

Research on Determine Buying and Selling Timing of US Stocks Based on Fear & Greed Index

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Fear & Greed Index 기반 미국 주식 단기 매수와 매도 결정 시점 연구

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Abstract Determining the timing of buying and selling in stock investment is one of the most important factors to increase the return on stock investment. Buying low and selling high makes a profit, but buying high and selling low makes a loss. The price is determined by the quantity of buying and selling, which determines the price of a stock, and buying and selling is also related to corporate performance and economic indicators. The fear and greed index provided by CNN uses seven factors, and by assigning weights to each element, the weighted average defined as greed and fear is calculated on a scale between 0 and 100 and published every day. When the index is close to 0, the stock market sentiment is fearful, and when the index is close to 100, it is greedy. Therefore, we analyze the trading criteria that generate the maximum return when buying and selling the US S&P 500 index according to CNN fear and greed index, suggesting the optimal buying and selling timing to suggest a way to increase the return on stock investment.

Key Words : Fear & Greedy index, Stock price analysis, Foreign capital, Stock investment, Macro index analysis, Stock prediction

요약 주식 투자에서 매수와 매도의 타이밍을 결정하는 것은 주식 투자의 수익률을 올리기 위해 가장 중요한 요인 중 하나이다. 주식을 싸게 사서 비싸게 팔면 이익이 되지만, 비싸게 사서 싸게 팔면 손해가 된다. 주식의 가격을 결정하는 매수와 매도의 물량에 의해 가격이 결정이 되고, 매수와 매도는 기업실적, 경제지표와도 관련이 있다. CNN에서 제공하는 공포와 탐욕 지수는 7가지 요소를 사용하고, 각 요소에 가중치를 부여하여 탐욕과 두려움으로 정의한 가중치 평균을 0~100 사이의 척도로 계산하여 매일 발표하고 있다. 지수가 0에 가까우면 주식시장 심리가 두려운것이고, 100에 가까우면 탐욕스러운 것이다. 따라서 미국 S&P 500 지수를 CNN 공포와 탐욕지수에 따른 매수와 매도를 할 경우 최대 수익률이 발생하는 매매 기준을 분석하여 최적의 매수와 매도 타이밍을 제시하여 주식투자에 수익률을 높일 수 있는 방안을 제시하고자 한다.

키워드 : 공포와 탐욕 지수, 주가분석, 해외자본, 주식투자, 거시지표 분석, 주가 예측

1. Introduction

There are two important combinations of returns when investing in stocks. One is the discovery of stocks, and the other is the timing of buying and selling. If you control these two things well, you could make a lot of money from investing in stocks.

Conversely, it is difficult to sell and buy the stocks at the best time. It is an big problem that has not been resolved even by numerous full-time investments over a long period of time. However, promising stocks can be discovered through financial statements or industry trends. However, the timing of buying and selling is very difficult to predict. It is

This research was conducted with the support of Baekseok University Research Fund in 2022.

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Received October 7, 2022

Accepted January 20, 2023

Revised January 1, 2023

Published January 28, 2023

almost impossible to maximize the return on investment by timing the sale at the right time. Nevertheless, it is essential for any stock investor to know how to sell well. Knowing whether a stock I'm buying is currently bottoming or peaking has a significant impact on returns. Wall Street investment experts fall into two categories: those who decide when to buy stocks when they need to be sold, and those who sell stocks when circumstances change during the holding process. However, the more important common denominator is that it is necessary to prepare the selling principle in advance when buying. Professional investors use economic indicators and expensive additional information to decide the timing of selling or buying stocks. However, individual investors have little information and little experience to know this, so they always miss the optimal buying and selling opportunities, resulting in a return In many cases, it adversely affects.

Goreskwa Ginjo is the "last stock gamer" produced by Japanese stockbrokers. He is an individual investor who has set an unprecedented record by repeating failures and successes. At one time, it surpassed leading corporate heads and chaebols to rank first in income tax payment. However, due to the failure of the selling strategy, he had to spend his entire life of investment. In his autobiography at the age of 93, he said that he is now on the brink of failure, and recommends a clear selling strategy that produces small losses and large profits. He has developed three selling strategies through his long investment experience. If the stock price breaks through the highest price three times, sell it at the last rebound, cut a loss within -10% when the market price declines, and switch if the stock price that hit the ceiling fails to break through the previous high within two weeks. He said that selling is more difficult than buying, and that it is the most important to sell according to the timing of the initial decision. He emphasizes that greed for a little more is only the seed of unhappiness [1]. Even experts with so much

experience say that timing buying and selling is a state of the art. The fear and greed index provided by CNN uses seven factors, and by assigning weights to each element, the weighted average defined as greed and fear is weighted values on a scale between 100 and 0 and, it is published every day. When the index is close to 0, the stock market sentiment is in fear, and when it is close to 100, it is in a state of greed. Therefore, we analyze the trading criteria that generate the maximum return when buying and selling the US S&P 500 index according to CNN fear and greed index, suggesting the optimal buying and selling timing to suggest a way to increase the return on stock investment.

