=	0.8672
Total	.021901138	126	.000173819	Root MSE	=	.0048

Bullwinwei~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.345634	.0661366	20.35	0.000	1.214721	1.476547
SMB	.4445166	.0852532	5.21	0.000	.2757631	.61327
HML	.675279	.1735439	3.89	0.000	.3317595	1.018799
_cons	-.0006384	.0004425	-1.44	0.152	-.0015142	.0002375

Table 14 Fama French regression bull winner equal weighted portfolio 6-6

```
. regress Bullwinequalrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	127
				F(3, 123)	=	345.09
Model	.023506719	3	.007835573	Prob > F	=	0.0000
Residual	.002792815	123	.000022706	R-squared	=	0.8938
				Adj R-squared	=	0.8912
Total	.026299534	126	.000208726	Root MSE	=	.00477

Bullwinequ~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.36133	.065603	20.75	0.000	1.231473	1.491187
SMB	.6886921	.0845654	8.14	0.000	.5213002	.8560841
HML	.867899	.1721437	5.04	0.000	.527151	1.208647
_cons	-.0006936	.0004389	-1.58	0.117	-.0015623	.0001752

Table 15 Fama French regression bull loser price weighted portfolio 6-6

```
. regress Bullwinweightedrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	127
				F(3, 123)	=	17.80
Model	.003032784	3	.001010928	Prob > F	=	0.0000
Residual	.006986657	123	.000056802	R-squared	=	0.3027
				Adj R-squared	=	0.2857
Total	.010019441	126	.000079519	Root MSE	=	.00754

Bullwinwei~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.6179852	.1037617	5.96	0.000	.4125952	.8233752
SMB	.0296091	.1337538	0.22	0.825	-.2351484	.2943666
HML	.2157669	.2722732	0.79	0.430	-.3231812	.754715
_cons	.0004253	.0006942	0.61	0.541	-.0009487	.0017994

Table 16 Fama French regression bull loser equally weighted portfolio 6-6

```
. regress Bullwinequalrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	127
				F(3, 123)	=	100.63
Model	.003062907	3	.001020969	Prob > F	=	0.0000
Residual	.001247972	123	.000010146	R-squared	=	0.7105
				Adj R-squared	=	0.7034
Total	.004310879	126	.000034213	Root MSE	=	.00319

Bullwinequ~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.6705481	.0438536	15.29	0.000	.5837427	.7573536
SMB	-.063747	.0565293	-1.13	0.262	-.1756434	.0481493
HML	.1015626	.1150728	0.88	0.379	-.1262169	.3293421
_cons	.0004318	.0002934	1.47	0.144	-.000149	.0010125

Table 17 Fama French regression bear winner price weighted portfolio 6-6

```
. regress Bearwinweightedrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	128
				F(3, 124)	=	83.24
Model	.000043045	3	.000014348	Prob > F	=	0.0000
Residual	.000021375	124	1.7238e-07	R-squared	=	0.6682
				Adj R-squared	=	0.6602
Total	.00006442	127	5.0724e-07	Root MSE	=	.00042

Bearwinwei~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0193831	.001286	15.07	0.000	.0168378	.0219284
SMB	-.0031557	.0031056	-1.02	0.312	-.0093026	.0029912
HML	-.0144656	.002302	-6.28	0.000	-.0190218	-.0099093
_cons	-.0000214	.0000369	-0.58	0.562	-.0000944	.0000516

Table 18 Fama French regression bear winner equal weighted portfolio 6-6

```
. regress Bearwinequalrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	128
				F(3, 124)	=	418.53
Model	.000023648	3	7.8825e-06	Prob > F	=	0.0000
Residual	2.3354e-06	124	1.8834e-08	R-squared	=	0.9101
				Adj R-squared	=	0.9079
Total	.000025983	127	2.0459e-07	Root MSE	=	.00014

Bearwinequ~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0142192	.0004251	33.45	0.000	.0133778	.0150605
SMB	-.0012887	.0010266	-1.26	0.212	-.0033205	.0007432
HML	-.0071346	.0007609	-9.38	0.000	-.0086406	-.0056285
_cons	-4.85e-06	.0000122	-0.40	0.692	-.000029	.0000193

Table 19 Fama French regression bear loser price weighted portfolio 6-6

