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Stock Market Simulation

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An Interactive Qualifying Project Report: submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

in Partial Fulfillment of the Requirements for the

Degree of Bachelor of Science

By

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Approved by Professor Dalin Tang, Project Advisor

Abstract

In this Interactive Qualifying Project (IQP), a five-week stock simulation was conducted using the technical trading method. Trades were made based on technical trading strategy and real-time news. Each week, investment results were analyzed and compare with three indices: S&P 500, Dow 30 and Nasdaq. Doing this IQP helped me to have a solid understanding of the stock market and experience different situations to become more competent and confident in the future.

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1 Introduction

1.1 Goal

The major goal of this IQP project is to help me have a better understanding about justifying US stock market by doing practical stock simulations and learn how to predict stock market trend with existing trading methods and updated news information. A solid understanding of strategies and skills is needed to become a competent investor. Following is basically my detailed plan for this project. For the first week, I will carefully plan out the time line, set up the goal and briefly format the paper by different chapters. The next two weeks, trading methods, the company stocks and the basis of the stock market, like history and historical events will be researched. Three or four company stocks will be then selected to be focused on. And then, the five-week simulation on selected stocks with one trading method will take place. For the trading method simulation, 100,000 will be used as the investment money pool to start investing. The final goal of this investment would be earning at least 15% of the initial investment money pool. During the third week from last, analyzing the trading data and concluding all the findings from the five weeks' simulation will be the major job to do. For the last two week, I will finalize the report, format the paper in appropriate writing style and proofread the final draft for small mistakes.

1.2 Rising of the Stock Market

Looking back into the rising of the stock market, the first genuine stock markets were created in the 1500s. Back in the 1400s and 1500s, those stock markets were linked back to Belgium. Bruges, Flanders, Ghent, and Rotterdam in the Netherlands all hosted their own “stock” market systems instead of one global union like today.

Nobody really understood the importance of the stock market in those early days. People realized it was powerful and valuable, but nobody truly understood exactly what it would become. Despite the ban on issuing shares, the London Stock Exchange was officially formed in 1801. Since companies were not allowed to issue shares until 1825, this was an extremely limited exchange. This prevented the London Stock Exchange from preventing a true global superpower. That's why the creation of the New York Stock Exchange (NYSE) in 1817 was such an important moment in stock market history. Today, virtually every country in the world has its own stock market. In the developed world, major stock markets typically emerged in the 19th and 20th centuries soon after the London Stock Exchange and New York Stock Exchange were first created. From Switzerland to Japan, all of the world's major economic powers have highly-developed stock markets which are still active today [1].

1.3 Global Financial Crisis in 2008

Wikipedia describes that the 2008 financial crisis “is considered by many economists to have been the worst financial crisis since the Great Depression of the 1930s. The immediate cause or trigger of the crisis was the bursting of the US housing bubble, which peaked in 2006/2007” [2].

Although the war in Iraq temporarily resolved the US domestic crisis, but did not fundamentally change the US capital losses, double deficit surge, the fate of the economic downturn. The US subprime mortgage crisis is due to subprime mortgage institutions bankruptcy, investment funds forced to close, the stock market turmoil caused by the storm, which led to the global major financial markets there is a shortage of liquidity crisis. Around 2006, banks released mortgages to those who were marked as a high-risk group, which means that those people had the bad financial condition and could not afford the monthly mortgage payment. As more and

more houses were sold, the house price rose rapidly. Even though some may not be able to pay for the loans, the banks could take those houses and sell them for a better and higher price. In short term, these series of actions ensured nice profits to the banks and investors. However, at the same time, most of the high-risk group with low income could not pay back the banks for the mortgages, finally went away and left a great number of houses for the banks to sell. As a result, the market for housing went down really quickly, profit that could be made due to the mortgages by the banks had gone and the housing bubbles in the money pool finally lead to the 2008 financial crisis [3].

1.4 How to Invest

Once talking about investment, we would first think about the stock market. Stock market investment is one common investment that people would choose in recent days. While choosing stock market for their way to invest, people normally are aimed to profit both in short and long term.

Before starting doing any stock market investment, a few suggestions are mentioned by the author, Laura Shin. First of all, learning before doing would always be the wise step to start with. Learning about basics of the stock market, like its history, different kinds of investing strategies and how to react to different events for the best profiting. Next, looking for investment in “a broadly diversified portfolio of low-cost ETFs and index funds” would be a great choice for the first investment. Although usually it would not bring great profit, it ensures low cost and low risk in the investment. In addition, challenging the market would not be a wise decision to make. Instead, Laura Shin suggests that investors new to this field should learn to involve in the market and understand every movement of the market to help prevent any loss of the investment. Also, set a small amount of money that is willing to lose it all. Profit in the investment is not

guaranteed, lost is common. Keeping calm to any gains and loses prevents the investor from making any bad decisions and having big lost in the stock market. This set amount helps investors stop continuing to invest when necessary. Furthermore, with all the necessary basics of the stock market, comparing all different types of investment strategies, the investors should select one that suits themselves the best and have some practice doing stock investment with that chosen trading strategy [4].

Risk in the stock market investment is one important issue that the investors should think about and take good care of.

2 Technical Trading Method

2.1 History

The first few aspects of technical trading method was introduced by the Amsterdam-based businessman, Joseph de la Vega in his accounts of the Dutch financial markets in the 17th century. During the early 18th century, technical trading strategy was officially named as one of the trading methods to be used in the market trades. Furthermore, in the 1920s, 1930s and 1948, more and more economics studied technical trading method and use this strategy in practice. Books talking about technical trading, such as Stock Market Theory and Practice and Technical Market Analysis, were published [5].

