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Stock Market Simulation

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By

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Abstract:

This project is an eight-week stock market simulation. The goal of this project is to compare two different trading strategies against each other, as well as give the participant a foundational understanding of the stock market through simulations. The first trading strategy is a Buy and Hold strategy where stocks can be bought but cannot be sold until the end of the eight weeks. The second strategy is a Frequent Trading strategy where stocks can be bought and sold or shorted and covered throughout the eight weeks. Both strategies were applied within a specific pool of twenty companies, and each strategy started with an initial cash sum of \$100,000. The results showed that the Buy and Hold strategy outperformed the Frequent Trading strategy, ending the simulation with a return of 2% compared to the Frequent Trading strategy's return of 0.6%. This project also provided the participant with foundational knowledge about the stock market.

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Chapter 1: Introduction

1.1 Goals and General Plan

The goals of this project are to compare the success of different frequencies of trading in the stock market and gain valuable experience to become a better trader and wiser investor in the stock market. To do this I must first understand the history of the stock market, identify common influences of the market, research techniques for evaluation of stocks, and identify different methods for trading stocks. Then, for eight weeks I will trade stocks within two different frequencies of trading: a set it and forget it strategy whose stocks I will not sell until the end of the eight weeks, and a frequent trading strategy where every day or two I will check on the status of the stocks and can trade as I wish to. Each strategy will start with an initial investment of \$100,000, and stocks can only be traded within a select group of twenty companies for the entirety of the eight weeks. At the end of the simulation the results of the different frequencies of trading will be compared.

1.2 History of The Stock Market

It is generally believed that the first stock exchange began in the city of Antwerp, Belgium in the 1500s. Prior to this there existed other systems like in France in the 12th century where agricultural debts were traded and in Venice, Italy in the 13th century where government securities were traded [1]. In Antwerp, lenders traded business, government, and individual debts, however no real stocks were traded. More modern stock markets began to develop at the height of imperialism in the 17th century. During this time Western European nations were chartering many voyages across seas. To decrease the risk of these voyages, ship owners would seek investors to pay for a crew and supplies for the ship in return for some of the profits from selling any goods brought back from the voyage. These investors were often big companies called East India

companies. Early strategies for dealing with risk could also be seen as East India companies would spread out their investments among multiple voyages at once to decrease the risk of losing money if one voyage happened to go bad. These companies offered stocks which paid dividends, creating the first modern joint-stock companies. This revolutionized business as it allowed these companies to grow rapidly by demanding more for their shares as they amassed more ships and increased their profits. These shares were kept on paper which could be bought and sold between individuals. Eventually the London Stock Exchange was created in 1773 but was heavily restricted by laws [2].

1.2.1 The New York Stock Exchange

The biggest stock exchange today is the New York Stock Exchange. In 1792 the NYSE was created by twenty-four brokers with the Buttonwood Agreement. While this trading remained informal by 1817 a new constitution was adopted giving more structure to the exchange. The NYSE grew rapidly especially with the help of technological advancements. By 1886 the NYSE reached a trading volume of 1 million. However, it wasn't all smooth sailing, in 1929 the market crashed as prices plummeted and the Great Depression ensued. After this historic crash U.S. congress created the Securities and Exchange Commission, SEC, which would regulate the exchange of securities. There have been other crashes since, but the exchange has recovered from each. The New York Stock Exchange continues to grow to this day and is considered center of the global capital market [3].

1.2.2 The Nasdaq

Other exchanges have emerged as well including the Nasdaq. Starting in 1971, the Nasdaq was entirely electronic and implemented efficient trading methods that would be adopted by other exchanges. In 1980 Apple listed its initial public offering on the Nasdaq and since then many major

technology companies are listed on the exchange like Microsoft and Amazon. As of 2017 the Nasdaq has over 3,800 companies listed and a total market capitalization of \$10 trillion [4]. In 2021 the Nasdaq amassed a total trading volume over 12 billion in a day [5].

1.2.3 Indexes

With so many companies and many markets around the world people often look for quick ways to summarize the performance of these companies in different markets. One of the most common ways to do this is through indexes. These indexes take a few of the many companies in these markets to simplify market trends and summarize overall performance. One popular index is the S and P 500, which takes the top 500 U.S. stocks, primarily chosen by overall market capitalization but they also consider liquidity, trading history and other factors. The S and P 500 accounts for about 80% of the U.S. market value so it is generally a good indicator of how well the U.S. market is doing. Another popular index is the Dow Jones Industrial Average, DJIA, which takes the 30 most influential stocks in the U.S. The DJIA is price weighted so the actual price of the stocks plays a heavy role in the calculation of the index rather than each company's market capitalization. The DJIA accounts for about a quarter of the overall U.S. market value. There is also an index for the Nasdaq exchange called the Nasdaq Composite Index. This index is market capitalization weighted and includes all companies listed on the Nasdaq. Since this index includes small cap companies as well the Nasdaq Composite Index can represent both how well the technology industry is doing, and how confident investors are in speculative technology stocks. There are many other indexes as well that include mid-cap and small-cap companies on the NYSE such as the many Russell indexes. Overall, these indexes can give investors a good idea of how overall markets are performing as well as specific industries [6].

Chapter 2: Methods

2.1 Analysis of Stocks

To trade stocks successfully and make a profit I must first understand how to analyze a stock. There are two common methods for analyzing stocks, technical and fundamental analysis. Technical analysis seeks to discover how a stock's price will change, while fundamental analysis focuses more on why. Technical analysis often looks for short term changes to make profits by assessing trends and patterns. Fundamental analysis looks more into how a company is run, their yearly profits, competitors in their industry, and other more wholistic patterns that determine if the company is one that you trust will perform and generate more value [7].

2.1.1 Important Metrics

With these techniques for analysis comes some important metrics to consider. Some basic numbers to consider are total market capitalization and profit margins. A company's total market capitalization is calculated by multiplying the number of shares of a company by the price of a share. The market cap is an indicator of how big or small a company is in relation to other companies. Profit margins can be measured by net income or EBITDA (earnings before interest, taxes, depreciation, and amortization) and is an indicator of how well the company is handling costs and generating revenue [8].

There are also more complicated metrics used by many investors to assess a company's performance. A very common one is the price-to-earnings ratio, P/E. This metric divides a stock's price by its earnings per share, EPS, over the past year (P/E ratios can also use a forecasted EPS). Higher P/E ratios indicate a relatively expensive stock which could mean investors are faithful that the company will perform, while lower P/E ratios can indicate a bargain for a stock or that investors

do not trust the company to perform well [9]. If a company is not yet profitable another useful ratio is the price-to-sales ratio. This is calculated by dividing a company's total market capitalization by its total revenue over the past four quarters. This can help to indicate how expensive or cheap a stock is for these non-profitable companies. Another useful metric is the return on equity. This is calculated by dividing a company's net income by the total equity of shareholders. This metric can indicate how well a company uses shareholder equity to create profits [7].

In technical analysis, an important metric is a moving average. Moving averages are used to determine trends in the market on different scales. Moving averages are calculated by averaging a stock's price over a period of time. If a company's 50-day moving average is a lot greater than their 200-day moving average, it could indicate that the company's shares are starting to become more valued even though on a daily basis the stock is volatile [10].

While these quantitative metrics are useful there are also qualitative characteristics that are important. Some factors to consider are what competitive advantages does a company have over others in the same industry? Leadership is also important so having a good chief executive with a successful history can provide trust in that company to perform well. Even with these traits a company's industry should also be considered to. If the industry is growing it can mean that the company will grow with it while if their industry is shrinking it could mean that the company will shrink with it [7].

2.1.2 Approaches to Investing

After calculating these metrics and considering important factors an investor can then choose how they want to invest. Two common approaches to investing are value investing and growth investing. In value investing, investors look to find stocks that are undervalued in hopes that the actual value of a stock will be realized, and the share will go up in price. In growth

investing, investors are willing to pay a premium price for a stock trusting that the company will grow, and the stock prices will rise [7]. While these are some simple approaches to investing, there are also more complex ways of trading stocks.

2.2 Techniques for Trading

2.2.1 Swing Trading

One common method for trading stocks is swing trading. The goal of swing trading is to capture a shift in share prices. Swing traders hope to buy a stock right before or as its price goes up and sell the stock as the price reaches its high [11]. To predict these shifts I will use exponential moving averages, EMA. An EMA is a moving average that puts more weight on recent data points which is important for finding when a stock's price will shift. To calculate an EMA, you use a stock's closing price or current price, multiply it by the smoothing factor divided by the number of days being observed plus one, then take the sum of that number and yesterday's EMA multiplied by one minus the smoothing factor divided by the number of days observed plus one. The smoothing factor is a number that can be adjusted to give more weight to more recent observations, the greater a smoothing factor, the more weight is given to recent observations when calculating EMA [12]. The formula for calculating EMA is given by Eq. (1):

$$EMA_{Today} = \left[Stock\ Price_{Today} \times \left(\frac{Smoothing}{1+Interval} \right) \right] + \left[EMA_{Yesterday} \times \left(1 - \left(\frac{Smoothing}{1+Interval} \right) \right) \right] \quad (1)$$

A common method for predicting an increase in stock prices is to use the 9-, 13-, and 50-week EMAs of a stock. When a stock's current price crosses above these EMAs it can signal that an upward trend is coming, and when the 9-week is greater than the 13-week EMA it can signal a stronger trend, if the 13-week EMA is greater than the 50-week EMA. When a stock's price falls below these averages it can signal a bearish trend and it is likely time to sell. If a 9-week EMA is

less than the 13-week EMA, which is also less than the 50-week EMA, the downward trend has started [13].

By timing these ups and downs in stock prices one can turn a profit buying and selling at the right times. However, it is important to also pick the right stocks. Finding stocks with high liquidity will help to ensure profits as you will be able to sell when you want or need to. As a result, larger market cap companies will be useful for swing trading as they have higher trading volumes than smaller companies [13].

2.2.2 Trend Trading

Another trading technique is known as trend trading. In this technique a trader looks to find the momentum of a stock, and trade according to that momentum. If a stock has upward momentum the trader can buy and hold the stock until the trend seems to stop. If the momentum of a stock is downward, the trader can choose to not buy, or they can use shorting [14]. Shorting is the act of selling a borrowed stock at market price, and then returning the borrowed stocks within a specified period of time at the current price. When a trader shorts a stock, they are hoping that the price will go down after selling it so that when they buy back the stocks to return it, they pay less than what they sold the borrowed stocks for and turn a profit [15].

In order to find the momentum of a stock, different indicators can be used. If short-term moving averages cross above long-term moving averages, it could signal an upward trend, and the opposite could signal a downward trend [14]. Another more technical strategy is to use relative the strength index, RSI. RSIs above 70 usually indicate an overbought or inflated security and a correction, or downward trend is expected. An RSI of below 30 usually means a security is oversold and undervalued and an upward trend could start. To calculate the RSI, you first find the average gains and average losses over a certain period. You then divide the average gains over

that period by the average losses and add it to one. Then divide 100 by this number and subtract what you get from 100. You can also use a smooth RSI which uses the previous average gain and loss measurements of just the day prior and the current day in its calculation [16]. The equations are provided below:

$$RSI_{regular} = 100 - \left[\frac{100}{1 + \frac{Average\ Gain}{Average\ Loss}} \right] \quad (2)$$

$$RSI_{smooth} = 100 - \left[\frac{100}{1 + \frac{(Previous\ Average\ Gain \times 13) + Current\ Gain}{(Previous\ Average\ Loss \times 13) + Current\ Loss}} \right] \quad (3)$$

By using these calculations, a trader could potentially predict the upward and downward trends in the market in hopes of using the momentum to turn profits through either buying and holding before an upward trend or short selling at the start of a downward trend.

2.3 Simulation and Strategies

For this project there will be two simulations each starting with \$100,000 and only trading within a group of twenty companies as mentioned before. Both the Buy and Hold strategy and the Frequent Trading strategy can use any of the previously mentioned techniques for analyzing stocks and trading them, as well as others not explicitly defined in this paper. The simulations will start on June 6th, 2022, and end on July 29th, 2022, and use real time data from the New York Stock Exchange and the Nasdaq. The companies that I will buy and sell within for both simulations will be: Nvidia Co (NVDA), Advanced Micro Devices Inc (AMD), Alphabet Inc (GOOGL), Amazon.com Inc (AMZN), Meta Platforms Inc (META), Apple Inc (AAPL), Intel Corp (INTC), Tesla Inc (TSLA), Microsoft Corp (MSFT), Netflix Inc (NFLX), DraftKings Inc (DKNG), Ford Motor Co (F), General Motors Co (GM), McDonald's Corp (MCD), Walmart Inc (WMT),

Discover Financial Services (DFS), International Business Machines Corp (IBM), Bank of America Corp (BAC), Walt Disney Co (DIS), and Nike Inc (NKE). This group includes eleven companies listed on the Nasdaq (NVDA – DKNQ), and nine listed on the NYSE (F – NKE). They are all large- to mega-cap companies except for DraftKings Inc which is a mid-cap company.

2.3.1 Buying and Holding

For this strategy any of the stocks of the group of twenty stocks can be bought initially. However, this strategy will not need to use any of the trading techniques as the shares will be kept and only sold at the end of the eight weeks. This strategy highlights what is commonly considered a sensible approach to investing, investing for the long run. In this strategy I will use some analysis as I could initially invest in shares with good deals which have low P/E ratios, or I could take on the mindset of investing for growth hoping that within the seven weeks a company may have a jump in price. In any case fundamental analysis will still be important as these investments will represent the trust, I have in the respective companies for these seven weeks rather than watching trends and predicting trends. As a result, looking into company management, their industry, and other qualitative aspects will be important.

2.3.2 Frequent Trading

For this strategy stocks will be checked at the frequently throughout each week. I can buy or short any stocks within the group of companies selected. For this strategy I will still want to invest in some companies that I believe will do well, but I will also practice technical trading. If I see an undervalued stock that has a low RSI, I could invest in it and hopefully by the next week an upward trend has started. I may also choose to swing trade, analyzing the different EMAs of a stock hoping to predict the next upward trend, or finding a downward trend to short on. At the end

of the eight weeks all stocks that I have at the time will be sold and counted towards my overall profit.

Chapter 3: Simulation 1: Buying and Holding

3.1 Simulation Reports

3.1.1 Week 1, June 6-12

This week I bought stocks in 15 companies of the total 20 I am watching. Table 3.1 summarizes my actions.

Table 3.1: Buy and Hold, Week 1 Transactions. All transactions were in \$'s.

Week 1								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
6/6/2022	WMT	Buy	125.25	70	8,757.00		91,243.00	
6/6/2022	AAPL	Buy	145.93	80	11,674.02		79,568.98	
6/6/2022	META	Buy	188.86	10	1,888.60		77,680.38	
6/6/2022	MSFT	Buy	269.69	25	6,742.16		70,938.22	
6/6/2022	AMD	Buy	106.48	80	8,518.40		62,419.82	
6/6/2022	INTC	Buy	43.62	50	2,181.00		60,238.82	
6/6/2022	NFLX	Buy	198.70	35	6,954.33		53,284.49	
6/6/2022	DKNG	Buy	13.06	150	1,958.25		51,326.24	
6/7/2022	BAC	Buy	36.30	40	1,451.80		49,874.44	
6/7/2022	F	Buy	13.75	100	1,374.90		48,499.54	
6/7/2022	IBM	Buy	142.92	15	2,143.80		46,355.74	
6/8/2022	NKE	Buy	121.32	20	2,426.42		43,929.32	
6/8/2022	TSLA	Buy	743.98	15	11,159.63		32,769.69	
6/8/2022	GOOGL	Buy	2,349.56	5	11,747.80		21,021.89	
6/8/2022	DIS	Buy	107.75	20	2,155.00		18,866.89	

June 6th:

The first stock I looked at was Walmart. Recent news indicated that the Walmart heir Rob Walton was looking to buy the NFL Broncos, at around 4.5 billion. As I am also an NFL fan, I know that the broncos traded for Russell Wilson, a very good quarterback, this past offseason. I believe buying the broncos could artificially inflate Walmart's stock price possibly leading to some

profits. However, this strategy will not let me sell any stock until the end of the seven weeks so I need to look at more fundamental metrics that will decide whether I believe Walmart's stock will grow in the coming weeks. Walmart's P/E ratio is currently 26.93. Comparably Costco, another major retailer has a P/E of 37.51, and Amazon, the highest market cap retailer has a P/E of 59.01. Walmart shares are also down about \$25 dollars since May 6th, 2022. So, I decided that Walmart could be a value buy that may also see some profits from recent news.

