Stock Market Simulation

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By

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Abstract

The goal of this Interactive Qualifying Project is to gain experiences in the stock market investment by researching stocks, building a portfolio, trading stocks, and making profits. This five-week simulation used the real-world market to practice investing, buying, selling, and analyzing trends. Two trading strategies were tested: swing trading and position trading. Two simulations started with $100,000 cash and the same portfolio made up of five companies. The returns of investment from the swing trading and the position trading strategies were 9.4% and 14.8%. The results from the simulations showed that the position trading yielded more profit. The strategies returned different results due to the differences in strategies, analyzing trends, and technical analysis. This project provided real-world experience for the stock market, investing, and analyzing trends.

Table of Contents

List of Figures

List of Tables

1 Introduction

1.1 Historical Overview of Technical Analysis

Trading markets have existed for centuries. The first record of its existence was of notes and checks between bankers in Babylon 2000 BC [1]. These markets progressed into the second century to currency exchange, commodities, and mercantile voyages in Ostia, a seaport of Rome. Then the market expanded in the Middle Ages to trade wheat, beans, oats, and barley in England. Through the early years, markets existed in most towns and cities as early as the twelfth century. Little record can be found of the development of ideas, analyses, and rules, but historians were still able to piece together the history of early developments in analyzing the stock market.

Exchanges were developed later during the fourteenth century in Mediterranean cities and state loan stocks were invented, became accepted, and traded [1]. With these stocks becoming more commonplace, traders began to record prices mentally to predict future price movements with their memories. This thought process was the first form of technical analysis; a method widely used today to make educational decisions in the stock market. Trading rules also became developed, and the first place recorded to use them is Japan during the 1700s [1]. This trading rule analyzed three days of past rice prices to predict the price of rice on the fourth day. Historians believed this methodology was not the first introduced in Japan, but the first place to have kept record of it.

Modern technical analysis is defined to have started in the 1880s with Charles Dow; the man who introduced stock indexes to measure the performance of the stock market to advance the sophistication of stock market participants. The first index included 12 railways and 2 industrial stocks; the index centered around the railroad industry due to its high importance within the

economy in the 1880s. A well-known index, the Dow Jones Industrial Average (DIJA), first appeared in 1896 with 12 stocks and expanded to 30 stocks by 1928 [1]. The practice of including 30 stocks in an index continues today. Dow's studies and analysis became known as the Dow Theory, the foundation for modern technical analysis.

The market began to expand as well as the analyses on market patterns and characteristics. Analysts "...also notice[d] that market dynamics are complicated and influenced by people and their own way of looking at investments...and their own emotions" which added another layer, a non-technical layer, to patterns within the stock market [1].

The development and use of technical analysis is important because it can protect an investor from large losses in stocks. With the development of computers, investors can further protect themselves by being able to compute every possible calculation for a greater analysis. Even with the power of technology, however, the perfect formula does not exist to predict the market. This is due to "...people trading and investing in an imperfect, emotionally charged world" as mentioned above [1]. Stock market studies have expanded beyond the scope of computational analysis to account for psychological patterns to inform trading behavior.

1.2 Key Topics of the Stock Market

Understanding the historical progression of technical analysis provides context before trading in the stock market. Along with the background, defining key trading terms is important to interpreting what daily articles, reports, and the market is conveying.

1.2.1 Trends

Markets include near intermediate, and long-term trends. The rules have been formed over the years to assist with interpretation and observation of the market to make informed decisions. These

decisions can be tested and experimented with to see results because interpretations do not guarantee quantifiable success. Identifying trends in a subjective decision improves through practice and patience while keeping emotions detached. Including emotions can be costly; "The most expensive education in the world is likely the money lost in incorrect, sloppy, and undisciplined decisions" [1]. This idea will be explored more in 1.2.2 Human Bias.

Charles Dow was the first modern technician to write that stock market prices tend to trade in trends. Observing this idea created a foundation for studying the market to understand it better. Short-term trends reverse before medium-term trends and medium-term trends reverse before long-term trends. Any trend is influenced by its next larger and next smaller trend. A trend is not a straight line, it is a direction the line moves in for an undetermined amount of time; However long it decides to continue moving up or down. If the peaks tend to be higher than the earlier peaks, and the troughs tend to be higher than the previous troughs, the trend must be upward. If the opposite occurs, the trend must be downward. If they are scattered the trend is undeterminable. Using these rules can tell a lot about a stock just by a quick glance.

Trending then occurs when prices travel in a trend. They head in one direction, and it signals an imbalance of demand and supply. In every transaction, there are an equal number of shares transacted which means there is always a temporary equilibrium between buyers and sellers at that instant in time. Prices are constantly changing, however, but they are constantly moving to a theoretical equilibrium.

1.2.2 Short term Patterns

Overall, patterns are used to confirm a longer trend is in control or warn that a trend is changing. They are used as a tool to identify reversals in long-term trends. However, short-term trends analyze the market in a different way.

Short-term does not refer to a length of time but the number of bars included in the snippet of trading data being analyzed. They happen frequently whereas long-term patterns do not occur as much. The frequency in which the short-term patterns occur can give false signals to analyzers, however. There has been debate on whether these patterns provide any insight at all, but when fully understood, they can be used for daily trading, or most useful, for entering and exiting longer-term positions at advantageous prices.

A method to use when looking for short-term patterns is to be able to locate sudden movements in the stock. The first sign is to identify a setup. "A setup occurs when certain known factors needed to establish the pattern have occurred, and the trader is waiting for the action signal to occur" or form [1]. If the pattern does not form correctly, then the trader must abandon the signal and wait for another one in the upcoming data. Short-term patterns are used to determine when upward or downward momentum is slowing and can signal more precisely when to act and what risks can exist once the momentum slows down.

There are multiple patterns that analysts have identified over the years that help traders recognize a pattern, understand it, and know what action needs to be taken given the data that occurs. Some patterns include Gaps, Knockout, Oops!, Horn, and Island Reversal to just name a few [1]. Each of these patterns also have variations as well. It is a good skill to learn in order to analyze the market in a different way.

1.2.3 Human Bias

Investors can be their own worst enemies when it comes to making logical trading decisions in the stock market. Their brains can make actions that make complete emotional sense but lack logical sense [1]. It is common knowledge that no one can fully predict the market, but investors still turn to people and hang on to their every word. Most people also know how to buy low and sell high, but more often than not, they buy high and sell low. Human bias can lead to illogical actions based upon their desires, stresses, and opinions that become cumbersome to ignore.

People tend to conform to a group of people and take on a group mentality. Being engulfed in this atmosphere makes it extremely difficult to trade without having a bias. People tend to feel secure when others share the same opinion and will cower if they feel compelled to express their own.

Being able to recognize human bias can help technical analysts understand how emotions and investment behavior contribute to market extremes. It also assists them in acknowledging how they can have the same biases and must constantly fight against them. Technical analysts want to profit from understanding how human bias affects people from making logical financial decisions, but the analysts are subject to the same illogical decisions and have to prevent themselves from falling in the same trap.

1.3 Notable Stock Market Crashes

Historical information about the development of technical analysis and resources on specific vocabulary for the stock market provides a good foundation prior to starting a trading

simulation. It is also essential to learn about the history of the stock market crashing in the United States to see how the market evolved through the years.

