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Stock Market Simulation

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By

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Abstract

This project is a four-week stock market simulation. The goal of this project was for the participant to learn more about the stock market and gain real-time experience so that he can make informed investment decisions in the future. This project analyzed the current stock market, compared two different methods of active trading (swing trading and news trading), and conducted a four-week simulation with two different companies with \$100,000 for each trading method. The results showed that swing trading was more profitable than news trading.

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Chapter 1: Introduction

1.1 – Goals, Scope, and General Plan

Over the course of this IQP, I hope to gain a solid understanding of the stock market and learn how to turn a profit by interacting with it. I want to be able to confidently handle my wealth and future assets. To achieve this goal, I will study the history of the stock market along with various proven strategies used to trade and make profits. The strategies I will use in this project are swing trading and news trading. I will gain experience with these methods by conducting a 4-week simulation of the stock market where I will invest a hypothetical sum of money into three different companies. By analyzing the simulation results I will gain insight into the trading methods and be better equipped to use them in the future.

1.2 – Stock Market History

The first modern stock trading was invented in Amsterdam in 1611 when the Dutch East India Company became the first publicly traded company. It was also the only company with any trading activity on the exchange for years. In the late 1700s, a group of merchants made the Buttonwood Tree Agreement. They met daily to buy and sell stocks and bonds. A practice which eventually formed the New York Stock Exchange (NYSE). Although, it still took centuries for it to become what it is today (Hwang, 2021).

The Philadelphia Stock Exchange was formed in 1790. This helped increase the development of the U.S.'s financial sectors and the country's expansion west. In 1896, the Dow Jones Industrial Average was created. It's initial 12 components were mainly industrial companies. The early version of the S&P 500 was created by Henry Barnum Poor's company in 1923, Poor's Publishing, where it began by tracking 90 stocks. The Dow Jones and the S&P 500 are both stock market

indexes in that they try to capture the performance of the whole market and economy. The first major crash of the U.S. stock market was in 1929, after the decade-long “Roaring 20s” period. This was because speculators made leveraged bets on the stock market, inflating prices (Hwang, 2021).

In 1971, trading began on another U.S. stock exchange, the National Association of Securities Dealers Automated Quotations, otherwise known as the NASDAQ. In 1992, it joined forces with the International Stock Exchange based in London becoming the first intercontinental securities market. Unlike the NYSE, a physical stock exchange, the NASDAQ allowed investors to buy and sell stocks on a network of computers (Hwang, 2021).

1.3 – Stock Market Analysis

Fundamental and technical analysis are two major schools of thought when it comes to looking at the markets; however, they are opposite ends of the spectrum. Investors and traders alike use both to research and forecast trends. But, like any investment strategy or philosophy, both have advocates and opposers.

Fundamental analysis attempts to evaluate the intrinsic value of a stock. Analysts will study everything from the overall economy and industry conditions to the financial strength and management of the companies. Earnings, expenses, assets, and liabilities all come under scrutiny by fundamental analysts (Majaski, 2022).

On the other hand, technical analysis attempts to identify opportunities by looking at statistical trends, like movements in a stock’s price and volume. Technical analysts assume that all known fundamentals are factored into price, thus one does not need to look closely at them.

Technical analysts don't try to measure intrinsic value, instead they use stock charts to look for patterns and trends to predict what a stock will do in the future (Majaski, 2022).

To summarize, fundamental analysts evaluate securities by attempting to measure their intrinsic value, while technical analysts look at statistical trends in the stock's price and volume.

1.4 – COVID-19's Effect on the Economy

Added levels of uncertainty in the stock market will lead to changes in its behavior. As COVID-19 began spreading across the globe, it wasn't entirely clear that we would still be experiencing its effects in 2022. But still, at the beginning of the pandemic, stocks immediately saw drops in price as less risk-averse investors sold off assets to look for safer returns. The lockdowns also negatively affected consumer-reliant industries like travel, entertainment, and hospitality.

Just six months into the COVID-19 crisis, small business revenue was down 20 percent compared to January 2020. To someone who doesn't know much about the economy this might not seem very important; however, small businesses employ nearly half of all private sector workers (Bauer, 2022). This means that if these businesses can't afford to hire plenty of workers, spending will go down across the board and all businesses will lose out on profits. Figure 1.1 shows the change in revenue for small businesses with an emphasis on retail and transportation, education and health services, and leisure and hospitality. If we compare their revenues as of August 9th to January, we can see that the leisure and hospitality sector is down 47.5 percent, the education and health services sector is down 16.4 percent, and the retail and transportation sector is down 14.1 percent. In total, all industries were down 19.1 percent (Bauer, 22). Massive hits in

revenue like this can lead to layoffs and even the closures of entire firms resulting in a recession.

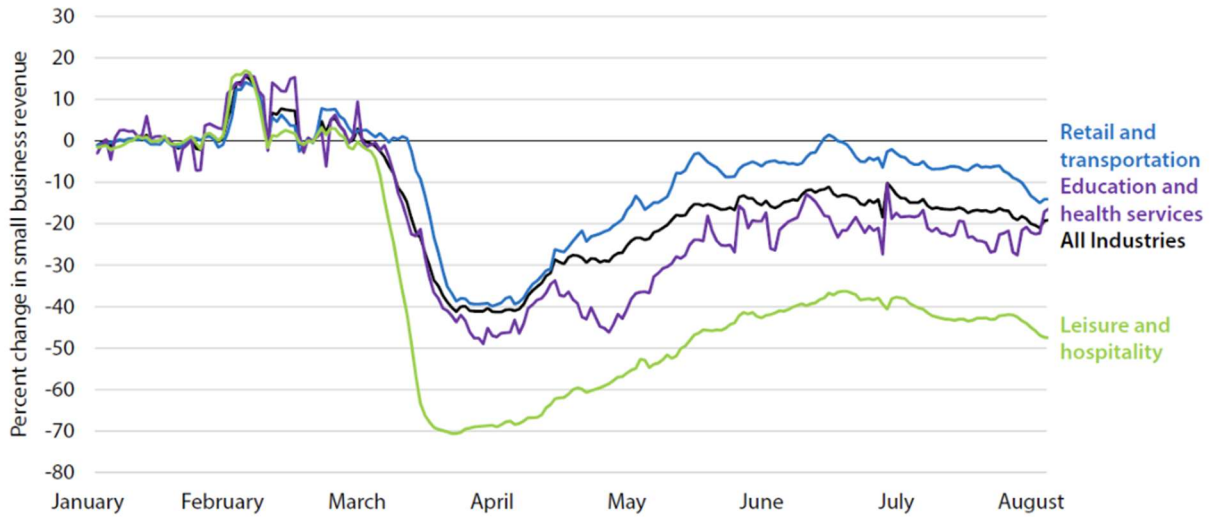


Figure 1.1 Change in Small Business Revenue Chart from Brookings.edu

We can see the effects of these layoffs and closures by looking at the decline in total hours worked from February through July. Figure 1.2 shows the daily change in total hours worked during that period. In March the number of total hours worked dropped by about 60 percent, but they began to rise again in April to about a 25 percent decrease compared to February.



Figure 1.2 Percent Difference in Total Hours Worked Chart from Brookings.edu

Ultimately, COVID-19 made it harder for people to work. Worldwide shutdowns made businesses layoff workers, which in turn led to a decrease in the consumption of commodities from those without jobs. This decrease in spending from the working class further amplified the decrease in revenue made from businesses of all sizes. These are not the only ways that COVID-19 hurt the economy, but they are some of the most immediately noticeable and highlight its effect on the working class.