Next, I looked at Apple. Currently their stock price is trending downward over the past couple months and down about \$25 from a high in April of about \$178 to a stock price now of \$146. Their P/E ratio is similar to Walmart at 23.63. Compared to other major Nasdaq companies this P/E ratio is relatively low and could mean a good value buy. Another thing worth noting is that today is Apple's Worldwide Conference for Developers, many hope that exciting products could be on the way and news of this could drive apple's price back up. As a result, I bought 80 shares.

Meta Platforms was interesting to me at a P/E ratio of 14 it seemed like very good value. However, since September of 2021 it has been on a steep decline and there is also recent news of chief operating officer Sherly Sandberg resigning. However, Meta Platforms is a huge company that has been largely successful over the years so I think it's possible that the price could recover in time. As a result, I bought 10 shares in case the stock rises to what it once was, but if not the low number of shares would only lead to a slight loss if the stock price declined.

Microsoft's stock was interesting to me as in the past year it has made many acquisitions while still providing profits for the company. Its P/E ratio was not very high for a tech company at 28.17. and its EPS seemed healthy at 9.65. In June of 2021 it was trading at about \$250 per share, the stock's price reached a high near the end of 2021 at about \$350 and since then it has

fallen back down to its current price of \$270. Historically it has been a steadily growing company and I believe it will bounce back from this downturn. I bought 25 shares.

Next, I looked at AMD and Intel, two tech companies known for computer processing units. Both companies are the major providers for CPUs across the laptop, and desktop markets. Over the past month AMD has been volatile but seemingly on an upward trend. Its current P/E is slightly high at 39.65, however its shares are relatively low at \$106 compared to its 52-week high of \$164.46. I think now is a good time to buy at a lower price as I believe AMD is a well-run company that will continue its current upward trend for the next couple of months. I bought 80 shares.

Intel has been a very volatile stock over its history and currently seems to be past one of its higher points, but on a downward trend. In June 2021 it was trading at a high of \$58 and it is now down to \$44. However, it remains a major leader in the CPU market and if AMD starts to falter, Intel could pick up the slack. Its P/E ratio is also very low so it could be a value buy. I bought 50 shares since it is relatively cheap, and it could help to hedge any sudden losses with AMD.

Netflix was another interesting stock. About 2 months ago it had a steep correction and lost over \$100 in stock price. However, since then it has remained relatively steady. Recently Netflix has released a new season of Stranger Things, a very popular tv show and it hit a record streaming day. I believe for the following months that Netflix will remain steady and could possibly grow with new viewers being attracted to its shows as Stranger Things gets more media coverage. Its P/E ratio is also relatively low at 18.06 and its EPS seems good at 11.29. I bought 35 shares for a little under \$200.

Lastly, I looked at DraftKings. It is the only mid-cap company in the group I am trading within. This stock is purely speculative as over the past year its stock has declined from a high \$64 down to its current price of \$13. However, a new football season is coming up, the last season of NFL was one of the best in recent years and this off season was one of the biggest changing off seasons in NFL history. As a result, I think the stock could climb back as we get closer to the start of the 2022-2023 NFL season, maybe not all the way back to \$64 but possibly \$20. I bought 150 shares totaling to just under \$2000.

June 7th:

Today I looked at the stocks on the NYSE except for Walmart which I looked at yesterday. First was BAC. Recently Bank of America Corp's wealth management branch Merrill Lynch had to pay out 15 million to customers after buying them into more expensive stocks, however it was noted how well they handled the situation and their stock only fell 60 cents. This could indicate a relative trust among shareholders. Their P/E ratio is also a good ratio at 10.31. I then looked at DFS. Discover Financial Services' stocks are very volatile, changing 3 dollars just today and a range of 52-week highs and lows of \$37. However, its P/E ratio is very low at 6.58 and a good EPS of 16.88. I decided to buy 40 shares of BAC as their stocks were cheaper and could be a value buy.

Next was Ford, their shares were trading at a very cheap price of \$13.75, however the car industry is probably not the best right now as gas prices remain very high. However, the housing market is very high which could indicate that people are ready to start spending more of their income again, and Ford has a new line up of cars that could be good for sales. They offer an electric truck and SUV, and they have recently brought back the Bronco. Along with this they offer the most sold model of any vehicle in the US, the F-150 Truck. As a result, I bought 100 shares which

could totaled just 1,374.90, and I'm hoping that as we recover from the pandemic, Ford's sales will increase, and their stock price could climb upward.

Next was IBM. While their stock price was volatile, the company had a low P/E for a tech company and their stock prices had recently shot upwards about \$13. I wasn't very confident in the company however it seemed that the general public liked the stock, so I wanted to get in before it got too high. I bought just 15 shares for a little over \$2,000 so that I could make some profits if it continued to climb, but not lose too much if the bubble burst.

Then I looked at Nike. Nike has historically been a steady growing company and it seemed to be in a current low. Since the start of 2022 its stock price had dropped about \$60 to \$107 in May, but since started climbing back up to its current price around \$122. I trusted that Nike would steadily grow or maintain value over the course of the simulation, so I bought shares at around \$121 a share.

June 8th:

Today I looked at some stocks that initially pushed me away due to high cost or P/E ratios. First was Tesla. Tesla was trading around \$730 which is a lot for a share, but after digging deeper I changed my mind. Since April Tesla stock has fallen from a high around \$1,145. Historically Tesla has been a fast-growing company as well. So, while its P/E ratio was high at 97.58, it has been on a downward trend. Also, with gas prices remaining high more people could be turned to electric cars, which creates a need for charging stations. Tesla provides both products. People may also want to use solar panels to lower their energy costs, which Tesla is also developing. Overall, Tesla's products are perfect for where the market will go and now is a suitable time to buy while it is low. I bought fifteen shares for a good portion of my cash totaling just under \$12,000.

The next company I looked at was Google. It was trading around \$2,350, which originally turned me away from buying any as it was so expensive. However, when I looked further into it, I found that it had a high EPS of 112.18 (also due to high share price though) and a low P/E of 20.79 which compared to other massive tech companies is good value. The stock has also declined nearly \$700 since February, but I trust that it will recover. This means that while the price of one share is very high it is actually a good value buy and as a result, I bought 5 shares.

Lastly, I looked at Disney which had a very high P/E ratio for a NYSE company, at around 70. Its earnings per share was also very low at 1.46. While it is not a good value stock, I think it could be a good speculative stock. Recently Disney has released its Obi-Wan Kenobi tv series which many people have been anticipating and it has released plans for many more shows and movies to come. I believe Disney could see a boost in sales which could drive its stock price up. As a result, I bought 20 shares at around \$108 hoping that they may see a boost in price as Disney releases more shows and more people watch them.

3.1.2 Week 2, June 13-19

Last week I had bought \$81,145.35 worth of stocks, leaving me with \$18,854.65 of cash in the account. Using the closing prices on Friday, June 10th, of each stock I owned, by the end of that week my investments had declined to a total value of \$75,975.95, about a 6.37% decline. As I cannot sell any investments, I decided to reinvest some of the cash I had left. This week I bought more shares in three companies that I already had investments in. Table 3.2 summarizes these transactions.

Table 3.2: Buy and Hold, Week 2 Transactions. All transactions were in \$'s.

Week 2								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
6/14/2022	NKE	Buy	110.77	20	2,215.40		16,651.49	
6/14/2022	META	Buy	164.53	20	3,290.58		13,360.91	
6/16/2022	AMD	Buy	82.15	80	6,572.00		6,788.91	

June 14th:

The market has continued its trend downward, however, I have used this to lower my average cost per share in some of my investments. I decided to invest more into Meta Platforms and Nike, whose prices have dropped around 10% and 15% respectively. I doubled my amount of shares in Nike bringing my avg cost per share to about \$116, and I bought 20 more shares of Meta Platforms bringing my avg cost per share for Meta Platforms to just under \$173. I have hope that both of these companies' stock prices can recover in time and by lowering my average cost per share it means that recovery doesn't have to be as great in order to return a profit.

June 16th:

After news of the federal interest rate rising .75 points, the stock market had a down day across most industries. Most of my investments have declined again. Like Tuesday I am again reinvesting into some companies to lower my average cost per share. Since June 6th AMD has declined nearly 20 percent. Since I cannot sell in this strategy, I decided to buy 80 more shares and make the recovery necessary for a profit less than what it would have been. After buying 80 more shares at \$82.15 I have lowered my cost per share to \$94.31.

After reinvesting, the overall portfolio continued to decline. By the end of the week the \$12,077.98 that was reinvested was only worth about \$11,947.20, about a 1% decline. Likewise, the rest of the portfolio had also declined, but by a larger amount of about 5.5%.

3.1.3 Week 3, June 20-26

This week saw an upward trend in the portfolio, ending with an 8% increase from the end of the previous week. Table 3.3 summarizes the changes in the portfolio since the previous week.

Table 3.3: Buy and Hold, Week 3 Portfolio Changes. All evaluations were in \$'s.

Week 3			
Stock	Price	Shares	% Change
WMT	123.72	70	4.6%
AAPL	141.66	80	7.7%
META	170.16	30	3.9%
MSFT	267.70	25	8.1%
AMD	87.08	160	6.8%
INTC	38.61	50	4.4%
NFLX	190.85	35	8.7%
DKNG	14.15	150	23.9%
BAC	32.31	40	1.2%
F	12.01	100	6.9%
IBM	142.06	15	5.2%
NKE	112.91	40	5.2%
TSLA	737.12	15	13.4%
GOOGL	2,359.60	5	10.1%
DIS	97.78	20	3.6%
Total Asset Value	% Change		
90,407.15	8.0%		

The overall account value including cash and investments totaled \$97,183.82. Every stock in the portfolio had increased in value from the previous week with the highest jumps being Tesla, Google, and Microsoft which saw share values rise 13.4%, 10.1%, and 8.1% respectively.

However, every stock was still down from what I had initially bought them for, with the biggest losses being

3.1.4 Week 4, June 27 - July 3

This week was the biggest decline since the start of the simulation. The portfolio value fell by 6.8%, which was about a \$6,000 decrease from the previous week. Table 3.4 summarizes this week's changes.

Table 3.4: Buy and Hold, Week 4 Portfolio Changes. All evaluations were in \$'s.

Week 4			
Stock	Price	Shares	% Change
WMT	122.63	70	-0.9%
AAPL	138.93	80	-1.9%
META	160.03	30	-6.0%
MSFT	259.58	25	-3.0%
AMD	73.67	160	-15.4%
INTC	36.34	50	-5.9%
NFLX	179.95	35	-5.7%
DKNG	11.77	150	-16.8%
BAC	31.56	40	-2.3%
F	11.32	100	-5.7%
IBM	141.12	15	-0.7%
NKE	101.18	40	-10.4%
TSLA	681.79	15	-7.5%
GOOGL	2,174.80	5	-7.8%
DIS	96.14	20	-1.7%
Total Asset Value	% Change		
84,238.90	-6.8%		

This decline left the overall account value at \$91,015.57. However, the account is still slightly above its lowest point of \$90,514.47 which occurred at the end of the second week. Every share price in the portfolio had gone down with the biggest declines being DraftKings, AMD, Nike, Google, and Tesla, which dropped 16.8%, 15.4%, 10.4%, 7.8%, and 7.5%, respectively. It

should be noted that this is the second time Tesla and Google have been listed among the biggest percentage change over the past weeks, highlighting these stocks' volatility.

3.1.5 Week 5, July 4-10

This past week saw a recovery from last week's big decline. The portfolio value rose by 6.1%, and the overall account value climbed to \$96,180.97. Table 3.5 summarizes these changes.

Table 3.5: Buy and Hold, Week 5 Portfolio Changes. All evaluations were in \$'s.

Week 5			
Stock	Price	Shares	% Change
WMT	125.40	70	2.3%
AAPL	147.04	80	5.8%
META	170.88	30	6.8%
MSFT	267.66	25	3.1%
AMD	79.35	160	7.7%
INTC	37.99	50	4.5%
NFLX	186.98	35	3.9%
DKNG	12.74	150	8.2%
BAC	31.79	40	0.7%
F	11.62	100	2.7%
IBM	140.47	15	-0.5%
NKE	107.93	40	6.7%
TSLA	752.29	15	10.3%
GOOGL	2,387.00	5	9.8%
DIS	95.86	20	-0.3%
Total Asset Value	% Change		
89,404.30	6.1%		

This is the second highest value the account has reached since the start of the simulation and just a thousand dollars short of the highest point at the end of week 3 of \$97,183.82. This week again saw Google and Tesla as the biggest changes with these stocks rising 9.8% and 10.3%, respectively. This was followed by Meta Platforms and AMD being the next biggest increase at 6.8% and 7.7%, respectively. However, not every stock had an upward trend this week. Two stocks

saw declines, those being IBM whose share values fell by 0.5% and Disney whose share values fell by 0.3%. While these are small declines, a second week in a row of a downward cycle while every other stock in the portfolio recovered could indicate a larger negative trend for these two companies.

3.1.6 Week 6, July 11-17

This week the portfolio had a small decline in value of about 1%. Table 3.6 summarizes these changes.

Table 3.6: Buy and Hold, Week 6 Portfolio Changes. All evaluations were in \$'s.

Week 6			
Stock	Price	Shares	% Change
WMT	129.07	70	2.9%
AAPL	150.17	80	2.1%
META	164.70	30	-3.6%
MSFT	256.72	25	-4.1%
AMD	81.11	160	2.2%
INTC	38.62	50	1.7%
NFLX	189.11	35	1.1%
DKNG	12.86	150	0.9%
BAC	32.35	40	1.8%
F	11.88	100	2.2%
IBM	139.92	15	-0.4%
NKE	104.70	40	-3.0%
TSLA	720.20	15	-4.3%
GOOGL	111.78	100	-6.3%
DIS	95.20	20	-0.7%
Total Asset Value	% Change		
88,517.75	-1.0%		

Seven shares decreased in trading value with the biggest losses being Google, Tesla, Microsoft, and Meta Platforms, falling 6.3%, 4.3%, 4.1%, and 3.6%, respectively. While these changes are relatively small and could just be due to volatility, Google could have another reason.

On July 15th Google shares split 20 to 1, so the five shares I owned now became 100 which were worth \$111.78 each as of the stock's closing price on Friday, July 15th. This split could have caused Google's price to go down as lower prices give access to more people which can increase volatility and unpredictability. However, on the other hand, allowing greater access could increase demand for the stock and drive the price back up. I have faith that Google's stock prices will recover and possibly benefit in the longer term from this split.

There were still some positive aspects of this week as eight investments in the portfolio had share values increase from the close of the previous week. The companies with the most growth in share prices from the previous week were Walmart, Ford, AMD, and Apple, growing 2.9%, 2.2%, 2.2%, and 2.1%, respectively. While there were many companies in the portfolio who recorder positive trends this week, only Apple and Walmart's stock prices have increased since buying their shares at the start of the simulation. Walmart's stock price was up 3% since the start of the simulation, and similarly Apple's stock prices were up about 2.9%. On top of this, each positive week in the portfolio, Apple shares have been among the top of the list for growth, and in negative weeks Walmart has seen the least amount of decline in stock prices. This success even in an unpredictable market could indicate far greater growth in these shares once the overall market begins to recover, as well as the trust that shareholders have in these two companies.

3.1.7 Week 7, July 18-24

This week ended in an increase in the portfolio of about 5.1%. The account value totaled \$99,749.67, the highest it has reached since starting the simulation. Table 3.7 summarizes these changes.

Table 3.7: Buy and Hold, Week 7 Portfolio Changes. All evaluations were in \$'s.

Week 7			
Stock	Price	Shares	% Change
WMT	132.21	70	2.4%
AAPL	154.09	80	2.6%
META	169.27	30	2.8%
MSFT	260.36	25	1.4%
AMD	88.10	160	8.6%
INTC	39.20	50	1.5%
NFLX	220.44	35	16.6%
DKNG	13.53	150	5.2%
BAC	33.43	40	3.3%
F	12.82	100	7.9%
IBM	128.25	15	-8.3%
NKE	109.12	40	4.2%
TSLA	816.73	15	13.4%
GOOGL	107.90	100	-3.5%
DIS	102.72	20	7.9%
Total Asset Value	% Change		
92,973.00	5.0%		

All but two stocks saw an increase in trading price since the previous week. Netflix, Tesla, and AMD recorded the biggest growth, with stock prices climbing 16.6%, 13.4%, and 8.6%, respectively, since the previous week. Netflix and Tesla were up about 10.9% and 9.8% since initially buying them at the start of the simulation. While AMD has recorded three positive weeks in a row, the stock prices were still lower than the initial price at the start of the simulation, about 17.3% lower. This is due to two strong negative weeks early on, but I am hopeful that the share value will continue to recover.

