

April 2014

Stock Market Simulation

Chris Tian Xia

Worcester Polytechnic Institute

Mercedes Lauren Walls

Worcester Polytechnic Institute

Yixi Chen

Worcester Polytechnic Institute

Zachary M. Stewart

Worcester Polytechnic Institute

Follow this and additional works at: <https://digitalcommons.wpi.edu/iqp-all>

Repository Citation

Xia, C. T., Walls, M. L., Chen, Y., & Stewart, Z. M. (2014). *Stock Market Simulation*. Retrieved from <https://digitalcommons.wpi.edu/iqp-all/3342>

This Unrestricted is brought to you for free and open access by the Interactive Qualifying Projects at Digital WPI. It has been accepted for inclusion in Interactive Qualifying Projects (All Years) by an authorized administrator of Digital WPI. For more information, please contact digitalwpi@wpi.edu.

Project Number: DTZ 1302

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

Yixi Chen _____

Mercedes Kuzina _____

Zachary Stewart _____

Chris Xia _____

Submitted:

May 6, 2014

Approved by Professor Dalin Tang, Project Advisor

Abstract

With the resources available on the internet, a ten week stock market simulation was conducted to examine the effects of four different trading methods: swing trading, pair trading, trading the news, and growth investing. Results from the four trading methods were compared and analyzed. The experience obtained through this project may give investors the confidence to trade wisely in the future.

Table of Contents

Abstract.....	1
Table of Contents	2
List of Figures.....	4
List of Tables	7
1 Introduction.....	8
1.1 Goals, Scope, General Plan.....	8
1.2 Stock Market Synopsis.....	9
2 Types of Investment.....	11
2.1 Certificate of Deposit.....	11
2.2 Bond.....	11
2.3 Mutual Fund.....	11
2.4 Real Estate.....	12
2.5 Precious Metal.....	12
2.6 Stock.....	12
3 Swing Trading Simulation.....	14
3.1 Technical Analysis.....	14
3.1.1 Support and Resistance	14
3.1.2 Volume and Price Relationship.....	16
3.1.3 Simple Moving Averages.....	17
3.2 Companies.....	18
3.3 Simulation Transactions.....	20
3.3.1 Week 1: 12/02/13-12/06/13.....	20
3.3.2 Week 2: 12/09/13-12/13/13.....	22
3.3.3 Week 3: 12/16/13-12/20/13.....	25
3.3.4 Week 4: 01/20/14-01/24/14.....	28
3.3.5 Week 5: 01/27/14-01/31/14.....	31
3.3.6 Week 6: 02/03/14-02/07/14.....	32
3.3.7 Week 7: 02/10/14-02/14/14.....	35
3.3.8 Week 8: 02/17/14-02/21/14.....	37
3.3.9 Week 9: 02/24/14-02/28/14.....	40
3.3.10 Week 10: 03/03/14-03/07/14.....	42
3.4 Results and Discussion.....	43
4 Pair Trading Simulation.....	46
4.1 Introduction.....	46
4.2 Mechanism.....	46
4.3 Terminology.....	47
4.3.1 Correlation.....	47
4.3.2 Price Ratio.....	48
4.4 Pairs of Stocks Selected.....	48
4.5 Simulation Transactions.....	52
4.5.1 Week 1: 12/02/13-12/06/13.....	52
4.5.2 Week 2: 12/09/13-12/13/13.....	55
4.5.3 Week 3: 12/16/13-12/20/13.....	58
4.5.4 Week 4: 01/20/14-01/24/14.....	60

4.5.5	Week 5: 01/27/14-01/31/14.....	62
4.5.6	Week 6: 02/03/14-02/07/14.....	65
4.5.7	Week 7: 02/10/14-02/14/14.....	67
4.5.8	Week 8: 02/17/14-02/21/14.....	70
4.5.9	Week 9: 02/24/14-02/28/14.....	72
4.5.10	Week 10: 03/03/14-03/07/14	74
4.6	Results and Discussion	76
5	Trading the News Simulation	78
5.1	Companies	79
5.2	Simulation Transactions	80
5.2.1	Week 1: 12/02/13-12/06/13.....	80
5.2.2	Week 2: 12/09/13-12/13/13.....	81
5.2.3	Week 3: 12/16/13-12/20/13.....	82
5.2.4	Week 4: 01/20/14-01/24/14.....	83
5.2.5	Week 5: 01/27/14-01/31/14.....	86
5.2.6	Week 6: 02/03/14-02/07/14.....	88
5.2.7	Week 7: 02/10/14-02/14/14.....	89
5.2.8	Week 8: 02/17/14-02/21/14.....	92
5.2.9	Week 9: 02/24/14-02/28/14.....	95
5.2.10	Week 10: 03/03/14-03/07/14	97
5.3	Results and Discussion	99
6	Growth Investing	102
6.1	Introduction	102
6.2	Company Analysis	105
6.3	Results and Discussion	115
7	Analysis	120
7.1	Analysis of strategies	120
7.2	Comparing Swing Trading and Pair Trading.....	121
7.3	Comparing Trading the News and Growth Investing.....	122
8	Conclusion	125
	References	126

List of Figures

Figure 3.1 Example of Support.....	14
Figure 3.2 Example of Resistance	15
Figure 3.3 Old Resistance Becomes New Support.....	16
Figure 3.4 Volume and Price Trend Reversal.....	17
Figure 3.5 Price Crosses Simple Moving Average.....	18
Figure 3.6 Simple Moving Average Crossover	18
Figure 3.7 Waste Management Technical Chart.....	20
Figure 3.8 Fiserv Technical Chart	21
Figure 3.9 FMC Technologies Technical Chart	21
Figure 3.10 Waste Management Technical Chart.....	23
Figure 3.11 FMC Technologies Technical Chart	23
Figure 3.12 AGL Resources Inc. Technical Chart.....	24
Figure 3.13 Kroger Co. Technical Chart	24
Figure 3.14 Waste Management Technical Chart.....	25
Figure 3.15 FMC Technologies Technical Chart	26
Figure 3.16 AGL Resources Inc. Technical Chart.....	26
Figure 3.17 Kroger Co. Technical Chart	27
Figure 3.18 Waste Management Technical Chart.....	28
Figure 3.19 FMC Technologies Technical Chart	29
Figure 3.20 AGL Resources Inc. Technical Chart.....	29
Figure 3.21 Kroger Co. Technical Chart	30
Figure 3.22 Fiserv Technical Chart	30
Figure 3.23 Waste Management Technical Chart.....	31
Figure 3.24 Fiserv Technical Chart	31
Figure 3.25 Waste Management Technical Chart.....	33
Figure 3.26 Fiserv Technical Chart	33
Figure 3.27 Kroger Co. Technical Chart	34
Figure 3.28 AGL Resources Inc. Technical Chart.....	34
Figure 3.29 Waste Management Technical Chart.....	35
Figure 3.30 FMC Technologies Technical Chart	36
Figure 3.31 AGL Resources Inc. Technical Chart.....	36
Figure 3.32 Waste Management Technical Chart.....	38
Figure 3.33 Fiserv Technical Chart	38
Figure 3.34 Kroger Co. Technical Chart	39
Figure 3.35 AGL Resources Inc. Technical Chart.....	39
Figure 3.36 Kroger Co. Technical Chart	41
Figure 3.37 AGL Resources Inc. Technical Chart.....	41
Figure 3.38 AGL Resources Inc. Technical Chart.....	42
Figure 4.1 Mechanism of Pair Trading.....	47
Figure 4.2 Stock Chart of Ford	48
Figure 4.3 Stock Chart of General Motors.....	49
Figure 4.4 Stock Chart of AT&T	49
Figure 4.5 Stock Chart of Verizon.....	50
Figure 4.6 Stock Chart of Citigroup	50

Figure 4.7 Stock Chart of Bank of America	51
Figure 4.8 Stock Chart of Exxon Mobil.....	51
Figure 4.9 Stock Chart of Chevron.....	52
Figure 4.10 Relative Strength of F & GM	52
Figure 4.11 Relative Strength of T & VZ.....	53
Figure 4.12 Relative Strength of C & BAC.....	53
Figure 4.13 Relative Strength of XOM & CVX.....	54
Figure 4.14 Relative Strength of F & GM	55
Figure 4.15 Relative Strength of T & VZ.....	55
Figure 4.16 Relative Strength of C & BAC.....	56
Figure 4.17 Relative Strength of XOM & CVX.....	56
Figure 4.18 Relative Strength of F & GM	58
Figure 4.19 Relative Strength of T & VZ.....	58
Figure 4.20 Relative Strength of C & BAC.....	59
Figure 4.21 Relative Strength of XOM & CVX.....	59
Figure 4.22 Relative Strength of F & GM	60
Figure 4.23 Relative Strength of T & VZ.....	61
Figure 4.24 Relative Strength of C & BAC.....	61
Figure 4.25 Relative Strength of XOM & CVX.....	61
Figure 4.26 Relative Strength of F & GM	62
Figure 4.27 Relative Strength of T & VZ.....	63
Figure 4.28 Relative Strength of C & BAC.....	63
Figure 4.29 Relative Strength of XOM & CVX.....	64
Figure 4.30 Relative Strength of F & GM	65
Figure 4.31 Relative Strength of T & VZ.....	65
Figure 4.32 Relative Strength of C & BAC.....	66
Figure 4.33 Relative Strength of XOM & CVX.....	66
Figure 4.34 Relative Strength of F & GM	67
Figure 4.35 Relative Strength of T & VZ.....	68
Figure 4.36 Relative Strength of C & BAC.....	68
Figure 4.37 Relative Strength of XOM & CVX.....	69
Figure 4.38 Relative Strength of F & GM	70
Figure 4.39 Relative Strength of T & VZ.....	70
Figure 4.40 Relative Strength of C & BAC.....	71
Figure 4.41 Relative Strength of F & GM	72
Figure 4.42 Relative Strength of T & VZ.....	72
Figure 4.43 Relative Strength of C & BAC.....	73
Figure 4.44 Relative Strength of F & GM	74
Figure 4.45 Relative Strength of T & VZ.....	74
Figure 4.46 Relative Strength of C & BAC.....	75
Figure 5.1 Week 1 GALE Stock Price.....	80
Figure 5.2 Week 2 GALE Stock Price.....	81
Figure 5.3 Week 2 NAVB Stock Price	82
Figure 5.4 Week 2 GALE Stock Price.....	83
Figure 5.5 Week 4 GALE Stock Price.....	84
Figure 5.6 Week 4 NAVB Stock Price	84

Figure 5.7 Week 4 HII Stock Price.....	85
Figure 5.8 Week 4 SWI Stock Price.....	85
Figure 5.9 Week 4 ANIK Stock Price.....	86
Figure 5.10 Week 5 HII Stock Price.....	87
Figure 5.11 Week 5 SWI Stock Price.....	87
Figure 5.12 Week 5 ANIK Stock Price.....	88
Figure 5.13 Week 6 HII Stock Price.....	88
Figure 5.14 Week 6 SWI Stock Price.....	89
Figure 5.15 Week 6 ANIK Stock Price.....	89
Figure 5.16 Week 7 HII Stock Price.....	90
Figure 5.17 Week 7 SWI Stock Price.....	90
Figure 5.18 Week 7 ANIK Stock Price.....	91
Figure 5.19 Week 7 TCRD Stock Price.....	91
Figure 5.20 Week 8 HII Stock Price.....	92
Figure 5.21 Week 8 SWI Stock Price.....	93
Figure 5.22 Week 8 ANIK Stock Price.....	93
Figure 5.23 Week 8 TCRD Stock Price.....	94
Figure 5.24 Week 8 BMY Stock Price.....	94
Figure 5.25 Week 9 HII Stock Price.....	95
Figure 5.26 Week 9 SWI Stock Price.....	95
Figure 5.27 Week 9 ANIK Stock Price.....	96
Figure 5.28 Week 9 TCRD Stock Price.....	96
Figure 5.29 Week 9 BMY Stock Price.....	97
Figure 5.30 Week 10 HII Stock Price.....	98
Figure 5.31 Week 10 SWI Stock Price.....	98
Figure 5.32 Week 10 TRCD Stock Price.....	98
Figure 5.33 Week 10 BMY Stock Price.....	99
Figure 6.1 History IRBT 2005-2013.....	107
Figure 6.2 History FCEL 1993-2013.....	108
Figure 6.3 Stock Performance of Various Breweries.....	108
Figure 6.4 History BREW 2008-2014.....	111
Figure 6.5 History DCI 1978-2014.....	112
Figure 6.6 History MKC 1978-2014.....	113
Figure 6.7 History HYMTF 2003-2014.....	115
Figure 7.1 Portfolio Values for Four Strategies.....	120

List of Tables

Table 3.1 Week 1 Transaction Record (Includes \$10 commission fee per trade)	22
Table 3.2 Week 2 Transaction Record (Includes \$10 commission fee per trade)	25
Table 3.3 Week 3 Transaction Record (Includes \$10 commission fee per trade)	28
Table 3.4 Week 5 Transaction Record (Includes \$10 commission fee per trade)	32
Table 3.5 Week 6 Transaction Record (Includes \$10 commission fee per trade)	35
Table 3.6 Week 7 Transaction Record (Includes \$10 commission fee per trade)	37
Table 3.7 Week 8 Transaction Record (Includes \$10 commission fee per trade)	40
Table 3.8 Week 9 Transaction Record (Includes \$10 commission fee per trade)	42
Table 3.9 Week 10 Transaction Record (Includes \$10 commission fee per trade)	43
Table 4.1 Week 1 Transaction Record (Includes \$10 commission fee per trade)	54
Table 4.2 Week 2 Transaction Record (Includes \$10 commission fee per trade)	57
Table 4.3 Week 3 Transaction Record (Includes \$10 commission fee per trade)	60
Table 4.4 Week 5 Transaction Record (Includes \$10 commission fee per trade)	64
Table 4.5 Week 6 Transaction Record (Includes \$10 commission fee per trade)	67
Table 4.6 Week 7 Transaction Record (Includes \$10 commission fee per trade)	69
Table 4.7 Week 8 Transaction Record (Includes \$10 commission fee per trade)	71
Table 4.8 Week 9 Transaction Record (Includes \$10 commission fee per trade)	73
Table 4.9 Week 10 Transaction Record (Includes \$10 commission fee per trade)	75
Table 5.1 Week 1 Transaction Record (Includes \$10 commission fee per trade)	81
Table 5.2 Week 2 Transaction Record (Includes \$10 commission fee per trade)	82
Table 5.3 Week 4 Transaction Record (Includes \$10 commission fee per trade)	86
Table 5.4 Week 7 Transaction Record (Includes \$10 commission fee per trade)	92
Table 5.5 Week 8 Transaction Record (Includes \$10 commission fee per trade)	94
Table 5.6 Week 9 Transaction Record (Includes \$10 commission fee per trade)	97
Table 5.7 Week 10 Transaction Record (Includes \$10 commission fee per trade)	99
Table 6.1 Performance of 10 Successful Growth Stocks 1962-1972	103
Table 6.2 Performance of 10 Nongrowth Stocks 1962-1972	103
Table 6.3 Key stats and ratios for IRBT	106
Table 6.4 Key stats and ratios for FCEL.....	108
Table 6.5 Key stats and ratios for BREW.....	111
Table 6.6 Key stats and ratios for DCI	112
Table 6.7 Key stats and ratios for MKC	113
Table 6.8 Key stats and ratios for HYMTF	114
Table 6.9 Purchase Summary (Includes \$10 commission fee per trade)	115
Table 6.10 Sell Summary (Includes \$10 commission fee per trade)	115
Table 6.11 Growth and Value Companies.....	118

1 Introduction

This experiment was conducted using Google Finance, which is an online simulator based off the real-time stock market. This simulation can be accessed at Google.com. There, the group will attempt to predict market fluctuations by using analytical skills to analyze and track stock price variations. The trading strategies investigated include: swing trading, pair trading, trading the news, and growth investing. Each investor began with \$100,000, which was invested responsibly into the stock market according to their strategy. Before we conduct the simulation, we must pick several companies to follow and invest in. The simulation will take place over the duration of ten weeks and each investor will utilize their strategy effectively to maximize their profits given the current economy.

1.1 Goals, Scope, General Plan

The objective of this report is to acquire the fundamental concepts associated with the stock market. Through our research, we hope to develop profitable strategies to use in the stock market. We also hope to gain valuable research techniques to determine which companies and markets will be the most profitable to invest in. In addition, we want to learn the stock market language, so we can communicate fluently with other stock investors. To gain these qualities, we will first research the history of the stock market and different strategic trading methods. Each of us will choose a strategy and become more familiar with it. At the end of the simulation, we will summarize and compare the results of the trading strategies conducted by each person. When this plan is completed, we would have achieved all the goals of understanding the stock market concepts and language. This would allow us to manage our stocks more wisely in the future.

1.2 Stock Market Synopsis

The New York Stock Exchange was developed to fund the War of 1812. The government began to sell bonds with the promise of profit for investors. In 1815, the market began to grow as government bonds, bank stocks, and insurance stocks were traded. The Bank of New York was the first company listed on the NYSE.

In 1923, the historic bull market began causing a surge in stock prices that continued rising for the next six years. On September 3, 1929 the Dow Jones Industrial Average reached its peak of 381.17. However, on October 29, 1929, also known as “Black Tuesday”, prices fell sharply and the stock market “crashes”. The Dow Jones Industrial Average fell more than 11 percent. In July 1932 the Dow hit bottom, down 89 percent from its 1929 peak. It took many years before the stock market regained value (NYSE EURONEXT, 2013).

Today there are various markets all over the world in which investors can invest. In the United States, investors can invest in the New York Stock Exchange (NYSE), National Association of Securities Dealers Automated Quotations (NASDAQ), and American Stock Exchange (AMEX) in addition to many others.

The success of the stock market in 2013 is not only because of Google, Netflix, and Twitter, but instead it has been a team effort by every large stock contributing company. Stocks in the Standard & Poor’s 500 stock index are trading in the highest territory in over 10 years. In addition, 451 stocks out of the 500 in S&P 500 are sporting gains in 2013.

The market outcomes of 2013 are setting large-company’s stocks to be on track for its best year since 2003, when 458 companies finished in the black. Stocks are posting great gains, which is both a sign of market and economic strength. The current market success is highly dependent on new technology and social media, which is going to be difficult for people trying to invest in

these types of companies for the long-term. The stock market reaching its all time highs in the last 10 years leads many analysts to question when and how far the market is going to fall [44].

2 Types of Investment

There are various types of investment people can allocate their funds. Some types include, certificate of deposit, bond, mutual fund, real estate, precious metal, and stock. Each type of investment boasts its own unique advantages and disadvantages. The best type of investment is based on the amount of funds someone is willingly to invest, amount of risk involved, and the duration of time available.

2.1 Certificate of Deposit

A certificate of deposit (CD) is a low risk investment with a low return over a short period of time, usually from one month to two years. CDs are similar to regular savings accounts, but they demand a fixed time period of deposit and pay a higher interest rate. The interest rates increase with the duration of deposited time. For comparison, the interest rate is 0.04% for a regular savings account, 0.15% for a one-month CD and 1.19% for a two-year CD [57].

2.2 Bond

A bond is a relatively long-term investment, usually from a few years up to 30 years. Some common bonds include government bonds, municipal bonds, and corporate bonds. The risk and return of bonds are dependent on the issuer. Bonds issued by a government are the most reliable, but earn the least interest. In contrast, corporate bonds are less warranted, but pay a higher interest rate, which sometimes outperform stocks.

2.3 Mutual Fund

A mutual fund is an investment in which a fund manager collects funds from a group of investors and invests in a variety of securities or real estate. Although it is usually less risky than stocks, some mutual funds are not regulated by a government and thus risky. The risk and return

involved depends on different funds. For example, bond funds have lower risk with lower return, while stock funds have higher risk and return.

2.4 Real Estate

Real estate is a long-term investment and usually requires some expertise. It has high risk and high return depending on the economy. One way to invest in real estate is to purchase a property and rent it to tenants. Another way is to purchase an underrated property and sell it when the value exceeds its appraisal value. An indirect way to invest in real estate is to purchase shares of real estate investment trusts (REITs), which are similar to mutual funds in that investors would earn an income without buying any real estate.

2.5 Precious Metal

Popular precious metals include silver and gold. Investing in precious metals is quite different from other types of investment since they offer protection against inflation, currency debasement, and financial stress of a country. However, the storage costs, insurance costs, and lack of short-term gains will not provide a substantial income. Overall, precious metals are viewed as a form of insurance more than investment.

2.6 Stock

Stock is extremely liquid and of high risk as the market fluctuates frequently and greatly. The return, however, could be highly rewarding if traded wisely. A stock increases its value when the company makes a profit and vice versa. There are various strategies to invest in the stock market such as day trading, swing trading, and trend following.

Day trading is a common trading technique in the stock market to buy and sell a share of stock within a single trading day to earn profits by small fluctuations in price. It is extremely risky, but could be also highly profitable. Traders also have to pay a large commission fee, so the price

difference has to be sufficient. Therefore, traders must accurately evaluate the trends and carefully choose the entry and exit point. In addition, traders have to set up a stop loss so that they would not lose all their money.

3 Swing Trading Simulation

Among the variety of trading strategies, swing trading is one of the most common techniques. It is not as labor intensive as day trading, but not as laid back as long-term trading. Typically, a swing trader holds a stock for a few days up to a couple of weeks and trades four or five times a week. Because stocks usually swing between high and low extremes, a swing trader will ride the wave in one direction and ride the other direction when the price reverses [30]. In a bear or bull market, swing trading becomes a challenge because stocks will not behave in the same up and down oscillations as in a stable market [32]. When there is a bear or bull market, the trader should opt for a long-term trade to gain higher profits. Overall, swing trading can gain some decent profits when shares are purchased and sold at the right signals.

3.1 Technical Analysis

3.1.1 Support and Resistance

One of the most important analyses in swing trading is pinpointing the support and resistance in a stock. Support is a specific price point in the chart where the stock price has trouble breaking through. This is easily recognizable in Figure 3.1, when the stock falls and rebounds at the low point several times. Thus, it is safe to say there is support at the specified low point.

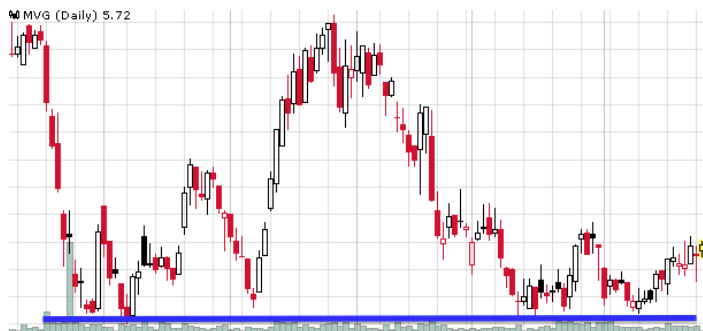


Figure 3.1 Example of Support

On the other hand, resistance is where the price of the stock has trouble breaking past a certain high point. This is when a stock tries to surpass its highest point, but fails. As shown in Figure 3.2, the stock hit the same high point several times signaling that this is a strong resistance.



Figure 3.2 Example of Resistance

Since support and resistance are usually the high and low of the oscillation in a stock, swing traders will keep an eye on these points to figure out when to enter or exit the stock. Obviously, there is a point when a stock will eventually stop bouncing off the support or resistance level and break through these points.

When a stock passes through the support or resistance level, swing traders will keep a close eye on the stock because it is experiencing a break out. This is when the stock makes new highs upon breaking the resistance level, which starts a new short-term upward trend. The new highs will become the new resistance and the old resistance will now be the new support [29]. More often than not, the stock will undergo a small pull back after a break out. A pull back is a minor drop in the stock, which may drop all the way down to the new support level and bounce up for the next new high [27]. This is exemplified in Figure 3.3. As a swing trader, this point would be an ideal time to purchase and go for the ride on an upward movement. The next step the swing trader needs to do is to keep an eye on the next resistance. It is important to exit if the stock bounces back on the next resistance and to hold if it breaks through the next resistance. A support breakout is just the opposite of a resistance breakout, where a support breakout starts a new short-term

downtrend. For example, when the stock makes a new low on a downtrend, the new low will become the new resistance.



Figure 3.3 Old Resistance Becomes New Support

Another important analysis to consider when swing trading is to make sure the quarterly earnings for the company will not be released anytime soon. The reason is because earnings may cause the stock to gap up or down. Thus, this will disturb the trend the swing trader is anticipating. Since there is no way of predicting if the earnings will cause the stock price to gap up or down, it would not be wise to place a position during the release of earnings.

3.1.2 Volume and Price Relationship

Volume and price relationship is another technical analysis a swing trader uses to improve his or her chance to gain profits. Volume is the amount of shares being bought and sold in a given amount of time. An increase in volume with respect to the normal volume can signal an increasing interest in the stock, which predicts something is going to happen soon [29]. When volume is coupled with price on a stock chart, swing traders can get a better understanding of what may happen in the future, such as trend reversals.

A trend reversal may be predicted using a volume-price relationship. After a long upward or downward trend, a spike in volume may signal an end of trend, which can be seen in Figure 3.4. On a downward trend, many people want to get out of the trade because they are panicking about

the rapid decline [29]. So, people begin to sell making the price decrease. Simultaneously, the volume is surging because the shareholders are heavily selling. Once all the sellers made their position, buying pressure begins to take over the market and the price increases, which translates to a trend reversal. This also holds true for a reversal on an upward trend, but instead of sellers panicking about a rapid decline, buyers are missing out on an upward trend.