1.5 – The Economic Impact of the War in Ukraine and Inflation

Much like a worldwide pandemic, an ongoing war in Europe will cause a large level of uncertainty among market participants. One way to measure this is with geopolitical risk. Figure 1.3 displays the geopolitical risk index from 1970 to 2022, highlighting key geopolitical events. Some notable spikes being the September 11th attacks and the Iraq War occurring right before a recession.

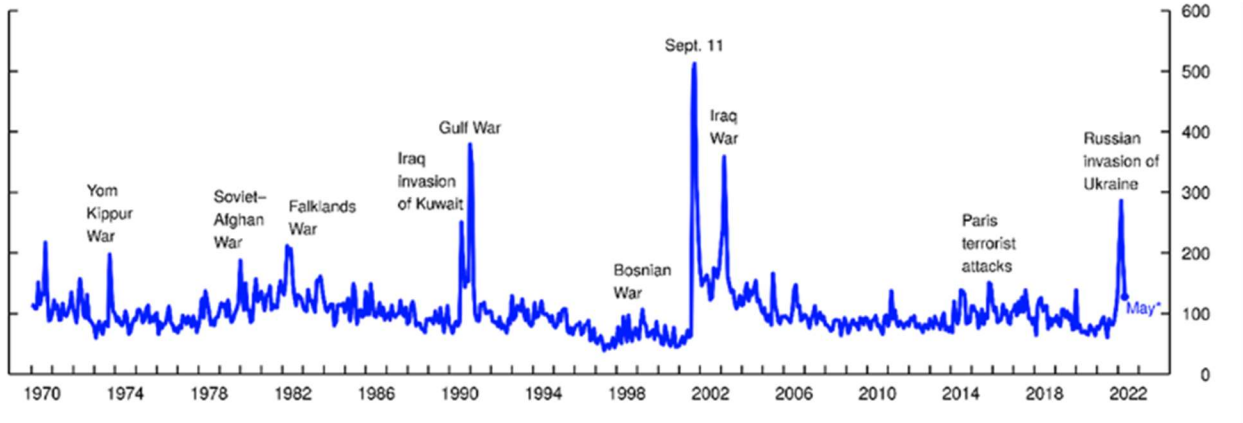


Figure 1.3 Geopolitical Risk Index from federalreserve.gov

Not only does an increase in geopolitical risk cause uncertainty for market participants, but it also amplifies inflation. Wars disrupt lives as well as economies by killing them directly and diverting international trade and global supply chains. This is why, even in the U.S. we feel the effects of this war. These factors aren't the only things driving inflation. The European Union's

decision to ban 90 percent of oil imports from Russia was aimed at crippling its economy. However, it also had the effect of raising energy prices around the globe. Figure 1.4 shows the U.S.'s gas prices over the past three decades. Gas prices in the U.S. are one of the most discussed topics at the moment. The reason for that is that nearly everyone needs to purchase it. Much like how small business' dropping in revenue caused the entire market to feel the effects, a widely consumed commodity experiencing inflation will bring about similar results.

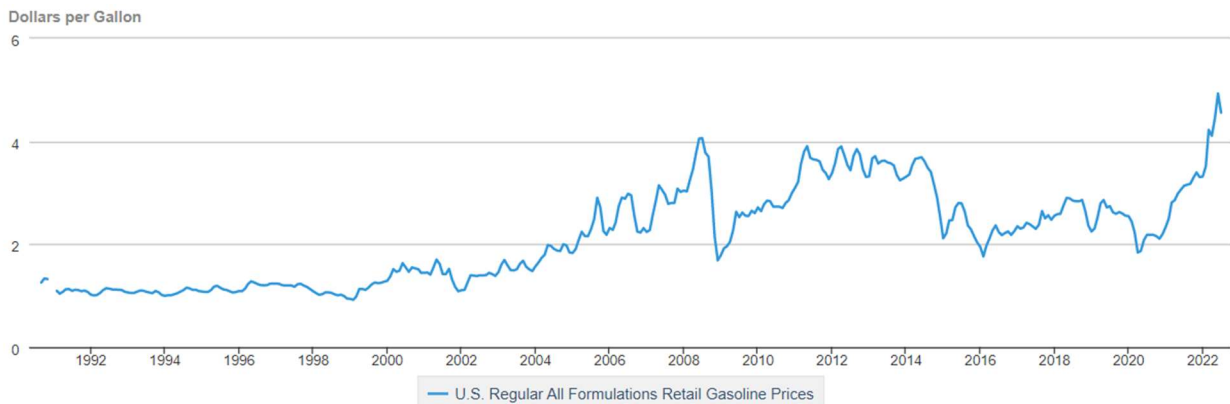


Figure 1.4 U.S. Retail Gasoline Prices from eia.gov

We can compare figure 1.4 and figure 1.3 and notice that the largest changes in recent history line up well. If we consider the September 11th attacks, the Iraq War and George Bush's presidency as one event this makes sense as one of our goals in the Middle East is always to obtain natural resources. Later in 2020, we can see that COVID-19 begun the increase in gas prices and the prices spiked again with the war in Ukraine.

The war in Ukraine has a significant hold over the economy. Global trade is diverted, supply chains are disrupted, and sanctions against Russia have impacted other countries as well. Fuel is something that nearly everyone needs to buy on a weekly basis, sometimes even more frequently. Inflation causing the price of such commodities to rise are bound to have widespread impact across the globe. The more money being spent on purchasing gas leaves less and less money

available to spent in other areas of the market. Even if the burden feels small on each person, its magnitude causes the issue to build up and have a massive effect on the economy as whole.

Chapter 2: Methods of Trading Stocks

In this chapter, we will first go over a few different methods of trading stocks. Following that introduction will be a description of the two methods of trading stocks that we will use in the simulation portion of this project.

2.1 – Various Methods of Trading Stocks

2.1.1 – Day Trading

Arguably the most well-known trading strategy, day trading, as its name implies is the technique of buying and selling securities within the same day. With day trading you can immediately take advantage of market volatility. You also don't have capital at risk being held overnight that is subject to post-market or pre-market pricing. However, you will have to pay multiple transaction fees due to higher amounts of orders. Day trading requires much more time and attention to execute, and the profits are incremental due to the short time that securities are held (Zucchi, 2022).

2.1.2 – Position Trading

Unlike day trading, position trading uses longer term charts. These charts can range from a day-by-day to a month-by-month basis. This results in trades taking up to several weeks at a time (Zucchi, 2022). Because of this wide range of time, position trading can be considered a method of active trading or a buy-and-hold strategy depending on the trader and trend. Trend traders look for successive highs to ascertain the trend of a security. By jumping on and riding the “wave,” trend traders aim to benefit from both the up and downside of market movements. It is more focused on the direction of the market and not necessarily the price levels of stocks (Zucchi,

2022). Meaning that higher volatility makes trend trading more difficult and its positions are reduced. Position trading is supported by technical analysis, but that means a strong background in technical analysis is required to effectively use this method.

2.1.3 – End-of-Day Trading

The end-of-day trading strategy revolves around trading towards the close of markets. This is when it can become clear that the price is going to settle or close (CMC Markets). Traders need to study the price action compared to the previous day's movements and based on indicators used in their system they can speculate how the price can move. Risk management is necessary with this method because of overnight risk. While having a system necessitates experience, end-of-day trading requires less time commitment because most action takes place in the morning or at night.

