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Stock Market Simulation

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By

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Abstract

During this four-week stock market simulation, two separate accounts were set up, each initially funded with \$100,000, to test the effectiveness of two investment strategies: buy and hold, and momentum trading. Prior to the simulation, a careful analysis of ten selected companies was conducted. The results of this experiment were quite revealing. The buy and hold strategy outperformed the momentum trading strategy, yielding a respectable profit of 3.69%, while the momentum trading strategy only managed a more modest gain of 0.74%. This project provides valuable insights into the world of stock market investing, demonstrating that a patient approach of holding onto stocks for the long term can be more profitable compared to quick trading, at least for the selected companies in this study.

Acknowledgements

I would like to extend heartfelt gratitude to Professor Tang, for invaluable guidance, unwavering support, and insightful advice throughout the duration of this project. Professor's expertise and mentorship played a pivotal role in shaping the research and ensuring its successful execution. Additionally, I wish to express deep appreciation to my parents for their unwavering belief in the importance of education and their generous investment in this summer term project. Their encouragement and financial support provided the opportunity to undertake this study.

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Chapter 1: Introduction

1.1 Goals of the Simulation

The main goal of this project is to study the stock market principles and rules of their functioning, the main strategies used by investors when trading in the stock markets, their advantages and disadvantages. In the process of working on the project, gain skills in applying buy-and-hold trading and momentum trading strategies on the securities of enterprises from various sectors of the economy. For the implementation of this project were selected shares of companies from different sectors: healthcare, high-tech, utilities, consumable essentials, oil companies, and car manufacturing companies. To achieve the goals, it is necessary to conduct a two-week study of the selected companies, based on their financial indicators that determine the profitability of their shares, to assess the growth potential of their business and possible risks that could adversely affect the activities of the selected companies. It is also necessary to study the two selected stock trading strategies based on the experience of professional traders. Then, based on the results of this study, a four-week process of simulating trading on an exchange with two stock portfolios, but with different trading strategies, will be carried out. This will allow you to check the effectiveness of the selected strategies in real trading. At the end of the simulation process, the results will be analyzed within two weeks and appropriate conclusions will be drawn.

1.2 History of the Stock Market

In the 1300s, Venetian moneylenders began selling debt to other creditors and individual investors. Moneylenders exchanged debts; a lender wanting to get rid of a high-risk, high-interest loan exchanged it for another loan from another lender. These creditors also bought back government debt issues. As their business naturally developed, lenders began selling debt issues

to the first individual investors. The Venetians were leaders in this field and were the first to trade in the securities of other governments.

The first stock market appeared in Antwerp as early as 1531. Brokers and moneylenders met there to discuss business problems, politics, and even individual debts. In the 1500s, there were no real shares, so the exchange dealt with bonds and bills. There were many types of partnerships between business and financiers that generated income, like a share, but there was no official share that would change hands.

In the 1600s, the governments of the Netherlands, Great Britain, and France granted privileges to the East India Companies in their own name. At the threshold of the apogee of imperialism, it seems that everyone was interested in the profits of the East Indies and Asia, except for the people living there. Sea voyages to bring goods from the East were extremely risky, because in addition to the Barbary pirates, there were risks of weather and poor navigation. In 1602, the Dutch East India Company issued the first paper shares. This exchange medium allowed shareholders to conveniently buy, sell and exchange their shares with other shareholders and investors.

The first official stock market was formed in 1773 in London, 19 years before the New York Stock Exchange (NYSE). While the London Stock Exchange (LSE) was shackled by law restricting the issuance of shares, the New York Stock Exchange has been active since its inception. However, the NYSE was not the first stock exchange in the US. That honor went to the Philadelphia Stock Exchange, which was founded in 1790, but the NYSE quickly became the most powerful.

Despite the existence of stock markets in Chicago, Los Angeles, Philadelphia and other major centers, the NYSE was the most powerful stock market at the US and abroad. However, in 1971, a new NASDAQ player emerged to challenge the NYSE.

The Nasdaq was the brainchild of the National Association of Securities Dealers (NASD), now called the Financial Industry Regulatory Authority (FINRA). From the very beginning, it was a different type of stock market: a network of computers that execute transactions electronically, without a physical presence on Wall Street [1].

The introduction of the electronic exchange made trading more efficient and reduced the spread that kept the NYSE from making more profits. Competition from the Nasdaq forced the NYSE to evolve, both through a listing and a merger with Euronext, to form the first transatlantic exchange, which it supported until 2014, when Euronext was spun off as an independent entity.

1.3 Stock Market Indices

A market index (MI) is an indicator of the state of the securities market, calculated in a certain way on the basis of a basket of the most liquid ordinary shares or bonds. Exchange indices allow assessing the state of the stock market as a whole, determining the current moment in the economic cycle [2].

1.3.1 Dow Jones Industrial Average Index

Founded in 1896 by Charles Dow and Edward Jones, the DJIA is price-weighted, meaning that stocks affect the index in proportion to their price per share. The DJIA tracks 30 major US publicly traded stocks. It was designed as an average for the economy as a whole.

The DJIA was designed to serve as a proxy for the health of the broader U.S. economy. Often referred to simply as "the Dow," the DJIA is one of the most-watched stock market indexes in the world. While the Dow includes a range of companies, all can be described as blue-chip companies with consistently stable earnings.

When the index initially launched in 1896, it included only 12 companies. Those companies were primarily in the industrial sector, including railroads, cotton, gas, sugar, tobacco, and oil [2].

1.3.2 Standard & Poor's 500 Index

The S&P 500, also simply called the S&P, was introduced by Standard & Poor's in 1957 as a stock market index to track the value of 500 large corporations listed on the New York Stock Exchange (NYSE) and the NASDAQ Composite. The collection of stocks that make up the S&P is intended to represent the overall structure of the US economy. Its exact mix and the weights of the various sectors have been adjusted as the economy has changed, and some stocks have been added and removed over time.

The S&P originally tracked 233 stocks, but it was too difficult to maintain daily and hourly quotes for that many stocks before computers, so the S&P 90 was created in 1928. The S&P 90 consisted of 50 industrial stocks, 20 railroad stocks, and 20 utility stocks. Performance data was provided at least hourly. The S&P also tracked the original 233 stocks but reported them weekly [2].

1.3.3 Nasdaq Composite Index

The Nasdaq Composite Index is a market capitalization-weighted index of more than 3,700 stocks listed on the Nasdaq stock exchange. As a broad index heavily weighted toward the important technology sector, the Nasdaq Composite Index has become a staple of financial markets reports. The Nasdaq Composite includes the stocks of companies headquartered abroad, in contrast with the S&P 500 Index and the Dow Jones Industrial Average, the two other most frequently cited market benchmarks.

The index was launched on Feb. 5, 1971 with an index value of 100.

The index is calculated constantly throughout the trading day and its value disseminated once per second from 9:30 a.m. to 5:16 p.m. ET. The closing value of the indexes may change up until 5:15 p.m. ET as a result to corrections to the last reported price for index components.

Two versions of the Nasdaq Composite Index are calculated: a price return index and a total return index. The total return index assumes the reinvestment of cash dividends distributed by companies included in the index [2].

1.4 Stock Market Indicators

A market indicator is a quantitative tool that is used by traders to interpret financial data in order to forecast stock market movements.

Market indicators are considered a subset of technical indicators, but the two share fundamental differences. Market indicators are calculated in the same way as technical indicators, which is by applying statistical formulas to a set of data points in order to derive ratios or formulas.

A market indicator can use data collated from multiple securities traded on a given market or part of an index. Technical indicators usually appear at the bottom of an index price chart, whereas market indicators are generally plotted on separate charts and graphs [3].

1.4.1 Moving Averages

Moving averages are useful in filtering out irrelevant data points in that they “smooth” out available price data. It is because a moving average is expressed as a single flowing line that represents the average price of a given security over a period.

The chosen period is up to the discretion of the trader, depending upon their priorities. For example, investors and long-term trend followers will normally consider a timeframe of 50, 100, or 200 days. Short-term traders may consider a week-long period.

The moving average can indicate several properties in the trajectory of a given security. The angle of the slope can expose the trendline. A horizontal moving average shows that the price of the security varies while a positively sloped moving average shows that the price is likely to rise.

It is important to note that moving averages do not predict price movements, but simply show the real price movements that have already occurred.

While it is impossible to predict the future movement of a specific stock, using technical analysis and research can help make better predictions. A rising moving average indicates that the security is in an uptrend, while a declining moving average indicates that it is in a downtrend.

A moving average is a statistic that captures the average change in a data series over time. In finance, moving averages are often used by technical analysts to keep track of price trends for specific securities. An upward trend in a moving average might signify an upswing in the price or momentum of a security, while a downward trend would be seen as a sign of decline.

Moving averages are widely used in technical analysis, a branch of investing that seeks to understand and profit from the price movement patterns of securities and indices. Generally, technical analysts will use moving averages to detect whether a change in momentum is occurring for a security, such as if there is a sudden downward move in a security's price. Other times, they will use moving averages to confirm their suspicions that a change might be underway [3].

1.4.2 Relative Strength Index

The relative strength index (RSI) is a momentum indicator used in technical analysis. RSI measures the speed and magnitude of a security's recent price changes to evaluate overvalued or undervalued conditions in the price of that security.