```
. regress Bearlosweightrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	128
				F(3, 124)	=	214.93
Model	.000047543	3	.000015848	Prob > F	=	0.0000
Residual	9.1430e-06	124	7.3734e-08	R-squared	=	0.8387
				Adj R-squared	=	0.8348
Total	.000056686	127	4.4635e-07	Root MSE	=	.00027

Bearloswei~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0133864	.0008411	15.92	0.000	.0117217	.0150511
SMB	-.0046262	.0020312	-2.28	0.024	-.0086464	-.000606
HML	.0136959	.0015055	9.10	0.000	.010716	.0166757
_cons	-.0000237	.0000241	-0.98	0.327	-.0000715	.000024

Table 20 Fama French regression bear loser equal weighted portfolio 6-6

```
. regress Bearlosequalrm RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	128
				F(3, 124)	=	849.08
Model	.000032568	3	.000010856	Prob > F	=	0.0000
Residual	1.5854e-06	124	1.2786e-08	R-squared	=	0.9536
				Adj R-squared	=	0.9525
Total	.000034153	127	2.6892e-07	Root MSE	=	.00011

Bearlosequ~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0119149	.0003502	34.02	0.000	.0112217	.0126081
SMB	-.0001262	.0008458	-0.15	0.882	-.0018003	.0015479
HML	.010403	.0006269	16.59	0.000	.0091621	.0116438
_cons	5.37e-06	.00001	0.53	0.594	-.0000145	.0000252

Table 21 Fama French regression bull winner price weighted portfolio 3-3

```
. regress Bullwinweightrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	66
				F(3, 62)	=	157.59
Model	.01183403	3	.003944677	Prob > F	=	0.0000
Residual	.001551975	62	.000025032	R-squared	=	0.8841
				Adj R-squared	=	0.8784
Total	.013386004	65	.000205939	Root MSE	=	.005

Bullwinw~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.436888	.0713466	20.14	0.000	1.294268	1.579507
SMB	.4256915	.1200163	3.55	0.001	.1857822	.6656007
HML	.6957773	.1987788	3.50	0.001	.2984241	1.09313
_cons	-.0001999	.000645	-0.31	0.758	-.0014893	.0010896

Table 22 Fama French regression bull winner equal weighted portfolio 3-3

```
. regress Bullwinequalrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	66
				F(3, 62)	=	189.28
Model	.015298904	3	.005099635	Prob > F	=	0.0000
Residual	.001670383	62	.000026942	R-squared	=	0.9016
				Adj R-squared	=	0.8968
Total	.016969287	65	.000261066	Root MSE	=	.00519

Bullwine~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.594718	.0740183	21.54	0.000	1.446758	1.742679
SMB	.6010906	.1245105	4.83	0.000	.3521976	.8499836
HML	.9443665	.2062224	4.58	0.000	.5321339	1.356599
_cons	-.0006996	.0006692	-1.05	0.300	-.0020373	.0006381

Table 23 Fama French regression bull loser price weighted portfolio 3-3

```
. regress Bulllosweightrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	66
				F(3, 62)	=	80.72
Model	.002972814	3	.000990938	Prob > F	=	0.0000
Residual	.000761145	62	.000012277	R-squared	=	0.7962
				Adj R-squared	=	0.7863
Total	.003733958	65	.000057446	Root MSE	=	.0035

Bulllosw~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.7723226	.0499648	15.46	0.000	.6724443	.8722009
SMB	-.0505114	.0840488	-0.60	0.550	-.2185227	.1174998
HML	-.030932	.1392071	-0.22	0.825	-.309203	.2473391
_cons	.0000891	.0004517	0.20	0.844	-.0008139	.0009921

Table 24 Fama French regression bull loser equal weighted portfolio 3-3

```
. regress Bulllosequalrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	66
				F(3, 62)	=	113.03
Model	.00295177	3	.000983923	Prob > F	=	0.0000
Residual	.000539723	62	8.7052e-06	R-squared	=	0.8454
				Adj R-squared	=	0.8379
Total	.003491492	65	.000053715	Root MSE	=	.00295

Bulllose~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.7683735	.0420742	18.26	0.000	.6842683	.8524787
SMB	-.0631834	.0707756	-0.89	0.375	-.2046617	.078295
HML	.0934491	.1172231	0.80	0.428	-.1408765	.3277747
_cons	.0002713	.0003804	0.71	0.478	-.0004891	.0010316

Table 25 Fama French regression bear winner price weighted portfolio 3-3