Two stocks recorded decreases in trading price since the close of the previous week. Google's stock price fell 3.5% this week, marking a second week of its downward trend. IBM saw much bigger losses as its stock prices fell 8.3%. This is the first time that IBM has recorded a negative week which had a decline greater than 1% other than in week 2 where it saw a 5.5%

decrease, but this was the lowest decrease of any company in that week. However, it is the fourth week in a row that IBM's stock prices have decreased from the previous week. This could indicate a correction for the IBM stock and prices may continue to sink, I expect that their stock prices will not recover by the time the simulation ends, as they are currently 10.3% down from the start of the simulation.

3.1.8 Week 8, July 25-31

This was the last week of the simulation, and I sold all investments within this week. Table 3.8 summarizes these transactions, and Table 3.9 summarizes the changes in the portfolio's stock prices from the previous week.

Table 3.8: Buy and Hold, Week 8 Transactions. All transactions were in \$'s.

Week 8								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/27/2022	META	Sell	167.92	30	5,037.60	-141.58	11,826.51	-141.58
7/27/2022	BAC	Sell	33.52	40	1,340.80	-111.00	13,167.31	-252.58
7/28/2022	WMT	Sell	130.15	70	9,110.50	353.50	22,277.81	100.92
7/28/2022	AAPL	Sell	156.85	80	12,548.00	873.98	34,825.81	974.90
7/28/2022	MSFT	Sell	274.22	25	6,855.50	113.34	41,681.31	1,088.24
7/28/2022	AMD	Sell	90.95	160	14,552.00	-538.40	56,233.31	549.84
7/28/2022	INTC	Sell	39.80	50	1,990.00	-191.00	58,223.31	358.84
7/28/2022	NFLX	Sell	225.12	35	7,879.20	924.87	66,102.51	1,283.71
7/28/2022	DKNG	Sell	13.60	150	2,040.00	81.75	68,142.51	1,365.46
7/28/2022	F	Sell	13.93	100	1,393.00	18.10	69,535.51	1,383.56
7/28/2022	IBM	Sell	129.56	15	1,943.40	-200.40	71,478.91	1,183.16
7/28/2022	NKE	Sell	111.45	40	4,458.00	-183.82	75,936.91	999.34
7/28/2022	TSLA	Sell	840.37	15	12,605.55	1,445.92	88,542.46	2,445.26
7/28/2022	GOOGL	Sell	113.50	100	11,350.00	-397.80	99,892.46	2,047.46
7/28/2022	DIS	Sell	104.54	20	2,090.80	-64.20	101,983.26	1,983.26

Table 3.9: Buy and Hold, Week 8 Portfolio Changes. All evaluations were in \$'s.

Week 8			
Stock	Sold Price	Shares	% Change
WMT	130.15	70	-1.6%
AAPL	156.85	80	1.8%
META	167.92	30	-0.8%
MSFT	274.22	25	5.3%
AMD	90.95	160	3.2%
INTC	39.80	50	1.5%
NFLX	225.12	35	2.1%
DKNG	13.60	150	0.5%
BAC	33.52	40	0.3%
F	13.93	100	8.7%
IBM	129.56	15	1.0%
NKE	111.45	40	2.1%
TSLA	840.37	15	2.9%
GOOGL	113.50	100	5.2%
DIS	104.54	20	1.8%
Total Asset Value	% Change		
95,194.35	2.4%		

The overall portfolio value saw an increase of 2.4% from last week's closing stock prices to this week selling price of each stock. This was the highest evaluation the portfolio had reached since the start of the simulation and the first time that the overall account had become profitable. Only two stocks sold at prices lower than their closing price of last week, those two being Walmart and Meta Platforms.

3.2 Results

By the end of the simulation a total of eight stocks saw declines in their prices, while seven saw increases. Table 3.10 describes the changes in the stock prices of the portfolio each week of the simulation compared to its bought prices.

Table 3.10: Buy and Hold, Portfolio Changes from Initial Buy.

Stocks	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
WMT	-2.8%	-5.6%	-1.2%	-2.1%	0.1%	3.0%	5.6%	3.9%
AAPL	-6.0%	-9.8%	-2.9%	-4.8%	0.8%	2.9%	5.6%	7.5%
META	-7.0%	-13.3%	-9.9%	-15.3%	-9.5%	-12.8%	-10.4%	-11.1%
MSFT	-6.2%	-8.2%	-0.7%	-3.7%	-0.8%	-4.8%	-3.5%	1.7%
AMD	-11.0%	-23.4%	-18.2%	-30.8%	-25.5%	-23.8%	-17.3%	-14.6%
INTC	-10.2%	-15.2%	-11.5%	-16.7%	-12.9%	-11.5%	-10.1%	-8.8%
NFLX	-7.9%	-11.7%	-4.0%	-9.4%	-5.9%	-4.8%	10.9%	13.3%
DKNG	0.3%	-12.6%	8.3%	-9.9%	-2.5%	-1.5%	3.6%	4.1%
BAC	-8.6%	-12.1%	-11.0%	-13.1%	-12.4%	-10.9%	-7.9%	-7.7%
F	-7.3%	-18.3%	-12.7%	-17.7%	-15.5%	-13.6%	-6.8%	1.3%
IBM	-4.7%	-5.5%	-0.6%	-1.3%	-1.7%	-2.1%	-10.3%	-9.3%
NKE	-5.4%	-11.5%	-6.9%	-16.6%	-11.0%	-13.7%	-10.1%	-8.1%
TSLA	-6.4%	-12.6%	-0.9%	-8.4%	1.1%	-3.2%	9.8%	13.0%
GOOGL	-5.4%	-8.8%	0.4%	-7.4%	1.6%	-4.9%	-8.2%	-3.4%
DIS	-7.7%	-12.4%	-9.3%	-10.8%	-11.0%	-11.6%	-4.7%	-3.0%

While more companies' stock prices fell than rose in the portfolio, the growth of the those that grew outweighed the losses from those that fell, and the overall account value totaled \$101,971.02 at the end of the simulation. That is about a 2% increase in the overall account value since the start of the simulation and a 2.1% increase in the portfolio value since the initial investments.

The highest percentage decreases in stock price since the start of the simulation were recorded by AMD, Meta Platforms, and IBM whose stock prices fell 14.6%, 11.1%, and 9.3%. Another big loss came with Google shares whose value fell by just 3.4% since that start of the simulation, but due to the large investment put into the company, it was the second biggest loss in dollar value totaling \$397.80 (Google shares split 20 to 1 on July 15th, but the stock price times the number of shares owned was used in this evaluation to give a more accurate representation of how Google's share value changed).

On the other hand, seven stocks returned profits by the end of the simulation. The highest percentage of growth in share value was recorded by Netflix, Tesla, and Apple, whose stock prices rose 13.3%, 13%, and 7.1%, respectively, since the start of the simulation. Although the highest profit recorded, \$1,444.92, did not come from Netflix shares, but from Tesla, as it was one of the higher dollar value investments I had made.

3.3 Conclusions

3.3.1 NYSE vs Nasdaq

Six companies I bought stock in are traded on the NYSE (BAC, F, WMT, NKE, IBM, DIS) and of these six companies, four saw their stock prices decline from what they were initially bought for (BAC, NKE, IBM, DIS). The other nine companies that I bought shares of are traded on the Nasdaq (AAPL, MSFT, INTC, AMD, GOOGL, TSLA, NFLX, DKNQ, META) and of these companies, four saw declines in their stock prices since the start of the simulation (META, AMD, INTC, GOOGL). The two biggest percentage decreases in stock price came from Nasdaq companies (META, -11.1%, and AMD, -14.6%), however it was also two Nasdaq companies that saw the biggest percentage increases in stock prices (NFLX, 13.3%, and TSLA, 13.0%). This suggests that the Nasdaq companies in this simulation saw more volatility than companies traded on the NYSE. Further calculation showed that the absolute value of percentage change in the buying price and selling price of the NYSE companies that I bought averaged 5.6%, while the Nasdaq companies averaged 8.6%. However, to be sure I decided to compare the weekly changes in stock prices of these companies. Table 3.11 summarizes the weekly percentage change in stock prices of each company in the Buy and Hold portfolio.

Table 3.11: Buy and Hold, Weekly Portfolio Percentage Change.

Stocks	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	AVG change per week
WMT	-2.8%	-2.8%	4.6%	-0.9%	2.3%	2.9%	2.4%	-1.6%	2.5%
AAPL	-6.0%	-4.1%	7.7%	-1.9%	5.8%	2.1%	2.6%	1.8%	4.0%
META	-7.0%	-6.7%	3.9%	-6.0%	6.8%	-3.6%	2.8%	-0.8%	4.7%
MSFT	-6.2%	-2.1%	8.1%	-3.0%	3.1%	-4.1%	1.4%	5.3%	4.2%
AMD	-11.0%	-14.0%	6.8%	-15.4%	7.7%	2.2%	8.6%	3.2%	8.6%
INTC	-10.2%	-5.6%	4.4%	-5.9%	4.5%	1.7%	1.5%	1.5%	4.4%
NFLX	-7.9%	-4.1%	8.7%	-5.7%	3.9%	1.1%	16.6%	2.1%	6.3%
DKNG	0.3%	-12.8%	23.9%	-16.8%	8.2%	0.9%	5.2%	0.5%	8.6%
BAC	-8.6%	-3.8%	1.2%	-2.3%	0.7%	1.8%	3.3%	0.3%	2.8%
F	-7.3%	-11.9%	6.9%	-5.7%	2.7%	2.2%	7.9%	8.7%	6.7%
IBM	-4.7%	-0.9%	5.2%	-0.7%	-0.5%	-0.4%	-8.3%	1.0%	2.7%
NKE	-5.4%	-6.4%	5.2%	-10.4%	6.7%	-3.0%	4.2%	2.1%	5.4%
TSLA	-6.4%	-6.7%	13.4%	-7.5%	10.3%	-4.3%	13.4%	2.9%	8.1%
GOOGL	-5.4%	-3.6%	10.1%	-7.8%	9.8%	-6.3%	-3.5%	5.2%	6.5%
DIS	-7.7%	-5.1%	3.6%	-1.7%	-0.3%	-0.7%	7.9%	1.8%	3.6%

Using the weekly percentage change, the average change per week can be calculated for each stock by averaging the absolute values of each week's change for the individual stocks. After doing this the average of the average change per week of the stocks can be calculated for the companies traded on the NYSE and on the Nasdaq. The NYSE companies in the portfolio averaged a weekly change of 4.0% while the companies traded on the Nasdaq averaged a weekly change of 6.1%. This further confirms that the companies traded on the Nasdaq saw more volatility throughout the simulation than the companies traded on the NYSE.

While the companies traded on the Nasdaq saw more volatility, they also saw more success than the NYSE companies. As stated, before four of the six NYSE companies saw declines in prices which resulted in the net profit of these companies being negative, a \$198.60 loss. On the other hand, the companies traded on the Nasdaq saw much more success, this group netting a profit of \$2,169.62, with less than half (four out of nine) declining in stock price since the start of the

simulation. Along with this, the last two weeks of the simulation saw positive trends and the market was mostly recovered since the start of the simulation. Within these two weeks Nasdaq companies saw higher growth with Tesla stock prices jumping 13.4% from the end of Week 6 to the end of Week 7, and Netflix stock prices climbing 16.6% in that time. So, Nasdaq companies offered higher possible gains, but with the higher risk as they saw more volatility than companies traded on the NYSE.

3.3.2 Market Capitalization Comparison

The companies with the highest market capitalization in the simulation were Apple and Microsoft with market caps of 2.7 and 2.2 trillion USD respectively. These are followed by Google who has a market cap of 1.6 trillion USD, then Tesla which is just under 1 trillion at 903.5 billion USD. Another group can be formed with Meta Platforms, Walmart, Bank of America, and Disney who all have market capitalizations between 200 and 500 billion USD. That leaves one last group of companies with market caps under 200 billion USD, these companies are: Nike, AMD, Intel, IBM, Netflix, Ford and DraftKings. Table 3.12 summarizes the performance of these groups in the simulation.

Table 3.12: Buy and Hold, Performance by Market Capitalization. All evaluations were in \$'s.

Market Cap	Cost	Proceeds	% Change	Profit/Loss
Over 500B	41,324.15	43,359.05	4.9%	2,034.90
200B-500B	17,553.68	17,579.70	0.1%	26.02
Under 200B	34,345.50	34,255.60	-0.3%	(89.90)

From these calculations it can be seen that the groups of companies with the highest market caps performed the best by the end of the simulation. Figure 3.1 describes the stocks changes over the course of the simulation in further detail. Orange lines highlight the companies with market

caps over 500 billion USD, blue lines highlight the companies with market caps between 200 billion and 500 billion USD, and grey lines highlight the lowest market cap group.

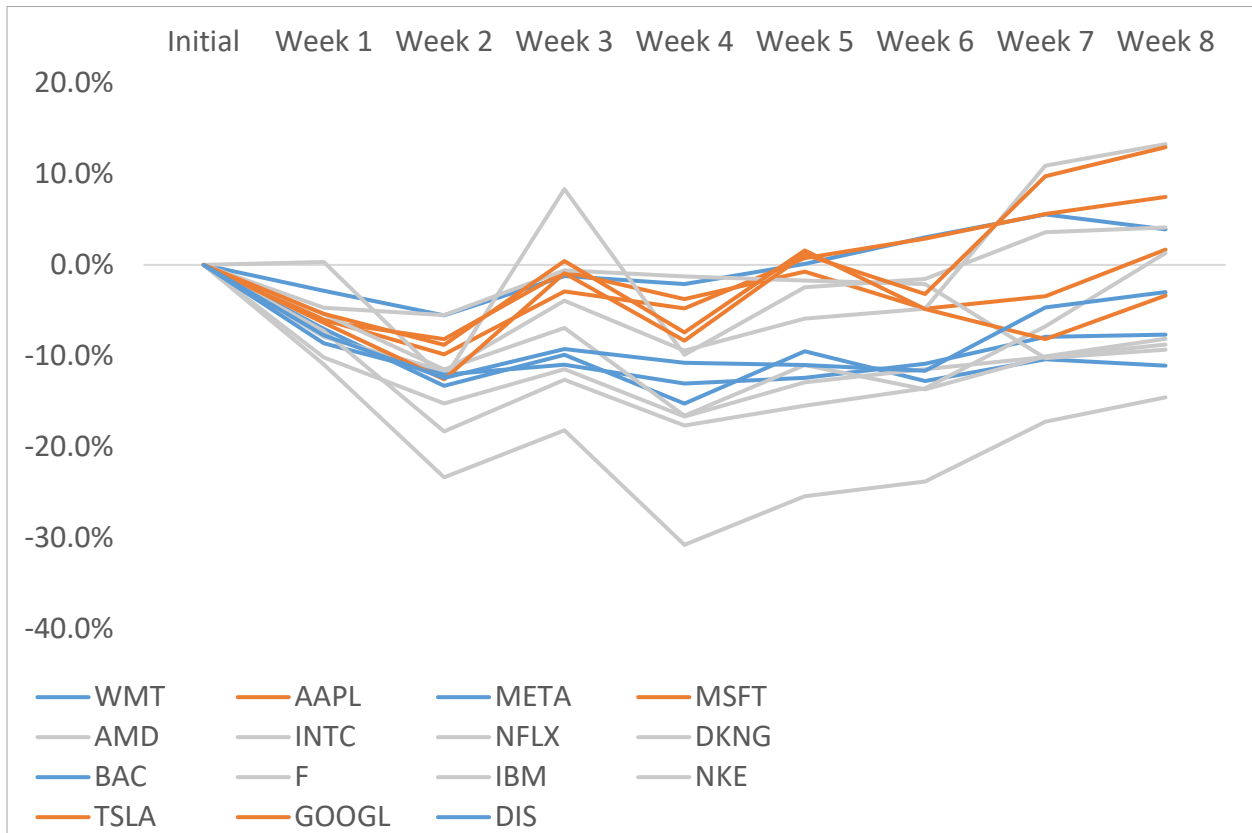


Figure 3.1: Buy and Hold, Stock Price Percentage Changes from the Start of the Simulation by Market Capitalization. From Microsoft Excel.