2.2 Technical Analysis

Technical trading is one of the commonly used trading methods nowadays. In general, technical analysis is based on charts and graphs, and any predictions are made due to the convergence or divergence of the past stock price. Movements on stock price and stock volume would be the main principle to make an action of trading the stocks.

There are three main assumptions made for the technical trading method: “1. Prices already reflect, or discount, relevant information. In other words, markets are efficient. 2.Prices move in trends. 3. History repeats itself” [6].

Unlike fundamental analysis, technical trading does not pay any attention to management, business models, elusive intrinsic value or competition of a company. Instead, technical analysis focuses on dealing with past data, charts, trend movements and indicators. Due to technical trading’s active identity, the technical trading method would not be considered as a long-term strategy. Frequent trading actions will be made with technical analysis being applied because the

changes of price and volume are common in short time period. Therefore, based on technical analysis, decisions of buying or selling stocks will be made [6].

2.3 John Murphy's Ten Laws of Technical Trading

Technical trading strategy is a statistical analysis mostly based on previous stock market actions. In this case, technical trading method will not always be accurate in predicting future stock price trends but will always match the stocks' general trend and movements. John Murphy, StockCharts.com's chief technical analyst, developed ten rules about technical trading. These ten rules would be great suggestions for investor new to the market.

1. **Map the Trends:** Although the technical trading method is not suitable for long-term trading, beginning with studying long-term charts is necessary. As mentioned in the previous section, "History repeats itself". These long-term charts would give the investor a general idea about how the stock price will change and help predict any price movements in certain time period.
2. **Spot the Trend and Go with It:** Identify whether the trend size is long-term, intermediate-term or short-term and trade in the direction of that trend. "Buy dips if the trend is up. Sell rallies if the trend is down".
3. **Find the Low and High of It:** All the peak and low spots would be the keys to make huge profits: buying at low and selling at high.
4. **Know How Far to Backtrack:** "Market corrections up or down usually retrace a significant portion of the previous trend". Studying a past trend helps measure the corrections. 50% is most commonly used. In addition, the percentage is bounded between one-thirds and two-thirds of the prior trend.

5. Draw the Line: Up and down trend lines drawn based on two successive lows and peaks generally give out the location of the next low and peak. The trend lines are not accurate but fit most of the conditions.
6. Follow that Average: “Moving averages provide objective buy and sell signals. They tell you if the existing trend is still in motion and they help confirm trend changes.” The investors could easily know the trading time from the moving averages.
7. Learn the Turns: Two popular oscillators, the Relative Strength Index (RSI) and the Stochastics Oscillator, are used to determine the overbought and oversold markets. For RSI, scoring over 70 is overbought and below 30 is oversold, while 80 and 20 are the scales for Stochastics.
8. Knowing the Warning Signs: The Moving Average Convergence Divergence (MACD) indicator provides the traders with warning signs about overbought and oversold markets.
9. Trend or Not a Trend: ADX, the Average Directional Movement Index, line helps the investors to identify the trend type and choose a suitable indicator to use for the technical trading strategy.
10. Know the Confirming Signs: Stock volume should always be paid great attention to. Changes in stock volumes indicate what occurs in the stock market generally [7].

3 Company Stock Selections

In Chapter 3, four companies were selected for the following stock simulation. The four company stocks represent four different price levels and company sizes. The way I selected these companies is to have a better overview of the stock market by including four different-leveled companies in the simulation. At the end, I would conclude how the market affected these four different stocks.

3.1 GOOG (Alphabet Inc.)

Google announced on August 10, 2015, that it will adjust the business structure, by creating a company called Alphabet "umbrella public (Umbrella Company), to its search, YouTube, other network subsidiaries and R & D investment sector separated. Google Chief Financial Officer Ruth Porat will serve as Alphabet Chief Financial Officer. Paige's vice president, Google's No. 3 character, Sundar Pichai, will serve as the new Google CEO, and the new Google will also account for the vast majority of the \$ 30 billion in revenue of the old Google.

Google said in a public statement, the new Google compared with the old Google will be "thin". Alphabet in addition to Google, including Google Ventures, Google Capital, Google Labs Google X and Nest and other subsidiaries, that is, from the main Internet products far from the business of the company will be classified as Alphabet, including health insurance business Such as Life Sciences and Calico [8].

In Figure 3.1, price trend of GOOG during the past year is shown.