The first U.S. stock market crash was in 1791 within the 13 colonies; Each time a crash occurred in the world, or more specifically the United States, the economy learned from it to prevent another one from happening. Each crash exposed a flaw in the financial market. The Panic of 1907 developed The Federal Reserve and central bank, and The Black Monday crash proved the worth of both, the Housing Crash of 2008 shed light on the importance of a stable credit history, and the Coronavirus Crash of 2020 caused historical market declines in various sectors. Exploring the historical events can help analysts learn about the market behavior in the present and how to prevent future crashes from occurring.

1.3.1 Panic of 1907

The country was vastly different than today, 2022, leading up to the panic of 1907. A sententious Republican, Theodore Roosevelt, was in the White House. Society was changing with a record high volume of immigrants entering the country. New technology was being introduced, Wall Street advisors were busy creating mergers and acquisitions, and the media created a negative attitude among the public towards business leaders [2]. The postwar economic expansion, lasting about 50 years, caused the government to be too involved in individuals' lives. The understanding of the world in the early 1900s provides context to the financial crisis of the early twentieth century that led to The Panic of 1907.

Investors were still learning about the market every day. The technology for prediction and communication was not instantaneous. Market crashes were attributed to bubbles in asset prices. Where these were corrected; it would send waves of panic through the country's credit system [3].

Bankers would realize pledged collateral impaired the trustworthiness of their loans and they were forced to call in their credits. Borrowers became to declare bankruptcy due to the inability to repay debts because of the asset price decline. The general public became worrisome of their funds in the bank and would run to withdrawal their money, enforcing a downward spiral. The progression of this sent a panic that created a "run on the banks" situation.

The panic of 1907 highlighted the issues from the National Banking Act of 1864; the most prominent one being that the act did not cover all banks. The panic was caused by a "...build-up of excessive speculative investment driven by loose monetary policy" and lasted for three weeks [4]. This short-lived event called attention to a lacking central bank in the United States. Financial markets had to be bailed out by personal money from J.P. Morgan and John D. Rockefeller. This was to prevent the closing of the New York Stock Exchange (NYSE) that dropped about 50% from the previous year. Plans developed to impose more government insight and public responsibility to bail on financial markets. This led to the creation of the Federal Reserve system within a few years.

1.3.2 Black Monday Crash of 1987

Black Monday marked the first contemporary global financial crisis. This crash included a chain reaction of market stressors which caused the global stock exchanges to plummet within a matter of hours. Most notable was the Dow Jones Industrial Average (DIJA), it dropped 22.6% in a single trade; this loss made history as the largest one-day stock market decline [5].

This event confirmed the role of the central bank in the country due to The Federal Reserve supporting the economic and financial system by providing a source of liquidity. Some experts now say that the positive response from The Federal Reserve promoted a new wave of investor

confidence in the central bank's ability to nullify severe market downturns. Since Black Monday was not followed by an extreme economic recession as in previous years. The stock markets quickly recovered, and the DIJA gained back 57% in two trading sessions [6]. Within two years, the markets were able to surpass their pre-crash peaks. This caused financial leaders to not think about the repercussions of their decisions or the financial freedom they began to offer.

1.3.3 Housing Crash of 2008

The global economy collapsed to the same equivalency to the banking system during the Great Depression during the Housing crash of 2008. The origins of the crash began in 1999 due to an unexpected growth of the subprime mortgage market. The Federal National Mortgage Association wanted to make home ownership more accessible to people with a sub-par financial history. Home loans became available to people who had low credit scores which meant there were higher risks of not paying back their loans; these people were called subprime borrowers. Nine years later, the vast majority of borrowers were defaulting to subprime mortgages -$3 trillion worth of mortgage credit - which caused issues in the financial system leading to a collapse in the stock market and starting a global Great Recession [7].

1.3.4 The Coronavirus Crash of 2020

The coronavirus (COVID-19) crash of 2020 caused the stock market to fall dramatically based on the country and some areas of the world to fully shut down. The COVID-19 pandemic caused panic due to its high transmittable rate, the deathly side effects, and the mandated isolation due to the former reasons. Since churches, schools, and businesses shut down for months at a time, the stock market rapidly declined across all sections.

The first month of the crisis where historically large declines took place. All media was negative early on, and uncertainty surrounded the topic. Governments began to get involved and released stimulus packages to help the business market regain some loss. The money helped businesses stay afloat, but nothing positive happened to the majority. Due to the pandemic's health-focused fears, however, pharmaceutical and biotechnology companies regained their market losses in just three months [8]. Other industries that remained closed due to the pandemic remained notably low and remained that way until vaccines started to become widespread about a year later. The market slowly rose again, but new strands of the vaccine began to appear, and businesses had to shut down again. The market went through, and is continuing to go throw, a roller coaster of trends.

1.4 Overview of the Current State of the Stock Market

The current stock market as of June 17, 2022, is still feeling the effects of the COVID-19 pandemic in some areas. Currently, inflation is high due to politics and international relations involving oil and food products due to supply chain bottlenecks. The Federal Reserve System is being pressured to accelerate the 'rate-hiking' campaign and is at risk of inducing a recession. The market is currently low. For investors, it could be a good time to buy since it is good to buy when the market is down, but the uncertainty of the market makes it risky since it could continue to go lower. Inflation will be a factor when purchasing in the market for months to come [9].

1.5 Project Goals and Plan

The goal of this project is to choose two types of trading methods and analyze which one made more profit at the end of a 5-week simulation period. The starting amount of money will be $50,000 for each method. I will be choosing 5 stocks to invest the money into and decide how passive or

aggressive I want to trade over this timespan. The data will be recorded every week with analysis on both trading strategies.

I will be starting week one with the two different strategies informing my decision as well as articles from Investopedia to keep me up to date on events happening that will affect the market. I will note my thinking process and how the strategy, political events, and my human bias (I will try to prevent it the best I can) motivated each decision I will make.

2 Methodology

2.1 Stock Market Simulation Plan

For both simulations, I will be putting $20,000 into each of the 5 stocks totaling about $200,000 for both simulations. Each simulation will have the same stocks but a different strategy when I choose to trade or sell. For choosing which stocks to invest in, I will refer to the Fortune 500 companies. I will conduct a small amount of research to see which companies in July and August are projected to have the most percent increase from now (June) until then.

2.2 Trading Strategies

Trading strategies are used to inform decisions when looking at trends in the stock market. Even though it has been established that the market is not 100% predictable, mathematic analysis has seen patterns develop overtime that brokers use to make a conscious choice on where they are investing money.

2.2.1 Swing Trading

Swing trading occurs over a period of a few days to several weeks. Its purpose is to capture profit from predicting an increase in cost from the stock. Swing traders mostly use technical analysis to inform their decisions, but they may also use fundamental analysis to analyze price trends and patterns to look for trading opportunities.

The primary goal is to make profit in a short period of time from an anticipated price move. The main risk with this method is the overnight and weekend gapping [10]. Each day the market opens, it could have dramatically changed from the trading period the day(s) before. However, it requires less time to trade than day trading, well-informed decisions can be made by just using technical analysis, and it maximizes short-term market potential.