By the end of the simulation, it seems that a company's market capitalization did not have a major effect on their stock prices as each capitalization group had at least one profitable stock. However, of the seven companies whose stock prices grew by the end, three belonged to the group of companies with market caps of 500 billion USD or more so there seems to be some significance. There also seems to be some significance in the highest market capitalization group's stock performance throughout the simulation as they remained less volatile than companies with lower market caps. This significance could be further explored by examining market indices over the

course of the simulation. From Week 1 to Week 6 of the simulation the market had fallen and remained very volatile. Throughout this time the S and P 500 saw declines as low as -11% and reached declines of -8% at least three times. Considering this it seems that the highest market capitalization companies were able to resist the down market better than the lower cap companies as the lowest point any of the highest cap companies had reached was Tesla in Week 2 when it dipped to -12.6%, while other groups saw declines in stock prices as big as -30.8% (AMD in Week 4), -18.3% (Ford in Week 2), and -16.7% (Intel in Week 4). By the end of the simulation the S and P 500 was only down about 1.2% from June 8th marking a recovery from a big downturn, and at this time it seemed that many of the lower cap size companies had recovered. So, while market capitalization may not be a good indicator of how a company will perform in a recovered market, it could indicate a lower level of risk in an investment as higher capitalization companies' stock prices seem more resistant to market crashes than smaller capitalization companies.

Chapter 4: Simulation 2: Frequent Trading

4.1 Simulation Reports

4.1.1 Week 1, June 6-12

This week I bought stocks in 18 companies of the 20 I am looking at and shorted one. These transactions are summarized in Table 4.1.

Table 4.1: Frequent Trading, Week 1 Transactions. All transactions were in \$'s.

Week 1								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
6/8/2022	MSFT	Buy	271.50	10	2,175.00		97,825.00	
6/8/2022	AMZN	Buy	123.14	20	2,462.80		95,362.20	
6/8/2022	AAPL	Buy	149.44	20	2,988.80		92,373.40	
6/8/2022	META	Buy	197.86	10	1,978.59		90,394.81	
6/8/2022	GOOGL	Buy	2,346.14	2	4,692.28		85,702.53	
6/8/2022	TSLA	Buy	738.46	3	2,215.37		83,487.16	
6/8/2022	NVDA	Buy	190.26	15	2,853.90		80,633.26	
6/8/2022	INTC	Short	41.98	-25	1,049.38		81,682.64	
6/8/2022	AMD	Buy	105.32	50	5,266.00		76,416.64	
6/8/2022	NFLX	Buy	204.51	20	4,090.20		72,326.44	
6/8/2022	DIS	Buy	108.83	20	2,176.61		70,149.83	
6/8/2022	NKE	Buy	123.15	50	6,157.50		63,992.33	
6/8/2022	F	Buy	13.74	100	1,373.50		62,618.83	
6/8/2022	GM	Buy	38.39	30	1,151.55		61,467.28	
6/8/2022	DFS	Buy	112.15	10	1,121.50		60,345.78	
6/8/2022	MCD	Buy	246.24	10	2,462.40		57,883.38	
6/8/2022	WMT	Buy	122.32	50	6,116.18		51,767.20	
6/8/2022	DKNG	Buy	14.39	80	1,151.20		50,616.00	
6/8/2022	IBM	Buy	141.63	50	7,081.50		43,534.50	

June 8th:

The first stocks I looked at were tech stocks on the Nasdaq. Microsoft, Amazon, and Apple all had similar trends where their 9-day EMAs were greater than their 13-day EMAs, and both measurements were approaching but still under the 50-day EMAs. The stock prices for these companies were also trading above the 9- and 13-day EMAs but below the 50-day EMA. While

this is not the defined case for the swing trading strategy listed early (where the 9-day EMA is greater than the 13-day and the 13-day is greater than the 50-day and the stock price is trading above these values) it still seemed that there was a coming upward trend as the EMAs, and stock prices were almost aligned and trending to the right order. As a result, I bought a few speculative shares in these companies to see if I could get in on an upward swing early. I bought 10 shares of Microsoft, and 20 of Amazon and Apple.

Next, I looked at Meta Platforms which had a 9-day EMA that had climbed up to the 13-day EMA over the past week. Its stock price was trading above these values, but all three values were still below the 50-day EMA. As a result, I again bought shares to try to get into an upward trend early as these values were close to the right order defined in the swing trading technique earlier and the 9-day EMA had reached the 13-day EMA showing more recent increases in the stock's price. I bought 10 shares

Then I looked at Tesla, Nvidia, and Google. Tesla's 9- and 13-day EMAs were close, and the stock was trading above both, but similar to all previous companies, these values were all below the 50-day EMA. As a result, I bought a few shares in case an upward trend came so that my average buying costs would be lower if I bought more later. I bought 2 Google shares, 3 Tesla shares, and 15 shares of Nvidia.

After that I looked at Intel. Intel's current stock price was trading below all three EMAs and the 9-day EMA was less than the 13-day which was also less than the 50-day. In the swing trading technique defined earlier, this alignment signals a downward trend. As a result, I decided to try shorting Intel stocks. However, shorting can create lots of debt since a stock's price has no limit to how high it can go. As a result, I only shorted 25 shares for a total of \$1049.38.

The opposite happened when I looked at AMD, which was the first stock that aligned with the upward trend indication. AMD's 9-day EMA was greater than its 13-day which was greater than its 50-day and the stock was trading above all these measurements. As a result, I bought a lot of shares since this should indicate a string upward trend. The 50 shares I bought of AMD totaled to \$5,266.

I then looked at Disney and Netflix. Both stocks had similar trends to the first ones I looked at where the stock was trading above the 9-day EMA which was greater than the 13-day EMA, however all three were below the 50-day EMA. I again bought a few shares, but not many, 20 of each.

The next strong trend I found was with Nike which similar to AMD was trading above all 3 EMAs, and all EMAs were in line for an upward trend (9-day greater than 13-day which is greater than 50-day). Like AMD I bought into a larger investment of 50 Nike shares totaling \$6,157.50.

After this I looked at Ford and General Motors. Both companies were trading above their 9-day and 13-day EMAs and were approaching their 50-day EMAs. Like before I bought a few shares out of speculation. I bought 100 shares of Ford and 30 shares of GM, totaling around \$1,300, and \$1,150 respectively.

Next, I looked at BAC and DFS stocks. Bank of America was trading below all three EMAs however it's 9-day EMA was above its 13-Day EMA so while the position could be a short position, there could also be more recent trends upward. I decided to wait to act on this stock and see what happens in the coming days or weeks. Discover Financial Services was trading above all EMAs which usually means an upward trend, but the EMAs were not aligned right as the 9-day

EMA was greater than the 50-day EMA, which was greater than the 13-day EMA. As a result, I decided to buy just a few shares and see what happens. I bought 10 shares.

I then looked at McDonald's stocks. The 9- 13- and 50-day EMAs were all aligned to signal an upward trend, but the stock was trading below all 3. I decided to put a market order in to buy stock if it dropped to \$240. It dropped briefly and I bought 10 shares at about \$246.

After this I looked at Walmart stock which was trading below all three EMAs and all three EMAs were aligned to signal a downward trend (9-day EMA less than 13-day EMA which is less than 50-day EMA). However, when I looked at Walmart's RSI it was very low at about 31. In trend trading technique a low RSI can indicate an oversold and undervalued stock. I decided to buy 50 shares hoping that this would prove true, and an upward trend would come.

Next, I looked at Draft Kings which was trading above its 9- and 13-day EMAs and similar to some of the other stocks I looked at the 9- and 13-day EMAs were approaching the 50-day EMA. I again made a small investment in case an upward trend was coming, I bought 80 shares totaling about \$1,150.

The last stock I looked at was IBM which was trading above all 3 EMAs and they were aligned to signal an upward trend. However, this had been the case for about a week now so I believed that I missed the upward trend and would be buying right before a downturn. However, I put an order in to buy 50 shares if the market price dipped to \$136 so that I could get in at a cheaper price. When it did dip to \$136 the market order was fulfilled but at a far more expensive cost of around \$141.

4.1.2 Week 2, June 13-19

This week I covered a short and bought more shares in 2 companies I have already invested in. Table 4.2 summarizes these transactions.

June 14th:

The first thing I decide to do was cover my short on Intel. Since shorting it on June 8th the stock's price has fallen about 10%, so I decided to take the profit as many of my investments are down and I didn't want to risk losing any profits from this short. I bought back the 25 shares at just under \$38, for a profit of about \$104.

I then saw that Disney's RSI was very low at 28. I also knew that a new movie was being released to theaters by Disney and thought it would be a good time to reinvest into the company. R buying 10 more shares at \$94.17 I brought my cost per share of my overall investment in Disney down to about \$104.

Table 4.2: Frequent Trading, Week 2 Transactions. All transactions were in \$'s.

Week 2								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
6/14/2022	INTC	Cover	37.82	25	945.45	103.93	42,589.05	103.93
6/14/2022	DIS	Buy	94.17	10	941.70		41,647.35	
6/14/2022	TSLA	Buy	667	3	2,001.00		39,646.35	

Lastly, I looked at Tesla, whose prices had dropped about 11% since my initial investment. While looking further into it I noticed that there was a recent upward trend over the past day as its trading price was approaching the 9- and 13-day EMA again. I still have a lot of faith in Tesla as I believe there is good demand for their products, so I decided to buy 3 more shares at \$667, lowering my cost per share to about \$702.

June 16th:

As mentioned before recent news of the increase in the federal interest rate led to a down day in the markets. I again decided to wait and see which investments might start to recover, and any that continue to do poorly I may cut my losses and move on. The only trade I put in for today was a limit buy for intel at \$36 as Intel's RSI was very low and I thought there may be a small jump in price. However, this trade did not go through as Intel's market price remained around \$37. I will continue to watch Intel though as it's RSI remains very low at just under 30.

4.1.3 Week 3, June 20-26

This week I bought share in 4 companies and sold shares in 4 as well. Table 4.3 summarizes these transactions.

Table 4.3: Frequent Trading, Week 3 Transactions. All transactions were in \$'s.

Week 3								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
6/21/2022	META	Buy	165.96	20	3,319.20		36,327.15	
6/21/2022	BAC	Buy	32.99	50	1,649.37		34,677.78	
6/21/2022	AMZN	Buy	110.73	40	4,429.20		30,248.58	
6/21/2022	DFS	Sell	94.01	10	940.10	-181.40	31,188.68	-77.47
6/21/2022	NFLX	Sell	173.70	20	3,473.99	-616.21	34,662.67	-693.68
6/21/2022	AAPL	Buy	136.19	20	2,723.70		31,938.97	
6/21/2022	GOOGL	Buy	2,234.15	2	4,468.29		27,470.68	
6/21/2022	DKNG	Sell	12.21	80	976.40	-174.80	28,447.08	-868.48
6/22/2022	DIS	Sell	92.99	30	2,789.70	-328.61	31,236.78	-1,197.09

June 21st:

At the start of the trading day all my investments were up, so I put in trailing stop sell orders for some stocks that I did not have trust in. This included IBM and MCD, which if the stock dropped 2%, I would sell. I also did this same strategy for Disney, Netflix, and Draft Kings. These three companies did drop in price within the following day and their stocks were sold at market

price. However, after dropping in price instead of avoiding a downward trend, these prices soon recovered. Figure 4.1 shows DraftKings' stock prices from June 22-24.

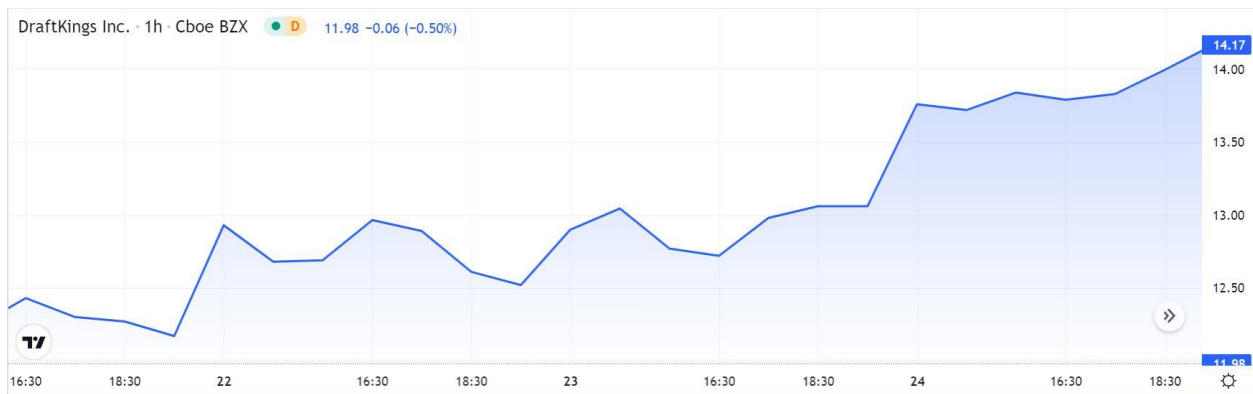


Figure 4.1: DraftKings stock prices, June 22-24. From Investopedia.

From this image it can be seen how after DraftKings price dropped 2% on June 22nd, the stop loss order was triggered and my stocks in DraftKings were sold, however, in the following days the price soon recovered. This also happened with Netflix and Disney and as a result I took unnecessary losses in these investments. Going forward I plan on increasing the percentage loss parameter in order to not trigger the order from small variation but rather bigger market trends.

Perhaps a 5-10% parameter would be more suitable.

I also decided to cut my losses with Discover Financial Services as they had continued to do poorly since my initial investment, and they had a brief increase in price that I wanted to capitalize on and decrease my losses in the investment.

Next, I looked at investments that I could increase. As the market seemed to be doing well, I decided to reinvest into some technology stocks that still hadn't responded. I reinvested into Meta Platforms, Apple, Google, and Amazon.

Lastly, I decided to invest in Bank of America Corp as interest rates are increasing and their profits may start to look better in the coming quarters due to higher rates on loans, and they seem to be at the bottom of a downward cycle.

4.1.4 Week 4, June 27 - July 3

This week I decided to sell most of my investments as some were profitable and for others, I wanted to cut my losses on. I made a few investments and shorted some stocks as well; Table 4.4 summarizes these transactions.

Table 4.4: Frequent Trading, Week 4 Transactions. All transactions were in \$'s.

Week 4								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
6/27/2022	IBM	Sell	143.07	50	7,153.41	71.91	37,850.19	-1,125.18
6/27/2022	GOOGL	Sell	2,340.75	4	9,362.98	202.41	47,213.17	-922.77
6/27/2022	MCD	Sell	248.07	10	2,480.70	18.30	49,693.87	-904.47
6/27/2022	F	Sell	11.97	100	1,196.50	-177.00	50,890.37	-1,081.47
6/27/2022	GM	Sell	34.55	30	1,036.35	-115.20	51,926.72	-1,196.67
6/27/2022	MSFT	Sell	266.19	10	2,661.89	-53.11	54,588.61	-1,249.78
6/27/2022	TSLA	Sell	732.40	6	4,394.40	178.03	58,983.01	-1,071.75
6/28/2022	GM	Short	35.93	-35	1,257.38		60,240.39	
6/28/2022	AAPL	Sell	139.84	40	5,593.60	-118.90	65,833.99	-1,190.65
6/28/2022	WMT	Sell	122.84	50	6,142.00	25.82	71,975.99	-1,164.83
6/30/2022	MCD	Short	246.65	30	7,399.50		79,375.49	
6/30/2022	IBM	Buy	141.10	50	7,055.00		72,320.49	
7/1/2022	IBM	Sell	139.80	50	6,989.75	-65.25	79,310.24	-1,230.08
7/1/2022	GM	Cover	31.69	35	1,109.15	148.23	78,201.09	-1,081.85
7/1/2022	IBM	Short	139.84	-40	5,593.60		83,794.69	
7/1/2022	INTC	Buy	35.98	50	1,799.00		81,995.69	

June 27th:

First, I took profits where I could. IBM had been very volatile since buying it, but it was up about \$1.50 a share from my purchase price, and it was approaching its 52-week high, so I

thought it was due for another downturn. I also sold stocks in Google as it had recently climbed \$200 dollars in the past week, about a 9% increase, and I thought this stock was also due for another downturn.

The same was also true for MCD and MSFT stocks as I believed they were at the top of a bubble as well. Figure 4.2 shows these stocks' changes over the week. I was able to avoid downturns in these investments except for MCD which held its price.

