The Performances of Different Strategies Based on Time Series Analysis

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Abstract

The markets and investors had faced severe challenges during the COVID-19 Pandemic. It is important for inventors to learn the way to spread their risk from their portfolio. This paper indicates the performance of different Hedge fund strategies during the Pandemic. Hedge funds use different risk management methods to improve the performance of portfolio. We examined three different hedge fund strategies (Merger Arbitrage, Momentum Strategy and PEG ratio) in a time series to analyze the way that hedge funds help investors to improve their performance in the COVID-19 pandemic. The characteristics of different strategies are demonstrated by giving strategy models and gave results on our time series analysis. Specifically, the Microsoft and ATVI are chosen for our Merger Arbitrage; Occidental Petroleum Corporation and Netflix, INC. are selected for momentum strategy; and Macy and FedEx are selected for PEG ratio. According to the analysis, most strategies enable investors to survive under the market depression. Moreover, limitations and future prospect were also discussed. These results shed light on guiding investors to use different hedge fund strategies to lower their risks in different global circumstances.

Keywords-*Hedge fund strategies; Merger arbitrage; PEG ratio; Momentum strategy.*

1. Introduction

Hedge funds focus on using different strategies to ensure a positive return for investors and hedge potential risk. In 1949, Jones established the first limited partnership that is considered as the first hedge fund [1]. The idea of shorting and leveraging is used by hedge fund manager. Managers buy stocks they predicted will rise and short stocks that they predict will fall. By hedging the risk, managers can ensure a positive return for investors. Although Hedge fund and Mutual fund use the same economic function, Mutual fund lacks complex investment strategies to hedge the risk and regulates heavily by the government [2]. On account of the high fees and potential high risk, Hege fund is only limited to wealthier investors. The stock market has gone through two phenomenal years: first COVID-19 swept across the globe in 2020, One of the deadliest epidemics in human history. Stock market tanked almost 30 percent; however, the Fed decided to lower the interest rate to stimulate the economy. Second, due to the supply chain, the CPI index has reached 8 percent, which is the largest since the 1970s. Third, the stock market is pricing in the tapering and reduction of the balance sheet. During the period of mid-February to mid-March in 2020, equity market in America and European Union dropped by as much as 30% [3]. Investors in the financial market faced severe challenges. The hedge fund market might perform differently than other equality market. By managing the risk and volatility, investors can produce a greater return by the resilient of hedge fund [4]. In this paper, we analyze the performance of 3 different hedge fund strategies, which are merger arbitrage, momentum and PEG ratio. For Merger Arbitrage, during the acquisition boom of the 1980s, merger arbitrage became at the forefront of hedge fund investment strategies [5-8]. At a time when the strategy was still new and lacked substantial competition, returns were very high, with some arbitrage firms averaging returns in excess of 20% per year. Notably, Warren Buffett earned a 53% return on

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his M&A arbitrage investments in 1988. These high returns are particularly noteworthy because they are usually not dependent on the direction of the stock market index. M&A arbitrage usually generates absolute returns, i.e., positive investment returns that are independent of the general direction of the stock market. In addition, for Momentum strategy, previous scholars reported that this strategy returned an average of 1% per month over the next 3 to 12 months. This finding has been confirmed by many other academic studies, some even dating back to the 19th century. Momentum strategies tend to have high turnover rates, which can reduce the net return of a momentum strategy [9-11]. Some even claim that transaction costs wipe out momentum profits. Generally, momentum's performance is accompanied by occasional big accidents. For example, in 2009, momentum plunged -73.42% in three months. This downside risk of momentum can be reduced by so-called "residual momentum" strategies, which use only stock-specific portions of momentum. Finally, for PEG ratio, The PEG indicator Jim Slater invented a stock valuation metric that builds on PE valuation and makes up for the lack of PE estimates of a company's dynamic growth [12-14]. In that case, the stocks were selected by choosing those companies with low P/E ratios while their growth rates were relatively high, and a typical feature of these companies was that the PEG would be very low. We chose the PEG ratio because of its specific use. The advantage of using the PEG indicator for stock selection is to observe the P/E ratio against the growth of the company's performance, where the key is to make an accurate expectation of the company's performance. Investors are generally accustomed to use P/E ratios to assess the value of stocks, but there are limitations to the operability of PEG ratios when it comes to extreme situations, e.g., when there are many stocks in the market that are well above the average P/E level of the stock market, or even up to hundreds of times the P/E ratio; when it is not possible to use PEG ratios to assess the value of such stocks. PEG is not as popular as P/E and P/N ratio, but it is also very important, and serves as a decisive factor in determining stock price movements in some cases.