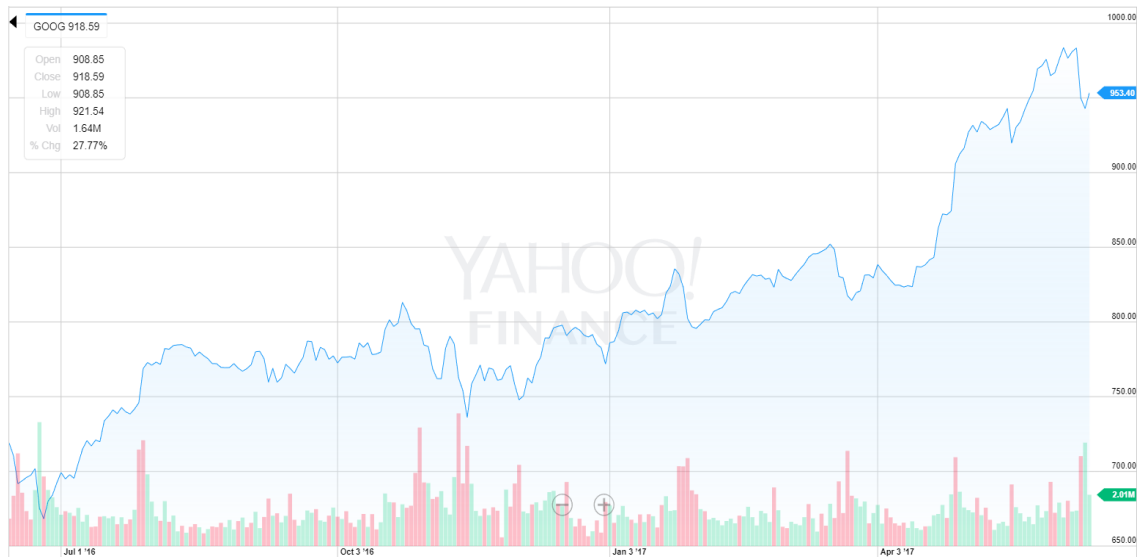


Figure 3.1 GOOG's Past Price Trend

3.2 BAC (Bank of American)

The establishment of the bank can be traced back to the Bank of Massachusetts in 1784, is the second oldest bank in the United States. Bank of America is a single bank holding company controlled by the California Consortium, founded on October 7, 1968, and headquartered in San Francisco. On April 1, 1969, Bank of America became a subsidiary of the Bank of America, and the entire shareholding was controlled by the company. Bank of America at all levels below the head office, there is no a fully centralized management of the institutions, but by the various business units or teams according to the situation of their respective settings, each other is not a mutual membership but a cooperative relationship. For example, the Bank of America, known as the store, is affiliated with individuals and small business units, the retail business unit. "Fortune" magazine released the latest US 500 list in the evening of June 7. Bank of America Rank 26, Revenue (USD million): 93,662 [9].

In Figure 3.2, price trend of BAC during the past year is shown.

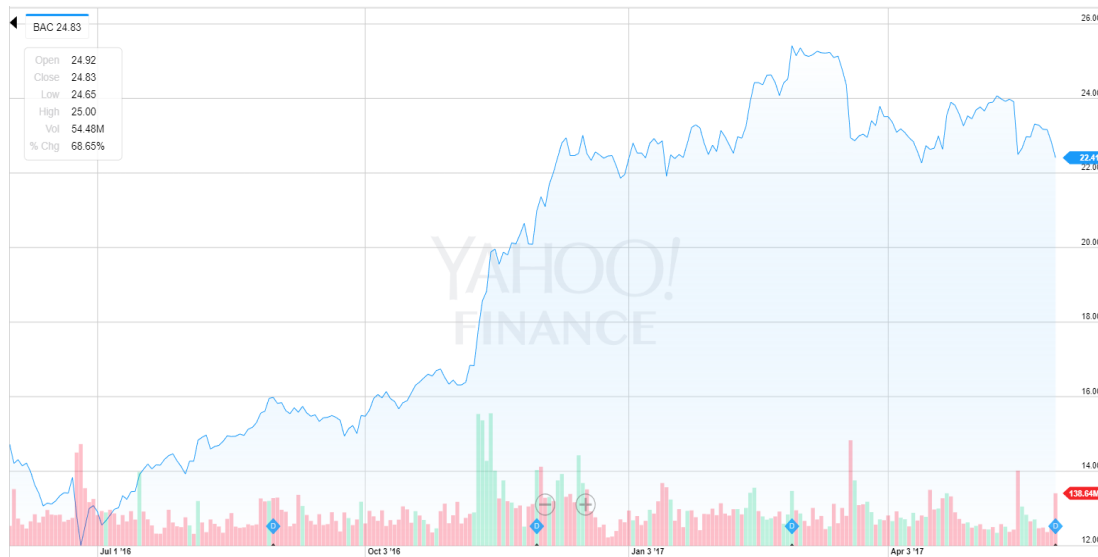


Figure 3.2 BAC's Past Price Trend

3.3 BABA (Alibaba)

Alibaba Network Technology Co., Ltd. (referred to as Alibaba Group) was the English teacher as Ma Yun, led by 18 people and founded in 1999 in Hangzhou. They believe that the Internet can create a fair competitive environment, so those small businesses through innovation and technology expansion Business, and in the domestic or global market competition in a more favorable position. Alibaba Group operates a number of businesses, and also from the associated company's business and services to obtain business ecosystem support. Business and affiliated company's business includes Taobao, TianMao, poly cost-effective, global quick sell, Alibaba international trading market, 1688, Ali mother, Ali cloud, ants gold clothes, rookie network [2]. September 19, 2014, Alibaba Group in the New York Stock Exchange officially listed, the stock code "BABA", founder and chairman of the board for Ma. For the full year of 2015, Alibaba total revenue of RMB94.384 billion and the net profit of RMB 68.844 billion [10].

In Figure 3.3, price trend of BABA during the past year is shown.



Figure 3.3 BABA's Past Price Trend

3.4 AAC (AAC Holding Inc.)

AAC Holding Inc. is a company that provides medical treatment, care and suggestions to cure drug and alcohol addiction. It was incorporated on February 12, 2014. Until June 30, 2016, AAC Holding Inc has “operated 12 residential substance abuse treatment facilities located throughout the United States, focused on delivering clinical care and treatment solutions across 1,139 beds, which includes 636 licensed detoxification beds, and 18 stand-alone outpatient centers”. The company also provides online consumer services for families and individuals having drug or alcohol addiction and seeks treatment options through online directories [11].

In Figure 3.4, price trend of AAC during the past two years is shown.



Figure 3.4 AAC's Past Price Trend

4 Simulation of Technical Trading

During the five weeks, the stock simulation was operated using the technical trading method which is introduced in chapter 2. \$100,000 was invested as the initial money pool. Not only the current market price trends, but also the past data of price changes should be focused on. During each week, analysis, trading and predictions were made for each stock. At the end of each week, a summary with weekly transaction table and indices comparing were written to conclude the entire week's work.