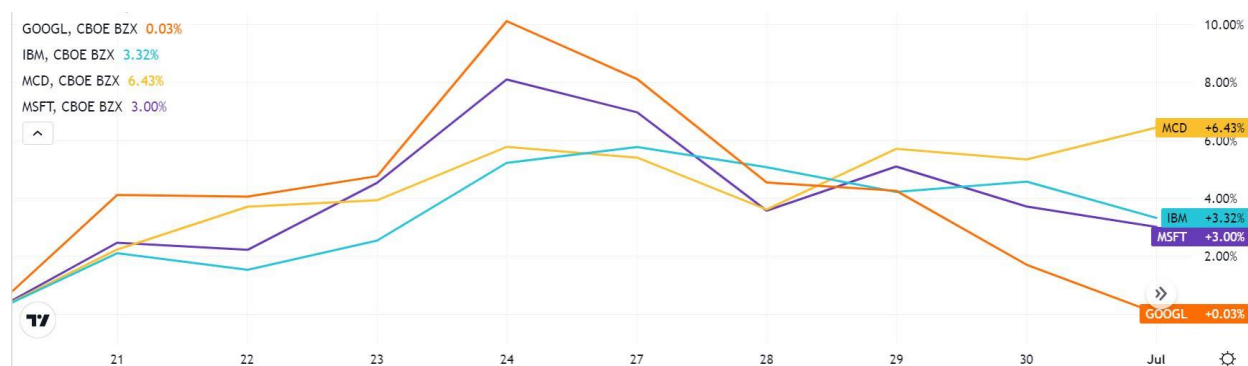


Figure 4.2: MCD, GOOGL, IBM, and MSFT stock price change percentages, June 20-July 1. From Investopedia.

Next, I looked at Ford and GM which I had lost faith in as the car industry is still struggling to get computer chips and manufacturing is slow. So, I cut my losses with both and sold both stocks.

June 28th:

I looked into shorting Ford and GM but decided to stay away from shorting Ford as it was approaching a 52-week low, but GM had recently had an increase in stock price that I believed would not hold. As a result, I shorted 35 shares of GM.

Next, I looked at Apple, which was close to covering my initial investment, but also seemed like it could fall again. As a result, I put a stop loss order with a 2% parameter. Later this day it was triggered, and I was able to sell my shares close to \$140 rather than its price later in the week at \$136. I did this same technique for Walmart and was able to make a small profit rather than take any losses.

June 30th:

The market had another downturn and I looked for more stocks to short. I decided to short McDonalds' stock as it seemed to be at the top of a cycle and was ready for a small downturn. Figure 4.3 shows MCD stock prices since the start of 2022. I'm hoping that within the next week it's stock prices will fall again.



Figure 4.3: MCD stock prices, Dec (2021)-July (2022). From Investopedia.

I also looked to try scalping some small profits. I decided to try to scalp IBM stock as it is very volatile and had recently started to spike upward.

July 1st:

I decided to cover my GM short whose stock prices had dropped nearly 11%. As the market is very unpredictable right now, I wanted to take profits where I could and not risk losing any potential gains.

Unfortunately, IBM had dropped since it spike, and I decided to sell out and instead short the stock. IBM seems to have large spikes so while I missed a scalping opportunity, I could still make money off a downturn by shorting the stock.

Lastly, I decided to buy Intel stock as its competitor AMD is doing very poorly right now and its RSI has remained very low throughout the week around 35 and dipping to 32 on Friday.

4.1.5 Week 5, July 4-10

This week I bought stocks in 3 companies, sold 7 investments, and shorted one stock. Table 4.5 summarizes these transactions.

Table 4.5: Frequent Trading, Week 5 Transactions. All transactions were in \$'s.

Week 5								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
7/5/2022	TSLA	Buy	652.16	11	7,173.76		74,821.93	
7/5/2022	GOOGL	Buy	2,134.71	5	10,673.55		64,148.38	
7/7/2022	TSLA	Sell	711.06	11	7,821.66	647.90	71,970.04	-433.95
7/7/2022	GOOG	Sell	2,322.53	5	11,612.67	939.12	83,582.71	505.17
7/7/2022	MSFT	Buy	266.87	20	5,337.40		78,245.31	
7/7/2022	INTC	Sell	38.00	50	1,900.00	101.00	80,145.31	606.17
7/7/2022	META	Sell	169.03	30	5,070.90	-226.89	85,216.21	379.28
7/8/2022	AMD	Sell	78.49	50	3,924.50	-1,341.50	89,140.71	-962.22
7/8/2022	GOOG	Short	2,360.31	-5	11,801.55		100,942.26	
7/8/2022	NVDA	Sell	156.17	15	2,342.51	-511.39	103,284.77	-1,473.61
7/8/2022	AMZN	Sell	115.90	60	6,954.23	62.23	110,239.00	-1,411.38

July 5th:

Both Google and Tesla seemed like good opportunities to swing trade. Both stocks had recently hit a low a couple days prior and seemed to be recovering, so I wanted to buy into both before they reached the top of their cycles.

July 7th:

Both Google and Tesla had gone up a good amount over the past two days, nearly 10%, and I didn't want to risk losing any gains as my portfolio has not been doing great over the course of the simulation, so I sold both and took the profits. Figure 4.4 shows these stocks' market prices from June 16th to July 8th.



Figure 4.4: TSLA and GOOGL stock price change percentages, June 17-July 8. From Investopedia.

I then looked for another opportunity to swing trade and I began analyzing Microsoft stock. Microsoft's stock price was trading above its 9- and 13-day EMA, and it was about to cross over its 50-day EMA so I decided to invest in it now hoping that it's price will continue to increase over the next week. Figure 4.5 shows Microsoft's stock price as well as its 9- 13- and 50-day EMAs.



Figure 4.5: MSFT stock prices and EMAs, June 21-July 7. From Investopedia.

Lastly, I decided to sell the Intel and Meta stocks I owned. Intel's stock had increased by about 5% since July 1st and while that seems like a small jump, since the start of the simulation Intel's stock hasn't usually changed much more than that so I decided to sell thinking that there would be an upcoming downturn. Meta's stock had also increased by about 7.5% since the start of July, and I figured I should sell before it goes down again. So, while I was taking a loss since it Meta stock had dropped about 13% since the start of the simulation from 197 to 172, I was able to lower my average cost by buying shares later when it was much cheaper at about \$166 and decrease what would have been a bigger loss.

July 8th:

While I have started to find success swing trading many stocks in overall pool were on the rise and it was not clear which ones would continue to grow. As a result, I first decided to cut my losses on some stocks while there high. I sold both NVDA and AMD stocks as these stocks had been my biggest losses since the start of the simulation and both seemed to be on a short upward trend. AMD stock prices were up about 8%, and Nvidia stock prices were up 9% since the start of July. Figure 4.6 shows both these companies' stock prices since June 8th. While both stocks were

down a good amount, I was able to decrease my overall loss on both investments by selling on a recent high.

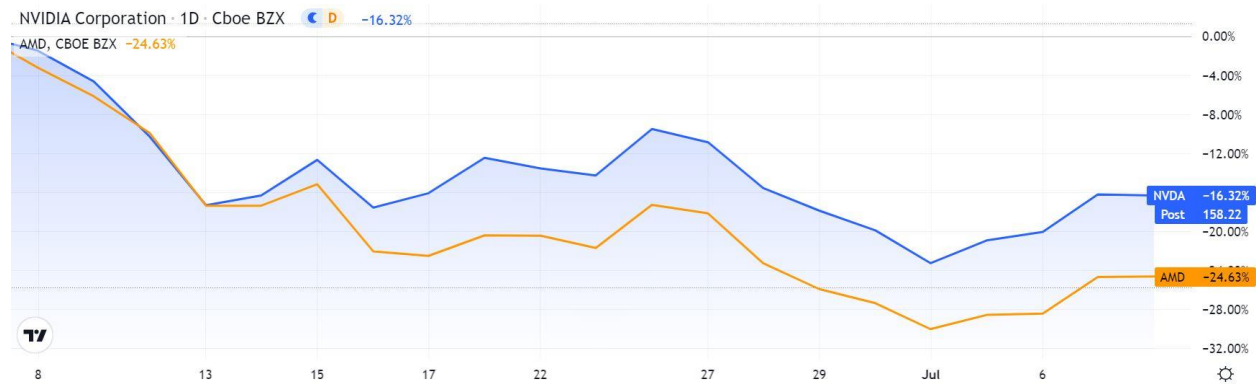


Figure 4.6: AMD and NVDA stock price change percentages, June 8-July 8. From Investopedia.

I also decided to sell Amazon stock as my investment was profitable since the start of the simulation. Amazon stock prices were down about 5% since June 8th, but since I bought more shares at a low of about \$111, I was able to decrease my average cost and since then the prices have recovered about 4.5% to \$116, making my overall investment in Amazon slightly profitable. So, I decided to take a profit while I still could.

Lastly, I shorted Google stock as it had increased 10% since a low on July 1st and I believed it would soon come down again since earlier in June it also had a 10% spike over the course of a week and shortly after fell nearly \$200.

4.1.6 Week 6, July 11-17

This week was my most active week of the frequent trading simulation since my first week. I made 22 transactions, of those, I bought stocks in 12 companies, sold stocks in 6 companies, shorted 2 stocks, and covered 2 previous shorts. Table 4.6 summarizes these transactions.

Table 4.6: Frequent Trading, Week 6 Transactions. All transactions were in \$'s.

Week 6								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
7/11/2022	META	Buy	161.99	20	3,239.70		106,999.30	
7/11/2022	INTC	Buy	37.20	60	2,232.00		104,767.30	
7/12/2022	GOOGL	Cover	2,314.81	5	11,574.05	227.50	93,193.25	-1,183.88
7/12/2022	AAPL	Short	146.77	-20	2,935.40		96,128.65	
7/12/2022	NKE	Buy	104.65	40	4,186.00		91,942.65	
7/12/2022	DKNG	Buy	11.32	100	1,132.00		90,810.65	
7/12/2022	AMZN	Buy	109.85	30	3,295.50		87,515.15	
7/12/2022	MSFT	Buy	256.47	20	5,129.40		82,385.75	
7/12/2022	TSLA	Buy	692.82	10	6,928.20		75,457.55	
7/12/2022	GM	Buy	31.60	100	3,160.00		72,297.55	
7/13/2022	GOOGL	Buy	2,236.69	5	11,183.45		61,114.10	
7/14/2022	MSFT	Buy	254.53	20	5,090.60		56,023.50	
7/14/2022	IBM	Cover	139.19	40	5,567.60	26.00	50,455.90	-1,157.88
7/15/2022	INTC	Sell	38.00	60	2,280.00	48.00	52,735.90	-1,109.88
7/15/2022	TSLA	Sell	727.67	10	7,276.70	348.50	60,012.60	-761.38
7/15/2022	AMZN	Sell	113.23	30	3,396.90	101.40	63,409.50	-659.98
7/15/2022	DKNG	Sell	11.90	100	1,189.50	57.50	64,599.00	-602.48
7/15/2022	GM	Sell	32.10	100	3,210.05	50.05	67,809.05	-552.43
7/15/2022	NFLX	Buy	175.02	20	3,500.40		64,308.65	
7/15/2022	DIS	Buy	93.09	30	2,792.70		61,515.95	
7/15/2022	NFLX	Sell	187.75	20	3,754.90	254.50	65,270.85	-297.93
7/15/2022	MCD	Short	253.70	-30	7,611.00		72,881.85	

July 11th:

Most of my investments were slightly down today so I looked for some stocks to buy that seemed to be lower than usual. Meta Platforms had dropped about 6% over the last two trading days and Intel stock prices had dropped about 3% in this time. Both stock prices were also approaching their 52-week lows set earlier in July. I decided to buy thinking both stocks were in the bottom of a cycle or close to it.

July 12th:

Another down day in the market lead me to look for more stocks in the bottom of a cycle. I decided to buy stocks in Draft Kings, Amazon, Tesla and General Motors. Figure 4.7 shows these companies' stock prices from July 5th to July 12th. All of these companies had recently dropped in price and appeared to be at the bottom of a cycle on July 12th so I decided to invest in them.

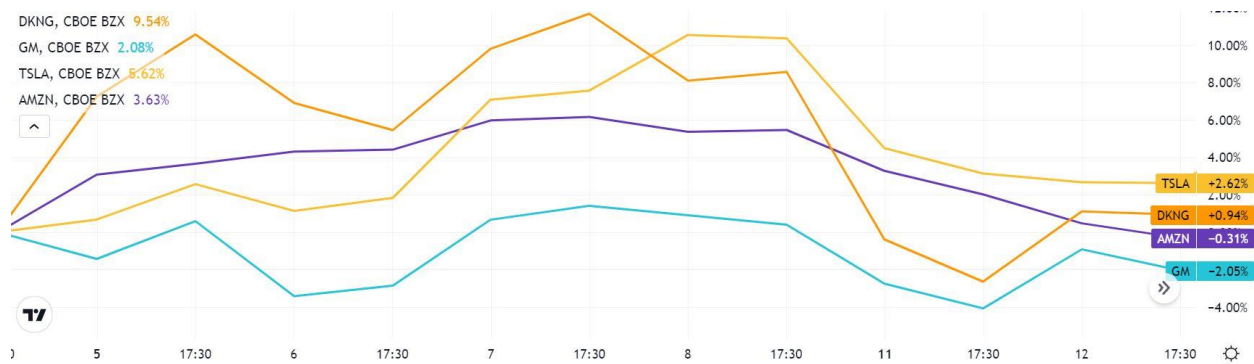


Figure 4.7: DKNG, GM, TSLA, and AMZN stock price change percentages, July 5-12. From Investopedia.

I then looked at investments of mine which were not doing so well. Microsoft's stock prices had dropped nearly 4% since buying 20 shares the previous week. I decided to reinvest and lower my average cost per share hoping that the stock price will recover within the next week. Another investment that has been doing poorly is Nike. Nike's stock price had dropped about 15% since my initial investment at the start of the simulation. I decided to buy more shares of Nike as I believed the price could somewhat recover and I wanted to lower my average cost in order to limit my losses on the overall investment.

Finally, I looked at my shorts. I decided to cover my short on Google as its stock prices had dropped 2% and it seemed to be approaching the bottom of a cycle dropping about 3% since

a recent high on July 8th. Figure 4.8 shows Google's stock prices from July 6th to July 15th, unfortunately I missed the bottom of the cycle but was still able to secure some profits.



Figure 4.8: GOOGL stock prices, July 6-15. From Investopedia.

I also decided to short Apple stocks. Since June 30th Apple's stock prices had climbed steadily from \$136 to \$146, about a 7% increase, and I believed it was due for a correction since it was also approaching a recent high of \$151 about a month and a half prior on June 2nd.

July 13th:

As seen in Figure 4.8, Google's stock price continued on the same trend as the previous days and dropped another 2%. In recent months Google's stock prices seem to fluctuate from high to low by 7-9% and since July 8th Google's stock price had dropped about 7% from \$2,390 to about \$2,225. Therefore, I believed that the stock's price was close to the bottom of a cycle, and I decided to buy before the price recovers.

July 14th:

Microsoft's stock prices had increased by about \$2 since the previous trading day, ending its downward trend over the past 4 trading days. I believed this marked the bottom of a cycle and I decided to lower my average cost even more by buying 20 more shares. By lowering my average

cost even more, I only need MSFT's stock price to increase by about 2% to \$259 before the investment becomes profitable. This seems likely as over the course of the simulation the stock has reached highs around \$268 three times.

I also decided to cover my short on IBM stock as it had recently hit a low of \$137, and since recovered to \$139 so, having missed the low, I wanted to still make some profit before the stock's price fully recovered.

July 15th:

Today was an up day in the market and I first looked for investments to sell and take a profit. Intel's stock prices had risen a dollar (about 2.5 %) in the past two days, and I didn't have much faith that it would continue to increase as it had only reached \$38.50 two times prior since the start of the simulation, so I decided to sell the investment. I then looked at Draft Kings which was up about 6%, and while the stock's price had seen much greater fluctuations, it is very unpredictable and I didn't think it would continue to increase, so I decided to take a small profit selling the stocks I owned and not risk losing any money. Next, I looked at GM whose stock prices had increased about 1.5% since buying them earlier in the week. Recent news had pointed out that there is still a chip shortage for cars and with inflation still high I didn't have much faith in the stock to continue its upward trend. As a result, I again decided to take a small profit selling the shares rather than risking a loss.