2.2 – Simulation Method 1 – Swing Trading

At the end of a trend for any given stock, there is typically price volatility. Swing traders buy or sell as the new price sets in. They attempt to secure short to medium term gains in a stock (shorter periods than trend traders.) Swing trading is the process of identifying where an asset's price is likely to move next, entering a position, and then getting a chunk of the profit if that move was correctly predicted (Mitchell, 2022). It is heavily based on a risk/reward basis and the trading process can be entirely reliant on technical analysis.

Compared to day trading, swing trading, usually, involves at least an overnight hold. But, swing trades, typically, close before trend trades. A swing trader will look at multi-day chart patterns like moving average crossovers that help filter out noise from trends. With a safe risk/reward setup, winning a profit on every trade isn't required. Over time a profit will be generated over many trades (Zucchi, 2022).

2.3 – Simulation Method 2 – News Trading

News trading involves trading based on news releases, both before and after. Trading based on news can be difficult because one needs to assess the release immediately and make a judgement on how to trade based on it (CMC Markets). Whether the news matches market expectations is very important. If news matches market expectations trends will be more likely to continue as they would have. Oftentimes news is already factored into an assets price, so traders need to be able to determine if news is already fully factored or on partially priced in.

One of the benefits to news trading is that you have a well-defined entry and exit strategy based on how the market interprets the news. And there is still variation like buying before a news release. Because of the easy entry strategy and the bountiful amount of news releases on any given day, there are lots of trade opportunities. On the other hand, this method does require some level of knowledge and skill. Like understanding how your position will be affected by an announcement. One must also be able to separate their own view on news releases and view them from a market perspective.

Chapter 3: Company Information and Simulation Plan

In this chapter, I will go over the stocks that we will trade during the simulation. I will outline their histories and detail why I chose them for the trading methods I will use.

3.1 – Tesla (TSLA)

Tesla was founded in 2003 by Martin Eberhard and Marc Tarpenning, something you won't find on the company's webpage. Elon Musk became the largest shareholder in 2004, and later CEO in 2008. Most people probably don't know that Musk's founder title is something that he bought when he took over the company. This is very important for Tesla's success as the company's reputation and Musk's reputation are one and the same. Tesla stock is reliant on the general public's view of Musk as a Tony Stark-like figure, tinkering away toward the future. It isn't solely reliant on Musk's outward appearance; Tesla's other main selling point is its innovation in battery technology.

I thought Tesla was a good candidate for swing and news trading because of Musk's constant media presence and his polarizing image creating volatility in the company's stock. Musk recently getting cold feet during his twitter takeover or his sexual assault allegations are good examples of news stories that likely indicate a drop in Tesla's stock prices. However, other things that I may find off putting could be appealing to the general public. This is a very important distinction one must make when news trading.

Tesla's annual revenue for 2021 was \$53.823 billion, a 70.67% increase from the previous year. More recently, it's revenue for the quarter ending March 31, 2022, was \$18.756 billion, an 80.54% increase year-over-year (Macro Trends). The company's net profit margin for Q1 2022,

ending March 31, 2022, was 13.51% and the average among companies listed in the S&P 500 was just 12.1% (Butters, 2022).

Below is a chart of Tesla's stock price so far for 2022 in Figure 3.1. There was a sharp uptick towards the end of Q1 and then a steady decrease with a few points where profits could have been made.

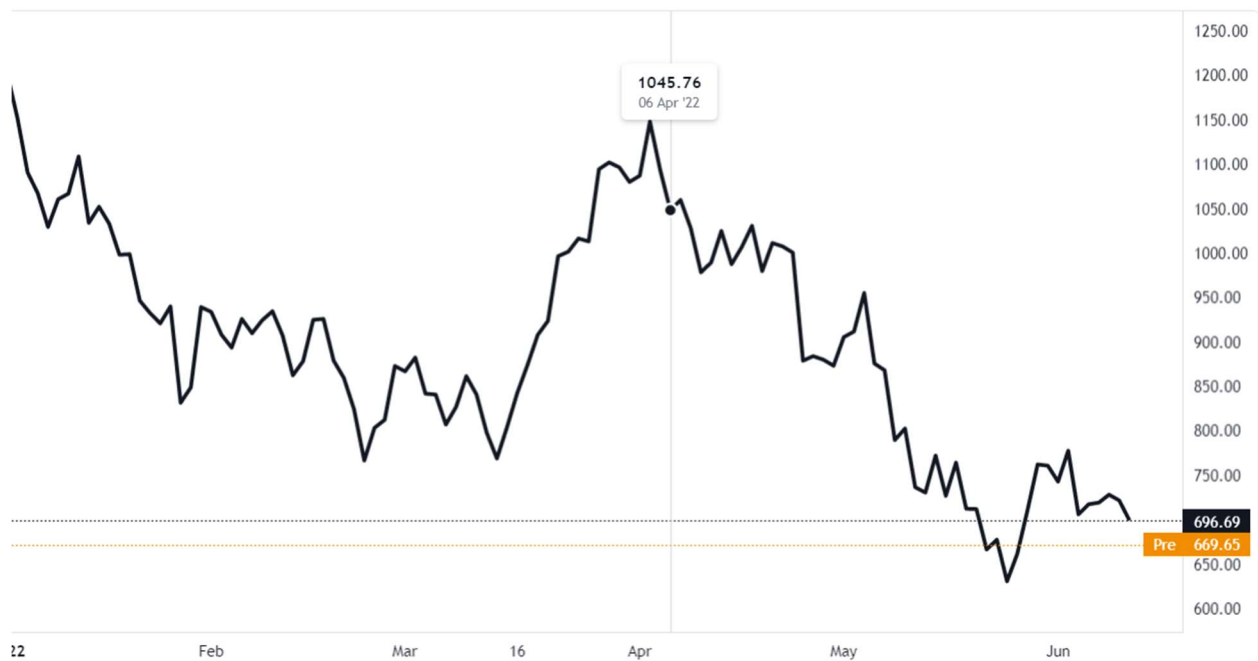


Figure 3.1 Tesla, Inc. Stock Price Chart from tradingview.com

3.2 – Bitcoin (BTC)

Bitcoin was first introduced in 2008 as a decentralized currency without the need for a central bank as an alternative to fiat currency. It's traded via the bitcoin network where transactions are authenticated by nodes and recorded on a blockchain. It was first used in 2009 after it was released as open-source software, when Nakamoto mined the starting block of the blockchain, referred to as the "Genesis Block", containing the first 50 Bitcoins ever. Since then, the currency took off and was worth as much as \$68,000.

Many of the big crashes of the Bitcoin market, and cryptocurrencies in general, came after the People’s Bank of China initiated three separate regulations in 2013, 2017, and 2021. This pattern was a big indicator that the U.S. talks of regulation this year was going to cause another massive downturn in Bitcoin price. Had this project been conducted with better timing the news trading section would have been quite eventful, although not a consistent example (Batey, 2021).

Bitcoin has no real “value” in the sense that there is no product other than its price and the goal of solidifying a decentralized currency. For this reason, trading it feels like gambling. Because of this, bitcoin is very volatile which makes it an interesting candidate for swing trading.

Below is a chart of Bitcoin’s stock price so far for 2022 in Figure 3.2. Throughout Q1 things were relatively stable compared to Bitcoin’s normal behavior. But, in May and now June talks of regulation in the U.S. has caused major drops in price.