```
. regress Bearwinweightrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	65
				F(3, 61)	=	1.30
Model	.001728721	3	.00057624	Prob > F	=	0.2811
Residual	.026946597	61	.000441747	R-squared	=	0.0603
				Adj R-squared	=	0.0141
Total	.028675319	64	.000448052	Root MSE	=	.02102

Bearwinw~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.4066073	.2458931	1.65	0.103	-.0850863	.8983009
SMB	-.603492	.5817437	-1.04	0.304	-1.76676	.5597765
HML	-.2920195	.9026293	-0.32	0.747	-2.096938	1.512899
_cons	.0052468	.0026777	1.96	0.055	-.0001076	.0106013

Table 26 Fama French regression bear winner equal weighted portfolio 3-3

```
. regress Bearwinequalrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	65
				F(3, 61)	=	321.70
Model	.009559399	3	.003186466	Prob > F	=	0.0000
Residual	.000604207	61	9.9050e-06	R-squared	=	0.9406
				Adj R-squared	=	0.9376
Total	.010163606	64	.000158806	Root MSE	=	.00315

Bearwine~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.134936	.0368203	30.82	0.000	1.061309	1.208562
SMB	.1342564	.0871109	1.54	0.128	-.0399326	.3084454
HML	.1592544	.1351606	1.18	0.243	-.111016	.4295247
_cons	.0002687	.000401	0.67	0.505	-.0005331	.0010704

Table 27 Fama French regression bear loser price weighted portfolio 3-3

```
. regress Bearlosweightrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	65
				F(3, 61)	=	84.89
Model	.021430581	3	.007143527	Prob > F	=	0.0000
Residual	.00513328	61	.000084152	R-squared	=	0.8068
				Adj R-squared	=	0.7973
Total	.026563861	64	.00041506	Root MSE	=	.00917

Bearlosw~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.712203	.1073228	15.95	0.000	1.497598	1.926809
SMB	.1133679	.2539085	0.45	0.657	-.3943535	.6210894
HML	1.02024	.3939626	2.59	0.012	.2324636	1.808017
_cons	-.001612	.0011687	-1.38	0.173	-.003949	.000725

Table 28 Fama French regression bear loser equal weighted portfolio 3-3

```
. regress Bearlosequalrm33 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	65
				F(3, 61)	=	117.67
Model	.017355652	3	.005785217	Prob > F	=	0.0000
Residual	.002998966	61	.000049163	R-squared	=	0.8527
				Adj R-squared	=	0.8454
Total	.020354619	64	.000318041	Root MSE	=	.00701

Bearlose~m33	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.539919	.0820314	18.77	0.000	1.375887	1.703951
SMB	.1957977	.1940732	1.01	0.317	-.1922756	.583871
HML	1.002978	.3011225	3.33	0.001	.4008468	1.60511
_cons	-.0006087	.0008933	-0.68	0.498	-.002395	.0011776

Table 29 Fama French regression bull winner price weighted portfolio 3-6

```
. regress Bullwinweightrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	355.30
Model	.021594649	3	.007198216	Prob > F	=	0.0000
Residual	.002532461	125	.00002026	R-squared	=	0.8950
				Adj R-squared	=	0.8925
Total	.02412711	128	.000188493	Root MSE	=	.0045

Bullwinw~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.383606	.0502487	27.54	0.000	1.284158	1.483055
SMB	.4018018	.0767137	5.24	0.000	.2499759	.5536276
HML	.613126	.1477009	4.15	0.000	.3208076	.9054443
_cons	-.000674	.0004073	-1.65	0.100	-.0014801	.000132

