

Project Number: DZT 1105

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

Peter Roberto

Submitted:
August 19, 2011

Approved by Professor Dalin Tang, Project Advisor

Table of Contents

Abstract	4
1. Introduction	
1.1 Goals, Scope, and General Plan	5
1.2 History of the Stock Market	5
1.3 Reasons to Invest	6
1.4 Advantages and Disadvantages of Stocks and ETFs	7
1.5 Project Overview	8
2. Investment Strategies	
2.1 Introduction	10
2.2 Choice of Strategies	10
2.3 Pros and Cons of each Investment Strategy	11
3. Growth Investing	
3.1 Introduction	12
3.2 Strategies and Goals	12
3.3 Stocks Chosen	13
3.4 Trades	17
3.5 Conclusion and Results	22
4. Value Investing	
4.1 Introduction	23
4.2 Strategies and Goals	23
4.3 Stocks Chosen	25
4.4 Trades	28

4.5 Conclusion and Results	32
5. Trend Following	
5.1 Introduction	33
5.2 Strategies and Goals	33
5.3 Stocks Chosen	36
5.4 Trades	38
5.5 Conclusion and Results	42
6. Market News throughout the Simulation	
6.1 Introduction	44
6.2 Week 1 (5/31/2011-6/3/2011)	44
6.3 Week 2 (6/6/2011-6/10/2011)	45
6.4 Week 3 (6/13/2011-6/17/2011)	45
6.5 Week 4 (6/20/2011-6/24/2011)	45
6.6 Week 5 (6/27/2011-7/1/2011)	46
6.7 Week 6 (7/5/2011-7/7/2011)	47
6.7 Conclusion	
47	
7. Comparisons & Analysis	52
8. Conclusion	54
References	56

Abstract

The project consisted of a ten-week period of researching various trading strategies, constructing a six-week simulation made up of three different strategies, and reflecting and analyzing the results of the simulation to determine which strategy performed best. The three trading tactics used were growth investing, value investing, and trend following. The trading experience and technical analysis skills developed over the course of the project will make one a more knowledgeable and complete investor in the future.

Chapter 1: Introduction

1.1 Goals, Scope and General Plan

The main objective of the IQP is to gain an understanding of the stock market and various trading strategies through by creating a short-term simulation. As I pursue a career in finance, this simulation will not only get me into the habit of thoroughly following the market and determining the markets current position, but also gives me the opportunity to implement some trading strategies that I will likely use in my future both personally and professionally. Additionally, the simulation will force me to determine what factors influence the market and to find credible resources that provide the information necessary for making choices in the market. From an educational point of view, I will have the opportunity to improve my time management, critical thinking, research and writing skills. In terms of investment I would like to outperform the Dow Jones Industrial, NASDAQ, and S&P 500. This goal will allow me assess how well my simulation and choices of stock and strategies performed as well as let me find the areas where I can improve in the future. Additionally the trading experience will help me in the future professionally and as an individual by allowing me to learn what trading strategies work best for me.

1.2 History of the Stock Market

The stock market as we know and think of it as today first started in 1602, when shares of the Dutch East India Company were first sold through the Amsterdam Exchange. Prior to this in 12th century France brokers managed and regulated debts owed from the Farmers to the banks. Additionally during the 13th brokers in France and Italy traded commodities and government securities [5]. In 1761, 150 men gathered in London to trade stock. This would later give birth to

the Philadelphia Stock Exchange in 1790, the New York Stock Exchange (NYSE) in 1792 and the official London Stock Exchange in 1801.

Due to the heavy burden of war debt the merchants that started the New York Stock Exchange took a break until March 8, 1817 when the New York Stock Exchange board was officially organized. Originally members had to be voted into the exchange by other members and the cost of an exchange seat was \$25 [10]. The exchange grew widely more popular and successful through the 19th century and into the early 20th century until the stock market crash of 1929 when stock prices widely varied from the actual value of companies. This created a need for greater regulation and led to the formation of the Securities and Exchange Commission (SEC) in 1934. Due to the large amount of manual labor needed to place trades in the New York Stock Exchange the NASDAQ stock exchange was founded in 1971 as the first electronic stock market [10]. The NASDAQ exchange led to a greater the number of over the counter trades between individuals rather than from broker to broker leading to a lower cost of commission. The NASDAQ exchange allows individuals to trade much more quickly, frequently, and in larger volumes leading to what we are familiar with today.

1.3 Reasons to Invest

Investing is an activity in which everyone will be involved in at least once in their life. Whether it's buying a hamburger or a multi-million dollar estate people must make decisions on how to invest their money at one point or another. In today's world being able to afford everything aspire to accomplish is nearly impossible without gaining some return on your own money. Some of the numerous reasons to invest such as being able to afford college for kids, paying off medical expenses, improving your standard of life, and beating the cost of inflation. One decision that is easy to come to a conclusion on is when to invest. Investing earlier lowers

your risks, potentially increase your rewards and will provide greater financial freedom in the future. The longer one waits the larger the initial investment must be and the greater the burden on the investor in the current point in time [7].

1.4 Advantages and Disadvantages of Investing in Stock

Since the Dutch East India Company first issued stock in 1602, thousands of companies across the world and have followed in giving the public the opportunity to purchase part of their company in order to raise capital in return. Investing in stock or ETFs is so easy today it can be done by using your phone or by the click of a mouse. Even though purchasing a share of a stock or ETF may be easy weighing out the advantages and disadvantages of each particular one may not be.

Stocks have numerous advantages and disadvantages that can vary from company to company. The main advantages of stock are potentially high returns, they are liquid, and there is a tremendous variety depending on the degree of risk you want to take, as well as your values and interests. Due to the size of the markets there is almost always someone who wants to buy when you are selling which allows for the stocks to be so liquid and for you to sell very close to the price that you want. Also there are two ways to realize gains from stocks which are capital gains and income from dividends. This allows you to vary the amount of risk you want to take as companies that are more focused on issuing dividends generally tend to not fluctuate in stock price as much as one that does not issue dividends. The main disadvantage of stock however is risk and potential for a dramatic loss. Unlike certificates of deposit and bonds there are more factors that influence the stock market than the interest rate and inflation. When investing in stock you could lose a tremendous amount of money even if the rest of the market is doing well due to the fact that you are only invested in one company and if that company has problems such

as a lawsuit, not meeting the expectations of analysts, a recall, or other extreme circumstances the company's value could plummet and you could lose a tremendous part of your investment [9]. Additionally, in today's world now more than ever is the world economy linked therefore if there is news about a company or the economy in one part of the world it is bound to impact your investments.

Due to the large risk associated with investing in only one company there has been several new investment tools created that allow to diversify your investments and to prevent yourself from taking a tremendous loss if one of your investments falters. One of these investment vehicles is the exchange traded fund. An example of how an exchange traded fund helps diversify your investment is that one of the most commonly traded ETFs is known as the Spider (SPY) and tracks the S&P 500 index. An exchange traded fund or ETF is a security that is made up of a group of assets or a commodity and trades at a certain price similar to a stock [9]. In addition to diversification, another advantage of exchange traded funds is that they provide the diversification without fees of a mutual fund. The disadvantages of ETFs are similar to that of stocks in that the market fluctuates and you could potentially lose a large portion of your investment and an even larger portion if the exchange traded fund is leveraged. If an ETF is leveraged it means that you own a value that is either two or three times what was actually paid meaning that your gains and losses are also two or three times of what the fluctuation is in the group of assets.

1.5 Project Overview

The simulation was built on three different trading strategies each consisting of a portfolio of three stocks or ETFs that were traded over a four week trading period. Each of the three portfolios had \$250,000 to be dispersed among the three stocks or ETFs within them.

During the project I also wanted to learn about the following; the factors influence market behavior and how to track these factors, various types of investment vehicles and the benefits and risks associated with each one, and reasons for investing. Chapter one gives reasons for investing and a brief history of the stock market. Chapter two lists various types of investment vehicles and the benefits and risks associated with each of them. Chapters three through five each follow an investment strategy and discuss the factors in the market that impact each strategy. The final chapter reflects upon the goals and experience of the project and compares and contrasts the three techniques used in the simulation.

Chapter 2: Investment Strategies

2.1 Introduction

In today's world there are a tremendous number of strategies available to investors as each strategy can be made up of all fundamental analysis, all technical analysis, or a combination of the two. Fundamental analysis focuses on the company's financials and potential for growth in the market while technical analysis focuses on the use of data to determine where resistance levels or support levels from the past history of a company will affect the stock price in the future. Technical analysis also takes into the account of the flow of volume of a stock, which along with the past trends that at specific price levels allows investors to deem a specific time frame on when to buy and when to sell. This chapter will explain the choice of the strategies to be used in the project and the advantages and disadvantages associated with each one.

2.2 Choice of Strategies

The three strategies that will be simulated during this project are growth investing, value investing, and trend following. These strategies were chosen due to the fact that growth investing tends to focus more on fundamental analysis where value investing is more technical, which will allow me to gain experience with both types of analysis. The trend analysis strategy will provide technical experience and experience with specific technical indicators as well as force me to be persistent in following market trends. In addition to the experience with the various types of analysis, these strategies will also allow me to experience investing over different time frames as growth investing tends to be long term, and value and trend following can be both long or short term [6]. This will teach me how to develop an entrance and an exit strategy as well as a time frame for each investment.

2.3 Pros and Cons of each Investment Strategy

No one investment style is perfect as the volatility in the market and company can make it very difficult to predict what will happen to a company's stock price in the future. All three investment styles that I have chosen to simulate each has their advantages and disadvantages. First the advantages of growth investing are that the investor focuses on the potential for growth therefore if the investor is correct in assessing a company's growth potential they will generally earn large capital gains [14]. At the same time a company that the investor deems to be growing could stop growing or even downsize. Other disadvantages with growth investing include; an extenuating circumstance such as a lawsuit could hinder the company's growth, the stock price of the company could be overvalued due to a large amount of hype, and finally stock tips and rumors are not very reliable sources of information. An advantage of value investing is that it is less risky as there is always a specific exit strategy for a stock if its price declines. A disadvantage of value investing is that the gains are smaller than those of growth investing but they are more frequent and steadier [14]. The advantages of trend following are that the potential losses are smaller than those of growth investing as there is an exit strategy associated with it. A disadvantage of trend following is that technical are only a guess of where a stock price should fall or rise and other events within the company or market could make the price move not in coordination with these indicators.