Figure 3.4 Volume and Price Trend Reversal

3.1.3 Simple Moving Averages

Since there are a lot of price fluctuations in a stock chart, it is sometimes difficult to spot the trend direction. Thus, a solution to smooth out price fluctuation is to add a simple moving average (SMA) indicator, which can help a trader spot the trend direction [53]. A simple moving average indicator is the average of the given closing prices. For an example, a 10 SMA is calculated by summing the last 10 closing prices and dividing by 10. Even though this is a simple indicator, it is extremely useful for swing traders to spot trend reversals.

Simple moving averages can signal trend reversals when the price crosses over a simple moving average. Usually, when a price crosses over a faster moving average such as a 10 simple moving average, it signals a short-term reversal. This can be easily seen in Figure 3.5. On the other hand, when a price crosses over a slower moving average such as a 50 simple moving average, it signals a long-term reversal [53].

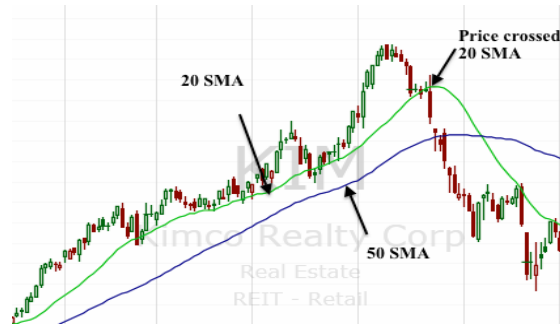


Figure 3.5 Price Crosses Simple Moving Average

When a simple moving average crosses over another moving average, a trend reversal is signaled [53]. If a faster moving average crosses over a slower moving average, it signals a downtrend and if a slower moving average crosses over a faster moving average, it signals an upward trend. Just as in Figure 3.6, the 10 SMA crosses (faster moving average) over the 20 SMA (slower moving average) signaling a downtrend.

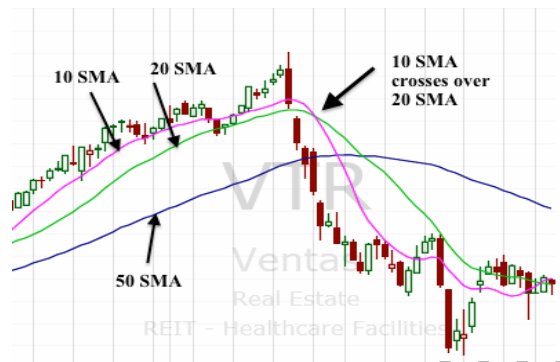


Figure 3.6 Simple Moving Average Crossover

3.2 Companies

Waste Management Inc. (WM)

Waste Management Inc. is a company that provides waste management services to a wide array of customers such as residential, commercial, and industrial customers in the United States. Some services it provides are collection, transfer, recycling and resource recovery, and disposal.

In addition, WM engages in renewable energy ideas such as waste-to-energy and landfill gas-to-energy [55].

FMC Technologies Inc. (FTI)

FMC Technologies Inc. was founded in 2000 and provides technological services to the energy industry. FTI has three segments, which includes Subsea Technologies, Surface Technologies, and Energy Infrastructure. The Subsea Technologies segment provides subsea systems for the production of crude oil and natural gas in offshore areas. On the other hand, the Surface Technologies segment provides surface wellheads, fluid control products, and wireline services for the oil and gas industry. Lastly, Energy Infrastructure segment provides measurement systems, loading and transfer systems, and separation systems [19].

Fiserv Inc. (FISV)

Fiserv Inc. was founded in 1984 and it provides financial service technologies to banks, thrifts, credit unions, retailers, and government agencies. The company has two segments, which are Payments and Industry Products and Financial Institution Services. To name a few, The Payment and Industry Products offer electronic bill payment, Internet and mobile banking systems, account-to-account transfers and person-to-person payments. The Financial Institution Services segment offers different kinds of processing services such as account and item processing. It also provides cash management, consulting services, and offers many products and services related to financial transactions [18].

AGL Resources Inc. (GAS)

AGL Resources is a company that provides energy-holding services by distributing natural gas to a wide range of costumers, which includes residential, commercial, industrial, and governmental consumers. This company consists of five segments: Distribution Operations, Retail

Operations, Wholesale Services, Midstream Operations, and Cargo Shipping segment. This company was founded in 1856 and continues to be a strong competitor in the energy business [21].

The Kroger Co. (KR)

Kroger Co. is a large retail company that manufactures and processes food that owns and operates many retail food and drug stores, jewelry stores, and convenience stores. Furthermore, it sells a wide variety of goods such as jewelry, home goods, electronics, toys, and automotive parts. This company owns many franchises such as Kroger, City Market, Dillons, Jay C, Food 4 Less, and many more. The Kroger Co. was founded in 1883 in Cincinnati, Ohio [34].

3.3 Simulation Transactions

3.3.1 Week 1: 12/02/13-12/06/13

Market Overview

WM:

As shown below (Figure 3.7), there were three days that spiked up in volume, which signals a potential trend reversal. Later on in week, the price drop passed the 20 SMA to confirm its trend reversal.



Figure 3.7 Waste Management Technical Chart

FISV:

On the FISV's stock chart below (Figure 3.8), the arrow shows a spike in volume last week, which was a signal for a possible trend reversal. So this week, this investor waited for the move

down to confirm a downtrend. But at the end of the week, there was good publicity for FISV and the price began to increase.



Figure 3.8 Fiserv Technical Chart

FTI:

At the beginning of the week, this investor waited for FTI to bounce back up from touching the support last week. As depicted in Figure 3.9, there are small candlesticks near the resistance price without any significant price movement and the 10 SMA and 20 SMA moving closer together. This investor paid special attention to the technical chart to look for a buy signal. During the middle of the week, the price began to increase and finally the stock price closed above the 20 SMA to confirm an upward trend.



Figure 3.9 FMC Technologies Technical Chart

Course of Action:

During the first week of the simulation, a few transactions were made. Once WM crossed the 20 SMA, this investor sold short 200 shares at \$44.65 on December 3, 2013. Also, this investor

decided to sell short 200 shares of FISV at \$109.57 on December 4, 2013. But at the end of the week, there was good publicity for FISV and the price began to rise. Thus, this investor needed to buy back to cover at \$110.84 with a loss of \$274 before the investor had a larger negative net gain. Since FTI closed above the 20 SMA, this investor bought 300 shares at \$50.18 on December 5th, 2013. These transactions were recorded in Table 3.1.

Results:

At the end of the week, this investor had lost \$274 from FISV. Even though this investor lost money from WM, the investor still believes the trend is behaving the way it should be. Furthermore, FTI still has some potential to gain, so this investor is holding on to it.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
12/02/13							100000	
12/03/13	WM	Sell Short	\$44.65	200	\$8920		108920	
12/04/13	FISV	Sell Short	\$109.57	200	\$21904		130824	
12/05/13	FTI	Buy	\$50.18	300	-\$15064		115760	
12/06/13	FISV	Buy to Cover	\$110.84	200	-\$22178	(\$274)	93582	(\$274)

Table 3.1 Week 1 Transaction Record (Includes \$10 commission fee per trade)

3.3.2 Week 2: 12/09/13-12/13/13

Market Overview

WM:

At the beginning of the week, WM's price made small incremental moves down. But on Thursday, WM made a large move down, almost 2% from the opening price that day. The stock price was approaching a support level of around \$43.60, as shown in the Figure 3.10. Therefore, the stock may rebound up from that price point next week.



Figure 3.10 Waste Management Technical Chart

FTI:

As shown in the chart below (Figure 3.11), FTI had a minor pull back and it looks like FTI is consolidating for a next big move up. The stock price stayed above the 10 SMA, which was a sign that there was still more buying pressure to push the price higher. For next week, there is still more room for the price of FTI to move higher.



Figure 3.11 FMC Technologies Technical Chart

GAS:

Last week this investor saw two days with huge volume, which made the investor keep an eye for a trend reversal. As shown in Figure 3.12, the technical chart of GAS, there appears to be yet again another a day with large volume. The price seems to be rounding off and there is a potential upward trend next week.



Figure 3.12 AGL Resources Inc. Technical Chart

KR:

Even though this company had already reversed its trend a few weeks ago, this investor was interested in KR this week because it tested support at around \$39.80 as shown in Figure 3.13. There is a chance for next week to break through support after two attempts of breaking through the support.



Figure 3.13 Kroger Co. Technical Chart

Course of Action

The first day of the week, this investor decided to buy 500 shares of GAS at \$45.18 because the investor saw several days with large volume, which signals a trend reversal. This investor also bought to cover 200 shares of WM at \$43.76 after making a large move down. The investor wanted to get out because it was hitting support at \$43.65. On Friday, this investor sold short 500 shares of KR at \$39.85 because the investor thought it would break through the support because on a 5

min chart, KR was making large moves down. All these transactions were recorded in the table below (Table 3.2).

Results

At the end of the week, this investor’s portfolio value was \$100,438, which is much better than last week where the portfolio value was \$99,832. This investor is still holding on to FTI because the investor thinks it is still a profitable stock. Furthermore, GAS’s price has not made a move up this week, but there is no reason to get out of the position yet.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
12/09/13	GAS	Buy	\$45.18	500	-\$22600		70982	
12/12/13	WM	Buy to Cover	\$43.76	200	-\$8762	\$158	62220	(\$116)
12/13/13	KR	Sell Short	\$39.85	500	\$19915		82135	

Table 3.2 Week 2 Transaction Record (Includes \$10 commission fee per trade)

3.3.3 Week 3: 12/16/13-12/20/13

Market Overview

WM:

On December 17, 2013, WM broke through support at around \$43.54 and passed through the 50 SMA as depicted in the technical chart below (Figure 3.14). The next day, WM reversed and the price rallied back up hard to approximately \$44. This may potentially become a short-term trend reversal. For next week, there may be a few days with an increase in price.



Figure 3.14 Waste Management Technical Chart

FTI:

On December 16th, FTI gaped up with a slight increase in volume, but then the price moved slowly down during the week. As it can be seen in Figure 3.15, FTI opened above the 50 SMA and at the end of the week the price still stayed above the 50 SMA, which means that there is still a potential upside. As long as the price is above the 20 SMA, FTI may continue to increase in price next week.



Figure 3.15 FMC Technologies Technical Chart

GAS:

In the middle of the week, there was a spike up in volume that may signal for a turn around. On the last day of the week, the price made a large move on the upside passing through the 50 SMA, which is exemplified in Figure 3.16 below. There is a great deal of potential for making higher moves up over the next few trading days.



Figure 3.16 AGL Resources Inc. Technical Chart

KR:

KR attempted to pass through support several times, but it bounced back up immediately. Basically, the price is moving sideways without any significant price movement. As shown in Figure 3.17, KR's price is held up by the support and pushed down by the 10 SMA, which is forcing the price into a point that may lead to a large move down or up next week.



Figure 3.17 Kroger Co. Technical Chart

Course of Action:

On the first day of the week, this investor decided to book \$820 profit from FTI by selling 300 shares at \$52.98. Also, this investor closed the position on KR to take a loss of \$5 because next week the price may make a large move up or down and the investor did not want to risk losing a large sum of money. On Tuesday, this investor sold short 500 shares of WM at \$43.53 because it went below support and it passed the 50 SMA, which signals a continuation of a downward trend. But at the start of the December 20th, WM came back up hard, so this investor bought to cover 500 shares of WM at \$44.10 to take a loss of \$305. On December 18th, this investor sold short 500 shares of KR at \$39.36 because it passed through support by a large amount. This investor decided to sell 500 shares of GAS at \$46.18 to book a profit of \$480 because the day before had a small spike in volume, which may signal for a downtrend. This week's transactions were recorded in Table 3.3.

Results:

At the end of this trading session, this investor's portfolio value was \$100,884, which is a large improvement from last week's portfolio value. This investor is holding on to KR because the investor thinks there will be some more room for the price to drop. Furthermore, this investor is keeping GAS because the investor feels there is no reason for a trend reversal yet.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
12/16/13	FTI	Sell	\$52.98	300	\$15884	\$820	98019	\$704
12/17/13	KR	Buy to Cover	\$39.8	500	-\$19910	\$5	78109	\$709
12/17/13	WM	Sell Short	\$43.53	500	\$21755		99864	
12/19/13	GAS	Sell	\$46.18	500	\$23080	\$480	122944	\$1189
12/20/13	WM	Buy to Cover	\$44.1	500	-\$22060	(\$305)	100884	\$884

Table 3.3 Week 3 Transaction Record (Includes \$10 commission fee per trade)

Note: No transaction will be conducted from December 23, 2013 to January 17, 2014 due to the winter break.

3.3.4 Week 4: 01/20/14-01/24/14

Market Overview

WM:

As shown in the chart below (Figure 3.18), WM was hitting support around \$42.75 and the price gaped down below the support near the end of the week. The next support level was around \$41.00.



Figure 3.18 Waste Management Technical Chart

FTI:

In Figure 3.19, one can see that the stock price has been moving sideways. There is no clear indication of what will happen next. But at the end of the week, the price began to decline a little faster. There may be some potential to short sell FTI next week depending on how the price and volume behaves.



Figure 3.19 FMC Technologies Technical Chart

GAS:

On Monday, the stock price went up substantially, but later in the week GAS’s price began to slowly decline as shown in Figure 3.20. There was no indication of what will happen in the future and no entering signals.



Figure 3.20 AGL Resources Inc. Technical Chart

KR:

After a massive drop in price over the winter break as depicted in Figure 3.21, KR was approaching the support this week. There were no clear signs of bouncing back or breaking through the support.



Figure 3.21 Kroger Co. Technical Chart

FISV:

Even though this stock has been on a decline, there was no clear entry point. FISV’s price has been making large moves up and then large moves down as shown in Figure 3.22.



Figure 3.22 Fiserv Technical Chart

Course of Action:

No transactions were made because there were no signals to enter any positions in any of the 5 stocks. WM had a potential small profit, but the risk for the potential small amount of profit was higher, therefore this investor did not enter in a transaction for WM.

Results:

No change in this investor’s portfolio value. Since no transaction was conducted, no table of transactions was presented.

3.3.5 Week 5: 01/27/14-01/31/14

Market Overview:

WM:

In the past week, the volume was increasing and it was a little higher than usual as depicted in the chart below (Figure 3.23). In addition, on Thursday the price began to make its move upwards. With the volume increasing and the price moving higher, WM may make large price moves up next week.



Figure 3.23 Waste Management Technical Chart

FISV:

At the start of the week, FISV hit support at around \$55.60 and made a move upward. Furthermore, there has been a larger increase in volume since last week, which may signal for a trend reversal. Despite FISV major drop in price Friday, one can see in Figure 3.24 that the price made its way back up support, which shows that there is still more potential for the price to increase next week.



Figure 3.24 Fiserv Technical Chart

Course of Action:

On Monday, this investor bought 500 shares of FISV at \$56.09 because FISV have been increasing in volume. Furthermore, it bounced back up after hitting support, which shows there is an increase in buying pressure. Near the end of the week, this investor bought 500 shares of WM at \$41.78 because there was a slight increase in volume and the price had made its move upward, which may confirm a trend reversal. The two transactions this week were recorded in Table 3.4.

Results:

At the end of the week this investor's portfolio value was \$100,844. The investor is holding on to FISV because even though the price broke through support on Friday, it closed higher than the support. This shows that there are still people interested in buying FISV. This investor is also holding on to WM because there are still potential to move higher in price.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
01/27/14	FISV	Buy	\$56.09	500	-\$28055		72829	
01/30/14	WM	Buy	\$41.78	500	-\$20900		51929	

Table 3.4 Week 5 Transaction Record (Includes \$10 commission fee per trade)

3.3.6 Week 6: 02/03/14-02/07/14

Market Overview:

WM:

On Monday, the price dropped 1.73% with a slightly larger volume than usual. The next day the price began to move up and by the end of the week the price closed above the 20 SMA at \$42.84 as shown in Figure 3.25. There is still more room for WM to increase in price next week.



Figure 3.25 Waste Management Technical Chart

FISV:

On Monday, the price of FISV attempted to cross the 10 SMA, but failed. Instead, FISV made a huge drop down and the price ripped through the support at around \$55.60, as shown in the chart below (Figure 3.26). But during the week, the price moved sideways and stayed below the support. This may setup for FISV’s price to make larger moves down next week.



Figure 3.26 Fiserv Technical Chart

KR:

KR started the week off making newer lows, but on Thursday it made a huge move up. Furthermore, the price broke through the 10 SMA showing there may be a potential uptrend. A further analysis of the chart below (Figure 3.27), there is a resistance at \$36.87, which KR hit on Friday and fell sharply afterwards. Next week, this stock may break through the resistance at \$36.87 for an upward trend or continue its downtrend.



Figure 3.27 Kroger Co. Technical Chart

GAS:

GAS has been making strong moves down and the volume has been picking up this week as shown in Figure 3.28. The price has leveled off a little bit during the last few days of the week. With large volume and the price leveling off, there may be a trend reversal next week.



Figure 3.28 AGL Resources Inc. Technical Chart

Course of Action:

On Monday, this investor sold 500 shares of FISV at \$55.57, which resulted in a loss of \$280 because FISV broke through support at \$55.60 and the investor did not want to lose more money. This investor purchased 800 shares of GAS at \$46.05 because there was an increase in volume, which could potentially signal a trend reversal. On Thursday, this investor decided to buy 1000 shares of KR at \$36.08 because it crossed the 10 SMA. The very next day, this investor sold all 1000 shares of KR at \$36.77 because it hit resistance and fell back down immediately. All of the transaction was recorded in Table 3.5.

Results:

At the end of the week, this investor gained \$908 with a total end of the week value of \$101,752. This investor is holding on to GAS because the investor believes there will be a move upward next week. In addition, this investor is still holding WM because there are no signs of any reversal yet.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
02/03/14	FISV	Sell	\$55.57	500	\$27775	(\$280)	79704	\$604
02/05/14	GAS	Buy	\$46.05	800	-\$36850		42854	
02/06/14	KR	Buy	\$36.08	1000	-\$36090		6764	
02/07/14	KR	Sell	\$36.77	1000	\$36760	\$670	43524	\$1274

Table 3.5 Week 6 Transaction Record (Includes \$10 commission fee per trade)

3.3.7 Week 7: 02/10/14-02/14/14

Market Overview:

WM:

After a substantial increase in price last week, WM consolidated early this week by forming an ascending triangle. As shown below (Figure 3.29), the volume decreased while each day WM's price made higher lows. The top part of the triangle represents the resistance at around \$43.00. Finally, on Thursday the price broke through the resistance, but without a large spike in volume. There is a chance WM may begin to decrease in price next week depending on the volume size.



Figure 3.29 Waste Management Technical Chart

FTI:

Last week, FTI hit support at around \$47.60 and bounced back up in price. On Monday, the price began to increase and merge back into its own “upward channel” as shown in Figure 3.30. There is more room for the price to increase in the next few weeks as long as the price stays within this “upward channel”.



Figure 3.30 FMC Technologies Technical Chart

GAS:

The price of GAS dropped during the week, but rallied back up on Thursday and Friday. After the recent large increase in volume, the price began to move up confirming a trend reversal as shown in Figure 3.31.



Figure 3.31 AGL Resources Inc. Technical Chart

Course of Action:

Early on this week, this investor bought 800 shares of FTI at \$50.14 because the price bounced back up from support and merged back into its “upward channel”. This investor missed

the entry this Monday or else the investor could have gained a larger profit. Also, this investor sold 800 shares of FTI at \$51.88 on Thursday because it went above its “upward channel” and then the price began to drop back into its original channel that same day. Thus, this investor wanted to book the profit before losing it all. Both transactions was recorded in the table below (Table 3.6).

Results:

At the end of this week the investor’s portfolio value reached \$103,811, which is a major increase in value of over \$2,000 from last week. The overall market was increasing which contributed to this week’s major success. This investor is holding on to WM because the investor believes there is still more profit that can be captured. But, the investor must be careful because the breakout could be a false alarm. Therefore, this investor must pay special attention to the volume of WM to help predict the trend of WM. Also, this investor is holding on to GAS because the investor feels that there is still more room for GAS to grow in price.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
02/11/14	FTI	Buy	\$50.14	800	-\$40122		3402	
02/13/14	FTI	Sell	\$51.88	800	\$41494	\$1372	44896	\$2646

Table 3.6 Week 7 Transaction Record (Includes \$10 commission fee per trade)

3.3.8 Week 8: 02/17/14-02/21/14

Market Overview:

WM:

On Tuesday, WM gapped down breaking the upward trend due to lower than expected earnings. This can easily be seen in Figure 3.32. As a result, WM’s price headed straight down over the course of the week testing support at around \$40.83.



Figure 3.32 Waste Management Technical Chart

FISV:

As shown below in Figure 3.33, FISV broke through its downward channel for a potential new upward trend. The 10 SMA and 20 SMA, crossed which signals a potential upward trend. Furthermore, FISV’s price broke through the 50 SMA and each day the price closed above the 50 SMA. With the price looking like it is rounding off, there may be a potential short-term reversal next week.



Figure 3.33 Fiserv Technical Chart

KR:

KR’s price made large moves upward this week and it passed through the 50 SMA confirming an upward trend. As shown below (Figure 3.34), there is a resistance at around \$39.60, which KR nearly hit on Thursday. Next week, KR may either bounce off the resistance and make a short-term downward trend or break through the resistance.



Figure 3.34 Kroger Co. Technical Chart

GAS:

GAS has been slowly making moves upward besides one day, which had a large decrease in price. As it can be seen in the technical chart below (Figure 3.35), there is a resistance at around \$47.00 that is causing trouble for GAS's price to continue increasing. Next week, there is potential for GAS to break through the resistance but one must pay special attention to the volume and price to detect a successful breakout.



Figure 3.35 AGL Resources Inc. Technical Chart

Course of Action:

On Monday, this investor sold all 500 shares in WM because the stock price gapped down and the investor didn't want to lose anymore profit. This investor also sold short 1000 shares of WM on the same day after the investor sold all 500 shares of WM. The price was falling fast and this investor went on for the ride down till WM hit its support at \$40.90. This investor bought to cover WM the next day after it bounced back up from support to book a \$1280 profit. This investor

also bought KR because the price broke past the 50 SMA and it has been making large price moves upward. This investor bought 200 shares of FISV because it broke through the downward channel for an upward trend. At the end of the week, this investor decided to sell all 200 shares of FISV because the price was rounding off and the candlesticks were becoming small with large “wicks” signaling a trend reversal. All the transactions for week 8 was recorded on Table 3.7.

Results:

At the end of the week, the investor’s portfolio value was \$105,386. This investor is holding on to both KR and GAS because the investor feels that there is potential for both the stocks to break through their resistance. Next week, this investor must pay special attention to the volume and the price movement of both to ensure a successful breakout or a potential trend reversal.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
02/18/14	WM	Sell	\$43.08	500	\$21530	\$630	66426	\$3276
02/18/14	WM	Sell Short	\$42.58	1000	\$42570		108996	
02/19/14	KR	Buy	\$38.34	500	-\$19180		89816	
02/19/14	FISV	Buy	\$57.02	200	-\$11414		78402	
02/19/14	WM	Buy to Cover	\$41.28	1000	-\$41290	\$1280	37112	\$4556
02/21/14	FISV	Sell	\$57.10	200	\$11492	\$78	48604	\$4634

Table 3.7 Week 8 Transaction Record (Includes \$10 commission fee per trade)

3.3.9 Week 9: 02/24/14-02/28/14

Market Overview:

KR:

KR’s price opened above its resistance of \$39.60 on Monday and each day the stock price slowly increased in price. This is a sign of consolidation because the volume is decreasing while the price makes small incremental increases. The price increased significantly on Friday with a large candlestick and large volume, as shown in Figure 3.36. When this happens after a long

upward trend, it signals for a trend reversal. This technical analysis is called exhaustion. Thus, KR is expected to decrease in price next week.



Figure 3.36 Kroger Co. Technical Chart

GAS:

As shown in the chart below (Figure 3.37), GAS made a minor pull back this week after last week’s bullish run. On Friday, GAS’s price broke through its resistance at \$47.00, but it had a hard time going higher because there is minor resistance at \$47.37. Next week, there may be more room for GAS price to increase but one must pay attention to the volume and price.



Figure 3.37 AGL Resources Inc. Technical Chart

Course of Action:

On Wednesday, this investor bought 500 additional shares of KR at \$38.89 because KR’s price passed its resistance at around \$38.60. Furthermore, the technical chart for KR showed that the price was consolidating for a next large move up. This investor also sold 1000 shares of KR on Friday because the technical chart showed an exhaustion candlestick, which means there is a potential trend reversal. This week’s transactions were recorded on Table 3.8.

Results:

At the end of the week, this investor's portfolio value is \$108,191, which is a major increase from last week. As shown in the table below (Table 3.8), the investor profited \$2,775 from the KR stock, which contributed to a large increase in portfolio value. This investor is also holding on to GAS because the investor feels that there is still more room for the price to increase especially if it breaks through its resistance at \$47.00.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
02/26/14	KR	Buy	\$39.89	500	\$19995		28609	
02/28/14	KR	Sell	41.92	1000	\$41910	\$2775	70559	\$7409

Table 3.8 Week 9 Transaction Record (Includes \$10 commission fee per trade)

3.3.10 Week 10: 03/03/14-03/07/14

Market Overview:

GAS:

As shown in the graph below (Figure 3.38), GAS barely broke through the resistance at \$47.00. Instead, the price topped off at around \$47.60 with a slight increase in volume and made its way down near the end of the week. This may signal a short-term trend reversal. For the next week, this investor would expect GAS to continue decreasing in price.