4.1 Week 1

4.1.1 GOOG

On Monday, at 9:46 a.m., the price went down from 952.48 to 920.20 (Figure 4.1). Such a quick drop on stock price is probably due to the first opening day of the week. It would be a good time to buy in the GOOG stock. Also, at the same time, the volume rose rapidly up to 70.52k. I bought 30 shares.



Figure 4.1 GOOG for Week 1

Then, GOOG slowly increased during Monday and Tuesday. In addition, a sharp peak appeared in the morning on Tuesday, however, I did not sell the stock due to the crazy rising

volume, up to about 90k. I wanted to hold the stock for a bit longer and see the price changes. I believed that the price would bounce to a new peak in a few days. On Wednesday, several local peaks appeared and I sold all the stock at one of them with the price of 959.70.

In the morning of Thursday, the stock price kept dropping to 926.10 while the volume of around 70k was rising. Therefore, I decided to want for a lower price to buy the stock. In an hour, another minimum point occurred at 925.94 and I bought 40 stocks at the price of 925.90. During Thursday and Friday, the stock maintained slowly rising trend, so I decided to hold on those stock for next week. Next week, the price will continue going up to a new peak.

4.1.2 BAC

Shown in Figure 4.2, on June 12, the stock price rapidly rose from 23.73 to 23.98. Then, three local maximums appeared while the volume was around 900k. After 11 a.m., the price lowered down while the volume rose up to 1.72M, which means selling occupied most of the market and the price would continue going down until it hit a low in pricing. Then, I bought 1000 shares at the price of 23.57.

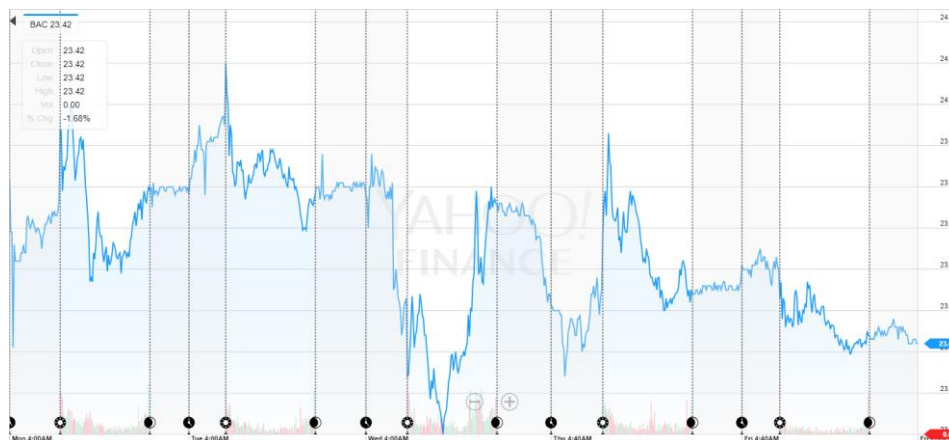


Figure 4.2 BAC for Week 1

On Tuesday, the stock opened at 23.97 per share with the volume of 3.82M. With such a high volume, the stock would probably reach a peak soon, so I sold the stock at the price of

24.10 and made a great profit. After then, the stock price was around 23.40, which I did not consider as a good time to buy in the stock.

On Wednesday, the stock price quickly dropped from 23.77 to 23.51 after 8:25 a.m. and I predicted that the stock price would achieve another low after the market opened and wanted to catch a good time to buy in the stock. I bought the stock at 23.25 while the volume rose to 1.21M. In addition, the minimum point on Wednesday was at 23.20.

When the market opened on Thursday, a sharp increase on the stock price happened and I sold the stock at 23.93. Later, the stock went back around 23.5 and generally the price slowly went down during Thursday and Friday. Therefore, I did not purchase any more BAC stock at the end of the week.

4.1.3 BABA

In Figure 4.3, when BABA opened on Monday, the price dropped to 136.64. In an hour, the price rapidly reached to 141.90. I made a lot of profit from this by trading 200 shares. In the next few days, I did not trade due to odd changes in price and I considered that it would be too risky to invest. From Monday to Friday, the price slowly dropped down in general. On Friday, I bought another 200 shares at a low of 133.60 and would hold those until next week to see how the price changes during next few weeks.

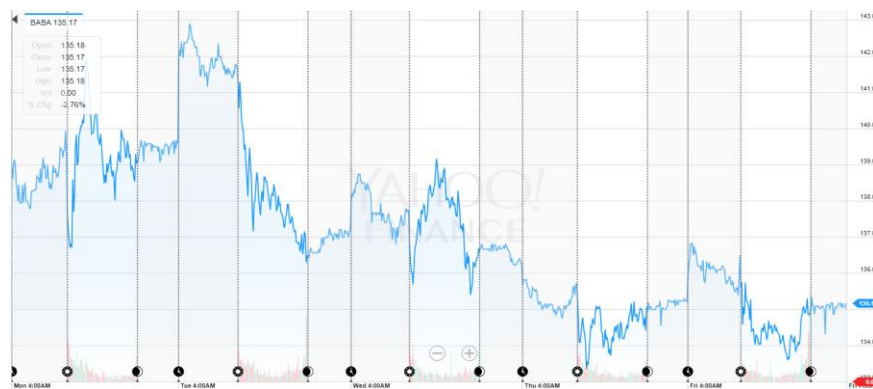


Figure 4.3 BABA for Week 1

4.1.4 AAC

Because AAC Holdings Inc. is a small company doing medical treatment, a lot financial activities would influence its stock price much. Appeared in Figure 4.4, the stock price maintained around 6.6 from Monday to Thursday. Not a great changes in price or volume occurred until Friday. Therefore, I bought 5000 shares at one of the low, 6.2 per share at the end of this week. The stock price would probably go back to 6.6 next week and then I could sell the stock for the huge profit.