Figure 3.2 Bitcoin Stock Price Chart from ycharts.com

3.3 – Simulation Program

Throughout the simulation process I will be using the Investopedia’s stock market simulator. It uses real time data from the stock markets which helps traders and investors get experience and practice without risking their money. Users can make a free account and start trading with a balance of \$100,000. The program also has a summary feature that details your gains

and losses in the “portfolio summary.” This will help give feedback throughout the trading process and maybe indicate sell points. I will use this platform to trade Tesla stock and another to trade Bitcoin because Investopedia doesn’t have the blockchain. To trade Bitcoin, I will be using the Crypto Spaniards simulator which has many of the same features as Investopedia as well as a weekly summary.

Chapter 4: Simulation – Swing Trading

This chapter will contain the details of the stock market simulation using swing trading. I allotted myself \$50,000 to use for both Tesla and Bitcoin.

4.1 – Week 1 (6-27, 7-1)

In the first week of simulation my Tesla stock saw a 1.26% increase resulting in a gain of \$126.82. As for Bitcoin we saw a 1.62% decrease resulting in a loss of \$727.03. Table 4.1 below shows the first trades of the simulation using the swing trading method.

Table 4.1 Initial Trades Using Swing Trading

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
							\$100,000.00	
6/29/22	TLSA	Buy	\$673.34	15	\$10,100.10	\$0	\$89,899.90	\$0
6/29/22	BTC	Buy	\$20,066.14	0.4971	\$9,974.88	\$0	\$79,925.02	\$0
6/29/22	BTC	Buy	\$20,004.59	0.748	\$14,963.43	\$0	\$64,961.59	\$0
6/29/22	BTC	Buy	\$19,575.26	0.5096	\$9,975.55	\$0	\$54,986.04	\$0
6/30/22	BTC	Buy	\$19,102.47	0.5222	\$9,975.31	\$0	\$45,010.73	\$0

My first trade of this simulation was with Tesla stock, shown below in Figure 4.1. Tesla had a 52-week low of \$620.46 and as it was once again dipping below \$700.00, I made a purchase at \$673.34. Ideally, I would like to sell at around the \$690.00-700.00 range, as Tesla stock has

been on a downward trend recently. This would give me the opportunity to reinvest when the price decreases while not holding other stocks.



Figure 4.1 Tesla Stock Price During Week 1 of the Simulation

As for Bitcoin, the hard cap for many investors to get out was \$20,000.00 so I made my initial purchase at \$20,066.14 otherwise this trading simulation wouldn't have involved much trading. Over the course of the first week the price of Bitcoin dipped below the \$20,000 mark so I continued to invest as the price dropped all the way down to \$19,102.47. Bitcoin is interesting for this project because there is no inherent value in the cryptocurrency. One can only predict what other market participants will do with it. Unfortunately, with Bitcoin market being open 24/7 I am not able to always monitor it. As a result, I missed an opportunity to sell when the price jumped all the way up to around \$25,000.00 in the middle of the night and dropped again within a few hours as shown below in Figure 4.2. Ideally, I would have already made a profit on Bitcoin while holding a net positive in Tesla stock. This problem will likely persist throughout the remainder of the simulation, so I will often consider hindsight and talk about what I would have done in scenarios that I miss.



Figure 4.2 Bitcoin Price During Week 1 of the Simulation

4.2 – Week 2 (7-5, 7-8)

At the beginning of week 2, Tesla saw a stark decrease in its stock price that was approaching their 52-week low of \$620.46 so I purchased 10 shares at \$656.84. Later that same day its price shot up to \$688.14. Since Tesla was in a down trend overall, I decided to sell all the stocks purchased in week 1 and week 2. Table 4.2 below shows the actions I made in week 2 of the simulation using swing trading.

Table 4.2 Week 2 Trades Using Swing Trading

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
							\$45,010.73	
7/05/22	TLSA	Buy	\$656.84	5	\$3,284.20	\$0	\$41,726.53	\$0
7/05/22	TSLA	Sell	\$688.14	20	\$13,762.80	\$378.50	\$55,489.33	\$0
7/05/22	BTC	Sell	\$20,254.34	2.23	\$46,000.08	\$1,111.64	\$101,489.41	\$1,489.41
7/06/22	BTC	Buy	\$20,207.85	0.7404	\$14,961.89	\$0	\$86,527.52	\$0
7/07/22	BTC	Buy	\$19,481.21	0.512	\$9,974.38	\$0	\$76,553.14	\$0
7/08/22	BTC	Sell	\$20,421.18	1.2524	\$25,373.32	\$437.05	\$101,926.46	\$1,926.46

As shown below in Figure 4.3, Tesla stock continued to increase after I sold my shares. In a perfect situation I could have improved my profit by a few percentage points, however with how Tesla stock has been performing recently I'm content with making a slightly smaller profit of \$519.40.

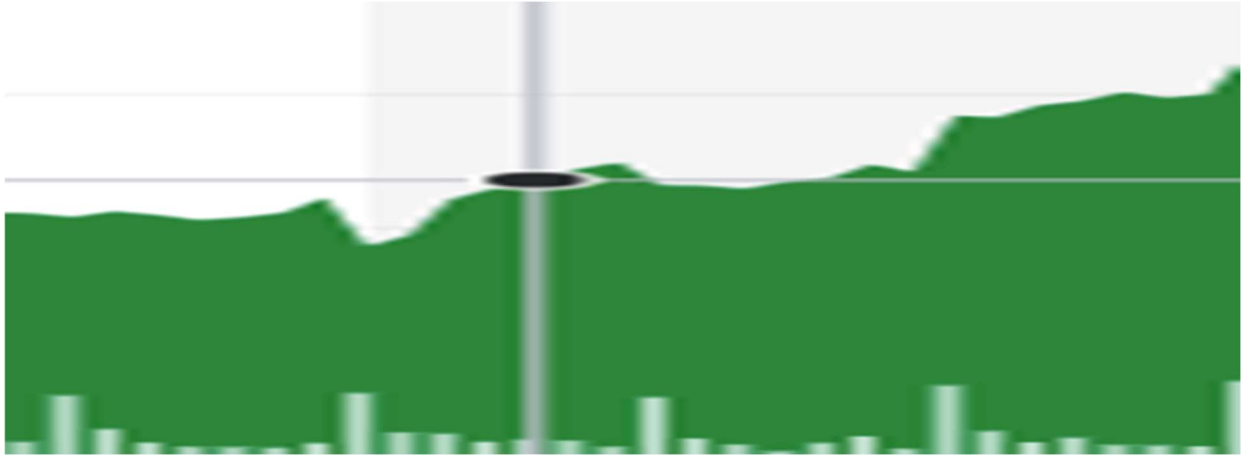


Figure 4.3 Tesla Stock During Week 2 of the Simulation

As for Bitcoin, it was struggling to stay above the \$20,000 mark during week 1 so when it crossed that line by a few percentage points on 7/05 I decided to sell, as shown below in Figure 4.4. This week went incredibly well in terms of when I decided to get in and out of Bitcoin. I managed to sell at two different points to make a total profit of \$1,548.23. Since the general feeling around Bitcoin is currently that it could crash to below \$18,000 at any moment my strategy is to not hold onto any profit for more than a few days.



Figure 4.4 Bitcoin Price After Week 2 of the Simulation

4.3 – Week 3 (7-11, 7-15)

Table 4.3 below shows the trades I made during week 3 of the simulation using swing trading.