Chapter 3: Growth Investing

3.1 Introduction

The growth investment simulation will be created from three different stocks which are deemed to have a high potential for growth. There are numerous different factors that growth investors can use to gauge a company's potential for growth such as price to earnings and price to book ratios. The price to earnings ratio gives the investor an estimate of what the company earns in relation to what their stock price is. However these ratios are not the only factors that must be taken into account by a growth investor, they must also know the company's products, their position in the industry, and their business strategy. This chapter will cover various indicators that growth investors' use when looking at a stock as well as some of the strategies are used. In addition this chapter will depict a simulation made up of three stocks and will show how these indicators and strategies can be implemented.

3.2 Strategies and Goals

The benchmark for the performance of the growth simulation will be set by the market indices such as the S&P 500, NASDAQ, DJIA, and the iShares Russel 1000 Growth Fund. My goal for the simulation would be to beat the market indices and the iShares Russel Growth Fund (IWF) which is an ETF which focuses in investing in companies with potentially high growth.

Some of the strategies that are used by growth investors are using P/E, PEG, and PERG to determine which companies are potentially good investments [4]. The P/E ratio is the stock price per share divided by the earning per share of a company. This allows the investor to gauge how much a company will earn on each share. The PEG ratio is the P/E ratio divided by an expected rate of growth in earnings per share. This allows an investor to see how much an investment will earn versus how fast it will grow. The PERG ratio is the following:

Price to Earnings ratio divided Expected Growth Rate of EPS and multiplied by the risk (Beta) of the investment. The PERG ratio allows an investor to judge if the earnings that the investment is expected to make are worth the expected risk.

3.3 Stocks Chosen

In order to find company's suitable for growth investing I used the P/E, PEG, and PERG ratios to determine which companies would give me an expected high return based on the risk that I was taking. Another factor that one should take into account is what particularly is special about that company that separates it from the competitors and is the market this company is in a market with potential growth in the future. Additionally, one must look for growth across the financials including revenue, cash flows, assets, equity and sales. With that being said Baidu Inc., Netflix Inc., and Teradata Corporation were selected as the three growth stocks that were to be invested in for the simulation. Table 3.1 shows the respective P/E, PEG, and PERG ratios as well as the risk of each company (Beta). The Beta value is how closely the company's share price is with the movement of the market as a value of 1 correlates directly with the market where a value less than one is less volatile than the market and a value higher than one is more volatile than the market. Another factor that all three of these companies have in common is that they all have extremely high P/E ratios. This means that their price is high in comparison to their earnings because they are expected to grow drastically in the future. The PEG ratios are also large even taking into account the already large P/E ratios meaning that the expected growth factor is also extremely high. Despite the high P/E ratios and growth factors the PERG ratios of Baidu Inc. and Teradata Corporation are relatively low due to either a high growth factor or beta value. Even though Netflix Inc. has a relatively low beta value there PERG ratio still remains low due to their tremendous expected growth. In addition to these strong ratio values, each of the

three companies shows strong growth in their financials and has something that gives them their tremendous potential for growth. In Baidu’s case, they are the primary search engine allowed in China due to China’s strict content policy. In Netflix’s case they have revolutionized the way people watch movies as they have significantly reduced the costs of renting of movie from a video rental location and have added the convenience of having the media delivered directly to the renter’s location, while maintaining significantly lower operating costs. For Teradata Corporation their strength is the industry itself as data is one of if not the most important asset of a business these days more and more people are looking to outsource to another company to make sure the data is properly protected and organized. In addition to the significant importance of data the amount of data being passed around the company and the cyber world is increasing rapidly. Below is more information on each company and what specific products and services they provide to customers and their respective financials in tables 3.2, 3.3, and 3.4.

	Baidu Inc (BIDU)	Netflix Inc. (NFLX)	Teradata Corp. (TDC)
P/E Ratio	84.43	79.43	32.54
PEG Ratio	1.35	2.03	1.86
Beta	1.48	0.31	0.82
PERG Ratio	0.50	1.59	0.66

Table 3.1: P/E, PEG, and PERG Ratios [15]

Baidu Inc. (BIDU)

Baidu.com is a Chinese and Japanese internet search engine. The search engine allows users to find relevant information online, including Web pages, news, images, multimedia files, and blogs. In addition, Baidu offers an instant messaging service and a consumer-oriented e-commerce platform. Baidu also designs and delivers online marketing services and auction-based

P4P services that allow customers to reach users who search for information related to products or services. The company serves online marketing to a wide variety of fields. Baidu, Inc. was founded in 2000 and is headquartered in Beijing [15].

Baidu Inc (BIDU)	2006	2007	2008	2009	2010
Total Revenue	\$837.84	\$1744.43	\$3198.25	\$4447.78	\$7915.07
Net Income	\$301.77	\$628.97	\$1048.11	\$1485.10	\$3525.17
Total Current Assets	\$1278.74	\$1725.49	\$2852.48	\$4842.87	\$8782.45
Total Assets	\$1668.08	\$2655.91	\$3937.99	\$6156.98	\$11048.44
Total Current Liabilities	\$301.00	\$631.20	\$849.33	\$1399.72	\$2551.85
Total Liabilities & Equity	\$1668.08	\$2655.91	\$3937.99	\$6156.98	\$11048.44
Net Change in Cash	\$235.68	\$214.33	\$1007.01	\$1822.77	\$3601.60

Table 3.2: Baidu Financials (All numbers in millions) [8]

Netflix Inc. (NFLX)

Netflix, Inc. provides an online movie rental service to the United States. The company offers its access to a library of movie, television, and other content. Their customers can have the media delivered to their homes and can instantly watch movies and TV episodes streamed to their TVs and PCs. Netflix has over 12 million subscribers. It also partners with consumer electronics companies to offer a range of devices that can instantly stream movies and TV episodes to members' TVs from Netflix. Netflix was founded in 1997 [15].

Netflix Inc (NFLX)	2006	2007	2008	2009	2010
Total Revenue	\$996.66	\$1205.34	\$1364.66	\$1670.27	\$2162.63
Net Income	\$48.84	\$66.61	\$83.03	\$115.86	\$160.85
Total Current Assets	\$411.01	\$379.54	\$441.22	\$492.25	\$640.97
Total Assets	\$679.73	\$648.29	\$693.97	\$770.28	\$982.07
Total Current Liabilities	\$227.44	\$243.45	\$258.17	\$312.11	\$388.58
Total Liabilities & Equity	\$679.73	\$648.29	\$693.97	\$770.28	\$982.07
Net Change in Cash	-\$5.66	-\$54.36	-\$26.9	-\$21.12	\$60.28

Table 3.3: Netflix Financials (All numbers in millions) [8]

Teradata Corporation (TDC)

Teradata Corporation provides data warehousing solutions, analytic technologies and services, and integrated marketing software. Teradata comprises software, hardware, and related business consulting and support services. They integrate an organization's departmental and enterprise-wide data about customers, financials, operations, and others into a single data warehouse. The company's software and hardware products include Teradata Database Software, which delivers real-time intelligence; Teradata Platform for the hardware component; Teradata Logical Data Models, or the design for a data warehouse; and Teradata Analytic Applications and Tools, a collection of data management tools to solve business problems. Teradata's focuses on creating solutions for data mining, data management, marketing management, risk management, finance management, demand and supply chain management, and profitability

analytics. Their primary customers are in banking/financial services, entertainment, government, insurance and healthcare, manufacturing, retail, telecommunications, transportation, and travel industries. The company operates in five different continents. The company was founded in 1979 [15].

Teradata Corp (TDC)	2006	2007	2008	2009	2010
Total Revenue	\$1,547.00	\$1,702.00	\$1,762.00	\$1,709.00	\$1,936.00
Net Income	\$192.00	\$200.00	\$250.00	\$254.00	\$301.00
Total Current Assets	\$502.00	\$873.00	\$1,015.00	\$1,152.00	\$1406.00
Total Assets	\$1,003.00	\$1,294.00	\$1,430.00	\$1,569.00	\$1,883.00
Total Current Liabilities	\$393.00	\$569.00	\$540.00	\$543.00	\$569.00
Total Liabilities & Equity	\$1,003.00	\$1291.00	\$1430.00	\$259.00	\$1883.00
Net Change in Cash	\$0.00	\$270.00	\$132.00	\$259.00	\$220.00

Table 3.4: Teradata Financials [8]

3.4 Trades

The strategy with growth investing tends to be a buy and hold strategy which means that if the stocks selected are properly evaluated as growth stocks they should over increase in stock price over the long term and provide capital gains on one's investment. The growth investing strategy is normally a long-term strategy and six weeks is generally considered to be too short of a time frame to practice the strategy properly. However, over the six week simulation Baidu Inc., Netflix Inc., and Teradata Corporation saw tremendous increase in stock price over a small period of time as seen in table 3.2 and charts 3.1 through 3.6. The large increase in share price is likely due to positive macro-economic news from end of June and also a recovering technology

sector that bounced back nicely from a slump as can be seen in chart 3.7, which depicts the share price of XLK a technology ETF from the May 31st to July 11th.