Table 30 Fama French regression bull winner equal weighted portfolio 3-6

```
. regress Bullwinequalrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	368.99
Model	.026474984	3	.008824995	Prob > F	=	0.0000
Residual	.002989555	125	.000023916	R-squared	=	0.8985
				Adj R-squared	=	0.8961
Total	.02946454	128	.000230192	Root MSE	=	.00489

Bullwine~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	1.487281	.0545955	27.24	0.000	1.37923	1.595332
SMB	.5395767	.0833498	6.47	0.000	.374617	.7045363
HML	.8288559	.1604778	5.16	0.000	.5112504	1.146461
_cons	-.0009335	.0004425	-2.11	0.037	-.0018093	-.0000577

Table 31 Fama French regression bull loser price weighted portfolio 3-6

```
.
. regress Bulllosweightrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	188.69
Model	.005389396	3	.001796465	Prob > F	=	0.0000
Residual	.001190065	125	9.5205e-06	R-squared	=	0.8191
				Adj R-squared	=	0.8148
Total	.006579461	128	.000051402	Root MSE	=	.00309

Bulllosw~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.7707991	.034446	22.38	0.000	.7026262	.838972
SMB	-.0376257	.052588	-0.72	0.476	-.1417039	.0664524
HML	-.0324742	.1012504	-0.32	0.749	-.2328614	.167913
_cons	.0001781	.0002792	0.64	0.525	-.0003745	.0007307

Table 32 Fama French regression bull loser equal weighted portfolio 3-6

```
. regress Bulllosequalrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	244.50
Model	.005560694	3	.001853565	Prob > F	=	0.0000
Residual	.000947628	125	7.5810e-06	R-squared	=	0.8544
				Adj R-squared	=	0.8509
Total	.006508321	128	.000050846	Root MSE	=	.00275

Bulllose~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.7796113	.0307378	25.36	0.000	.7187775	.8404452
SMB	-.0296222	.0469267	-0.63	0.529	-.1224961	.0632516
HML	.0821967	.0903505	0.91	0.365	-.0966182	.2610116
_cons	.0003654	.0002491	1.47	0.145	-.0001277	.0008585

Table 33 Fama French regression bear winner price weighted portfolio 3-6

```
. regress Bearwinweightrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	28.32
Model	5.3719e-06	3	1.7906e-06	Prob > F	=	0.0000
Residual	7.9037e-06	125	6.3230e-08	R-squared	=	0.4046
				Adj R-squared	=	0.3904
Total	.000013276	128	1.0372e-07	Root MSE	=	.00025

Bearwinw~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0124027	.0017798	6.97	0.000	.0088803	.015925
SMB	-.012505	.0032343	-3.87	0.000	-.0189061	-.0061038
HML	-.0114573	.0021475	-5.34	0.000	-.0157075	-.0072071
_cons	.0000126	.0000224	0.56	0.577	-.0000319	.000057

Table 34 Fama French regression bear winner equal weighted portfolio 3-6

```
. regress Bearwinequalrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	920.42
Model	4.4002e-06	3	1.4667e-06	Prob > F	=	0.0000
Residual	1.9919e-07	125	1.5935e-09	R-squared	=	0.9567
				Adj R-squared	=	0.9557
Total	4.5993e-06	128	3.5932e-08	Root MSE	=	4.0e-05

Bearwine~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0111528	.0002825	39.47	0.000	.0105937	.011712
SMB	.0019795	.0005135	3.86	0.000	.0009633	.0029957
HML	.0001955	.0003409	0.57	0.567	-.0004792	.0008703
_cons	-6.41e-07	3.56e-06	-0.18	0.858	-7.69e-06	6.41e-06

Table 35 Fama French regression bear loser price weighted portfolio 3-6

```
. regress Bearlosweightrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	98.37
Model	.000019349	3	6.4496e-06	Prob > F	=	0.0000
Residual	8.1952e-06	125	6.5562e-08	R-squared	=	0.7025
				Adj R-squared	=	0.6953
Total	.000027544	128	2.1519e-07	Root MSE	=	.00026

Bearlosw~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0163542	.0018123	9.02	0.000	.0127675	.0199409
SMB	-.0039433	.0032934	-1.20	0.233	-.0104614	.0025749
HML	.0096124	.0021867	4.40	0.000	.0052846	.0139403
_cons	-.0000296	.0000229	-1.30	0.197	-.0000748	.0000156

Table 36 Fama French regression bear loser equal weighted portfolio 3-6

```
. regress Bearlosequalrm36 RmRf SMB HML
```