Some tactics include looking for multi-day patterns using charts like flags, triangles, candlesticks, and moving average crossovers. It is also important to keep in mind the risk and reward ratio. Risk is always taken, but some decisions should not be made if the reward does not compensate the risk.

2.2.2 Position Trading

Position trading is meant to be a longer-term strategy. Since the simulation will only be for five-weeks, the true potential of position trading will not be seen, but there will still be a notable difference between swing trading and this strategy.

Position traders tend to use both technical and fundamental analysis to inform their decisions. Since their investment will be for a longer period, and last for multiple years, other factors are considered like market trends and historical patterns. It is important to be able to identify the correct enter and exit points.

Position trading strategy is closely similar to traditional investment. Money is put into one stock, accumulates profit, grows, and gets pulled out after years of waiting weeks, months, or years [11]. It is smart to invest in a stable company that will continue to grow in years to come. Newer companies can be at risk due to minimal stability and unpredictable patterns. These companies can also turn into a high reward since they are newer and growing at a more rapid rate, but it is up to interpretation and analysis.

2.3 Data Analysis Method

Since these two strategies are different from each other, I will pick the same five stocks for both simulations to use as the control variable. I will analyze my thought process, what information I used to inform my decisions, and the weekly profit or loss each week.

2.4 Selection of Stocks

I will select my stocks from companies in the S&P 500. The stocks that are a part of this index are 500 large companies listed on exchanges in the United States. I am choosing to pick these companies because they are well-known which means there is up-to-date news on how the company is doing, they could be involved in political matters (which keeps things interesting), and they have enough past data to analyze trends and patterns.

Right now, the overall stock market has taken a downturn due to the high interest rates, increasing real-estate, and everyday commodities increasing their prices. Looking at the downturn with a wider lens, the monetary policy change by the Federal Reserve and the economic fallout from Russian's invasion of Ukraine has had investors anxious. These are all reasons why the stocks I have chosen are starting low and have a lot of potential for growth during this uncertain time period.

Another country event that just occurred was the overturn of Roe v. Wade which triggered abortion bans across the country, meaning there is no longer a federal constitutional right to abortion. Women feel like their rights are being stripped away while others are happy that this ruling aligns with their moral views. This is a big upset in the political atmosphere and a lot of big companies, for example: The Walt Disney Company, have released news that they will fund the transportation of employees to states which abortion is legalized. The country may not all agree on this, and it may negatively affect the stocks.

I will begin trading during the last week in June. The stocks I have chosen are listed below with an update of their value as of June 25th, 2022.

2.4.1 Tesla (TSLA)

Tesla is a battery company focused on sustainable energy with electric cars and solar integrated renewable energy solutions for homes [12]. The focus of the company is their electric vehicles and the capabilities they offer compared to gasoline cars. They have self-driving enhancements, a 17" touch screen in the center console that includes gaming, streaming, and smart phone capabilities, and automatic software updates to the car's features. The company sells direct to consumers, has an international presence, and has taken a unique approach in this market to establish themselves among consumers.

In previous years, the month of June is known for being below average because the S&P 500 tends to decrease. For Tesla, however, they have performed exceptionally well during the month of June. In the past five years, the electric car market has grown an average of 17% in the month of June. Since the market has taken a downturn recently, Tesla's stocks have been fluctuating with minimal growth overall as seen in Figure 2.1.

The media just announced during the first week of July that June was the highest vehicle production performance in the history of Tesla. Tesla will announce their financial results after the close of the market on Wednesday, July 20th, 2022 [13]. This news was released on July 2nd, during a weekend, and the stock price grew after the holiday when the stocks reopened. This news is highly anticipated for the stock and the price will continue to climb.
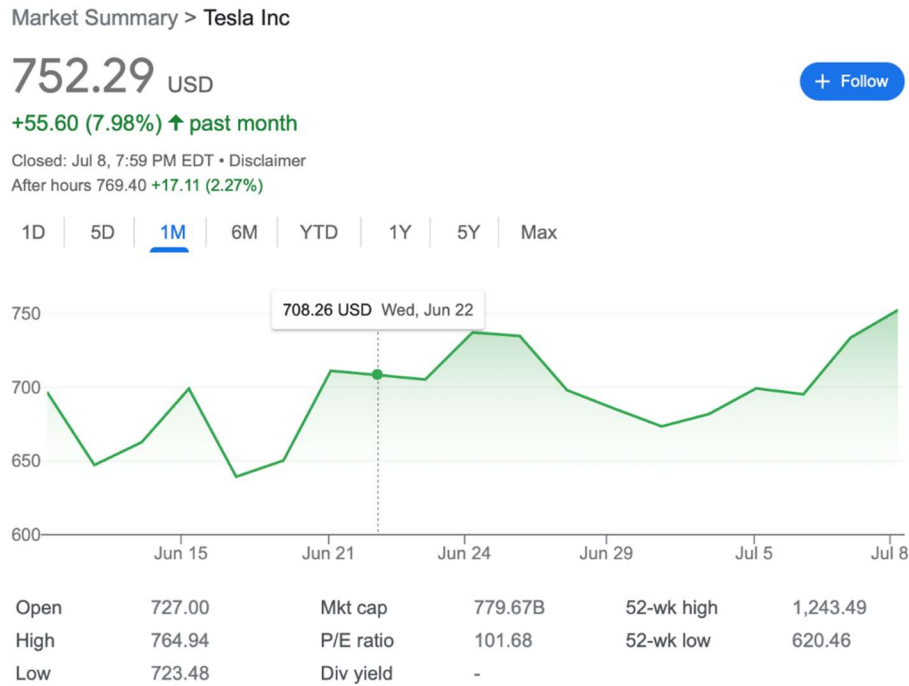
Figure 2.1: Snapshot of Tesla's Stock on July 8th, 2022.

2.4.2 The Walt Disney Company (DIS)

The Walt Disney Company is an American worldwide entertainment company known for their theme parks and movies. Their mission statement is "…entertain, inform, and inspire people around the globe through power of unparalleled storytelling, reflecting the iconic brands, creative minds, and innovative technologies that makes ours the world's premier entertainment company" [14]. The company is diverse in their segments and are competitive in each area from sports to service, or clothing to animation.

Looking at The Walt Disney Company's most successful year in 2019, analyzers have concluded that key factors in the global economy allows Disney to profit from all areas of the company. This company generates revenue from their theme parks, merchandise, streaming networks, movies, and merchandise domestically and internationally. The best combination for Disney is to have low

unemployment rates, low interest rates, a booming economy, low geopolitical tensions, and consumers willing to pay for services and experiences rather than goods. The year 2019 was able to meet all these requirements.

Currently, interest rates and inflation are taking over the economy which is not a good sign for consumers prioritizing vacationing. This declining trend can be seen in Figure 2.2. Disney, however, continues to produce new media for their streaming platforms as well as movies to go into theater's which diversifies their company's successes [15].

Analysts stated that Disney is a company with a loyal fanbase and will continue to grow. They are a good company for long-term investment and will see an increase as the economy starts to become more stable.