The rest of this paper is organized as follows. The second section will introduce the data and method we used in analyzing the performance of Merger arbitrage, Momentum and PEG ratio. The third section will demonstrate the results and discussion of our trades, as well as clarify the research limitation. Eventually, a brief summary is given in Sec. V.

2. Data & method

The Merger Arbitrage, Momentum strategy and PEG ratio are utilized to analyze how different hedge fund strategies perform during the Pandemic. Merger Arbitrage is the strategy that longs the target company and shorts the acquiring company. Acquiring company will give details on how much it will buy the target company stocks and how many shares it will buy. The buying price will be higher than the current target company's stock price. After the announcement has been made by the acquiring company, the acquiring company's stock price will decrease and the target company's price will increase. The target firm's stock price will usually reach the buying price after the merger has been done. Investors can benefit from buying the target firm's stock because of the rising price and shorting the acquiring firm's because of the lowering price. The merger can be done through cash over or stock offer. The volatility of Merger Arbitrage is usually 4%, which is even lower than the low-risk investment strategy, 5%. Merger Arbitrage was applied to the merger of Microsoft and Activision Blizzard in our discussion. According to an announcement from Microsoft, Microsoft announced a merger with Activision Blizzard on Jan. 18 2022 for $95.00 per share with a total of $68.7 billion in cash.

The second hedge fund solution that we are going to discuss is the momentum strategy. A momentum trading strategy is an investment strategy that presets filter criteria for stock returns and trading volume and buys or sells stocks when stock returns or stock returns and trading volume meet both filter criteria. The proposal of momentum trading strategy in the behavioral finance sense originated from the study of medium-term stock price return continuity in the stock market. After an in-depth study of it, our momentum strategy is divided into several steps

- Determine the range of target securities markets to be traded;
- Select a length of time as the security performance evaluation period, usually called the portfolio formation or ranking period;
- Calculate the return of each sample security for the formation period;
- According to the magnitude of the return of each sample security in the formation period, all sample securities in the target market are ranked in ascending and descending order, and then divided into several groups, among which the group with the largest return is called the winning portfolio and the group with the smallest return is called the losing portfolio;
- After the formation period or after an interval, a length of time is then chosen as the holding period after selling and buying the winner portfolio and the loser portfolio;
- Performance evaluation. Calculate the mean value of the return of each holding period of the momentum strategy and t-statistics, if the t-statistic value indicates that the return of the

momentum strategy is significantly greater than less than 0, the industry is said to be a successful momentum strategy. This completes our momentum strategy;

We calculated the moving average by using the formular

$$MA = \frac{[P(-200) + P(-199) \ldots + P(Today)]}{200} \quad (1)$$

The 200 days stock price moving average helps investors to determine how one specific stock performs. If the 200 days moving average is lower than the current price, investors should long for the stock. If the 200 days moving average is larger than the current price, investors should not buy the stock. We examined the profitability of Momentum Strategy by Longing Occidental Petroleum Corporation and shorting Netflix, INC.

Price/Earning to growth ratio strategy (PEG) is a hedge fund strategy that evaluates the performance of one particular stock. Based on PEG ratio, it can help investors to decide whether one specific stock price is undervalued or overvalued. We calculated the PEG ratio by using the formula

$$PEG = \frac{StockPrice}{g \cdot EPS} \quad (2)$$

where EPS represents for earning per share, g is the earning growth rate. The PEG ratio generates the idea from the PE ratio but revises it by dividing the growth rate. P/E ratio indicates by keeping the growth rate constant, how long investors can generate their principle back. PEG ratio takes into consideration the company's growth rate, which helps investors to determine the difference between two stocks that have equal P/E ratio. When one stock's PEG ratio is lower than 1, the stock is undervalued. Investors should buy the stock. When one stock's PEG ratio is bigger than 1, the stock is overvalued. Investors should short the stock. We examined the profitability of PEG ratio by longing Macy and shorting FedEx.

3. Results & Discussion

3.1. Merger Arbitrage

Using the merger arbitrage strategy, we are up 3.9 percent on MSFT, and we are up 2.48 percent on ATVI. In total, we gained around 3 percent. The announcement by Microsoft on Jan.18 had shocked the whole gaming industry. Its merger with Activision Blizzard makes Microsoft the third gaming company in the world. According to the merger arbitrage strategy, the target company stock price will steadily rise to the buying price, which is $95. As shown in Fig. 1, the stock price had increased about 20% ($65-$82) after Microsoft announced the merger on Jan 18, 2022. The potential risk for merger arbitrage is the possibility that merger was banned by the Federal Trade Commission. However, Microsoft has a small portion of gaming profit, which the merger might be successful. Although the recent price of Microsoft has roamed around $80 per share, this is ascribed to the time period of the completion date. Merger of Microsoft and Activision Blizzard will be finished in 2023, there are many factors that influenced the investors' decision.