The RSI can do more than point to overbought and oversold securities. It can also indicate securities that may be primed for a trend reversal or corrective pullback in price. It can signal when to buy and sell. Traditionally, an RSI reading of 70 or above indicates an overbought situation. A reading of 30 or below indicates an oversold condition.

As a momentum indicator, the relative strength index compares a security's strength on days when prices go up to its strength on days when prices go down. Relating the result of this comparison to price action can give traders an idea of how a security may perform. The RSI, used in conjunction with other technical indicators, can help traders make better-informed trading decisions.

After the RSI is calculated, the RSI indicator can be plotted beneath an asset's price chart, as shown below. The RSI will rise as the number and size of up days increase. It will fall as the number and size of down days increase [3].

1.5 Current State of the Stock Market

Global problems affecting the stock markets of all countries are the following factors: military actions on the territory of Ukraine and the expiring sanctions against Russia and Belarus, financial and military support of Ukraine [4]. These factors eventually led to an increase in inflation on a global scale, including the United States. The Fed responded by raising the target federal funds rate by 5% [5]. Although higher rates can help to reduce inflation, they lead to an increase in the cost of investment and growth of companies. Also, because of rising rates the cost of credit for ordinary Americans has increased, which directly affected corporate profits and stock prices [5] It should also be noted that it was affected by the recent collapse of several banks such as: Silicon Valley bank, Signature Bank and First Republic. Figure 1.5.1 below shows the global GDP, where you can see that the value of GDP is declining.

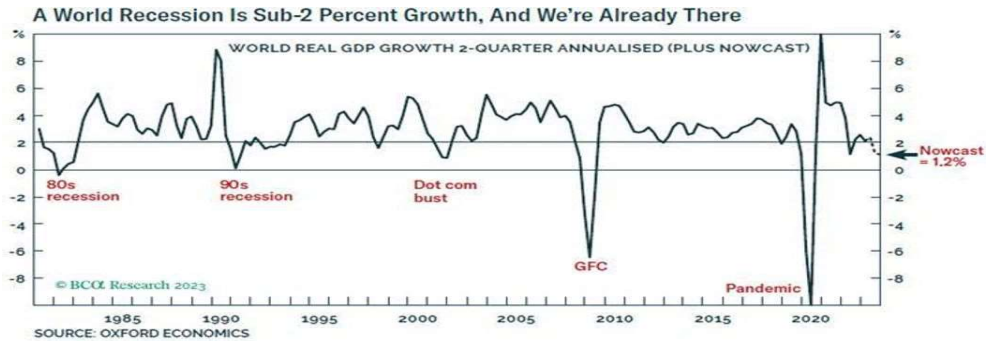


Figure 1.5.1 World GDP Over All Recessions

Chapter 2: Methodology

2.1 Stock Market Simulation Platform

In order to study the stock market I used platforms with the possibility to simulate trading on the stock market in real time. These platforms are often used by beginners in the field of trading stocks and securities as in this case there is no risk of losing real money, but there is an opportunity to earn valuable experience trading stocks of real companies with a cost per security in real time. When searching for the optimal platform for trading by means of the search engine, the following platforms were revealed: Investopedia Stock Simulator, TradingView platform, Wall Street Survivor platform and TD Ameritrade Thinkorswim PaperMoney. The most convenient and suitable platform for my purposes was Investopedia Stock Simulator.

The reasons why I chose the Investopedia Stock Simulator platform are, first of all, very simple and user-friendly design. The transition from the collected portfolio to purchases or learning to trade is very easy to find - it is at the bottom of the page. The second main feature of this platform is that they give \$100,000 of virtual money as seed money that can be used later on for the purchase of securities as shown in Figure 2.1.1. Also, in this platform on the main page it is possible to follow the dynamics of the rates of all purchased shares individually and of the entire portfolio.

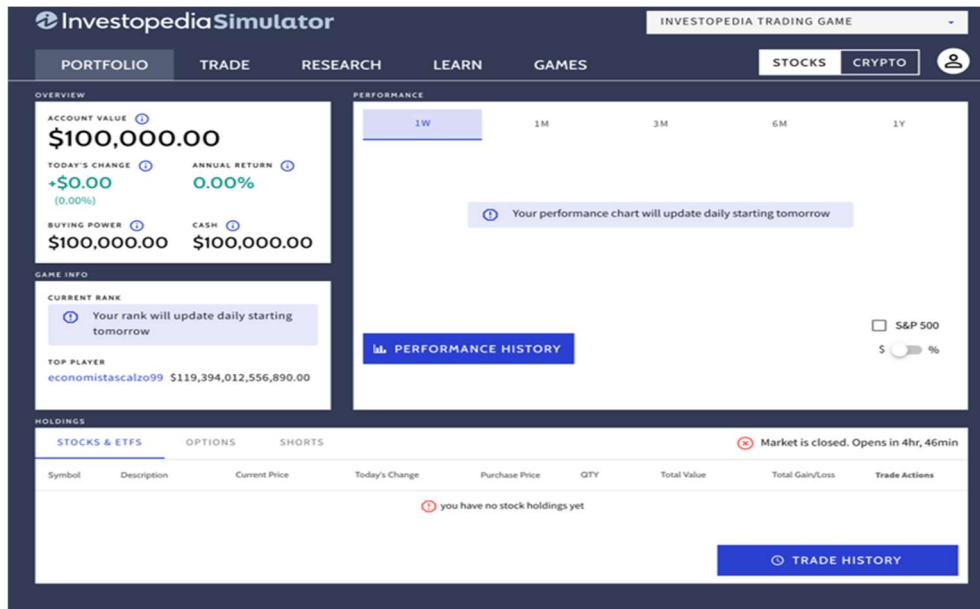


Figure 2.1.1 Investopedia Stock Market Simulator – Main Page

I would like to note that in this simulator there is a separate section of stock trading training where traders painted all about trading in the stock market and how you can use their platform in order to gain the necessary skills and trading experience. The topics that were described start from what the stock market is and end with options trading strategies. As shown in Figure 2.1.2 the authors have detailed more than 20 articles.

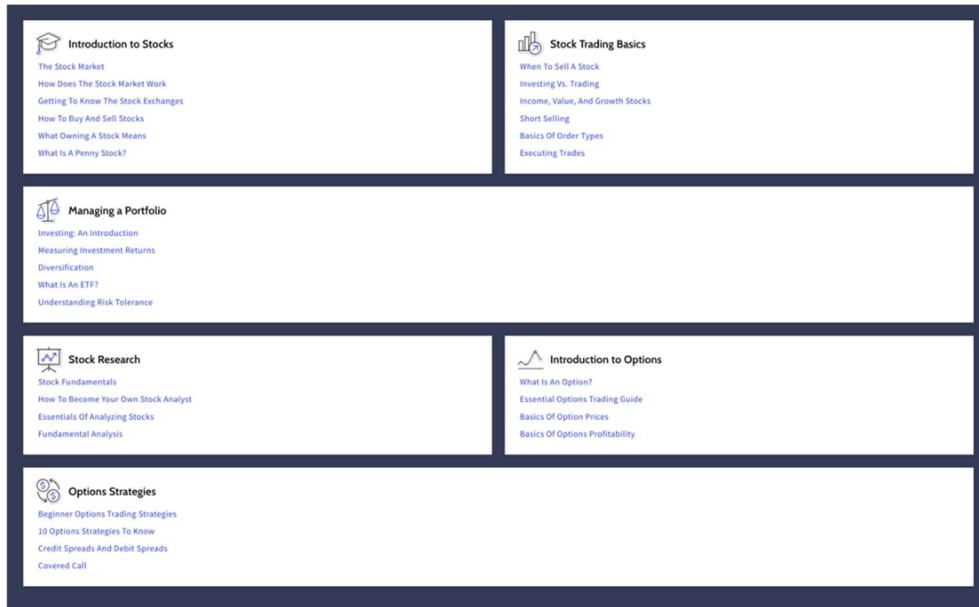


Figure 2.1.2 Learn Section of the Stock Market Simulator

On Figure 2.1.3 is the research section - where you can see the most liquid stocks on the market, which are located in the middle of the page in the form of a slider, in which 10 companies are placed. The bottom of the page shows the top companies by capitalization, where at the moment the top is headed by Apple with a capitalization of more than 3 billion dollars.