Source	SS	df	MS	Number of obs	=	129
				F(3, 125)	=	596.72
Model	.000010049	3	3.3497e-06	Prob > F	=	0.0000
Residual	7.0170e-07	125	5.6136e-09	R-squared	=	0.9347
				Adj R-squared	=	0.9332
Total	.000010751	128	8.3991e-08	Root MSE	=	7.5e-05

Bearlose~m36	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RmRf	.0134672	.0005303	25.40	0.000	.0124177	.0145167
SMB	.000101	.0009637	0.10	0.917	-.0018063	.0020083
HML	.0053012	.0006399	8.28	0.000	.0040349	.0065676
_cons	-4.61e-06	6.69e-06	-0.69	0.491	-.0000178	8.62e-06

Table 37 T-test abnormal returns bull market winner price weighted portfolio 6-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	122	-1.22e-11	.0009969	.0110114	-.0019737	.0019737

```
    mean = mean(r)                                     t =  -0.0000
Ho: mean = 0                         degrees of freedom =      121

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 38 T-test abnormal returns bull market winner equal weighted portfolio 6-6

```
. ttest r1==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r1	122	-1.61e-12	.0011085	.0122436	-.0021945	.0021945

```
    mean = mean(r1)                                    t =  -0.0000
Ho: mean = 0                         degrees of freedom =      121

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 39 T-test abnormal returns bull market loser price weighted portfolio 6-6

```
. ttest r2==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r2	127	-1.38e-11	.0006608	.0074465	-.0013076	.0013076

```
    mean = mean(r2)                                    t =  -0.0000
Ho: mean = 0                         degrees of freedom =      126

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 40 T-test abnormal returns bull market loser equal weighted portfolio 6-6

```
. ttest r3==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r3	127	5.41e-12	.0002793	.0031471	-.0005527	.0005527

```
    mean = mean(r3)                                    t =   0.0000
Ho: mean = 0                         degrees of freedom =      126

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 41 T-test abnormal returns bear market winner price weighted portfolio 6-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	128	-4.69e-13	.0000363	.0004103	-.0000718	.0000718

```
    mean = mean(r)                                            t =  -0.0000
Ho: mean = 0                                     degrees of freedom =      127

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 42 T-test abnormal returns bear market winner equal weighted portfolio 6-6

```
. ttest r2==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r2	128	1.92e-13	.000012	.0001356	-.0000237	.0000237

```
    mean = mean(r2)                                           t =   0.0000
Ho: mean = 0                                     degrees of freedom =      127

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 43 T-test abnormal returns bear market loser price weighted portfolio 6-6

```
. ttest r3==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r3	128	-7.25e-13	.0000237	.0002683	-.0000469	.0000469

```
    mean = mean(r3)                                           t =  -0.0000
Ho: mean = 0                                     degrees of freedom =      127

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 44 T-test abnormal returns bear market loser equal weighted portfolio 6-6

```
One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r4	128	-4.60e-13	9.88e-06	.0001117	-.0000195	.0000195

```
    mean = mean(r4)                                           t =  -0.0000
Ho: mean = 0                                     degrees of freedom =      127

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.5000         Pr(|T| > |t|) = 1.0000          Pr(T > t) = 0.5000
```

Table 45 T-test abnormal returns bull market winner price weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	66	.0017789	.0016609	.013493	-.0015381	.0050959

```
    mean = mean(r)                                     t =   1.0711
Ho: mean = 0                         degrees of freedom =       65

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.8559         Pr(|T| > |t|) = 0.2881          Pr(T > t) = 0.1441
```

Table 46 T-test abnormal returns bull market winner price weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	66	.0017386	.0018884	.0153417	-.0020329	.00551

```
    mean = mean(r)                                     t =   0.9206
Ho: mean = 0                         degrees of freedom =       65

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.8197         Pr(|T| > |t|) = 0.3606          Pr(T > t) = 0.1803
```

Table 47 T-test abnormal returns bull market loser price weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	66	.0006206	.0008324	.0067628	-.0010419	.0022831

```
    mean = mean(r)                                     t =   0.7456
Ho: mean = 0                         degrees of freedom =       65