Table 4.3 Week 3 Trades Using Swing Trading

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
							\$101,926.46	
7/11/22	TLSA	Buy	\$721.46	5	\$3,607.30	\$0	\$98,319.16	\$0
7/11/22	BTC	Buy	\$20,882.38	0.2388	\$4,986.71	\$0	\$93,332.45	\$0
7/11/22	BTC	Sell	\$22,076.86	0.2388	\$5,271.95	\$285.24	\$98,604.40	\$0
7/12/22	BTC	Buy	\$19,996.88	0.4988	\$9,974.44	\$0	\$88,629.96	\$0
7/13/22	BTC	Buy	\$19,307.81	0.2583	\$4,987.21	\$0	\$83,642.75	\$0
7/14/22	BTC	Sell	\$19,854.04	0.2583	\$5,128.30	\$141.09	\$88,771.05	\$0
7/14/22	BTC	Sell	\$20,136.51	0.4988	\$10,044.09	\$69.65	\$98,815.15	\$0
7/15/22	TSLA	Sell	\$745.82	5	\$3,729.10	\$121.80	\$102,544.25	\$2,544.25
7/15/22	BCT	Buy	\$20,973.01	0.2378	\$4,987.38	\$0	\$97,556.87	\$0
7/16/22	BTC	Sell	\$22,165.16	0.2378	\$5,270.86	\$283.50	\$102,827.73	\$2,827.73

On Monday, July 11th Tesla saw a stark decrease in their stock price after a few good days toward the end of the previous week. I used this opportunity to purchase 5 shares at \$721.46 and

ended up holding them for the entire week. I missed two brief windows during the week to purchase more shares on Wednesday and Thursday morning when Tesla stock dipped to \$676.74 and \$691.63 respectively shown below in Figure 4.5. My hope is that Tesla stock will increase at the beginning of the week so I can sell my shares. If not, I will continue holding or buy more if the price drops.



Figure 4.5 Tesla Stock During Week 3 of the Simulation

I was much more active with Bitcoin this week, as you can see, I bought in at four different points and sold at three. As shown below in Figure 4.6, Bitcoin slowly climbed out of the \$19,000 mark all the way up to \$21,500. However, I still managed to buy in at times that allowed for me to make a net gain. The first two trades are not depicted on the graph; however, Bitcoin jumped over 5% on Monday, and as I don't trust the stability of the cryptocurrency, I decided to get out with what profit I had made that day. This turned out to be the right call as its price dropped below \$20,000 by Wednesday.



Figure 4.6 Bitcoin Price During Week 3 of Simulation

I bought back in once the price dropped below \$20,000, since it frequently bounces back from that point. But instead, its price continued towards \$19,000 so I bought more at \$19,307.81. Soon after the price began to rise again and instead of selling both at the same price, I decided to make a smaller profit on my second trade so that I could at least come out with something if the price were to tank again. But luckily, after selling some of my Bitcoin the price continued to rise, and I made a profit on both trades. In hindsight I could've made more profit if I held out, but I know things won't always go as I expect them to in the markets.

4.4 – Week 4 (7-18, 7-22)

During the final week of the simulation using swing trading, I didn't make any trades. This section will include my final earnings for the simulation as well as my reasoning for staying out of the market this week.

The total profit I made from trading Tesla using swing trading was \$500.30. Below in Figure 4.6 is Tesla's stock price during week 4.



Figure 4.7 Tesla's Stock Price During Week 4 of the Simulation

During the beginning of the week Tesla was at its recent peak in stock price. I had already sold at the same price at the end of the previous week, so I had no plans of buying back in at the same price. As the price remained stable for the first few days, I continued to wait. But on Thursday, the price jumped up past \$800.00. At this point I knew there would not be enough time in the rest of the week to make a profit, so I kept the profits I had already made.

The total profit I made from trading Bitcoin with swing trading was \$2,327.43. Below in Figure 4.7 is Bitcoin's price during the fourth week of simulating.

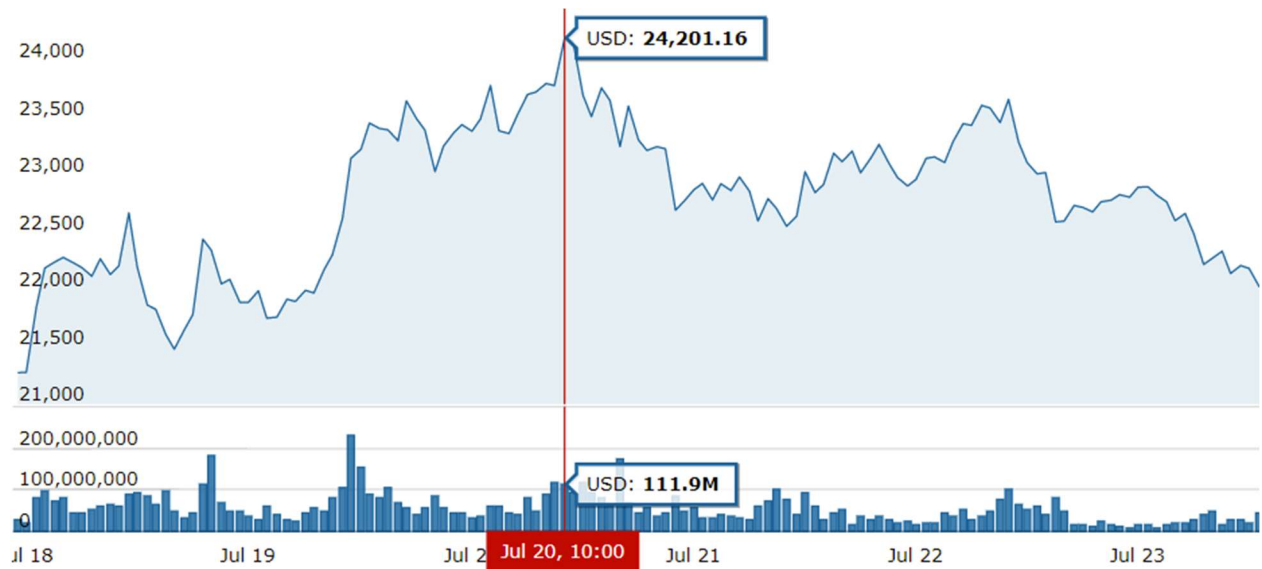


Figure 4.8 Bitcoin Price During Week 4 of the Simulation

Bitcoin soared up to \$24,000 by the middle of the week. This was the highest it had been in the past two months. This was reason enough for me to sit this week out and see if the trend would establish itself. As you can see in Figure 4.7 the price of Bitcoin continued to fall after peaking at just over \$24,000. Had this simulation gone on for another week I probably would've bought Bitcoin at the \$22,000 mark.

Chapter 5: Simulation - News Trading

This chapter will contain the details of the stock market simulation using news trading. I allotted myself \$50,000 to use for both Tesla and Bitcoin.

5.1 – Week 1 (6-27, 7-1)

Both Tesla and Bitcoin are in similar boats with their controversies constantly coming in and out of the news cycle. With my research of the two, I decided not to make any purchases this week. The likelihood that both stocks could drop in price considerably was too high, but this also leaves opportunities in later weeks to make much cheaper purchases.

Tesla had a wide variety of negative coverage this past week ranging from lawsuits alleging racial abuse to their own poor performance and the success of competitors like Ford. Fifteen current and former black employees at Tesla filed a lawsuit against the company this past Thursday (Reuters, 2022). The allegations ranged from general racist comments to racist practices adopted by the company in their hiring and promotion processes. While this does reflect negatively on Tesla and indicates a dip in stock price, it wasn't trending too hard in the news cycle, so it wasn't the only thing I based my decision on. A COVID-related shutdown in Shanghai has hindered Tesla's supply chain (Jin, 2022). In addition, their Texas and Berlin factories have seen a slow output growth. Several analysts predict Tesla to report deliveries in the 250,000-range compared to previous record highs of 310,048 the preceding quarter (Jin, 2022). Many analysts are predicting Ford to take over the electric vehicle market in the coming years.