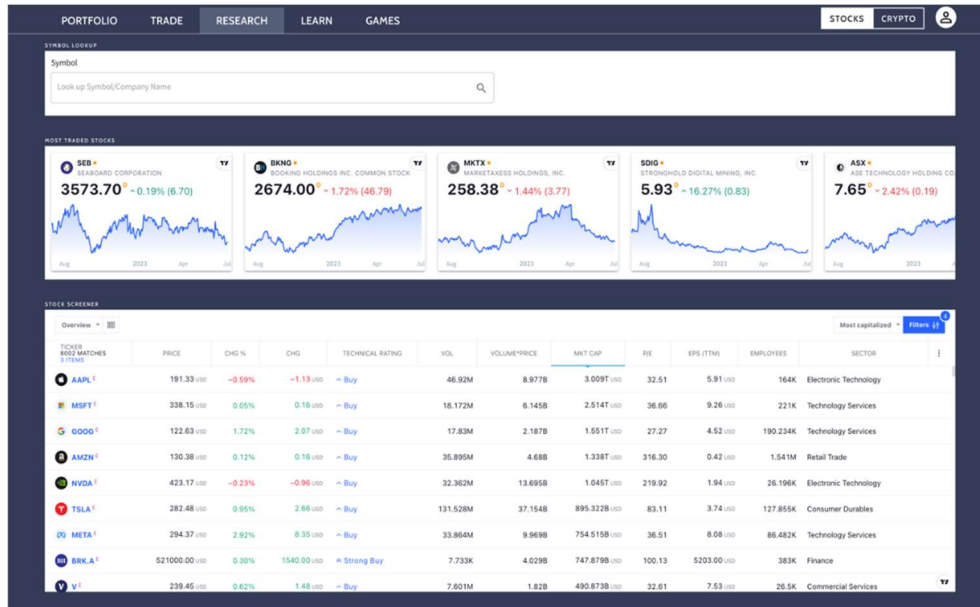


Figure 2.1.3 Research Section of Stock Market Simulator

2.2 Buy and Hold Strategy

Buy-and-hold strategy is quite trivial - it is a passive investment strategy where an investor buys various stocks and holds them for quite a long time, regardless of market fluctuations. Most famous investors, including such a legendary investor as Warren Buffett consider a buy-and-hold strategy ideal for those looking for a healthy long-term return on investment [6]

An example of this strategy is as follows: let's imagine that we bought shares of Google in 2012. At that time the price per share was approximately 12\$, and let's imagine that we bought shares for 15,000\$ which would end up giving us 1250 shares of the company. And if I owned these shares to this day, their value would be in the region of 1250 multiplied by the current value of the share (which is now around 119\$) in the end we get 148,750\$. Which in fact is almost tenfold increase in my investment. According to [7] the average interest on bank deposits is 0.42% APY, and in online banks it can be up to 4%. Let's imagine that I invested the same amount of

money in a deposit account in a bank for 11 years (from 2012 to 2023), then at this point I would have about 23.000\$, assuming that the tax would be minimal (around 10%) [8]. That's why the buy and hold strategy looks more attractive than investing in a deposit bank account. Figure 2.2.1 shows the value of Google stock from 2005 to 2023.

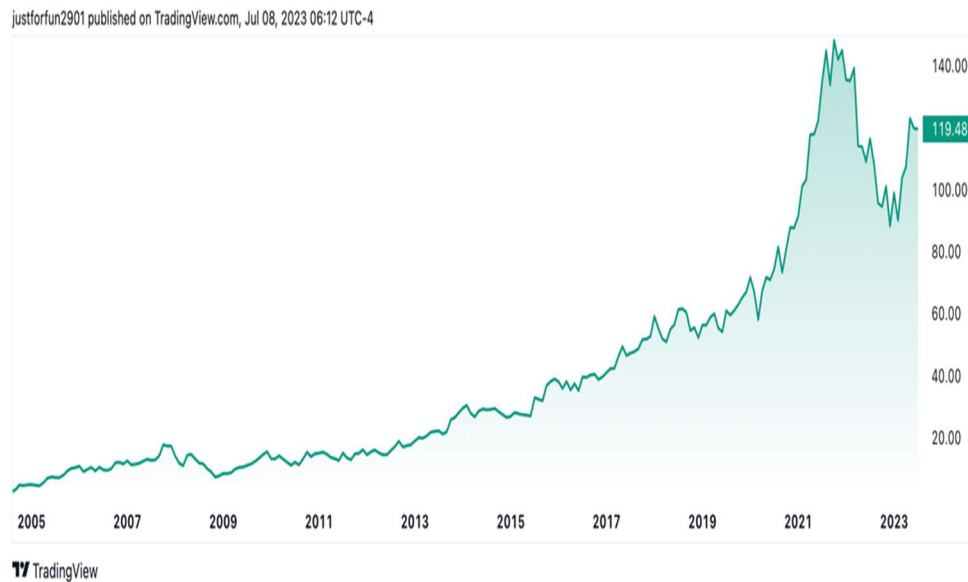


Figure 2.2.1 Google Stock Price Over 18 Years

It is worth noting that although many people speak well of this strategy, I will not be able to unlock its full potential in a 4-week period of time. Therefore, this strategy will play a role more for comparison with short-term strategies.

2.3 Momentum trading strategy

Momentum strategy involves identifying stocks or assets that are exhibiting strong upward or downward price trend [9]. Traders using this strategy aim to capitalize on the continuation of

this trends. Momentum trading is associated with short-term trading, allowing quicker returns compared to long-term strategies mentioned above.

Momentum might seem similar to other short-term strategies such as Swing strategy but in fact they differ significantly. While both momentum trading and swing trading involve capturing short to medium-term price movements, the main difference lies in the approach. Momentum trading focuses on stocks with strong price momentum, aiming to ride the trends, whereas swing trading focuses on capturing price swings withing a trend, regardless of the overall momentum.

Let's say you are using a momentum trading strategy. You would look for stocks that are exhibiting strong price momentum, which means they have been consistently moving in an upward direction with increasing trading volume. As shown in Figure 2.3.1 there are 2 uptrends that one might try to "catch". In this case, you would enter a trade by buying the stock, expecting the upward momentum to continue. Your exit strategy might involve setting a profit target – where you just leave. Your main goal is to capture the ongoing price movement and exit the trade before the momentum starts to weaken or reverse.

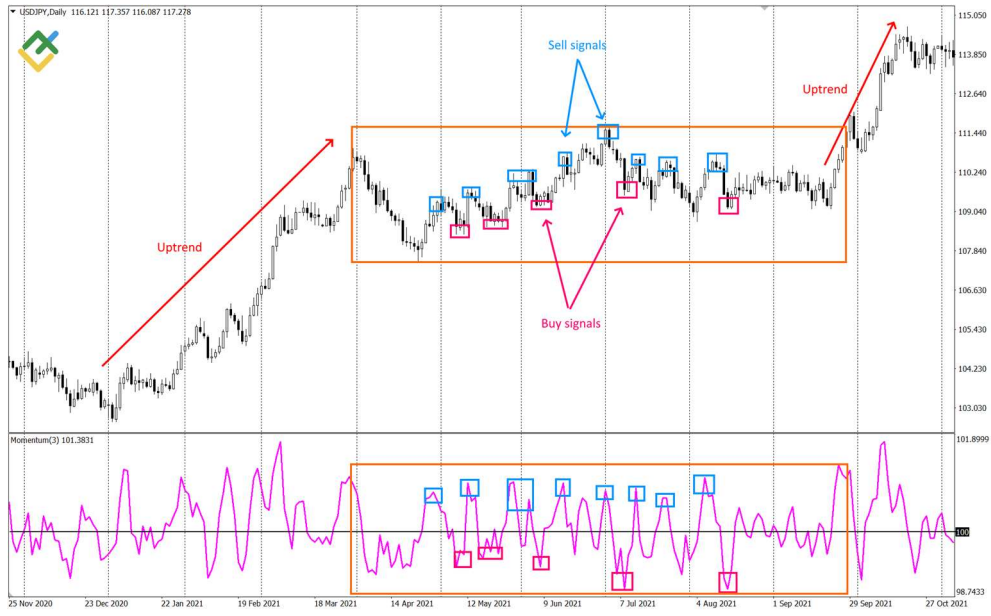


Figure 2.3.1 Momentum Example on the Graph

Chapter 3: Selected Companies

When choosing stocks to fill my portfolio, I proceeded from the following principle. At a time when stock markets are falling globally, it is best to invest in securities of companies with the largest capitalization because they are more stable to market fluctuations and provide a slight increase in value to compensate for inflation.

In my project, I decided to diversify the portfolio into 5 segments responsible for different areas of the economy, such as: technology, oil companies, health care, consumer goods and car manufacturers. Each of these areas has great potential and plays a significant role in the U.S. economy.

3.1 Technologies

The technology sector in the U.S. leads the world and has done so for several decades, and by now all the trends in technology development are set by leading companies from the U.S. At the moment the most discussed topic in the tech sector is the development of artificial intelligence. Companies engaged in the development of the artificial intelligence sector have the greatest growth potential due to the huge interest of investors.

3.1.1 Apple

Despite all fears of a downturn in the U.S. economy, Apple managed to reach the \$3 trillion capitalization mark [10]. This mark was already reached on January 3, 2022, but the company failed to keep it on this position. Now Apple has consolidated this position and the stock rose by more than 2% reaching the mark of \$193.97. The recent presentation of the virtual reality glasses, The Vision Pro, also influenced the growth of the company's stock. In Figure 3.1.1 below, you can see that the stock is up 49% in 2 years.

NASDAQ: AAPL



Figure 3.1.1 Apple Stock Price Over the Past 2 Years

3.1.2 Nvidia

As mentioned earlier at the moment investors have a huge interest in the field of artificial intelligence. Nvidia company creates graphics cards very famous among the community of gamers, but as it turned out, these graphics cards can be used in the training of artificial intelligence models [11]. Which was very good effect on the growth of the company's share price. As shown in Figure 3.1.2, the company's stock has grown by 180% this year.

