An Interactive Qualifying Project Report:

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By

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Abstract

The objective of this project is to perform a five-week stock market simulation and obtain some basic background information and experience about investing in the stock market. First, the current state of the US economy was determined to be in-between a Late Recovery and Early Recession. The services sector was then picked as a focus for potential stocks. Of the services sector, five very different industries were chosen. The spread of industries was carefully chosen to provide stocks that were affected differently by market forces. The stock market simulation was begun with $100,000. At the end of the five-week stock simulation, a profit of $6774.10 was generated. This results in a 6.77% return on investment over the five-week period. The experiences learned would be very helpful for future real-life investments.

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1 Introduction

1.1 Goals

The first objective of this project is to understand how to apply basic economic principles to gain insight on the current economic environment of the stock market. This also includes determination of economic forces that influence stock market behavior. Once the economic environment is understood, an economic sector can be chosen to invest in, allowing for further research in companies within this sector. This also provides some guidance when determining what type of investing strategy to implement.

The second objective is to gain understanding between different types of investments: currency trading, real estate, precious metals, mutual funds, stocks. These are all well-known investment methods, but they are all employed for different reasons.

The third objective, similar to the second, is to gain understanding between different stock market investment strategies: Buy and Hold, Fundamental and Technical analysis, Contrarian, Swing Trading, Dogs of the Dow, CANSLIM, etc. These are just a few of the different strategies, and it will be very important to understand which ones are long-term or short-term. Given that the simulation will be run for 4-6 weeks, a long-term strategy should be avoided.

The fourth objective is to gain firsthand experience in applying an investment strategy with respect to the stock market. Simulations are run to obtain knowledge without risking investment capital.

1.2 Investments

Investing can best be described as "growing" money, although it is not as easy as that sounds. Stocks, Bonds, and Mutual funds are some of the most well-known investment options. A few other investing methods comprise of Currency trading, Precious metals, Real estate, and commodities. All of these methods can increase the value of an initial sum of investment capital while having quite different implementations.

1.2.1 Stocks

Stocks are essentially fragments of a company's ownership. When stocks are purchased, a percentage of ownership of that company comes with it. Stock prices are determined mostly by the economy and also by company success. There are also different types of stocks to choose from. **Income stocks** provide a steady income for investors through dividends, which are quarterly payouts to stock holders. It is important to note that not every company hands out dividends, meaning some companies are better for income stocks than others. **Growth stocks** reside in companies who are about to, or are currently undergoing expansion. When companies grow, their stock prices increase. **Penny Stocks** are stocks that sell around $5. These types of stocks are purchased in bulk hoping to buy low and sell high [1].

1.2.2 Precious Metals

Investing in precious metals has similar working mechanics to stocks. Prices fluctuate depending on economics. Instead of providing dividends, these metals are used for store of value purposes. Metals like gold, silver, and platinum are highly desired for their excellent engineering

properties and for this reason are safely used to protect against inflation and crashing economies. However, these metals tend to be volatile, so it is risky to buy and sell for the purpose of profiting. Profits can be made by excellent use of technical analysis techniques [3].

1.2.3 Real Estate

Investing in Real Estate can have huge returns if meticulously planned. It can also provide long term wealth through development of income properties. This is one of the more tangible forms of investment, since the investor can see the land they purchased. Unlike stocks, real estate requires more commitment to the investment. Equally large loses can be incurred if an investor is not careful. There are a few different approaches to investing in Real Estate. **Flipping Houses** is most likely the shortest term investment strategy. The main goal is to purchase a foreclosed or somewhat dilapidated house to renovate. Houses in foreclosure are owned by the bank through which the previous owner had a mortgage with. Properties are renovated because the cost of labor is less than the added value to the property through renovation. Most people who partake in this method renovate the houses themselves for a higher profit margin. This is considered to be short-term, since no major construction takes place. **Income Properties** are pieces of real estate that are rented out to tenants. These types of properties include apartment complexes, condominiums, commercial buildings, and houses. Income properties are a decent store of value because people will always need someplace to live. While the actual property value may fluctuate, income can still flow consistently even during economic depression. **Real Estate Investing Trusts** or REIT's are a means to invest in real estate without physically purchasing land. Investing in REIT's is just about the same as investing in the stock market.

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Some REIT's are even listed on stock market exchanges. If the economy is right, this may be a good candidate for the stock market simulation [1].

1.3 Stock Market Terminology

Before diving into the stock market, there are some important terms to understand and questions to answer. Important questions that will be answered in this section are: What are interest rates and how much do they affect the economy? Are there any signs for the state of the economy and what are they? What is a sector and what is sector rotation? What are stock indexes and how are they different? What is a stock exchange? Answering these questions will provide useful insight to begin researching the current economic status and companies to invest in.

1.3.1 Interest Rates

All interest rates stem from the Federal Reserve. They control the interest rates for the banks to borrow money. This affects the interest rates that companies, students, home owners, etc. receive when taking out loans (business, student, mortgages). Therefore, the FED interest rate strongly dictates economic growth. When the interest rate is low, businesses are able to afford larger loans, increasing the amount of growth for the company. Successfully growing companies experience an increase of stock prices. On the contrary, increasing interest rates often leads to decreasing stock market prices [1].

1.3.2 Economic Indicators

The most well-known economic indicator is the GDP (Gross Domestic Product). This indicator takes into account national consumption, investments, government spending, and net

exports. The current GDP report shows if the economy is growing or shrinking and is a decent starting place to determine where the economy is with respect to the economic cycle. The vintage history of the GDP should further be analyzed to see a more accurate economic forecast.

There are other economic indicators such as the consumer price index (CPI), consumer confidence index, job growth statistics, unemployment index, housing starts, and producer price index (PPI). These are only some of the leading economic indicators [1].

1.3.3 Sectors and Sector Rotation

A sector is a collection of industries that are all closely related to each other. Sectors are used to generalize the many industries of an economy. The US has 20 different sectors, as classified by NAICS, the North American Industry Classification System. Sector rotation closely follows the economic cycle. Beginning with full recession, the following stages are early recovery, late recovery, and early recession [4]. Similarly, the sector rotation follows with technology and industrial sectors flourishing during full recession. During early recovery, basic materials and energy have the strongest performance. Consumer staples begin to outperform everything else during the late recovery period (or fully thriving economy). As early recession starts to settle in, utilities and services begin to excel [6].

1.3.4 Stock Indexes

Stock indexes are quite similar to the various economic indicators. Their sole purpose is to showcase how a stock is performing over time. It is important to watch both stock indexes and economic indexes, since stock indexes are somewhat derived from economic indexes. The most famous stock index is the Dow Jones Industrial Average. This is a publically published gauge of

the market for the top 30 companies in the US, containing industries from different sectors. In this index, all of the companies are given equal weight (weighted by stock price). This means that a change in price of any of the represented stocks will affect the DOW number by the same amount.

The S&P 500 is an index that weights by market capitalization. This is done by calculating the total market capitalization of the represented companies. By doing this, companies that contribute more to the total market capitalization will affect the S&P 500 number by a larger amount than smaller companies. This index represents 400 industrial stocks, 40 financial stocks, 20 transportation stocks, and 40 utility stocks.

The Russell 2000 represents the small-cap stock market, which are the companies with a market capitalization between $300 million and $2 billion. This index is also weighted by market capitalization. Small companies are good candidates for growth during periods of early recovery [1].

1.3.5 Stock Exchanges

Stock exchanges are the physical market place where stocks are bought and sold. The two most prominent stock exchanges in the US are NYSE (New York Stock Exchange) and NASDAQ (National Association of Securities Dealers Automated Quotations). The NYSE is housed in New York's financial district and hosts only the biggest board of companies in the US. There are large requirements in order for a company to be hosted here. The NASDAQ is purely an online stock exchange; it technically does not have a physical exchange floor like the NYSE [1].

2 Investment Strategies

2.1 Economic Environment

Determination of which part of the economic cycle the economy is in will be a critical factor in the outcome of the stock market simulation. To begin, the GDP report of the first quarter of 2016 has been published and read. Then, the vintage history of the GDP in Figure 2.1 is analyzed [5].
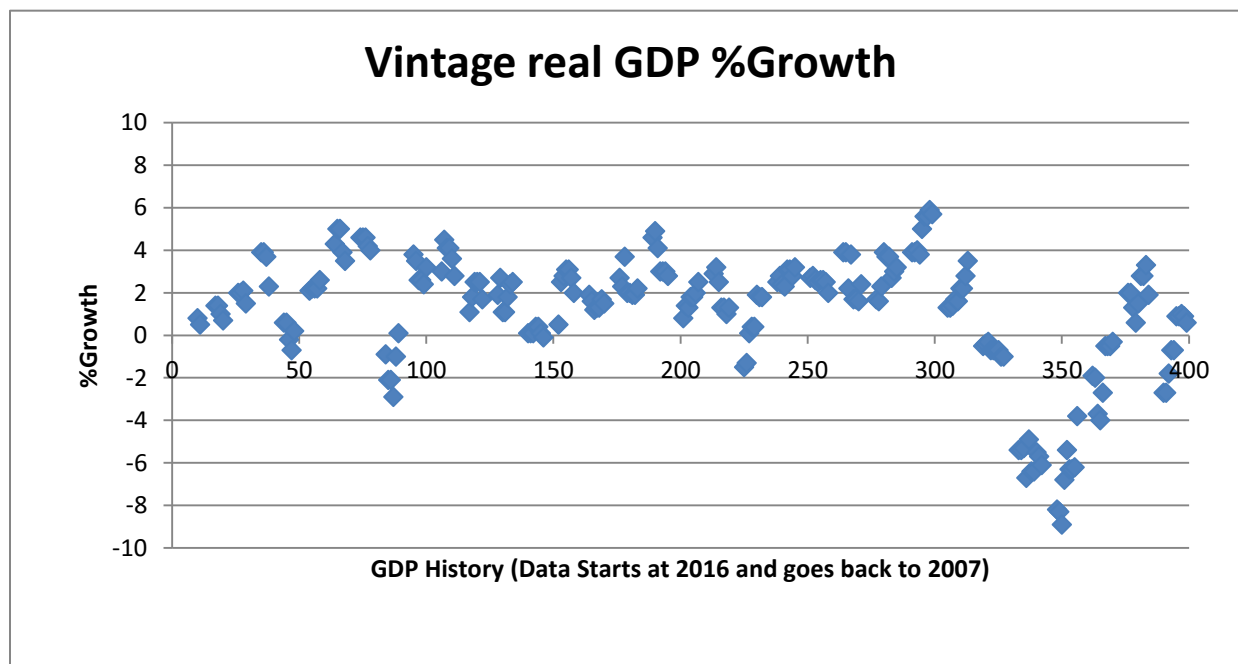
Figure 2.1: GDP History