As for Bitcoin, recent talks of forming regulation around cryptocurrencies has scared some investors. Many have set \$20,000 as their dropout point to avoid further capital loss. Meaning that dipping below that point could result in an even steeper drop off for Bitcoin. Some analysts predict

the cryptocurrency to fall as low as \$16,000 and one warns that it will fall to \$13,000 by the end of the year (Browne, 2022). Such a large percent decrease is too much of a risk to start investing now when we are already sitting at the \$20,000 barrier.

It's interesting to compare the types of news that circulate around these two very different entities. With Tesla you have a company that provides a product, or many products. We have stories releasing about the poor treatment of black employees and lackluster results from their factories. While with Bitcoin the type of news one can find is almost entirely revolving around the speculation that investors are going to buy or sell. But, recently with the news of regulation and government involvement there is more to go off.

Based on my research this past week if the price of either stock decreases, I will likely buy into it for the sake of the project. If this was a longer-term engagement I would likely wait more, but in a 4-week simulation there isn't too much time to make profit based on the news.

5.2 – Week 2 (7-5, 7-8)

Table 5.1 below shows the trades I made during week 2 of the simulation using news trading.

Table 5.1 Week 2 Trades Using News Trading

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
							\$100,000.00	
7/05/22	BTC	Buy	\$20,207.85	0.4936	\$9,974.59	\$0	\$90,025.41	\$0
7/06/22	BTC	Buy	\$19,481.21	0.512	\$9,974.38	\$0	\$80,051.03	\$0
7/07/22	BTC	Sell	\$20,421.18	1.0056	\$20,535.54	\$586.57	\$100,586.57	\$586.57
7/05/22	TSLA	Buy	\$656.84	5	\$3,284.20	\$0	\$97,302.37	\$0
7/05/22	TSLA	Sell	\$688.14	5	\$3,440.70	\$156.50	\$100,743.07	\$743.07

On July 5th, Tesla reported having record deliveries from their Shanghai factories following the previous difficulties they had due to COVID-related shutdowns (Lambert, 22). This piece of news indicated to me that Tesla stock would increase, so I immediately purchased 5 shares. Although, because of Tesla's recent under performance compared to other electric vehicle manufacturers like Ford, I sold my shares within the same day as they saw a decent increase up to \$688.14. See Figure 5.1 below for Tesla's stock price during this week.

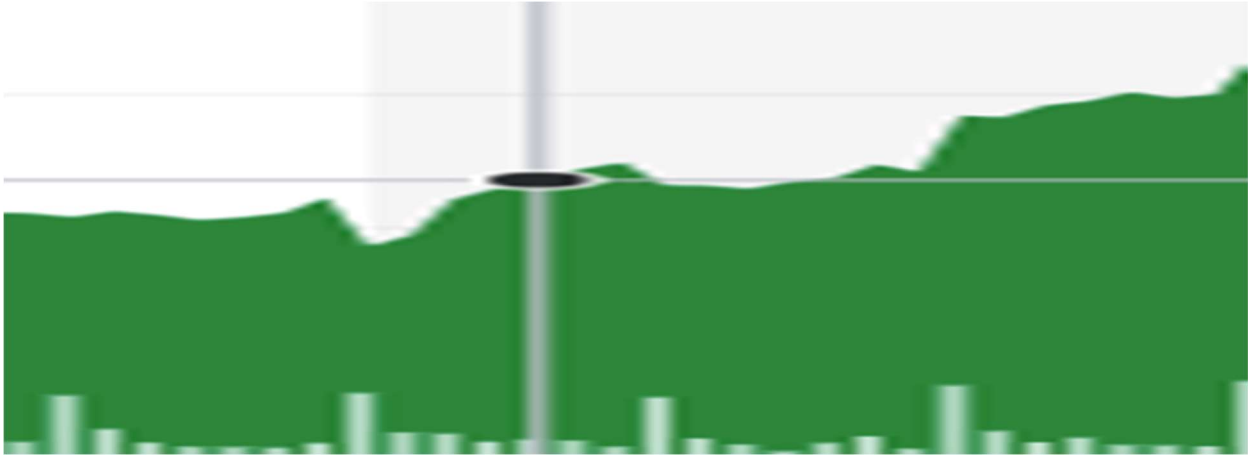


Figure 5.1 Tesla Stock During Week 2 of the Simulation

In the case of Bitcoin, analysts reported that the cryptocurrency could increase to \$30,000 by the end of the year. Although, many other analysts had a negative outlook on Bitcoin's chances I don't have until the end of the year for this simulation, so I decided to make a purchase at the \$20,207.85 mark. Because these predictions may cause others to get in now in hopes for it to increase by the end of the year, giving me an opportunity to get out before the price drops again. However, the price dropped before raising so I bought more Bitcoin at \$19,481.21 and thankfully the price rose to \$20,421.18 on Thursday so I sold my remaining Bitcoin for a profit of \$586.57. See figure 5.2 below for Bitcoin's price during this week's simulation.



Figure 5.2 Bitcoin Price During Week 2 of the Simulation

5.3 – Week 3 (7-11, 7-15)

This week, Tesla stock dropping in price after a good report from its factories in Shanghai wasn't surprising as the company has had difficulty with stability recently. However, since it was following good news, I decided to buy in at \$721.46, expecting others to be waiting for a similar opportunity to purchase shares. Table 5.2 below shows the trades I made during week 3 of the simulation using news trading.

Table 5.2 Week 3 Trades Using News Trading

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
							\$100,743.07	
7/11/22	BTC	Buy	\$21,649.53	0.2304	\$4,988.05	\$0	\$95,755.02	\$0
7/11/22	Tesla	Buy	\$721.46	5	\$3,607.30	\$0	\$92,147.72	\$0
7/11/22	BTC	Sell	\$22,076.86	0.2304	\$5,086.51	\$98.46	\$97,234.23	\$0
7/12/22	BTC	Buy	\$20,855.13	0.2391	\$4,986.46	\$0	\$92,247.77	\$0
7/15/22	BTC	Sell	\$20,999.00	0.2391	\$5,020.86	\$34.40	\$97,268.63	\$0
7/15/22	TSLA	Sell	\$745.82	5	\$3,729.10	\$121.80	\$100,997.73	\$997.73

As shown below in Figure 5.3, there weren't many opportunities to sell as the price was fairly stable throughout the week, barring two drops on Wednesday and Thursday morning.



Figure 5.3 Tesla Stock During Week 3 of the Simulation

News relating to Bitcoin is interesting because most of it is just the opinions of market analysts and how the cryptocurrency has been recently behaving. I have to predict how other market participants will behave based on the opinions of professionals. While there are many differing opinions among analysts on Bitcoin, some are predicting that the coin could skyrocket back up to the \$30,000 range by the end of the year. I don't personally have faith that this will happen, and I wouldn't invest or trade in Bitcoin if I were to use my own money. But I thought that this would lead to many people buying in now, giving me the opportunity to turn a small, yet quick, profit. Which is exactly what happened as I purchased bitcoin at \$21,649.53 and sold within the same day at \$22,076.86. As shown below in Figure 5.4, during the remainder of week, Bitcoin dropped back down to \$19,000 and then started to climb back to \$21,000.



Figure 5.4 Bitcoin Price During Week 3 of the Simulation

As you can see there were a few points during this week where I could've turned a profit within the same day. However, I only did this one more time on July 12th through the 14th, as I wasn't completely confident in Bitcoin's ability to stay above \$20,000. I will try to use similar patterns in the final week of simulation.