Figure 3.38 AGL Resources Inc. Technical Chart

Course of Action:

At the end of the trading day on Tuesday, this investor decided to sell 500 shares of GAS at \$47.48 because there was a slight increase in volume that may signal for a trend reversal. Also, the price on Tuesday didn't close much higher than the opening price, which means it wasn't a strong breakout. The final transaction of this simulation was recorded in Table 3.9.

Results:

At the end of the week, this investor's portfolio value was \$108,533 and the investor profited \$1,124 from selling 500 shares of GAS.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
03/04/14	GAS	Sell	\$47.48	800	\$37974	\$1124	108533	\$8533

Table 3.9 Week 10 Transaction Record (Includes \$10 commission fee per trade)

3.4 Results and Discussion

At the end of the simulation, this investor has profited \$8,533, which is an 8.5% gain in ten weeks. It was difficult for a swing trader to maximize his or her profits by buying and selling on the high and low extremes, since the stock market was in a bullish run during the simulation. Instead, it would be more profitable if a trader just invested for a long-term trade.

During the first two weeks of the simulation this investor tended to wait too long to jump into a trade even when there was a signal to enter. If this investor got into the position right when the signal was shown in the chart, they could have maximized their profit. For example, in the first week this investor purchased FTI at \$50.18, but in a few days the technical chart of FTI signaled a trend reversal at around \$48.00. Obviously, had this investor place a trade at around \$48.00, this investor could have made \$2.00 extra per share, which would be a large increase in profit. Furthermore, there are times when this investor got out of the position too early. For example in

week 6, this investor bought KR at \$36.08 and sold it the next day at \$36.77 to book a profit of \$670. If this investor read the charts more carefully there was no reason to get out of the position yet and in the next few weeks they could have sold KR at around \$42.00 to make roughly \$6.00 a share rather than 69 cents a share.

Although technical analysis can greatly improve a trader's odds of gaining profit, it should not be the only analysis a trader uses in trading stocks. News is an important factor that should also be considered. In this investor's simulation, there were several times when the news either cut into their profits or forced them to make losses. For example, in week 8, WM was forming an ascending triangle but suddenly WM's missed its targeted earnings, which completely shattered this investor's ascending triangle trend. If WM's earnings report did not come out, there would have been a good chance the price would increase even more. As one can see, swing trading with technical analysis is not always as straightforward and not always one hundred percent correct even when a trader sees a perfect technical pattern in the charts. Thus, news is extremely important and it should take priority over technical analysis.

Throughout the simulation this investor relied less and less on the simple moving averages because the investor noticed that the moving averages are not signals to enter a trade. Every time the simple moving averages cross, it was a little late to get into a position. Thus, simple moving averages should only be used to look for trends and not for signals to enter a position. They also can be used to help a trader confirm a trend reversal when the investor sees a trend reversal signal from either a price and volume analysis or other technical patterns. Simple moving averages are useful, but are only useful when combined with other types of analysis.

There were times when technical analysis helped the investor pin-point exactly when to enter and when to exit allowing them to maximize their profits. For example, in week 6, this

investor purchased GAS at the exact time of a trend reversal signal by using a price and volume analysis and then sold it right when it indicated another trend reversal by using the same analysis. In the end this investor maximized their profit totaling \$1,124 in this trade.

Swing trading with technical analysis can be very profitable if a trader has the time to constantly keep an eye on the stock charts. There are times when this investor missed a signal to enter a position because this investor was either in class or occupied with other tasks. If this investor had the time to constantly watch the stock market, they would be able to control their portfolio better to maximize any gains. Overall swing trading is a good strategy to capture a reasonable amount of profits even when the stock market is bullish.

4 Pair Trading Simulation

4.1 Introduction

To earn profit with relatively low risk, pair trading is an effective strategy. It is called pair trading because an investor usually trades two historically highly correlated stocks at the same time. These two stocks are usually in the same market such as Ford and General Motors, or Coca-Cola and Pepsi. Pair trading could be either long term or short term.

A pair trader usually waits and keeps watching the stock market until the correlation between a pair of correlated stocks weakens. Then the pair trader buys an underperforming stock and short sells the outperforming one simultaneously. When the correlation becomes strong again, some profits are realised if the value of one stock increases greater than the other [54].

4.2 Mechanism

Refer to Figure 4.1. In Phase I, two stocks are highly correlated at their historical values. A pair trader would wait until Phase II, when their correlation starts to weaken. As the red stock moves up greater than the blue stock in this figure, the red stock is called the outperforming one. In Phase III when their values start to return to their historical values, the pair trader buys the blue stock and short sells the red stock. In Phase IV, both stocks return to their historical values and the pair trader gains from the red stock while losing from the blue. When the gain and the loss are summed, the pair trader makes profit because the gain is greater than the loss [54].

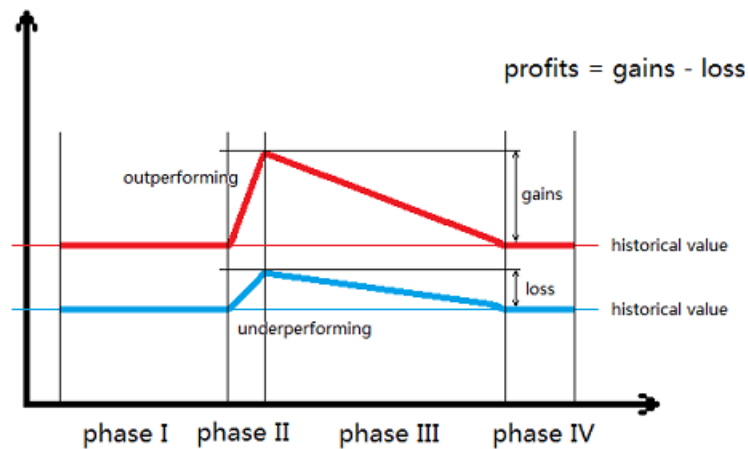


Figure 4.1 Mechanism of Pair Trading

4.3 Terminology

4.3.1 Correlation

Correlation is a statistical terminology that describes the relationship between two trends. It is measured by the correlation coefficient, which ranges between -1 and 1. A correlation coefficient is 1 if both trends move in exactly the same direction, -1 if exactly opposite, and 0 if the pair moves randomly.

In pair trading, a high correlation represents that a pair of stocks moves synchronically. In this case, a pair trader could hedge against risk by buying one stock and short selling its counterpart by an equal amount of capital. If the pair of stocks moves upward or downward at the same rate, the pair trader would neither earn nor lose money. However, when the pair does not move synchronically a pair trader can earn the percent difference.

In reality, it is impossible to find a pair of stocks which has the correlation coefficient equal to 1. Typically, a correlation of 0.8 or above is considered a high correlation and less than 0.5 is weak [38].

4.3.2 Price Ratio

Price ratio is simply the ratio of the price of stock A to that of stock B. It is also named relative strength. When the correlation between A and B remains high, the price ratio of this pair would not fluctuate greatly, and vice versa.

4.4 Pairs of Stocks Selected

Pair 1: Ford Motor Co. & General Motors Company

Correlation Coefficient of a year: 0.976 (high correlation)

Ford Motor Co. (F)

Ford Motor Company is an automobile manufacturing company engaged in the development, manufacture, distribution, and service of vehicles, parts, and accessories worldwide. The company operates in two segments, Automotive and Financial Services. The Automotive segment markets cars, trucks, parts, and accessories. The Financial Services segment offers automotive financing products to and through automotive dealers. Ford Motor Company was founded in Dearborn, Michigan in 1903 [17].



Figure 4.2 Stock Chart of Ford

General Motors Company (GM)

General Motors Company designs, manufactures, and markets cars, trucks, and automobile parts in the United States and internationally to dealers for consumer retail sales as well as to customers. The company also offers connected safety, security and mobility solutions, and

information technology services. General Motors Company was founded in Detroit, Michigan in 1908 [22].



Figure 4.3 Stock Chart of General Motors

Pair 2: AT&T, Inc. & Verizon Communications Inc.

Correlation Coefficient of a year: 0.700 (medium correlation)

AT&T, Inc. (T)

AT&T Inc. is a telecommunication company that provides services to consumers and businesses worldwide. The company operates in three segments: Wireless, Wireline, and Other. The Wireless segment offers wireless communication services, wireless products, and accessories. The Wireline segment provides data services. The Other segment provides application management, security services, integration services, etc. AT&T Inc. was founded in Dallas, Texas in 1983 [50].



Figure 4.4 Stock Chart of AT&T

Verizon Communications Inc. (VZ)

Verizon Communications Inc. provides communications, information and entertainment products and services to consumers, businesses, and governmental agencies worldwide. The company operates in two segments, Wireless and Wireline. The Wireless segment offers access to

wireless voice and data services, messaging services, and multimedia applications. The Wireline segment offers data services and networking products. Verizon Communications Inc. was founded in New York, New York in 1983 [55].



Figure 4.5 Stock Chart of Verizon

Pair 3: Citigroup, Inc. & Bank of America Corporation

Correlation Coefficient of a year: 0.927 (high correlation)

Citigroup, Inc. (C)

Citigroup, Inc. provides financial products and services including consumer banking and credit, corporate and investment banking, securities brokerage, wealth management, and transaction services worldwide. The company operates in two segments, Citicorp and Citi Holdings. The Citicorp segment consists of Global Consumer Banking (GCB) business and Institutional Clients Group (ICG) business. The Citi Holdings segment consists of Brokerage and Asset Management, Local Consumer Lending, and Special Asset Pool. Citigroup Inc. was founded in New York, New York in 1812 [13].



Figure 4.6 Stock Chart of Citigroup

Bank of America Corporation (BAC)

Bank of America Corporation consists of five segments: Consumer & Business Banking, Consumer Real Estate Services, Global Banking, Global Markets, and Global Wealth & Investment Management. The company provides financial products and services for individuals, market businesses, institutional investors, corporations, and governments worldwide. Bank of America Corporation was founded in Charlotte, North Carolina in 1874 [8].



Figure 4.7 Stock Chart of Bank of America

Pair 4: Exxon Mobil Corporation & Chevron Corporation

Correlation Coefficient of a year: 0.487 (weak correlation)

Exxon Mobil Corporation (XOM)

Exxon Mobil Corporation engages in exploration, production, transportation and marketing of crude oil, natural gas, and petroleum products. It has approximately 37,228 gross and 31,264 net operated wells. The company has a strategic cooperation agreement with Rosneft to jointly participate in exploration and development activities in Russia, the United States, and other parts of the world. Exxon Mobil Corporation was founded in Irving, Texas in 1870 [60].



Figure 4.8 Stock Chart of Exxon Mobil

Chevron Corporation (CVX)

Chevron Corporation is an energy company engaged in petroleum, chemicals, mining, power generation, and energy operations worldwide. The company operates in two segments, Upstream and Downstream. The Upstream segment is involved in the exploration, production, and transportation of crude oil and natural gas. The Downstream segment is engaged in refining and marketing crude oil and refined products. Chevron Corporation was founded in San Ramon, California in 1879 [14].



Figure 4.9 Stock Chart of Chevron

4.5 Simulation Transactions

4.5.1 Week 1: 12/02/13-12/06/13

Market Overview

Pair 1: F & GM

According to Figure 4.10, the correlation was low this week. However, the price ratio started going down and then flat in the last day. Considering that the price ratio has been decreasing since November 25, this pair might be promising for a day trading.

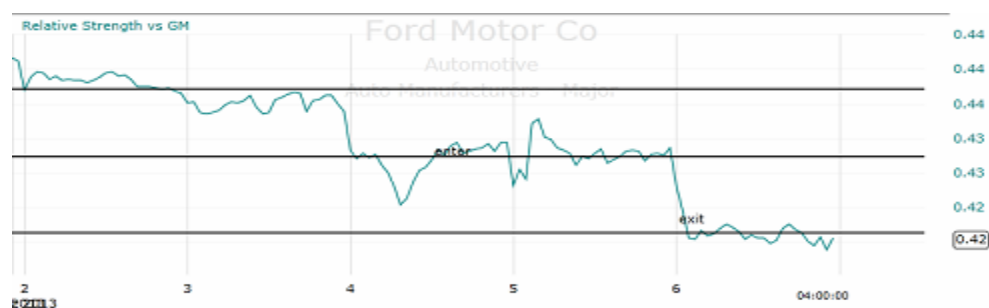


Figure 4.10 Relative Strength of F & GM

Pair 2: T & VZ

According to the relative strength chart (Figure 4.11) below, the price ratio was fluctuating along the historical value, indicating that this pair is relatively reliable to invest in.

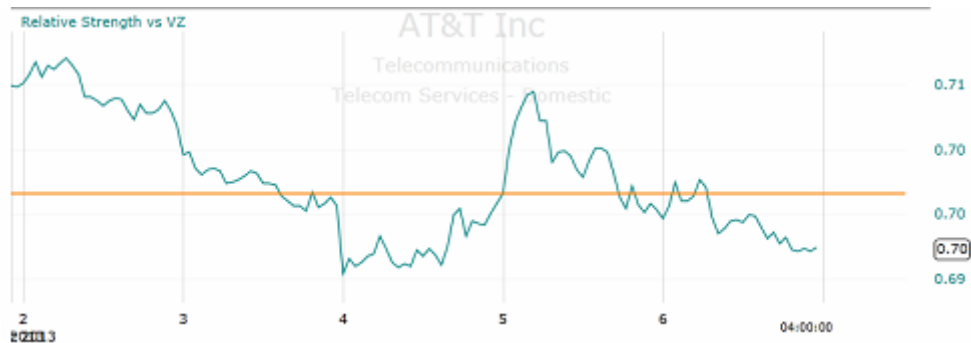


Figure 4.11 Relative Strength of T & VZ

Pair 3: C & BAC

As shown below (Figure 4.12), the correlation was relatively high in the first three days but dropped abruptly. However, the correlation became high again in the last two days.

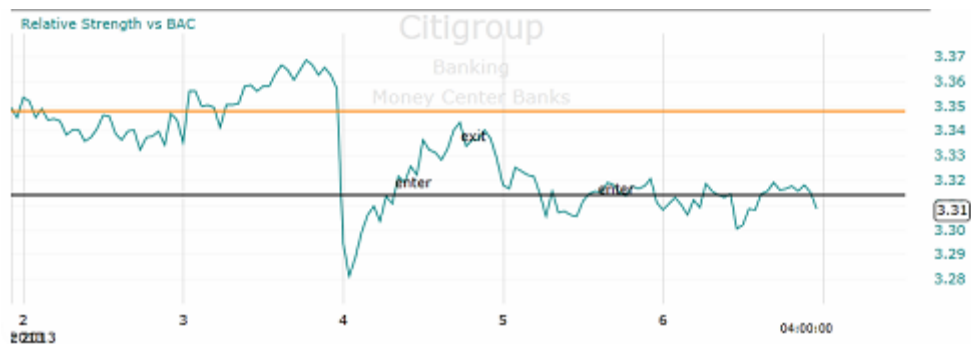


Figure 4.12 Relative Strength of C & BAC

Pair 4: XOM & CVX

The price ratio of this pair kept increasing above the historical value over a week, as shown below (Figure 4.13). Since the correlation continued to weaken, it might be promising to invest in the next several weeks.

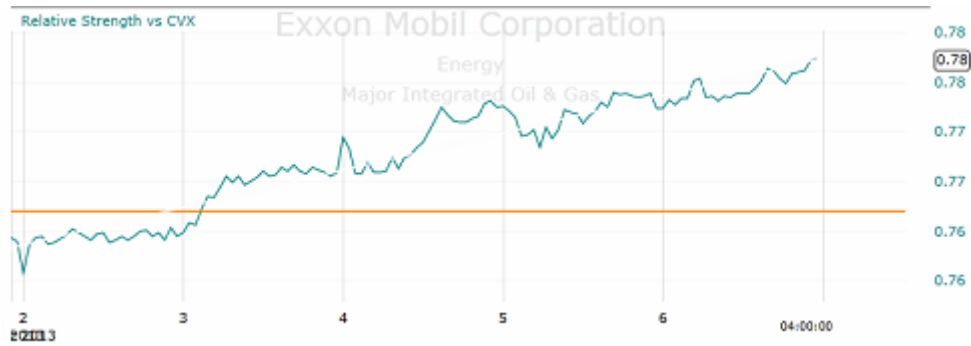


Figure 4.13 Relative Strength of XOM & CVX

Course of Action

On December 4, C and BAC were traded and covered quickly due to the significant fluctuation in their price ratio. F and GM were also traded in pair on December 4 because their price ratio was thought to go back to previous value. However, the price ratio continued to drop on December 6, so they had to be covered shortly. C and BAC were traded again on December 5 as the price ratio started to recover.

Results

The portfolio value declined significantly this week. The table of transactions describing the performance of this week was presented below (Table 4.1).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
Dec 4, 2013	F	Buy	\$16.51	1514	-\$25006.14		\$974993.86	
Dec 4, 2013	GM	Sell Short	\$38.53	649	\$24995.97		\$999989.83	
Dec 4, 2013	C	Buy	\$51.94	481	-\$24993.14		\$974996.69	
Dec 4, 2013	C	Sell	\$52.13	481	\$25064.53		\$1000061.22	
Dec 4, 2013	BAC	Sell Short	\$15.62	1601	\$24997.62		\$1025058.84	
Dec 4, 2013	BAC	Buy to Cover	\$15.61	1601	-\$25001.61	\$67.4	\$1000057.23	\$67.4
Dec 5, 2013	C	Buy	\$51.12	489	-\$25007.68		\$975049.55	
Dec 5, 2013	BAC	Sell Short	\$15.41	1623	\$25000.43		\$1000049.98	
Dec 6, 2013	F	Sell	\$16.63	1514	\$25167.82		\$1025217.8	
Dec 6, 2013	GM	Buy to Cover	\$39.95	649	-\$25937.55	(\$779.9)	\$999280.25	(\$712.5)

Table 4.1 Week 1 Transaction Record (Includes \$10 commission fee per trade)

4.5.2 Week 2: 12/09/13-12/13/13

Market Overview

Pair 1: F & GM

During the first four days of the week, the price ratio of F and GM moved along the historical average as showed below (Figure 4.14). Since the correlation was high, it was not the right time to invest in this pair. However, the price ratio started to go up abruptly in Friday morning and went down slowly in the afternoon. Considering that the price ratio was continuously decreasing over a month, it is expected that the price ratio would continue decreasing until it hits the historical average. Therefore, this pair is very promising.

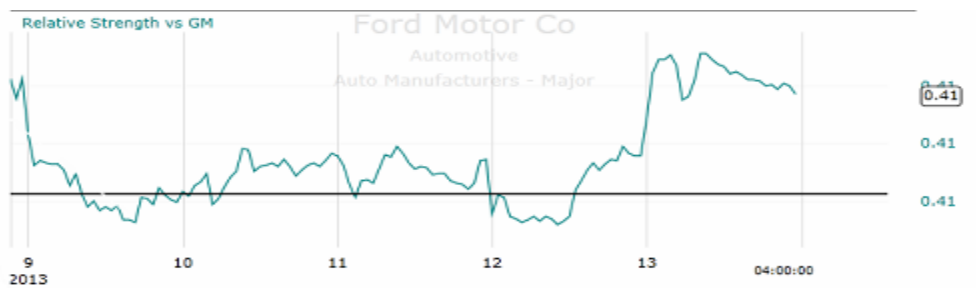


Figure 4.14 Relative Strength of F & GM

Pair 2: T & VZ

According to Figure 4.15 below, the performance of this pair was ideal for pair trading. The price ratio fluctuated considerably along the average in a short period, which allowed a pair trader to make quick money.

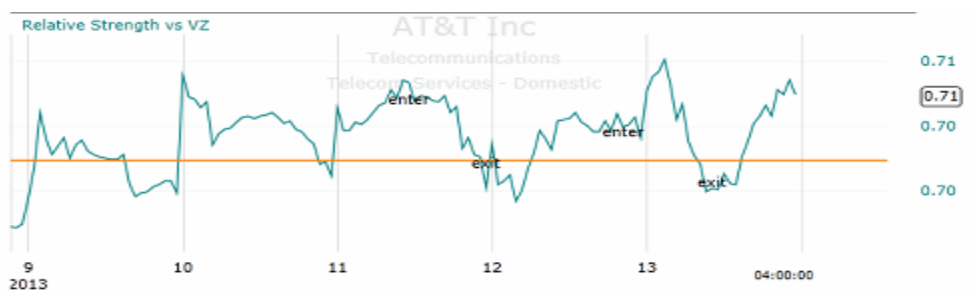


Figure 4.15 Relative Strength of T & VZ

Pair 3: C & BAC

Based on the relative strength chart below (Figure 4.16), the correlation of this pair was low in the first four days. However, it was high in the last day and thus assumed that it was a good time to invest in this pair. Since the price ratio was almost constant over a month, this would be still promising to invest in next week.



Figure 4.16 Relative Strength of C & BAC

Pair 4: XOM & CVX

As shown below (Figure 4.17), the price ratio continued going down in the first few days. Although it was expected to hit the historical value on December 11, it went up and never came across the historical average. It is estimated that the price ratio of XOM and CVX might hit the maximum and start to decline in a short time, which would be the best time to invest in.

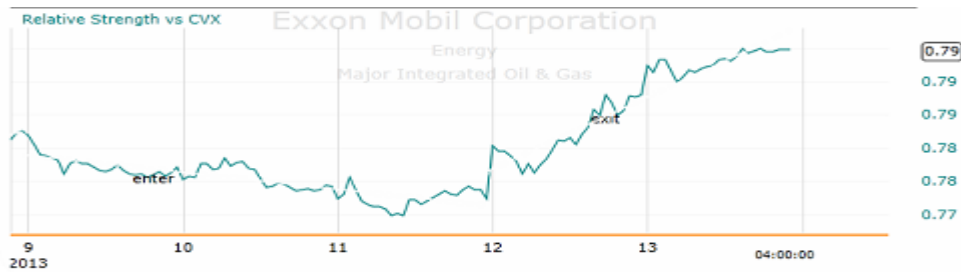


Figure 4.17 Relative Strength of XOM & CVX

Course of Action

In general, it was an easy week to make profit. The pair C and BAC were covered on December 9 when the price ratio returned to the historical average. Some other transactions of C

and BAC were also conducted when the correlation weakened significantly. In addition, the price ratio of T and VZ was fluctuating frequently and therefore they were traded when the price ratio was returning to the historical average. In addition, XOM and CVX were traded on December 9, hoping the price ratio continued to decrease. However, the price ratio went up and their positions had to be closed to avoid losing more money.

Results

The pair XOM and CVX was going well at first but it failed to return to the historical average. This might be caused by the weak historical correlation between these two stocks, which indicates that the prediction could be unreliable and inaccurate. The table of transactions describing the performance of this week was presented below (Table 4.2).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
Dec 2, 2013							\$100000	
Dec 9, 2013	XOM	Sell Short	\$95.88	261	\$25014.68		\$1024294.93	
Dec 9, 2013	CVX	Buy	\$123.55	202	-\$24967.1		\$999327.83	
Dec 9, 2013	C	Sell	\$52.18	489	\$25506.02		\$1024833.85	
Dec 9, 2013	BAC	Buy to Cover	\$15.58	1623	-\$25296.34	\$202.4	\$999537.51	(\$510.1)
Dec 11, 2013	T	Sell Short	\$33.93	737	\$24996.41		\$1024533.92	
Dec 11, 2013	T	Buy to Cover	\$33.99	737	-\$25060.63		\$999473.29	
Dec 11, 2013	VZ	Buy	\$48.05	520	\$-24996		\$974477.29	
Dec 11, 2013	VZ	Sell	\$48.4	520	\$25158	\$97.8	\$999635.29	(\$412.3)
Dec 12, 2013	T	Sell Short	\$34.04	734	\$24975.36		\$1024610.65	
Dec 12, 2013	VZ	Buy	\$48.3	518	-\$25029.4		\$999581.25	
Dec 12, 2013	XOM	Buy to Cover	\$94.83	261	-\$24760.63		\$974820.62	
Dec 12, 2013	CVX	Sell	\$120.63	202	\$24357.26	(\$355.8)	\$999177.88	(\$768.1)
Dec 12, 2013	C	Buy	\$51.02	490	-\$25009.8		\$974168.08	
Dec 12, 2013	BAC	Sell Short	\$15.32	1632	\$24992.24		\$999160.32	
Dec 13, 2013	T	Buy to Cover	\$33.7	734	-\$24745.8		\$974414.52	
Dec 13, 2013	VZ	Sell	\$48.05	518	\$24879.9	\$80.1	\$999294.42	(\$688.0)
Dec 13, 2013	C	Sell	\$51.14	490	\$25048.6		\$1024343.02	
Dec 13, 2013	BAC	Buy to Cover	\$15.23	1632	-\$24865.36	\$165.7	\$999477.66	(\$522.3)

Table 4.2 Week 2 Transaction Record (Includes \$10 commission fee per trade)

4.5.3 Week 3: 12/16/13-12/20/13

Market Overview

Pair 1: F & GM

According to Figure 4.18 below, the price ratio kept going down over a month. However, it went up a little last week, so it had been expected to go down this week. As expected, the price ratio went down.