The data shown above begins with the most current history and progresses back in time following the positive x-axis. Around data entry 350 lies the recession of 2008, where real GDP growth rates were as low as - 8.4%. It is difficult to see, but each relatively small cluster of points resembles the data of a single quarter. That 2008 recession was hitting early recession around the first three quarters of 2008, maturing to late recession of the fourth quarter of 2008.

This heavy recession lasted until the second quarter of 2009, at which point steady early recovery kicked in. Since then, the US has been in a slow but steady recovery, with minor fluctuations in the GDP growth rate. Up until the fourth quarter of 2013, The US was definitely in an early to late recovery state. Then, quite suddenly the GDP reports negative growth rates for a single quarter. This is not long enough to show that the country is in early recession [7].

The most recent four quarters of the vintage history report a growing real GDP, since the growth rates have been positive. The growth rates have been steadily decreasing, as shown by data points 0 – 50. This could mean either a late recovery economic status or early recession is imminent. Typically, recession is shown by negative growth rates for two or more quarters. It is clear that growth rates are low, so it will be decided that the US is in Late Recovery with a potential to enter Early Recession.

Checking in with a professional opinion, Thomas Cooley and Co. further suggests that the US economy is progressing towards a recession. In recent years, there has been repetitive weak Q1 ones which all rebounded quickly. This time, however, looks slightly different. In previous years, the weak Q1 ones were all quite sudden; while this year's weak performance was observed three quarters in a row [8].

2.2 Technical Analysis

Technical analysis is a popular means by which stocks are traded. This method strictly analyzes numerical data and trends of the market. Recognition of certain trends signal when to buy and when to sell based on the highs and lows of the market. A prominent technique in this category is the use of candle stick charts. These charts depict the highs and lows of a stock

during a single day, and over many days' showcase trends. Technical analysts then make the majority of their decisions to buy or sell based on interpretations of these charts. One thing to note is that technical analysis does not care about the value of a company. With the right equipment and training, analysts can find trends in any company to capitalize on. Since the value of a company is rarely considered here, pure technical analysis is better suited for day or short term trading [1].

2.3 Fundamental Analysis

Fundamental analysis is conducted for the purposes of long term, growth, and income types of investing. This is performed to capitalize on company growth or dividend payments. Potential investment candidates are researched thoroughly on their business history. The company's Revenue, Profits, Debt, competition, Business model, reputation, market presence, etc. are all critically evaluated before investing in the company. Warren Buffet is quoted with saying "The dumbest reason to buy a stock is because it's going up." The idea with this strategy is that, over time, the price of the stock will reflect the value of the company [1].

2.4 Long Term Techniques

The Buy and Hold method is just about the only true long term stock market strategy. The biggest concept here is to invest in a big, successful company, remaining faithful and investing more even when stock prices are at an all-time low. Warren Buffet is known to have built all of his wealth through this method and advises to never sell a security unless you truly need the money. Even if the stock market crashes, a well-constructed company will come back to

life. Some notable examples are Coca-Cola, General Electric, Deere, and Paramount Pictures. These companies survived the stock market crash of 1929 and are still thriving today [1].

2.5 Short Term Techniques

The polar opposite of Long-Term trading is Day Trading, where the buying and selling of a stock takes place within the same day. Some slightly longer time frames extend to buying and selling within two to five days. In this category, there are quite a few different strategies for day trading.

2.5.1 Scalping

This day trading technique employs buying and selling a stock immediately during an upward trend. This minimizes risk due to short exposure time. Stock is also sold when investors feel that a given security is overvalued, thus incorporating a bit of fundamental and technical analysis.

2.5.2 Trend Following

The trend following method is the Newton's first law approach to the stock market. Stocks that have been rising will continue to rise and stocks that are falling will continue to fall. Riding a trend until it shows signs of reversal can be rewarding, albeit a risky strategy to implement.

2.5.3 Contrarian Trading

Contrarian trading is the antithesis of the Trend following technique. The methodology here is that, trends that have been rising may suddenly fall, and trends that have been falling may suddenly rise. Therefore, stocks are purchased while they have a downward trend and sold not too long after a profit has been made. Selling modestly is the key here since shorter exposure times reduce risk. This can be adapted to somewhat longer time frames (Swing 2 – 5 days) if stocks drop significantly.

2.5.4 Momentum Trading

Momentum trading is strongly dictated by news releases, since good or bad news may influence fundamental analysts to make decisions. This is also signaled by stock volume movement. Some momentum traders will watch the stock volume and sell right when stock volume begins to decrease. The stock volume decreases and signals a drop in demand, therefore dropping the price.

2.5.5 Artificial Intelligence

Some investors have a means to create computer programs to do their trading for them. This gives incredible reaction times to prices and trends purely based on technical analysis and give these traders an upper hand in the market. The proposed program should have access to real time prices, technical analytic software, and well-designed logic to make proper buying and selling decisions. This specific strategy can only work through online stock exchanges and would not have an effect on the NYSE.

3 Contrarian Swing Trading Simulation

To begin the stock market simulation, the services sector has been chosen as a focus for company review. This sector flourishes near the end of the Late Recovery period and the beginning of an Early Recession period. The GDP report and additional indicators show that the US is most likely in this in-between area of the two stages. Therefore, it is hypothesized that companies in this sector will have an active market, making them good candidates for contrarian trading.

The MACD (Moving Average Convergence Divergence) chart will be used to determine buying and selling conditions. It has been implemented through the assumption that stock prices have a "momentum" similar to how a moving ball has momentum. This momentum is measured using the difference between the 12-day and 26-day exponential moving averages of the stock prices. If the moving averages are converging, the momentum is slowing down. If the moving averages are diverging, the momentum is increasing. The last step is to have a signal for the buying and selling conditions. Typically, a black line on the chart represents the MACD line, which is the difference between the two exponential moving averages. A 9-day exponential moving average is imposed onto the same chart as a red line. When the black line crosses above the red line, investors are signaled to buy. When the black line crosses below the red line, investors are signaled to sell. To use this method efficiently, investors should buy immediately as the black line crosses above the redline, and sell when the opposite happens.

3.1 Company Choice

From the services sector, which is broadly defined as industries that provide intangible goods, five very different companies have been selected. These companies include Waste Management, VSE Corp, Aflac, Advanced Auto Parts, and MITEK systems. A brief overview of the companies will be given below along with their stock portfolios shown in Figures 3.1 – 3.10.

3.1.1 Waste Management Inc. [WM]

We are North America's leading provider of comprehensive waste management environmental services. We partner with our residential, commercial, industrial and municipal customers and the communities we serve to manage and reduce waste at each stage from collection to disposal, while recovering valuable resources and creating clean, renewable energy. Our "Solid Waste" business is operated and managed locally by our subsidiaries that focus on distinct geographic areas and provides collection, transfer, recycling and resource recovery, and disposal services. Through our subsidiaries, we are also a leading developer, operator and owner of landfill gas-to-energy facilities in the United States. In December 2014, we sold our Wheelabrator business, which provides waste-to-energy services and manages waste-to-energy facilities and independent power production plants. During 2015, our largest customer represented 1% of annual revenues. We employed approximately 40,600 people as of December 31, 2015 [9].

1 Year Target	62
Today's High /Low	$ 61.65 / $ 61.05
Share Volume	1,308,095
90 Day Avg. Daily Volume	2,399,570
Previous Close	$ 61.41
52 Week High/Low	$ 62.05 / $ 45.86
Market cap	$ 27,308,764,732
P/E Ratio	24.3
Forward P/E(1y)	21.93
Earnings Per Share (EPS)	$ 2.53
Annualized dividend	$ 1.64
Ex Dividend Date	Jun. 1, 2016
Dividend Payment Date	Jun. 17, 2016
Current Yield	2.67 %
Beta	0.16

Figure 3.1: WM Common Stock

Figure 3.2: WM 3 Month Stock Chart

3.1.2 VSE Corporation [VSEC]

We are a diversified services and supply company that assists our clients in sustaining, extending the service life, and improving the performance of their transportation, equipment, and other assets and systems. We provide logistics and distribution services for legacy systems and equipment and professional and technical services to the United States Government (the "government"), including the United States Postal Service ("USPS"), the United States Department of Defense ("DoD"), federal civilian agencies, and to commercial and other customers. Our largest customers are the USPS and the DoD. Our operations include supply chain management solutions and parts supply for vehicle fleets; maintenance, repair, and overhaul ("MRO") services and parts supply for aviation clients; vehicle and equipment maintenance and refurbishment; logistics; engineering; energy and environmental services; IT and health care IT solutions; and consulting services [10].