The reason behind each trade made during the growth investment simulation is explained in charts 3.1 through 3.6. Charts 3.1, 3.3, and 3.5 depict the Bollinger Bands (Green) and the 20-day simple moving average (Red), and current stock price (blue) of Baidu Inc., Netflix Inc., and Teradata Corporation respectively from the May 31st until July 7th. These charts show that originally on the May 31st when the shares of each of three stocks were bought, BIDU's current share price was at the moving average, while NFLX and TDC's share prices were at or above the upper Bollinger band. Normally this would indicate that these stocks are currently overbought and their share price was overvalued and it would not be an opportune time to buy them. Charts 3.2, 3.4, and 3.6 also showed each of the three companies' current stock prices to be overvalued as of May 31st as the stock price (blue) was above the 5-day (Red) 10-day (Green), and 20-day (Yellow) exponential moving averages. These technical indicators were likely the cause of profit taking and the prices of the three stocks dropping until mid-June where they bounced back until they reached a point above where they started on July 7th. The growth stocks acted just as they were expected to as they react to technical and current news over the short term but show growth and increase in stock price over the long term.

Date	Symbol	Buy/ Sell	Price	Shares	Net Cost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
5/31/2011							\$250,000.00	
5/31/2011	BIDU	Buy	\$136.84	548	\$74,998.32		\$175,001.68	
5/31/2011	NFLX	Buy	\$267.25	374	\$99,961.50		\$75,040.18	
5/31/2011	TDC	Buy	\$55.86	1343	\$75,029.98		\$10.20	
7/7/2011	BIDU	Sell	\$147.01	548	\$80,551.48	\$5,553.16	\$80,561.68	\$5,553.16
7/7/2011	NFLX	Sell	\$292.42	374	\$109,355.08	\$9,393.58	\$189,916.76	\$14,946.74
7/7/2011	TDC	Sell	\$62.33	1343	\$83,699.19	\$8,669.21	\$273,615.95	\$23,615.95

Table 3.5: Growth Investing Transactions



Chart 3.1: BIDU Bollinger Bands 7/7/2011 [15]



Chart 3.2: BIDU 5-10-20 EMA's 7/7/2011 [15]



Chart 3.3 NFLX Bollinger Bands 7/7/2011 [15]



Chart 3.4: NFLX 5-10-20 EMA's 7/7/2011 [15]



Chart 3.5: TDC Bollinger Bands 7/7/2011 [15]



Chart 3.6: TDC 5-10-20 EMA's 7/7/2011 [15]

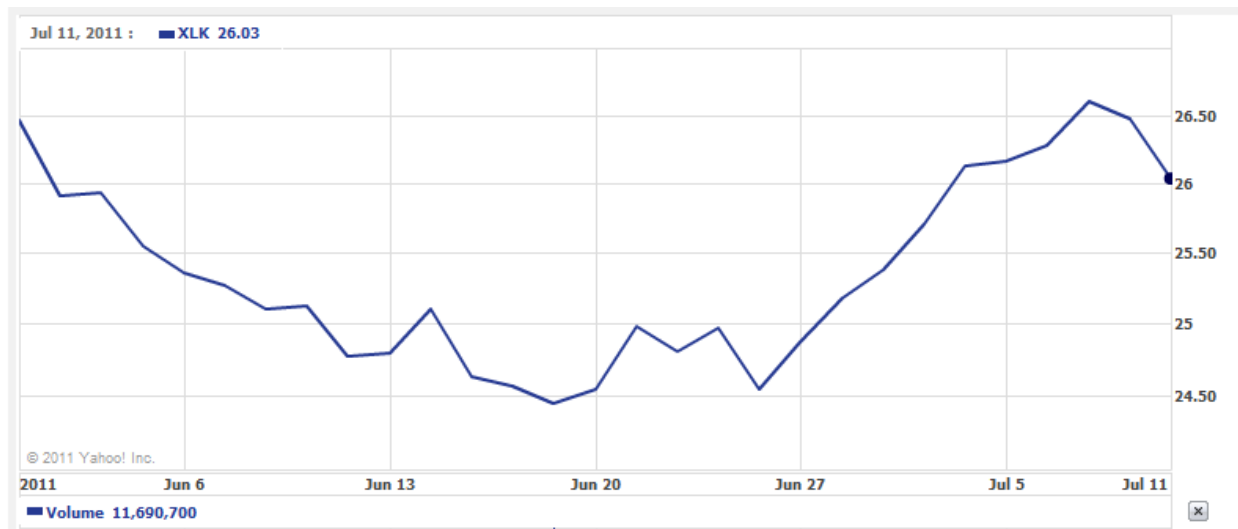


Chart 3.7: XLK share price 5/31/2011-7/11/2011 [15]

3.5 Conclusion and Results

Overall the BIDU, NFLX, and TDC preformed tremendously well with profits of 7.4%, 9.4%, and 11.55% respectively and a cumulative growth of 9.45%. This is especially impressive as NASDAQ 100 Technology sector index NDXT fell almost 2% over the course of the six week simulation. Additionally one of my goals specifically for my portfolio of growth stocks was to outperform the iShares Russel 1000 Growth Fund or IWF. Over the course from market open on May 31st to July 7th the IWF fund saw a growth of 1.44% which is miniscule compared to the 9.45% which I made on the three stocks I chose. The results that I saw would have been even more drastic had I not bought on May 31st and had bought the stocks when they were at or below their lower Bollinger band. However, the fact that I did not do this shows the ability to make profit with growth stocks over the long term regardless of the starting price. The simulation shows growth stocks ability to return high profits regardless of the starting price but until about June 20th it was looking like that the stocks were not going to grow at all and that starting price was going to hurt me that much worse.

Chapter 4: Value Investing

4.1 Introduction

The concept of value investing first came to life in 1934 when Benjamin Graham and David Dodd published the book *Security Analysis*. In the book, Graham expressed his beliefs that with careful analysis of a company's financial statements, one would be able to find undervalued stocks. The idea of the bargain gave birth to the idea of intrinsic value or the putting a dollar value on what a firm is actually worth based on the tangible and intangible assets that a firm holds. Warren Buffett a student of Graham's has been quoted saying "It is better to buy a great company at a fair price than a fair company at a great price." This chapter will give an overview on several different strategies to determining intrinsic value when value investing as well as describe and explain the simulation used to reflect the value investing style.

4.2 Strategies and Goals

Value investing is one of the most common investment strategies used over time and has been proven to be successful by the likes of Warren Buffett, Seth Klarman, and Mario Gabelli. While value investing has proven to be successful in the past, even Graham himself stated in a 1976 seminar "I am no longer an advocate of elaborate techniques of security analysis in order to find superior value opportunities". Although in the same seminar he also illustrated one of the methods which he used to identify bargain stocks when he stated "My first, more limited, technique confines itself to the purchase of common stocks at less than their net current-asset value and deducting all liabilities in full from the current assets" [1]. This idea is illustrated by the following formula:

$$\text{Net Current Asset Value Per Share} = \frac{(\text{Current Assets} - \text{Total Liabilities})}{\text{\# Shares Outstanding}}$$

If the net current asset value per share was greater than that of the share price shares from the firm should be purchased. While this is one easy way to determine a firm's intrinsic value, there are now numerous methods of determining the intrinsic value of a firm including the Gordon Growth model and the discounted cash flow formula. These two formulas came into affect due to the fact that many investors thought that Graham's formulas for calculating intrinsic values were too vague. The Gordon Growth Model is as follows:

$$V_0 = \frac{D_0(1+g)}{k-g} = \frac{D_1}{k-g}$$

The Gordon Growth model uses calculates the intrinsic value V_0 by using dividend at year zero D_0 , the growth rate g , and the required rate of return k [1]. This is different than what Graham used in his original formulas as he used the five year growth rate of earnings instead of that of dividends which is generally more stable. The discounted cash flow formula also uses the growth of dividends to determine the intrinsic value. The discounted cash flow formula is the following:

$E(r) = \text{Dividend yield} + \text{Capital gains yield}$

$$= \frac{D_1}{P_0} + \frac{P_1 - P_0}{P_0} = \frac{D_1}{P_0} + g$$

As we can see from the discounted cash flow formula the formula not only takes into consideration the rate of growth of the dividends but also applies it to the change in price P_0 vs P_1 of the firm's stock [1].

4.3 Stocks Chosen

Finding stocks that fit Benjamin Graham's specifications proved to be a difficult task even with the use of a stock screener. In today's world of technology it was difficult to find companies that had a low enough liability in comparison to their current assets that would make the share price less than that of the Net Current Asset Value per share or a buy in Benjamin Graham's eyes. This is likely due to the fact that due to the fact that technology companies do not possess a lot of assets besides cash and many companies had cut back on adding assets after the recession. With that being said I used Bollinger Bands and exponential averages to determine over the short term which company may be undervalued based on their technical indicators. Shown below is the share price of Canadian Solar, Google, and Hewlett Packard and their net current asset values per share. The share price as of May 31st is clearly higher than their NCAVPS value therefore it graham would not deem them undervalued. However, as you will see in the following section as the share price of the three stocks dropped closer to the lower Bollinger band and below the exponential averages they were deemed to be undervalued by investors and then were bought until their share price increased to a higher value. Below also provides some information on the three companies and what goods or services they offer to their customers. This information would normally not be of importance to a value investor as they normally only focus on the current position and if the stock is under-valued based on their equations.

Canadian Solar (CSIQ)

Current share price: \$9.63

$$\text{Net Current Asset Value Per Share} = \frac{(\text{Current Assets} - \text{Total Liabilities})}{\# \text{ Shares Outstanding}}$$

$$\text{Net Current Asset Value Per Share} = \frac{(\$1,034,665,000 - \$889,041,000)}{42,910,000}$$

Net Current Asset Value Per Share = \$3.39

Google (GOOG)

Current share price: \$525.00

$$\text{Net Current Asset Value Per Share} = \frac{(\text{Current Assets} - \text{Total Liabilities})}{\# \text{ Shares Outstanding}}$$

$$\text{Net Current Asset Value Per Share} = \frac{(\$41,562,000,000 - \$11,610,000,000)}{322,890,000}$$

Net Current Asset Value Per Share = \$92.76

Hewlett Packard (HPQ)

Current Share price: \$37.28

$$\text{Net Current Asset Value Per Share} = \frac{(\text{Current Assets} - \text{Total Liabilities})}{\# \text{ Shares Outstanding}}$$

$$\text{Net Current Asset Value Per Share} = \frac{(\$54,184,000,000 - 84,054,000,000)}{2,070,000,000}$$

Net Current Asset Value Per Share = **-\$14.43**

Canadian Solar (CSIQ)

Canadian Solar Inc. designs, develops, manufactures, and markets solar power products. The company creates solar cell and modules that convert sunlight into electricity for various uses. Their products are used in residential, commercial, and industrial solar power generation. CSIQ also has products that are involved in solar-powered bus stop lighting, portable solar home

systems and solar-powered car battery chargers. Their products are also featured in the automotive, telecommunications, and LED lighting sectors. The company was founded in 2001 [15].