Figure 4.4 AAC for Week 1

4.1.5 Week 1 Summary

All transactions for Week 1 are recorded in Table 4.1 below. During the first week, I earn \$3,392.55 after taking off the commissions, which is 3.39255% of the money pool. At the same time, S&P 500 benefits about 0.03%, Dow 30 benefits 0.11% and Nasdaq lost 0.22% in the stock market (Figure 4.5). Comparing with those three common indices, I have a good start in this stock market simulation project.



Figure 4.5 Indices for Week 1

Date	Symbol	Buy/Sell	Price	Share	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
06/12/2017							\$100,000	
06/12/2017	GOOG	Buy	\$920.2	30	(\$27,610.95)		\$72,389.05	
06/12/2017	BAC	Buy	\$23.57	1000	(\$23,574.95)		\$48,814.1	
06/12/2017	BABA	Buy	\$136.64	200	(\$27,332.95)		\$21,481.15	
06/12/2017	BABA	Sell	\$141.9	200	\$28,375.05	\$1,042.1	\$49,856.2	\$1,042.1
06/13/2017	BAC	Sell	\$24.1	1000	\$24,095.05	\$520.1	\$73,951.25	\$1,562.2
06/14/2017	GOOG	Sell	\$959.7	30	\$28,786.05	\$1,175.1	\$102,737.3	\$2,737.3
06/14/2017	BAC	Buy	\$23.25	1000	(\$23,254.95)		\$79,482.35	\$2,737.3
06/15/2017	GOOG	Buy	\$925.9	40	(\$37,040.95)		\$42,441.4	\$2,737.3
06/15/2017	BAC	Sell	\$23.93	1000	\$23,925.05	\$670.1	\$66,366.45	\$3,407.4
06/16/2017	BABA	Buy	\$133.6	200	(\$26,724.95)		\$39,641.5	\$3,407.4
06/16/2017	AAC	Buy	\$6.20	5000	(\$31,004.95)		\$8,636.55	\$3,407.4

Table 4.1 Transaction for Week 1

4.2 Week 2

4.2.1 GOOG

Like I predicted last week, the GOOG stock price increased to a new high. During this week, the price went around 957 per share (Figure 4.6). On Friday, the stock price went up quickly to 965.19 per share. Last week, I bought 40 shares at 925.90 per share and last week's maximum sell was at 959.70 per share. Therefore, I consider selling at 965.19 for the 40 share already promise me a great profit. The stock price may go up a bit next week, however, will finally drop down again. To ensure earnings, I decided to sell all 40 shares at the price of 965.10 per share.



Figure 4.6 GOOG for Week 2

4.2.2 BAC

In Figure 4.7, BAC went up to 23.99 per share on Monday. However, during the rest of the week, the stock price went down day by day. The greatest drops occurred on Wednesday and Friday. On Friday, the stock price went down to 22.75 per share, which is even lower than last week. According to the trend and past price peaks and lows, I think BAC will go back up again next week and the stock price probably hits the ground on Friday. Friday would be a fair time to buy in the stocks. Therefore, I bought 1100 shares at the price of 22.80 per share.



Figure 4.7 BAC for Week 2

4.2.3 BABA

During the week, the stock price rose back around 140 per share. During Monday and Tuesday, the stock slowly increased (Figure 4.8). A great gap in price happened on Wednesday. The price went up to 143.36 per share and continued rising. On Thursday, a sharp peak appeared. Once it appeared, I quickly sold all the shares at the price of 144.45 and waited for another time to buy in the stock. However, during the rest of the week, the stock price kept sticking around 142.5 per share and I did not buy in any BABA stock.



Figure 4.8 BABA for Week 2

4.2.4 AAC

Shown in Figure 4.9, AAC stock price had huge climbs on Monday and Tuesday. Due to these two peaks, I thought that the stock would go up again during the rest of the week. In Wednesday morning, another peak appeared, however, the stock price then quickly dropped down to 6.52 per share, which is just 0.32 higher per share than the price I bought in, so I hold the stock to see how the stock price would change on Thursday. Not surprisingly, the stock price rose again and went even higher. Therefore, I sold all the shares at 7.25 per share.

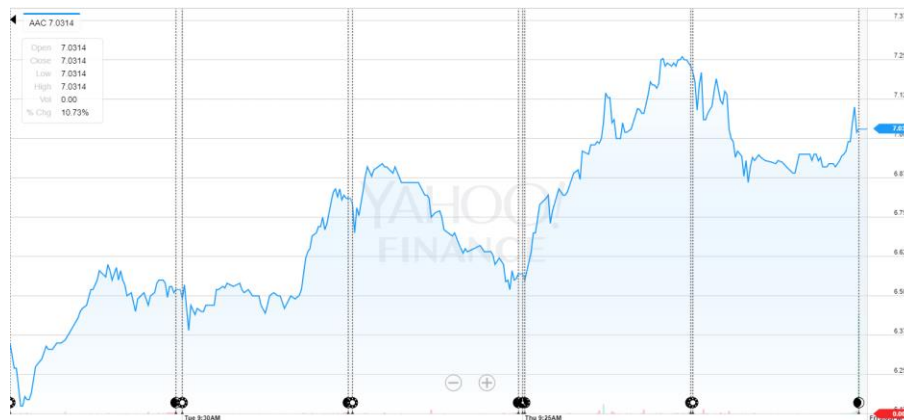


Figure 4.9 AAC for Week 2

4.2.5 Week 2 Summary

During the first week, I earn \$8,968.2 after taking off the commissions, which is 8.9682% of the original money pool. At the same time, S&P 500 benefits about 0.16%, Dow 30 lost 0.01% and Nasdaq earned 0.46% in the stock market (Figure 4.10). Comparing with those three common indices, the progress is fairly good and I am pretty satisfied with the outcomes.