Best Bid/Ask	N/A / N/A
1 Year Target	
Today's High /Low	$ 66.54 / $ 65.4395
Share Volume	7,061
50 Day Avg. Daily Volume	16,236
Previous Close	$ 66.25
52 Week High/Low	$ 71.20 / $ 33.52
Market cap	$ 355,276,704
P/E Ratio	13.54
Forward P/E(1y)	
Earnings Per Share (EPS)	$ 4.86
Annualized dividend	$ 0.44
Ex Dividend Date	May 2, 2016
Dividend Payment Date	May 18, 2016
Current Yield	0.66 %
Beta	2.03
NASDAQ Official Open Price	$ 66.36
Date of Open Price	Jun. 3, 2016
NASDAQ Official Close Price	$ 65.80
Date of Close Price	Jun. 3, 2016
Community Sentiment	Bullish

Figure 3.3: VSEC Common Stock

Figure 3.4: VSEC 3 Month Stock Chart

3.1.3 Aflac Inc. [AFL]

Aflac offers voluntary insurance policies in Japan and the United States that provide a layer of financial protection against income and asset loss. We continue to diversify our product offerings in both Japan and the United States. Aflac Japan sells voluntary supplemental insurance products, including cancer plans, general medical indemnity plans, medical/sickness riders, care plans, living benefit life plans, ordinary life insurance plans and annuities. Aflac U.S. sells voluntary supplemental insurance products including products designed to protect individuals from depletion of assets (accident, cancer, critical illness/ care, hospital intensive care, hospital indemnity, fixed-benefit dental, and vision care plans) and loss-of-income products (life and short-term disability plans) [11].

1 Year Target	70
Today's High /Low	$ 69.34 / $ 68.53
Share Volume	1,958,477
90 Day Avg. Daily Volume	2,385,025
Previous Close	$ 69.58
52 Week High/Low	$ 70.0874 / $ 51.41
Market cap	$ 28,614,783,721
P/E Ratio	11.35
Forward P/E(1y)	10.42
Earnings Per Share (EPS)	$ 6.09
Annualized dividend	$ 1.64
Ex Dividend Date	May 16, 2016
Dividend Payment Date	Jun. 1, 2016
Current Yield	2.36 %
Beta	0.94

Figure 3.5: AFL Common Stock

Figure 3.6: AFL 3 Month Stock Chart

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3.1.4 Advanced Auto Parts Inc. [AAP]

We are a leading automotive aftermarket parts provider in North America, serving "do-it-for-me", or Commercial, and "do-it-yourself", or DIY, customers as well as independently-owned operators. Our stores and branches offer a broad selection of brand name, original equipment manufacturer ("OEM") and private label automotive replacement parts, accessories, batteries and maintenance items for domestic and imported cars, vans, sport utility vehicles and light and heavy duty trucks.

We were founded in 1929 as Advance Stores Company, Incorporated and operated as a retailer of general merchandise until the 1980s. During the 1980s, we began targeting the sale of automotive parts and accessories to DIY customers. We began our Commercial delivery program in 1996 and have steadily increased our sales to Commercial customers since 2000. We have grown significantly as a result of comparable store sales growth, new store openings and strategic acquisitions. Our parent company, Advance Auto Parts, Inc., a Delaware corporation, was incorporated in 2001 in conjunction with the acquisition of Discount Auto Parts, Inc. [12].

1 Year Target	160
Today's High /Low	$ 152.67 / $ 149.73
Share Volume	895,847
90 Day Avg. Daily Volume	978,236
Previous Close	$ 152.15
52 Week High/Low	$ 201.24 / $ 131.59
Market cap	$ 11,085,632,748
P/E Ratio	23.04
Forward P/E(1y)	19.36
Earnings Per Share (EPS)	$ 6.54
Annualized dividend	$ 0.24
Ex Dividend Date	Mar. 16, 2016
Dividend Payment Date	Apr. 1, 2016
Current Yield	0.16 %
Beta	1.23

Figure 3.7: AAP Common Stock

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Figure 3.8: AAP 3 Month Stock Chart

3.1.5 Mitek Systems Inc. [MITK]

Mitek Systems, Inc. develops, markets and sells proprietary mobile capture and identity verification software solutions for enterprise customers. Our mobile capture and identify verification technologies are embedded into the mobile applications of leading brands across the globe to improve usability while minimizing risk. They serve the needs of any regulated business that has Know Your Customer ("KYC") obligations. By licensing our proprietary technology, enterprise customers improve customer acquisition and other key objectives including securing high risk transactions, verification for age sensitive and age-restricted commerce, and meeting KYC and other compliance regulations. Our technology uses advanced algorithms to correct image distortion, extract relevant data, route images to their desired location and process transactions. As of September 30, 2015, we have been granted 22 patents and have an additional 21 patent applications pending [13].

Best Bid/Ask	N/A / N/A
1 Year Target	8
Today's High /Low	$ 7.93 / $ 7.49
Share Volume	1,217,047
50 Day Avg. Daily Volume	752,312
Previous Close	$ 7.56
52 Week High/Low	$ 9.4899 / $ 2.71
Market cap	$ 251,275,885
P/E Ratio	111.43
Forward P/E(1y)	68.73
Earnings Per Share (EPS)	$ 0.07
Annualized dividend	N/A
Ex Dividend Date	N/A
Dividend Payment Date	N/A
Current Yield	0 %
Beta	0.13
NASDAQ Official Open Price	$ 7.69
Date of Open Price	Jun. 3, 2016
NASDAQ Official Close Price	$ 7.80
Date of Close Price	Jun. 3, 2016
Community Sentiment	Bullish

Figure 3.9: MITK Common Stock

Figure 3.10: MITK 3 Month Stock Chart

3.2 Stock Market Simulation 6/6/16 – 6/10/16

Table 3.1 depicts the trade history for week one. At the end of week one, $323 have been lost accounting for the current value of the stocks as of 06/10/16. An opportunity to gain $295 from AFL on 06/08/16 was missed because I did not believe the trend would swing so suddenly. The closing price for AFL on 06/10/16 was $68.95. I am hoping that, by holding onto the AFL stock, the prices will rise allowing for a better return on the investment placed in AFL. As for the AAP stock, the closing price on 06/10/16 was $153.02. This is not much of a loss. The MACD for both of these companies is signaling to hold.

Table 3.1: Trade History for 06/06/16 – 06/10/16

Date	Symbol	Buy / Sell	Price	Shares	Net Cost / Proceeds	Profit / Loss	Total Cash	Total Profit	Total Assets
06/06/16							$100,000	$0.00	$100,000
06/07/16	AFL	Buy	$69.38	577	$40,037.26		$59,963	$0.00	$100,000
06/08/16	AAP	Buy	$153.27	261	$40,008.47		$19,954	$0.00	$100,295
06/10/16									$99,677

Waste Management is having a great week shown in Figure 3.11. I should have bought the stock immediately on Monday (06/06) morning. I did not purchase specifically because the MACD line didn't cross over the signal line. In hindsight, I realize that it's just as fine to purchase stock where the MACD had recently crossed over, protecting from the MACD "faking" an investor out.
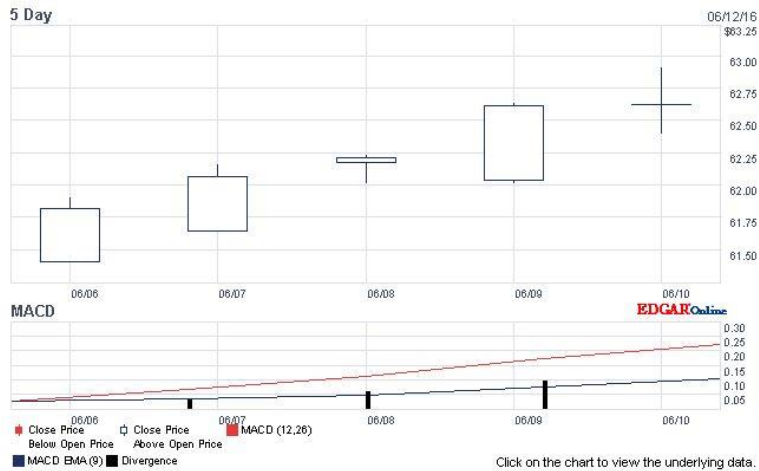
Figure 3.11: WM 06/06 – 06/10

VSEC is also having a great week shown by Figure 3.12. I truly should have purchased this stock at the same time that I would have purchased WM. It's exhibiting almost the exact same behavior and is still on an upward trend. I also missed out on this opportunity because I was taking the MACD guidelines too strictly. Hopefully in the following weeks I can use the MACD more effectively.
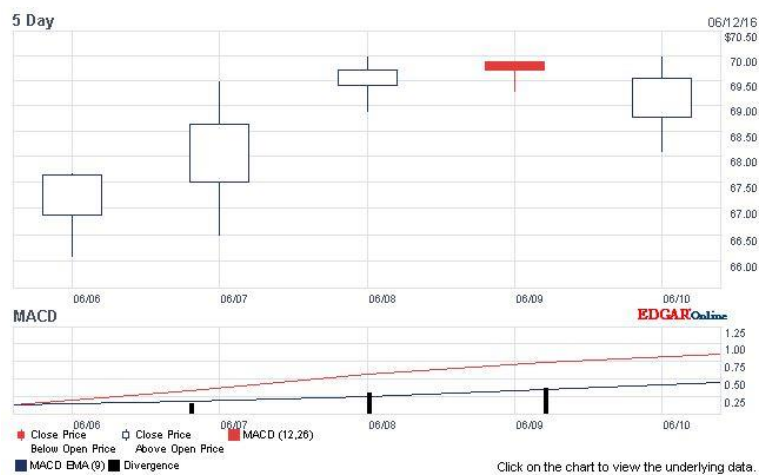