Google (GOOG)

Google runs several Web sites and other online content for users, advertisers, and Google network members and other content providers. It offers an advertising network through videos, text, images, and other interactive ads. Google also owns YouTube that provides video, , and other ad formats for advertisers. Another section of Google is Google Mobile which runs Google's applications on mobile devices Google also offers Android, an open source mobile software platform; Google Chrome OS, an open source operating system; Google Chrome, a Web browser; Google TV, a platform for the consumers to use the television and the Internet on a single screen; and Google Books which allows customers to access printed books online. They also created Google Apps, a cloud of message and collaboration tools, which includes Gmail, Google Docs, Google Calendar, and Google Sites. Google was created in 1998 [15].

Hewlett Packard (HPQ)

Hewlett-Packard Company offers various products, technologies, software, solutions, and services to individual consumers and small- and medium-sized businesses (SMBs), as well as to the government, health, and education sectors worldwide. The company's Services segment provides consulting, outsourcing, and technology services to infrastructure, applications, and business process domains. Its Enterprise Storage and Servers segment offers storage and server products. The company also offers its PALM smart phones. Hewlett-Packard Company was created in 1939 [15].

4.4 Trades

Typically, a value investor would buy and hold a stock until they deemed the stock to no longer be undervalued based on which ever calculations they use to determine a stock to be undervalued. In this case however, I used technical indicators to determine short-term time frames where the stock was trading below the value it should be trading at commonly represented by a moving average. Below, table 4.1 provides a list of the trades and time frames of the trades that were made throughout the simulation. Additionally, charts 4.1-4.6 provide the technical indicators and data that were used to make decisions on when and what to trade. Below, charts 4.1 and 4.2 show that CSIQ's stock price (blue) was above the upper Bollinger (green) Band in chart 4.1 and chart 4.2 shows that CSIQ's stock price (blue) was above the 5-day(red), 10-day(green), and 20-day(yellow) exponential moving averages. Therefore both these indicators provide the information that CSIQ is currently overvalued and should be sold off and that is what was done at \$10.15 for a profit of \$3,360.52 which can be seen in table 4.1 below. With the cash from selling all of my position (6501 shares) of CSIQ, I decided to buy 136 shares of GOOG at \$485.02 on June 16th as chart 4.5 showed GOOG's stock price to be near the lower Bollinger Band (Green) and GOOG's stock price (blue) was below the 5-day (red), 10-day (green), and 20-day(yellow) exponential moving averages. This meant that the stock was deemed undervalued and should be bought as the lower Bollinger band often provides support for a company's share price. The next set of trades too place on June 21st when I sold 2350 shares of HPQ for \$35.30 for a loss of \$4,673.00 as chart 4.3 indicated that the HPQ's share price (blue) was approaching the simple moving average (red) which is normally a resistance point coming from below the average. Also chart 4.4 indicated that HPQ's share price (blue) was above the 5-day (red), 10-day (green) exponential moving average, and heading towards the 20-day(yellow)

which is normally a sell off point for investors. Therefore HPQ was approaching being overvalued and was sold off and with the cash from that trade 168 additional shares of Google were purchased at \$493.00 as charts 4.5 and 4.6 still indicated GOOG's stock price to be near the lower Bollinger Band (green) and GOOG's stock price (blue) was below the 5-day (red), 10-day (green), and 20-day (yellow) exponential moving averages. Finally, on July 7th, all of the position of Google was sold off as the simulation ended at \$546.60 for a profit of \$33595.68. At the time of sale GOOG's share price was well above the upper-Bollinger band (green) in chart 4.5 and above all three exponential averages in chart 4.6.

Date	Symbol	Buy/Sell	Price	Shares	NetCost/Proceeds	Profit/Loss	Total Cash	Total Profit
5/31/2011							\$250,000.00	
5/31/2011	CSIQ	Buy	\$9.63	6501	\$62,614.63		\$187,385.37	
5/31/2011	GOOG	Buy	\$525.00	190	\$99,760.00		\$87,625.37	
5/31/2011	HPQ	Buy	\$37.28	2350	\$87,618.00		\$7.37	
6/14/2011	CSIQ	Sell	\$10.15	6501	\$65,975.15	\$3,360.52	\$65,982.52	\$3,360.52
6/17/2011	GOOG	Buy	\$485.02	136	\$65,972.72		\$9.80	
6/21/2011	HPQ	Sell	\$35.30	2350	\$82,945.00	-\$4,673.00	\$82,954.80	-\$1,312.48
6/21/2011	GOOG	Buy	\$493.00	168	\$82,834.00		\$120.80	
7/7/2011	GOOG	Sell	\$546.60	494	\$270,020.40	\$33,595.68	\$270,141.20	\$32,283.20

Table 4.1: Value Trading Transactions

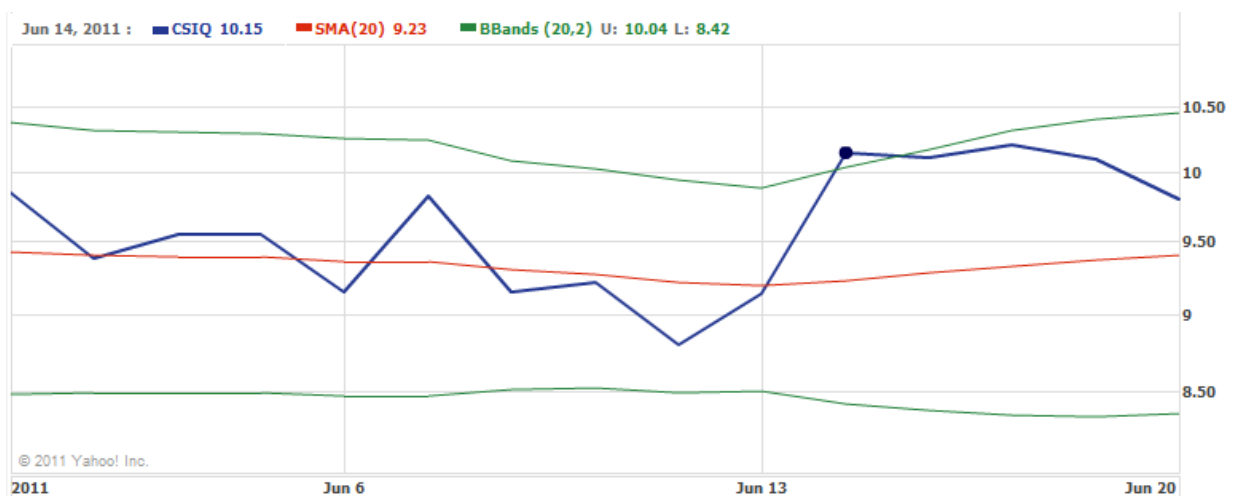


Chart 4.1: CSIQ Bollinger bands 5/31/2011-6/20/2011 [15]

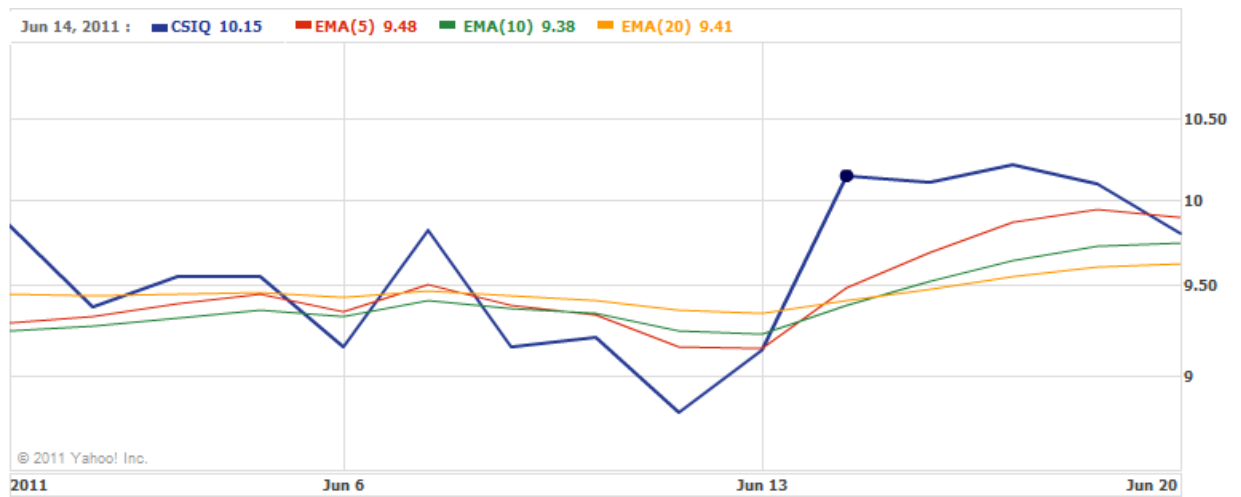


Chart 4.2: CSIQ Exponential 5-10-20 5/31/2011-6/20/2011 [15]



Chart 4.3 HPQ Bollinger bands 6/21/2011 [15]



Chart 4.4: HPQ 5-10-20 EMA's 6/21/2011 [15]



Chart 4.5: GOOG Bollinger Bands 7/7/2011 [15]



Chart 4.6: GOOG 5-10-20 EMA's 7/7/2011 [15]

4.5 Conclusion and Results

Over the six week simulation the Value stocks portfolio built from CSIQ, HPQ and GOOG brought in a cumulative return of 8.06%. This greatly outperformed the Dow Jones Industrial Average, NASDAQ, and S&P 500 which saw returns of 2.22%, 1.71%, and 1.66% respectively. Most of the growth was driven by GOOG as I moved all of my position in the portfolio as of June 21st. This turned out to be a tremendously successful move and the technical analysis that revealed that Google had been trading below its lower Bollinger band allowed me to identify GOOG was the most undervalued of the three and allowed me to make the decision to move my position accordingly.