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.7707         Pr(|T| > |t|) = 0.4586          Pr(T > t) = 0.2293
```

Table 48 T-test abnormal returns bull market loser equal weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	66	.0008049	.0008295	.0067388	-.0008517	.0024615

```
    mean = mean(r)                                     t =   0.9703
Ho: mean = 0                         degrees of freedom =       65

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.8323         Pr(|T| > |t|) = 0.3355          Pr(T > t) = 0.1677
```

Table 49 T-test abnormal returns bear market winner price weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	65	.0051089	.0006446	.0051972	.0038211	.0063968

```
    mean = mean(r)                                     t =   7.9253
Ho: mean = 0                         degrees of freedom =       64

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 1.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 0.0000
```

Table 50 T-test abnormal returns bear market winner equal weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	65	-.0001098	.0015159	.0122215	-.0031381	.0029186

```
    mean = mean(r)                                     t =  -0.0724
Ho: mean = 0                         degrees of freedom =       64

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.4712         Pr(|T| > |t|) = 0.9425          Pr(T > t) = 0.5288
```

Table 51 T-test abnormal returns bear market loser price weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	65	-.0027792	.0022697	.018299	-.0073135	.0017551

```
    mean = mean(r)                                     t =  -1.2245
Ho: mean = 0                         degrees of freedom =       64

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.1126         Pr(|T| > |t|) = 0.2253          Pr(T > t) = 0.8874
```

Table 52 T-test abnormal returns bear market loser equal weighted portfolio 3-3

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	65	-.0016834	.0020426	.0164676	-.0057639	.002397

```
    mean = mean(r)                                     t =  -0.8242
Ho: mean = 0                         degrees of freedom =       64

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.2064         Pr(|T| > |t|) = 0.4129          Pr(T > t) = 0.7936
```

Table 53 T-test abnormal returns bull market winner price weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	.0012037	.0011436	.0129888	-.0010591	.0034665

```
    mean = mean(r)                                     t =   1.0526
Ho: mean = 0                         degrees of freedom =      128

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.8527         Pr(|T| > |t|) = 0.2945          Pr(T > t) = 0.1473
```

Table 54 T-test abnormal returns bull market winner equal weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	.0012734	.0012662	.0143818	-.0012321	.0037788

```
    mean = mean(r)                                     t =   1.0056
Ho: mean = 0                         degrees of freedom =      128

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.8418         Pr(|T| > |t|) = 0.3165          Pr(T > t) = 0.1582
```

Table 55 T-test abnormal returns bull market loser price weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	.0007844	.0005713	.0064888	-.0003461	.0019148

```
    mean = mean(r)                                     t =   1.3729
Ho: mean = 0                         degrees of freedom =      128

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.9139         Pr(|T| > |t|) = 0.1722          Pr(T > t) = 0.0861
```

Table 56 T-test abnormal returns bull market loser equal weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	.0010404	.0005803	.0065911	-.0001078	.0021887

```
    mean = mean(r)                                     t =   1.7929
Ho: mean = 0                         degrees of freedom =      128

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.9623         Pr(|T| > |t|) = 0.0754          Pr(T > t) = 0.0377
```

Table 57 T-test abnormal returns bear market winner price weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	-.0000159	.000018	.0002049	-.0000516	.0000198

```
    mean = mean(r)                                          t =  -0.8824
Ho: mean = 0                              degrees of freedom =      128

    Ha: mean < 0                Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.1896         Pr(|T| > |t|) = 0.3792          Pr(T > t) = 0.8104
```

Table 58 T-test abnormal returns bear market winner equal weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	-8.20e-06	.0000163	.0001854	-.0000405	.0000241

```
    mean = mean(r)                                          t =  -0.5021
Ho: mean = 0                              degrees of freedom =      128

    Ha: mean < 0                Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.3082         Pr(|T| > |t|) = 0.6165          Pr(T > t) = 0.6918
```

Table 59 T-test abnormal returns bear market loser price weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	-.0000335	.0000342	.0003888	-.0001012	.0000342

```
    mean = mean(r)                                          t =  -0.9784
Ho: mean = 0                              degrees of freedom =      128

    Ha: mean < 0                Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.1649         Pr(|T| > |t|) = 0.3297          Pr(T > t) = 0.8351
```

Table 60 T-test abnormal returns bear market loser equal weighted portfolio 3-6