Figure 3.12: VSEC 06/06 - 06/10

I am pretty disappointed in the performance of this stock for the first week shown by Figure 3.13. I had applied the MACD guidelines properly, but I really should have sold the stock

at closing price on 06/08. This not only made me miss out on $295 of profit, but also tied up the

$40,000 that I could have invested in a better choice like WM or VSEC. It is not looking like this

stock will spring back into an upward trend. If that is the case, this stock will be sold on 06/13.
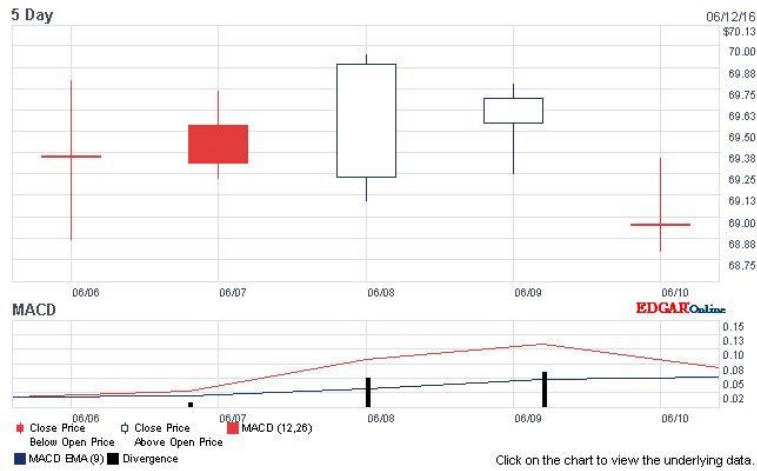

Figure 3.13: AFL 06/06 – 06/10

I have a neutral opinion on the performance of AAP this week shown by Figure 3.14. The

stock is clearly in an upward trend, with Friday being a surprisingly bad day. The closing price

was just enough to cause a setback, even though the stock movement is upward. I have a decent

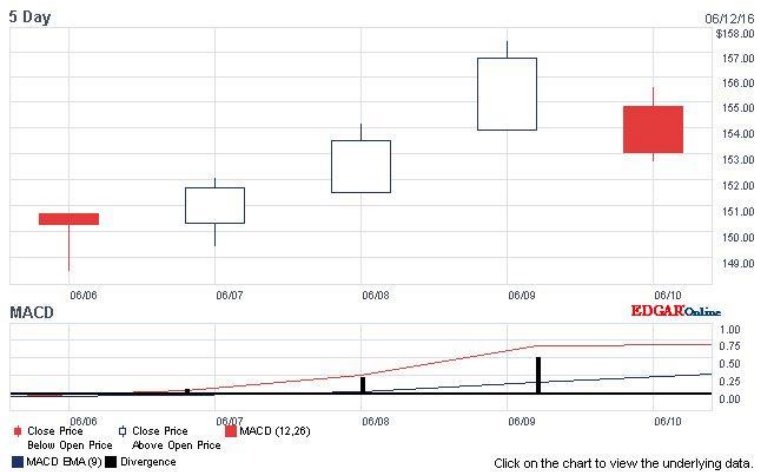feeling that AAP will generate a decent profit around 06/15.

Figure 3.14: AAP 06/06 – 06/10

MITK has had a rough week with a strong downward trend shown by Figure 3.15. This is good news since the stock prices will drop and the trend will switch at some point. I will be watching this stock for an investment opportunity.
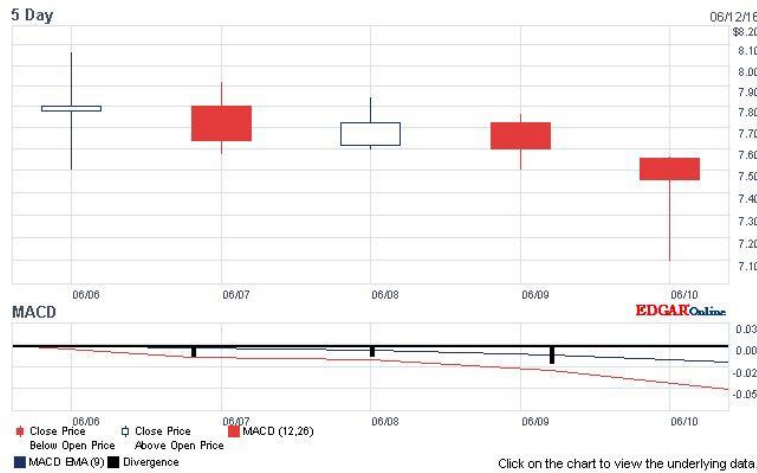
3.3 Stock Market Simulation 6/13/16 – 6/17/16

Table 3.2 depicts the trade history for week two. AFL was sold at a loss of $373.51 on 06/13/16. AAP was the only company that exhibited a buying signal this week. 200 shares of AAP were purchased on 06/14/16 after confirming the upward trend. AAP stock has been held the entirety of the week as it is in a strong upward trend. The closing price on Friday was above the opening price as indicated by the candlestick chart. Due to the beneficial action of AAP, the loss from AFL has been recovered and there is potential to generate profit. This stock will be monitored closely on Monday to decide whether or not the stock will continue increasing in price.

Date	Symbol	Buy / Sell	Price	Shares	Net Cost / Proceeds	Profit / Loss	Total Cash	Total Profit	Total Assets
06/06/16							$100,000	$0.00	$100,000
06/07/16	AFL	Buy	$69.38	577	$40,037.26		$59,963	$0.00	$100,000
06/08/16	AAP	Buy	$153.27	261	$40,008.47		$19,954	$0.00	$100,295
06/10/16									$99,677
06/13/16	AFL	Sell	$68.75	577	$39,663.75	$373.51	$59,618.02	-$373.51	$99,420.52
06/14/16	AAP	Buy	$152.73	200	$30,551.00		$29,067.02	-$373.51	$99,475.55
06/17/16									$100,314.57

WM is beginning to have a switch in trend after having a strong week shown by Figure 3.16. If I had stock in WM at the end of this week I definitely would have sold it early on Friday or at closing price. Hopefully WM will go down in price, creating a good entering opportunity. WM seems to be relatively constant with its trends.
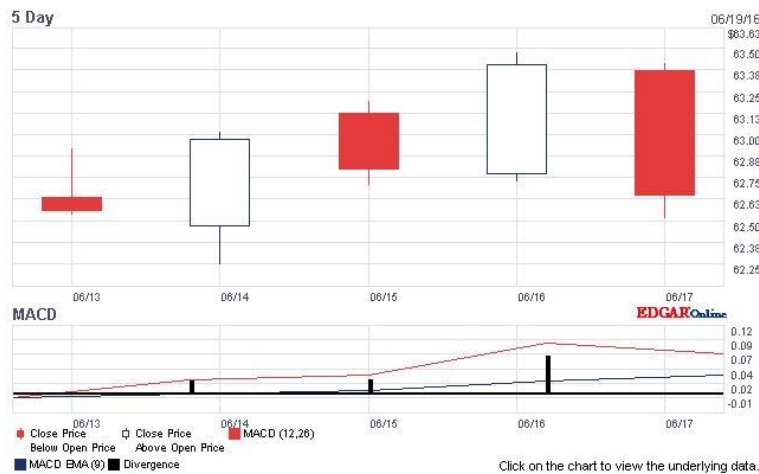

Figure 3.16: WM 06/13 – 06/17

VSEC had a pretty questionable week last week, and, as a result I did not trust its buying signal shown by Figure 3.17. This was a missed opportunity to generate a few hundred dollars over the course of this week. VSEC will most likely drop in price next week, where a new opportunity may present itself.
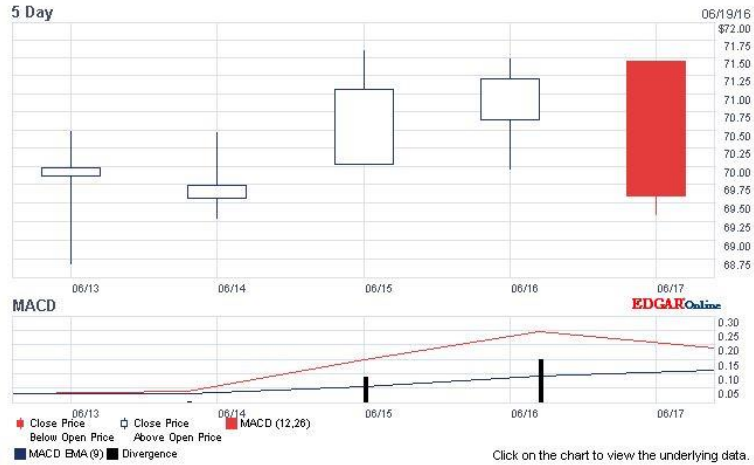
Figure 3.17: VSEC 06/13 – 06/17