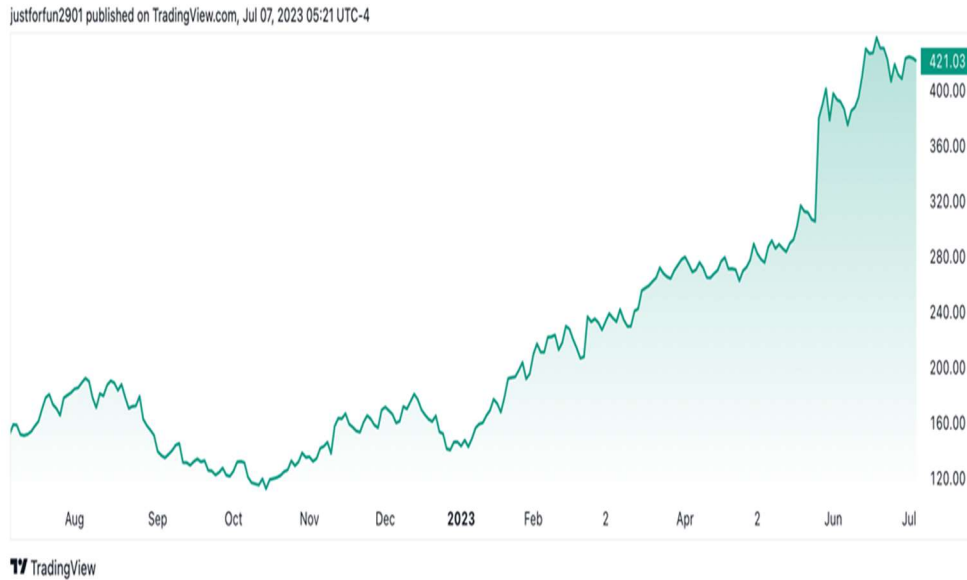


Figure 3.1.2 Nvidia Stock Price Over the Past Year

3.2 Oil Companies

Currently, the demand for petroleum products is very high, in particular it is automotive fuel, aircraft fuel, marine fuel and others. According to statistics, 91.7% of American families have at least one car [12]. Also, among all new cars purchased in 2022, only 12.3% will be electric cars, as a result 87.7% of new cars will use fuel produced from oil refining [12].

3.2.1 ConocoPhillips

An American oil company headquartered in Houston, it produces oil and crude gas in Alaska, Canada, Norway and other countries. The Figure 3.2.1 below shows that the company's stock is up 19% in a given year.



Figure 3.2.1 ConocoPhillips Stock Price Over the Past Year

3.2.2 EOG Resources

One of the largest independent oil companies in the United States, headquartered in Houston, Texas [13]. The company is engaged in production of hydrocarbons and is included in the Fortune 500 and Forbes Global 2000. It has great potential due to the existing demand for oil products. The Figure 3.2.2 below shows that the company's shares have grown by almost 10% this year.



Figure 3.2.2 EOG Resources Stock Price Over the Past Year

3.3 Healthcare

Unlike other sectors of the economy, securities in health care benefit greatly from a simple and irreversible trend - the baby boomer generation is aging. In the U.S. approximately 10,000 baby boomers retire every day. Even the youngest members of this social group will reach retirement age through 2029-2030. Given the inevitable health problems that accompany old age, we can talk about the demand for these companies' products.

3.3.1 Johnson & Johnson

J&J's business is well diversified, and the company is increasingly focused on aggressively expanding its pharmaceutical business. J&J now has 35 treatments for various diseases in phase 3 clinical trials. In Figure 3.3.1 you can see that the company's stock has lost around 9% this year, according to several sources now is the right time to buy the stock.



Figure 3.3.1 Johnson & Johnson Stock Price Over the Past Year

3.3.2 Eli Lilly

An American pharmaceutical company founded in 1876 and headquartered in Indianapolis, Indiana. It is considered the first company to launch industrial production of insulin in 1923. Recently Eli Lilly has grown by 3% after the approval of a new cancer drug [14]. As shown in Figure 3.3.2, the company's stock is up more than 40% this year, which holds great potential.



Figure 3.3.2 Eli Lilly Stock Price Over the Past Year

3.4 Consumable essentials

Another sector with a lot of "dividend kings" is the consumer staples sector and it consists of two large parts:

1. Companies that produce basic everyday products (such as beverages, food, etc.)
2. Companies selling these products (stores, supermarkets, etc.).

This group of issuers is stable because the goods they offer are always in demand, regardless of income. Their securities are stable even with a sharp decline in the market, so they belong to the category of protective. However, their growth, as a rule, is slow.

3.4.1 Coca-Cola

The company in the field of basic everyday products that I chose was Coca-Cola. The main reason why I chose this company is its capitalization of more than 200 billion dollars, brand recognition, wide production and distribution network and of course their strong position in the stock market. Figure 3.4.1 shows the company's stock price over the last year, which has fallen by 5%. However, since my period of experimentation will be short, it will be possible to earn on these fluctuations.



Figure 3.4.1 Coca-Cola Stock Price Over the Past Year

3.4.2 Walmart

The company with the largest hired labor force in the world is recognized supermarket chain Walmart [15]. As I mentioned earlier I divided this sector into a manufacturer and a retailer, Walmart is in the second category, that is, it sells a huge number of products. Only in the United States the company has 4.630 stores [16]. Figure 3.4.2 shows that only this year the share price of the company increased by 22%.



Figure 3.4.2 Walmart Stock Price Over the Past Year

3.5 Car manufacturers

As I mentioned in the refining sector, almost every family in the United States has a car. That makes the auto market sector an attractive investment.

3.5.1 Tesla

A young American car company from Silicon Valley, focused on the production of electric cars. In mid-June, Morgan Stanley analysts published an analyst report that called Tesla the most important car company in the world. Figure 3.5.1 shows that the company's stock rose 17% over the year.

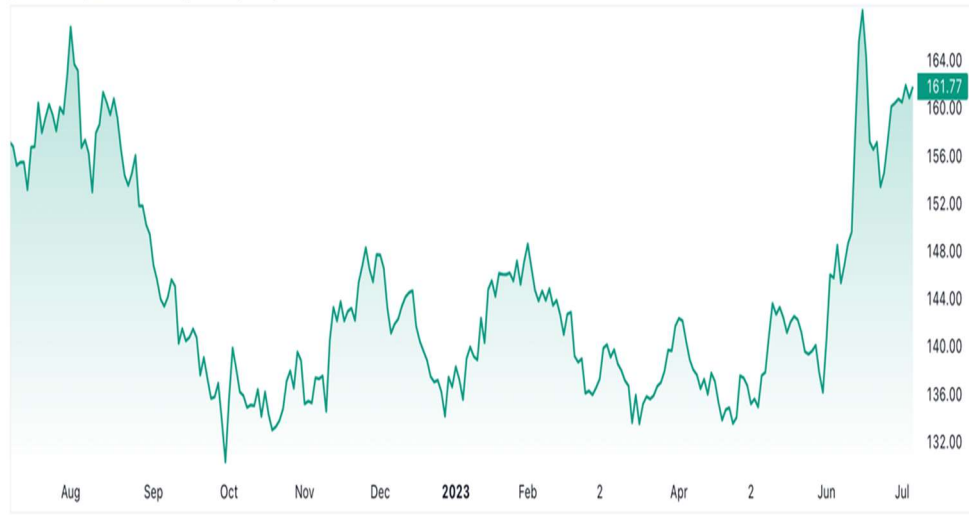


Figure 3.5.1 Tesla Stock Price Over the Past Year

3.5.2 Toyota

There is currently a significant demand for the Toyota Prius car model in America. This model has been on sale for the first time since 1997 and immediately became popular because it was one of the first hybrid cars. This car has gone through 5 generations and is still the market leader. Toyota has paid attention to the great demand in the U.S. market and has decided to create a special luxury brand Lexus, originally designed for the U.S. market. Figure 3.5.2 shows a graph of the company's stock price for the year, they are up 4%.

justforfun2901 published on TradingView.com, Jul 08, 2023 05:38 UTC-4



TradingView

Figure 3.5.2 Toyota Stock Price Over the Past Year

Chapter 4: Buy and Hold Simulation

As was mentioned in Chapter 2, the first methodology that I'm planning to use is called buy and hold strategy, which is straightforward. I'm planning to buy stocks of each company for equal amount of money, which will be approximately \$10,000 for each company's stock. The companies that I will invest in are mentioned in the Chapter 3.

The results of profits and losses of portfolio will be calculated at each Friday of the week. Results will be calculated accordingly to the price of each stock in the market at the close of trading each Friday. The price from the previous Friday will be calculated as the starting price of the following week in order to accurately determine the percentage of loss or gain for each week.

4.1 Week One (07/10-07/16)

The initial portfolio stocks were bought on Monday 10th of July. According to the plan, shares of all selected companies were purchased. Then it was only necessary to wait for the end of the week to calculate the results of each stock's price. Figure 4.1.1 below shows portfolio during the third day of simulation.