2. Fear & Greedy Index vs. S&P 500

The Fear & Greed Index is an index created and used by CNN Money, also called the CNN VIX Index (CNN Volatility Index). It is an indicator of the relative strength of fear and optimism inherent in the market by synthesizing seven indicators known to reflect investment sentiment. 0 represents extreme fear and 100 represents extreme optimism. Therefore, the closer to 0, the closer the buying timing is, and the closer to 100, the closer the selling timing. Professional stock investors often say that the advice is not to buy or sell stocks, but to accumulate long-term stocks, and over the past 20 years, stocks have risen upwards, giving long-term investors a lot of returns. However, there are cases in which the global economic recession or the global financial crisis caused by the COVID pandemic stimulates volatility in the stock market, causing huge losses if taken for a long time. Because stock investing is for profit, you cannot hold stocks forever, you must sell them to make a profit. Let's find out how the CNN index affects the stock market through the analysis of CNN's fear and greed index, which suggests the timing of buying and selling. CNN uses 7 factors and each factor is weighted to calculated the weight average of what it defines as greed and fear on a scale between 0 to

100. These factors are market momentum, market volatility, put & call options, stock price breadth, stock price strength, safe haven demand, and junk bond demand [2].

2.1 Market Momentum

It's helpful to look at the stock market levels compared to where they have been over the past several months. When the S&P 500 is above its rolling or moving average of the 125 trading days, that is a sign of positive momentum. However, if the index is below this average, investors get nervous. The Fear & Greed Index uses slowing momentum as a signal for Fear and growing momentum for Greed [6].

2.2 Market Volatility

The most well-known estimate of market sentiment is the Chicago Board Options Exchange (CBOE) VIX (Volatility Index) [3]. The VIX estimates expected price volatility or fluctuations in the S&P 500 Index options over the next 30 days. The VIX downs on days when the broader market changes a lot when stocks are thrust. However, the main point is to look at the VIX over time. It is responsible for being lower in strong markets and higher when the endures are in control. The Fear & Greed Index uses increasing market volatility to signal fear [7].

2.3 Stock price breadth

The market consists of millions of stocks. In addition, on any given day, investors are actively selling and buying them. This measure is the

Table 1. S&P 500 vs. Fear & Greed index from Jan 3, 2020 to June 30, 2020 by day

Date	F&G	S&P500	Date	F&G	S&P500	Date	F&G	S&P500	Date	F&G	S&P500
20-01-03	93	3235	20-02-19	53	3386	20-04-02	21	2527	20-05-18	47	2954
20-01-06	93	3246	20-02-20	50	3373	20-04-03	22	2489	20-05-19	48	2923
20-01-07	89	3237	20-02-21	44	3338	20-04-06	27	2664	20-05-20	52	2972
20-01-08	92	3253	20-02-24	29	3226	20-04-07	25	2659	20-05-21	52	2949
20-01-09	93	3275	20-02-25	22	3128	20-04-08	31	2750	20-05-22	50	2955
20-01-10	91	3265	20-02-26	21	3116	20-04-09	43	2790	20-05-26	50	2992
20-01-13	90	3288	20-02-27	13	2979	20-04-13	37	2762	20-05-27	53	3036
20-01-14	91	3283	20-02-28	10	2954	20-04-14	45	2846	20-05-28	50	3030
20-01-15	87	3289	20-03-02	14	3090	20-04-15	41	2783	20-05-29	52	3044
20-01-16	89	3317	20-03-03	10	3003	20-04-16	42	2800	20-06-01	58	3056
20-01-17	89	3330	20-03-04	15	3130	20-04-17	44	2875	20-06-02	58	3081
20-01-21	82	3321	20-03-05	9	3024	20-04-20	41	2823	20-06-03	60	3123
20-01-22	74	3322	20-03-06	7	2972	20-04-21	40	2737	20-06-04	62	3112
20-01-23	68	3326	20-03-09	3	2747	20-04-22	40	2799	20-06-05	66	3194
20-01-24	62	3295	20-03-10	6	2882	20-04-23	40	2798	20-06-08	67	3232
20-01-27	48	3244	20-03-11	4	2741	20-04-24	39	2837	20-06-09	67	3207
20-01-28	52	3276	20-03-12	2	2481	20-04-27	42	2878	20-06-10	67	3190
20-01-29	53	3273	20-03-13	5	2711	20-04-28	41	2863	20-06-11	56	3002
20-01-30	56	3284	20-03-16	3	2386	20-04-29	47	2940	20-06-12	54	3041
20-01-31	44	3226	20-03-17	4	2529	20-04-30	47	2912	20-06-15	53	3067
20-02-03	46	3249	20-03-18	5	2398	20-05-01	42	2831	20-06-16	52	3125
20-02-04	55	3298	20-03-19	7	2409	20-05-04	44	2843	20-06-17	52	3113
20-02-05	60	3335	20-03-20	8	2305	20-05-05	44	2868	20-06-18	51	3115
20-02-06	64	3346	20-03-23	5	2237	20-05-06	40	2848	20-06-19	52	3098
20-02-07	57	3328	20-03-24	13	2447	20-05-07	40	2881	20-06-22	52	3118
20-02-10	55	3352	20-03-25	17	2476	20-05-08	45	2930	20-06-23	52	3131
20-02-11	56	3358	20-03-26	22	2630	20-05-11	44	2930	20-06-24	48	3050
20-02-12	59	3379	20-03-27	23	2541	20-05-12	39	2870	20-06-25	49	3084
20-02-13	58	3374	20-03-30	25	2627	20-05-13	39	2820	20-06-26	45	3009
20-02-14	55	3380	20-03-31	25	2585	20-05-14	38	2853	20-06-29	48	3053
20-02-18	51	3370	20-04-01	22	2471	20-05-15	39	2864	20-06-30	47	3100