```
. ttest r==0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
r	129	-9.15e-06	.0000247	.0002802	-.000058	.0000397

```
    mean = mean(r)                                          t =  -0.3708
Ho: mean = 0                              degrees of freedom =      128

    Ha: mean < 0                Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.3557         Pr(|T| > |t|) = 0.7114          Pr(T > t) = 0.6443
```

Table 61 Durbin-Watson statistic bull winner price weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   255) =   2.10096
```

Table 62 Durbin-Watson statistic bull winner equal weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   255) =  1.896591
```

Table 63 Durbin-Watson statistic bull loser price weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   255) =  2.022447
```

Table 64 Durbin-Watson statistic bull loser equal weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   255) =  1.826328
```

Table 65 Durbin-Watson statistic bear winner price weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   253) =  1.927217
```

Table 66 Durbin-Watson statistic bear winner equal weighted portfolio 6-6

```
 . estat dwatson

 Durbin-Watson d-statistic(  4,   253) =  1.868914
```

Table 67 Durbin-Watson statistic bear loser price weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   253) =  1.163123
```

Table 68 Durbin-Watson statistic bear loser equal weighted portfolio 6-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   253) =  1.957349
```

Table 69 Durbin-Watson statistic bull winner price weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   130) =  2.042599
```

Table 70 Durbin-Watson statistic bull winner equal weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   130) =  1.713333
```

Table 71 Durbin-Watson statistic bull loser price weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   130) =  1.474713
```

Table 72 Durbin-Watson statistic bull loser equal weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   130) =  1.446108
```

Table 73 Durbin-Watson statistic bearl winner price weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   126) =  1.941404
```

Table 74 Durbin-Watson statistic bearl winner equal weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   126) =  1.402139
```

Table 75 Durbin-Watson statistic bearl loser price weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   126) =   1.96693
```

Table 76 Durbin-Watson statistic bearl loser equal weighted portfolio 3-3

```
. estat dwatson

Durbin-Watson d-statistic(  4,   126) =  2.199495
```

Table 77 Durbin-Watson statistic bull winner price weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   193) =  1.935196
```

Table 78 Durbin-Watson statistic bull winner equal weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   193) =   1.69822
```

Table 79 Durbin-Watson statistic bull loser price weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   193) =  1.464369
```

Table 80 Durbin-Watson statistic bull loser equal weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   193) =  1.450431
```

Table 81 Durbin-Watson statistic bear winner price weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   190) =  1.874214
```

Table 82 Durbin-Watson statistic bear winner equal weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   190) =  1.385459
```

Table 83 Durbin-Watson statistic bear loser price weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   190) =  .9663124
```

Table 84 Durbin-Watson statistic bear loser equal weighted portfolio 3-6

```
. estat dwatson

Durbin-Watson d-statistic(  4,   190) =  1.906304
```

Table 85 Dickey-Fuller test on stationarity bull market winner price weighted portfolio 6-6

```
. dfuller Bullwinweight

Dickey-Fuller test for unit root                   Number of obs   =       254

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -15.449          -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 86 Dickey-Fuller test on stationarity bull market winner equal weighted portfolio 6-6

```
. dfuller Bullwinequal

Dickey-Fuller test for unit root                   Number of obs   =       254

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -14.893          -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 87 Dickey-Fuller test on stationarity bull market loser price weighted portfolio 6-6

```
. dfuller Bulllosequal

Dickey-Fuller test for unit root                   Number of obs   =       254

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -17.124          -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 88 Dicky-Fuller test on stationarity bull market loser equal weighted portfolio 6-6

```
. dfuller Bulllosweight

Dickey-Fuller test for unit root                   Number of obs   =       254

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -16.191          -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 89 Dickey-Fuller test on stationarity bear market winner price weighted portfolio 6-6

```
. dfuller Bearwinweight

Dickey-Fuller test for unit root                   Number of obs   =       252

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -16.034           -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 90 Dickey-Fuller test on stationarity bear market winner equal weighted portfolio 6-6

```
. dfuller Bearwinequal

Dickey-Fuller test for unit root                   Number of obs   =       252

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -17.245           -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 91 Dickey-Fuller test on stationarity bear market winner pricel weighted portfolio 6-6