Market Summary > Walt Disney Co

95.86 USD

-3.54 (-3.56%) ↓ past month

Closed: Jul 8, 7:58 PM EDT • Disclaimer
After hours 95.87 +0.010 (0.010%)

| 1D | 5D | 1M | 6M | YTD | 1Y | 5Y | Max |

	Open	96.57	Mkt cap	174.61B	CDP score	B
	High	97.12	P/E ratio	66.13	52-wk high	187.58
	Low	95.35	Div yield	-	52-wk low	92.01
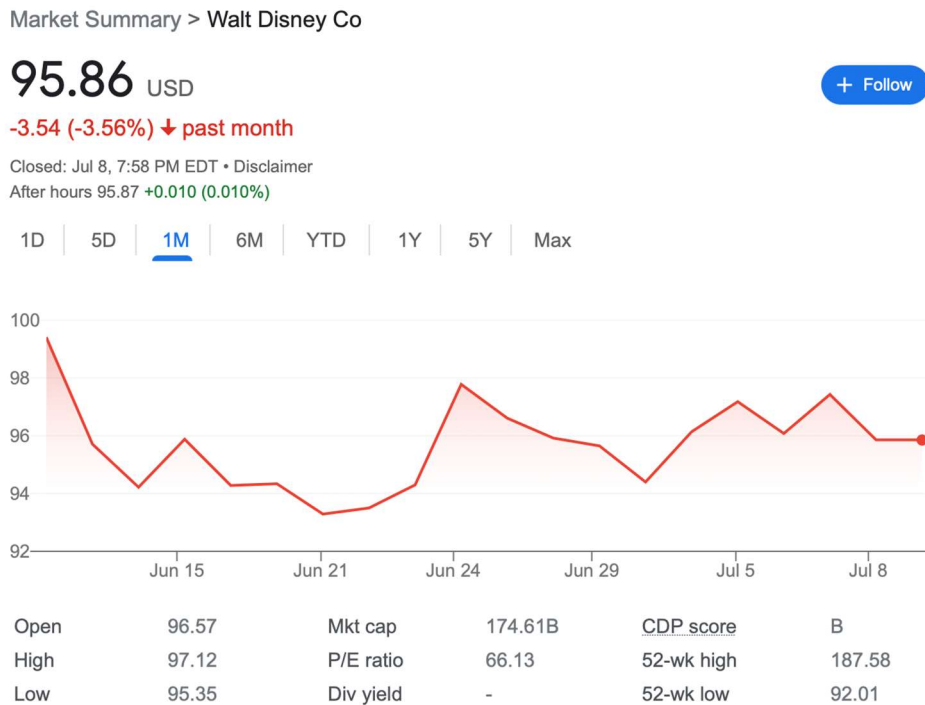
Figure 2.2: Snapshot of Disney's Stock on July 8th, 2022.

2.4.3 Starbucks (SBUX)

Starbucks is a multinational chain of coffee houses. Starbucks became successful by changing the experience consumers have while ordering their coffee. Their shop introduces a calming, yet sophisticated, atmosphere for people to stay and complete work, host meetings, or just slow down and sip coffee. Their products include made to order coffee, bakery items, merchandise items, and coffee beans.

During the pandemic, Starbucks changed the primary way of serving their customers' orders and could no longer offer their unique in-store experience. Instead of them coming inside the Starbucks stores to order, sip their coffee, and sit at a table, mobile ordering was introduced. This allowed customers to order ahead and grab their coffee with speed and ease. Since the pandemic restrictions are no longer present, the company thought that customers would want to go back to the leisure way of ordering their coffee. Executives have reported, however, that more customers demand their coffee in a quicker fashion. Customer satisfaction has declined since minimal interaction is actually happening within the stores.

With this lingering change for the franchise, Starbucks shares are down 35% since the beginning of 2022. Starbucks is planning on investing into their online ordering platform and cater to the changing consumer market. People do not value in-store experiences like they used to, and Starbucks is beginning to lose their competitive edge.

Analysts are not recommending investing in Starbucks right now, but after a sharp decline on June 15th, as seen on Figure 2.3, the stock seems to be progressively climbing upwards [16].
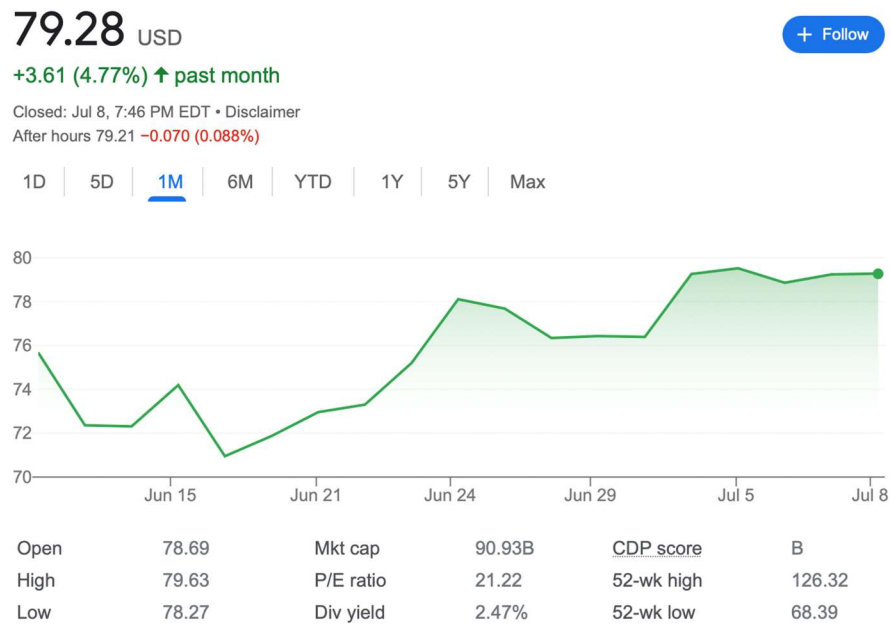
Figure 2.3: Snapshot of Starbucks' Stock on July 8th, 2022.

2.4.4 Amazon (AMZN)

Amazon started as an online bookseller and exploded into ecommerce. It quickly grew to be an everything store and offer customers free, expedited shipping, on a multitude of items like furniture, electronics, food, textbooks, and clothing [17]. Online delivery expectations were completely changed, and other companies are trying to compete.