5.4 – Week 4 (7-18, 7-22)

Much like my final week of simulation with swing trading, I decided based on the news that staying out of both Tesla and Bitcoin was for the best. Unlike previous week I will go over them both together as the news is one in the same.

As for total profits throughout the simulation, I made \$278.30 with Tesla and \$719.43 with Bitcoin. I consider this timing a stroke of luck because this is a very interesting interaction to take place during my simulation. Tesla sold three quarters of their Bitcoin holdings which totaled \$2 billion. This occurred around the same time as Bitcoin began falling from its peak of \$24,000. See Figure 5.5 below for Bitcoin's price during this week of the simulation.

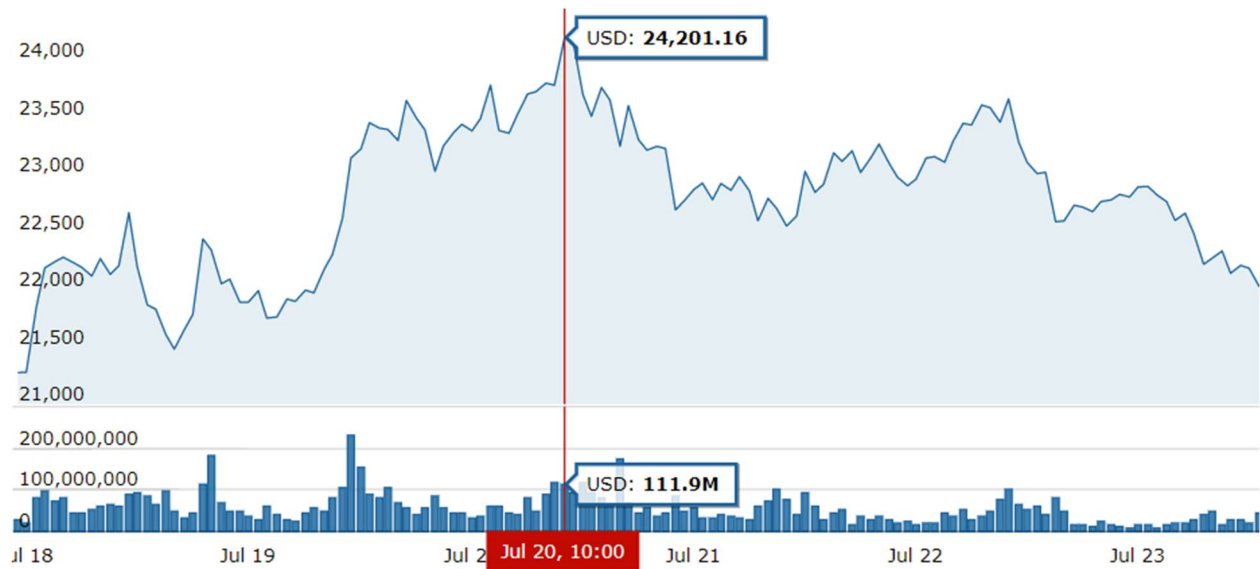


Figure 5.5 Bitcoin Price During Week 4 of the Simulation

Typically, I would have seen this as good news for Tesla and bought its stock as its Bitcoin holdings were a risk for many investors. But this was going on at the same time as Tesla's CEO Elon Musk was on trial for backing out of his deal to purchase Twitter. See Figure 5.6 below for Tesla's Stock price during week four of the simulation.



Figure 5.6 Tesla Stock Price During Week 4 of the Simulation

Seeing as the price of Tesla jumped to a recent high of almost \$850.00, I should've stuck with my initial instinct. Especially since there hasn't been a negative verdict for Musk yet, the trial wouldn't have had as much of an impact on Tesla's stock price. Even with hindsight I believe the choice I made was the safest bet because Tesla is still one of the most volatile companies in the market when Musk is making waves.

Chapter 6: Analysis and Comparison

Over the course of a four-week simulation, I tested two different trading methods to compare them. I ended up making a profit with both swing trading and news trading. In this chapter, I will compare their strengths and weaknesses while considering each of the companies that were traded. Throughout the simulation Tesla stock was around the \$650-750 range while Bitcoin hovered around \$19,000-21,000, so I had to buy more Tesla stock in each trade to attain similar profits. The average return on investment (ROI) was quite similar for each method, as I had a 3.34% ROI for swing trading and a 3.11% ROI for news trading. However, the final cash in each portfolio resulted in \$102,827.73 and \$100,997.73 for swing trading and news trading respectively.

Figure 6.1 compares the profits made during each week with swing trading and news trading. Some of the weeks will have no profit because either a stock was sold on the following week, or no trades were made during the week.

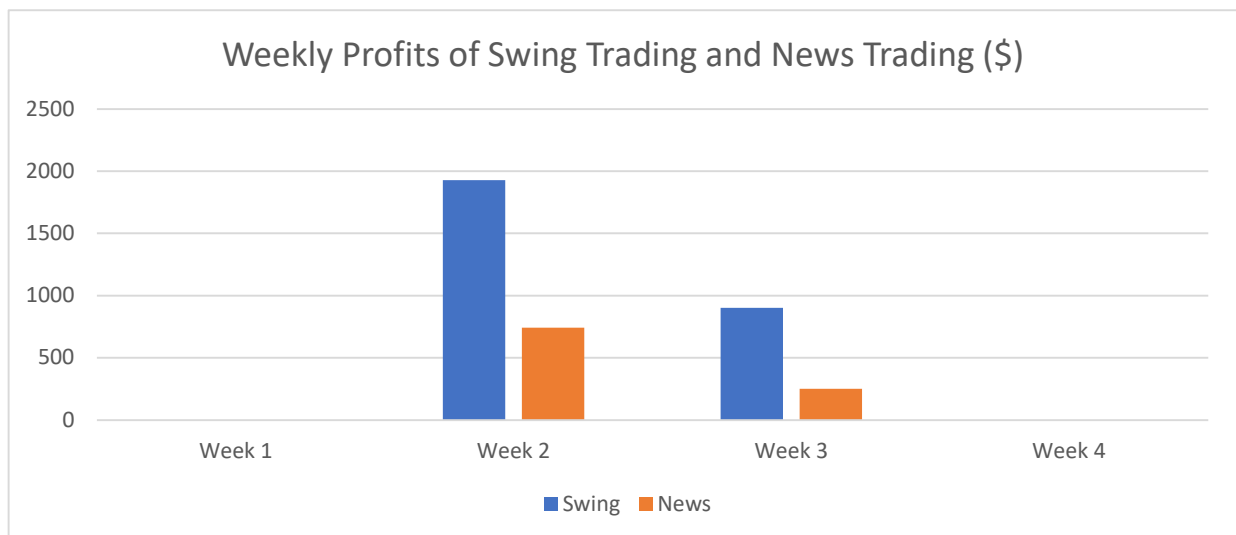


Figure 6.1 Weekly Profits of Swing Trading and News Trading Chart

Weeks two and three were the only weeks in which a profit was made. Most of the profit for both trading methods came from week two. Both swing and news trading saw around a 60% and 70% decrease in profit respectively in the following week. Swing trading's large profit margin in week two can partially be attributed to the fact that some of the stocks were bought during week one. However, swing trading was clearly more profitable during the span of this simulation.

If we were to look at a different metric like the total cash at the end of each week in Figure 6.2, we get an entirely different picture.