amount, volume, and shares on the New York Stock Exchange (NYSE) [4] that are going up compared to the number of shares that are going down. A minimum number is a weak sign. The Fear & Greed Index uses failing trading volume as a sign for fear [8].

2.4 Put & Call Options

A put option is the best to sell the underlying futures contract at a predetermined price. The Options are contracts that give investors the right to buy or sell stocks, indexes, or other financial securities at an agreed-upon price and date. Calls are the option to buy., while puts are the option to sell. When the ratio of puts to calls is rising, it is a sign investors are growing more fearful. A ratio above one is considered weak. The Fear & Greed Index uses a weak options ratio as a sign for fear [9].

2.5 Stock Price Strength

A some huge stocks can bake returns for the market. Knowing how many stocks are doing well versus those struggling is also essential. It shows the number of stocks on the NYSE at 52-week peaks compared to those at 52-week bottoms. When there are many more peaks than bottoms, this is a strong sign, and it signals Greed [10].

2.6 Safe Haven Demand

Stocks are riskier than bonds. In the long run, the rewards for investing in stocks are greater. Bonds could outperform stocks over short periods. Safe Haven Demand shows the difference between Treasury bonds and stock return over the past 20 trading days. Bonds do better when investors are scared. The Fear & Greed Index uses increasing safe-haven demand as a signal for Fear.

2.7 Junk bond demand

Junk bonds carry a higher risk of default compared to other bonds. Bond yields – or the return on investing in a bond – dip when prices

arise. If investors crave junk bonds, the yields fail. Furthermore yields rise when people are selling. So a small difference between after government bonds and yields for junk bonds, and it is a significant investor taking on more risk. A wider spread indicates more attention. The Fear & Greed Index uses junk bond demand as a sign for Greed.

Fig. 1 shows the fear & greed index on July 18, 2022 in the US Stock Market. The indicator shows the extreme fear which means time for buying stocks. The indicator points out the extreme greed which means selling time for stocks [11-15].

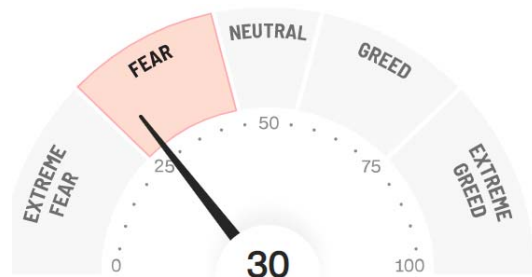


Fig. 1. CNN Fear & Greed index on July 18, 2022

3. Experimental Analysis and Results

The S&P 500 shows the best single gauge of large-cap U.S. equities. According to the Annual Survey of Assets, an estimated USD 13.5 trillion is indexed or benchmarked to the index, with indexed assets comprising approximately USD 5.4 trillion of this total (as of Dec. 31, 2020). The index includes 500 leading companies and covers about 80% of available market capitalization [5]. Table 1 and Fig. 2 are the same data. Fig. 2 shows the S&P 500 and Fear & Greed index table from Jan 2020 to June 2020 for 6 months. Recently, stock prices have been very volatile.

The left y axis is S&P index which is from 4,000 to 2,000, and the other right y axis is Fear & Greed index which from 0 to 100.