I then looked at Tesla and Amazon which had bigger increases over the past week. Tesla's stock had increased 5% since July 12th, and while it has had much greater upward trends over the course of the simulation (10-15%) its recent dip in price by 6% was far less than its usual downward cycle. Therefore, I decided to sell the stock and take a decent profit as I was unsure

how much more the price could increase. Amazon's stock prices had risen by about 3.7% from a low on July 12th of \$109 to its current price of \$113. Amazon's stock was still less than its previous highs of \$116, however like Tesla, its most recent downward cycle was less than in previous weeks, so I was unsure how strong the upward trend would be, and I again decided to sell and not risk losing any profits. Figure 4.9 shows Amazon and Tesla stock prices from June 17th to July 15th.

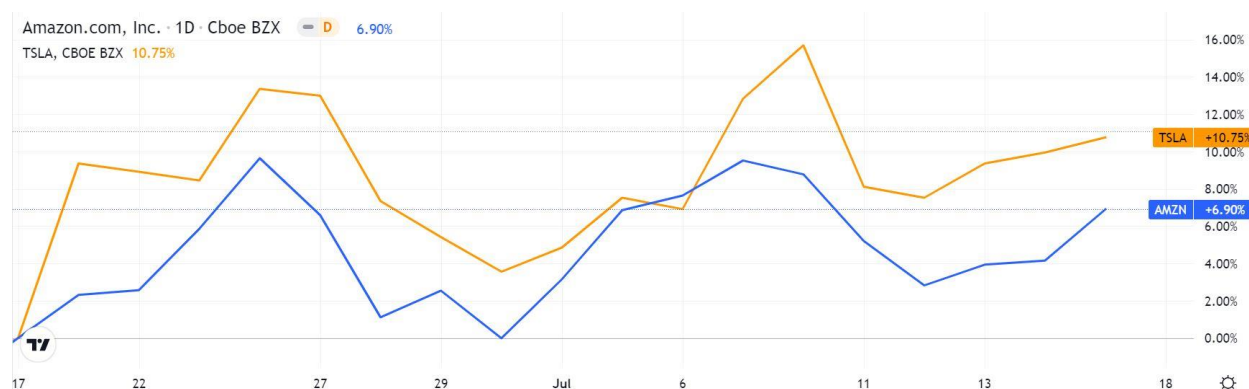


Figure 4.9: AMZN and TSLA stock price change percentages, June 17-July 15. From Investopedia.

I then looked at Netflix and Disney stocks. NFLX shares had fallen about 8.5% over the past week and reached their previous low of \$174 at the end of June. I decided to buy some shares as it seemed to be at the bottom or close to the bottom of a downward cycle. Disney had set a 52-week low the day prior around \$92. Since then, it had increased to \$93, and it seemed that the stock was now on an upward trend however the RSI was still very low at 33 so I decided to buy shares believing that it was slightly undervalued, and its price would continue to recover.

Next, I decided to increase my short on McDonalds' stock. I decided to increase my short as the stock price had climbed about 3.6% from \$246 to \$255 since my initial short and the stock was up about 8.5% since a previous low of \$234. Along with this its RSI has increased to 62 which could indicate an overvalued stock, and the last time its shares were trading at a price this high

was 3 months ago on April 20th which then fell \$10 within a week. This leads me to believe that the stock price is due for a correction, and by increasing my short when the price is higher, I have now increased my average price per share, so the stock only needs to drop by \$5 to \$250 before the short position becomes profitable.

Lastly, I decided to sell the Netflix stocks that I had previously bought on this day. This is because NFLX shares surged in price by about 7.5% shortly after I bought them. This increase in price had usually taken Netflix stocks about 3-4 days but occurred in just a few hours this time. As a result, its RSI is very high at 72 indicating an overvalued stock. This surge in price is likely due to Netflix's earnings report coming out on Monday, July 18th, and while a good report may lead to an even bigger increase, I decided not to risk the loss and instead take the profit.

4.1.7 Week 7, July 18-24

This week was another relatively active week as I made 13 transactions in 11 different companies. Table 4.7 summarizes these transactions.

Table 4.7: Frequent Trading, Week 7 Transactions. All transactions were in \$'s.

Week 7								
Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
7/19/2022	DIS	Sell	97.57	30	2,927.10	134.40	75,808.95	-163.53
7/19/2022	AAPL	Cover	147.54	20	2,950.80	-15.40	72,858.15	-178.93
7/19/2022	F	Short	12.60	-200	2,520.00		75,378.15	
7/19/2022	META	Sell	171.32	20	3,426.30	186.60	78,804.45	7.67
7/19/2022	AAPL	Buy	148.50	20	2,970.02		75,834.43	
7/21/2022	AAPL	Sell	155.06	20	3,101.20	131.18	78,935.63	138.85
7/21/2022	BAC	Sell	33.42	50	1,670.75	21.38	80,606.38	160.23
7/21/2022	NKE	Sell	111.37	90	10,023.30	-320.20	90,629.68	-159.97
7/21/2022	MSFT	Sell	264.02	60	15,840.90	283.50	106,470.58	123.53
7/21/2022	DFS	Buy	99.88	30	2,996.40		103,474.18	
7/21/2022	GOOGL	Sell	114.15	50	5,707.50	115.78	109,181.68	239.31
7/21/2022	NFLX	Short	219.48	-50	10,973.81		120,155.49	
7/21/2022	IBM	Buy	126.56	50	6,328.12		113,827.37	

July 19:

I first looked at some stocks that were doing well. I had previously bought Disney stock while it was low at about \$93. Today DIS shares were up about 6.5% since a previous low of about \$91, and their prices were approaching previous peaks around \$97 dollars on July 7th and June 23rd. As a result, I decided to take a profit where I could and sell the stock while its prices were high. I also decided to sell the stock I owned in Meta. Meta shares were trading around \$171 at the start of the day, about an 8% increase from a low five days prior of \$158. Meta's stock prices have also only climbed back up to \$170 twice since the start of the simulation, therefore I believed the stock was close to the top of a cycle and I decided to take the profits before it was too late. Figure 4.10 shows META and DIS stock prices from June 22nd to July 21st. From this figure it can be seen that the trades I made were close to the top of a cycle, however there were still more profits that could have been made.



Figure 4.10: DIS and META stock price change percentages, June 2-July 21. From Investopedia.

I then checked on my shorts. Since shorting Apple stock on July 12th, it had one down day where its stock price closed at \$147 on July 18th, but other than that it has continued to grow, and on July 19th it was up from that closing price. Recent news of updated versions of MacBooks which have been receiving high praise could also lead to further growth in the stock's price. As a result,

I decided to cover my short while it was in a small downturn and not risk any greater loss. Since it was in a downturn, I also thought it would be a good idea to buy Apple stock at this time, hoping that it would recover, and recent praise of its updated MacBooks would help drive the stock price up.

Lastly, I looked at Ford. Over the past three days its share prices had increased about 10.5%. While this may seem like Ford is recovering from the down market over the past months, I was skeptical. There is still a chip shortage for cars, this coupled with high inflation rates lead me to believe that people will still be reluctant to buy new cars. As a result, I decided to short the stock, hoping that it was due for a downward correction.

July 21st:

I first looked at profitable stocks to sell. Since buying Apple stock two days prior its price had grown about 4.4%. This was also the highest that Apple shares had been traded at since an early downturn at the start of the simulation. I was unsure how much higher the stock price would climb, and I decided to sell before another downturn. Similarly, Microsoft shares were trading at \$264, about 4.4% higher than a low point a week prior on July 13th. This steady increase in price as well as utilizing low points to reinvest and lower my average cost per share made my overall investment in Microsoft a decent profit. I decided to sell my shares in MSFT as well before it was too late, and another downward cycle started. Figure 4.11 shows Microsoft's and Apple's stock price percentage change from July 13th to July 22nd.

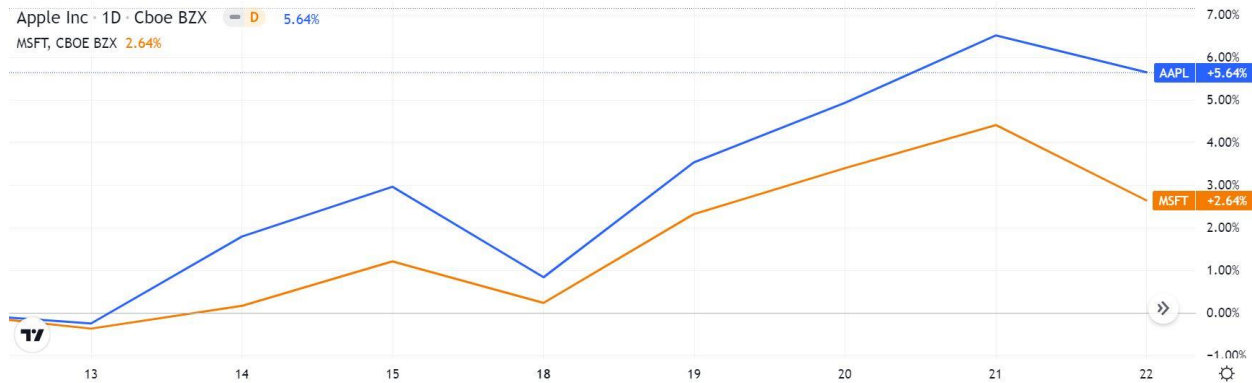


Figure 4.11: AAPL and META Stock Price Change Percentages, July 13-22. From Investopedia.

I then looked at Google. Recently, Google stock split 20 to 1. Initially the value of the stock quickly dropped after the split but recovered as much as 4.4% from July 18th to July 19th. After this correction, Google shares seemed to be trading at a stable level as the next three days saw closing prices all between \$113 and \$114. As a result, I was unsure whether the stock would climb to values that it had seen in previous weeks (accounting for the split) or if the stock would fall again. To play it safe I sold half of the google shares I owned and took some profits in case the stock fell but could still take more profits if the stock price increased further.

Next, I looked at Nike and Bank of America whose stocks had not been so successful for me. Recently BAC shares have jumped in trading price by about 11% from July 14th to July 21st. While this may seem good, I unfortunately did not buy BAC shares at their low point an instead bought shares a month prior at 32.99. From this basis, the stock had only increased about 1.3%. However, I did not have confidence that Bank of America’s stock price would continue to grow at this rate, so I decided to sell on a high and take at least some profits while I could. Likewise, Nike had seen another big jump from July 14th, increasing about 7.9% to \$111.37. Like BAC shares, I bought Nike shares while on a high point as well, so my investment had led to a loss. However, I was able to decrease my overall loss by buying shares in the previous week while the stock was

low. So, although this investment had lost money, I was able to decrease my overall loss. I decided to sell my shares in Nike while the stock was on a high in order to decrease my losses as much as possible and not risk losing any more money.

I then looked for new opportunities to make money. I decided to buy shares in both IBM and DFS. Recently IBM stock prices had suffered a strong downward trend, dropping about 9% over 4 days. DFS stock price had also dropped about 9% however this was just in one day. As a result, I thought it could be a good opportunity to buy shares while the prices were close to the bottom of a cycle.

Lastly, I decided to short Netflix. From July 14th to July 21st Netflix shares saw a jump from a trading price of \$175 to \$224, a 28% increase. Since the start of the simulation the highest prices that Netflix stock had reached was about \$203. Along with this Netflix's stock price had an RSI close to 70, which is extremely high. All of this led me to believe that Netflix stock was highly overvalued and was waiting for a big correction. Therefore, I decided to short 50 shares. Figure 4.12 shows Netflix stock prices and RSI from July 6th to July 22nd.



Figure 4.12: NFLX stock price and RSI, July 6-22. From Investopedia.

4.1.8 Week 8, July 25-31

This week I covered any remaining shorts and sold any owned stocks. I made seven transactions in six companies which are summarized in Table 4.8.

Table 4.8: Frequent Trading, Week 8 Transactions. All transactions were in \$'s

Date	Symbol	Buy/Sell	Price	Shares	Net Cost / Proceeds	Profit/ Loss	Total Cash	Total Profit
7/25/2022	MCD	Cover	248.98	60	14,938.80	71.70	98,888.57	311.01
7/26/2022	IBM	Sell	128.20	50	6,410.00	81.88	105,298.57	392.89
7/26/2022	NFLX	Cover	214.25	25	5,356.25	130.66	99,942.32	523.55
7/26/2022	F	Cover	12.54	200	2,508.00	12.00	97,434.32	535.55
7/27/2022	DFS	Sell	100.53	30	3,015.90	19.50	100,450.22	555.05
7/28/2022	NFLX	Cover	221.14	25	5,528.50	-41.60	94,921.72	513.45
7/28/2022	GOOGL	Sell	113.80	50	5,690.00	98.27	100,611.72	611.72

July 25th:

McDonald's stock closed last week at \$254 and by the middle of the day on Monday it had dipped about 2% to just under \$249. This dip made my short on MCD shares slightly profitable for the first time since shorting the stock. As a result, I took the opportunity to cover and take a small profit before the stock recovered.

July 26th:

Over the last 4 trading days IBM stock prices had slowly increased and since buying the stock at \$126.56 on Thursday, July 21st, its price had increased about 1.3% to \$128. I decided to sell my shares of IBM and take a profit.

I then looked at the stocks that I was still shorting. Netflix's stock prices had dropped about \$5 since shorting the stock on July 21st. However, I believed that the stock could continue to drop

in the coming days. As a result, I covered half of my shares in order to take some profits, but also have a chance at making more.

Next, I looked at Ford which I shorted on July 19th. After shorting Ford shares, their prices had 2 days of growth followed by another two days of decline. This was the third day of its downward trend and the stock prices had just dropped below what I shorted them at by about six cents. I was unsure whether the stock would continue its decline or if it would start to recover so I decided to cover and take a small profit before it possibly turned into a loss.

July 27th:

DFS shares had a big correction on July 21st when I bought 30 shares. Since then, the price hadn't changed much but was slightly above what I bought the shares for by just under a dollar. I again was not confident in the stock continuing this upward trend, so I decided to sell the shares and take a small profit.

July 28th:

Since covering half of the Netflix shares, I was shorting, the price had increased by about \$7 or about 3.3%. Its current price of \$221.14 was also above what I had originally shorted the shares at which was \$219.48. I decided to cover the shorted shares remaining in case the stock continued to grow, and before the overall short was no longer profitable, as the previous shares I covered ensured some profits. Figure 4.13 shows Netflix's stock prices from July 1st to August 3rd.



Figure 4.13: Netflix stock prices, July 1-August 3. From Investopedia.

Lastly, I still owned 50 shares of Google which I needed to sell. After selling half of my shares of GOOGL on July 21st the stock had a quick downturn and fell about 8% in 4 days to \$105 a share on July 25th. This quick downturn was followed by a quick upward trend and by the 28th the stock was trading at around \$114. I decided to sell as the stock had been very volatile over the past week and my investment was profitable again after the fast increase in price.

4.2 Results

At the end of the simulation, after all owned stocks were sold and all shorts were covered, the account value totaled \$100,611.72, a \$611.72 profit. Table 4.9 summarizes the changes in the Frequent Trading account evaluations at the end of each week throughout the simulation.

Table 4.9: Frequent Trading, Account Evaluations. All evaluations were in \$'s.

	Total Stock Value	Cash	Account Value	% Change From Previous Week
Week 1	53,071.57	42,994.50	96,066.07	-3.9%
Week 2	54,171.18	39,106.35	93,277.53	-2.9%
Week 3	66,494.42	30,696.78	97,191.20	4.2%
Week 4	12,456.85	81,995.69	94,452.54	-2.8%
Week 5	-12,811.80	110,239.00	97,427.20	3.1%
Week 6	25,467.70	72,881.85	98,349.55	0.9%
Week 7	-14,017.90	113,827.37	99,809.47	1.5%
Week 8	0.00	100,611.72	100,611.72	0.8%

The last week was the first week that the Frequent Trading Strategy had become profitable. This is likely due to the first two weeks of the simulations which saw big losses with the account declining 3.9% in the first week and another 2.9% after the end of the second week. This marked the lowest recorded account value throughout the simulation of \$93,277.53. The following six weeks saw five profitable weeks and only one more negative week (Week 4 which saw a decline of 2.8%). Week 3 saw the highest recorded growth in the account value as it totaled \$97,427.20, a 4.2% increase from the end of the previous week. However, this was not the week which recorded the highest profits, instead its growth came from a rise in the portfolio's stock prices. The week with the highest profits was Week 6 where its transactions totaled a \$1,113.90 profit, but the overall account value did not see much growth as the stocks still remaining in the portfolio declined in price.