Figure 1. The trend of MSFT stock price.

3.2. Momentum Trade

Using the Momentum strategy, we bought OXY for 100 shares, and I shorted NFLX for 150 shares. By now, we are up 39.43 percent on OXY, and we are up 11.89 percent on NFLX. In total, we have around 13.6 percent profit. Till now, there are three main reasons that we bought OXY. First, OXY's 200-day moving average is smaller than its current price, which is a good sign to buy. Second, the oil price has been growing the past two years due to hiking inflation, and the oil price just 'jumped' due to the Russian and Ukraine war. Third, the attractive assets OXY owns in the Permian, which makes up a little less than half of OXY's production volumes, where OXY can drill at advantageous costs and with compelling cash flow profiles. There are two main reasons for shorting NFLX. First, Netflix's 200-day moving average is greater than its current price, which is a good sign to sell or short. Second, Netflix lacks momentum to grow. During Covid-19 pandemic, people got bored by staying at home, and Netflix was a good way to entertain themselves. Therefore, Netflix's paid membership has been increasing the past two years; however as more and more people get vaccinated and more and more people start to go back to their work, people would have less and less time to watch TV dramas at home, hence Netflix's paid membership growth will decline day by day as illustrated in Fig. 2. In addition, there are more and more competitions in the streaming market such as Hulu and Amazon, thus Netflix's revenue will be squeezed as well as shown in Fig. 3.

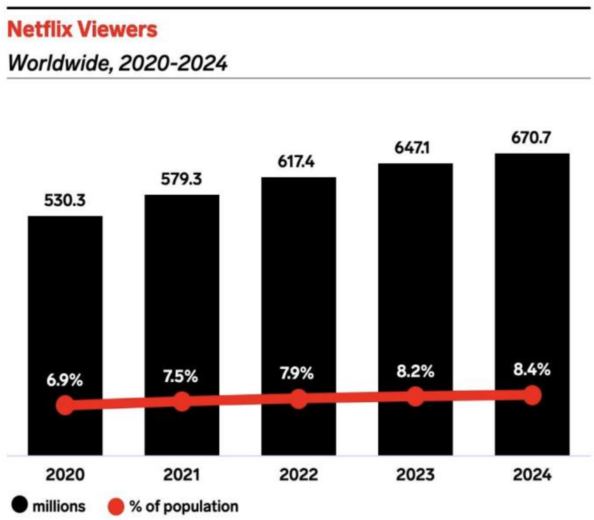

Figure 2. Expect Netflic worldwide viewers 2020-2024

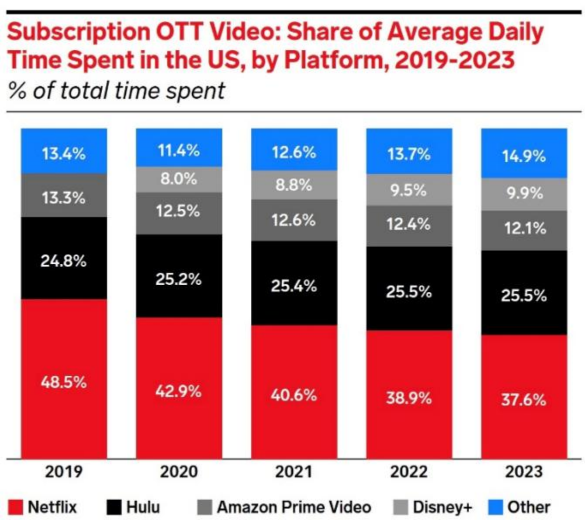

Figure 3. Expect time spent on video platform in the US 2019-2023.

So far, Facebook is down 15.73 percent, and Match Group is up 17.15 percent. In total, this pair trade is reporting around 4 percent loss. There are three main reasons that we bought FB. First, Facebook has a 0.67 PEG ratio which is smaller than 1, thus it is a good sign to buy. Second, although Facebook is facing lots of competition from other companies and privacy scandals, its user base has generally kept growing despite all the negative publicity. The number of daily active users across its entire family of apps, which includes Instagram, WhatsApp, and Messenger was 2.82 billion as of Dec. 31, 2021, which is still the most used social media in the world as shown in Fig. 4.