Chapter 5: Trend Following

5.1 Introduction

In today's market data is easier to track and follow now more than ever with the use of computer's. One specific investment strategy that has grown more popular now that data is more readily available is trend trading. Trend trading focuses on the momentum of the stock based on the current price and history of a particular stock. The current price is used to gauge where the stock is in the current trend and the history is used to determine the current which the stock is on and to estimate how the stock price will change in the future based on the history of that company's stock prices. This chapter will explain how Bollinger bands, chart analysis, and moving averages are three useful tools for those who use the trend following investment strategy. Also covered in this chapter will be a simulation using the trend trading investment strategy and the results of that simulation.

5.2 Strategies and Goals

As the trend following strategy grows more and more popular, so does the use of technical indicators to determine particular trends in a stock. One of the more popular indicators is the Bollinger band. The Bollinger band was developed by technical trader John Bollinger and is a line that is plotted two standard deviations above and below the moving average which is usually twenty days. The closer the share price moves toward the upper band the stock is said to be overbought and vice versus with the lower band. Another common trend that technical traders do is when the price is on and up trend and about to hit the moving average investors often sell and take profits from when they bought at the lower band. An additional way in which investors can make profits using Bollinger bands is to short a stock, if the price has hit the upper band and

sell at the current price as they expect the price of the stock to lower [6]. Examples of Bollinger Bands and how they influence trading decisions can be seen in section 5.4.

Another strategy that is commonly used by technical traders is chart analysis. Chart analysis is the use of the history of stock prices to determine resistance and support price levels of a stock. Some examples of chart analysis strategies are head and shoulders, flags and pennants, double tops and bottoms, and finally triangles. All are shown below:

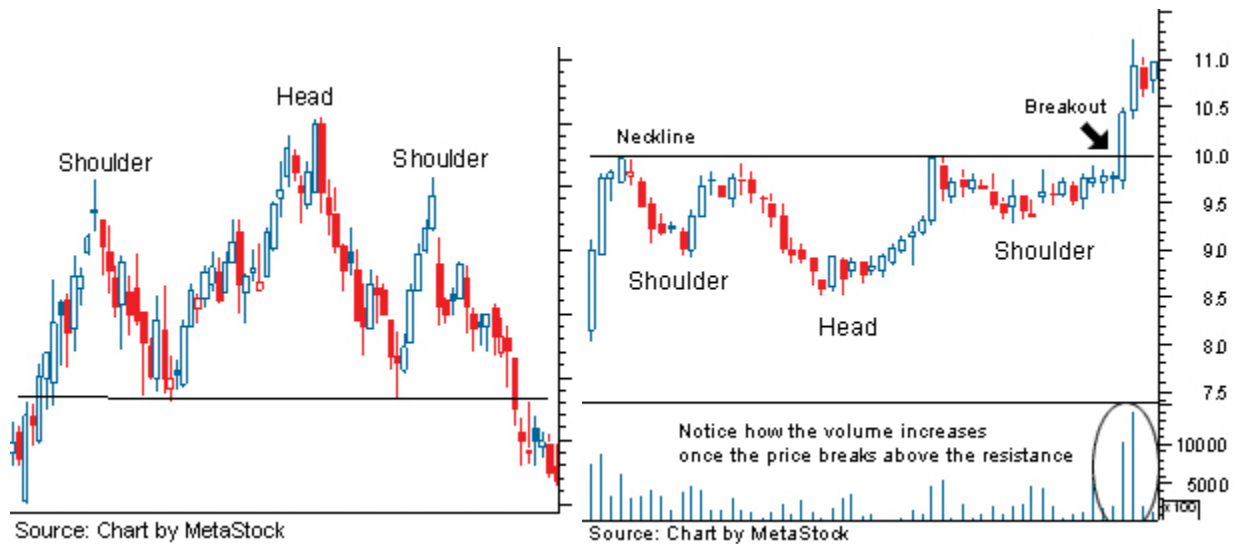


Figure 5.1 & 5.2: Head and Shoulders [6]

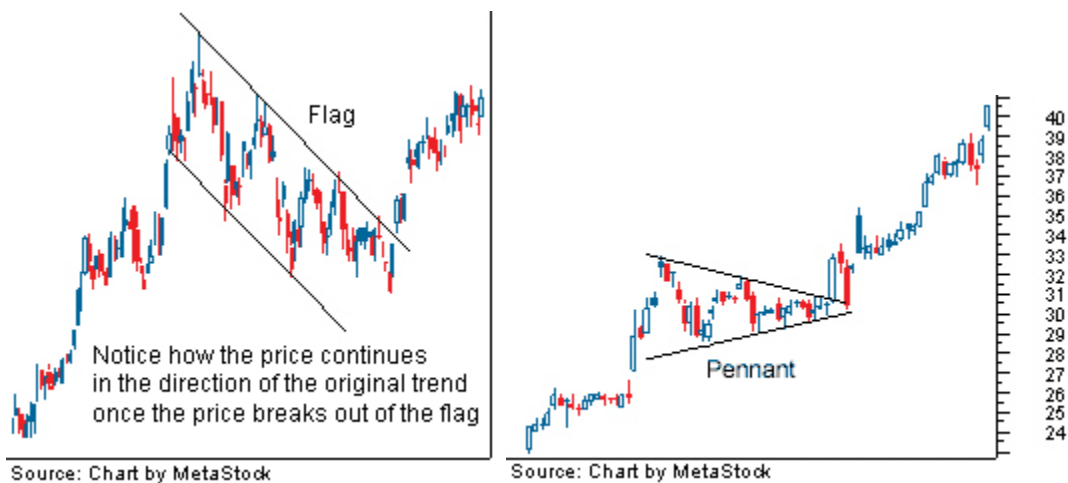


Figure 5.3& 5.4: Flags and Pennants [6]

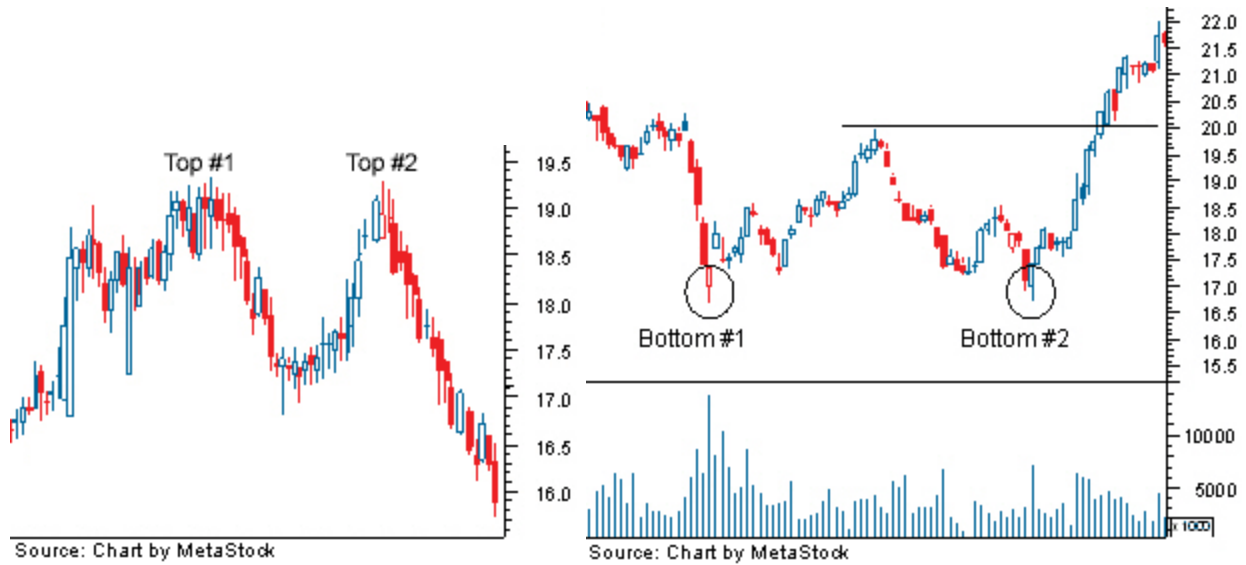


Figure 5.5 & 5.6: Double Top and Double Bottom [6]

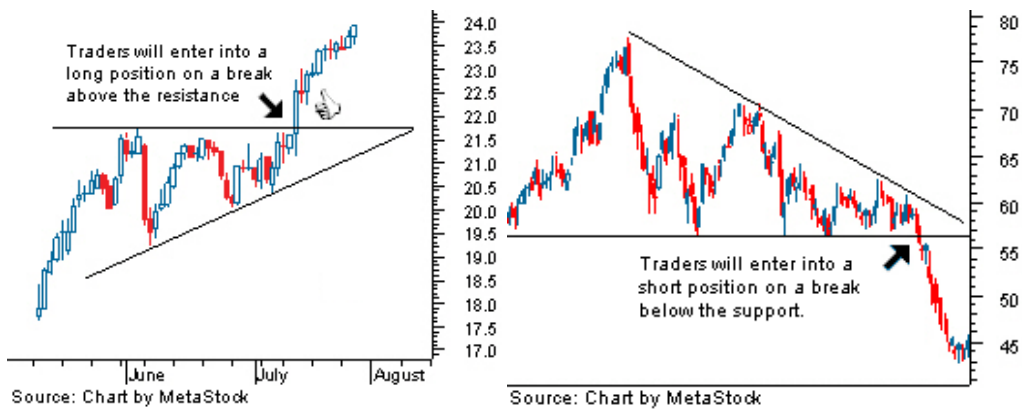


Figure 5.7 & 5.8: Triangles [6]

These shapes are made by common trends in history and help traders predict the trend that a particular company is currently and gives the trader a buying and selling price.