Figure 4.10 Indices for Week 2

Date	Symbol	Buy/Sell	Price	Share	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
06/16/2017							\$8,636.55	\$3407.4
06/22/2017	BABA	Sell	\$144.45	200	\$28,885.05	\$2,160.1	\$37,521.6	\$5,567.5
06/22/2017	AAC	Sell	\$7.25	5000	\$36,245.05	\$5,240.1	\$73,766.65	\$10,807.6
06/23/2017	BAC	Buy	\$22.80	1100	(\$25,084.95)		\$48,681.7	\$10,807.6
06/23/2017	GOOG	Sell	\$965.10	40	\$38,599.05	\$1,558.1	\$87,280.75	\$12,365.7

Table 4.2 Transaction for Week 2

4.3 Week 3

4.3.1 GOOG

Last week, I predicted that the stock price would drop again and sell all the shares for profit at the end of last week. During this week, the stock truly did decrease again to a new low. I missed the opportunity to buy the stocks on Wednesday. However, when the stock price dropped again on Thursday, I did not hesitate and bought 40 shares at the price of \$911.5. On Friday, the

stock continued decreasing slowly. Maybe I could find a good time to sell those stocks for profit next week. I decided to hold all the shares for next week.



Figure 4.11 GOOG for June 29

4.3.2 BAC

During Monday through Wednesday, BAC increased slowly. However, a huge change in price occurred on Thursday. Just after the market opened on Thursday, the stock price increase dramatically once to a peak with the price of \$24.67 per share. In addition, the volume maintained around 1M, the price would rise up again soon. Finally, I sold all the share at the price of \$24.62 per share.



Figure 4.12 BAC for June 29

4.3.3 BABA

According to Figure 4.13, during this week, the stock, BABA, was always moving around \$143 per share and did not have great changes in price and volume. Selling out all the stock was a great choice made last week. Also, it would be better to wait for another low to buy some stock for investment. Otherwise, most of the profits would be used to pay for the commissions.



Figure 4.13 BABA for Week 3

4.3.4 AAC

Last week, I made a huge profit from this stock due to its price drop. The stock probably wouldn't drop to \$6.2 per share any more. Therefore, on June 29, when the volume went up to 701 and price dropped to \$6.6305 per share, I considered it as another low point to buy in the stocks. At the end of the day, the price rose back up to \$7.04 per share so I sold the stock at that price.



Figure 4.14 AAC for June 29

4.3.5 Week 3 Summary

During the first week, I earn \$4,229.5 after taking off the commissions, which is 4.2295% of the original money pool. At the same time, S&P 500 benefits about 0.15%, Dow 30 earned 0.29% and Nasdaq lost 0.06% in the stock market (Figure 4.15). Comparing with those three common indices, the progress is fairly good and I am pretty satisfied with the outcomes.



Figure 4.15 Indices for Week 3

Date	Symbol	Buy /Sell	Price	Share	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
06/23/2017							\$87,280.75	\$12,365.7
06/29/2017	GOOG	Buy	\$911.5	40	(\$36,464.95)		\$50,815.8	\$12,365.7
06/29/2017	BAC	Sell	\$24.62	1100	\$27,077.05	\$1,992.1	\$77,892.85	\$14,357.8
06/29/2017	AAC	Buy	\$6.63	5500	(\$36,469.95)		\$41,422.9	\$14,357.8
06/29/2017	AAC	Sell	\$7.04	5500	\$38,715.05	\$2,245.1	\$80,137.95	\$16,602.9

Table 4.3 Transactions for Week 3

4.4 Week 4

4.4.1 GOOG

During the last week, I purchased 40 shares of GOOG. Because of the Independence Day, I predicted that there wouldn't be huge changes on the price this week, and decided to hold what I have right now. Just like what I thought shown in Figure 4.16, the price went up and down in less than 10 dollars. At the end of the week, the price goes up 7.16 per share.



Figure 4.16 GOOG for Week 4

4.4.2 BAC

Based on the last week trend, the BAC probably would still have several turmoils this week. According to Figure 4.17, the price goes up to 24.88 per share in the Monday morning. I missed the chance to purchase at the lowest price, so I decided to wait for the further trends. At 11:35 am, the price starts to go down, I thought it was a good time to purchase more shares now. I bought 1000 shares at 24.72. From Wednesday to Thursday the price slowly increasing, and the price goes up and down several times on Friday. At the end of the day the price drop to 24.83. No more trading on BAC were made during this week.



Figure 4.17 BAC for Week 4

4.4.3 BABA

In the Monday morning, the price kept decreasing from 142.27 to 139.63 per share, and the volume decrease to 176.71k, shown in Figure 4.18. I feel it should be a perfect time to buy some shares. The price did have a huge increase on Wednesday. It goes up to 144.98 per share at the end of the day. However, the price went back to 142.07 on Thursday and had several increasing and decreasing on Friday. It ends with 142.42 per share.



Figure 4.18 BABA for Week 4

4.4.4 AAC

During this week, AAC kept decrease. The stock price quickly dropped from 7.00 to 6.13 per share. The trading volume varied from 100 to 4k. Normally, the stock price should be around 6.7 per share. Therefore, when it approached one of the lows, I decided to buy some stock to see whether the stock would rise back to the normal level in next week. In addition, because next week is the last week for the stock simulation, to ensure safety, I would only buy 1500 shares at the price of 6.14 per share.



Figure 4.19 AAC on July 6

4.4.5 Week 4 Summary

During the first week, I earn \$1,327.6 after taking off the commissions, which is 1.3276% of the original money pool. At the same time, S&P 500 benefits about 0.64%, Dow 30 earned 0.44% and Nasdaq profited 1.04% in the stock market (Figure 4.20). Comparing with those three common indices, the progress is fairly good.