AFL has been sporadic for the last two weeks and has had relatively neutral action this week shown by Figure 3.18. Thursday presented a very good opportunity to buy and sell almost immediately due to its large difference in opening to closing price. I'm very cautious towards this stock, regardless of the MACD buying signal. It looks like the MACD may signal to buy in a couple days.
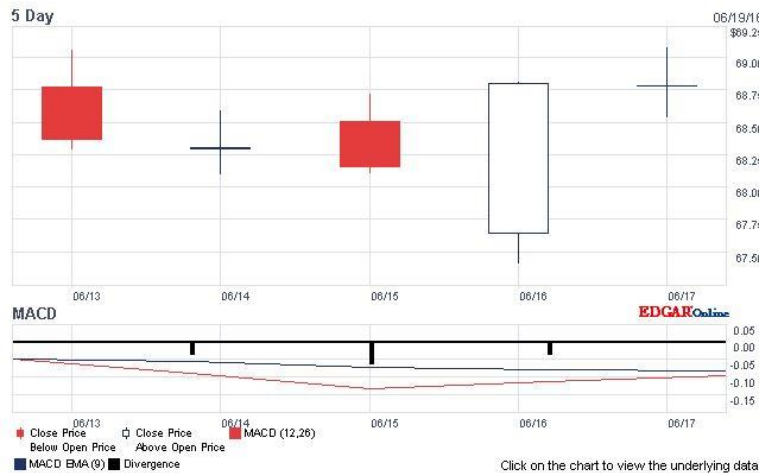

Figure 3.18: AFL 06/13 – 06/17

AAP had a great week, and it seems as though it will continue into the next week or slow down slightly shown by Figure 3.19. This could be a very good trend to ride for a decent profit

31

and at the very least this action has helped to overcome some of the losses I have already incurred.
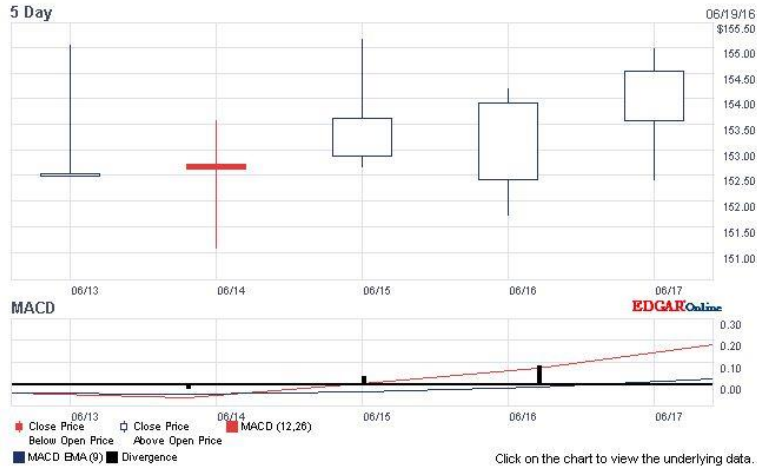

Figure 3.19: AAP 06/13 – 06/17

Figure 3.20 Shows the performance for MITK in week two. MITK is behaving very closely to a penny stock. This is the type of stock where you want to buy thousands of shares, hoping to sell a few cents higher than you purchased for. This becomes a pretty risky stock. I may try investing in this stock once when the MACD line signals a good trend.
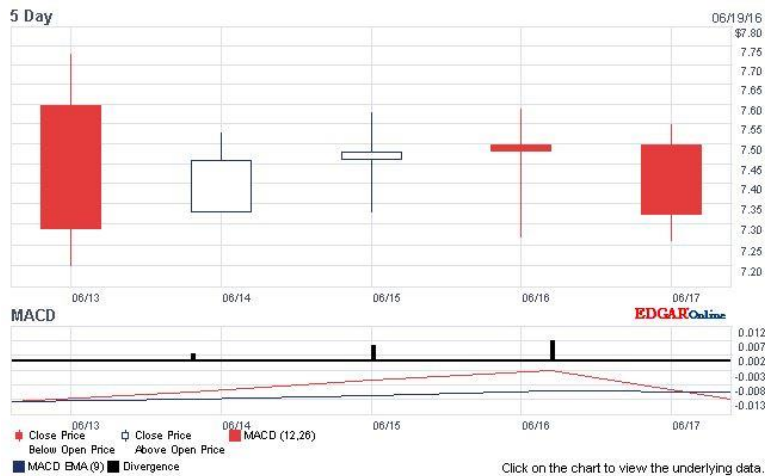

Figure 3.20: MITK 06/13 – 06/17

3.4 Stock Market Simulation 6/20/16 – 6/24/16

Table 3.3 depicts the trade history for week three. Despite the difficult market this week, there have been some good opportunities I was able to capture. First, AAP was sold immediately on 06/20 because it had lost its momentum over the weekend. This created a profit of $1,167.13, which is a little more than a 1% return on investment over the course of two weeks. The following day, WM was picking up momentum and signaled to buy on the previous day. About $50,000 was invested into WM at this time. AFL was also picking up in momentum, so another $50,000 was invested here as well. I was confident in splitting up my capital this way because AAP had just dropped and the other two stocks are very unpredictable right now. On 06/22/16, AFL was sold because I did not trust its momentum. In previous weeks, AFL exhibited strong fluctuations in 1-3 day periods. Selling AFL created a profit of $417.80. AFL continued to increase the next day (06/23) and then dropped on Friday 06/24. WM continued to grow over the course of the week, and this growth was factored into the Total Assets column for 06/24/16.

Table 3.3: Trade History for 06/20/16 - 06/24/16

Date	Symbol	Buy / Sell	Price	Shares	Net Cost / Proceeds	Profit / Loss	Total Cash	Total Profit	Total Assets
06/06/16							$100,000	$0.00	$100,000
06/07/16	AFL	Buy	$69.38	577	$40,037.26		$59,963	$0.00	$100,000
06/08/16	AAP	Buy	$153.27	261	$40,008.47		$19,954	$0.00	$100,295
06/10/16									$99,677
06/13/16	AFL	Sell	$68.75	577	$39,663.75	$373.51	$59,618.02	-$373.51	$99,420.52
06/14/16	AAP	Buy	$152.73	200	$30,551.00		$29,067.02	-$373.51	$99,475.55
06/17/16									$100,314.57
06/20/16	AAP	Sell	$155.60	461	$71,726.60	$1,167.13	$100,793.62	$793.62	$100,793.62
06/21/16	WM	Buy	$62.80	796	$49,993.80		$50,799.82	$793.62	$100,793.62
06/21/16	AFL	Buy	$70.10	713	$49,986.30		$813.52		$100,793.62
06/22/16	AFL	Sell	$70.70	713	$50,404.10	$417.80	$51,217.62	$1,211.42	$101,445.22
06/24/16									$101,922.82

WM signaled to buy on 06/20 and exhibited growth during the entire week shown by Figure 3.21. Buying on 06/21 was a safe strategy to confirm the trend, while buying on 06/20

would be riskier with a greater profit margin. This stock is performing favorably for the moment and will hopefully experience a strong upward trend.
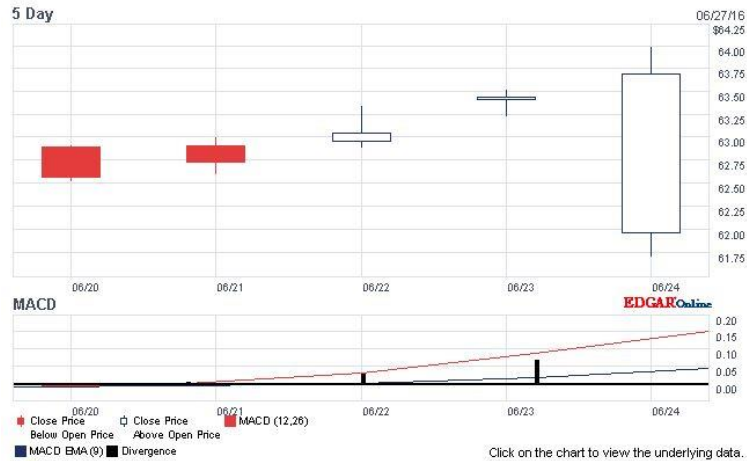

Figure 3.21: WM 06/20 – 06/24

VSEC is currently unstable, making this stock very hard to predict shown by Figure 3.22. Over the course of this week, VSEC signaled to buy twice and to sell three times. If strictly applying the MACD principles, the MACD would have been signaling to buy high and sell low, guaranteeing losses in this stock this week. I will have to be very certain that this stock is in a trend before investing in it.
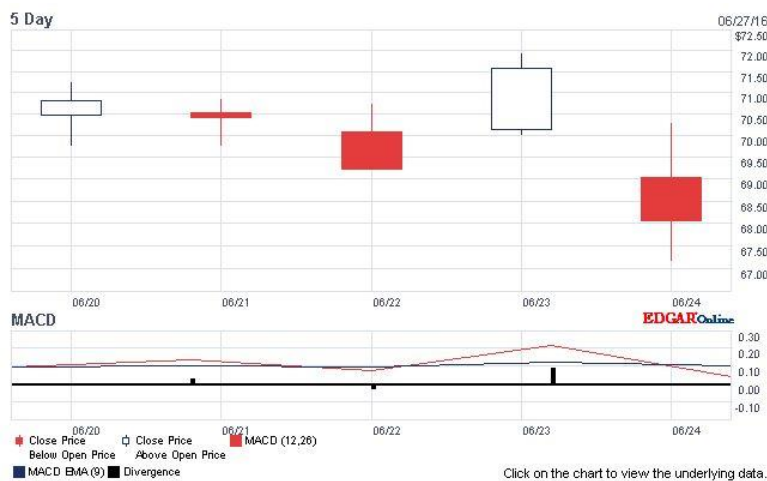