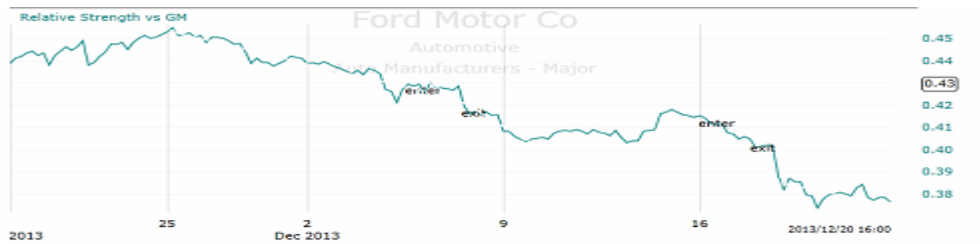


Figure 4.18 Relative Strength of F & GM

Pair 2: T & VZ

Although Figure 4.19 shown below demonstrates that the price ratio was fluctuating frequently, the correlation was actually very high as the chart is zoomed in. Therefore, the high profit failed to be achieved despite many transactions conducted in the previous week.

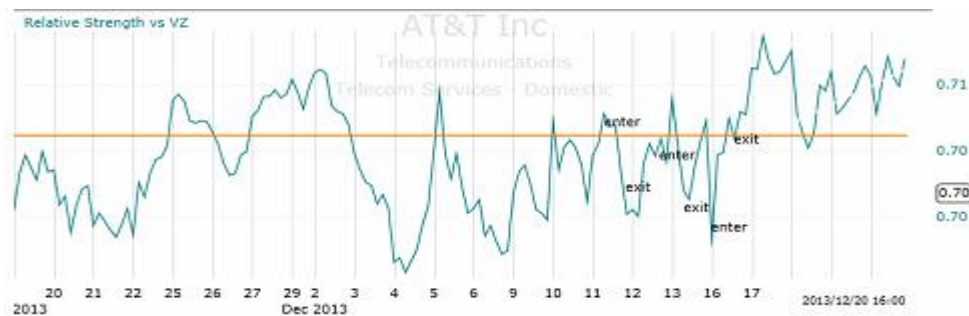


Figure 4.19 Relative Strength of T & VZ

Pair 3: C & BAC

As shown below (Figure 4.20), the correlation was high over a month. It is estimated that some profit could be achieved from this pair.

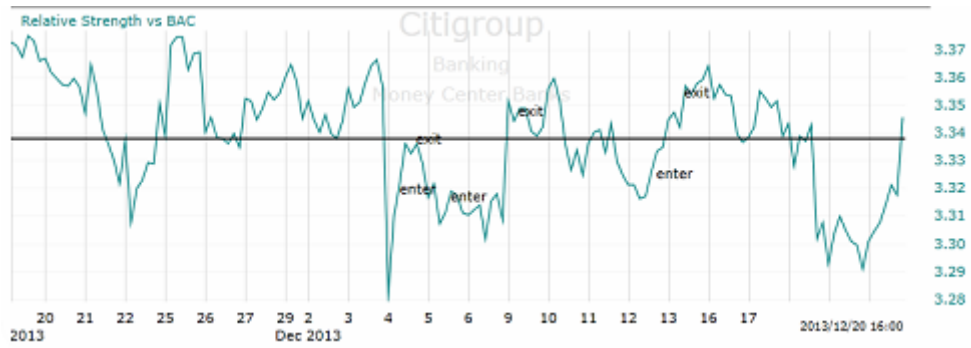


Figure 4.20 Relative Strength of C & BAC

Pair 4: XOM & CVX

According to Figure 4.21, the price ratio increased significantly on December 16 and went constant afterwards. This pair was not suitable for trading this week, and may not be suitable for next week as well.

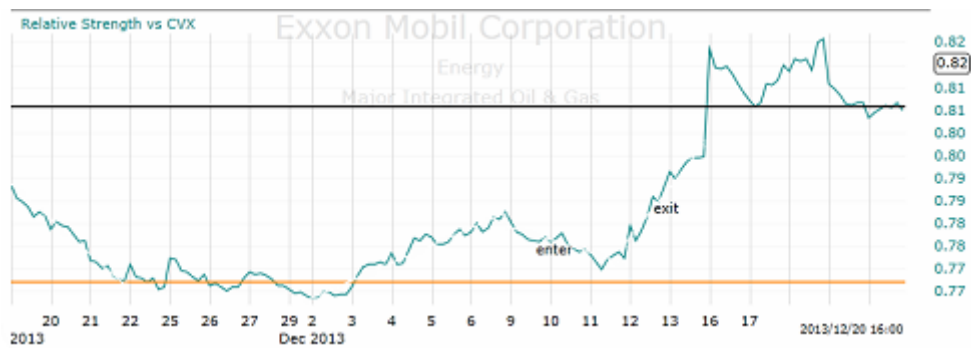


Figure 4.21 Relative Strength of XOM & CVX

Course of Action

As analyzed above, only F, GM, T and VZ were suitable for trading. They were traded and covered quickly as the price ratio kept fluctuating frequently. No transaction will be conducted from December 23, 2013 to January 17, 2014 due to the winter break.

Results

This week was very successful. The table of transactions describing the performance of this week was presented below (Table 4.3).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
Dec 16, 2013	F	Sell Short	\$16.84	1485	\$24997.4		\$1024475.06	
Dec 16, 2013	GM	Buy	\$40.65	615	-\$25009.75		\$999465.31	
Dec 16, 2013	T	Buy	\$34.14	732	-\$25000.48		\$974464.83	
Dec 16, 2013	T	Sell	\$34.15	732	\$24987.8		\$999452.63	
Dec 16, 2013	VZ	Sell Short	\$48.82	517	\$25229.94		\$1024682.57	
Dec 16, 2013	VZ	Buy to Cover	\$48.3	517	-\$24981.1	\$236.16	\$999701.47	(\$286.2)
Dec 17, 2013	F	Buy to Cover	\$16.8	1485	-\$24958		\$974743.47	
Dec 17, 2013	GM	Sell	\$41.6	615	\$25574	\$603.65	\$1000317.47	\$317.47

Table 4.3 Week 3 Transaction Record (Includes \$10 commission fee per trade)

4.5.4 Week 4: 01/20/14-01/24/14

Market Overview

Pair 1: F & GM

As shown below (Figure 4.22), the price ratio of this pair was steadily increasing over a month, but it started going constant or even slightly down since January 17. Considering that the average price ratio of 6 months is far above the current value, the price ratio of F and GM might come back to its average if the price ratio continues going up.

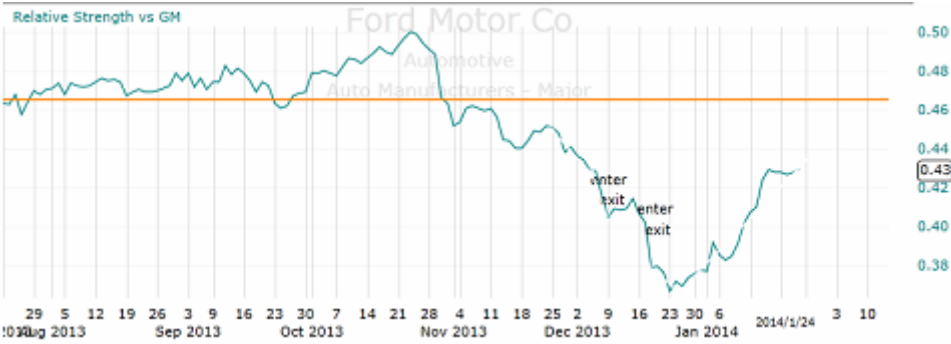


Figure 4.22 Relative Strength of F & GM

Pair 2: T & VZ

As shown below (Figure 4.23), the correlation of this pair was extremely high over a long period. No action could be made until the correlation weakens.



Figure 4.23 Relative Strength of T & VZ

Pair 3: C & BAC

Figure 4.24 shows that the price ratio of was decreasing since January 2 and then started to increase on January 24. If the price ratio continues increasing up to the average value, it is estimated that a considerable amount of profit could be achieved.

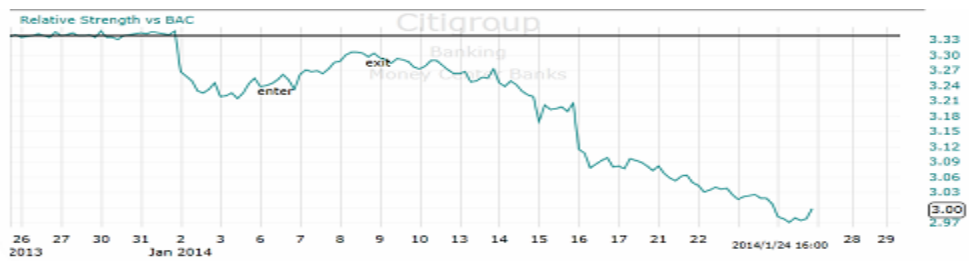


Figure 4.24 Relative Strength of C & BAC

Pair 4: XOM & CVX

According to Figure 4.25, the price ratio of XOM and CVX was going up and down over a month, but the range is not sufficient to make a lot of profit. It is discovered that this pair is extremely difficult to predict the future trend and thus hard to determine the enter point.

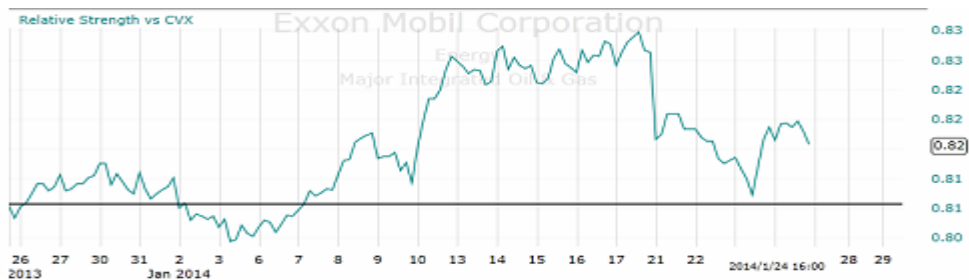


Figure 4.25 Relative Strength of XOM & CVX

Course of Action

No action was made this week. Although the pair F and GM was highly promising to invest in, the price ratio started going constant in the last day. As a result, it was assumed a bad time to open the position. T, VZ, XOM and CVX were simply not suitable for trading.

Results

No transaction was conducted this week.

4.5.5 Week 5: 01/27/14-01/31/14

Market Overview

Pair 1: F & GM

Figure 4.26 shows that the price ratio of F and GM was going constant since January 16. It was evaluated that the price ratio would continue increasing and come back to its historical value when the correlation weakened. However, the price ratio actually started decreasing on January 28 and continued going down until January 31, when the price ratio slightly went up. It is difficult to predict the trends of the next week.

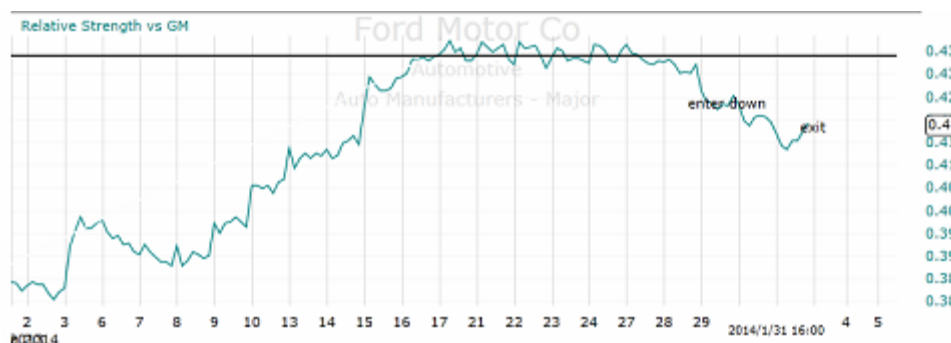


Figure 4.26 Relative Strength of F & GM

Pair 2: T & VZ

In the beginning of the week, the price ratio continued going up as shown below (Figure 4.27). On January 29, however, the price ratio dropped abruptly. Although it recovered slightly,

the price ratio started to be stabilized. According to its historical record, it is estimated that the price ratio would go up, coming back to its average, but it is hard to say.

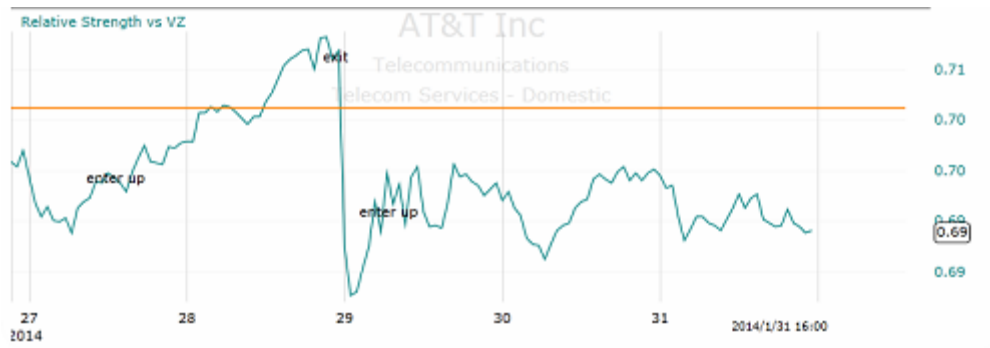


Figure 4.27 Relative Strength of T & VZ

Pair 3: C & BAC

According to the relative strength chart shown below (Figure 4.28), the price ratio of this pair kept going down since January 16. Since the trend is almost linear, the price ratio will probably continue decreasing next week.

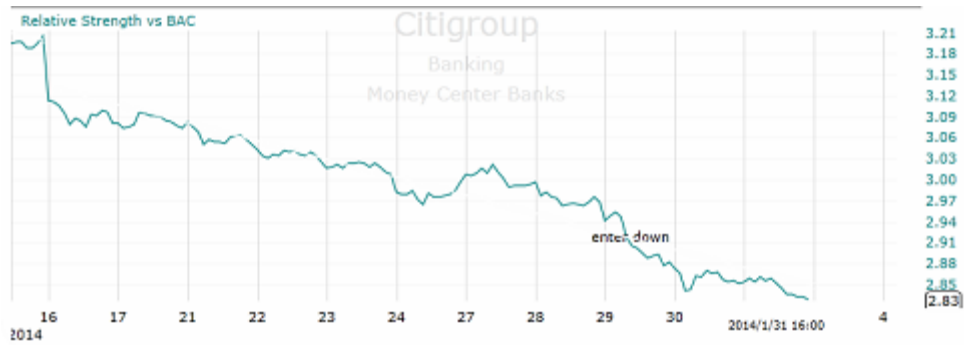


Figure 4.28 Relative Strength of C & BAC

Pair 4: XOM & CVX

Although the correlation was not too low, this pair is still very risky to invest in. As shown below (Figure 4.29), there were some times when the price ratio changed abruptly by a huge percentage. It is evaluated that the price ratio might go down next week.

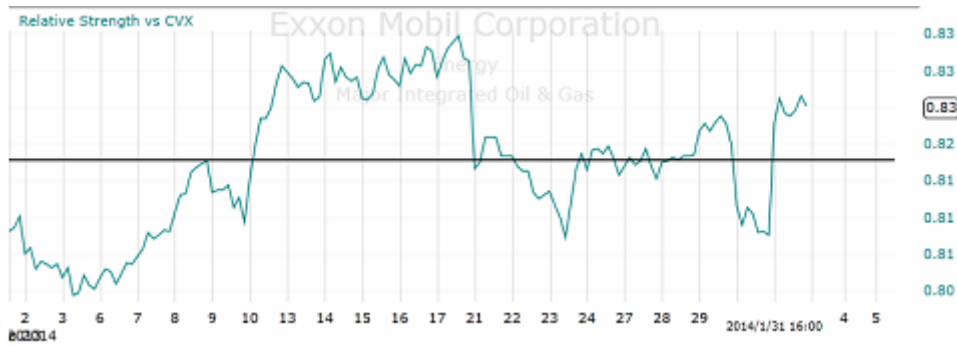


Figure 4.29 Relative Strength of XOM & CVX

Course of Action

As the price ratio started going down, F was short sold while GM was bought. Although a pair trader usually does not open the position when the correlation just starts weakening, I believed this pair was reliable due to its steadily high correlation. On January 31, however, F and GM were covered since the price ratio started going up. T and VZ were traded quickly since their price ratio fluctuated frequently this week. It is worth noting that the potential great loss from the pair T and VZ happening in the morning of January 29 was avoided.

Results

The table of transactions was presented below (Table 4.4).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
Jan 27, 2014	T	Buy	\$33.5	746	-\$25001		\$975316.47	
Jan 27, 2014	VZ	Sell Short	\$48.04	520	\$24970.8		\$1000287.27	
Jan 28, 2014	T	Sell	\$33.68	746	\$25115.28		\$1025402.55	
Jan 28, 2014	VZ	Buy to Cover	\$47.36	520	-\$24637.2	\$447.88	\$1000765.35	\$765.35
Jan 29, 2014	F	Sell Short	\$15.42	1622	\$25001.24		\$1025766.59	
Jan 29, 2014	GM	Buy	\$36.84	679	-\$25024.36		\$1000742.23	
Jan 29, 2014	C	Sell Short	\$48.77	513	\$25009.01		\$1025751.24	
Jan 29, 2014	BAC	Buy	\$16.78	1490	-\$25012.2		\$1000739.04	
Jan 31, 2014	F	Buy to Cover	\$14.96	1622	-\$24275.12		\$976463.92	
Jan 31, 2014	GM	Sell	\$36.08	679	\$24488.32	\$190.08	\$1000952.24	\$955.43

Table 4.4 Week 5 Transaction Record (Includes \$10 commission fee per trade)

4.5.6 Week 6: 02/03/14-02/07/14

Market Overview

Pair 1: F & GM

According to Figure 4.30, the price ratio of this pair was quite stable in the beginning of the last week. However, it went up abruptly in between the end of Wednesday and the beginning of Thursday, and fluctuated significantly in the rest of the week. Since the correlation was low, it might be very risky to make a transaction next week.

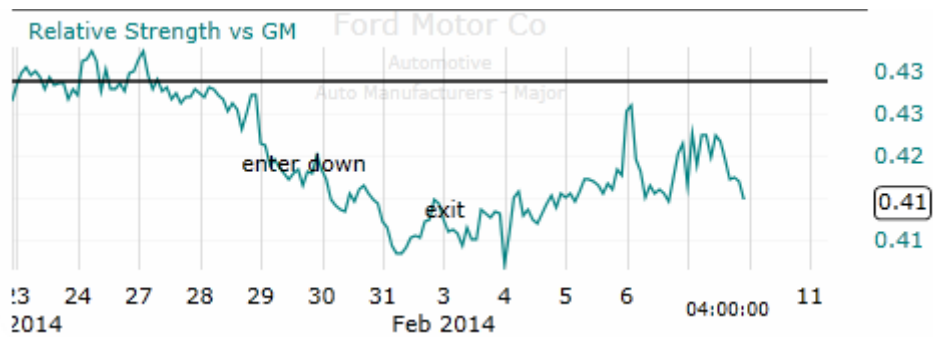


Figure 4.30 Relative Strength of F & GM

Pair 2: T & VZ

According to Figure 4.31, the price ratio of T and VZ was going down steadily and then started to increase slowly according to the relative strength chart. Because T and VZ always have a very high correlation, it is anticipated that high profit would be made next week.

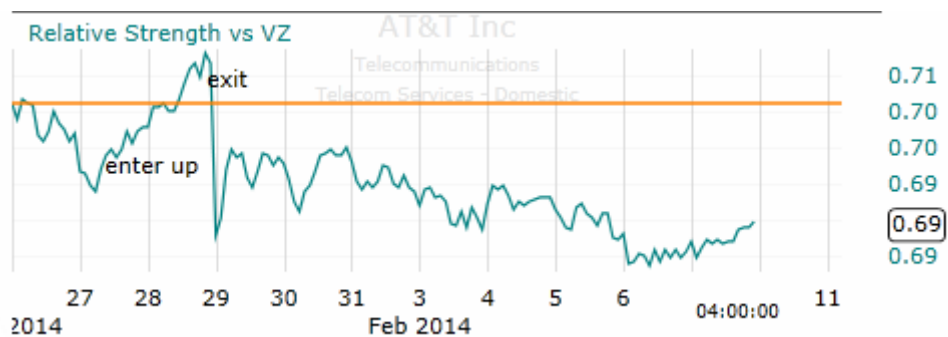


Figure 4.31 Relative Strength of T & VZ

Pair 3: C & BAC

As shown below (Figure 4.32), the price ratio of the pair C and BAC started going up in the beginning of the week. A high profit is anticipated to be achieved next week.

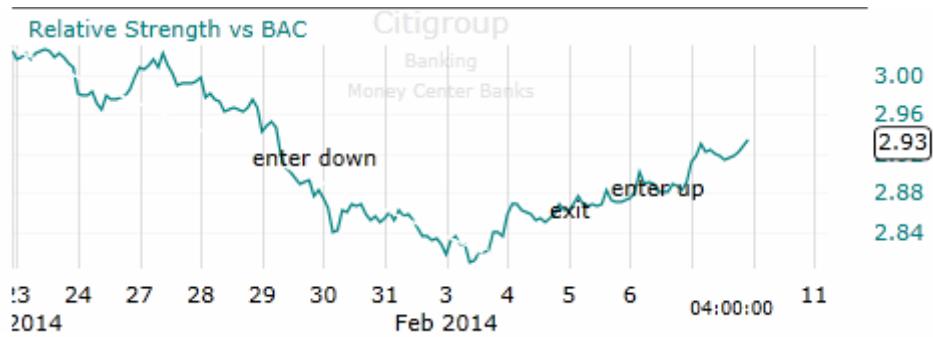


Figure 4.32 Relative Strength of C & BAC

Pair 4: XOM & CVX

According to Figure 4.33, the correlation was low and thus the price ratio was fluctuating greatly over a week. This pair is still very risky to invest in.

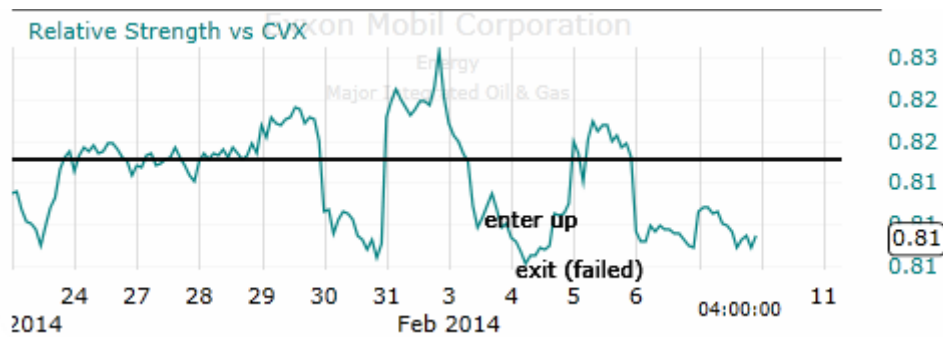


Figure 4.33 Relative Strength of XOM & CVX

Course of Action

Only a few transactions were conducted this week. BAC and C invested last week were covered on February 5, and they were traded oppositely on 6 as the price ratio continued increasing. CVX and XOM were tried to make profit but failed.

Results

These five pairs did not have obvious trends as last week. As a result almost no profit was made this week. The table of transactions describing the performance of this week was presented below (Table 4.5).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
Feb 3, 2014	XOM	Buy	\$90.46	262	-\$23710.52		\$977241.72	
Feb 3, 2014	CVX	Sell Short	\$111.46	224	\$24957.04		\$1002198.76	
Feb 4, 2014	XOM	Sell	\$89.81	262	\$23520.22		\$1025718.98	
Feb 4, 2014	CVX	Buy to Cover	\$111.34	224	-\$24950.16	(\$183.4)	\$1000768.82	\$772.01
Feb 5, 2014	C	Buy to Cover	\$46.42	513	-\$23823.46		\$976945.36	
Feb 5, 2014	BAC	Sell	\$16.19	1490	\$24113.1	\$286.5	\$1001058.46	\$1058.46
Feb 6, 2014	C	Buy	\$48.08	520	-\$25011.6		\$976046.86	
Feb 6, 2014	BAC	Sell Short	\$16.62	1504	\$24986.48		\$1001033.34	

Table 4.5 Week 6 Transaction Record (Includes \$10 commission fee per trade)

4.5.7 Week 7: 02/10/14-02/14/14

Market Overview

Pair 1: F & GM

According to Figure 4.34, the fluctuation of the price ratio between F and GM was quite large. Although in general the price ratio kept increasing over a week, it was very difficult to tell the trend at that time. It is estimated that the price ratio will continue increasing next week.

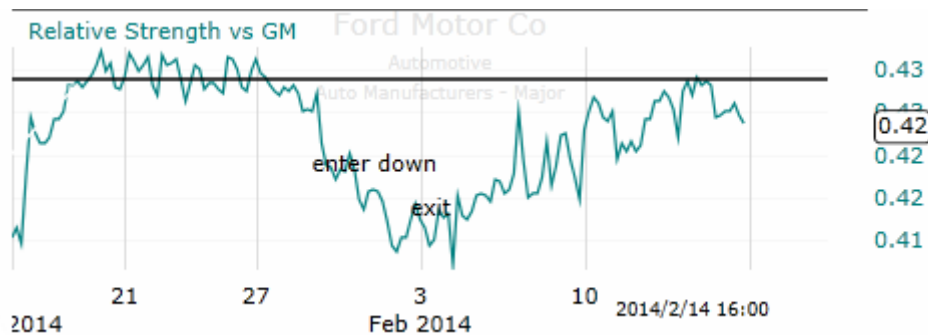


Figure 4.34 Relative Strength of F & GM

Pair 2: T & VZ

Based on Figure 4.35 shown below, it is easy to tell that the price ratio of T and VZ was increasing near the historical value over a week. This was the optimum situation for pair trading. Since the price ratio has exceeded that highest value over a month, it might go down next week.