Third, Facebook has invested billions of dollars in the meta universe. Although it has not been profitable, it is a huge opportunity. As the leader in social media, Facebook can transform its mature system into the meta universe. Goldman Sachs analyst Eric Sheridan thinks the metaverse could be an $8 trillion opportunity.

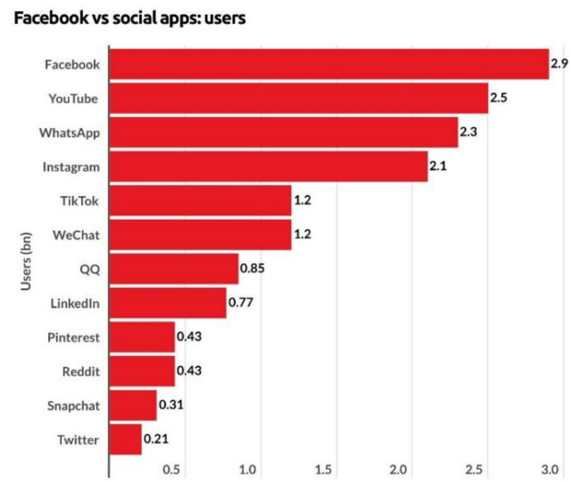

Figure 4. Daily active users across social media.

There are three main reasons account that shorting match group will work. First, the match group has a 1.39 PEG ratio, which is a sign to sell or short. Second, match group is an online dating app, it has the same logic as Netflix: during the COVID-19 pandemic, more and more people chose to date online instead of dating in person. Nevertheless, as Omicron starts to fade away and in-person dating returns stronger than ever. Third, in markets where containment efforts have been less successful and COVID-19 cases have increased, new users signing up and the preference to pay for membership have declined, which can lead to decrease in revenue and profit.

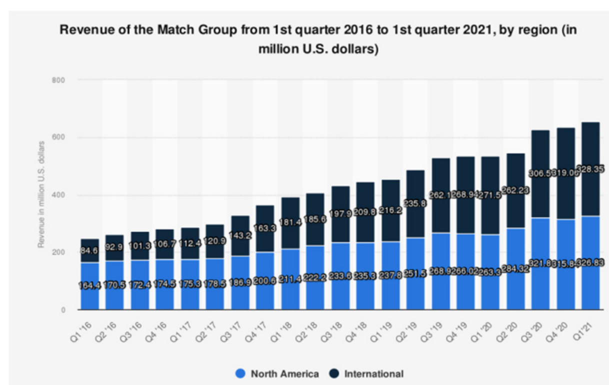

Figure 5. Revenue of match group during 2016-2021

There are three reasons that this trade does not work. First, FB had a double- missing earning report, and Facebook has invested lots of money in the meta universe, and some investors cannot witness its profit availability. Second, there are lots of competitors in the social media market, e.g., TikTok and WeChat. Third, according to the latest news, Russia just blocked Facebook and Twitter, and Facebook will lose lots of daily active users.

3.3. Limitation

Although the analysis shows empirical evidence on the profit of Merger Arbitrage, Momentum and PEG ratio, there are some limitations that investors should concern. For the Merger Arbitrage, the merger between Microsoft and Activision Blizzard is still full of uncertainty. The stock price of Activision Blizzard has roamed between $80. The main reason for this scenario can be attributed to the merger complete date. The merger between Microsoft and ATVI will be done in 2023, which different circumstances may happen. Furthermore, our time series analysis focus on the performance of Merger Arbitrage, Momentum and PEG ratio in a short period of time (3 months). We exclude many factors that might influence the result of individual strategy. Based on previous studies, those low-momentum stocks 's average price have no difference with Momentum stock in a longer period of time. When investors are choosing their own portfolio, more factors should be taken in to consideration. These individual hedge fund strategies could not perfectly indicate the performance of one particular stocks. Investors should take more consideration in their portfolio selection.

4. Conclusion

In summary, this paper investigates the performances of three Hedge funds trading strategies, i.e., merger, momentum, and PEG ratio. Specifically, it has around 3 percent gain for the Merger arbitrage, around 13.6 percent regrading to the momentum strategy, and around 4 percent loss in respect to PEG-ratio trading. This research gives us a big idea that how the hedge funds strategies perform during COVID-19 and post COVID-19. In addition, this research helps investors to approximate their risks and returns. In the future, more factors and indexes ought to be include for better comparison and more companies should be investigated as well. Overall, these results offer a guideline for investors to hedge the risk during COVID-19.

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