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An Interactive Qualifying Project Report:

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ABSTRACT

This Interactive Qualifying Project is a stock market simulation exploring the reliability of three common stock trading strategies: buy and hold, day trading, and trend following. Each strategy was tested in a separate simulation, each starting from the same budget and taking place simultaneously over the same seven week time period. Ten companies were selected for use in all three simulations and general corporate histories and information were reviewed. The goal of the research and simulations was to produce a final super-system containing different percentages of the three basic strategies. The conclusions reached were based on careful analysis of the experimental results. As expected, the final super-system contains primarily buy and hold, followed by trend following, and day trading takes the lowest priority. Overall, this project was successful and highly informative.

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Chapter 1. INTRODUCTION

The stock market is not the easiest realm to enter unprepared. The intricate nature of the way money can be put to good use to create more money, or, in the attempt, be wholly lost due to bad luck or poor decisions, is one of the most complicated arenas of play constructed by man. Middlemen line up to control and manipulate stock owned by others, shrewd billionaires cripple enormous corporations, and frantic brokers scream into telephones. All of these players have the mentality of a good gambler; when you lose, lose as little as possible, but when you win, win as much as possible. Today, intelligent investors can largely cut out the middlemen, if they so desire, conducting trades strategically behind the screen of a computer, doing their own diligent research. The gambler's mentality still pervades, and there are many sharks in the water. It is important to learn as much as possible about the stock market before jumping in. A stock market simulation is one of the best ways to acquire a basic understanding of the skills and challenges involved with investing.

1.1 *Brief History of the Stock Market*

The concept of investing has existed for as long as people have been able to freely spend money. We naturally seek to take what we have and use it to gain more. In the modern stock market, anyone can purchase a small piece of the value of any publically traded company. If the company is successful, and increases its net worth, the stock value increases. At this point, a person who bought the stock when it was cheaper may choose to sell it, and walk away with more money than he spent. However, often times a stock will decrease in value when the company proves unsuccessful. An optimistic investor might choose to wait and see if the value starts to rise again, whereas another might choose to sell it then and there, accepting a small loss.

The second investor fears what might befall the first should the stock value plummet and never rebound. Playing the stock market is a game of basic strategy; one would like to buy a share, watch the value rise as fast as possible, and sell it. But like all games of basic strategy, there are complicated ways to play, and being able to spot which shares to buy, when, and how many, are skills that take years to develop.

Stock exchanges first developed into fruition during the rise of the East India Trading Companies in the 1600s. European investors would fund expeditions to Asia and the Indies collaboratively to minimize the risk involved for a single person to stake the operation. Trading ships would often sink, but the more investors funding each venture, the more the risk was spread and minimized. Investors would find themselves funding multiple ventures at once, never making quite as much on a successful voyage as they would funding it alone, but losing less when something went wrong. The companies eventually began to consolidate and, instead of forming a wholly new investment opportunity for each voyage, they began to fund repeating ventures. These companies established a level of permanence that made it conducive for investors to purchase paper stocks, shares of the value of the company. The negative effects of a single mishap at sea would no longer cost anyone a fortune. People could buy and later sell these paper stocks by hiring a stock broker to aid in the transaction process. Over time these transactions began to take place in small exchanges, gatherings of brokers and investors, which would grow over hundreds of years into the vastly larger stock exchanges of today [5].

Presently, the largest and most powerful stock exchange in the world is the New York Stock Exchange (NYSE), which recently merged with the European stock exchange, Euronext. The next three stock exchanges as ranked by market capitalization are the NASDAQ, the Tokyo Stock Exchange (NIKKEI 225), and the London Stock Exchange; the NYSE is larger than these

three stock exchanges combined. The companies traded in this experiment are on the NYSE and the NASDAQ. Operating hours for these stock exchanges are Monday through Friday, 9:30 a.m. to 4:00 p.m. and trading during the experiment will be timed accordingly [5].