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TOTAL VALUE		TODAY'S CHANGE		TOTAL GAIN/LOSS	
\$100,186.26		\$931.95 (0.94%) ↑		\$1,335.73 (1.35%) ↑	

Symbol	Description	Current Price	Today's Change	Purchase Price	QTY	Total Value	Total Gain/Loss	Trade Actions
AAPL	Apple Inc	\$189.44	\$54.07 ↑ (0.54%)	\$188.04	53	\$10,022.31	\$56.02 ↑ (0.56%)	Buy/More Sell
COP	Conoco Phillips	\$108.81	\$131.52 ↑ (1.28%)	\$103.57	96	\$10,445.76	\$503.04 ↑ (5.06%)	Buy/More Sell
EOG	EOG Resources, Inc.	\$120.54	\$58.48 ↑ (0.57%)	\$116.28	86	\$10,344.08	\$344.00 ↑ (3.44%)	Buy/More Sell
JNJ	Johnson & Johnson	\$158.79	\$9.92 ↑ (0.10%)	\$159.62	62	\$9,844.98	-\$51.46 ↓ (-0.52%)	Buy/More Sell
KO	Coca-Cola Co	\$59.95	\$78.12 ↑ (0.78%)	\$59.73	168	\$10,077.48	\$43.26 ↑ (0.43%)	Buy/More Sell
LLY	Lilly(Eli) & Co	\$442.78	\$71.39 ↑ (0.74%)	\$450.53	22	\$9,737.97	-\$73.64 ↓ (-1.75%)	Buy/More Sell
NVDA	NVIDIA Corp	\$433.12	\$748.98 ↑ (2.55%)	\$419.49	23	\$10,002.13	\$153.93 ↑ (3.67%)	Buy/More Sell
TM	Toyota Motor Corporation - ADR	\$160.14	\$106.64 ↑ (1.09%)	\$160.07	62	\$9,928.68	\$4.34 ↑ (0.04%)	Buy/More Sell
TSLA	Tesla Inc	\$273.00	\$115.56 ↑ (1.19%)	\$267.70	36	\$9,828.00	\$190.95 ↑ (1.98%)	Buy/More Sell
WMT	Walmart Inc	\$155.55	\$57.28 ↑ (0.58%)	\$154.53	64	\$9,954.88	\$65.28 ↑ (0.66%)	Buy/More Sell

Figure 4.1.1 Simulator Portfolio on Third Day

By the end of the week all the stocks were sold by the price before the closing of the market. The Table 4.1 below demonstrates all transactions in my buy and hold portfolio account. Only two companies' stocks price decreased during the first week period of simulation, while other companies' stocks price increased. In total, I have made \$2,184.32 by using buy and hold strategy.

Table 4.1 Buy and Hold Portfolio Transactions Week 1 (07/10-07/14)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/10/2023							\$100,000	
7/10/2023	TM	Buy	\$160.13	62	\$9,928.06	0	\$90,071.94	0
7/10/2023	TSLA	Buy	\$266.83	36	\$9,605.88	0	\$80,466.06	0
7/10/2023	KO	Buy	\$59.71	168	\$10,031.28	0	\$70,434.78	0
7/10/2023	LLY	Buy	\$450.36	22	\$9,907.92	0	\$60,526.86	0
7/10/2023	JNJ	Buy	\$159.53	62	\$9,890.86	0	\$50,636	0
7/10/2023	EOG	Buy	\$116.37	86	\$10,007.82	0	\$40,628.18	0
7/10/2023	COP	Buy	\$103.73	96	\$9,958.08	0	\$30,670.10	0
7/10/2023	NVDA	Buy	\$419.34	23	\$9,644.82	0	\$21,025.28	0
7/10/2023	AAPL	Buy	\$187.74	53	\$9,950.22	0	\$11,075.06	0
7/10/2023	WMT	Buy	\$154.52	64	\$9,889.28	0	\$1,185.78	0
7/14/2023	TM	Sell	\$159.15	62	\$9,867.3	\$60.76	\$11,053.08	-\$60.76
7/14/2023	TSLA	Sell	\$281.38	36	\$10,129.68	\$523.8	\$21,182.76	\$463.04
7/14/2023	KO	Sell	\$60.90	168	\$10,231.2	\$199.92	\$31,413.96	\$662.96
7/14/2023	LLY	Sell	\$449.46	22	\$9,888.12	\$20.8	\$41,302.08	\$642.16
7/14/2023	JNJ	Sell	\$159.87	62	\$9,911.94	\$21.08	\$51,214.02	\$663.24
7/14/2023	EOG	Sell	\$118.93	86	\$10,227.98	\$220.16	\$61,442	\$883.4
7/14/2023	COP	Sell	\$107.09	96	\$10,280.64	\$322.56	\$71,722.64	\$1,205.96
7/14/2023	NVDA	Sell	\$454.69	23	\$10,457.87	\$813.05	\$82,180.51	\$2,019.01
7/14/2023	AAPL	Sell	\$190.69	53	\$10,106.57	\$156.35	\$92,287.08	\$2,175.36
7/14/2023	WMT	Sell	\$154.53	64	\$9,898.24	\$8.96	\$102,185.32	\$2,184.32

4.2 Week Two (07/17-07/23)

During the second week, most companies experienced share price gains in the range of 2%. The exception was tesla company in dynamics of share price change, which showed decrease within 6%. The starting value of the stock this week I take the value of the stock as it was last

week on the Friday before the stock market closed. This is done in order to track the progress of each week separately. In the Table 4.2 below, under the 'buy' value you can see the prices from last week.

Table 4.2 Buy and Hold Portfolio Transactions Week 2 (07/17-07/21)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/17/2023							\$102,185.32	
7/17/2023	TM	Buy	\$159.15	62	\$9,867.3	0	\$92,318.02	0
7/17/2023	TSLA	Buy	\$281.38	36	\$10,129.68	0	\$82,188.34	0
7/17/2023	KO	Buy	\$60.90	168	\$10,231.2	0	\$71,957.14	0
7/17/2023	LLY	Buy	\$449.46	22	\$9,888.12	0	\$62,069.02	0
7/17/2023	JNJ	Buy	\$159.87	62	\$9,911.94	0	\$52,157.08	0
7/17/2023	EOG	Buy	\$118.93	86	\$10,227.98	0	\$41,929.1	0
7/17/2023	COP	Buy	\$107.09	96	\$10,280.64	0	\$31,648.46	0
7/17/2023	NVDA	Buy	\$454.69	23	\$10,457.87	0	\$21,190.59	0
7/17/2023	AAPL	Buy	\$190.69	53	\$10,106.57	0	\$11,084.02	0
7/17/2023	WMT	Buy	\$154.53	64	\$9,889.92	0	\$1,194.1	0
7/21/2023	TM	Sell	\$162.81	62	\$10,094.22	\$226.92	\$11,288.32	\$226.92
7/21/2023	TSLA	Sell	\$260.02	36	\$9,360.72	\$768.96	\$20,649.04	-\$542.04
7/21/2023	KO	Sell	\$62.44	168	\$10,489.92	\$258.72	\$31,138.96	-\$283.32
7/21/2023	LLY	Sell	\$462.04	22	\$10,164.88	\$276.76	\$41,303.84	-\$6.56
7/21/2023	JNJ	Sell	\$170.19	62	\$10,551.78	\$639.84	\$51,855.62	\$633.28
7/21/2023	EOG	Sell	\$124.61	86	\$10,716.46	\$488.48	\$62,572.08	\$1,121.76
7/21/2023	COP	Sell	\$112.89	96	\$10,837.44	\$556.8	\$73,409.52	\$1,678.56
7/21/2023	NVDA	Sell	\$443.09	23	\$10,191.07	\$266.8	\$83,600.59	\$1,411.76
7/21/2023	AAPL	Sell	\$191.94	53	\$10,172.82	\$66.25	\$93,773.41	\$1,478.01
7/21/2023	WMT	Sell	\$158.37	64	\$10,135.68	\$245.76	\$103,909.09	\$1,723.77

The total profit for the second week of simulation amounted to \$1,723.77, which is equal to approximately 1.6% of total cash. Tesla shares fell significantly this week, down about 7% resulting in some losses. Also, Nvidia shares fell 4.8%, which is due to a correction associated with a significant price gain in the week 1 of simulation.

4.3 Week Three (07/24-07/28)

The third week of the simulation was memorable for its steady increase in the stock price of all selected companies, except Eli Lilly, for the buy-hold strategy. This week there were no holidays, and the market functioned all week in a normal mode. Table 4.3 shows the price dynamics for this third week of the simulation.

Table 4.3 Buy and Hold Portfolio Transactions Week 3 (07/24-07/28)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/24/2023							\$103,909.09	
7/24/2023	TM	Buy	\$162.81	62	\$10,094.22	0	\$93,814.87	0
7/24/2023	TSLA	Buy	\$260.02	36	\$9,360.72	0	\$84,454.15	0
7/24/2023	KO	Buy	\$62.44	168	\$10,489.92	0	\$73,964.23	0
7/24/2023	LLY	Buy	\$462.04	22	\$10,164.88	0	\$63,799.35	0
7/24/2023	JNJ	Buy	\$170.19	62	\$10,551.78	0	\$53,247.57	0
7/24/2023	EOG	Buy	\$124.61	86	\$10,716.46	0	\$42,531.11	0
7/24/2023	COP	Buy	\$112.89	96	\$10,837.44	0	\$31,693.67	0
7/24/2023	NVDA	Buy	\$443.09	23	\$10,191.07	0	\$21,502.60	0
7/24/2023	AAPL	Buy	\$191.94	53	\$10,172.82	0	\$11,329.78	0
7/24/2023	WMT	Buy	\$158.37	64	\$10,135.68	0	\$1,194.10	0
7/28/2023	TM	Sell	\$167.15	62	\$10,363.30	\$269.08	\$11,557.40	\$269.08
7/28/2023	TSLA	Sell	\$266.44	36	\$9,591.84	\$231.12	\$21,149.24	\$500.20
7/28/2023	KO	Sell	\$62.48	168	\$10,496.64	\$6.72	\$31,645.88	\$506.92
7/28/2023	LLY	Sell	\$458.48	22	\$10,086.56	\$78.32	\$41,732.44	\$428.60
7/28/2023	JNJ	Sell	\$174.48	62	\$10,817.76	\$265.98	\$52,550.20	\$694.58
7/28/2023	EOG	Sell	\$130.7	86	\$11,240.20	\$523.74	\$63,790.40	\$1,218.32
7/28/2023	COP	Sell	\$115.93	96	\$11,129.28	\$291.84	\$74,919.68	\$1,510.16
7/28/2023	NVDA	Sell	\$467.5	23	\$10,752.50	\$561.43	\$85,672.18	\$2,071.59
7/28/2023	AAPL	Sell	\$195.83	53	\$10,378.99	\$206.17	\$96,051.17	\$2,277.76
7/28/2023	WMT	Sell	\$159.91	64	\$10,234.24	\$98.56	\$106,285.41	\$2,376.32

The total profit for the third week of the simulation was \$2,376.32 which is the maximum for all 3 past weeks. The company that rose in price the most this week was EOG Resources, with its share price up 5.3%. The total share price including cash balance exceeded \$106,285.41, which is the highest of the past 3 weeks.