3.1 Theoretical background

The correlation (r_{xy}) between Fear & Greedy

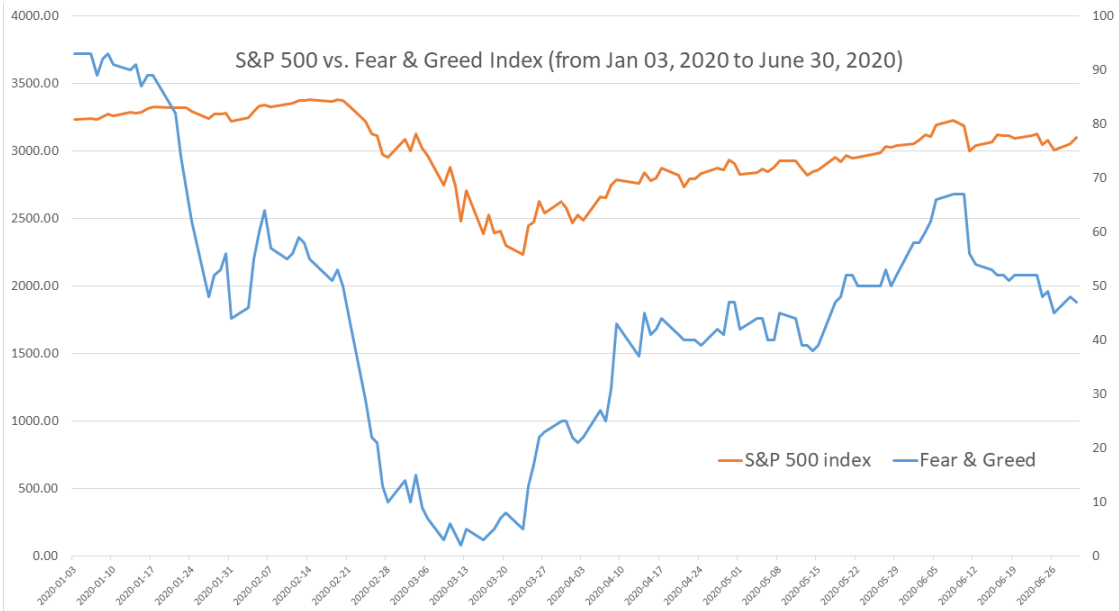


Fig. 2. S&P 500 vs. Fear & Greed index from Jan 3, 2020 to June 30, 2020 (based on table 1)

Index and S&P 500 is based on the theoretical background with equation (1).

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}} \quad (1)$$

Where Σ is Sigma, the symbol for "sum up" correlation formula $(x_i - \bar{x})$ is each x-value minus the mean of x (called "a" above) correlation formula $(y_i - \bar{y})$ is each y-value minus the mean of y (called "b" above) [16]

4. Simulation & Discussion

The first simulation is to buy a stock on Jan 03, 2020 for \$100,000, so each S&P 500 stock price is \$3,235 for a total of 30.69 stocks. Then, there is no way to decide whether the stock price is high or low. It sells at the end of June 30, 2020. The estimated cost is 95,163. Simulation 1 is gain -\$4,836 (profit % -1.05). The proposed strategy is to buy stocks when the F&G index is under seven and the stock price is down compared to the previous

stage. According to Table 1, there are six times to buy stocks on March 6, 9, 11, 13, and 16th. These days satisfy the criteria to buy stocks. Then if the fear and greed index is over 60. The proposed strategy sells stocks split and sell not all of them at once. As a result, the first simulation lost profit. However, the proposed strategy gains \$19,913 (profit % 19.9%). Therefore, the fear and greed index can tell us when we can buy or sell our own stock.

5. Conclusion

In the stocks market, you can lead to a successful investment by finding the right timing to buy and sell. However, it is challenging to find the timing of buying and selling. In the case of ordinary investors, it is complicated to know the highs and lows of stocks because they lack knowledge about the economy and have difficulty accessing expensive information. However, if you decide the timing of buying and selling by referring to the CNN fear and greed index, we expect to see higher returns. It is often said that stocks are not bought or sold.

However, it must be held for a long period to make a profit. But in a volatile market like today, owning it doesn't make much money. In particular, as a result of a comparative analysis of past data, the domestic stock market often suffers losses if held for an extended period. In the case of US stocks, long-term investment is correct because there are high-quality stocks that rise upward in the long term. Still, the domestic stock market is highly volatile, so it is possible to increase the return by analyzing buying and selling timings and appropriately buying and selling simultaneously. In this study, to improve the return based on the S&P 500, a split purchase was attempted when the fear and greed index was seven or less, and then split and sold when the fear and greed index exceeded 60, resulting in a return of 19%. However, it is expected that the optimal buying and selling timings for each stock will be different, not the same standards for other stocks. Therefore, in the future, we plan to conduct research by analyzing the correlation coefficient between individual stocks and the fear and greed index.

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