Another tool that is commonly used by traders is the moving average which is the average value of a stock over a set amount of time. From the line plot of the moving average traders can determine when to buy or sell a stock based on if the stock price is above or below the moving average. One strategy which investors use is the 5-10-20 strategy which uses the five

day, ten day, and twenty day moving averages to give investors a sense of if the stock is over-bought or under-bought. As the price exceeds the three moving averages this is a common time for traders to sell and as the price falls below the three averages this is a signal for an investor to buy. Examples of this strategy can be seen in section 5.4 below in charts 5.6 and 5.7 as I sold FSLR on 6/14/2011 and bought USO on 6/17/2011 based on the 5-10-20 strategy [11].

5.3 Stocks Chosen

The method used to chose the two stocks and one etf to be used in the simulation was a relatively simple one I used a market carpet from as seen in chart 5.1 to determine which sector was currently up trending and from there I chose three equities that had recently been up trending. This simple strategy would later come back to hurt my profits as the sector was up trending at the time of purchase the three equities had seemly already reached their maximum potential in the uptrend and their price would fall as a result of this. However even with this problem through the use of technical indicators I was able to minimize losses and make up for most of the losses experienced early on. This is due to the fact that the particular company does not matter as much as the trends that the company and sector are experiencing at a given point in time. Below is a brief background on Exxon Mobil, First Solar, and United States Oil which were the three equities chosen to be used as part of the simulation.

MarketCarpet: S&P Sector ETFs



Chart 5.1: Market Carpet [12]

Exxon Mobil Corporation (XOM)

Exxon Mobil Corporation engages in the exploration and production of crude oil and natural gas, and manufacture of petroleum products, as well as transportation and sale of crude oil, natural gas, and petroleum products. The company manufactures and markets commodity petrochemicals, and polypropylene plastics. The company has operations in five different continents around the world. Exxon Mobil Corporation was founded in 1870 [15].

First Solar (FSLR)

First Solar manufactures and sells solar modules using thin-film semiconductors. They also design, construct, and sell solar power systems. The company's solar modules convert sunlight into electricity. First Solar operates primarily in the United States, Germany, France, and Canada. First Solar was founded in 1999 [15].

United States Oil Fund (USO)

The United States Oil Fund is an ETF that invests in futures contracts for Texas Intermediate (WTI) light, sweet crude oil, other types of crude oil, heating oil, gasoline, natural gas and other petroleum based-fuels that are traded on exchanges [15].

5.4 Trades

The trend-following strategy is generally a shorter term strategy and requires a higher trade frequency than that of a growth or value strategy. This is due to the fact that market trends are more subject to macro-economic and company news. The simulation started on May 31st where 1200 shares of XOM were bought at \$83.28, 396 shares of FSLR at \$126.37, and 2459 shares of USO at \$40.66 per share. This was not the opportune time to purchase each of these three as can be seen on charts. On June 17th, the position in FSLR was sold off at \$121.55 as chart 5.3 showed that FSLR's Stock price (blue solid) had just passed the 20 simple moving average (blue line) and therefore would likely be down trending as people tend to take profit at the moving average. Chart 5.6 also showed that FSLR had cleared the five, ten, and twenty day exponential moving averages in red green and pink respectively. The cash from selling the position in FSLR was used to purchase 1313 additional shares of USO as chart 5.4 showed the price (blue) trading below the lower Bollinger band (red) and chart 5.7 showed the price below all three exponential moving averages as of June 17th. On June 21st, the 1200 shares of XOM

were sold at \$80.57 per share for a \$3272.00 loss. This decision was made as chart 5.2 shows the stock price of XOM heading toward the 20-day simple moving average (blue) and charts 5.5 shows that the stock price of XOM is above all three exponential moving averages. The same day an additional 2628 shares of USO were purchased at \$36.79 as chart 5.7 indicated that USO was trading below the five, ten and twenty day exponential moving averages. In addition, chart 5.8 indicates that USO is just above support at \$36.16 (blue) and well below resistance at \$38.56 (red). Finally on July 7th, 6400 shares of USO were sold for a profit of \$2301.75.

Date	Symbol	Buy/Sell	Price	Shares	Net Cost/Proceeds	Profit/Loss	Total Cash	Total Profit
5/31/2011							\$250,000.00	
5/31/2011	XOM	Buy	83.28	1200	\$99,946.00		\$150,054.00	
5/31/2011	FSLR	Buy	126.37	396	\$50,052.52		\$100,001.48	
5/31/2011	USO	Buy	40.66	2459	\$99,992.94		\$8.54	
6/17/2011	FSLR	Sell	\$121.55	396	\$48,123.80	-\$1,928.72	\$48,132.34	-\$1928.72
6/17/2011	USO	Buy	\$36.63	1313	\$48,105.19		\$27.15	
6/21/2011	XOM	Sell	\$80.57	1200	\$96,674.00	-\$3,272.00	\$96,701.15	-\$5200.72
6/21/2011	USO	Buy	\$36.79	2628	\$96,694.12		\$7.03	
7/7/2011	USO	Sell	\$38.61	6400	\$247,094.00	\$2,301.75	\$247,101.03	-\$2898.97

Table 5.1: Trend Following Transactions



Chart 5.2: XOM Bollinger Bands 5/31/2011-7/7/2011 [3]



Chart 5.3: FSLR Bollinger Bands 5/31/2011-7/7/2011 [3]

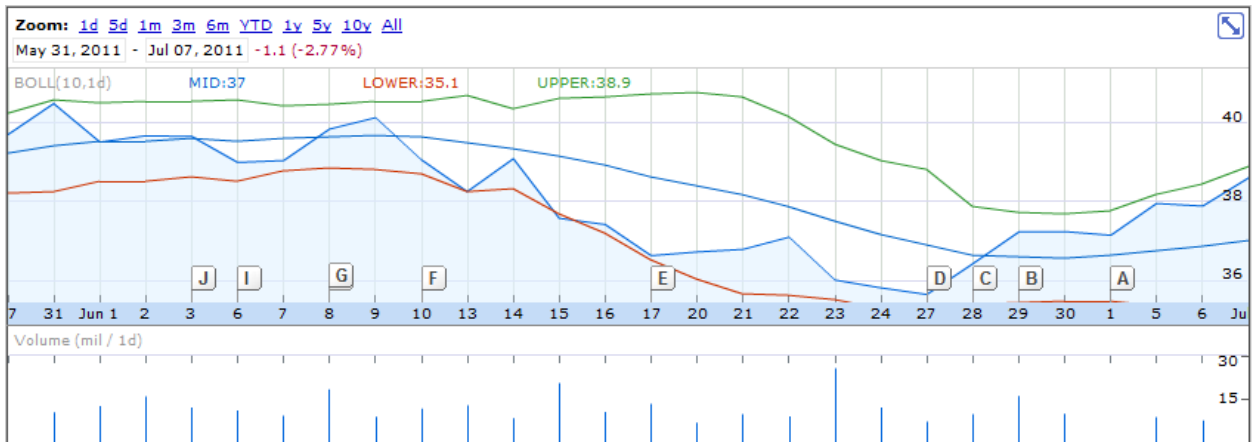


Chart 5.4: USO Bollinger Bands 5/31/2011-7/7/2011 [3]



Chart 5.5: XOM 5-10-20 EMA's 5/31/2011-7/7/2011 [3]



Chart 5.6: FSLR 5-10-20 EMA's 5/31/2011-7/7/2011 [3]



Chart 5.7: USO 5-10-20 EMA's 5/31/2011-7/7/2011 [3]



Chart 5.8: USO at Support 6/21/2011 [13]

The above chart gives resistance levels (red) and support levels (blue) as determined by stockconsultant.com using data of the stock price over time. As we can see the USO stock price is just over a support level at about \$36.16 and below a resistance level at \$38.55. Therefore I decided to purchase 2628 shares of USO at a price of \$36.79 with the money from selling off my shares of Exxon Mobil. My exit point is somewhere just before the \$38.55 resistance level which appears to be around the twenty day moving average currently.

5.5 Conclusion and Results

The Trend-Following simulation saw a loss of 1.16%. This was due to the initial purchase of USO, XOM and FSLR which were well above the 5-10-20 moving averages made it hard to turn a profit after initially taking a loss from them. However, the use of the 5-10-20 strategy and Bollinger bands allowed me to sell off those shares before a potential major loss and allowed me to move my position to USO on June 17th and June 21st which these purchases saw a return of about 5% which is probably about that of the returns seen over that three week period by the

Dow Jones, NASDAQ, and S&P 500. In conclusion, current position is everything with the trend following trading strategy as it gives you your entrance and exit strategy which is a critical part of the trend following technique. I believe that the returns that were realized in my positions in USO from June 17th and June 21st are a better reflection of the trend following strategy as I initially bought them in a better current position or as they were seen to be under-bought or over-sold. The timing on my initial positions in USO, XOM, and FSLR were not a great reflection of the potential returns of the trend following strategy as I bought them when they were over-valued.

Chapter 6: Market News throughout Simulation

6.1 Introduction

The impact that news such as jobless claims, GDP announcements, consumer and producer price index, home sales, and chairman conferences, cannot be emphasized enough. The information provided these announcements gives investors an idea in which the market is headed either up or down, where the market is currently at, and where the market should be at given this information. With that said here is a list of the events that and information that was released during the simulation broken down by week over the six week simulation.