The past few months, Amazon stock has declined due to the geopolitical atmosphere but also due to internal bottom-line loss during their first quarter [18]. Amazon stock dropped 39% since the beginning of this year (about six months ago) and continues to fall. Inflation does not support the e-commerce market, but the second half of the year should provide better results. The past month has been slowly trending upwards as seen in Figure 2.4. Analysts are hopeful that growth will appear in July due to Amazon Prime Day that occurs from July 12th to July 13th. This day offers sales on a variety of products like electronics, home appliances, and skin care items. This online

event is equivalent to the sales that occur after Thanksgiving deemed as "Black Friday". With the good deals being released on the second week of July, it is providing hope for Amazon to grow their earnings and have their stock prices reflect that.
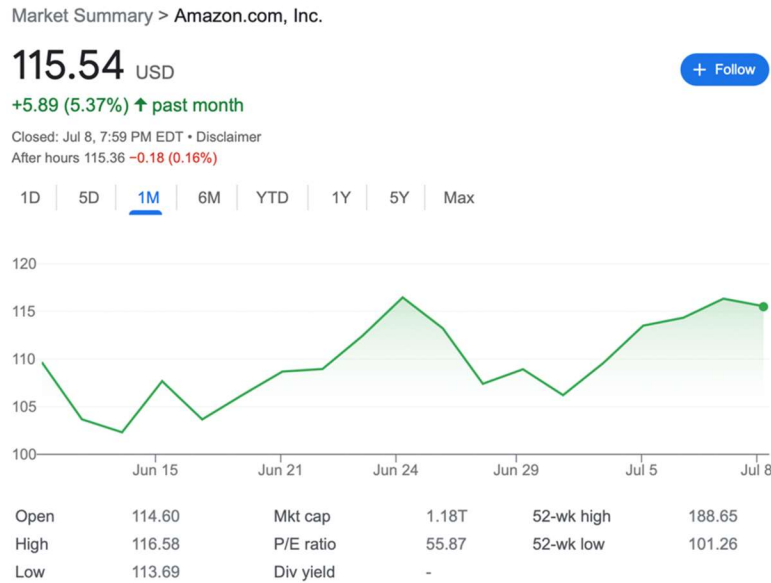
Figure 2.4: Snapshot of Amazon's Stock on July 8th, 2022.

2.4.5 Costco Wholesale Corporation (COST)

Costco is a wholesale retail chain known for selling brand-name products in bulk at a discounted price. The corporation holds the title as the largest seller of choice of prime beef, organic foods, rotisserie chicken, and wine [19]. A lot of small businesses will use these stores to stock up on necessary items. Besides food, Costco also offers sales on electronics, furniture, clothing, appliances, and jewelry.

Costco experienced record highs in April reaching about $610 a share. This was an impressive price and held for a few weeks before the stock started to decline. The decline became more rapid during the first few weeks of May hitting a low close to $400. A slow build-up started after that,

and the stock is hovering between $450 to $480 as seen in Figure 2.5. The past ten years of data

shows that Costco has had positive returns in July 90% of the time. The share price might not reach

the high of $610 but might increase to hold around $550 by the end of July [20].

Figure 2.5: Snapshot of Costco's Stock on July 8th, 2022.

3 Swing Trading

Swing Trading uses technical analysis to predict when a stock is going to go up so you can sell for profit. This type of trading is done on a weekly basis in order to analyze a pattern, sell when the stock goes high, and buy again when the stock is low. For the five-week simulation, I will look at my portfolio's performance each week to determine which stocks I should buy or sell for profit.

3.1 Week One

As previously mentioned, I wanted to split the $100,000 I am starting with in the simulation evenly amongst my 5 stocks. With the simulation I am using, it would only allow me to buy shares in whole, not by a dollar value. Due to this, I bought a quantity that got me to the closest to the investment of $20,000 per stock. In total, I invested $100,144.18 when I first started. Table 3.1 shows the date I placed the order, which stock, how many shares I purchased, the price each share cost, and the total cost I spent per stock (Appendix 1).

Table 3.1: Week One Initial Purchases

Date 2022	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit	Total Asset
6/24	--	--	--	--	--	--	100,000	--	--
6/27	DIS	Buy	98.22	204	20,036.88	--	80,107.30	--	--
6/27	AMZN	Buy	117.09	171	20,022.39	--	60,084.91	--	--
6/27	COST	Buy	485.81	41	19,918.21	--	40,166.70	--	--
6/27	SBUX	Buy	78.00	256	19,968.00	--	20,198.70	--	--
6/27	TSLA	Buy	748.10	27	20,198.70	--	-144.18	--	--
Wk 1	Portfolio	--	--	--	--	(1,742.98)	--	--	98,401.23

Once the purchases went through on Monday, I wanted to just observe what the market was doing the first week. Since there was a lot of change in the geopolitical atmosphere due to Rode v. Wade

being overturned, plus inflation and the unpredictable crashing market, I wanted to gather a week of baseline data. Figure 3.1 shows the total value of my portfolio after the first week. I did not make any trades that week as the value of the stocks started to decline immediately following my purchases. It would have been smart to observe the market on Monday to make an education purchase rather than buy shares right when the market opened back up after the weekend.

INVESTOPEDIA STOCK GAME

Figure 3.1: Performance History at the end of Week One.

Since the value of the shares are steadily increasing, I will be put in a good position to start trading and making profit this upcoming week.

3.2 Week Two

The second week started on Tuesday, July 5th, due to the Fourth of July holiday. This week I wanted to start to trade and make some profits. Figure 3.2 shows how the market changed over the weekend and the overall performance on Tuesday. Since most of the stocks stayed below the original purchase price, selling any of them would not make any sense except for Costco. Costco went up 0.42% and gave me an opportunity to make about $80.00 if I sold it all.

Total Value	Today's Change	Total Gain/Loss					
$78,038.73	$1,366.92 (1.78%) ↑	-$2,137.45 (-2.67%) ↓					

Symbol	Description	Current Price	Today's Change	Purchase Price	QTY	Total Value	Total Gain/Loss	Trade Actions
AMZN	Amazon.com Inc.	$113.65	$699.39 (3.73%) ↑	$117.09	171	$19,434.15	-$588.24 (-2.94%) ↓	⊕ Buy More ⊖ Sell
COST	Costco Wholesale Corp	$487.80	$83.64 (0.42%) ↑	$485.81	41	$19,999.80	$81.59 (0.41%) ↑	⊕ Buy More ⊖ Sell
DIS	Walt Disney Co (The)	$97.05	$185.64 (0.95%) ↑	$98.22	204	$19,798.20	-$238.68 (-1.19%) ↓	⊕ Buy More ⊖ Sell
TSLA	Tesla Inc	$696.54	$398.25 (2.16%) ↑	$748.10	27	$18,806.58	-$1,392.12 (-6.89%) ↓	⊕ Buy More ⊖ Sell

Figure 3.2: Performance of Investments on the First Day of Week Two

I ended up selling all my shares at Costco and made a $100.45 profit. I also sold all my shares for Starbucks right before the market closed because I thought I was going to make a small profit. By the time the order went through, however, I ended up losing money. It was not a significant amount, but still a loss (See Table 3.2). When I noticed this, I put the money back into the stock to re-invest it. The price per share went up $1.46 since I bought it the week prior. For the remainder of the week, Starbucks dropped less than a dollar per share from the price I purchased them at. Before the market closed, the share price was $79.28 which is still $0.18 below the price I paid. Since it is hovering around that same price and slowly on an upward trend, I predict I will be able to make profit on it by the end of the third week.

On Friday afternoon, July 8th, I noticed that Disney dropped (-2.25%) which is about $450.00. With this decrease, wanted to invest more money before Disney's stock would start to climb back up again. They have been on a decrease, so this decision was based upon looking at the downward trend and predicting it will start to climb again. The share price has been hovering between $93.00-$97.00 since June 14th whereas June 2nd it was around $110.00. I invested about $10,000 into Disney which is equal to about $30,000 in their stock right now (Table 3.2).