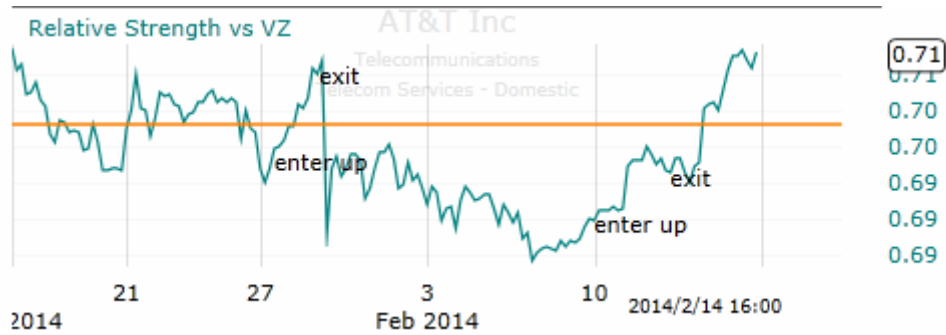


Figure 4.35 Relative Strength of T & VZ

Pair 3: C & BAC

This pair also had a beautiful trend for pair trading. According to Figure 4.36, the price ratio was steadily increasing while correlation was still very high, which indicates that this pair was extremely safe to invest in. Although it also mean the profit cannot be achieved quickly, low risk is the point of pair trading. There must be some trade-offs. It is predicted that the price ratio will continue growing next week.

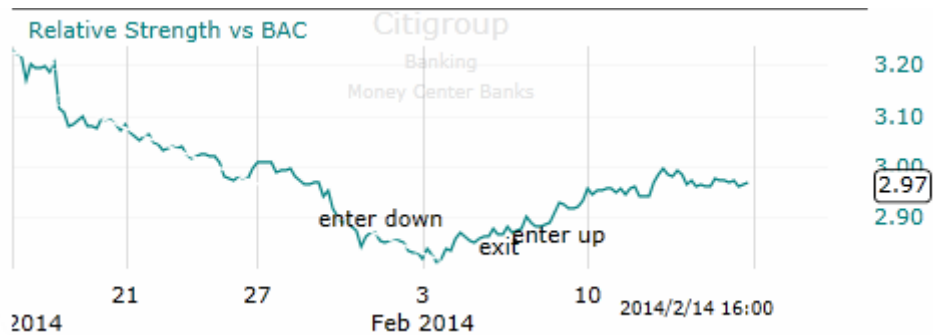


Figure 4.36 Relative Strength of C & BAC

Pair 4: XOM & CVX

This pair was not suitable for pair trading. As shown below (Figure 4.37), there were a couple of times when the price ratio changed abruptly, which greatly weakened correlation. This pair will not be discussed in the later weeks unless it has a suitable trend.

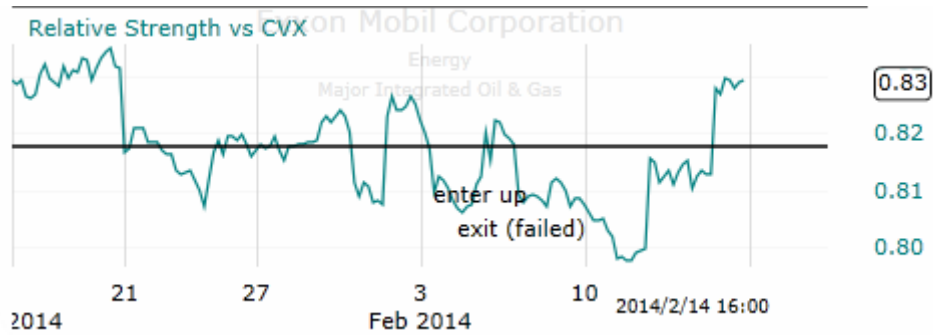


Figure 4.37 Relative Strength of XOM & CVX

Course of Action

Only T and VZ were traded because they had perfect trends for pair trading. At the same time, the pair C and BAC was decided to be held longer since the price ratio was growing steadily. Although the price ratio of F and GM was increasing, they were not traded considering the high risk.

Results

The performance of this week was quite successful although only a few transactions were conducted. Compared to the last week, the portfolio value increased by almost 500 dollars. The table of transactions describing the performance of this week was presented below (Table 4.6).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
Feb 10, 2014	T	Buy	\$32.28	774	-\$24994.72		\$976038.62	
Feb 10, 2014	VZ	Sell Short	\$46.78	534	\$24970.52		\$1001009.14	
Feb 12, 2014	T	Sell	\$32.96	774	\$25501.04		\$1026510.18	
Feb 12, 2014	VZ	Buy to Cover	\$47.29	534	-\$25262.86	\$213.98	\$1001247.32	\$1272.44

Table 4.6 Week 7 Transaction Record (Includes \$10 commission fee per trade)

4.5.8 Week 8: 02/17/14-02/21/14

Market Overview

Pair 1: F & GM

According to the relative strength chart of F and GM (Figure 4.38), the price ratio was going down steadily this week. Compared to the last week, the correlation was much higher as the price ratio did not fluctuate greatly, so this pair is still quite promising in a short term.

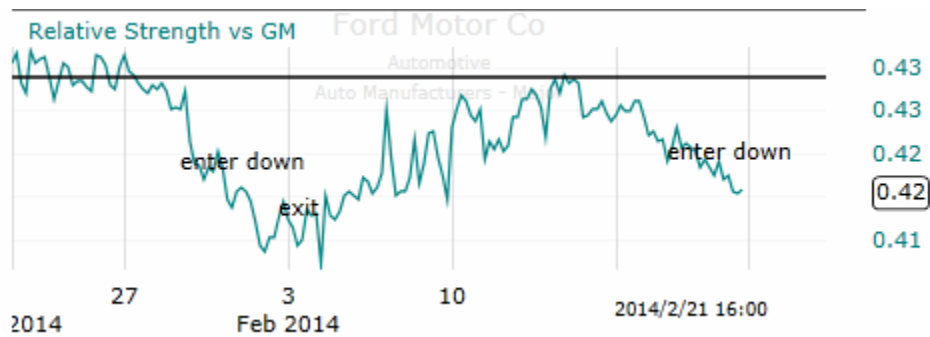


Figure 4.38 Relative Strength of F & GM

Pair 2: T & VZ

As shown below (Figure 4.39), the correlation of T and VZ was low this week. It is worth noting that the price ratio abruptly dropped significantly in between Wednesday and Thursday.

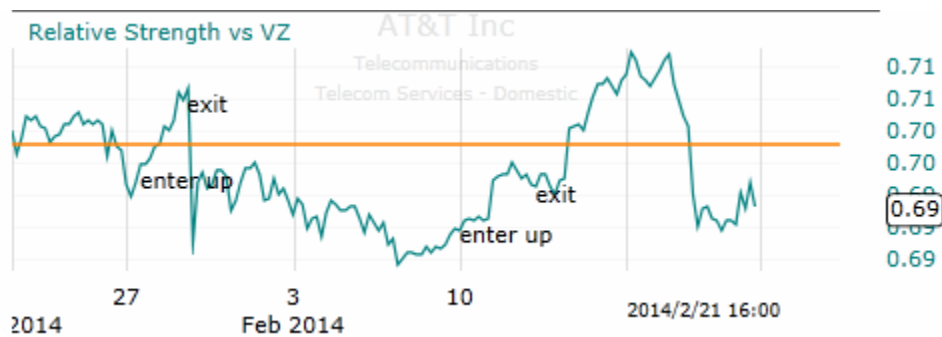


Figure 4.39 Relative Strength of T & VZ

Pair 3: C & BAC

Based on Figure 4.40, the price ratio kept increasing last week, but it became constant in the beginning of this week and then started decreasing. As the correlation still remains high, it is expected that the pair C and BAC is profitable if they are invested next week.

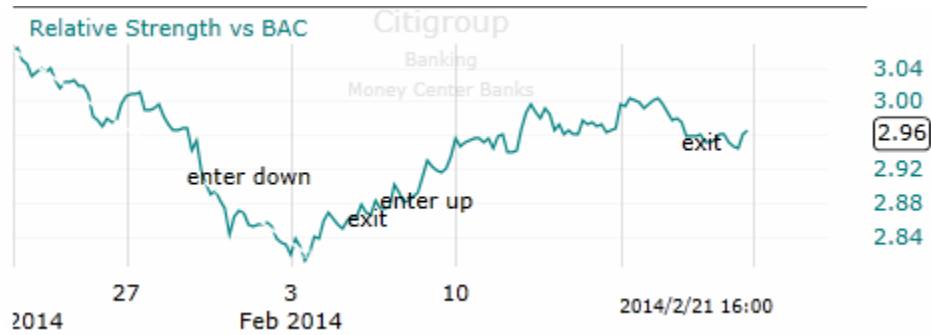


Figure 4.40 Relative Strength of C & BAC

Course of Action

As described above, the price ratio of C and BAC started going down, so their positions were closed in the beginning of February 20. In addition, the pair F and GM was traded on February 20 as the trend of reversed and started moving down steadily.

Results

Considering that only one pair was traded and more than 500 dollars of profit was achieved, it was quite successful this week. The table of transactions describing the performance of this week was presented below (Table 4.7).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
Feb 20, 2014	F	Sell Short	\$15.21	1644	\$24995.24		\$126242.56	
Feb 20, 2014	GM	Buy	\$36.04	694	-\$25021.8		\$101220.8	
Feb 20, 2014	C	Sell	\$48.07	520	\$24986.4		\$126207.2	
Feb 20, 2014	BAC	Buy to Cover	\$16.24	1504	-\$24435.0	\$526.32	\$101772.24	\$1798.8

Table 4.7 Week 8 Transaction Record (Includes \$10 commission fee per trade)

4.5.9 Week 9: 02/24/14-02/28/14

Market Overview

Pair 1: F & GM

Although the price ratio of F and GM was expected to continue going down this week, the correlation weakened significantly and the price ratio started going up as shown in Figure 4.41. It is expected that the price ratio may go up and even pass the historical average next week.

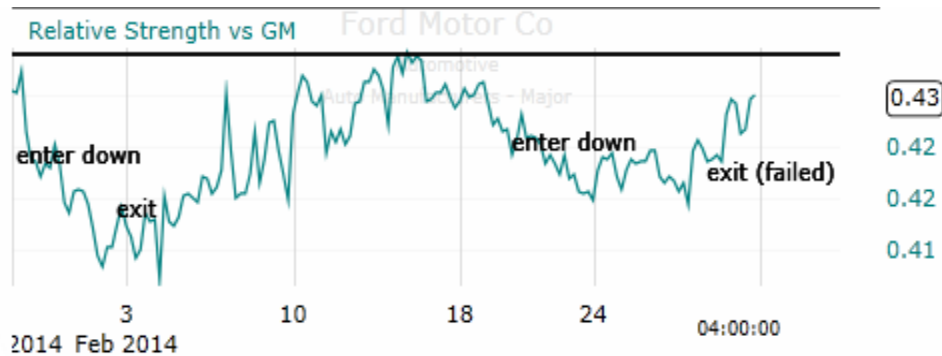


Figure 4.41 Relative Strength of F & GM

Pair 2: T & VZ

As shown below (Figure 4.42), the correlation between T and VZ was low this week. The price ratio fluctuated slightly in the beginning of the week and then started dropping significantly. Since the historical correlation was quite high for this pair, it is expected that the trend will return to their historical average in the short term.

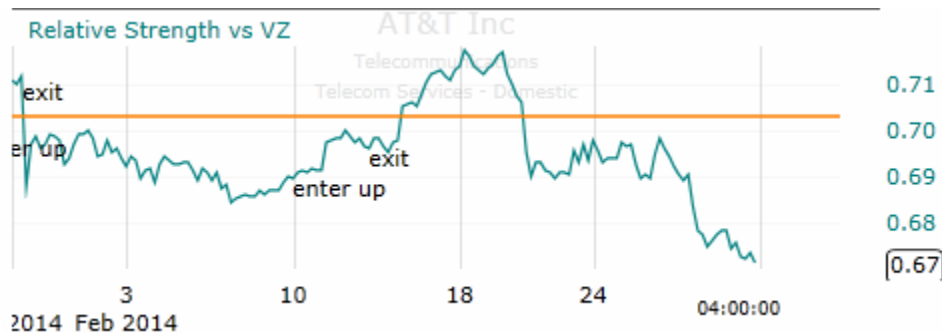


Figure 4.42 Relative Strength of T & VZ

Pair 3: C & BAC

It is easy to tell from the figure shown below (Figure 4.43) that the correlation of C and BAC was extremely high. The price ratio moved along the historical average and did not fluctuate much. It is difficult to predict the trend of their price ratio next week.

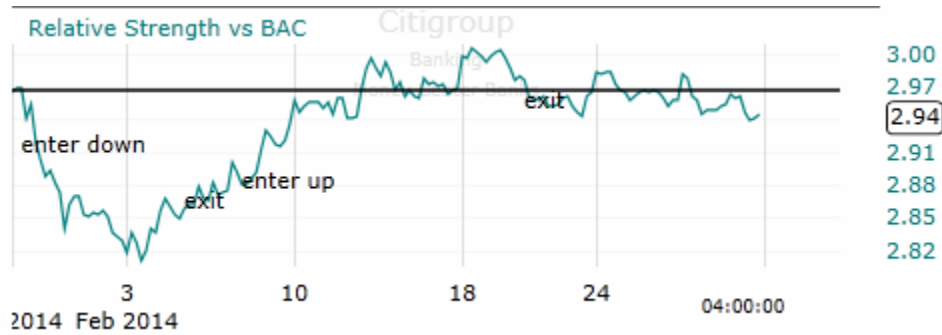


Figure 4.43 Relative Strength of C & BAC

Course of Action

Only two transactions were conducted this week. In fact, new positions could not be opened since the correlation was either too high or too low. The positions of F and GM were covered because their price ratio started going opposite. It was disappointing that no more profit was achieved from this pair.

Results

In general, this week was not suitable for pair trading. The table of transactions describing the performance of this week was presented below (Table 4.8).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
Feb 27, 2014	F	Buy to Cover	\$15.36	1644	-\$25261.84		\$76510.4	
Feb 27, 2014	GM	Sell	\$36.69	694	\$25452.86	\$164.5	\$101963.26	\$1963.26

Table 4.8 Week 9 Transaction Record (Includes \$10 commission fee per trade)

4.5.10 Week 10: 03/03/14-03/07/14

Market Overview

Pair 1: F & GM

According to Figure 4.44, the price ratio decreased significantly, increased abruptly, and then started to decrease slowly. As a result, the correlation between F and GM was never high. However, the price ratio has been fluctuating up and down along the one-month average value over a month, so it is expected that the price ratio will go up and may pass the average soon.

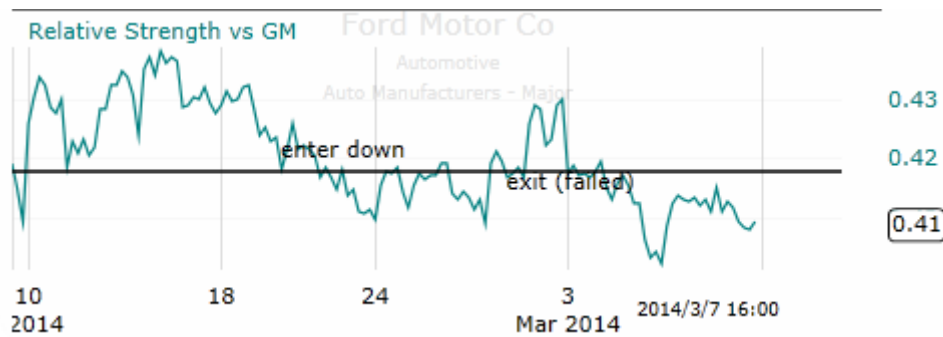


Figure 4.44 Relative Strength of F & GM

Pair 2: T & VZ

As shown below (Figure 4.45), the price ratio was going down significantly. This week, however, the trend of the price ratio reversed and started to go up steadily. In the last day of this week, the price ratio almost hit the historical value.

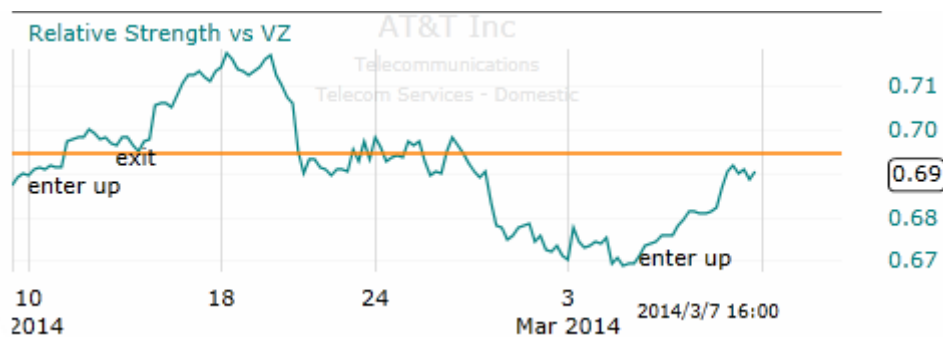


Figure 4.45 Relative Strength of T & VZ

Pair 3: C & BAC

As shown below (Figure 4.46), the correlation between C and BAC was surprisingly high since February 10. However, the price ratio dropped significantly on May 5. Although the price ratio was stable after May 6, it is expected that it will go up and return to its historical average soon due to its historically high correlation.

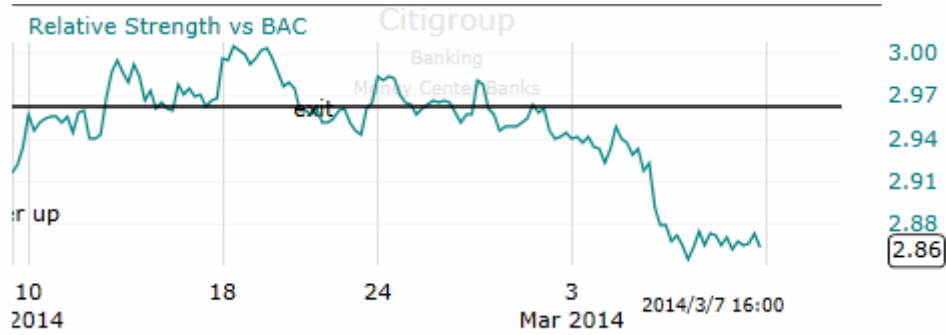


Figure 4.46 Relative Strength of C & BAC

Course of Action

The pair T and VZ was traded by \$50,000 respectively, considering that this pair had an excellent trend and also this week was the last week of stock simulation. As expected, a considerable amount of profit, more than \$1,100, was made.

Results

This week might be the most successful week ever. The table of transactions describing the performance of this week was presented below (Table 4.9).

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
Mar 5, 2014	T	Buy	\$32.04	1560	-\$49992.4		\$51970.86	
Mar 5, 2014	VZ	Sell Short	\$47.52	1052	\$49981.04		\$101951.9	
Mar 7, 2014	T	Sell	\$32.55	1560	\$50768		\$152719.9	
Mar 7, 2014	VZ	Buy to Cover	\$47.14	1052	-\$49601.28	\$1155.4	\$103118.62	\$3118.62

Table 4.9 Week 10 Transaction Record (Includes \$10 commission fee per trade)

4.6 Results and Discussion

After a ten-week simulation of pair trading, \$3118.62 of profit was achieved, which represented 3.12% gain. Although \$3000 was not a significant achievement, it proved that pair trading is a strategy with relatively low return and low risk, in spite of several losses.

During the first couple of weeks, transactions were conducted frequently, but manipulated poorly. There were many times when the relative performance of two stocks in a pair was misevaluated and thus the outperformer was short sold incorrectly while the underperformer was bought. As a result, a considerable amount of money was lost because they were traded oppositely. For example, F was considered that it was the underperformer compared to GM on December 4, 2013, so F was bought while GM was short sold, predicting that the price ratio of F and GM would increase soon. However, the price ratio continued to decrease significantly, causing a huge loss and their positions had to be closed 2 days later. A similar case happened to the pair XOM and CVX several times as well. Additionally, many unprofitable transactions were also conducted as a result of my diffidence in a pair of stocks. Obviously, transactions making profit less than \$100 were not worth being conducted so frequently. These two types of poor manipulation could be contributed to the fact that I was not familiar enough with the pair trading strategy.

However, the performance became a lot better and the total portfolio value started to be positive since the third week. Some remarking transactions were conducted, making a profit greater than \$200, or even more than \$500, from a single pair in a short term, usually within a week. Since two or three pairs were held in a week, more than \$500 of profit was frequently achieved. Considering the situation that only four pairs were studied in this ten-week simulation and not all of these pairs were suitable for trading all the time, it could be defined as a success if more than \$500 of profit could be achieved in a week.

In the last week, more than \$1000 of profit was achieved from a single pair T and VZ. Admittedly, I do not deny that I was lucky, but the achievement could be also attributed to my better understanding and better manipulation of the strategy. It was really exciting that the pair trading started to work. Unfortunately, the simulation was already completed.

Prior to the start of the simulation, I selected two historically highly correlated, one medially correlated, and one weakly correlated pairs, in order to determine the relationship among the correlation, return, and risk. Eventually, it was discovered that high return was seldom achieved from the highly correlated pair such as the pair C and BAC, but not never. For example, the correlation of pair F and GM weakened significantly in the third week, and \$603.65 of profit was achieved within a week. If the transactions of F and GM had been conducted properly, it was possible to profit \$779.90 instead of losing it. In conclusion, historically highly correlated pairs are infrequently but highly profitable, and thus worth paying close attention to them.

Medially correlated pairs are also quite profitable but differently from the highly correlated pairs. As it could be observed from the transaction record of the pair T and VZ, relatively steady profits were achieved frequently, usually about \$300. It is concluded that medium profit could be achieved frequently from historically medially correlated pairs.

Weakly correlated pairs, however, are very risky. As it was stated in the weekly analysis in previous sections, it was never able to make profit from the pair XOM and CVX due to the extremely high fluctuations in their price ratio. It may be assumed that high profit could be achieved if a pair trader pays close attention to a weakly correlated pair, but it is difficult to determine the entry point and exit point. Considering that pair trading is aimed to reduce the risk, it is nonsense to do so. Therefore, historically weakly correlated pairs should be avoided for pair trading.

5 Trading the News Simulation

Trading the news can be a difficult strategy when investing in the stock market, but if this strategy is done right it can be very profitable. Trading the news involves an investor using stock market information and business press releases to decide where they are going to invest. It is usually more successful with longer term investing because as news story can take several weeks to unfold and that could keep driving the price of the stock up or down. Economic information is the biggest catalyst to the success of trading. Since information can be published about a product at any time there are plenty of opportunities to find good information concerning the stocks and the opportunity to invest in many different areas. This makes it very easy to diversify accounts. The downside to trading the news is that it is time consuming. News changes constantly and it is important to stay informed to make sure you are investing in the right stock and or figure out if it is time to sell your stock [5].

Trading the news is a very intensive strategy for an investor. No stock or company can be randomly chosen without research. Analyzing the news is crucial for trading the news. This investor will be looking at news conglomerates to discern which stocks are doing well and which ones are not.

When choosing stock information, Yahoo and Google have comprehensive articles on stock market trading. Those websites are able to compile information that investment only websites couldn't cover. These website have links to articles of news information that has been released about that company recently, along with their past stock market performance and where that company stands in comparison to other companies in the same market. Although a company's current performance is important, investors must research on how the company has been performing before this in order to make sure it is a sound investment.

Investment websites will be very important to the success of this investor. Investment websites usually will analyze the news to determine if it is a strong buy or not. If the investor sees information from an investment website about investing in that particular company then further research will be conducted.

5.1 Companies

Galena Biopharma Inc. (GALE): Galena Biopharma, is a pharmaceutical company that specializes in cancer and oncology treatments to help fight advanced types of cancer. The scientists at Galena Biopharma are currently developing a vaccine called NeuVax, which is currently in phase three trials for breast cancer and it could be released onto the market in the near future. Many investors are interested in Galena because the NeuVax vaccine attacks residual cancer cells and increases the odds that breast cancer will not reoccur [25] [20].

Navidea Biopharmaceuticals Inc. (NAVVB): Navidea Biopharmaceuticals, is a pharmaceutical company that makes medical and radiopharmaceutical devices. This company is creating lymph detection in head and neck cancer. Navidea was granted fast track designation by the FDA, which will speed along the review process for this drug. Due to this drug's high importance, their stock has been skyrocketing the past couple of days [59].

Huntington Ingalls (HII): This company designs and manufactures ships for the military. Its profits are skyrocketing and performing much better than expected. It does all of its work exclusively with the US Navy and Department of Defense. Huntington Ingalls is on the top tier of defense contractors and hopefully their stock market performance will continue to increase [30].

SolarWinds (SWI): SolarWinds creates enterprise information technology which includes individual software to software that would be used by IT professionals. SolarWind is not as

expansive as compared to its competitors, Hewlett Packard and IBM but it is a stock to look out for [40] [41].

Anika Therapeutics (ANIK): This company makes therapeutic products to protect and heal tissues. Their stock has begun to increase in 2014. It is listed as a “strong buy” and it is a considered a conservative purchase [49] [1].