4.3 Conclusions

4.3.1 NYSE vs Nasdaq

The five most profitable stocks throughout the Frequent Trading simulation were all traded on the Nasdaq, however, of the five stocks which totaled the most losses across all their transactions, three were traded on the Nasdaq. Table 4.10 summarizes each stock's overall profits or losses across all transactions that occurred during the simulation. It also includes information on the number of buying or shorting transactions for each stock as well as the total profit or loss for these types of transactions.

Table 4.10: Frequent Trading, Transaction Totals for Each Stock. All evaluations were in \$'s.

Stocks	# Of Buys	Profit/Loss on Buys	# Of Shorts	Profit/Loss on Shorts	Total # of Transactions	Total Profit/Loss	Market
GOOGL	4	1,355.58	1	227.50	5	1,583.08	NAS
TSLA	4	1,174.43	0	0.00	4	1,174.43	NAS
INTC	2	149.00	1	103.93	3	252.93	NAS
MSFT	4	230.39	0	0.00	4	230.39	NAS
AMZN	3	163.63	0	0.00	2	163.63	NAS
IBM	3	88.54	1	26.00	4	114.54	NYSE
MCD	1	18.30	2	71.70	3	90.00	NYSE
GM	2	-65.15	1	148.23	3	83.08	NYSE
WMT	1	25.82	0	0.00	1	25.82	NYSE
BAC	1	21.38	0	0.00	1	21.38	NYSE
AAPL	3	12.28	1	-15.40	3	-3.12	NAS
META	3	-40.29	0	0.00	3	-40.29	NAS
DKNG	2	-117.30	0	0.00	2	-117.30	NAS
DFS	2	-161.90	0	0.00	2	-161.90	NYSE
F	1	-177.00	1	12.00	2	-165.00	NYSE
DIS	3	-194.21	0	0.00	3	-194.21	NYSE
NFLX	2	-361.71	2	89.05	4	-272.66	NAS
NKE	2	-320.20	0	0.00	2	-320.20	NYSE
NVDA	1	-511.39	0	0.00	1	-511.39	NAS
AMD	1	-1,341.50	0	0.00	1	-1,341.50	NAS

Overall, it seems that more profits were able to be made by trading stocks traded on the Nasdaq rather than stocks traded on the NYSE. While only five of the eleven stocks traded on the Nasdaq were able to be traded profitably, the total sum of transactions across these companies totaled a profit of \$1,118.21. Comparatively, five of the nine stocks traded on the NYSE were able to be traded profitably, however the sum of all transactions throughout the simulation for companies traded on the NYSE totaled a loss of \$506.49. So, while companies traded on the NYSE may have had a higher proportion of profits across the totals of all trades, companies on the Nasdaq were able to produce higher total profits across their transactions.

Figure 4.14 shows the percentage change in stock prices of each company at the end of each week compared to the end of the previous week. Companies traded on the Nasdaq are highlighted by orange lines and companies traded on the NYSE are highlighted by the blue lines. The graph also shows the average percentage change of the Nasdaq companies' stock prices (highlighted in a bolder orange) and the average percentage change for NYSE companies (highlighted in a bolder blue). Some of the highest and lowest percentage changes are labeled for each week.

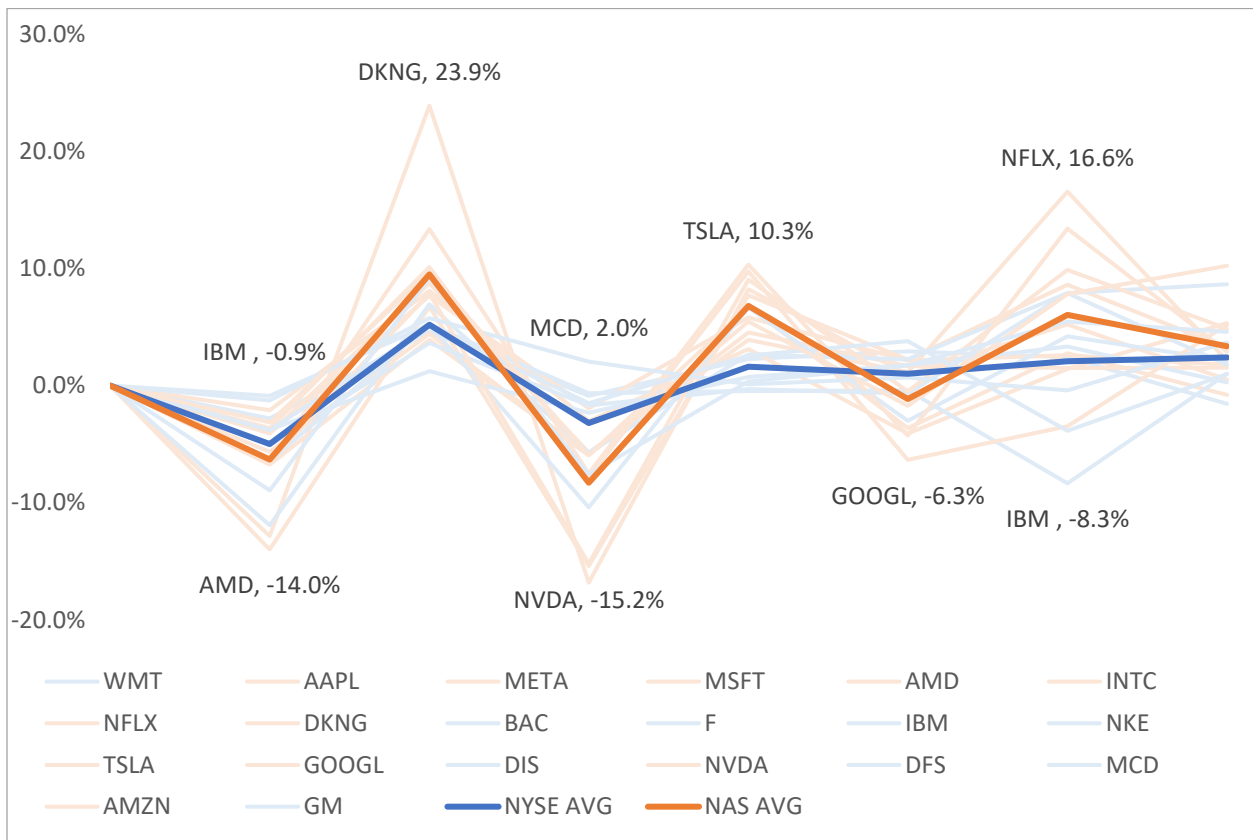


Figure 4.14: Frequent Trading, Nasdaq and NYSE Companies' Stock Price Percentage Change Each Week. From Microsoft Excel.

From this graph it is clear that the companies traded on the Nasdaq saw more volatility than those traded on the NYSE throughout the simulation. This is a likely reason to why the most

profitable traded stocks were Nasdaq companies, their increased volatility led to larger gains over smaller periods of time compared to the companies on the NYSE. Similarly, a majority of the losses for the frequent trade strategy can be traced to stocks traded on the Nasdaq since their stock prices could decline just as fast.

4.3.2 Market Capitalization Comparison

Like the Buy and Hold strategy, these companies' market capitalizations can be compared. Table 4.11 shows each stock's overall profit or loss across all trades as well as their market capitalization.

Table 4.11: Frequent Trading, Stocks' Profit/Loss Compared to Market Capitalization. All evaluations were in \$'s.

Stocks	Total Profit/Loss	Market Cap
GOOGL	1583.08	1,560,000,000,000
TSLA	1174.43	903,470,000,000
INTC	252.93	146,710,000,000
MSFT	230.39	2,150,000,000,000
AMZN	163.63	1,467,000,000,000
IBM	114.54	120,040,000,000
MCD	90	195,782,000,000
GM	83.08	58,394,000,000
WMT	25.82	357,790,000,000
BAC	21.38	288,590,000,000
AAPL	-3.12	2,740,000,000,000
META	-40.29	481,640,000,000
DKNG	-117.3	8,980,000,000
DFS	-161.9	30,057,000,000
F	-165	64,300,000,000
DIS	-194.21	219,350,000,000
NFLX	-272.65	107,930,000,000
NKE	-320.2	179,300,000,000
NVDA	-511.39	467,898,000,000
AMD	-1341.5	162,380,000,000

At an initial glance it seems that there is no relationship between a company's market capitalization and its success in the Frequent Trading strategy. However, a scatterplot may be useful to better visualize this relationship. Figure 4.15 shows the relationship of these stocks' market caps (x axis) compared to their success in the simulation (profit/loss, y axis). Companies with under 200 billion USD market capitalizations are highlighted by grey dots while companies with market capitalizations between 200 billion and 500 billion USD are highlighted in blue dots. Companies with market caps above 500 billion USD are highlighted by red dots.

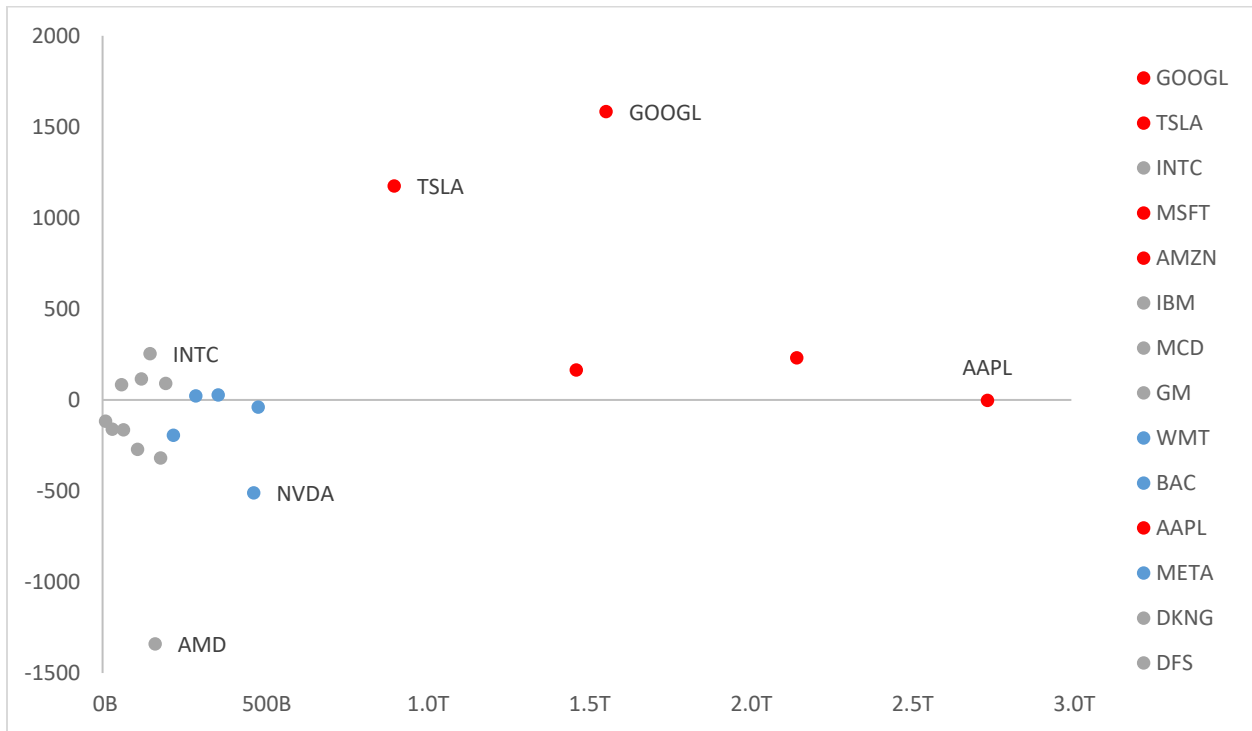


Figure 4.15: Frequent Trading, Market Capitalization Compared to Profit/Loss. From Microsoft Excel.

While the scatter plot confirms that a company's market capitalization may not be a good predictor for exactly how well their stock can be traded, there are still some interesting trends to note. The first is that of the companies with market caps under 500 billion, the ratio of successfully traded stocks (the total of all the stock's trades was profitable by the end of the simulation) to all

stocks traded was 40% (6/15). This is significantly lower than the proportion of successfully traded stocks whose market caps were greater than 500 billion, which is 80% (4/5). Another interesting note is that for stocks with market caps under 500 billion, the average loss for unsuccessful stocks calculated to \$347.16 which was far greater than the average profit for successful stocks which was \$97.96. Even if AMD is excluded as an outlier the average loss still remains far greater at \$222.87. This compared to the massive gains by trading Google and Tesla stocks, as well as the fact that the only negatively traded stock with a market cap over 500 billion was Apple which totaled a loss of just \$3.12 suggests that stocks in larger cap companies can have better success when trading. The reason for this has likely already been discovered though. As stated before, companies listed on the Nasdaq saw more volatility than companies on the NYSE, and of the companies with at least 500 billion USD of market capitalization, all were listed on the Nasdaq (Google, Tesla, Amazon, Microsoft, and Apple). However, there were many stocks which saw high levels of volatility but ended the simulation with a net loss across their transactions. So, was there a difference between these larger cap companies, and those that lost money across their trades? In order to find this answer I compared Google, Apple, Tesla, Amazon, and Microsoft's stock prices throughout the simulation, to four stocks which were traded the least successfully (AMD, NVDA, NKE, and NFLX). Figure 4.16 shows these companies percentage change from their stock prices in each week to their stock price in week one. The companies with market capitalizations over 500 billion are highlighted by orange lines, with Google and Tesla which were traded very successfully highlighted by bolder orange lines. The four companies traded the least successfully are highlighted by a light blue line.

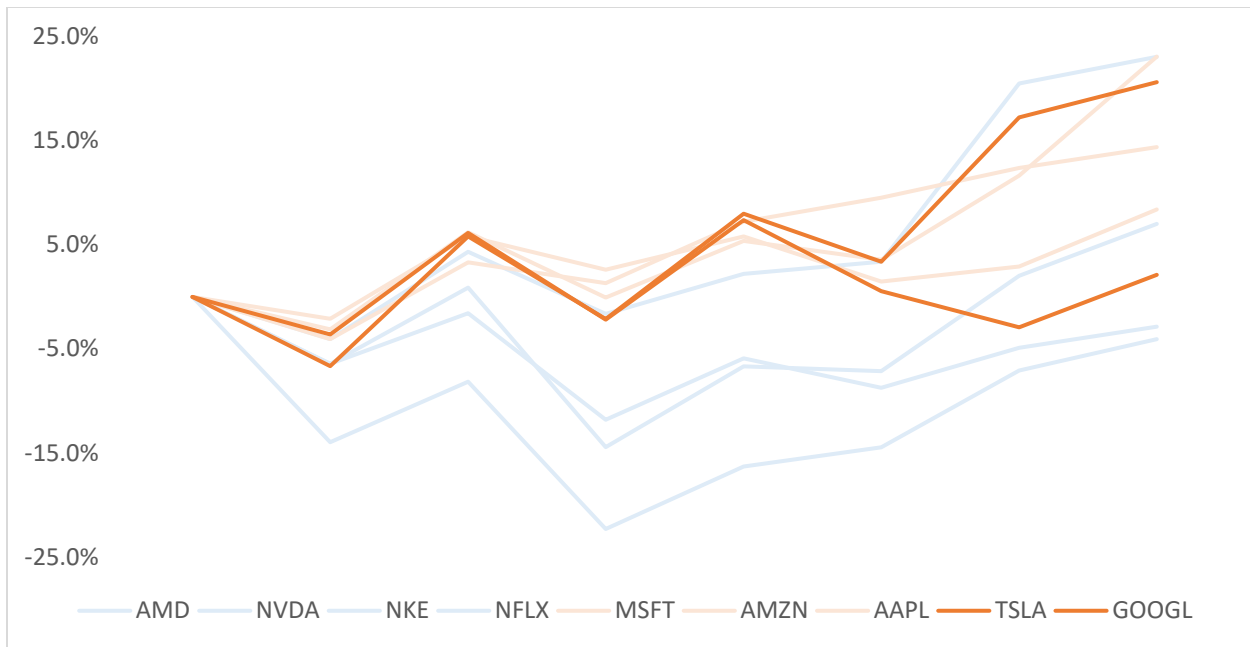


Figure 4.16: Frequent Trading, Large Capitalization and Unsuccessful Stocks' Price Percentage Change Each Week from the Start of the Simulation. From Microsoft Excel.