```
. dfuller Bearlosweight

Dickey-Fuller test for unit root                   Number of obs   =       252

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -15.013           -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 92 Dickey-Fuller test on stationarity bear market loser equal weighted portfolio 6-6

```
. dfuller Bearlosequal

Dickey-Fuller test for unit root                   Number of obs   =       252

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -15.162           -3.460            -2.880           -2.570
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 94 Dickey-Fuller test on stationarity bull market winner price weighted portfolio 3-3

```
. dfuller Bullwinweight33

Dickey-Fuller test for unit root                   Number of obs   =       129

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -11.922           -3.500            -2.888           -2.578
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 93 Dickey-Fuller test on stationarity bull market winner equal weighted portfolio 3-3

```
. dfuller Bullwinequal33

Dickey-Fuller test for unit root                   Number of obs   =       129

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -11.239           -3.500            -2.888           -2.578
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 95 Dickey-Fuller test on stationarity bull market loser price weighted portfolio 3-3

```
. dfuller Bulllosweight33

Dickey-Fuller test for unit root                   Number of obs   =       129

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -12.965           -3.500            -2.888           -2.578
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 96 Dickey-Fuller test on stationarity bull market loser equal weighted portfolio 3-3

```
. dfuller Bulllosequal33

Dickey-Fuller test for unit root                   Number of obs   =       129

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -13.226           -3.500            -2.888           -2.578
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 97 Dickey-Fuller test on stationarity bear market winner price weighted portfolio 3-3

```
. dfuller Bearwinweight33

Dickey-Fuller test for unit root                   Number of obs   =       125

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -11.768            -3.502            -2.888           -2.578
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 98 Dickey-Fuller test on stationarity bear market winner equal weighted portfolio 3-3

```
. dfuller Bearwinequal33

Dickey-Fuller test for unit root                   Number of obs   =       125

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -12.267            -3.502            -2.888           -2.578
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 99 Dickey-Fuller test on stationarity bear market winner price weighted portfolio 3-3

```
. dfuller Bearlosweight33

Dickey-Fuller test for unit root                   Number of obs   =       125

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -11.378            -3.502            -2.888           -2.578
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 100 Dickey-Fuller test on stationarity bear market winner equal weighted portfolio 3-3

```
. dfuller Bearlosequal33

Dickey-Fuller test for unit root                   Number of obs   =       125

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -11.105            -3.502            -2.888           -2.578
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 101 Dickey-Fuller test on stationarity bull market winner price weighted portfolio 3-6

```
. dfuller Bullwinweight36

Dickey-Fuller test for unit root                   Number of obs   =       192

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -13.797            -3.479            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 102 Dickey-Fuller test on stationarity bull market winner equal weighted portfolio 3-6

```
. dfuller Bullwinequal36

Dickey-Fuller test for unit root                   Number of obs   =       192

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -13.127            -3.479            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 103 Dickey-Fuller test on stationarity bull market loser price weighted portfolio 3-6

```
. dfuller Bulllosweight36

Dickey-Fuller test for unit root                   Number of obs   =       192

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -15.407            -3.479            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 104 Dickey-Fuller test on stationarity bull market loser equal weighted portfolio 3-6

```
. dfuller Bulllosequal36

Dickey-Fuller test for unit root                   Number of obs   =       192

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -15.624            -3.479            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 105 Dickey-Fuller test on stationarity bear market winner price weighted portfolio 3-6

```
. dfuller Bearwinweight36

Dickey-Fuller test for unit root                   Number of obs   =       189

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -14.376            -3.480            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 106 Dickey-Fuller test on stationarity bear market winner equal weighted portfolio 3-6

```
. dfuller Bearwinequal36

Dickey-Fuller test for unit root                   Number of obs   =       189

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -16.558            -3.480            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 107 Dickey-Fuller test on stationarity bear market loser price weighted portfolio 3-6

```
. dfuller Bearlosweight36

Dickey-Fuller test for unit root                   Number of obs   =       189

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -12.657            -3.480            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 108 Dickey-Fuller test on stationarity bear market loser equal weighted portfolio 3-6

```
. dfuller Bearlosequal36

Dickey-Fuller test for unit root                   Number of obs   =       189

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -15.253            -3.480            -2.884           -2.574
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```