THL Credit (TCRD): THL credit, is a company that manages investments and invests in mezzanine debt which is, debt that is private subordinated debt. The stock performed well last quarter and investors predict it to be a good purchase [4].

Bristol-Myers Squibb (BMY): A biopharmaceutical company, Bristol-Myers Squibb, creates and distributes biopharmaceuticals on a global scale. Their best selling products are Abilify and Plavix, which earn billions of dollars [10] [12].

5.2 Simulation Transactions

5.2.1 Week 1: 12/02/13-12/06/13

Market Overview:

Galena Biopharma Inc.: Galena is receiving a lot of good publicity recently because their breast cancer therapy, Neuvax, which is an innovative product the company created. This resulted in many investors becoming eager to purchase Galena’s stock. The stock was purchased a few days after the news was released and the stock stayed relatively stagnant throughout the week, which resulted in a loss of merely fifty dollars. Seen in Figure 5.1, there is potential for the stock will continue to trend upward [25].

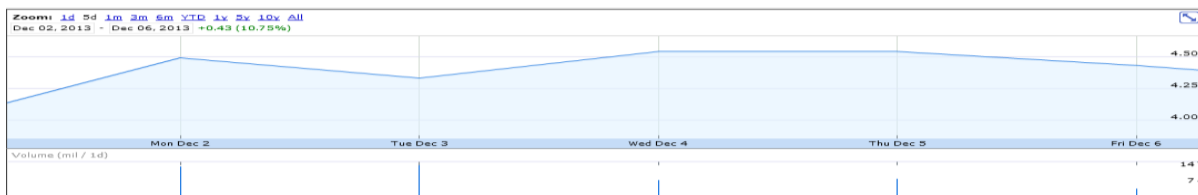


Figure 5.1 Week 1 GALE Stock Price

Course of Action:

During the first week of trading the news, this investor thought it was important to start small and get a feel for how to invest and which information and articles to trust. Articles about Galena Biopharma were being posted on numerous websites and after further research this investor felt as though this was a good company to invest in. The pharmaceutical industry is a growing market and creating a drug that can help keep cancer patients in would be valuable. The articles might have been found too late because this investor purchased the stock after its dramatic increase Monday morning, but the stock still seems to be gaining momentum. In Figure 5.1, it can be seen that the stock was relatively inexpensive, so it is worth it to hold onto this stock and see if the price continues to increase.

Date	Symbol	buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
12/02/13							\$100,000	
12/02/13	GALE	Buy	\$4.44	5,000	\$22,200.00		\$87,800.00	

Table 5.1 Week 1 Transaction Record (Includes \$10 commission fee per trade)

5.2.2 Week 2: 12/09/13-12/13/13

Market Overview:

Galena Biopharma Inc.: In Figure 5.2 it is evident that the stock has been falling steadily this week, but it appears to have potential to increase in value in the near future. If the stock is sold at this point, the investor loses any opportunity to make a profit.

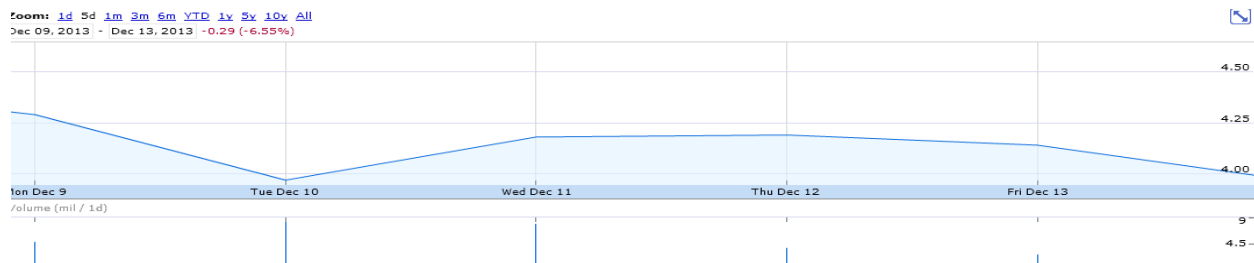


Figure 5.2 Week 2 GALE Stock Price

Navidea Biopharmaceuticals Inc.: Navidea has been increasing in small increments throughout the course of the week which is exemplified in Figure 5.3. Over the course of week 2, this investor was able to gain over one hundred dollars and hopes to continue earning a profit in the future. Navidea’s newest vaccine, Lymphoseek, is on the fast track designation, which is the reason the stock price has been rising [59].



Figure 5.3 Week 2 NAVB Stock Price

Course of Action: Adding Navidea stock to this investor’s portfolio has helped expand the portfolio and helped lessen the blow when Galena was not performing as anticipated, which can be seen in Table 5.2.

Date	Symbol	buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
12/10/13	NAVB	Buy	\$2.02	5,000	\$10,100.00		\$67,700.00	

Table 5.2 Week 2 Transaction Record (Includes \$10 commission fee per trade)

5.2.3 Week 3: 12/16/13-12/20/13

Market Overview:

Galena Biopharma Inc.: There were no press about Galena that past week however, their stock fell rather steadily which is apparent in Figure 5.4. This investor did not sell the stock because it was imperative to keep in case NeuVax had a new breakthrough in the following weeks.

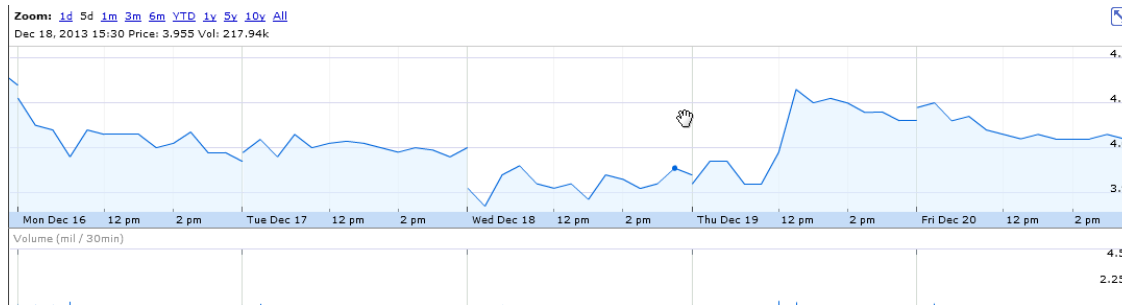


Figure 5.4 Week 2 GALE Stock Price

Navidea Biopharmaceuticals Inc.: Lymphoseek was performing well in their trials, especially with their fast track designation granted to them by the FDA. This investor is optimistic that not selling the stock will only give the stock more time to accumulate profit [59].

Course of Action: This investor kept Navidea in order to see their portfolio grow despite the fact that Galena was in a steady decline.

Note: No transaction will be conducted from December 23, 2013 to January 17, 2014 due to the winter break.

5.2.4 Week 4: 01/20/14-01/24/14

Market Overview:

Galena Biopharma Inc.: Over the past several weeks, Galena's prices were soaring upward and this investor felt that it was critical to keep them. As one can see on Figure 5.5, the stock value had a dramatic increase compared to the previous weeks. On January 7th Galena Biopharma released that it had enrolled its first patient in GALE-301, in order to treat a patient with ovarian cancer. GALE-301 is a Float Binding Protein, which is a vaccine developed by Galena. GALE-301 exemplified the company's innovative cancer immunotherapy research and vaccinations. Six days later, Galena Biopharma acquired Mills Pharmaceuticals, which caused Galena to expand rapidly and obtain a new vaccine, GALE-401, because it was acquired in the merger. With all this, it was important to hold onto the stocks because the price was destined to increase over the following

weeks. This investor sold their shares of Galena at the start of the week. Observing Figure 5.5, the stock value decreased over the week, which made it beneficial to sell the stock at the beginning of the week [23] [24].



Figure 5.5 Week 4 GALE Stock Price

Navidea Biopharmaceuticals Inc.: Navidea had not had any innovations in the past couple of weeks and the stock did not seem to be moving in any direction, so it was sold at the start of the week. In Figure 5.6, it is clear that the stock declined in value throughout the week and this signaled selling the stock was a smart decision.



Figure 5.6 Week 4 NAVB Stock Price

Huntington Ingalls: Many news articles claimed that Huntington Ingalls was a safe company to invest in. After making such a large profit in Galena, this investor focused more on companies that would produce small, but steady growth over the course of the following weeks. The reason why the firm might be doing so well in the stock market could be because they have had a strong earnings estimate revision over the past month. The industry HII is involved in a stable and

growing market, which makes this company a solid choice. As one can see in Figure 5.6 the stock remained relatively steady throughout the week, which will only help this investor’s portfolio [61].



Figure 5.7 Week 4 HII Stock Price

SolarWinds: SolarWinds is another company that appears, to be growing steadily and is a sound investment. Figure 5.7 shows how the company has been steadily growing, despite the fact that the stock price slightly dropped this Friday. Several investment articles stated that SolarWinds was a smart purchase such as Tech research firm, Gartner, who said, “global IT spending will grow 3.1% this year.” This leaves room for SolarWinds to grow, since they are recognized by create quality products rather inexpensively [41].



Figure 5.8 Week 4 SWI Stock Price

Anika Therapeutics: Anika has been expanding and was named one of the best stocks to purchase this year, so it appeared seemed to be a safe buy. Their stock has been increasing for the first time in quite some time. The company is in a growing market of biological and biomedical advances and their company creates a variety of different products. Even though the stock seemed to be in

a decline throughout the week, which is exemplified in Figure 5.9, this investor is still confident that this stock will turn a profit [1].



Figure 5.9 Week 4 ANIK Stock Price

Course of Action: Selling the stock in Galena gave this investor a large profit for their portfolio, which provides a cushion in case a bad investment is made. The three newly purchased stocks increased this investor’s portfolio by \$12,450. The stocks that were purchased or sold can be seen in Table 5.3 below.

Date	Symbol	buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
01/20/14	GALE	Sell	\$7.00	5,000	\$22,200.00	\$12,800	\$102,700.00	\$12,800
01/20/14	NAVB	Sell	\$1.95	5,000	\$10,100.00	(\$350)	\$112,450.00	\$12,450
01/22/14	HII	Buy	\$93.45	100	\$9,651.00		\$102,799.00	
01/22/14	SWI	Buy	\$39.84	100	\$4,030.00		\$98,769.00	
01/22/14	ANIK	Buy	\$34.46	100	\$3,207.00		\$95,562.00	

Table 5.3 Week 4 Transaction Record (Includes \$10 commission fee per trade)

5.2.5 Week 5: 01/27/14-01/31/14

Market Overview:

Huntington Ingalls: This week, there was not much in the news about Huntington Ingalls. However, it was evident that this is a good sector of the market to invest in. Investor Place puts defense companies in the buy market right now, making it a safe investment. This can be seen by its steady growth throughout the week, despite Friday, in Figure 5.10 [4].



Figure 5.10 Week 5 HII Stock Price

SolarWinds: Investors have begun taking an interest in SolarWinds. Zacks, an investment research group, raised the rating to a neutral buy. This is due to Zacks’s opinion on the current technology stock sector. Their ratings for other technology companies, including Nuance Communications, rating were increased. Hopefully, this sentiment is shared by other investors. The stock prices shown below on Figure 5.11 shows SolarWind’s steady growth [45].



Figure 5.11 Week 5 SWI Stock Price

Anika Therapeutics: There was nothing in the news about Anika Therapeutics but, after investing in Galena Biopharma and Navidea, this investor knows that researching in drug companies takes a bit of patience if a profit is to be made. Figure 5.12 shows the stock prices for Anika this week.



Figure 5.12 Week 5 ANIK Stock Price

Course of Action: No transaction was conducted this week.

5.2.6 Week 6: 02/03/14-02/07/14

Market Overview:

Huntington Ingalls: No news articles about Huntington Ingalls were released this week but, the stock was going fairly steady throughout the week, so I kept the investment with Huntington Ingalls. The steadiness of the stock prices can be seen in Figure 5.13.



Figure 5.13 Week 6 HII Stock Price

Solarwinds: Solarwinds reported that they made a substantial profit in the fourth quarter, which helped their stock, increase this week. The company released this information and will hold a press conference later this month to give more details about the profit. The release of this information has strengthened SolarWinds as an investment. This publicity has seemed to increase stock prices, which can be seen on Figure 5.14 [46].



Figure 5.14 Week 6 SWI Stock Price

Anika Therapeutics: Anika has been thought very highly of by many investment firms. Their company made a profit, which is why the stock value is increasing, thus making it a sound investment. The stock price has increased over the past week, which can be seen in Figure 5.15 [9].



Figure 5.15 Week 6 ANIK Stock Price

Course of Action: No transaction was conducted this week.

5.2.7 Week 7: 02/10/14-02/14/14

Market Overview:

Huntington Ingalls: According to Bloomberg News, Huntington Ingalls Industry should have taken a hard hit since Wednesday. They lost a contract with the U.S. Coast Guard ship program to build a ship for the government. General Dynamics, Huntington Ingalls number one competitor, got the contract. This should have resulted in the stock value plummeting. As shown in Figure 5.16 below, for the past two days the stock began to rise, which made this investor more comfortable purchasing more stock [26].



Figure 5.16 Week 7 HII Stock Price

Solarwinds: As shown below in Figure 5.17, Solarwind’s stock has been increasing dramatically the past week. There has been a lot of discussion over the profits that Solarwind made last quarter. They are releasing their profit statement in several weeks and several executives have been exercising their stock options now and purchasing stock in the company, which seems to assure investors that when the company releases their quarter four reports that the price of their stock will continue to increase [3].



Figure 5.17 Week 7 SWI Stock Price

Anika Therapeutics: Anika is also planning on releasing their end of the year results and its fourth quarter performance. The release will take place February 26th and they will hold a press

conference on the 27th. This excited investors as their stock rose throughout the week which, is evident from Figure 5.18 [7].



Figure 5.18 Week 7 ANIK Stock Price

THL Credit: Investment websites have said only positive things about THL credit and strongly urge their consumers to buy it. On the 14th, the company began trading ex-dividend and they announced they would be doing so a few days prior. That seemed to peak investor’s interest and the stock began to rise, which is shown in Figure 5.19 [51] [4].



Figure 5.19 Week 7 TCRD Stock Price

Course of Action: Due to the stability of the Huntington Ingalls Industries, SolarWinds Inc., and Anika Therapeutics Inc. stock over the past weeks and positive news publicity about these companies this investor decided to invest more money into each one. Also, THL Credit was

purchased which seemed to be doing well according to the news. This can all be seen on Table 5.4 below.

Date	Symbol	buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
02/12/14	HII	Buy	\$91.00	100	\$9,100.00		\$86,462.00	
02/12/14	SWI	Buy	\$42.70	900	\$38,430.00		\$48,032.00	
02/12/14	ANIK	Buy	\$30.25	400	\$12,100.00		\$35,932.00	
02/12/14	TCRD	Buy	\$15.70	1,000	\$15,430.00		\$20,502.00	

Table 5.4 Week 7 Transaction Record (Includes \$10 commission fee per trade)

5.2.8 Week 8: 02/17/14-02/21/14

Market Overview:

Huntington Ingalls: The important news that effected Huntington Ingalls’s stock had more to do with their competitors. Airbus Group, was under investigation for a year for helicopters that were not up to standard for the United Kingdom Civil Aviation Authority. This made investors move their money into competitor’s stock, which helped Huntington Ingalls increase the value of their stock. This is apparent in Figure 5.20. [61].



Figure 5.20 Week 8 HII Stock Price

Solarwinds: At the start of this week, Solarwinds has proven to be headed in a positive direction. In an article by Seeking Alpha, Solarwinds has begun to show that they are moving in the right direction because their company is creating more technology than ever before this year. It is an expanding company and the increase in their stock value reflects that, which is shown in Figure 5.21 [48].



Figure 5.21 Week 8 SWI Stock Price

Anika Therapeutics: Anika is still preparing its fourth quarter report, which will debut next Wednesday and appears to have enticed more investor's to invest their money in hopes that this stock will continue to grow after they release of their quarter four report. This investor felt as though it was important to hold on to this stock in hopes that the value would rapidly increase after their earnings report on Wednesday. The stock value had been increasing throughout the week, which can be seen in Figure 5.22 [7].



Figure 5.22 Week 8 ANIK Stock Price

THL Credit: Investment experts seem to have a positive outlook on THL Credit and their stock's ability to produce good results. They claim this is due to THL Credit's yields are starting to become more stable. They also commented on their vast growth capital, which could increase returns. Although there wasn't anything else in the news about THL this investor felt that that article, coupled with the stock's performance this week, warranted that the stock should be kept for the remainder of the week. The stock value fluctuated throughout the week, which is shown in Figure 5.23 [52].



Figure 5.23 Week 8 TCRD Stock Price

Bristol-Myers Squibb: Several analyses of Bristol-Myers Squibb have stated how this company is a company that an investor should invest their money in. The company's stock prices have risen over the past few days. TheStreet, an investment website, encouraged their follows to buy this stock. The release of their fourth quarter earnings helped boost their rating in investor's eyes. CEO, Lamberto Andreotti, sold a good portion of his stock last week, which exemplified how much the price of the stock has increased. Bristol-Myers Squibb has been outperforming S&P 500 and the period of growth. Bristol-Myers Squibb has been performing well showing that their stock will perform well over the next weeks. Their stock market performance over this week can be viewed in Figure 5.24 [15] [11].



Figure 5.24 Week 8 BMY Stock Price

Course of Action: This investor allowed the previously purchased stocks to grow because they were all increasing in value throughout the week and was able to buy another stock to strengthen their portfolio. The list of transactions can be seen below on Table 5.5.

Date	Symbol	buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
02/17/14	BMY	Buy	\$53.80	300	\$16,140.00		\$4,342.00	

Table 5.5 Week 8 Transaction Record (Includes \$10 commission fee per trade)

5.2.9 Week 9: 02/24/14-02/28/14

Market Overview:

Huntington Ingalls: Huntington Ingalls had an impressive week in the stock market. This is due to the report of their fourth quarter earnings. Their profit increased from 82%, from 50 million to 91 million. Mike Petters, Huntington Ingalls's president and CEO said, "As HII's three-year anniversary approaches, I am pleased with the operational improvements achieved by our team and the resulting financial performance." The performance of Huntington Ingalls as well as the confident statement of the CEO has helped the stock grow steadily this week, which can be seen on Figure 5.25 [61].

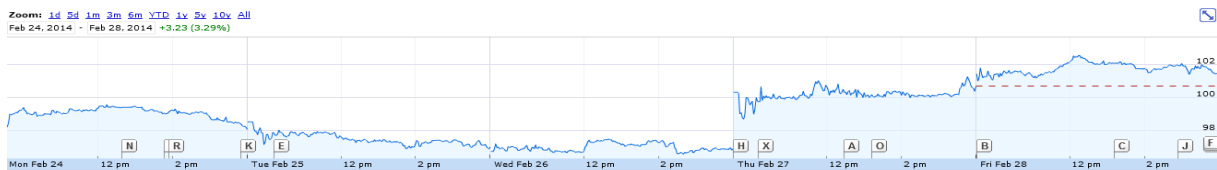


Figure 5.25 Week 9 HII Stock Price

Solarwinds: SolarWinds had a pretty successful week. Several investment groups speculated that it is due to the CEO Kevin B. Thompson selling \$50,000 of his stock. This transaction was disclosed and immediately it affected the stock values. Deutsche Bank analysts raised the price of the stock, and Needham & Company raised the price target of SolarWinds as well as analysts at Jefferies. Since the analysts were confident in the stock, it caused the value of the stock to increase. This can be seen on Figure 5.26 [47].



Figure 5.26 Week 9 SWI Stock Price

Anika Therapeutics: The value of Anika Therapeutic’s stock skyrocketed this week. The increase in stock value was due to the FDA giving marketing approval to the drug Monovisc which, is for osteoarthritis of the knee. This drug will be marketed by a subsidiary of Johnson and Johnson. Sean Williams of Motley Fool, an investment advice contributor, stated that many investors might have “overshot what Anika is really capable of,” After reading that advice along with this investor’s experience in investing in pharmaceutical companies it was best to sell the stock mid-week. As one can see in Figure 5.27 this seemed to be the smart decision [15].



Figure 5.27 Week 9 ANIK Stock Price

THL Credit: With the release of THL Credit’s fourth quarter earnings next week, this investor felt it was important to keep the stock to continue monitoring its performance. Investors have been posting articles of anticipation for their quarterly release. BDC Buzz from Seeking Alpha, an investment group ranked THL Credit third on their rankings. Their stock has had a small increase this week, which can be seen on Figure 5.28 [47].



Figure 5.28 Week 9 TCRD Stock Price

Bristol-Myers Squibb: This week Bristol-Myers Squibb received some very exciting news. Their drug, Myalept is used to help people who are born with little to no fat tissue was approved to as the first drug to treat the condition. Their stock fell a small portion which, can be seen in Figure

5.29, but this investor remains optimistic. If their drug is this revolutionary, then their stocks are sure to soar [14].

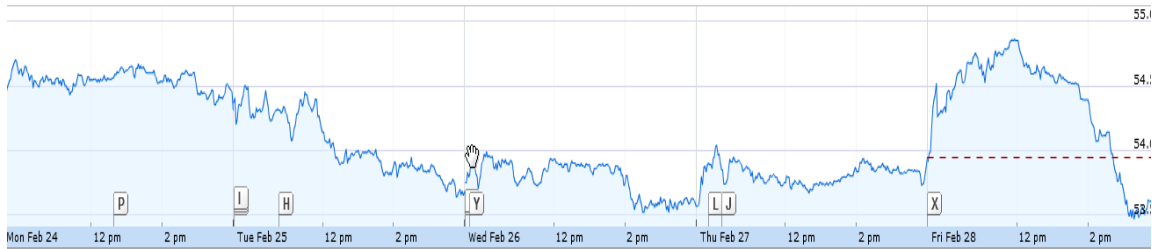


Figure 5.29 Week 9 BMJ Stock Price

Course of Action: All the stock in Anika Therapeutic was sold mid-way through the week and the rest of the stocks were kept in order to see how they perform in the final week. The transactions can be seen below on Table 5.6.

Date	Symbol	buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
02/26/14	ANIK	Sell	\$52.02	500	\$15,307.00	\$10,703	\$30,352.00	\$23,153

Table 5.6 Week 9 Transaction Record (Includes \$10 commission fee per trade)

5.2.10 Week 10: 03/03/14-03/07/14

Market Overview:

Huntington Ingalls: Over the past week, news of Huntington Ingalls selling their dividends this week. Zacks Investment Research is reporting that in 2014 Huntington Ingalls is estimated to have a 24.3% increase in revenue, which is over double the industry average. Since the company was growing, this investor waited until the last day of the simulation to sell the stock, in order to accrue as much profit as possible. As shown below on Figure 5.30, the information about the company's expected profits seemed to please investors, since the value of the stock has increased over the past week [51].

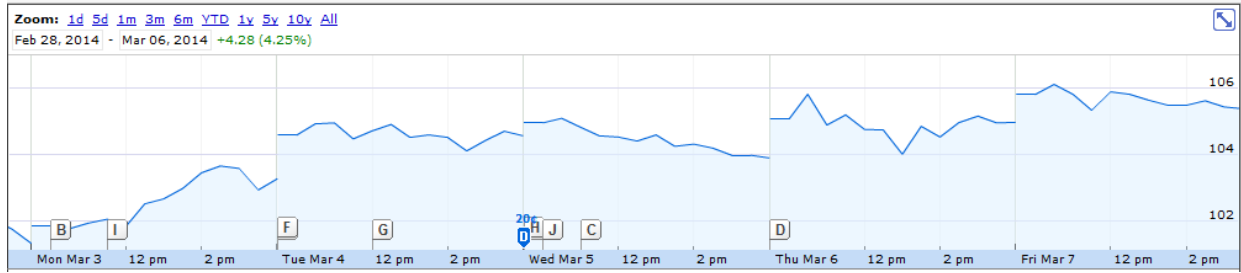


Figure 5.30 Week 10 HII Stock Price

Solarwinds: On the 5th of March, Solarwinds improved its Network Performance Monitor. As a creator of affordable IT management software, this seemed to be an incredible advancement. Solarwinds is one of the few companies that offer this level of improvement at a low cost. This investor decided to sell the stock the following day, in order to ensure the profit was maximized. As one can see on Figure 5.31 below, March 6th was the day the most profit could be made [43].



Figure 5.31 Week 10 SWI Stock Price

THL Credit: THL Credit had not been earning much money during the course of the simulation. This investor made the decision that the stock should be sold at the beginning of the week in order to earn a small profit. As shown below in Figure 5.32 this was a smart decision because the stock plummeted in the second half of the week.



Figure 5.32 Week 10 TRCD Stock Price

Bristol-Myers Squibb: There was not much in the news about Bristol-Myers Squibb this week. However, this investor noticed the price of the stock increasing until mid-week. Then, the stocks were sold in case the stock value was to decrease. One can see, the upward trend for the week on Figure 5.33 below.



Figure 5.33 Week 10 BMY Stock Price

Course of Action: All four stocks were sold at various times in the week in order to great profit. TCRD was sold at the beginning of the week. BMY was sold in the middle of the week. SWI and HII were sold at the end of the week. The profits made over this week can be seen below on Table 5.7.