Figure 3.22: VSEC 06/20 – 06/24

AFL had a relatively stable week shown by Figure 3.23, allowing me to make around $400. The selling decision was not based on the MACD selling criterion, rather, I decided by watching the slope of the MACD line. The slope of the MACD line responds more quickly to price changes than the position does, creating an early indication of where the stock may be going.
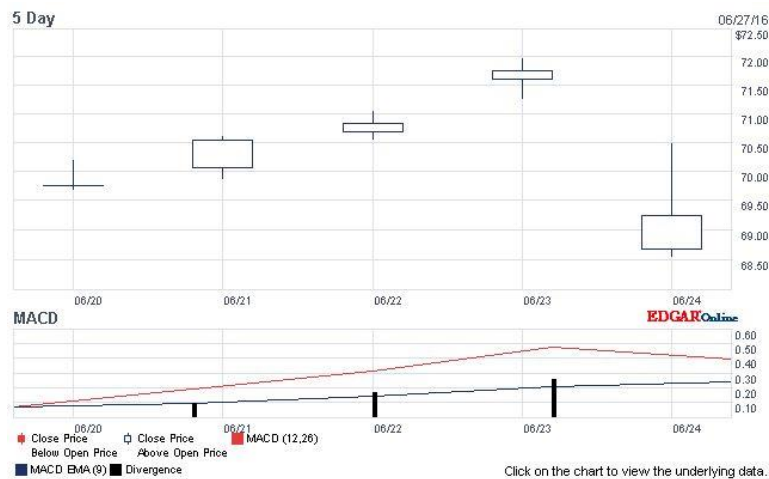
Figure 3.23: AFL 06/20 – 06/24

AAP's performance reflected the prediction of the MACD line shown by Figure 3.24. Since the price has dropped considerably, next week may present a good investing opportunity. AAP has been a good stock to invest in since the price swing is in dollars, where a lot of the other stocks only change a few cents in price swings. Even though it is a much more expensive stock to invest in, the returns are much better because of how greatly the price swings from low to high.
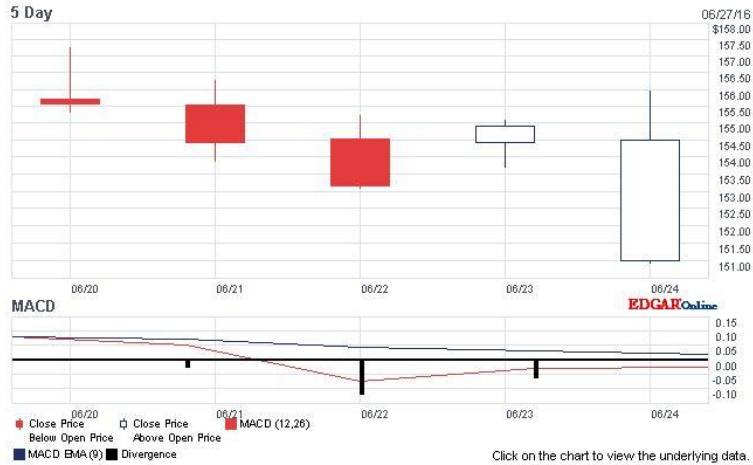
Figure 3.24: AAP 06/20 – 06/24

MITK has been a difficult stock to work with because its price swings are very small and its stock action has been unstable shown by Figure 3.25. On this current chart, the low to high difference is only about eighty cents. In order to generate any kind of sizable profit, I would have to invest a lot of capital into this company and I am really not confident in this stocks performance. This is the type of stock that requires significant automation to be successful with.

Figure 3.25: MITK 06/20 – 06/24

3.5 Stock Market Simulation 6/27/16 – 7/1/16

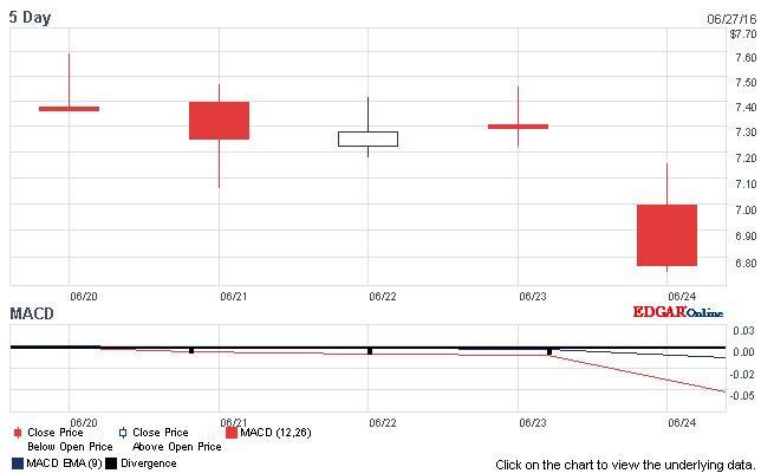Table 3.4 depicts the trade history for week four. This week, every single stock I was watching performed beautifully. My call on investing in WM last week was correct and the price had gone from $62.80 to $66.47. WM is still in a strong upward trend, but I will be very cautious in holding the stock for much longer. I suspect the price is going to swing to a down trend at the very beginning of the week. Since all of the stocks were looking good, I decided to put the rest of my cash into AAP. AAP has the greatest returns as I've previously stated, due to its large change in price. The MACD has not signaled to sell, and since the divergence of the MACD is looking hopeful, I have strictly held on to the stock. If the prices still look good on Monday, I will most likely sell immediately. If I were to have sold all of my stock at closing price on Friday, I would have created about $4,150 of profit. This is about a 4% return on investment, which is very good over the course of one week.

Table 3.4: Trade History for 06/27/16 - 07/01/16

Date	Symbol	Buy / Sell	Price	Shares	Net Cost / Proceeds	Profit / Loss	Total Cash	Total Profit	Total Assets
06/06/16							$100,000	$0.00	$100,000
06/07/16	AFL	Buy	$69.38	577	$40,037.26		$59,963	$0.00	$100,000
06/08/16	AAP	Buy	$153.27	261	$40,008.47		$19,954	$0.00	$100,295
06/10/16									$99,677
06/13/16	AFL	Sell	$68.75	577	$39,663.75	$373.51	$59,618.02	-$373.51	$99,420.52
06/14/16	AAP	Buy	$152.73	200	$30,551.00		$29,067.02	-$373.51	$99,475.55
06/17/16									$100,314.57
06/20/16	AAP	Sell	$155.60	461	$71,726.60	$1,167.13	$100,793.62	$793.62	$100,793.62
06/21/16	WM	Buy	$62.80	796	$49,993.80		$50,799.82	$793.62	$100,793.62
06/21/16	AFL	Buy	$70.10	713	$49,986.30		$813.52		$100,793.62
06/22/16	AFL	Sell	$70.70	713	$50,404.10	$417.80	$51,217.62	$1,211.42	$101,445.22
06/24/16									$101,922.82
06/28/16	AAP	Buy	$157.46	324	$51,022.04		$195.58		$102,360.62
07/01/16									$106,153.04

WM has had a great week jumping up nearly $4 between the time I purchased and its most recent closing price shown by Figure 3.26. This has performed better than I had hoped for

and it seems to still be on the rise. I will be holding on to this stock for as long as I can, but the slope of the mountain chart seems to indicate the price momentum may begin to shift.

Figure 3.26: WM 06/27 – 07/01
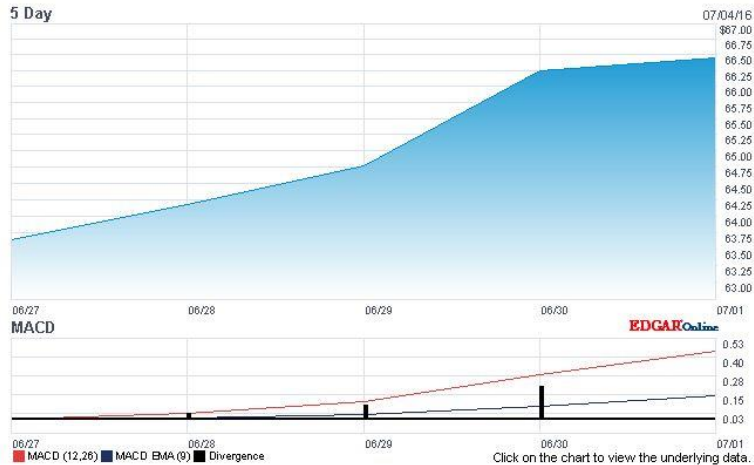
VSEC's performance goes against what the MACD predicts shown by Figure 3.27. The MACD signaled to sell on Monday, and then the price increased by $3 at the end of the week. Due to the very unstable performance last week, I ignored VSEC entirely. VSEC may finally be stabilizing for this financial quarter and may become a decent candidate next week.