Table 3.2: Week Two Transaction Record

Date 2022	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit	Total Asset
07/06	COST	Sell	488.26	41	20,018.66	100.45	19,874.48	100.45	--
07/06	SBUX	Sell	77.74	256	19,901.44	(66.65)	39,775.92	33.80	97,904.18
07/06	SBUX	Buy	79.46	256	20,036.88	--	19,435.44	--	--
07/08	DIS	Buy	96.25	102	9,817.50	--	9,617.74	--	--
Wk 2	Portfolio	--	--	--	--	--	--	--	99,297.04

3.3 Week Three

The S&P 500 slipped 0.45% due to the June data reports being published showing that inflation hit its highest level since 1981 [21]. This adds more fear to the market that the Federal Reserve will get more aggressive in their fight to tame the rising prices.

Other relevant news is that Twitter sued Elon Musk, the CEO of Tesla, because Musk decided to back out the deal he made with Twitter on buying the company and paying $54.20 a share [22]. Musk seeks to be let out of the agreement as it "…no longer serves his personal interests" and Twitter believes it is because their stock dropped, and Musk did not like that. Despite this, Tesla still rose after the other events on Tuesday and stayed on a positive trajectory until the market close on Friday.

My investments in the third week did not do well due to the market being on a downward slope. On Monday, my overall stocks took a decline and hit the bottom on Tuesday. My portfolio slowly grew throughout the week and almost hit the same value as the stock when it opened on Monday. Looking at Figure 3.3, you can see my overall account value ranged from $99,315.95 to $95,320.49.

Figure 3.3: Performance History at the end of Week Three

At market open on Monday, July 11, I bought 38 shares of Costco to re-invest back into the stock after selling it last week. Then on Friday, I sold the 38 shares again to make a small profit. I re-invested into Costco to prepare for the predicted growth of the start next week. My transaction record can be seen in Table 3.3.

Table 3.3: Week Three Transaction Record

Date 2022	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit	Total Asset
07/12	COST	Buy	501.12	38	19,042.56	--	105,645.50	--	96,220.88
07/16	COST	Sell	516.92	38	19,642.96	600.40	108,771.42	634.20	98,659.45
07/16	COST	Buy	521.29	39	20,330.31	--	108,771.42	--	--
Wk 3	Portfolio	--	--	--	--	--	--	--	98,659.45

My plan is to sell when the stock reaches their peak next week. I will have to be mindful to sell before they take another downturn. It will be hard not to sell too early or wait too long.

3.4 Week Four

Stocks steadily went up during week four and put the S&P 500 up 9% over the past month. This was a good sign for investors and profits from prior weeks' investments can finally be cashed in. The upcoming weeks might show a heavy decline and this pattern might not hold steady.

The Federal Reserve Board is meeting this upcoming week on July 26th and 27th for a two-day meeting [23]. They will discuss if another interest rate increase is necessary and to analyze key data to confirm if we are in a recession or not [24]. The last time the Federal Reserve met was on July 11th (week three) and the market declined the day after and tried to recover for the rest of the week. Observing that, I am predicting another decline will happen during week five as well. Also, more data will also be released from quarter 2 and inform traders of what quarter 3 earnings might look like. I think the next week will have trends that are all over the place. Not as steady as week three's, however.

For week four, I noticed that my stocks were gradually going up and increasing my total gain as seen in Figure 3.4. I wanted to wait out for as long as I could before selling them to maximize my profit for the week. I ended up selling them at market open on Friday because I did not want to wait too long and lose out on the potential gain for most of my stocks.

Figure 3.4: Performance History at the end of Week Four

You can see the results of my trades in Table 3.4. My total profit for week four was $6,786.82. This profit was attributed to me not selling any of my stock, except Costco, last week. Since I bought most of my portfolio when it was low, my prediction to hold off and see the upward trend at the end of week four paid off. Unlike last week, I traded each of my stocks except for Costco. At the end of market close on Thursday, Costco could have been sold for profit, but I wanted to gamble this one and see if it would continue to grow into week 5. Since the overall dollar value of gain was around $300, at least $1,000.00 less than my other profits, I thought Costco was the best stock to "test the waters" with.

Table 3.4: Week Four Transaction Record

Date 2022	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit	Total Asset
07/23	TSLA	Sell	828.66	27	22,373.82	2,175.12	86,787.20	2,809.32	--
07/23	SBUX	Sell	84.16	256	21,544.96	1,508.08	86,787.20	4,317.40	--
07/23	DIS	Sell	103.28	306	31,603.68	1,749.30	86,787.20	6,066.70	--
07/23	AMZN	Sell	125.01	171	21,376.71	1,354.32	86,787.20	7,421.02	--
Wk 4	Portfolio	--	--	--	--	--	--	--	107,446.28

Next week, my plan is to watch the performance of Costco and sell it for profit. I will also see if the market becomes in a good position to re-invest into the other stocks in my portfolio. Since it is the final week of the simulation, I will probably make a better overall profit if I focus on selling Costco and not re-invest my other money.

3.5 Week Five

This past week, the market was anxiously waiting for the Fed's to make public the result of their two-day committee meetings. Another anticipated piece of information is the publication of quarterly earnings. When the news broke about the 75-basis-point rate increase on Wednesday and learning about the stronger-than-expected earnings from Amazon.com and Alphabet, the Nasdaq Composite Index grew 4% in one-day [25]. The S&P 500 also experienced sharp gains as seen in Figure 3.5.

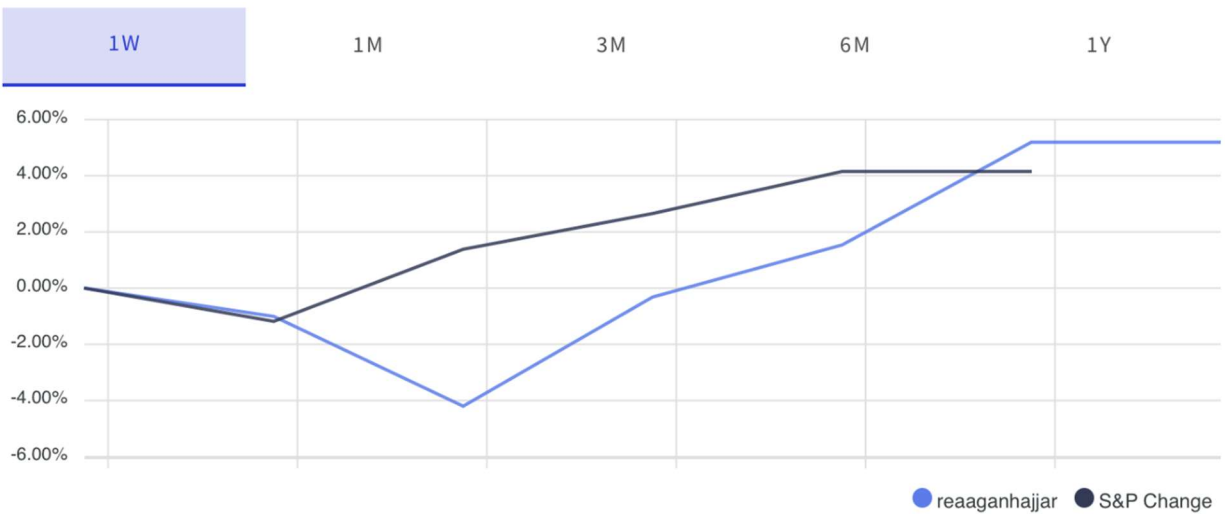*Figure 3.5: The S&P 500 Percent Increase from July 25th – July 29th.*