Date	Symbol	buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
03/03/14	TCRD	Sell	\$15.88	1,000	\$15,880.00	\$450	\$46,253.00	\$450
03/05/14	BMY	Sell	\$56.96	300	\$17,088.00	\$948	\$63,340.00	\$1,398
03/06/14	SWI	Sell	\$52.60	1,000	\$52,600.00	\$10,140	\$115,940.00	\$11,538
03/07/14	HII	Sell	\$105.87	200	\$21,174.00	\$2,423	\$137,114.00	\$13,961

Table 5.7 Week 10 Transaction Record (Includes \$10 commission fee per trade)

5.3 Results and Discussion

When the ten week simulation came to a close, this investor was able to make \$37,114 in profit. Galena Biopharma was the most successful stock in this portfolio earning \$12,800. Solarwinds and Anika Therapeutics also made a substantial profit earning \$10,140 and \$10,703 respectively. All of these three stocks are technology based stocks, two of which were biopharmaceutical companies. That being said, Navidea Biopharmaceuticals, a technology based

company, was the only stock that was purchased that lost money. The investor had several other types of stock such as defense contracting with Huntington Ingalls and a banking stock with THL Credit. The values of those two stocks did not fluctuate much during the simulation, but they did not accrue much money. In this investor's opinion, the technology stocks that appear in the news are risky investments, but are worth the reward.

Even though this investor used the trading the news strategy, several modifications to the strategy were made to improve it. As the project progressed, it became evident that stocks needed to be held on to if there was to be a greater return off the initial investment. Galena Biopharma had been losing money for several weeks, however the stock was not sold because with the vaccine being released, this investor knew that a profit could be made. This is the reason for many weeks there was little trading because most of the news was to observe the stocks and make sure they were not losing any money.

Also, past experience was used with Anika Therapeutics. It is a very similar company to Galena Biopharma. When the stock was first purchased it was not earning much of a profit, which was similar to Galena. As a result, this investor keep Anika in hopes that that past experience coupled with some positive stories in the news about Anika would make a large return off the investment.

Although the 37.1% return on investment seemed to be a good return off the initial investment this investor feels as though there were several things that could have been done in order to maximize profits. Trading the news was a beneficial strategy, but there were things that could have been utilized in order to make the strategy more efficient. News alerts, on websites such as Google News, were not used. If they were used, this investor would not have to keep checking the news periodically and would have been on top of every stock, thus knowing the

perfect time to trade. Several times, the stock price would change because something had happened in the news and this investor would not catch it until it was too late.

Another idea that was discussed between the investors in the project group was the use of twitter for this investment strategy. Twitter, if used properly, could have provided the most up to the date information if the investor followed the right companies. Over the first couple weeks this method was attempted, but no important information was collected so it was quickly discarded. If companies were selected that reported a lot of news on social media it might have been incorporated in the strategy because it would have been more beneficial.

Some modifications may not have been applied, but overall a great deal of information was found out about the stock market. The most important factor to this strategies' success over the ten week simulation was that it was flexible when the investor could trade their stock. It didn't call for the stocks to be sold every so often, allowing for them to grow. At the same time, the stocks could be sold if they were not earning a profit, like Navidea Biopharmaceuticals, which decreased in value by three hundred and fifty dollars. Being able to couple knowledge and intuition into the strategy was critical to its success.

6 Growth Investing

6.1 Introduction

Growth investing is defined as increasing one's wealth through long- or short-term capital appreciation. Stocks are purchased at a premium price, held for several years as earnings grow and as a result make a large return on the initial investment. The growth strategy is used by investors who seek out stocks that they deem have serious potential growth in the future. A good company to invest in has expected earnings that grow at an above-average rate compared to its industry and market.

Many investors are fond of growth investing because hindsight is required to determine those successful growth stocks. IBM, Xerox, and Google are already successful growth stocks. Their stock prices have appreciated and they command high stock prices today because the market expects these stocks to continue to grow in the future.

The risk involved in growth investing is determining what stocks are growth stocks and what ones are not. There are several factors to consider when evaluating investment growth. Growth investors research a company's return of equity (ROE), earning per share (EPS), and projected earnings before investing in a company for a long duration of time.

Return of Equity (ROE), is a mathematical equation expressing how efficiently a corporation can make a profit. A company ROE is the ratio between the company's net income divided by the total equity of shareholders. The ROE symbolizes the company's ability to generate profit given the shareholders equity. The ROE is particularly important when comparing companies within the same industry.

Earning per share, EPS, or P/E ratio is a mathematical expression that is the net income divided by the number of outstanding shares. The EPS is the most popular method used to gauge

the profitability of a company. Growth investors typically seek out companies that have increasing earnings per share (EPS). This typically suggests that a company is succeeding; however, one needs to conduct further research to ensure that the EPS is a result from legitimate business deals.

The table below (Table 6.1) shows the stock price appreciation of 9 stocks whose earnings grew substantially from 1962-1972 and the same data for 9 well-known stocks that were sustained over the same period.

Company	1962 Price (\$)	1972 Price (\$)	EPS Growth (%)	1962-72 Return (%)
Marriott Corporation	2	35	19.5	33.5
Johnson&Johnson	8	131	20.7	32.8
Xerox Corporation	11	149	27.5	31.4
Delta Air Lines	5	65	16.0	30.5
Coca-Cola Company	21	149	14.0	23.7
Eastmen Kodak Company	26	148	14.1	20.9
IBM	81	322	14.6	16.2
Minnesota Mining & Mfg.	27	86	10.2	14.0
Avon Products	15	137	17.1	26.9
Average			17.08%	25.5%

Table 6.1 Performance of 10 Successful Growth Stocks 1962-1972

Company	1962 Price (\$)	1972 Price (\$)	EPS Growth (%)	1962-72 Return (%)
Ford Motor Company	45	80	4.1	9.8
General Motors Corporation	58	81	-9.9	9.8
Scott Paper Company	33	15	-2.5	-3.4
Kaiser Aluminum & Chemical	35	18	-2.7	-3.2
Bethlehem Steel Corp.	29	29	2.8	5.6
Penn-Dixie Industries	15	9	-8.9	-0.7
Reynolds Metals Company	24	16	-9.5	0.0
Falstaff Brewing Corp.	15	5	-19.9	-5.8
Marquette Cement Mfg.	37	11	-23.5	-8.6
Average			-7.78%	.39%

Table 6.2 Performance of 10 Nongrowth Stocks 1962-1972

The growth stocks, Table 6.1, returned an average of 25.5 percent per year compared to 0.39 percent per year from non-growth stocks, Table 6.2. A successful growth company will

typically have an ROE around 17% and a return around 25%. Even though Ford Motor Company is a successful company today, their growth rate from 1962-1972 was only 4.1%, so a growth investor would not receive a large profit over these ten years. The most important factor in growth investing is to not necessarily to invest in well-known companies. Rather, a growth investor should determine if a product the given company provides to their consumers would grow at an above average rate in the next decade.

There are several others factors in determining whether a company is an ideal growth company. The following list shows other characteristics of a company that should be looked at in addition to the statistical analysis.

1. Management skill

- a. Is the management of the company known for its outstanding professional management ability?

2. Product sales growth

- a. Are the products of the company growing in unit sales at a high rate? Is this rate of demand growth likely to continue in the future?

3. Product pricing

- a. Does the company dominate the markets it serves so that it can raise prices when necessary? Or is the company a small factor in its key markets, dependent on other to set the pace?

4. High sustainable growth

- a. Can the company finance its own growth at a satisfactory rate?

In determining which companies could potentially be ideal growth companies this investor looked at the companies EPS and ROE from 2011-2013. In addition, this investor looked at the stock history since this company went public. When looking at this graph this investor wants to see if the company is reaching new and higher peaks as the company continues to be traded on the market. Research on the company must be conducted to develop hindsight on the company's success in the future. Some factors that might lead an investor to believe this company has a high rate of growth in the future are branching out into different global markets and acquiring companies in the near future. Overall, if this investor found any information that lead them to believe this company was going to have an above average growth in the future this investor would invest in this company.

6.2 Company Analysis

This investor has invested a total of \$99,396.11 in a total of six different companies whom this investor deemed to be high earning growth stocks. Throughout the duration of this experiment, this investor needed to monitor their portfolio value. This investor did the necessary research to determine that all these companies have important characteristics that make them excellent companies for a high gross return in the future. Throughout this simulation, this investor needed to ensure that throughout this experiment all business practices were ethical. If this investor finds at any time that a company they invested in is taking part in unethical business practices this investor will immediately sell their shares. However, before investing in these companies this investor did a significant amount of research to ensure that unethical business practices were unlikely.

At any point if a company's stock value dramatically decreases and all business practices are ethical this investor will continue to hold their shares in this company.

iRobot Corporation (IRBT)

iRobot Corporation designs and builds practical robots. iRobot was founded in 1990 by roboticists from Massachusetts Institute of Technology.

One of the many robots iRobot designs and manufactures are home robots that revolutionize the way people clean. More than 10 million home robots have been sold worldwide. The most popular product is the iRobot Roomba, which is a vacuum cleaning robot. iRobot also designs and builds combat-proven defense and security robots to support troops and public safety professionals. More than 5,000 have been distributed worldwide.

In 2012, iRobot generated \$436 million in revenue and employed more than 500 people. Corporate headquarters are located in Bedford, Massachusetts, but offices are also located in California, United Kingdom, and Hong Kong.

iRobot Corporation (IRBT) provides a unique product to the market, thus the ROE was not taken into series consideration. According to Table 6.3, the EPS for IRBT dropped severely in 2012, but in 2013 the EPS was restored. After viewing Figure 6.1, the general trend for IRBT since this company went public, has been a positive increase. Given all these factors this investor decided to purchase 780 shares totaling \$25,032.40.

Stat/ Ratio	2013	2012	2011
Earnings Per Share (EPS)	0.28	0.02	0.27
Return on average equity (ROE)	9.06%	6.63%	19.30%

Table 6.3 Key stats and ratios for IRBT



Figure 6.1 History IRBT 2005-2013

FuelCell Energy Inc (FCEL)

FuelCell Energy Inc is a leading global fuel cell company that designs, manufactures, sells, installs, operates, and services stationary fuel cells. This company uses a wide range of fuels to produce electricity electrochemically without combustion, thus the process is silent and produces little pollution. Their fuel cells are used to power electric utilities, commercial and industrial companies, universities, municipalities, and government entities. FuelCell Energy world headquarters are located in Danbury, Connecticut. In June 2011, the company acquired German subsidiary FuelCell Energy Solutions, GmbH to service customers in Europe. In addition, customers in Asia may inquire through partner company POSCO Energy. On October 31, 2013 FCEL revealed that its total revenue increased 56%.

Currently, FuelCell Energy Inc is researching hydrogen generation and carbon capture in addition to solid oxide fuel cells and hydrogen compression and storage. This investor decided to invest in FuelCell Energy Inc because even though, this company has a negative ROE and EPS, as exemplified in Table 6.4. In addition, the stock trend appears to be at a plateau, Figure 6.2, but the research this company is currently conducting shows promise of success in the future. Overall, this is a risky investment with the possibility of a large profit margin in the future. This investor purchased 20,000 shares of FCEL totaling 27,410.00.

Stat/ Ratio	2013	2012	2011
Earnings Per Share (EPS)	-0.2	-0.23	-0.47
Return on average equity (ROE)	-3,582.1%	-	-

Table 6.4 Key stats and ratios for FCEL



Figure 6.2 History FCEL 1993-2013

Craft Brew Alliance (BREW)

Analysts predict that small microbreweries stock values will increase over 20% in the next 5 years. See the Figure 6.3 below for a synopsis of stock performance for many popular breweries.

Name	Price	52-Week Range	Mkt Cap (mil) USD	Revenue (mil) FY 1 USD	Net Income (mil) FY 1 USD	EPS FY 1 USD	EPS Est Growth % Mean 5 Yr	Div Yield % TTM
Anheuser-Busch InBev (BUD)	92.52	64.99 - 101.86	147,695.9	39,758.0	7,243	4.45	12.0	2.05
United Breweries (CCU)	26.75	24.112 - 34.95	4,247.2	2,246.6	239	0.60	7.0	1.76
Boston Beer Co. (SAM)	153.01	97.66 - 172.05	1,967.0	580.0	59	4.39	18.4	N/A
Craft Brew Alliance (BREW)	7.50	5.62 - 8.92	143.3	169.0	2	0.13	20.0	N/A
Molson Coors (TAP)	49.45	37.96 - 53.35	9,022.6	3,916.0	443	2.44	5.9	2.59

Figure 6.3 Stock Performance of Various Breweries

The company currently dominating the market is Anheuser-Busch InBev (BUD). Based in St. Louis, Anheuser-Busch is the leading American brewer, holding 47.6 percent share of U.S beer sales to retailers. The company brews eight of the world's 12 top selling beers. Their most popular being Budweiser and Bud Light. Currently, Anheuser-Busch operates 12 breweries across the United States. Anheuser-Busch is a wholly-owned subsidiary of Anheuser-Busch InBev, a leading global brewer [5]. Of all the Breweries listed BUD is the safest investment because BUD has the highest gross and net profit margins, which would provide a buffer during difficult economic times. BUD would not be the best growth company to invest in because Anheuser-Busch has already established itself as the lead global commercial brewer. So, an investor looking to make a large return on their investment would not want to invest in BUD.

Boston Beer Company, SAM, is America's leading brewer of craft beers. Producing over 30 distinctive award-winning styles of craft beer. Well known, for Sam Adams, Twisted Tea, and Angry Orchard. The brewery has won more awards in international beer tasting competitions in the last five years than any other craft beer brewery in the world [42]. During the 2009 recession, SAM plunged 62% while BUD retreated a mere 36%. When the market came back however SAM climbed 711% (Martin, Rudy 5 Beer Stocks brewing up gains in a down draft). SAM is currently trading at the highest market value compared to other breweries, so an investor looking to make a large return would most make a significant profit. In addition, during an economic recession the value of SAM plunges as exemplified in 2009. So, investing in Boston Brew Company is a risky investment with the probability of very little return.

The Craft Brew Alliance, BREW, is a partnership among three craft beer brands including Wildmer Brothers Brewing, Redhook, and Kona Brewing. Each brand executes different strategies, but shares the same capability, knowledge, and passion (Craftbrewalliance.com).

Widmer Brother Brewing was founded in 1984 in Portland Oregon and is most noted for their unique and unconventional twist on traditional styles. For example, their MarionBerry Hibiscus Gose is a traditional cloudy German style wheat beer that contains Oregon-grown marionberries as well as dried hibiscus flowers [58].

Redhook began in Seattle in 1981. Redhook is one of the countries first craft breweries. Some of Redhook's common brews include Redhook ESB, Long Hammer IPA, Pilsner, Copper Hook, and several seasonal offerings. Redhook distributes its products through the Craft Brew Alliance Inc and has a distribution agreement with Anheuser-Busch InBev, which owns 32% of the stock in Craft Brew Alliance. Redhook is currently distributed in 48 states [39].

Kona Brewing was founded in 1994 in Hawaii. Their objective is to produce local island brews with spirit, passion, and quality. Kona brews 13 different styles of beer. The most popular brews being Big Wave Golden Ale, Fire Rock Pale Ale, and Longboard Island Lager. Their beers are distributed in 36 states and 9 countries abroad [35].

This investor choose to invest in the Craft Beer Alliance because this company is a partnership of three different microbreweries located all over the country that each offer a unique product and a strong emphasis on quality. These three brands joining forces allows them to satisfy more consumers and offer a broader range of distinct craft beers than any other brewery. In addition, since Anheuser-Busch Inbev owns a major portion of this alliance and is responsible for its distribution, which exemplifies that their product can be successfully distributed throughout the country. Investing in BREW is somewhat of a risky investment since it is small, relatively new company that has not been on the market during an economic regression. According to Table 6.5 the EPS for BREW has been decreasing since 2011, but analysts predict over the next five years the EPS for BREW will grow over 20%. The dramatic increase in the ROE from 2012-2013

exemplifies that BREW has a high probability of growth in the future. In addition, after viewing Figure 6.4, since 2008 BREW has been steadily increasing and in 2013 BREW began to grow rapidly. Given all of these factors this investor purchased 500 shares totaling \$8,025.00.

Stat/ Ratio	2013	2012	2011
Earnings Per Share (EPS)	0.06	0.13	0.51
Return on average equity (ROE)	6.95%	2.38%	-

Table 6.5 Key stats and ratios for BREW



Figure 6.4 History BREW 2008-2014

Donaldson Company, Inc (DCI)

Donaldson Company, Inc is a Minneapolis-based company, which manufactures air filters for trucks, industrial equipment, mining equipment, and gas turbines. Donaldson is one of the largest and most successful filtration manufacturers in the world. A few big-name clients include Caterpillar and Deere.

According to Table 6.6, Donaldson Company has had a slight decrease in ROE and EPS from 2012-2013, but this investor still decided to invest in the Donaldson Company, Inc. According to Figure 6.5, the stock value for DCI has been steadily increasing since this company went public. Currently, Donaldson Company, Inc is building an additional manufacturing plant in

Mexico, which will support the strong demand for filters in Latin America. In addition, there are a number of gas turbine projects in the Middle East, China, and the United States. This international expansion will continue to drive sales outside the United States. Currently, 60% of all sales are from outside the United States.

Over the past five years Donaldson’s earnings have increased by 12%. Analysts predict that stocks will continue to rise by 13% per year over the next three to five years due to the demand of new and replacement filters [43]. This investor purchased 170 shares totaling 6,957.90.

Stat/ Ratio	2013	2012	2011
Earnings Per Share (EPS)	1.64	1.73	-
Return on average equity (ROE)	21.97%	24.80%	-

Table 6.6 Key stats and ratios for DCI

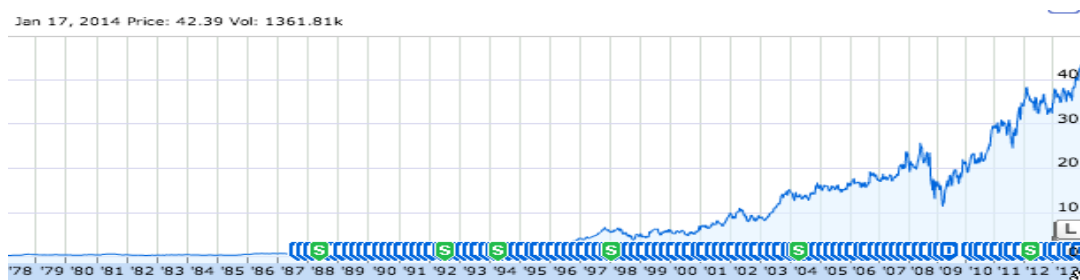


Figure 6.5 History DCI 1978-2014

McCormick & Company, Incorporated (MKC)

McCormick & Company, Incorporated is a fortune 1000 company that manufactures spices, herbs, and food flavorings for retail, commercial, and industrial markets. Today the company has approximately 8,000 employees and contains many brands located in the United States, Europe, and Canada.

Most people have at least some McCormick & Company products in their spice cabinet, which might signify that McCormick & Company is not a high growth company offering a large profit margin. However, according to Table 6.7 below the ROE has increased significantly over

the course of 2013 and the EPS has remained fairly constant since 2011. According to Figure 6.6 since this company has gone public in the 1970's they have had a general increasing stock trend. The main reason this investor purchased shares in McCormick & Company is because currently they are acquiring a Polish mustard company and more importantly a joint venture with a rice company in India. Overall, McCormick & Company is a successful growth company because they are expanding on the products they offer their customers in their venture into the rice industry. Due to this partnership, analysts anticipate an annual growth of 9%. Given all this information this investor purchased 100 shares totaling \$6,944.00.

Stat/ Ratio	2013	2012	2011
Earnings Per Share (EPS)	2.91	3.04	2.79
Return on average equity (ROE)	28.06%	21.52%	-

Table 6.7 Key stats and ratios for MKC

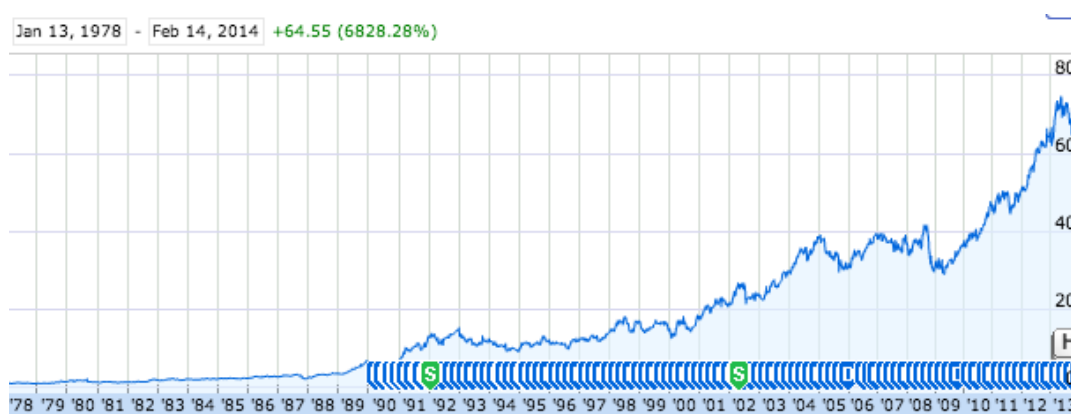


Figure 6.6 History MKC 1978-2014

Hyundai Motor Group HYMTF

The Hyundai Motor Group is a South Korean multinational automotive manufacturer. Hyundai Motor group is comprised of Hyundai Motor Company and 32.8% owned subsidiary Kia Motors. Hyundai Motor Group was founded in 1967. In 2008, Hyundai Motor Company was voted eighth largest automotive manufacturer and in 2012 was the fifth largest automotive manufacturer.

In 2012, the Company sold over 4.4 million vehicles and combined with Kia Motors sales equaled 7.12 million. Hyundai Motor Company employs approximately 100,000 people and their vehicles are sold in 193 countries in 6,000 dealerships.

Over the past few years, Hyundai has had an operating profit margin of approximately 10%, which is significantly higher than its global competitors, which include Ford, General Motors, Toyota, and Honda. Hyundai is also trading at a lower value than its competitors, which makes this a great investment for those looking to invest in the long-term [30].

As Table 6.8 points out, ROE and EPS information for 2012 and 2011 were unavailable, but for 2013 the high ROE suggests a good return for investors at 17.35%. Also, according to Figure 6.7, the stock trend has been increasing since 2003. Ultimately, this investor chose to invest in Hyundai because in the spring of 2015, Hyundai will begin selling its hydrogen fuel-cell electric Tucson crossover available only to citizens of California. In the state of California there will be nine hydrogen-refueling stations. Hyundai estimates each Tucson will be able to get 300 miles per hydrogen gas tank. Customers can lease one of these vehicles for 36-months for a price of \$2,999 down and \$499 a month, which includes unlimited hydrogen tanks [2]. Overall, Hyundai motor company has built up a positive image in the automotive industry with the reliability of their cars and in the future this company will continue to grow as they venture into alternative ways to fuel their vehicles, which will be offered to their customers at a fair price. Given this information this investor purchased 481 shares totaling \$25,026.81.

Stat/ Ratio	2013	2012	2011
Earnings Per Share (EPS)	0.31	-	-
Return on average equity (ROE)	17.35%	-	-

Table 6.8 Key stats and ratios for HYMTF



Figure 6.7 History HYMTF 2003-2014

6.3 Results and Discussion

On March 7th, this investor sold all of their stocks, since the stock market simulation had ended. This investor made of profit of \$57,238.29, which is a 57.59% gain since their initial investment.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
12/02/13							100,000	
12/02/14	IRBT	Buy	32.08	780	\$25,032.40		74,967.60	
12/02/13	FCEL	Buy	1.37	20,000	\$27,410.00		47,557.60	
12/9/13	BREW	Buy	16.03	500	\$8,025.00		39,532.60	
01/27/14	HYMTF	Buy	52.01	481	\$25,026.81		14,505.79	
01/27/14	DCI	Buy	40.87	170	\$6,957.90		7,547.89	
01/27/14	MKC	Buy	69.34	100	\$6,944.00		603.89	

Table 6.9 Purchase Summary (Includes \$10 commission fee per trade)

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
03/07/14	IRBT	Sell	43.35	780	\$33,813.00	8,780.6	34,416.89	8,780.6
03/07/14	FCEL	Sell	3.53	20,000	\$70,600.00	43,190.0	105,016.60	51,970.6
03/07/14	BREW	Sell	15.97	500	\$7,975.00	(50.00)	112,991.60	51,920.6
03/07/14	HYMTF	Sell	62.80	481	\$30,206.80	5,180.0	143,198.40	57,100.6
03/07/14	DCI	Sell	43.18	170	\$7,340.60	382.7	150,539.00	57,483.3
03/07/14	MKC	Sell	66.99	100	\$6,699.00	(245.00)	151,238.00	57,238.29

Table 6.10 Sell Summary (Includes \$10 commission fee per trade)

The most successful stock this investor chose to invest in was FCEL. During the last week of the simulation, FCEL's stock value increased by 18.06% and since this investor invested a majority of their portfolio in FCEL, they were able to make a 157.7% return off their initial investment. FuelCell Energy Inc sells fuel cells that demand a high price, typically in the millions of dollars. So, when FuelCell Energy Inc sells their product they acquire a long-term customer, thus their stock value will jump drastically and will be sustained over a long period of time. This is the reason for the jump that occurred during the last week of the simulation.

The only stocks that this investor lost a small amount of money on were BREW and MKC however, if this simulation were to continue, this investor believes they would see a large return on FCEL and MKC. Overall, the key to successful growth investing is not just looking at statistical data; rather, an investor needs to do research on the company to determine if they are going to be doing something profitable in the future. The most important factor is to ensure that a company has ethical business practices because that is how many growth investors lose a majority of their profile.