Figure 4.20 Indices for Week 4

Date	Symbol	Buy/Sell	Price	Share	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
06/29/2017							\$80,137.95	\$16,602.9
07/03/2017	BAC	Buy	\$24.72	1000	(\$24,724.95)		\$55,413	\$16,602.9
07/03/2017	BABA	Buy	\$139.63	250	(\$34,912.45)		\$20,500.55	\$16,602.9
07/04/2017	BABA	Sell	\$144.98	250	\$36,240.05	\$1,327.6	\$56,740.6	\$17,930.5
07/06/2017	AAC	Buy	\$6.14	1500	(\$9,214.95)		\$47,525.65	\$17,930.5

Table 4.4 Transactions for Week 4

4.5 Week 5

4.5.1 GOOG

During this week, as I predicted in last two week, GOOG finally bump back and continued rising slowly as shown in Figure 4.21. However, it was the last week of doing the stock simulation. I sold all the stock at the price of 956 per share at the end of the week.



Figure 4.21 GOOG for Week 5

4.5.2 BAC

On Monday, indicated by Figure 4.22, BAC was slowly increasing and I waited for its further rising in next few days. However, the stock price suddenly dropped on Tuesday morning. Because it was the last week of stock simulation, all the trading should be done in this week. To avoid more losses in BAC, I decided to sell all the stock at the price of 24.81 per share.



Figure 4.22 BAC for Week 5

4.5.3 BABA

On Figure 4.23, starting from Monday, BABA slowly rose. I thought it would continue this trend in the next few days. Therefore, I decided to buy 300 shares at the price of 143.7 per share on Tuesday. In addition, I sold the stocks for 152 per share at the end of the week.



Figure 4.23 BABA for Week 5

4.5.4 AAC

In Monday morning, AAC dropped again to 6.06 per share, shown in Figure 4.24 and I bought another 4500 shares. Not surprised, AAC stock price quickly increased again. On the

same day, the stock price rose up to 7.11 per share and I sold all the stocks at the price of 7 per share.



Figure 4.24 AAC on July 10

4.5.5 Week 5 Summary

During the first week, I earn \$9,835.4 after taking off the commissions, which is 9.8354% of the original money pool. At the same time, S&P 500 benefits about 0.47%, Dow 30 earned 0.39% and Nasdaq profited 0.61% in the stock market (Figure 4.25). Comparing with those three common indices, the earning for the final week is impressive.



Figure 4.25 Indices for Week 5

Date	Symbol	Buy/ Sell	Price	Share	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
07/06/2017							\$47,525.65	\$17,930.5
07/10/2017	AAC	Buy	\$6.06	4500	(\$27,274.95)		\$20,250.7	\$17,930.5
07/10/2017	AAC	Sell	\$7	6000	\$41,995.00	\$5,505.1	\$62,245.7	\$23,435.6
07/11/2017	BAC	Sell	\$24.81	1000	\$24,805.05	\$80.1	\$87,050.75	\$23,515.7
07/11/2017	BABA	Buy	\$143.7	300	(\$43,114.95)		\$43,935.8	\$23,515.7
07/14/2017	GOOG	Sell	\$956	40	\$38,235.05	\$1,770.1	\$82,170.85	\$25,285.8
07/14/2017	BABA	Sell	\$152	300	\$45,595.05	\$2,480.1	\$127,765.9	\$27,765.9

Table 4.5 Transactions for Week 5

5 Analysis

During these five weeks' simulation, I earned \$27,765.9 net profit with initial money pool of \$100,000. For a better look at the data, earning ratio is a great strategy to use for measuring the profit in five weeks. Earning ratio equals to net profit over the initial investment money pool. In this case, the earning ratio would be 27.7659%.

After all the research about the US stock market, I started the first-week simulation. Because it was my first time to trade in the US stock market and I was not familiar with the environment, I tried to trade with all four companies to see how things went with four different stock. Also, I profited a bit during the first week. In the following four weeks, trading was not as frequent as the first week. I noticed that considering the cost of commissions, unnecessary trades in price's rise and drop would cause lost due to the commission fees for each trade. Figure 5.1 shows the distribution of profit percentage of this project simulation, S&P 500, Dow 30 and Nasdaq during the five weeks.

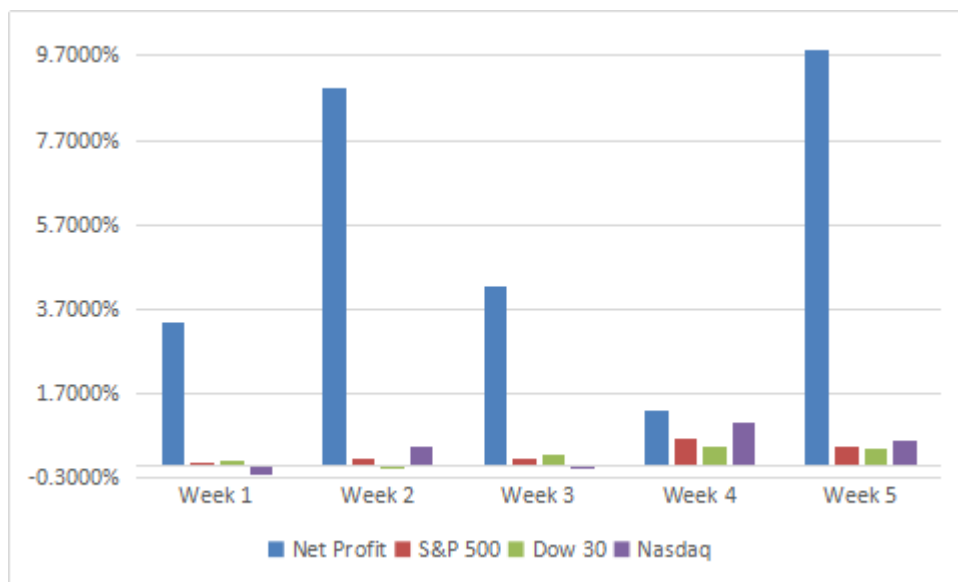


Figure 5.1 Profit Percentage Distribution

According to the figure above, during each week, profit was made. At the same time, compared with the three indices, the earning ratio for each simulation week is significantly higher. In week 4, the earning ratio is much lower. This is because most of the trading made in that week were buys. Therefore, due to the small sample size, I chosen for doing this simulation, the distribution chart for each week would be a bit inaccurate. However, it does not affect my goal of this project: making profits and learning about current US stock market.