Figure 3.27: VSEC 06/27 – 07/01

AFL had a great week and its performance is comparable to WM shown by Figure 3.28. I most likely would not have bought AFL until 06/29, which means I only would have gotten about $2 in price change. Also, AFL had a wild week previously, which lead me to go with WM, the more stable option. It seems that AFL is beginning to slow down based on the last segment of the mountain chart.
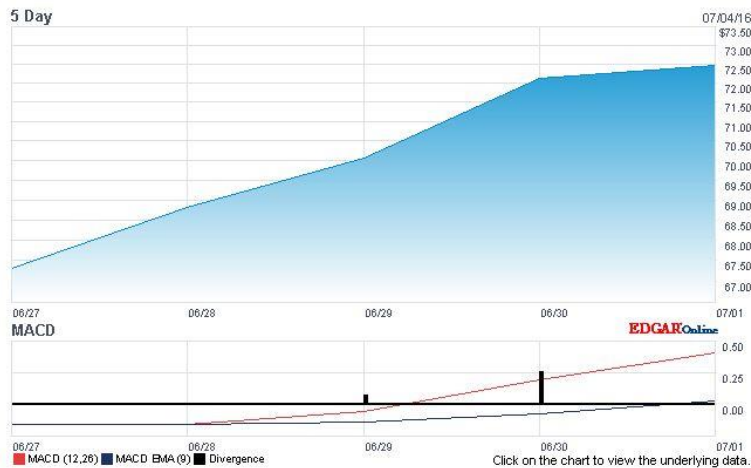

Figure 3.28: AFL 06/27 – 07/01

AAP has had the greatest week out of all the stocks shown by Figure 3.29. This is the second time AAP has made me a lot of money. I will be holding onto this stock for as long as I can as well and it seems like it is still on the rise. My stock in this company has grown nearly $8 since I've invested in it.
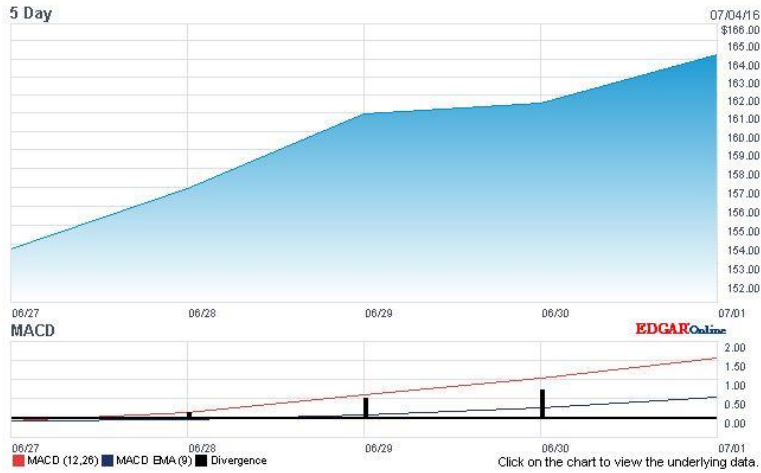
Figure 3.29: AAP 06/27 – 07/01

The most surprising performance was MITK shown by Figure 3.30. MITK is essentially a penny stock and has been performing exactly how a penny stock would. Since MITK has also exhibited this sort of behavior this week, I feel that something in the economy has changed to provide all around growth. If this is the case, next week may continue to be a week of growth. This is good news, since the stocks I've currently invested in are very strong stocks.

Figure 3.30: MITK 06/27 – 07/01

3.6 Stock Market Simulation 7/4/16 – 7/8/16

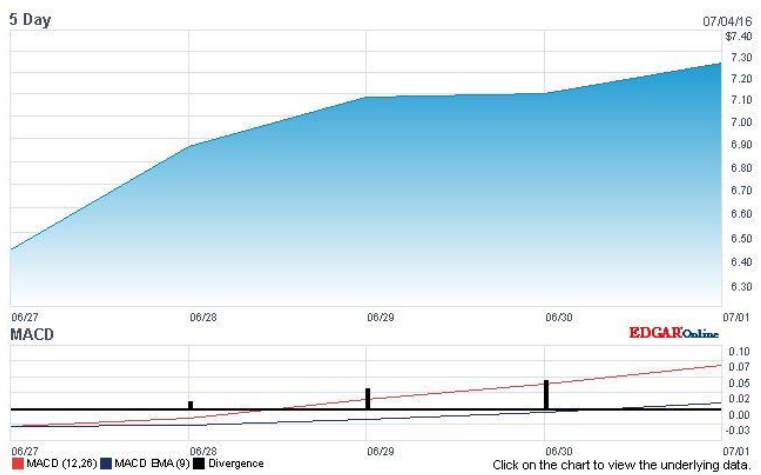Table 3.5 depicts the trade history for week five. This week was somewhat shaky. I did not realize that the stock market observed national holidays, which resulted in a bit of a price stagnation over the long weekend. For this reason, I decided to sell all of my stock while I had a very good profit. I could have held on to WM, since it continued to grow even over the long weekend. AAP on the other hand fell drastically on 07/05. If I had held onto AAP, the stock price would have dropped $4.00, resulting in $1200 in missed profit. For the rest of the week, AAP and AFL were unstable. For the other stocks, VSEC had a nice week after 07/05, but the MACD was not anywhere close to signaling buy. MITK was decreasing and had a large price spike on 07/08. After making nearly 5% return on investment over two weeks, I was cautious in throwing my money around into stocks that were hard to predict.

Table 3.5: Trade History for 07/04/16 - 07/08/16

Date	Symbol	Buy / Sell	Price	Shares	Net Cost / Proceeds	Profit / Loss	Total Cash	Total Profit	Total Assets
06/06/16							$100,000	$0.00	$100,000
06/07/16	AFL	Buy	$69.38	577	$40,037.26		$59,963	$0.00	$100,000
06/08/16	AAP	Buy	$153.27	261	$40,008.47		$19,954	$0.00	$100,295
06/10/16									$99,677
06/13/16	AFL	Sell	$68.75	577	$39,663.75	$373.51	$59,618.02	-$373.51	$99,420.52
06/14/16	AAP	Buy	$152.73	200	$30,551.00		$29,067.02	-$373.51	$99,475.55
06/17/16									$100,314.57
06/20/16	AAP	Sell	$155.60	461	$71,726.60	$1,167.13	$100,793.62	$793.62	$100,793.62
06/21/16	WM	Buy	$62.80	796	$49,993.80		$50,799.82	$793.62	$100,793.62
06/21/16	AFL	Buy	$70.10	713	$49,986.30		$813.52		$100,793.62
06/22/16	AFL	Sell	$70.70	713	$50,404.10	$417.80	$51,217.62	$1,211.42	$101,445.22
06/24/16									$101,922.82
06/28/16	AAP	Buy	$157.46	324	$51,022.04		$195.58		$102,360.62
07/01/16									$106,153.04
07/04/16	WM	Sell	$67.07	796	$53,382.72	$3,388.92	$53,578.30	$4,600.34	$106,779.10
07/04/16	AAP	Sell	$164.20	324	$53,195.80	$2,173.76	$106,774.10	$6,774.10	$106,774.10
07/08/16							$106,774.10	$6,774.10	$106,774.10

WM had a decent week shown by Figure 3.31. The price swing was $0.60 from low to high this week. The low slopes of the mountain chart made me cautious to hold on to the stock

for the entire week. I think that the trend of WM will be switching momentarily. I am not too

worried about selling the stock early, since I only missed $477 of profit.
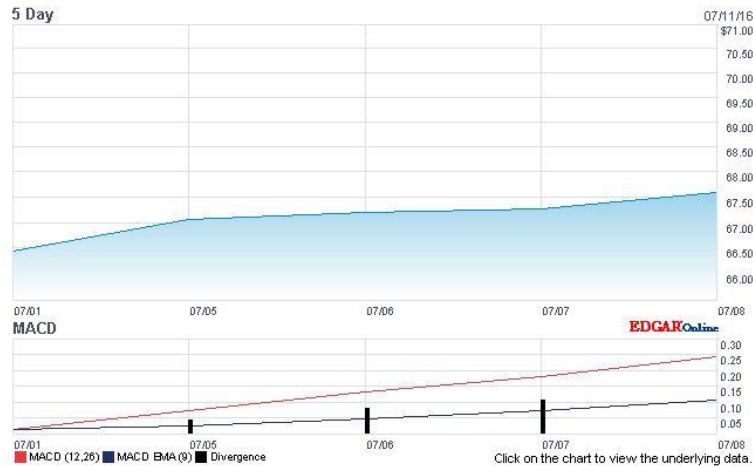

Figure 3.31: WM 07/04 – 07/08

VSEC had a good week shown by Figure 3.32, and I would have been able to

generate some short term profit with this stock, had I felt confident in neglecting the MACD

signal. Typically, VSEC has been sporadic and I didn't want to gamble on this stock. A good

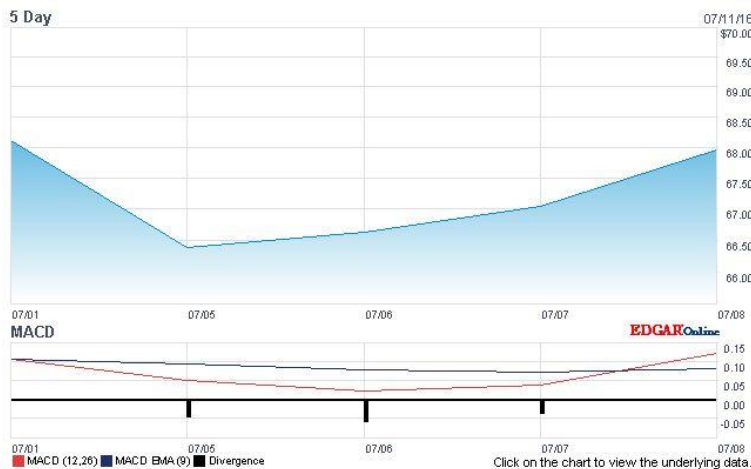time to buy would have been on 07/08.