6.2 Week 1 (5/31/2011-6/3/2011)

The market moved downward after several negative news stories the most prominent coming on Friday, where the payroll report showed that there was only an increase of 54,000 jobs for the month of May which was well below consensus expectations of 170,000 jobs. The addition of 54,000 jobs paled in comparison to 232,000 jobs added during the month of April and caused the unemployment Chart to rise to 9.1%.

Another negative news story leading markets downward this week was the announcement by Institute for Supply Management (ISM) which showed a level of 53.5 which was a significant drop from 60.4 level in April. The 53.5 level fell below the 57.5 consensus level and showed slowing expansion as a level above 50 shows expansion and below 50 shows contraction. While the manufacturing index was down the ISM reported for the services sector in the USA was at a level of 54.6 and slightly above the consensus of a level of 54. The 54.6 level was up from 52.8 in April [2].

6.3 Week 2 (6/6/2011-6/10/2011)

As the simulation went into the second week the market continued to downtrend on the news that jobless claims remained at 427,000 which up 1,000 from the week before. The 427,000 jobless claims were also higher than the expected consensus of 418,000. The positive news for this week was that the international trade deficit decreased to -\$43.7 billion down from -\$46.8 billion in April and above the consensus of -\$49 billion. The large dip in oil prices was said to play a significant role in improving the US deficit. Even with this positive news concerns over European debt and the United States debt ceiling rapidly approaching led to another decline in the market [2].

6.4 Week 3 (6/13/2011-6/17/2011)

The third week of the simulation experienced a mix of positive and negative news leading the Dow Jones and S&P 500 slightly up, while the NASDAQ fell slightly. As concern continues to grow over the debt in Europe, investors learned Thursday that the bailout funds would continue to be given to Greece at least until end of September. During the week the consumer price index which is commonly used to measure change in inflation, increased by 0.2% this was above the consensus of 0%. In other news, retail sales were reported to have dropped by 0.2% during May, housing starts were at 560,000 for May above the consensus of 541,000, and jobless claims were at 414,000 below the consensus of 420,000 and down from 430,000 the week before [2].

6.5 Week 4 (6/20/2011-6/24/2011)

The fourth week was filled with a lot of big announcements that led the market down slightly. Wednesday saw Ben Bernanke's press conference where he said that the market was growing but not at the rate that he initially expected due to temporary factors. He also seemed

concerned over an increase in inflation as the market continues to grow and as they continued to deliberate over the debt ceiling in Washington. Another big event for the market occurred on Tuesday as the Prime Minister of Greece managed to get a parliamentary vote which gives the Greek government to take the necessary measures in order to continue receiving bailout money. This will come in the way of tax increases for the people of Greece and spending cuts for the government. In other news for the week existing home sales were said to be at 4.81 million which was above the consensus of 4.75 million but still a significant fall from the previous level of 5 million. Additionally, Jobless claims dropped to 319,000 from 326,000 but were still above the expected consensus of 305,000. In other big news the real GDP growth was shown to be 1.9% which was just below the expectation of 2% [2].

6.6 Week 5 (6/27/2011-7/1/2011)

The markets boomed going into the holiday weekend as there were several positive news events throughout the week. The first major news story was the Institute for Supply Management (ISM) which showed a level of 55.3 which was far above the consensus of 52 and previous level of 53.5, showing recovery in manufacturing. In other good news for the week, the pending home sales index increased to a level of 88.8 up from 81.9 the previous month. In other positive housing news the Case-Shiller data showed home prices increased by 0.8% which was a tremendous increase from the -0.6% the prior month. Finally, jobless claims fell by 1000 from the previous week to 428,000 but were still above the expected consensus of 420,000 claims. This week also saw big news in the technology sector as Facebook announced it would use their acquisition of Skype to allow for video calling through Facebook. Google also announced this week that they will be launching a new social network called Google Plus which has some investors looking for large growth in Google [2].

6.7 Week 6 (7/5/2011-7/7/2011)

In the final week of the simulation, there were three news stories that led to a slight uptrend in the market for the week. The first story was that the jobless claims were reported at 418,000 down from 432,000 the previous week and beating the consensus of 420,000 claims. In other news, factory orders increased by 0.8% for May which was a bounce back from a -0.9% drop off in April. Finally the ISM reported for services sector that composite index level was at 53.3 for June and fell just below the consensus level of 54.0 [2].

7.8 Conclusion

The news played a tremendous role in the simulation as it always tends to play a big role on the markets as can be seen in the following six charts. Chart 6.1 below shows the Bollinger bands (Green), Dow Jones Index (Blue), and 20-day moving average (Red) from the April 1st- July 7th. As you can see the market took a harsh dip the from the end of May through the middle of June riding the lower Bollinger band until the positive news of the Greek bailout, positive manufacturing and housing data, and a decrease in jobless claims led to an upswing from the middle of June to the end of the 1st week of July. The following chart 6.2 shows the 5-day (Red), 10-day (Green) and 20-day (Yellow) exponential moving averages, as well as the Dow Jones Industrial Average (Blue) from the April 1st- July 7th. The market was consistently below all three averages until the news turned around in the middle of June and the Dow shot above all three averages. The third chart 6.3 displays the Bollinger bands (Green), NASDAQ Average (Blue), and 20-day moving average (Red) from the April 1st- July 7th. As you can see the market took a harsh dip and then recovered nicely with the big announcements from Google and other technology companies going into the last week of June and the start of July. The fourth chart is the 5-day (Red), 10-day (Green) and 20-day (Yellow) exponential moving averages, as well as

the NASDAQ Average (Blue) from the April 1st- July 7th. The market fell below all three averages from the end of May until the middle of June. The strong performance from the technology sector at the end of June helped the NASDAQ rocket above the three averages. Below chart 6.5 is the Bollinger bands (Green), S&P 500(Blue), and 20-day moving average (Red) from the April 1st- July 7th. This chart shows how the news has a similar impact on all three indices even though their holdings may vary. The final chart 6.6 is the 5-day (Red), 10-day (Green) and 20-day (Yellow) exponential moving averages, as well as the S&P 500 (Blue) from the April 1st- July 7th. This chart yet again shows the impact that the economic news holds on all three indices and that all three indices respond similarly to macroeconomic events. Also as seen toward the end of June you can see how positive macro-economic news can surpass even technical indicators to sell.



Chart 6.1: Dow Jones (DJIA) Bollinger Bands 7/7/2011 [15]



Chart 6.2: Dow Jones (DJIA) 5-10-20 EMA's 7/7/2011 [15]



Chart 6.3: NASDAQ Bollinger Bands 7/7/2011 [15]

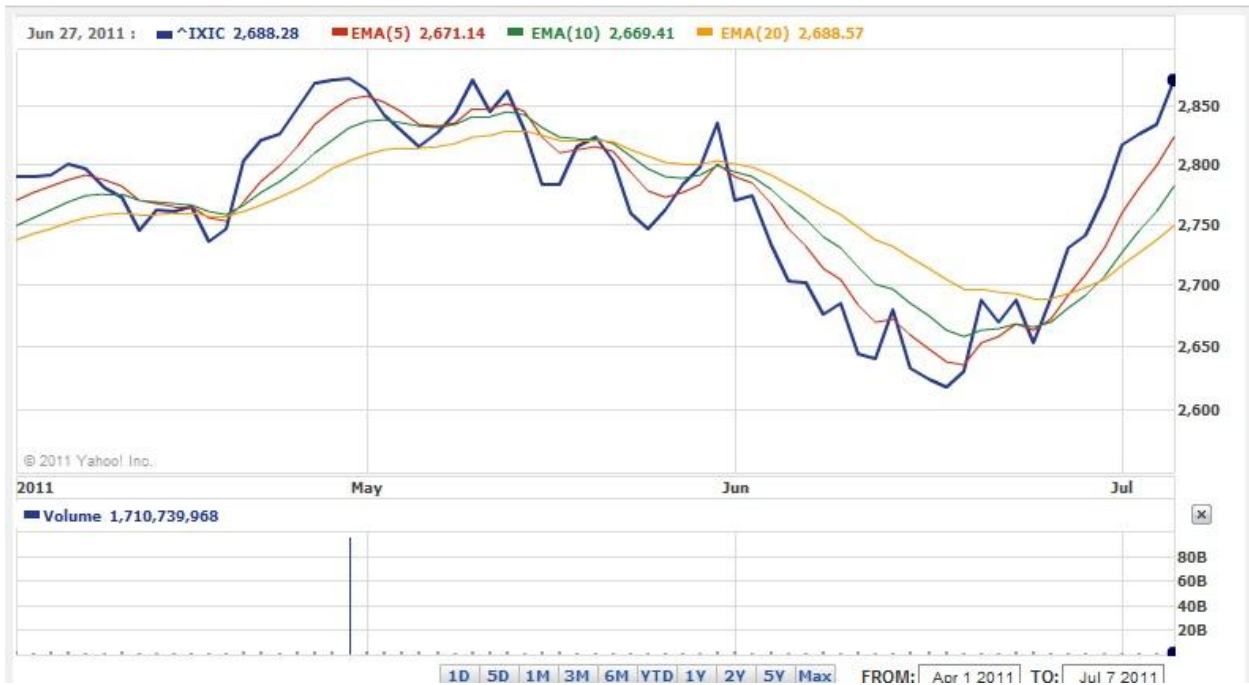


Chart 6.4: NASDAQ 5-10-20 EMA's 7/7/2011 [15]