4.3 Week Four (07/31-08/04)

During the final week of the stock market trading simulation, events occurred that significantly affected the value of the shares purchased. The most important event, which is covered in the media, is the downgrade of the U.S. credit rating by Fitch [17]. Table 4.4 below shows the price dynamics for the fourth week of the simulation.

Table 4.4 Buy and Hold Portfolio Transactions Week 4 (07/31-08/04)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Losses	Total Cash	Total Profit
7/31/2023							\$106,285.401	
7/31/2023	TM	Buy	\$167.15	62	\$10,363.30	0	\$95,922.11	0
7/31/2023	TSLA	Buy	\$266.44	36	\$9,591.84	0	\$86,330.27	0
7/31/2023	KO	Buy	\$62.48	168	\$10,496.64	0	\$75,833.63	0
7/31/2023	LLY	Buy	\$458.48	22	\$10,086.56	0	\$65,747.07	0
7/31/2023	JNJ	Buy	\$174.48	62	\$10,817.76	0	\$54,929.31	0
7/31/2023	EOG	Buy	\$130.70	86	\$11,240.20	0	\$43,689.11	0
7/31/2023	COP	Buy	\$115.93	96	\$11,129.28	0	\$32,559.83	0
7/31/2023	NVDA	Buy	\$467.50	23	\$10,752.50	0	\$21,807.33	0
7/31/2023	AAPL	Buy	\$195.83	53	\$10,378.99	0	\$11,428.34	0
7/31/2023	WMT	Buy	\$159.91	64	\$10,234.24	0	\$1,194.10	0
08/04/2023	TM	Sell	\$170.79	62	\$10,588.98	\$225.68	\$11,783.08	\$225.68
08/04/2023	TSLA	Sell	\$253.86	36	\$9,138.96	\$452.88	\$20,922.04	\$227.2
08/04/2023	KO	Sell	\$60.71	168	\$10,199.28	\$297.36	\$31,121.32	\$524.56
08/04/2023	LLY	Sell	\$449.49	22	\$9,888.78	\$197.78	\$41,010.10	\$722.34
08/04/2023	JNJ	Sell	\$169.04	62	\$10,480.48	\$337.28	\$51,490.58	\$1,059.62
08/04/2023	EOG	Sell	\$129.80	86	\$11,162.80	\$77.40	\$62,653.38	\$1,137.02
08/04/2023	COP	Sell	\$113.71	96	\$10,916.16	\$213.12	\$73,569.54	\$1350.14
08/04/2023	NVDA	Sell	\$449.80	23	\$10,345.40	\$407.1	\$83,914.94	\$1757.24
08/04/2023	AAPL	Sell	\$181.99	53	\$9,645.47	\$733.52	\$93,560.41	\$2490.76
08/04/2023	WMT	Sell	\$158.34	64	\$10,133.76	\$100.48	\$103,694.17	\$2,591.24

The fourth week of the simulation was one of failure due to the big downturn in the stock market. In total for this week the value of shares decreased by \$2,591.24. And it happened because of the negative general trend on the market. According to experts, this was due to the downgrade of the US credit rating by Fitch rating agency from 'AAA' to 'AA+'.

Chapter 5: Momentum Trading Simulation

In momentum trading strategy it was necessary to first find companies among which there was an uptrend that I could try to catch. For this purpose, I used the Trading View platform in which I was able to find a momentum indicator. With the help of this indicator, I could find companies whose stocks were experiencing a rapid rise or a rapid fall. Next, following my strategy, I chose the conditions under which I would try to catch the trend.

Such conditions for entering the uptrend were:

1. Momentum indicator value above zero.
2. Increase in stock price volume.
3. Visible local uptrend on the chart.

And conditions for exiting the deal:

1. Market reversal.
2. Momentum indicator value below zero.
3. Unfavorable news about company

5.1 Week One (07/10-07/16)

During the first day of the company matching all the trend entry criteria could not be found. However, on the second day, I noticed that Nvidia's stock had taken an uptrend and I started doing technical analysis. And according to my strategy, firstly, the momentum of stock price was 1.18

(above 0), secondary, the stock market price volume was positive and lastly, there was a visible local uptrend with little correction that gave me opportunity to buy stocks at a more favorable price. The Figure 5.1.1 shows the momentum index and the Nvidia stock price graph.



Figure 5.1.1 Nvidia Stock Price Chart on 07.11.2023

Also, on the Figure 5.1 I have indicated a resistance level that indicates my target. At this level I plan to exit the trade and earn about \$200. That was the end of my first day of trading and I decided to wait for more favorable conditions of other selected companies to enter the deal and more favorable conditions to exit the Nvidia deal.

On the next day, 12th of July, I noticed that Nvidia Momentum Indicator rose to value of 16 (above 0) and it reached my goal of \$437.6. So, it was my time to sell all stocks that I bought which resulted in 3.2% profit. Figure 5.1.2 shows the graph of Nvidia on the next day.



Figure 5.1.2 Nvidia Stock Price Chart on 07.12.2023

On the Wednesday, 12th of July, Apple stock showed a gain on the momentum indicator, and I invested in it expecting a gain. In figure 5.1.3 below you can see the momentum indicator and the chart are in an uptrend. My plan was to exit the trade between the lower high and the upper high, however, the market was not volatile on the eve of the close and the momentum indicator did not drop to below zero, so I decided to wait until next week.



Figure 5.1.3 Apple Stock Price Chart Week 1

For the first week of the simulation the selected companies have shown moderate growth, however, the momentum indicator for almost all of them was at low position. For that reason I was not able to gain the same amount of profit as the buy and hold strategy. In the Table 5.1 below all my transactions are summered down.

Table 5.1 Momentum Strategy Portfolio Transactions Week 1 (7/10-7/14)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/10/2023							\$100,000	
7/11/2023	NVDA	Buy	\$423.42	23	\$9,738.76	0	\$90,261.24	0
7/12/2023	NVDA	Sell	\$437.60	23	\$10,064.69	325.93	\$100,325.93	325.93
7/12/2023	AAPL	Buy	\$190.06	26	\$4,941.56	0	\$95,384,37	325.93

5.2 Week Two (07/17-07/21)

During the second week of trading using the momentum strategy, several things happened:

1. The price of a barrel of oil increased, which led to an increase in the value of stocks in the oil extraction and refining industry, 2. Pharmaceutical companies published their quarterly reports, which showed profits, which also led to an increase in stocks. Using my Momentum strategy and this knowledge I managed to make a profit. The results of all trades are shown in the Table 5.1 below.

Table 5.2 Momentum Strategy Portfolio Transactions Week 2 (7/17-7/21)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/17/2023							95384.37	
7/17/2023	AAPL	Sell	\$192.92	26	\$5,015.92	\$74.36	100400.29	\$74.36
7/17/2023	TSLA	Buy	\$286.54	34	\$9,742.36	0	90657.93	\$74.36
7/18/2023	TM	Buy	\$162.72	55	\$8,949.60	0	81708.33	\$74.36
7/18/2023	LLY	Buy	\$451.78	17	\$7,680.26	0	74028.07	\$74.36
7/18/2023	TSLA	Sell	\$290.75	34	\$9,885.50	\$143.14	83913.57	\$217.5
7/19/2023	JNJ	Buy	\$159.39	52	\$8,288.28	0	75625.29	\$217.5
7/19/2023	TM	Sell	\$163.92	55	\$9,015.60	\$66	84640.89	\$283.5
7/19/2023	LLY	Sell	\$453.32	17	\$7,706.44	\$26.18	92347.33	\$309.68
7/20/2023	COP	Buy	\$111.3	82	\$9,126.60	0	83220.73	\$309.68
7/20/2023	JNJ	Sell	\$167.93	52	\$8,732.36	\$444.08	91953.09	\$753.76

As stated in the report for the first week of the simulation, I left apple stock for the following week as the momentum value did not go to zero. And as I expected Apple stock and the momentum value rose as shown in Figure 5.2.1. The highlighted section in the momentum column shows its value on Monday, July 17th.



Figure 5.2.1 Apple Stock Price Chart Week 2

The next deal that became the most successful for this week of simulation was the deal on purchase of JNJ stock. Before buying the shares I did not know the information about the upcoming quarterly report, but I noticed by the momentum indicator that there is a potential for growth of the share price. Momentum indicator and company price chart can be found in Figure 5.2.2.