Growth investing is a high risk and high return form of investing. To make the largest profit, a growth investor should not invest in stocks that are widely publicized. For example, at the start of this simulation Tesla was widely publicized among many stock market analysts. However, this investor chose to invest in Hyundai instead. Hyundai has a great reputation and is debuting a fuelcell-powered car in 2015. This investor was able to buy Hyundai Motor Companies stock cheap and then wait for the large spike. Whereas, the cost for Tesla was already commanding a high market value, over \$200.00 a share, so there was little room for growth in this 10-week simulation. In addition, this investor used their knowledge of Chemical Engineering to determine that investing in an all-electric car is not as environmentally friendly as people think. Since

electricity must be generated, which produces a fair amount of pollution. In a fuel cell powered car pure hydrogen is extracted from natural gas and there is little to no pollution while the car operates. Based off their knowledge and research, this investor predicted that once Hyundai and other motor companies introduce their fuel cell powered cars onto the market the value of Tesla will plummet.

There are two major strategies to utilize when investing in the stock market over a long-duration of time. The two approaches are the “growth-oriented” and “value-oriented”. A growth-oriented investor seeks out companies, which have earnings that are going to rapidly increase each year. Investors who are value-oriented are less focused on the rapid growth of a company, but instead on the stock value that appears to be a bargain. Both of these strategies have been proven to be effective in investing in the stock market. Growth investors can make a tremendous return by determining companies that are going to experience exponential growth. Similarly, a value investor can identify a company that either has just started being traded publically or has had a minor setback, thus purchasing shares at a discounted price.

The major risk with a growth-oriented approach is that investors can find themselves paying top dollar for companies that could end up not growing at the rate anticipated, which can result in a major loss in the initial investment. Similarly, the major-risk with value investing is that a stock might seem like a bargain, but the stock could potentially continue to decrease and could be permanent. Fortunately, during the course of this simulation, this investor did not run into this problem.

This investor began the simulation using strictly a growth-oriented approach, however over the course of this simulation this investor ended up using a strategy that blends both growth and value investing. This strategy is called growth-at-a-reasonable-price (GARP). This method offers

security with the risks associated with growth and value investing. As seen in table 6.10, this investor invested in both growth companies that came with a high stock value and value companies, which appeared to be good deals.

Growth Stocks	Value Stocks
DCI	FCEL
MKC	BREW
HYMTF	IRBT

Table 6.11 Growth and Value Companies

An example, of how this investor used the GARP strategy was when this investor wanted to purchase stocks in Hyundai during Week 1. However, in December the value of HYMTF was \$60.00. This investor determined that its price was too expensive, so they would wait until the price went down. Eventually, at the end of January the Hyundai stock value hit a low at \$52.01. At this price this investor felt this stock was a bargain and had the promise of strong growth in the future.

The major benefit of investing in the long-term is that it is much easier to predict what will cause a company's stock to go up or down. In looking at the history of companies being traded on the stock market, in the long run the stock market value increases as companies continue to establish themselves as well as national and global economies continue to grow.

The challenge in growth investing is determining which companies will offer large returns in the future. Ultimately, this investor looked for companies that had a combination of high quality standards with promise of economic growth. The most important factors to consider when evaluating a company are if a company has a high degree of pricing power. As a long-term investor, you want to invest in companies that are the price setters not matchers. Secondly, a company that requires a high degree of repeat revenues also shows promise of being a growth company. In this case this investor invested in Donaldson Company, Inc, which the market leaders in air filters and also requires repeat customers as air filters need replacing.

Patience is a prerequisite for any long-term investor. In this beginning of this simulation this investor invested \$25,032.40 in iRobot IRBT. All the necessary research was conducted and this company was considered to offer a large return in the future. However, at the beginning of this simulation, this investor lost \$680.80 and over the subsequent weeks made an insignificant profit. However, during week ten IRBT made a profit of 9,740.00 or 38.91% overall return. Throughout this simulation this investor continually questioned whether iRobot was a good company to invest in, but this investor remained confident in their research.

Overall, the most important aspect of long-term investing is the ability to be patient. Sometimes an investor can purchase a stock at the wrong time for example after the stock is purchased the value plummets. However, a growth investor needs to remember that a stock might go down after it is purchased, but given time and a significant amount of research it will ultimately increase thus creating a large profit. In the long run, a company's stock price will increase if the earning of the company increase.

7 Analysis

7.1 Analysis of strategies

Throughout the ten-week simulation four strategies were executed. The weekly portfolio values for each strategy were plotted and analyzed as shown below, Figure 7.1.

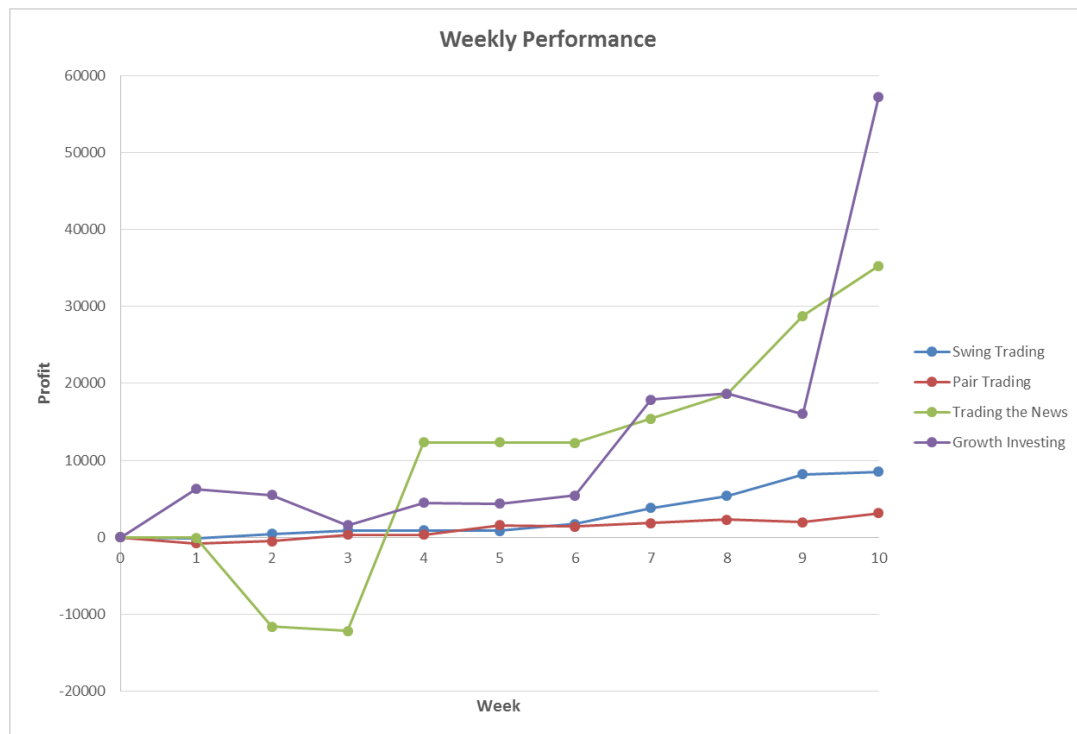


Figure 7.1 Portfolio Values for Four Strategies

According to the graph, four of the strategies emerged into two separate trends based on their portfolio values. Swing trading and pair trading did not seem to fluctuate much. Instead, there was a constant steady increase. Trading the news and growth investing had varying trends that gained and lost money drastically throughout the weeks.

These investors speculated that the reason for this occurrence was due to the amount of trading. Swing and pair trading are extremely technical strategies that require a lot of weekly

transactions. However, trading the news and growth investing are not trading intensive strategies. The amount of trading can result in a strategy being a short-term strategy or a long-term strategy. Short-term strategies demand rigorous trading and long-term strategies do not. This concept of these two different trends was explored further in order to advance the understanding of the stock market and the four strategies.

7.2 Comparing Swing Trading and Pair Trading

Swing trading and pair trading share many common features. The most obvious one is that they are short-term investments based on technical analysis. Due to the nature of these strategies, swing traders and pair traders would buy and hold on to a stock from several days to two or three weeks. Therefore, both of these strategies require traders to continually watch their stocks and frequently conduct transactions, which provides traders more control over their stocks. Because the performance of these two strategies depends solely on the statistics and technical analysis, swing traders and pair traders could achieve steady profit despite the status of the economy.

Another common feature of swing trading and pair trading is that both of these strategies do not require extensive research before making a trade. Technical analysis is typically independent of financial performance, so swing traders and pair traders are able to trade any stock without fully knowing about the company's economic status as long as an appropriate trend or signals appear. As a result, they could make quick money if they execute their trades properly.

However, even though there are similarities, swing trading and pair trading are quite different. One of the main differences is that a swing trader would look at several technical tools such as volume, simple moving averages, and candlestick charts whereas a pair trader uses only price ratio charts. Because the two strategies require different technical tools, the trading of each strategy is different.

Since pair trading and swing trading have different trading approaches, the risk for each strategy is different. As demonstrated in the chapter four, the pair trader simultaneously traded two historically highly correlated stocks. Manipulating a pair of stocks by this approach, the pair trader could hedge against the risk by summing up the profit from one stock and the loss by the other. Therefore, pair traders usually do not expect considerable decline in their portfolio. On the other end of the spectrum, swing traders buy low and sell high at the entry and exit signals depicted by technical analysis. Unlike pair traders, swing traders will only pay attention to the entry and exit signals. Thus, this allows the swing trader to focus on the important price points in the stock market. Since, these entry and exit signals are not foolproof and there is no way of hedging against risk, it makes swing trading riskier than pair trading.

As with all investing, there are different returns associated with different risks. Since pair trading is less risky than swing trading, the return for pair trading is less than the return of swing trading.

7.3 Comparing Trading the News and Growth Investing

Trading the news and growth trading are similar strategies because they both require extensive research on the socio-economic status of each company to determine if it is a solid investment. News articles were utilized for both strategies to determine companies that will yield a large return off of the initial investment. Due to the reliance on news articles, growth and trading the news investors hold onto their stock over a relatively long duration of time.

Both strategies are great for students just out of college or people in the workforce who do not have time to devote to buying and trading stocks daily. These methods are very simple and do not require technical mathematical equations to try and predict how a stock will perform. Rather, these strategies require simple reliable research and infrequent monitoring.

The major difference between these two strategies is the duration of time. A growth investor seeks out stock that will earn them a large profit in the next ten to fifteen years whereas an investor trading the news looks for any rapid increase in stock value. Another difference is a growth investor looks for specific qualities in a company to help determine if in the future this company will be categorized as a growth company. Some characteristics of a growth company include: outstanding professional management ability, high product sales growth, market dominance, and products serving long-term customers. An investor trading the news will invest in a company when the companies' accomplishments begin to trend on the Internet. Then, once the company begins to lose popularity the investor will sell their stock. Certain news articles make this decision easier for the investor. If a lot of good press comes out about a company, then the investor is more inclined to purchase said stock. If the company is doing something that makes the news in a negative way, the investor quickly sells.

Growth investing is a very useful strategy for recent college graduates beginning to save for retirement and it is also a good strategy for people who don't want a labor-intensive portfolio. All growth investing requires is a little research and lot of patience and hopefully an investor can make a large return. Trading the news requires a little more attention to the stock market than growth investing. This also means it can be used more in the short term. If an investor wants to see a return on investment relatively quickly then trading the news might be a good idea. That way the investor can watch a news story unfold about a company and invest in that company accordingly.

Growth investing and trading the news are much riskier investments compared to swing trading and pair trading. These strategies do not have complex methods to ensure that the portfolio will not lose value and it was not mathematically based. Instead of relying on formulas, these strategies are very dependent upon the economy at the time. When the economy fluctuates, the

value of the portfolio could drastically change. During the simulation, the economy was relatively stable. This is what helped these two investors make a larger profit. The portfolios could have been much less successful if the economy was bullish. The two strategies' reliance on the economy makes the strategies riskier. However, in this simulation growth investing and trading the news were able to make a significantly larger return off of their initial profit. This experiment supports the notion that an investor can make a larger return off of a riskier investment.

8 Conclusion

At the conclusion of this simulation, a few interesting details became apparent to the investors. First, the investors realized that each strategy seemed to be coherent with the personality of that investor. Two of the investors in the group preferred technical analysis, so they gravitated towards swing trading and pair trading, since these strategies are highly dependent on statistics. The other two investors' were more interested in the "big-picture", which made them more inclined to choose a research based approach, such as trading the news and growth investing. When it comes to investing in the stock market there are many options an investor can utilize. The best method for one to invest in the stock market is a method that the investor feels they will be able to use effectively.

One of the other factors that the investors determined to help an investor pick a strategy was the amount of time that one was willing to commit to their portfolio. If an investor has a lot of time to commit to investing, a more labor-intensive strategy, such as swing investing, can be utilized. The amount of money needed to invest is another aspect when deciding upon a strategy. An investor who has more money and is willing to wait a long duration of time to make a profit might choose growth investing, since it is a long-term strategy. In addition, interest in the economy can influence choosing a specific strategy. Since the economy affects the stock price, investing in riskier stocks should be dependent on the state of the economy. These factors are important to consider because the best strategy to choose when investing is one that suits the investor.

References

1. 17 Triple A Stocks to Buy. (n.d.). *InvestorPlace RSS*. Retrieved April 6, 2014, from <http://investorplace.com/2014/01/17-triple-a-stocks-to-buy-acet-ael-anik-br-dl-evac-feng-fss-hii-prx-qcor-qihu-sfun-snts-stz-ubnt-yy-3/>
2. 2015 Hyundai Tucson Fuel Cell | Hydrogen-Powered Vehicle | Hyundai. (n.d.). *2015 Hyundai Tucson Fuel Cell | Hydrogen-Powered Vehicle | Hyundai*. Retrieved April 11, 2014, from <https://www.hyundaiusa.com/tucsonfuelcell/>
3. 3 Capital Markets Stocks to Buy Now. (n.d.). *InvestorPlace RSS*. Retrieved April 6, 2014, from <http://investorplace.com/2014/02/3-capital-markets-stocks-to-buy-now-lm-terd-arcc/#.UwEuek2x670>
4. 5 Best Sectors to Watch This Week. (n.d.). *InvestorPlace RSS*. Retrieved April 6, 2014, from <http://investorplace.com/2014/01/5-best-sectors-to-watch-this-week-vips-away-ostk-gent-lgnd-insy-mga-vc-dw-hii-atk-ba-sb-dac-nm/#.Uu6nhE2x670>
5. Analyzing Chart Patterns: Triangles. (n.d.). *Investopedia*. Retrieved April 6, 2014, from <http://www.investopedia.com/university/charts/charts5.asp>
6. Anheuser-Busch.com | Homepage. (n.d.). *AnheuserBuschcom Home Comments*. Retrieved April 6, 2014, from <http://www.anheuser-busch.com/>
7. Anika Therapeutics Announces Date of Fourth-Quarter and Year-End 2013 Financial Results Conference Call. (n.d.). *MarketWatch*. Retrieved April 6, 2014, from <http://www.marketwatch.com/story/anika-therapeutics-announces-date-of-fourth-quarter-and-year-end-2013-financial-results-conference-call-2014-02-12>
8. BAC Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=BAC+Profile>

9. Biotech Top Gainers – Cambrex Corporation (NYSE:CBM), Anika Therapeutics, Inc. (NASDAQ:ANIK), BIND Therapeutics Inc (NASDAQ:BIND), Oncomed Pharmaceuticals Inc (NASDAQ:OMED) | Gaining Green. (n.d.). *Gaining Green Biotech Top Gainers Cambrex Corporation NYSECBM Anika Therapeutics Inc NASDAQANIK BIND Therapeutics Inc NASDAQBIND Oncomed Pharmaceuticals Inc NASDAQOMED Comments*. Retrieved April 6, 2014, from <http://www.gaininggreen.com/biotech-top-gainers-cambrex-corporation-nysecbm-anika-therapeutics-inc-nasdaqanik-bind-therapeutics-inc-nasdaqbind-oncomed-pharmaceuticals-inc-nasdaqomed/127402/>
10. Bristol-Myers Squibb Co: NYSE:BMV quotes & news - Google Finance. (n.d.). *Bristol-Myers Squibb Co: NYSE:BMV quotes & news - Google Finance*. Retrieved April 6, 2014, from https://www.google.com/finance?q=NYSE%3ABMY&ei=B-sIU_LjGKiw6gG2GQ
11. Bristol-Myers Squibb Given Buy Rating at TheStreet (BMV). (n.d.). *WKRB News RSS*. Retrieved April 6, 2014, from <http://www.wkrb13.com/markets/263090/bristol-myers-squibb-given-buy-rating-at-thestreet-bmv/>
12. Bristol-Myers Squibb: Our Company. (n.d.). *Bristol-Myers Squibb: Our Company*. Retrieved April 6, 2014, from <http://www.bms.com/ourcompany/Pages/home.aspx>
13. C Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=C+Profile>
14. CVX Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=CVX+Profile>

15. Can Bristol-Myers Squibb Beat the S&P in 2014?. (n.d.). *Can Bristol-Myers Squibb Beat the S&P in 2014?*. Retrieved April 6, 2014, from <http://www.fool.com/investing/general/2014/02/21/can-bristol-myers-squibb-beat-the-sp-in-2014.aspx>
16. Craft Brew Alliance. (n.d.). *Craft Brew Alliance*. Retrieved April 6, 2014, from <http://craftbrew.com/>
17. F Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=F+Profile>
18. FISV Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=FISV+Profile>
19. FTI Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=FTI+Profile>
20. GALE Profile | Galena Biopharma, Inc. Stock - Yahoo! Finance. (n.d.). *GALE Profile | Galena Biopharma, Inc. Stock - Yahoo! Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=GALE>
21. GAS Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=GAS+Profile>
22. GM Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=GM+Profile>
23. Galena Biopharma Enrolls First Patient in GALE-301 (Folate Binding Protein (FBP)) Cancer Immunotherapy Phase 2 Clinical Trial in Ovarian Cancer. (2014, January 7). (*NASDAQ:GALE*). Retrieved April 6, 2014, from <http://investors.galenabiopharma.com/releasedetail.cfm?ReleaseID=817420>

24. Galena Press Release. (n.d.). *Galena Biopharma*. Retrieved April 6, 2014, from <http://investors.galenabiopharma.com/releasedetail.cfm?releaseid=818783>
25. Galena: A Pipeline Rich For Investors. (n.d.). *Galena Biopharma Inc (GALE)*. Retrieved April 6, 2014, from http://seekingalpha.com/article/1870351-galena-a-pipeline-rich-for-investors?source=google_news
26. General Dynamics Gets Shot at \$12 Billion U.S. Ship Program. (n.d.). *Bloomberg Business Week*. Retrieved April 6, 2014, from <http://www.businessweek.com/news/2014-02-12/general-dynamics-gets-shot-at-12-billion-u-dot-s-dot-ship-program>
27. Home - Fuel Cell Energy. (n.d.). *Home - Fuel Cell Energy*. Retrieved April 6, 2014, from <http://www.fuelcellenergy.com/>
28. How to Identify Support and Resistance Levels on a Stock Chart. (n.d.). *How to Identify Support and Resistance Levels on a Stock Chart*. Retrieved April 6, 2014, from <http://www.swing-trade-stocks.com/support-and-resistance.html>
29. How to Interpret Volume on a Stock Chart. (n.d.). *Stock Chart Volume*. Retrieved April 6, 2014, from <http://www.swing-trade-stocks.com/stock-chart-volume.html>
30. Hyundai Motor Company. (2014, December 4). *Wikipedia*. Retrieved April 13, 2014, from http://en.wikipedia.org/wiki/Hyundai_Motor_Company
31. Huntington Ingalls Industries Inc: NYSE:HII quotes & news - Google Finance. (n.d.). *Huntington Ingalls Industries Inc: NYSE:HII quotes & news - Google Finance*. Retrieved April 6, 2014, from <https://www.google.com/finance?q=HII&ei=skTIUviEG6GK6gHj5QE>
32. Introduction To Swing Trading. (n.d.). *Investopedia*. Retrieved April 6, 2014, from <http://www.investopedia.com/articles/trading/02/101602.asp>

33. KO Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=KO+Profile>
34. KR Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=KR+Profile>
35. Kona Brewing Company | Just another place with sand between its toes. (n.d.). *Kona Brewing Company | Just another place with sand between its toes*. Retrieved April 6, 2014, from <http://konabrewingco.com/>
36. Official iRobot site - Roomba robot vacuum cleaner and robots for the home - iRobot. (n.d.). *Official iRobot site - Roomba robot vacuum cleaner and robots for the home - iRobot*. Retrieved April 6, 2014, from <http://www.irobot.com/global/en/home.aspx>
37. PEP Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=PEP+Profile>
38. Pairs Trading: Correlation. (n.d.). *Investopedia*. Retrieved April 6, 2014, from <http://www.investopedia.com/university/guide-pairs-trading/pairs-trading-correlation.asp>
39. Redhook Brewery. (n.d.). *Redhook*. Retrieved April 6, 2014, from <http://redhook.com/>
40. SWI Company Profile. (n.d.). *Reuters*. Retrieved April 6, 2014, from <http://www.reuters.com/finance/stocks/companyProfile?rpc=66&symbol=SWI>
41. SWI: SolarWinds a Virtual Winner for Investors. (n.d.). *InvestorPlace RSS*. Retrieved April 6, 2014, from <http://investorplace.com/2014/01/solarwinds-swi-goog-stocks-to-buy/>
42. Samuel Adams® - For The Love of Beer. (n.d.). *Samuel Adams® - For The Love of Beer*. Retrieved April 6, 2014, from <http://www.samueladams.com/>

43. Schonberger, J. (2012, May 31). 5 Stocks From the New Class of Rising Blue Chips. *Kiplinger*. Retrieved April 6, 2014, from <http://m.kiplinger.com/article/investing/T052-C008-S001-5-stocks-from-the-new-class-of-rising-blue-chips.html>
44. Shell, A. (2013, October 28). This 2013 stock market rally is a team effort. *USA Today*. Retrieved April 6, 2014, from <http://www.usatoday.com/story/money/markets/2013/10/28/stock-rally-broadest-since-2003/3287109>
45. SolarWinds Stock Rating Upgraded by Zacks (SWI). (n.d.). *WKRB News RSS*. Retrieved April 6, 2014, from <http://www.wkrb13.com/markets/255026/solarwinds-stock-rating-upgraded-by-zacks-swi/>
46. SolarWinds boosts revenue, profits flat in Q4. (n.d.). *Widgets RSS*. Retrieved April 6, 2014, from <http://www.bizjournals.com/austin/blog/techflash/2014/02/solarwinds-boosts-revenue-profits-flat-in-q4.html>
47. SolarWinds insider flips stock options. (n.d.). *Widgets RSS*. Retrieved April 6, 2014, from <http://www.bizjournals.com/austin/blog/techflash/2014/02/solarwinds-insider-flips-stock-options.html>
48. SolarWinds: Moving In The Right Direction As Revenue Growth Accelerates. (n.d.). *SolarWinds Inc (SWI) news*. Retrieved April 6, 2014, from <http://seekingalpha.com/article/2026261-solarwinds-moving-in-the-right-direction-as-revenue-growth-accelerates>
49. Stock Report: "Anika Therapeutics, Inc." (ANIK) Report Updated: Mar 31, 2014 | Print This Page. (n.d.). *ANIK*. Retrieved April 6, 2014, from <http://navelliergrowth.investorplace.com/portfolio-grader/stock-report.html?t=ANIK>

50. T Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=T+Profile>
51. THL Credit Senior Loan Fund (TSLF) Ex-Dividend Date Scheduled for February 14, 2014. (n.d.). *NASDAQ.com*. Retrieved April 6, 2014, from <http://www.nasdaq.com/article/thl-credit-senior-loan-fund-tslf-exdividend-date-scheduled-for-february-14-2014-cm326271>
52. THL Credit: Falling Yields And Growing Dividends?. (n.d.). *THL Credit, Inc. (TCRD) news:*. Retrieved April 6, 2014, from <http://seekingalpha.com/article/2026051-thl-credit-falling-yields-and-growing-dividends>
53. Technical Analysis: Moving Averages. (n.d.). *Investopedia*. Retrieved April 6, 2014, from <http://www.investopedia.com/university/technical/techanalysis9.asp>
54. The Secret To Finding Profit In Pairs Trading. (n.d.). *Investopedia*. Retrieved April 6, 2014, from <http://www.investopedia.com/articles/trading/04/090804.asp>
55. VZ Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=VZ+Profile>
56. WM Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from <http://finance.yahoo.com/q/pr?s=WM+Profile>
57. Welcome to Bankrate. (n.d.). *Mortgage Rates Credit Cards Refinance Home CD Rates by Bankrate.com*. Retrieved April 6, 2014, from <http://www.bankrate.com>
58. Widmer Brothers Brewing. (n.d.). *Widmer Brothers Brewing*. Retrieved April 6, 2014, from <http://widmerbrothers.com/>
59. Williams, S. (n.d.). Why Navidea Biopharmaceuticals Inc. Shares Soared. *DailyFinance.com*. Retrieved April 6, 2014, from <http://www.dailyfinance.com/2013/12/10/why-navidea-biopharmaceuticals-inc-shares-soared/>

60. XOM Profile. (n.d.). *Yahoo Finance*. Retrieved April 6, 2014, from

<http://finance.yahoo.com/q/pr?s=XOM+Profile>

61. Zacks Investment Research. (n.d.). *U.K. CAA Demands Upgrades on Faulty Copters*.

Retrieved April 6, 2014, from <http://www.zacks.com/stock/news/123984/uk-cao-demands-upgrades-on-faulty-copters>