Since week 5 is the final week of the simulation, I was hesitant to re-invest my profits due to the uncertainty I had due to the Fed's meeting and the quarterly reports being released. After the index took a dip after Monday, July 25th, I was expecting it to further drop and mimic the same pattern

as seen the last time the Fed's met on the week of July 11th. The only investments I had at the start of the week was Costco. You can see in Figure 3.5, Costco followed the same down then upward trend for the week.
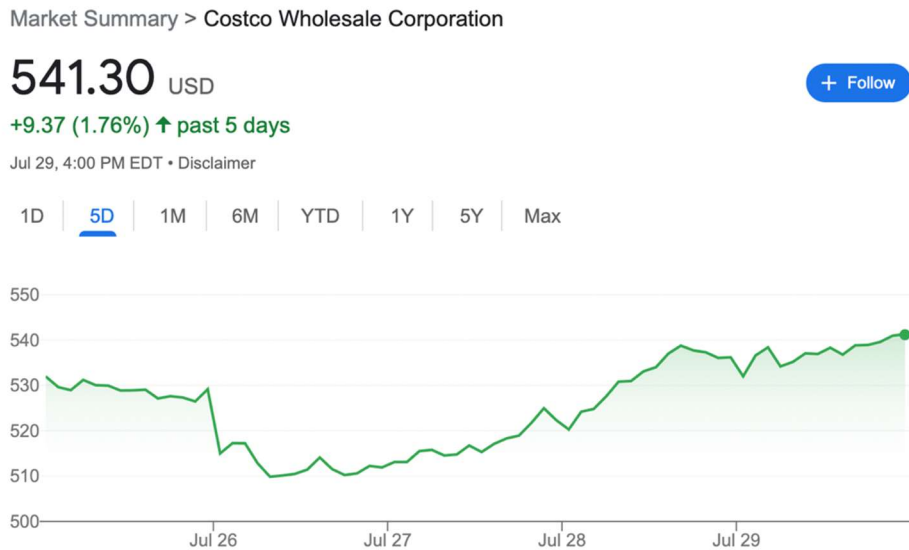
Figure 3.5: Summary of Costco from July 25th – July 29th.

After the initial drop on Tuesday, I saw it started to climb back up again. I wanted to wait until Friday to sell it to maximize my profit, but I did not want to wait until Friday market close in case the stock would drop. I sold Costco at market open on Friday and made $604.50 profit as seen in Table 3.6. I do regret not re-investing into my other stocks in my portfolio, and I would have on Tuesday if there were other weeks in the simulation, or if I was trading in real life. I had the motive to maximize my profits within the five weeks, so I did not want to risk anything.

My final table and cumulative profit are listed below in Table 3.5.

Table 3.5: Week Five Transaction Record

Date 2022	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit	Total Asset
7/30/2022	COST	Sell	536.79	39	20,934.81	604.50	107,722.01	8,025.52	--
Wk 5	Portfolio	--	--	--	--	--	--	--	107,722.01

Section 3.6: Limitations

This stock simulation was to teach me about the stock market through hands on experience in the market. I had some limitations throughout the five weeks that did not allow for the best overall performance of my portfolio.

The obvious limitation is the lack of market knowledge I had going into this. That is the entire purpose of this project, learn through doing. I read books and articles about the stock market and trading strategies so I would have some background going into it. Being able to invest is an incredible tool to use, but it is also rather intimidating with the amount of data and knowledge that is necessary to perform exceptionally well.

Another limitation was that I was working full-time from 8:00am – 5:00pm throughout the week; I was working while the market was open. This made it challenging because I could only look at the market or perform transactions during my lunch break (which varied every day). I could look at the performance in the evening and I would place my orders to either buy or sell when market opens since I could not do it during the day. I specifically chose Swing Trading as my strategy, though, because of my work schedule. I thought it would make the most sense because I did not have to be very hands on with my portfolio and it was observing trends of a few days to a week rather than over a few hours. If I did not have to work, or was allotted more flexibility during my

job, I would have made more trades daily, been a bit more aggressive with my portfolio, and exercised more strategies that I learned.

There were no other limitations on this simulation except for the cash I started out with, and I set that limitation for myself. I think my situation of working full-time while also actively trading in the market is very applicable to the average person's work schedule. If I was investing $100,000 as a college student, however, I would have monitored my portfolio a lot more closely.

4 Position Trading

As previously mentioned, position trading known for being the most "traditional" form of investment. Money is invested into a portfolio of stocks consisting of strong companies that will grow for multiple years. Since this project is only a five-week simulation, the true potential will not be seen during this short period of time. However, I chose position trading to see how different a hands-on approach (swing trading) and a hands-off approach (position trading) can both make profit in different ways.

Table 4.1: Week One Initial Purchases

Date 2022	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit	Total Asset
--	--	--	--	--	--	----	100,000	--	--
6/28	DIS	Buy	96.48	204	19,681.92	--	80,318.08	--	--
6/28	AMZN	Buy	113.90	171	19,476.05	--	60,842.03	--	--
6/28	COST	Buy	482.55	41	19,784.55	--	41,057.48	--	--
6/28	SBUX	Buy	77.70	256	19,891.20	--	21,166.28	--	--
6/28	TSLA	Buy	734.46	27	19,830.42	--	1,335.86	--	--
Wk 1	Portfolio	--	--	--	--	--	--	--	99,881.28
Wk 5	Portfolio	Sell	114,621.31	699	--	14,740.03			

Section 4.2: Summary of Actions

I started my portfolio with $100,000 in total cash. I planned to evenly split the cash among the five stocks and got as close to $20,000 as I could (The simulation would not allow me to purchase fractions of stocks). Once I did this, I did not touch my portfolio until I sold everything on the last day of the simulation, five weeks later.

Section 4.2: Limitations

The limitation for this method was the length of the simulation. This method usually takes a few months or years to see the positive impacts it had. A possible limitation was having to invest in

the stocks during a restricted period. It would have been more beneficial to invest when the market was down to see a bigger growth. I did look at the record highs for 2022 so far to see where my stocks were prior to investing. They were all about average, so it was not unwise for me to invest when I did.

Chapter 5: Analysis and Comparison

5.1 Conceptual Comparison of Strategies

Both of the strategies, swing trading and position trading, required a small background of stock market knowledge prior to jumping in. Of course, to get better requires practice, more research, and an in-depth understand of how the market functions, but it was not burdensome using these strategies as a beginner.

Swing trading is a more hands on approach and requires continuous research and monitoring of your portfolio's performance to make wise decisions and attempt to predict how the market will perform. I found myself looking at summaries that were published on the previous week's performance and see what the analysts were predicting for the week to come. Multiple types of information can affect performance and it is important to have well-rounded information before trading.