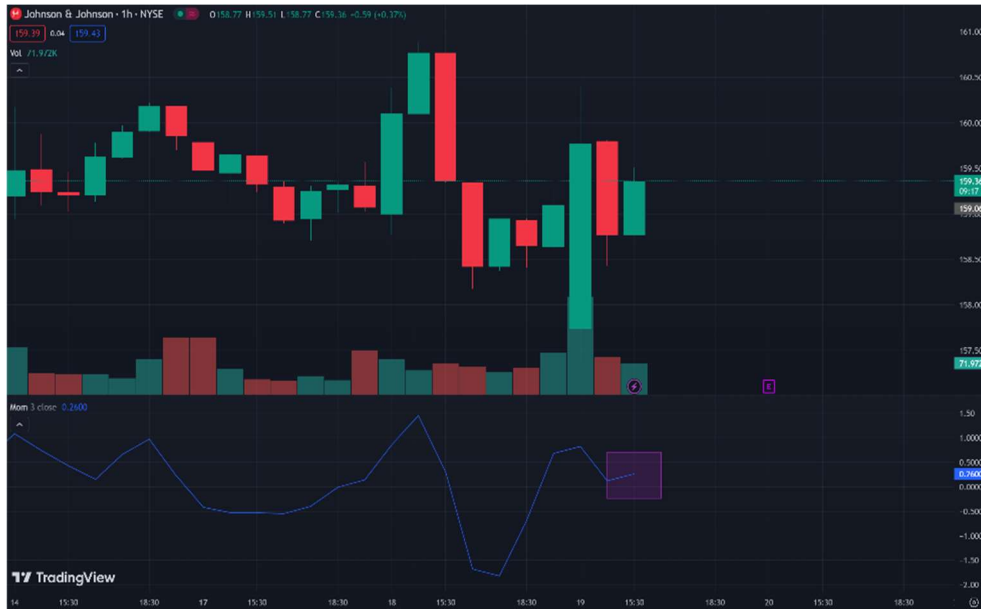


Figure 5.2.2 JNJ Stock Price Chart Start of The Week 2

By Thursday, July 20th, the momentum indicator rose from a value of 0.26 to a value of 8.41. You can also see that the momentum indicator reversed, which was a sign for me to exit this trade. In Figure 5.2.3, you can see the reversal of the indicator I mentioned earlier.



Figure 5.2.3 JNJ Stock Price Chart End of The Week 2

5.3 Week Three (07/24-07/28)

For a trading strategy using the momentum indicator, the third week of the simulation proved to be one of failure, for a number of the following reasons. Firstly, the difficulty of forecasting due to different trends in the current markets. Secondly, the stock market in the current week behaved more chaotically than in the previous weeks of the simulation. But, despite all of the above, using this strategy I managed to achieve positive results in the profitability of purchased shares. All transactions can be seen in Table 5.3.

Table 5.3 Momentum Strategy Portfolio Transactions Week 3 (07/24-07/28)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/24/2023							\$91,953.09	
7/24/2023	JNJ	Buy	\$172.86	52	\$8,988.72	0	\$82,964.37	0
7/24/2023	COP	Sell	\$115.06	82	\$9,434.92	\$308.32	\$92,399.29	\$308.32
7/24/2023	JNJ	Sell	\$171.24	52	\$8,904.48	\$84.24	\$101,303.77	\$224.08
7/25/2023	COP	Buy	\$115.16	87	\$10,018.92	0	\$91,284.85	\$224.08
7/25/2023	COP	Sell	\$116.39	87	\$10,125.93	\$107.01	\$101,410.78	\$331.09
7/26/2023	WMT	Buy	\$160.51	62	\$9,951.62	0	\$91,459.16	\$331.09
7/27/2023	NVDA	Buy	\$466.56	19	\$8,864.64	0	\$82,594.52	\$331.09
7/28/2023	NVDA	Sell	\$466.17	19	\$8,857.23	\$7.41	\$91,451.75	\$323.68
7/28/2023	WMT	Sell	\$160.49	62	\$9,950.38	\$1.24	\$101,402.13	\$322.44

In the third week of the simulation, I managed to make \$308.32 from a trade to sell COP shares. It should be noted that I decided to keep these shares last week and the sell signal came only this week. Also, the total amount of earnings for the third week is \$322.44. Out of 5 trades I managed to make money only on two of them, which is the reason why I consider this week unsuccessful.

5.4 Week Four (07/31-08/04)

The final week of the stock market trading simulation using the momentum strategy produced the biggest losses of the entire month. As already mentioned in Chapter 4.4, the main reason for the total decline in the market was the situation with the Fitch rating agency's assessment. The results for the fourth week are shown in Table 5.4.

Table 5.4 Momentum Strategy Portfolio Transactions Week 3 (07/31-08/04)

Date of Transaction	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
7/31/2023							\$101,402.13	
7/31/2023	EOG	Buy	\$132.83	75	\$9,962.25	0	\$91,439.88	0
8/1/2023	NVDA	Buy	\$467.18	21	\$9,810.78	0	\$81,629.10	0
8/2/2023	NVDA	Sell	\$449.95	21	\$9,448.95	\$361.83	\$91,078.05	\$361.83
8/2/2023	EOG	Sell	\$129.69	75	\$9,726.75	\$235.50	\$100,804.80	\$597.33
8/2/2023	LLY	Buy	\$457.22	21	\$9,601.62	0	\$91,203.18	\$597.33
8/2/2023	LLY	Sell	\$455.00	21	\$9,555.00	\$46.62	\$100,758.18	\$643.95
8/4/2023	COP	Buy	\$115.55	86	\$9,937.30	0	\$90,820.88	\$643.95
8/4/2023	WMT	Buy	\$159.28	62	\$9,875.36	0	\$80,945.52	\$643.95
8/4/2023	WMT	Sell	\$159.58	62	\$9,893.96	\$18.60	\$90,839.48	\$625.35
8/4/2023	COP	Sell	\$115.12	86	\$9,900.32	\$36.98	\$100,739.80	\$662.33

By the end of the week the total loss amounted to \$662.3. The reason why the trading technique using the momentum indicator did not bring the desired result was the chaotic price swings on the stock market. Caused by the behavior of sellers on the market, traders tried to get rid of potentially "dangerous" stocks in the leading uncertainty.14.17

The first trade was shares of EOG Resources at \$132.83, buying under the following conditions: rising uptrend, momentum is at "2" which is below average for this company.

The stock was sold at the moment of price reversal at \$129.69 and the trade went to a loss of \$235.65 due to the news background. The Figure 5.4.1 illustrates the momentum index and the price chart of EOG Resources.



Figure 5.4.1 EOG Resources Stock Price Chart Start of the Week 4

I decided to buy shares of Elly Lilly at 457.22 on Wednesday for several reasons: rising uptrend, bounce on the Momentum indicator at the mark "0". Also breakout of the previous local top. Stop Loss was also set at \$455, in case of an unexpected market reversal on the background of news, which happened, and the deal was closed at a loss of \$46.62. Figure 5.4.2 shows the status of the Elly Lilly stocks at the time of purchase.



Figure 5.4.2 JNJ Stock Price Chart Start of the Week 4

The next trade was Nvidia, which was purchased at \$467.18 at the time of purchase the price at the price compression point, and the condition of purchase was the Momentum indicator that indicated a bounce from the "0" mark towards the mark "1.3". The sale of the asset occurred the next day at \$499.65 and the transaction went to a loss of \$361.83 amid the news concerning the company Nvidia. The stock chart is shown in Figure 5.4.3.



Figure 5.4.3 Nvidia Stock Price Chart Start of the Week 4

The next Walmart trade opened at \$159.28 under the following conditions: uptrend, the nearest high was confirmed three times, which led to the expectation of a breakout of the level at \$160.50, momentum was coming out of the minus area into the plus area. The trade was closed after the breakout of the local top, the reversal occurred immediately after the breakout of the local top and at \$159.58 the trade was closed with a stop-loss which resulted in a profit of \$18.60. Figure 5.4.4 illustrates the change of the Walmart stock price for the final week of simulation.



Figure 5.4.4 Walmart Stock Price Chart End of the Week 4

The last deal this week was the shares of COP at \$115.55. The conditions for buying were as follows: the momentum indicator went from the minus zone to the plus zone, good news background, formation of the inverse double mountain pattern. The trade was closed at \$115.12 resulting in a loss of \$36.98. The trade had to be closed due to the end of the week. Figure 5.4.5 depicts the price dynamics for the week 4 of the simulation.



Figure 5.4.5 COP Stock Price Chart End of the Week 4

Chapter 6: Results and Comparative Analysis

This four-week simulation was performed to compare two selected trading strategies: the buy and hold strategy and the momentum trading strategy. Both strategies showed profits ranging from 0.74% and up to 3.69%. The overall stock market condition deteriorated significantly by the end of the simulation due to several factors: persistent rumors of a recession in the U.S. market, investors' fears that the Federal Reserve (Fed) will take a more aggressive stance in terms of further monetary tightening. To get some insight into the market on the state at the time of my four-week simulation, I have provided the state of the S&P 500 chart. Figure 6.1 shows the chart of the S&P 500 from July through August.