Figure 3.32: VSEC 07/04 – 07/08

AFL has had a very unstable week shown by Figure 3.33. This type of behavior is very good if I had the chance to watch the stock market very closely throughout the day. With proper technical analytics, AFL would have presented two large opportunities to sell high. This type of strategy is too risky for me.
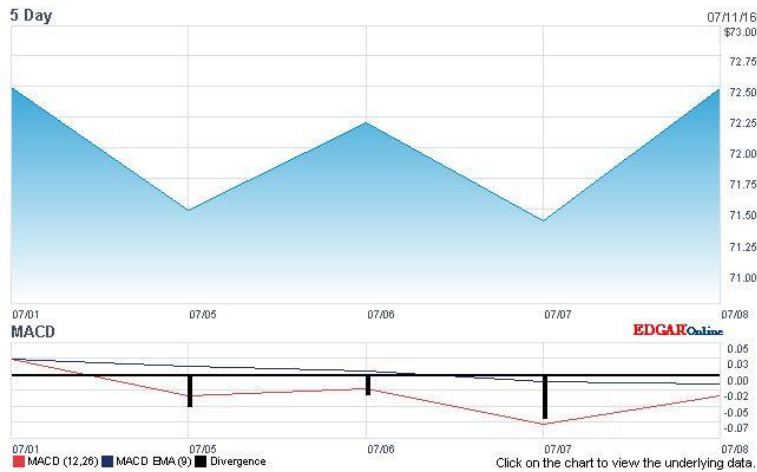
Figure 3.33: AFL 07/04 – 07/08

AAP did not perform too well this week shown by Figure 3.34. Luckily I had sold the stock before the price drop on 07/05. The MACD signaled to sell on 07/01, which I waited to do on 07/04. This was a mistake since I did not realize the stock market extended the weekend for the 4th of July. I didn't buy the stock while it was low because I was unsure of the stock's behavior. The MACD signals to buy on 07/08.
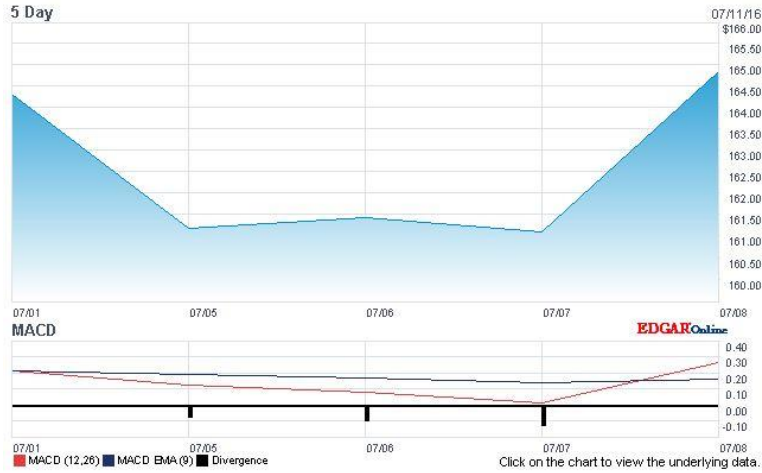
MITK had a relatively stable week shown by Figure 3.35. Had I invested in MITK last week and held onto the stock until Friday, I would have potentially made a 14% return on my investment. That is an extremely good trade, but also a very risky one. The price spike on Friday was completely unpredicted. Since this stock is behaving as a penny stock, it really wouldn't make much sense to buy MITK to hold it for a long amount of time.

Figure 3.35: MITK 07/04 – 07/08

4 Results & Analysis

Table 4.1 shows the final trade history and analysis of the stock simulation performance. Starting with $100,000 I was able to profit $6,774.10. This turns out to be a 6.77% return on investment. This can be treated in two different ways. One way is to consider the return on investment over the five-week stock simulation. T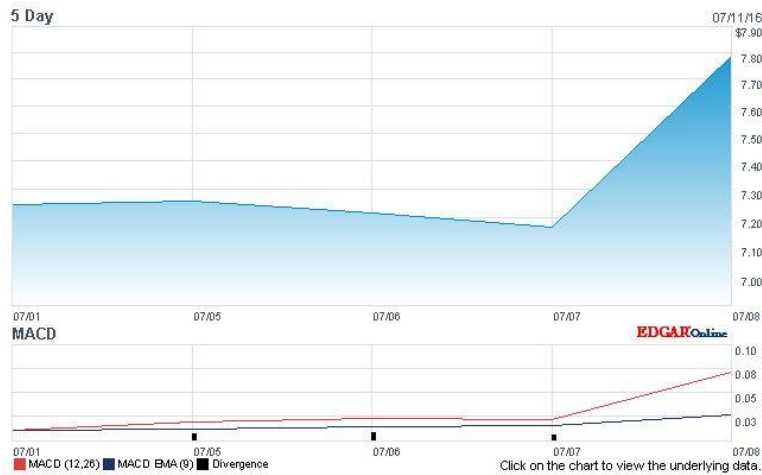his causes the percentage to be somewhat of an average based on the choices made throughout the five weeks. The return on investment could also be calculated with respect to each week. If this were to be conducted, the return on investment for the last week is 4.31%. 6.77% is quite high, especially when compared to a 1% interest rate for a savings account (which is very high for savings accounts). When trying to predict future performance, it is more conservative to choose the high percentage compounded every 5 weeks. This is highly inaccurate regardless, since the market can enter times of great unpredictability.

Table 4.1 Final Trade History and Analysis

Date	Symbol	Buy / Sell	Price	Shares	Net Cost / Proceeds	Profit / Loss	Total Cash	Total Profit	Total Assets
06/06/16							$100,000	$0.00	$100,000
06/07/16	AFL	Buy	$69.38	577	$40,037.26		$59,963	$0.00	$100,000
06/08/16	AAP	Buy	$153.27	261	$40,008.47		$19,954	$0.00	$100,295
06/10/16									$99,677
06/13/16	AFL	Sell	$68.75	577	$39,663.75	$373.51	$59,618.02	-$373.51	$99,420.52
06/14/16	AAP	Buy	$152.73	200	$30,551.00		$29,067.02	-$373.51	$99,475.55
06/17/16									$100,314.57
06/20/16	AAP	Sell	$155.60	461	$71,726.60	$1,167.13	$100,793.62	$793.62	$100,793.62
06/21/16	WM	Buy	$62.80	796	$49,993.80		$50,799.82	$793.62	$100,793.62
06/21/16	AFL	Buy	$70.10	713	$49,986.30		$813.52		$100,793.62
06/22/16	AFL	Sell	$70.70	713	$50,404.10	$417.80	$51,217.62	$1,211.42	$101,445.22
06/24/16									$101,922.82
06/28/16	AAP	Buy	$157.46	324	$51,022.04		$195.58		$102,360.62
07/01/16									$106,153.04
07/04/16	WM	Sell	$67.07	796	$53,382.72	$3,388.92	$53,578.30	$4,600.34	$106,779.10
07/04/16	AAP	Sell	$164.20	324	$53,195.80	$2,173.76	$106,774.10	$6,774.10	$106,774.10
07/08/16							$106,774.10	$6,774.10	$106,774.10
		Return on Investment	Number of Trades	Total Losses	Total Profits	Average Holding Period	Number of Shares Traded		
		6.77%	11	$373.51	$6,774.10	7.6 Days	2871		

Overall, the market was unstable and difficult to predict. The first two weeks exhibited this behavior, and made it difficult for me to generate profit as I was still getting accommodated to reading stock charts and dealing with an unpredictable market. Around the third week, I was able to generate profit from a stock that I had held on for the entire three weeks. On this stock, I implemented a long term strategy where I bought and held the stock instead of selling it at a loss. I also put more money into the stock as it fell below the initial price I paid for it. During the 4th week, all of my stocks experienced a strong upward trend. I simply choose the two stocks that I had trusted the most and this paid off very well. The last week of the simulation became highly unpredictable once more and I decided to not gamble on the volatility.

The MACD line provided a decent guide as to when a stock should be bought/sold. The MACD line, if strictly followed during this period, signaled to make some poor decisions. This was what resulted in my initial loss on AFL in week one. Significantly more sophisticated technical analysis strategy and equipment will improve stock market performance. I found difficulties in trying to monitor stock prices throughout the day as I did not have real time access to the prices.

Typically, swing trading occurs in the 3 to 5-day period and my average length of trade was 7.6 days. This is mainly a result of being uncomfortable with stock charts and making risky choices. I tried to act as if this was truly my money to simulate the effect of what I'd actually do in this situation. I think I may have been a little over cautious with my trading and I may have missed chances to make more money.

5 Conclusions

I am very satisfied with my results and I have fulfilled all of the goals I set out to achieve. First and foremost, I was able to analyze the current US economy in order to have an accurate description of what industries would have stock action. Although the market is in an unpredictable state, WM and AAP had somewhat reliable behavior. Second, I've learned a lot about different types of investments. In the future I will invest my money in real estate. Although the stock market can generate nice profit, I strongly disliked the uncertainty of the market. I would describe it as gambling without the charm of a casino. Third, I learned about different stock trading strategies. If I were to invest in the stock market in the future I would go into the long term strategy of Buy and Hold. In this case, this is not a gamble. I would put considerable amount of research into a company whose product I supported. I would do this in hopes of collecting a good dividend. Lastly, I gained firsthand experience with the stock market. I now understand how to read the different types of stock charts for indications of trends. I am also comfortable with not buying when the market is too risky. I did not expect to make much of a profit and even though I did quite well I would have to say I got lucky.

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