Another interesting fact happens between four different company stocks. Table 5.1 shows the net profit distribution and the average price per share for each stock. Generally, stock with the lower average price per share tends to make a greater net profit. For big companies, like Google and Alibaba, they have higher stock prices, also the stock prices are relatively much more stable than other developing companies, like AAC with \$6.62 per share on average. AAC stock price would be from 6 to 7 per share, which means the maximum profit can be made each time is close to 16.67%. Meanwhile, GOOG stock price waved between 920 and 965. In the same way, the maximum profit could be made each time is about 4.89%. Such great differences in profiting occurred due to the gap between the initial stock prices. Therefore, with the same amount of money, investing small companies like AAC would give better outcomes.

	Net Profit	Average Price Per Share
AAC	12990.3	6.62
BAC	3262.1	23.98
BABA	7009.9	142.11
GOOG	4503.3	939.73

Table 5.1 Earning for Each Stock

6 Conclusion

At the beginning, I set the goal as 15% of profiting. Looking at the result of 27.7659% earning in five weeks, I would say be really satisfied with this outcome. Finally, the goal was reached. Considering that, I think technical trading method is a fine trading strategy to use in current US stock market. In addition, because this project is based on a five weeks' simulation and frequent trading happened, no conclusion could be drawn to the long-term investment. With the result of this paper, technical trading method would be suitable to use for short term investment.

However, some small errors would still exist in this simulation process. For each trading I made, I always assume that the trades would happen at the price as I simulate. In reality, the trading price would vary a bit from what I simulate. The inaccurate trading stock price may affect the final result.

Taking into account of the errors may exist, the final result would be affected too much. In conclusion, I did a fairly good job in profiting during the five weeks' simulation.

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Appendix

Date	Symbol	Buy/Sell	Price	Share	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
06/12/2017							\$100,000	
06/12/2017	GOOG	Buy	\$920.2	30	(\$27,610.95)		\$72,389.05	
06/12/2017	BAC	Buy	\$23.57	1000	(\$23,574.95)		\$48,814.1	
06/12/2017	BABA	Buy	\$136.64	200	(\$27,332.95)		\$21,481.15	
06/12/2017	BABA	Sell	\$141.9	200	\$28,375.05	\$1,042.1	\$49,856.2	\$1,042.1
06/13/2017	BAC	Sell	\$24.1	1000	\$24,095.05	\$520.1	\$73,951.25	\$1,562.2
06/14/2017	GOOG	Sell	\$959.7	30	\$28,786.05	\$1,175.1	\$102,737.3	\$2,737.3
06/14/2017	BAC	Buy	\$23.25	1000	(\$23,254.95)		\$79,482.35	\$2,737.3
06/15/2017	GOOG	Buy	\$925.9	40	(\$37,040.95)		\$42,441.4	\$2,737.3
06/15/2017	BAC	Sell	\$23.93	1000	\$23,925.05	\$670.1	\$66,366.45	\$3,407.4
06/16/2017	BABA	Buy	\$133.6	200	(\$26,724.95)		\$39,641.5	\$3,407.4
06/16/2017	AAC	Buy	\$6.20	5000	(\$31,004.95)		\$8,636.55	\$3,407.4
06/22/2017	BABA	Sell	\$144.45	200	\$28,885.05	\$2,160.1	\$37,521.6	\$5,567.5
06/22/2017	AAC	Sell	\$7.25	5000	\$36,245.05	\$5,240.1	\$73,766.65	\$10,807.6
06/23/2017	BAC	Buy	\$22.80	1100	(\$25,084.95)		\$48,681.7	\$10,807.6
06/23/2017	GOOG	Sell	\$965.10	40	\$38,599.05	\$1,558.1	\$87,280.75	\$12,365.7
06/29/2017	GOOG	Buy	\$911.5	40	(\$36,464.95)		\$50,815.8	\$12,365.7
06/29/2017	BAC	Sell	\$24.62	1100	\$27,077.05	\$1,992.1	\$77,892.85	\$14,357.8
06/29/2017	AAC	Buy	\$6.63	5500	(\$36,469.95)		\$41,422.9	\$14,357.8

06/29/2017	AAC	Sell	\$7.04	5500	\$38,715.05	\$2,245.1	\$80,137.95	\$16,602.9
07/03/2017	BAC	Buy	\$24.72	1000	(\$24,724.95)		\$55,413	\$16,602.9
07/03/2017	BABA	Buy	\$139.63	250	(\$34,912.45)		\$20,500.55	\$16,602.9
07/04/2017	BABA	Sell	\$144.98	250	\$36,240.05	\$1,327.6	\$56,740.6	\$17,930.5
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07/14/2017	GOOG	Sell	\$956	40	\$38,235.05	\$1,770.1	\$82,170.85	\$25,285.8
07/14/2017	BABA	Sell	\$152	300	\$45,595.05	\$2,480.1	\$127,765.9	\$27,765.9

Table 8.1 Overall Transactions for Technical Trading Method