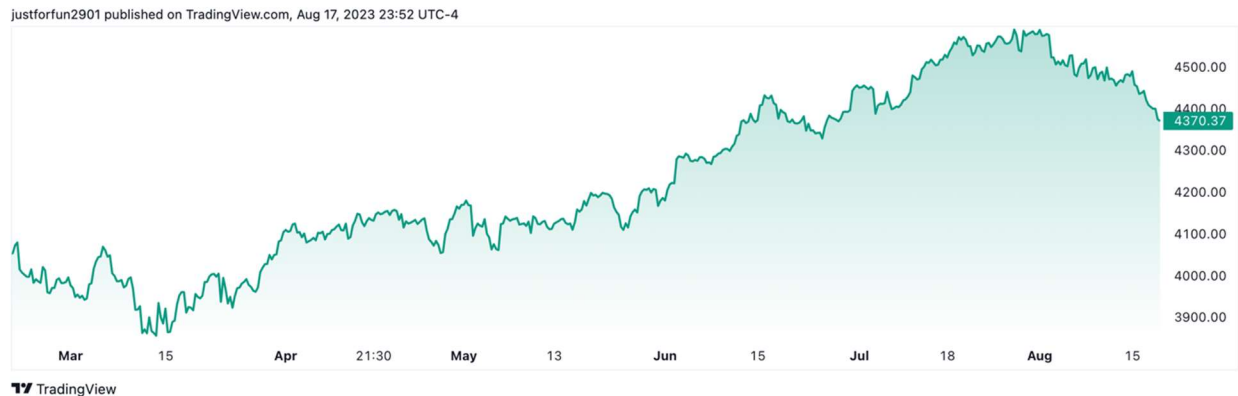


Figure 6.1 S&P 500 Index over Six-Month Period Surrounding the Simulation

The S&P 500 on the first day of the simulation, July the 10th, was \$4,401.21 and at the end of the simulation, August the 4th, it was \$4,528.14. The gain was \$126.93 or 2.88% over the four-week simulation period.

The buy and hold strategy made a large profit of \$3,694.17. Figure 6.2 shows the profit/loss of all companies using this strategy.

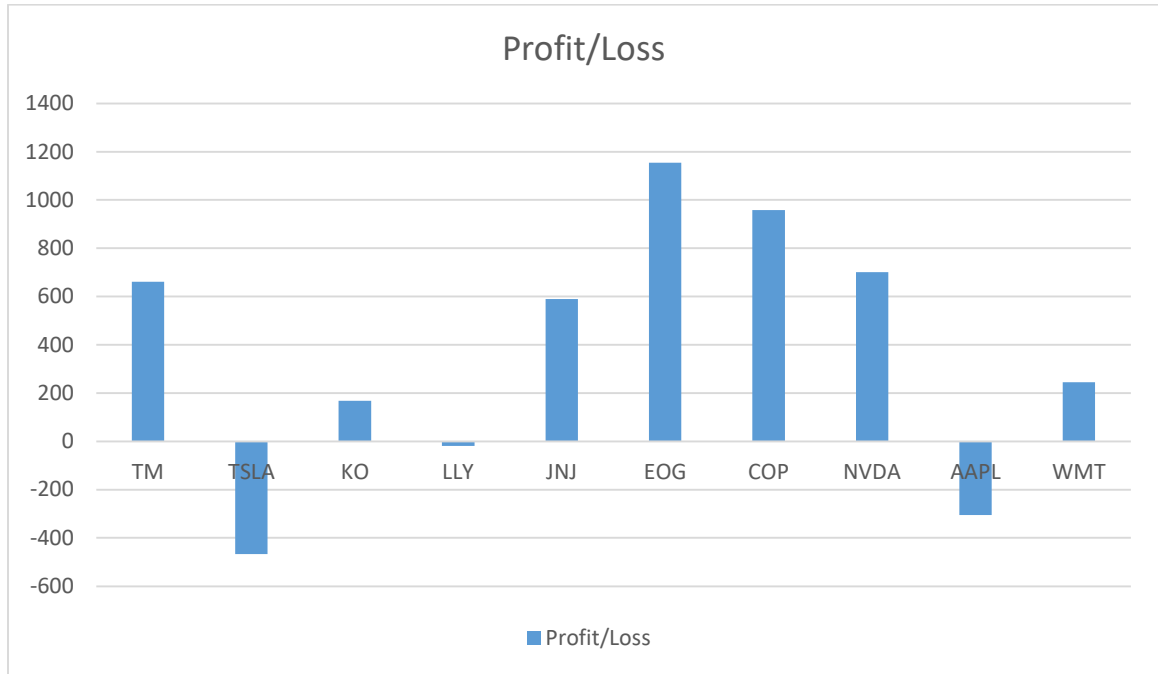


Figure 6.2 Buy and Hold Portfolio Profit and Loss

Oil sector companies EOG Resources and ConocoPhillips posted the biggest gains, while tech sector companies Apple and Tesla posted the biggest losses. The latter two were chosen for several reasons, such as: the highest share price value of Apple's stock price in history, great potential for both companies due to upcoming new product introductions.

While the momentum trading strategy earned 0.74% over the four-week simulation period. Figure 6.3 shows the companies with the number of earned/lost investments.

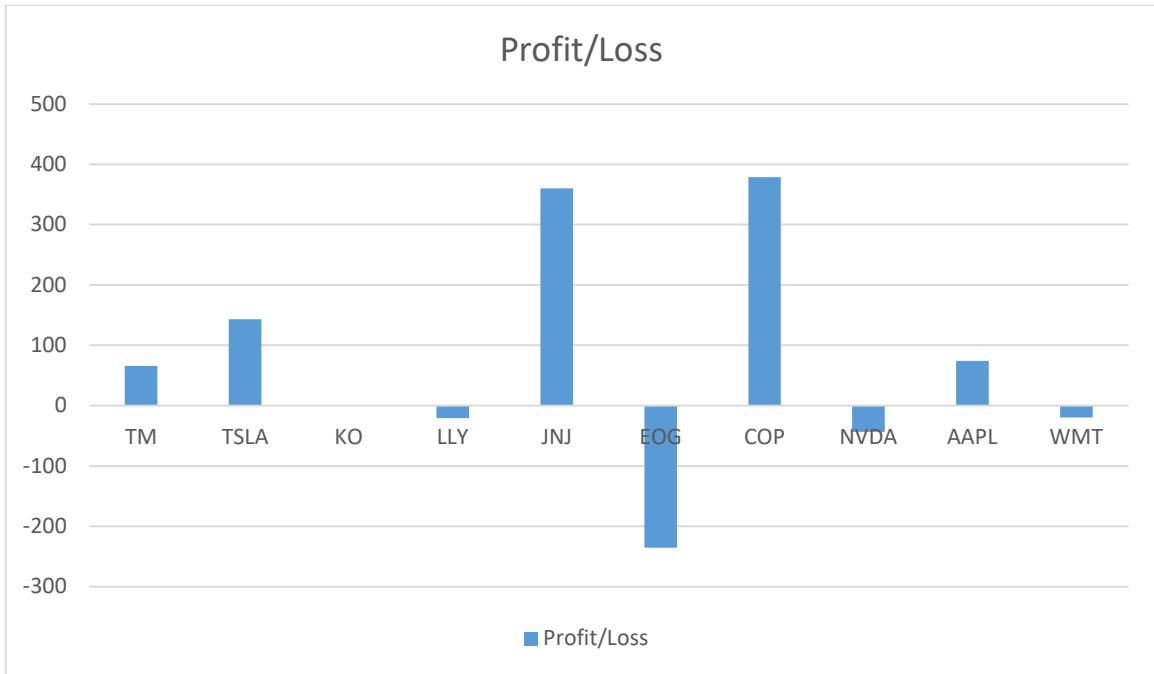


Figure 6.3 Momentum Trading Portfolio Profit and Loss

Unlike with the buy hold strategy, EOG Resources made the biggest losses, due to several factors that mentioned in Chapter 5 that turned market price of the company around very quickly. While JNJ and COP brought in the largest gains of up to over \$350, this is due to news stories about these companies that were very well liked by investors. The earnings on COP were not a surprise, as the oil sector used in both strategies generated the highest profits due to rising prices in this sector of the market. While JNJ company got a share price gain due to the quarterly report published to the public, on which the company showed a good profit.

Chapter 7: Conclusion

As mentioned in the previous chapter, in my simulation, the buy and hold strategy performed the best, earning \$3,694.17 which is equal to 3.69% of the money invested. While the momentum trading strategy earned \$739.80 or 0.74% over a four-week period. The second strategy had great potential, which it showed in the first week, but as the simulation results showed, it has its risks too. And the buy-and-hold strategy has proven to be a more stable and less risky approach; throughout the simulation, the stock prices of the invested companies using this strategy have only increased. Overall, both strategies proved to be profitable and produced large earnings in percentage terms.

The goal of this project was to learn how to trade stocks on the stock exchange by analyzing, trial and error. Despite good results, I also had many trades that resulted in losses. I was also able to learn a simple way of analyzing companies, how the information field can influence the formation of the stock price and what factors to pay attention to when choosing a company. I also had a great experience analyzing the market in real time, how to react to certain shifts and jumps in price. In most cases, I had to stick to my strategy in cold blood, despite the great desire to make money and break the rules.

In summary, this project has shown how valuable experience and knowledge in stock trading can be and how much profit it can bring. This simulation allowed to feel the unpredictability of the market and how despite this it is possible to earn money.

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