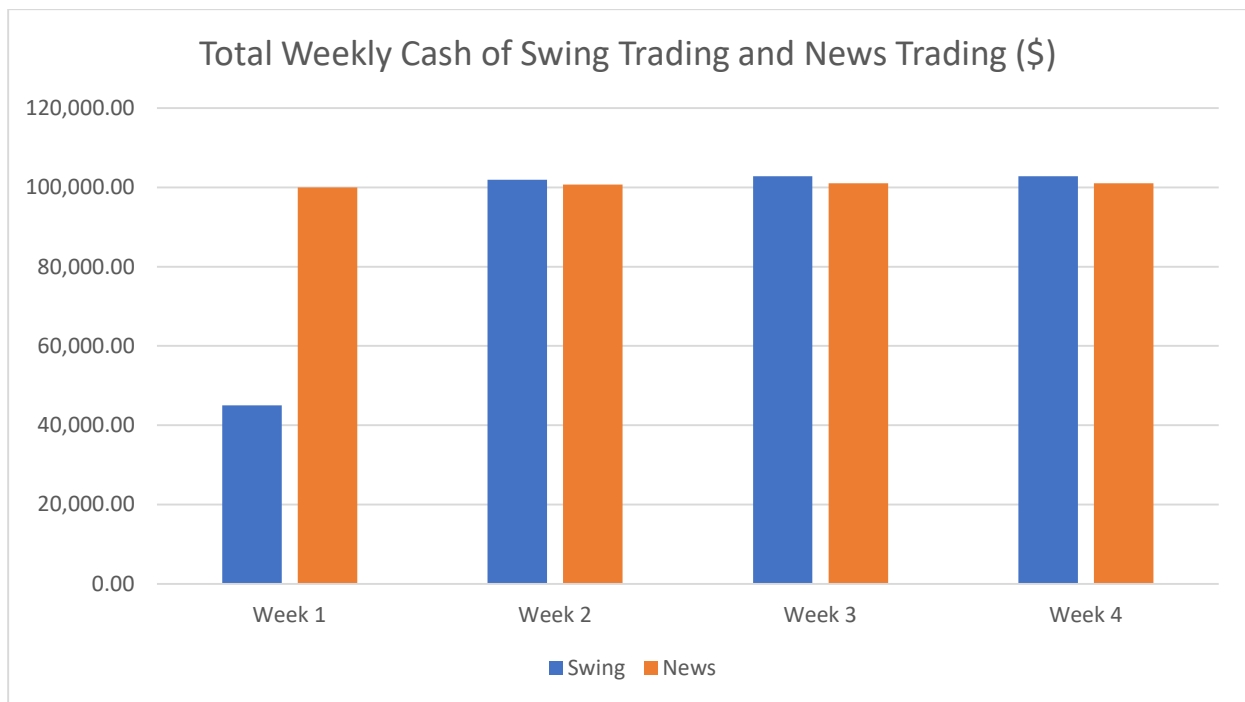


Figure 6.2 Total Weekly Cash of Swing Trading and News Trading Chart

The initial deficit in swing trading's funds is simply because the trades were held over into the following week. Immediately, you could assume that news trading is more consistent and less risky than swing trading. While this could be true depending on the company and one's own proficiency at news trading, during this simulation swing trading ended with over 100% more profit than news trading. This is hard to see in Figure 6.2 because of the large starting balance and short time to make profit.

Next, I want to compare the weekly profits of the two companies I traded with. Figure 6.3 clearly shows that Bitcoin brought in more total profit than Tesla. This is in part due to the fact that more trades were made with Bitcoin because of the market state. Since many investors saw \$19,000 as their floor to get out of Bitcoin, the currency bounced back and forth between \$21,000 and the target \$19,000. This relationship created a Bollinger band and is how I made predictions on when to buy and sell Bitcoin. The more concrete structure allowed me to trade more frequently with Bitcoin allowing it to make well over double my profit with Tesla.

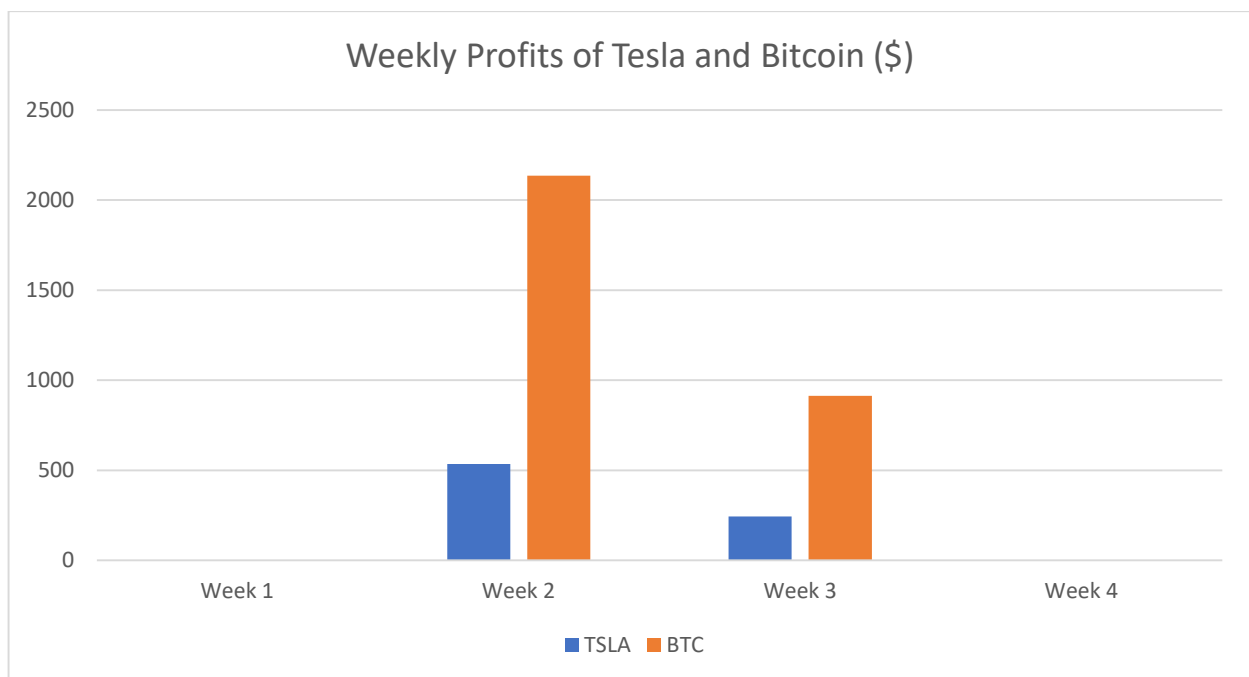


Figure 6.3 Weekly Profits of Tesla and Bitcoin Chart

A similar relationship existed between the two methods of trading. Swing trading was personally easier to grasp and use to predict market behavior compared to interpreting how the news would influence stock price.

Chapter 7: Conclusion

Based on this four-week simulation, swing trading is more effective than news trading. However, I think that news trading requires more skill and practice to become proficient in, so given more time to study and trade it could have performed better. Regardless, both techniques ended up making profit, so I am happy with the result of this project.

Coming into this project I knew next to nothing about the stock market and even less about trading. Now that I have completed this project, I can confidently say that I fulfilled my goal of learning about the stock market and its behavior. While this is only a start, I will be able to continue building off the knowledge I gained and keep learning.

Overall, this was a very beneficial experience for me, and I think it will prove invaluable to me throughout my career. While I don't plan on active trading with my own income, I will be able to apply what I have learned to longer term investments.

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