Position trading does not require the daily or weekly research like swing trading does. The research will happen once at the front end to understand what stocks will have the best chance of growing over a certain period of time as well as building a well-rounded and strong portfolio of strong companies. When the beginning research is done, the investment occurs, and no further action is necessary until it is time to sell the portfolio for profit. The amount of monitoring can vary, but it is not required for this type of strategy in order to be successful.

Overall, both strategies require research prior to building a portfolio and a general understanding of the stock market. Swing trading is more appropriate for a person who has the time to conduct the research and monitoring their portfolio. Position trading is better for a person who does not have the time for daily or weekly check-ins.

5.2 Technical Comparison of Strategies

The technical elements in these strategies are similar but happen at different times and frequencies during the investment time period. Swing trading relies on being able to identify opportunities in price trends and patterns seen from previous or current performances in stocks. It is important to have historical, current, and educational predictions of market data to make informed decisions on when to invest, buy, and sell.

Position trading can use technical analysis to inform their decisions, but it is mostly used to look at historical price patterns so they can select stocks they think are about to go higher. The trader ignores the minor price fluctuations and uses technical analysis to predict how the market will be in the future.

5.3 Data Analysis to Compare Results

Both strategies were able to produce profit by the end of the five-week simulation. As seen in Table 5.1, position trading gave better results than swing trading. I personally think that I made some mistakes while learning how to predict trends and the timing of buying or selling stocks. Since position trading did not require multiple transactions throughout the five-weeks, it was less room for error and had a better outcome.

Table 5.1: Summary of Results

Strategy	Beginning Account Value	Ending Account Value	Percent Increase	Profit
Swing Trading	98,401.23	107,722.01	9.4%	9,320.78
Position Trading	99,881.28	114,621.31	14.8%	14,740.03

As seen in Figure 5.1, both strategies mirrored each other with only a few thousand dollars between them until the market dropped on July 27th. Since I was still making a profit after the market took a downturn, I did not aggressively use swing trading and let my account value plateau until the end of the simulation. Since I let my position trading account hold the same number of shares and value, it ended up having a positive increase within the last week.
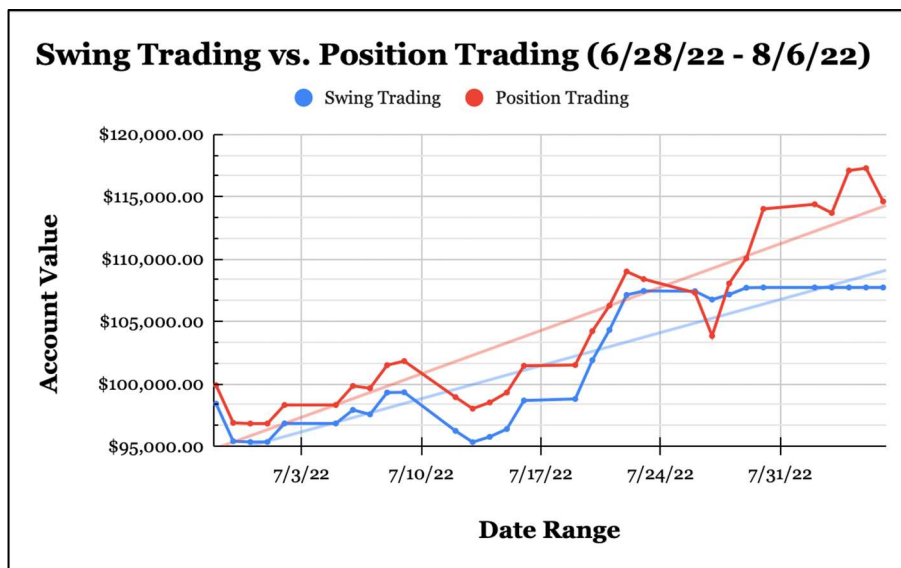
Figure 5.1: Comparison of Account Values

If my decisions to trade were not confined to the five-week simulation. For the swing trading portfolio, I would have invested back into all my stocks during the fifth week instead of not re-investing. For the position trading portfolio, I saw it peak and then drop off. I would have sold everything during the peak to make the most money. I saw the trend keep increasing, but I wanted to wait until the final day.

Chapter 6: Conclusion

6.1 Simulation Summary

The research and participation allowed me to compare two trading strategies, swing trading and position trading, in the stock market. The simulation provided a safe environment to learn in, make mistakes, and monitor the effects of the market in real-time.

I learned the different time commitment between both strategies, how outside events affect the market, and how to apply outside research towards my actions with my portfolio. The position trading strategy performed better with having a 14.8% increase in the total account value compared to the swing trading strategy of having only a 9.4% increase in the total account value.

6.2 Takeaways

I learned some key take aways from this experience. The first is to pick the trading strategy that aligns with your monetary goals and life schedule – available time to monitor your portfolio. Without the proper dedication of time, it will not maximize the potential of the portfolio you created for yourself. Another important take away is to continue to read up on the current news and learn about what other analysts are doing. Having a continuous improvement mindset will prevent settling into a routine that might not be the best to support the ever-changing portfolio. Lastly, when performing technical analysis, it is important to not only focus on the numbers and numerical trends. The context of companies and the political atmosphere can be more beneficial at times. All this information I read prior to starting the simulation, but by learning through doing, I understand these pieces a lot better.

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Appendices

Appendix 1: Daily Portfolio Values from both Strategies

Date	Swing Trading		Date	Position Trading
7/13/22	$95,320.49		7/13/22	$98,005.49
7/1/22	$95,330.95		7/1/22	$96,811.00
6/30/22	$95,330.95		6/30/22	$96,811.00
6/29/22	$95,390.68		6/29/22	$96,870.73
7/14/22	$95,745.54		7/14/22	$98,502.81
7/12/22	$96,220.88		7/12/22	$98,926.79
7/15/22	$96,372.45		7/15/22	$99,301.08
7/5/22	$96,818.19		7/5/22	$98,298.24
7/2/22	$96,818.19		7/2/22	$98,298.24
7/7/22	$97,544.75		7/7/22	$99,643.83
7/6/22	$97,904.18		7/6/22	$99,823.27
6/28/22	$98,401.23		6/28/22	$99,881.28
7/16/22	$98,659.45		7/16/22	$101,442.79
7/19/22	$98,784.05		7/19/22	$101,503.09
7/8/22	$99,297.04		7/8/22	$101,490.42
7/9/22	$99,315.95		7/9/22	$101,819.30
7/20/22	$101,892.30		7/20/22	$104,220.38
7/21/22	$104,315.22		7/21/22	$106,269.76
7/27/22	$106,752.47		7/27/22	$103,839.65
7/22/22	$107,122.26		7/22/22	$109,002.66
7/28/22	$107,157.29		7/28/22	$108,048.63
7/26/22	$107,423.66		7/26/22	$107,301.41
7/23/22	$107,446.28		7/23/22	$108,393.84
7/29/22	$107,698.22		7/29/22	$110,057.15
8/6/22	$107,722.01		8/6/22	$114,621.31
8/5/22	$107,722.01		8/5/22	$117,286.88
8/4/22	$107,722.01		8/4/22	$117,101.53
8/3/22	$107,722.01		8/3/22	$113,697.21
8/2/22	$107,722.01		8/2/22	$114,392.02
7/30/22	$107,722.01		7/30/22	$114,022.85