This graph provides some possible answers. The first is that the companies with \$500 billion or more in market capitalization did not see any major declines in price beyond Tesla's dip in Week 2 of 6.7%. Comparing this to the stocks traded the least successfully, Nike, Nvidia and AMD saw declines of 11.8%, 14.4% and 22.3%, respectively, in Week 3 while every large cap company saw an increase in price from the start of the simulation. So, it is possible that these large cap companies, although volatile in price, carried less risk of major declines than smaller cap companies, and therefore saw more success when traded. Another reason could be the consistency of the changes in price. Between Week 1 and Week 6 All of the larger cap companies recorded change sin prices contained between -7.5% and 7.5% with the exception of Apple being up 9.5% in Week 6. Along with this after each down week, these stocks saw an up week and vice versa. This consistency could have made it easier to predict price changes and therefore easier to trade these stocks successfully.

4.3.3 Shorting

Another comparison can be found when looking at stocks that were bought or shorted. Table 4.12 describes each stock and the net profit or loss across all buying transactions and shorting transactions.

Table 4.12: Frequent Trading, Each Stock's Net Profit/Loss on Buying and Shorting. All evaluations were in \$'s.

Stocks	Profit/Loss on Buys	Profit/Loss on Shorts
GOOGL	1,355.58	227.50
TSLA	1,174.43	0.00
INTC	149.00	103.93
MSFT	230.39	0.00
AMZN	163.63	0.00
IBM	88.54	26.00
MCD	18.30	71.70
GM	-65.15	148.23
WMT	25.82	0.00
BAC	21.38	0.00
AAPL	12.28	-15.40
META	-40.29	0.00
DKNG	-117.30	0.00
DFS	-161.90	0.00
F	-177.00	12.00
DIS	-194.21	0.00
NFLX	-361.71	89.05
NKE	-320.20	0.00
NVDA	-511.39	0.00
AMD	-1,341.50	0.00
Total	-51.30	663.02

The buying transactions across all stocks totaled a net loss of \$51.30 while the shorting transactions totaled a net profit of \$663.02. Along with this the proportion of stocks whose buying transactions totaled net profits was 50% (10/20), while seven of eight stocks which were shorted totaled net profits across all their shorts, and the only negative total was just a loss of \$15.40

(AAPL). It is clear that I was able to profit off of shorting stocks far more effectively than buying stocks. To explore why this is I decided to graph the stock prices of each company that I shorted throughout the simulation. Figure 4.17 shows the percentage change in stock prices throughout the simulation of each stock I shorted from their price at the start of the simulation. Colored lines represent periods that a stock was being shorted and each line is labeled. Netflix and McDonalds' lines change in the boldness of their color, the bolder periods represent periods of a larger short. So, in the case of MCD stock, the short position was increased after some time, while in the case of NFLX stock, half of the shorted stocks were covered after a week leaving half still in a short position.

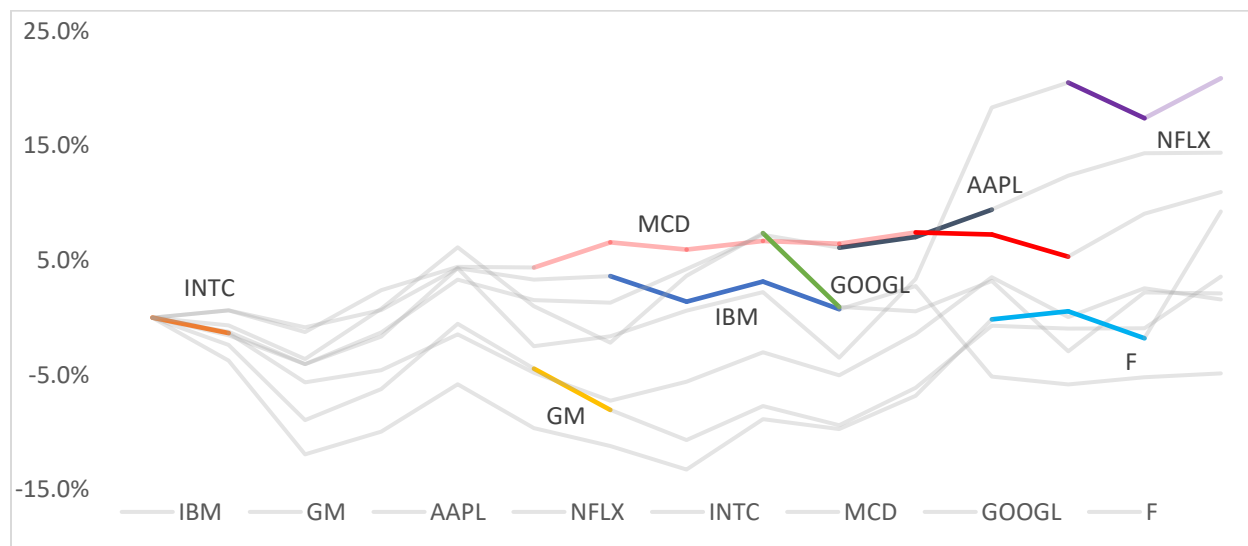


Figure 4.17: Frequent Trading, Short Positions and Stock Price Changes. From Microsoft Excel.

This graph starts to give a better picture as to why the shorts were successful. For each short there was a period of growth in the stock price beforehand, and with a volatile market it was likely that the price would drop after this period. The most successful shorts were INTC, GOOGL, and GM, these short positions also lasted for the least amount of time which hints at another reason that the shorts could have been so successful. Shorting is considered high risk as theoretically you

can lose large amounts of money since a stock price is not bound by an upper limit. While it is unlikely for a stock to grow in this nature, the idea of shorting being such a risk led me to track these transactions much more carefully. As a result, I was more careful with which companies I shorted (only entering 8 short positions throughout the simulation compared to 45 buying transactions), since in all cases I looked for stocks that had seen periods of large growth, and I watched over the changes in stock price more consistently, leading to some short positions that only lasted a few days if the stock had dropped and I could ensure some profit. Some of the short positions that lasted longer were due to the fact that the stock had failed to drop in price. In the case with Apple, after a week of the price steadily growing, I decided to cut my losses and cover. Watching over the price consistently saved me more losses as Apples stock price continued to grow after I had covered. In the case with McDonalds the price had grown but not as fast as Apple and I believed there would still be an opportunity to make profits. After two weeks the price had reached another high point and I decided to increase my short. The following week MCD stock saw a dip in price, and I was able to make a profit. Again, it was consistently tracking the price that led to profits.

Chapter 5: Comparison and Analysis

Both the Frequent Trading strategy and the Buy and Hold strategy made money. The Frequent Trading strategy ended with a net profit of \$611.72 while the Buy and Hold strategy ended with a net profit of \$1,971.02 (a 0.6% and 2% return, respectively). While it seems that the Buy and Hold strategy was the clear winner, that does not tell the full story. Figure 5.1 graphs each strategy's overall account value throughout the simulation. The Buy and Hold strategy is highlighted by a blue line and the Frequent Trading strategy is highlighted by an orange line.

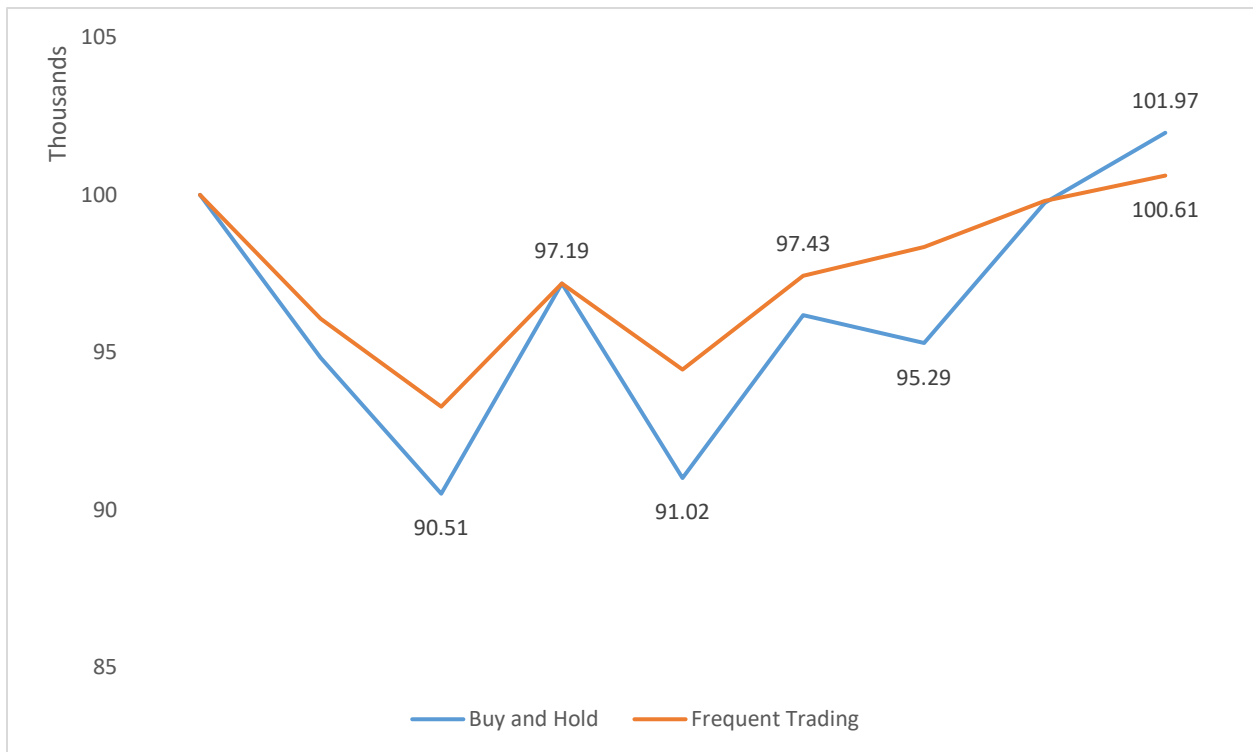


Figure 5.1: Comparison and Analysis, Comparison of Each Strategy's Value Over the Course of the Simulation. From Microsoft Excel.

For most of the simulation both strategies performed poorly as they did not become profitable until the last two weeks. Along with this, the Frequent Trading strategy performed as

good if not better than the Buy and Hold strategy for seven of the eight weeks as in that time its account value ranged from 0% to 3.8% higher than the Buy and Hold account value. To better understand why both strategies performed poorly and why the Buy and Hold strategy increased in value at a much higher rate than the Frequent Trading strategy in the last two weeks I looked at overall market trends. Figure 5.2 graphs the percentage change each week in both strategies' values since the start of the simulation. Again, these strategies are marked by blue and orange lines. The chart also includes percentage changes in the S and P 500 index and the Nasdaq Composite index (yellow and green dashed lines, respectively) to represent stock market trends during the simulation.

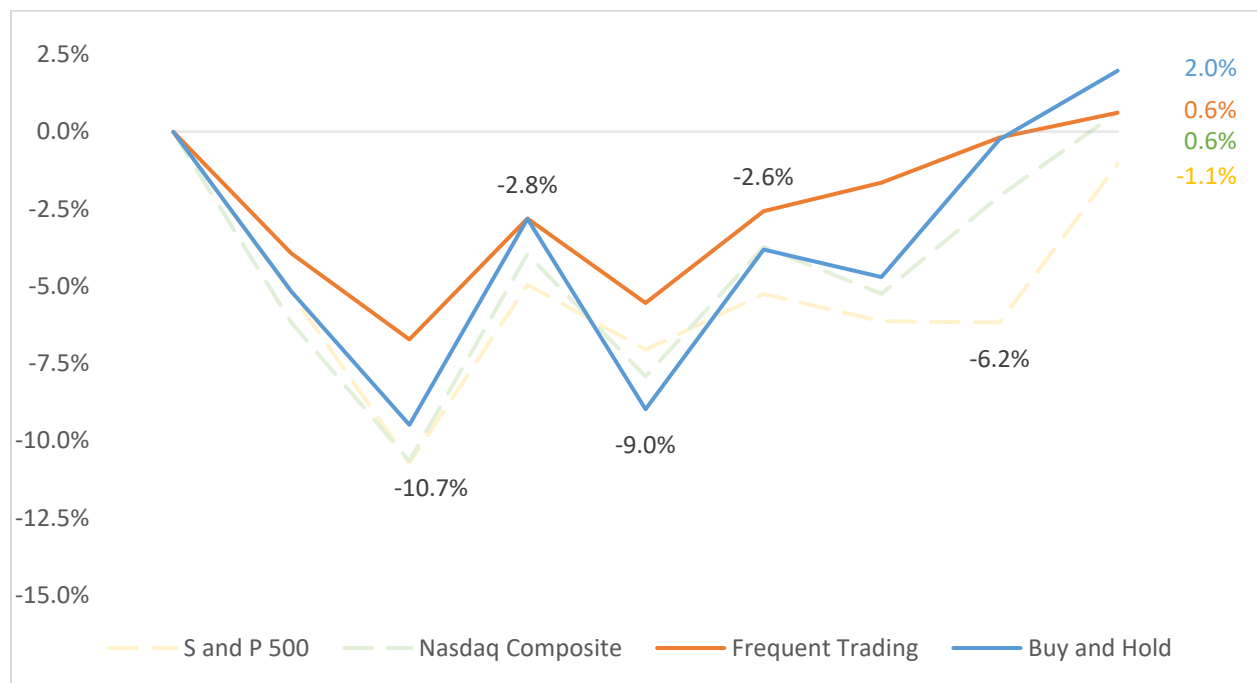


Figure 5.2: Comparison and Analysis, Percentage Changes in Strategy's Value Compared to Indices.

Over the course of the simulation the stock market saw a large initial decline with the S and P 500, and the Nasdaq Composite falling nearly 11% by Week 2. This was followed by some

weeks of high volatility until finally the Nasdaq Composite recovered and the S and P 500 mostly recovered, ending at -1.1% from its value at the start of the simulation. Both strategies were affected by the market conditions as their up and down weeks mostly followed the indices up and down weeks. However, the Frequent trading strategy was able to consistently remain above the Buy and Hold Strategy and the Indices during the down market and high volatility. Once the market started to recover and both indices recorded two positive weeks in a row, the Buy and Hold strategy quickly passed the Frequent Trading strategy and produced a higher profit. So, while a market is good the Buy and Hold strategy could perform better than the Frequent Trading strategy, but during down and highly volatile markets, consistent trading can outperform a traditional investing technique. This is likely due to the fact that during the down market I was consistently checking the Frequent Trading portfolio and I was able to sell out of any stocks performing poorly. The market's high volatility also helped to turn large profits on quick transactions. Another advantage that the Frequent Trading strategy had was the use of shorts. I did not short any stocks during the Buy and Hold simulation, however I was able to utilize shorting in the Frequent Trading simulation which led to some profitable transactions during weeks where the market was trending down.

Chapter 6: Conclusions

After analyzing and comparing the simulations it can be concluded that market conditions have an impact on how one should act within the stock market. In times of volatility and decline in the market, a trading approach can help limit losses and allow one to still profit from transactions. It can also be advantageous to trade stocks within larger market capitalization companies as their stock prices were more resistant to overall market trends. If one is to trade, they can find the best opportunities within the more volatile stocks. In these simulations the more volatile stocks tended to be companies traded on the Nasdaq. However, one should also be careful as with more volatility comes heightened risk of stock prices falling. Trading within the larger market capitalization companies on the NYSE could decrease one's risk. Shorting can also be utilized in a down market, but carefully selecting which stocks to short is key. In the Frequent Trading simulation, the most successful shorts came with volatile stocks that saw a period of fast growth.

One can still take a traditional approach of buying and holding a stock. Given that the market is volatile, buying stocks in Nasdaq companies when they are low could provide large gains once the market recovers, but if one is looking for less risk then buying shares of companies that are traded on the NYSE could protect them from higher levels of volatility. In either market it was the largest market capitalizations companies that better resisted overall market trends so like with the frequent trading strategy, investing in these companies could help to limit any losses. If a market stabilizes or recovers then this approach could also prove more efficient than frequently trading, but due to the lack of steady market conditions during the simulations it is unsure which strategy would have performed better. However, no matter the performance of the market, traditional investing does offer the benefit of consuming less of one's time.

Apart from specific strategies for trading stocks, I also developed a good foundation for investing in the future. Through this project I was able to learn the basics about the stock market and how to evaluate stocks, using both technical and fundamental analyses. Through the simulations I was able to develop an understanding of the forces that can affect a stock's price as well as the broader market. I kept track of the news cycles and read different opinions about the companies I traded within. Overall, the experience gave me a fun crash course in the stock market, and I am excited to gain more knowledge about.

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