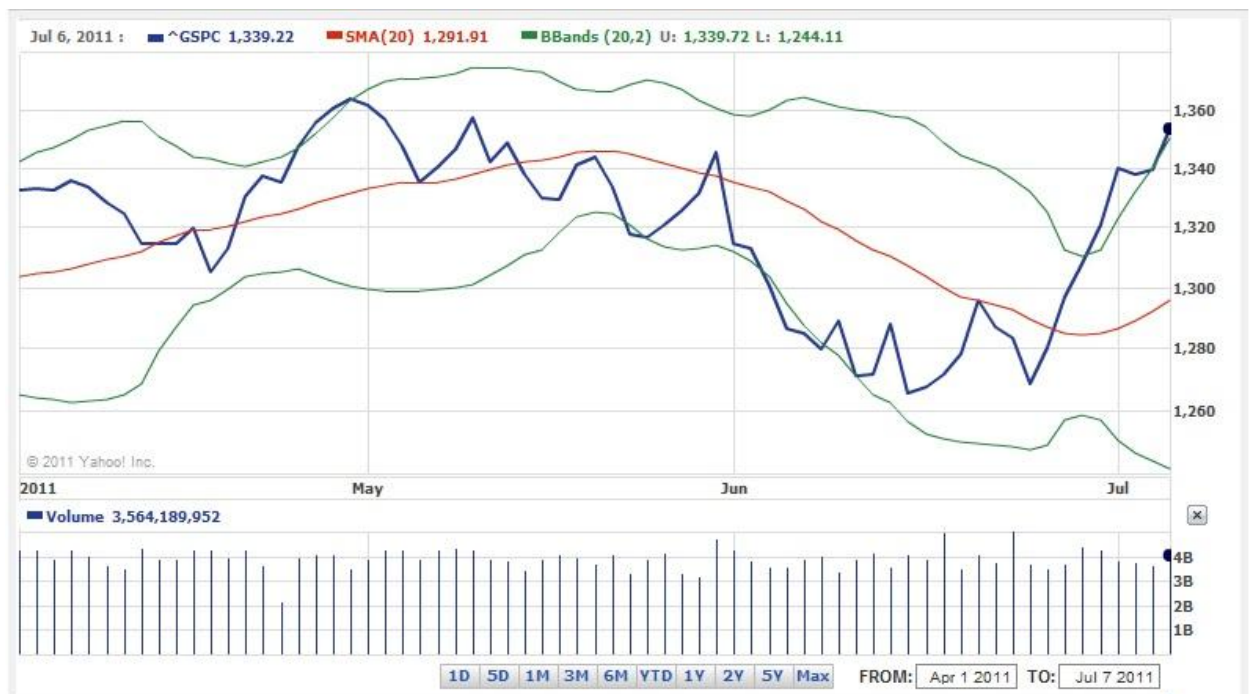


Chart 6.5: S&P 500 Bollinger Bands 7/7/2011 [15]



Chart 6.6: S&P 500 5-10-20 EMA's 7/7/2011 [15]

Chapter 7: Comparisons & Analysis

The three strategies of Growth Investing, Value Investing, and Trend-Following saw returns of 9.45%, 8.06%, and -1.16% respectively. These numbers do not tell the whole story of which strategy is the best however. The growth strategy performed the best overall but also seemed very risky at first as you know the companies you're investing in have been growing for a while and are supposed to grow in the future but you do not know what factors the news and market are going to deal with and how they are going to impact the potential growth of these companies. Also when investing in growth companies long term, it is important to make sure you are following that company to make sure that they are still innovative, their financials are still solid, they aren't at risk for a potential lawsuit or other extraneous factor that could have a harmful impact on those companies' growth in the future.

The nice thing about value investing is that you do not have to worry about the company's products or what they are doing in the future and you can use the data that is easily available to the public to make investment decisions. Whereas with growth investing there is a lot going on internally in a company that could impact an investor's decisions or investment that they will never know about such as new products or a new direction for the company. Value investing is nice because it is easy to make a decision once you find out a company is grossly undervalued and that their current market price is far lower than it should be. However the problem I noticed with value investing personally is that it is particularly hard to find undervalued companies that meet Benjamin Graham's standards. Some methods that help make this easier are to use a stock screener to narrow the field for you or to find someone else who is a value investor and suggests a particular company and to re-evaluate that stock to see if it is currently still undervalued.

Trend-following investing is thought to be the safest out of the three styles as you are not investing in potentially over-hyped stocks whose future growth is already taken into their stock price or cheap stocks whose stock price will never be able to meet the level that it should be at. Additionally, trend following seemed the most clear-cut out of the three strategies as you buy when the price is below the five, ten, and twenty day exponential moving averages and around the lower Bollinger band and sell when it approaches the upper Bollinger band 20-moving average or clears the three exponential averages. Some disadvantages to Trend-following are that the gains are usually smaller than that of growth and value investing and it also more time consuming.

Finally, as seen in table 7.1 below two of the three strategies used during the simulation outperformed the three major indices. Also if you take the cumulative performance of all three portfolios in the simulation this was more than doubled the growth of the Dow Jones with the cumulative portfolios growth at 5.45% and the DJIA at 2.22%.

Index or Strategy	Original Value (5/31/11)	Closing Value (7/7/11)	Total Change	% Change
DJIA	12,443.40	12,719.49	276.09	2.22%
NASDAQ	2,824.25	2,872.66	48.41	1.71%
S&P 500	1,331.10	1,353.22	22.12	1.66%
Growth	250,000.00	\$273,615.95	23,615.95	9.45%
Value	250,000.00	\$270,141.20	20,141.20	8.06%
Trend-Following	250,000.00	\$247,101.03	-2,898.97	-1.16%
Cumulative	750,000.00	\$790,858.18	40,858.18	5.45%

Table 7.1: Overall Performance Comparison

Chapter 8: Conclusion

In conclusion, the simulation was successful as two of the three strategies produced a significant amount of profit and outperformed the three major indices with the exception of the trend-following strategy. Cumulatively, the three strategies more than doubled the performance of that of all three indices as seen above in table 7.1. During the simulation the main obstacle was the six-week timeframe on which the simulation was conducted. The Growth strategy was the most successful due to positive news in the marketplace but this seems to be more of good timing for growth stocks on a short positive upswing rather than long term rapid growth. Had the timeframe of the simulation been longer it would have been interesting to see if the Growth stocks would continue on their rapid pace or would if they would tail off. Also the longer time frame would allow one to see if the value or trend following strategies were able to catch up to the return of the growth stocks performance if they were to slow in growth. The performance of the three strategies would have been likely been significantly better if the time frame were longer as the short time frame forced the simulation to start at a time where the current positions of the stocks chosen were not ideal. This however taught me the importance of current position when deciding on a time to invest in the market. I also learned how crucial current position was to the value and trend-following technique as the poor initial market position had me “paddling upstream” to make up for early losses.

Two things that I would have done differently would have been to analyze trends using daily Bollinger bands similar to that of day trading strategy rather than 20-day Bollinger bands I used for the trend following strategy. A better assessment of the value trading technique would have been to use stocks that fit Benjamin Graham’s requirements rather than just stocks that were deemed to be trading at a greatly undervalued price at the time.

The project really opened up my eyes to the value and trend-following strategies as before I was almost exclusively a growth style investor. This new knowledge gives me the ability to intelligently invest in a wider variety of companies and sectors due to the fact that I now have a background in the value and trend-following investment strategies. This experience gave me a basic understanding on how the market works, what impacts the market, how to go about analyzing particular stocks and how to track and trade those stocks in a professional and intelligent manner. Another tremendous benefit of this project is that since it is a simulation you can gain a lot more experience trading in a short amount of time than if it was real money because when trading real stocks you have to worry about taxes on profits, large commissions, fees and potentially losing real money which make one less likely to trade or become involved with the market. As I look to pursue a career in finance this project stimulated my interest in the financial markets and taught me what factors influence the market and sources one can use to provide the information necessary for making choices in the market. The project also forced me to develop a habit of checking the market daily and determining the markets current position. Overall this project was a tremendous learning experience as I gained a vast amount of knowledge about all three trading strategies and developed the necessary skills that will help me to be more of a complete investor in the future.

References

1. Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Essentials of Investments*. Boston: McGraw-Hill/Irwin, 2007. Print.
2. "Economic Calendar." *Bloomberg*. Web. 14 Jul 2011.
<<http://www.bloomberg.com/markets/economic-calendar/>>.
3. Estrada, Javier. "Adjusting P/E ratios by growth and risk: the PERG ratio." *International Journal of Managerial Finance* 1.3 (2005): 187-203. Web. 5 Jun 2011.
<<http://web.iese.edu/jestrada/PDF/Research/Refereed/PERG.pdf>>.
4. Google.com/Finance <<http://google.com/finance>>
5. "History of the Stock Market." *http://finance.mapsofworld.com/* Web. 20 May 2011. <http://finance.mapsofworld.com/stock-market/history-of-stock-market.html>
6. Investopedia. <<http://investopedia.com/>>
7. Maranjian, Selena. "The Motley Fool." *Want to Be a Millionaire? You Can!*. N.p., n.d. Web. 20 May 2011. <<http://www.fool.com/teens/teens01.htm>>.
8. MSN Money <<http://money.msn.com/>>
9. "OTC NYSE stock tips." *Advantages and Disadvantages of Investing in Stocks*. OTC NYSE stock tips, Web. 27 May 2011. <<http://www.otcnyse.com/2008/05/07/advantages-and-disadvantages-of-investing-in-stocks/>>.
10. Ritchie, Joshua. "The History of the Stock Market." *http://www.mint.com/* 30 07 2009. Web. 20 May 2011. <<http://www.mint.com/blog/investing/the-history-of-the-stock-market/3/>>.
11. "Seeking Alpha." *Testing the 5-10-20 Trend-Following Strategy* . N.p., 02 12 2008. Web. 17 Jun 2011. <<http://seekingalpha.com/article/108708-testing-the-5-10-20-trend-following-strategy>>.
12. Stockcharts. <<http://stockcharts.com/>>
13. Stock Consultant <<http://stockconsultant.com/>>

14. Victor, Jins. "Value or Growth. Which style should you adopt?." *Share Market School*. Web. 2 Jun 2011. <<http://www.sharemarketschool.com/value-or-growth-which-style-should-you-adopt/>>.
15. Yahoo Finance. < <http://finance.yahoo.com/>>