The New York Stock Exchange was formed in 1792, nineteen years after the London Stock Exchange and two years after the Philadelphia Stock Exchange. Because of its location and careful organization, the NYSE rapidly became a force to be reckoned with. The enormous industrial metropolis surrounding the Wall Street headquarters fed fuel to the economic flames. Banks quickly invested themselves and strengthened the NYSE position further. The London Stock Exchange also found itself at legal disadvantages in its competition with the NYSE, governed by British law and prohibited from dealing with shares. Trade was a major reason why New York City existed in the first place, being a port city strategically located at the outlet of several large rivers; over time, trade was so successful there that it became the most populous city in the United States. With all that economic activity, it only follows logically that the world's most powerful stock exchange would arise and thrive there [5].

From shortly after its inception until now, the NYSE has had more financial power than any other stock exchange in the world. The have used that power to sustain and increase their advantage over time. The more reliable an institution becomes, the more people want to get involved. The NYSE is the kind of institution, at this point, deemed "too big to fail." If it were to collapse, the resulting economic nightmare is cause enough for government intervention and bailout. This has helped to increase faith in the organization and increase its power and dominance further.

The major competition for the NYSE is the relatively new stock exchange called the NASDAQ (National Association of Securities Dealers Automated Quotation). Formed by the

NASD (National Association of Securities Dealers), later renamed the FINRA (Financial Industry Regulatory Authority), the NASDAQ is a fully electronic stock exchange run by a large network of computers around the world. They reduced the bid-ask spread, which represents the difference between the lowest price a seller is willing to sell the stock for and the highest price the buyer is willing to pay; this gave them a distinct advantage over the NYSE. Despite these advantages, the NASDAQ is still much smaller than the NYSE in terms of market capitalization, which often tends to be the deciding factor for companies looking to join one or the other. Thus, the NYSE still tends to attract larger companies and remains the world's largest stock exchange. However, it is important to recognize that the NASDAQ was established in 1971, nearly two hundred years after the NYSE, and it has risen to present a significant force of competition against its older counterpart [5].

1.2 *Goals, Scope, General Plan*

The goal of this project was to test three basic stock market trading strategies and assess the results of the test to determine which is the most lucrative. Once this has been determined, and given that a working strategy would involve a combination these strategies, define the combination which would produce the best results. A portfolio of ten companies was chosen for trading and was used in all three experiments. By using the same companies for each experiment, the difference in terms of gains and losses between the strategies will be dependent more on the strategy itself than the selection of the portfolio. The experiments were conducted simultaneously over the course of a seven-week simulation. Starting with a budget of $250,000 in each separate experiment, all trades were conducted and recorded in accordance with the tenants of the trading strategy under scrutiny. The gains and losses were accounted for using a

table system. This experiment was also accompanied by careful research into the stock market field to ensure that errors in implementation of the trading strategy were minimized and allow for accurate analysis of results. At the end of the experiment, the final results of gains and losses for each strategy were assessed, and the strategies were ranked accordingly.

1.3 *Portfolio*

Any good experiment must have some level of control over variables which may affect the results. This being said, choosing the right companies to buy is of paramount importance in playing the stock market correctly. A portfolio of ten companies was carefully chosen for use in all three experiments to minimize the differences which would be apparent were completely different companies chosen for each strategy. The portfolio consists of the following.

Ticker Symbol	Full Name	Exchange
LUV	Southwest Airlines Company	NYSE
DCIX	Diana Containerships Incorporated	NASDAQ
DPZ	Domino's Pizza Incorporated	NYSE
MSFT	Microsoft Corporation	NASDAQ
GOOG	Google Incorporated	NASDAQ
BAC	Bank of America Corporation	NYSE
GS	Goldman Sachs Group Incorporated	NYSE
WEN	Wendy's Company	NASDAQ
PCYC	Pharmacyclics Incorporated	NASDAQ
HOG	Harley Davison Incorporated	NYSE

Figure 1.1 Portfolio

Each of these companies was selected for specific reasons. Southwest Airlines Company was selected because the seven weeks of the simulation will take place primarily in the summer months, when the travel sector should see an increase in demand. Diana Containerships Incorporated is considered a part of the oil and gas sector, with a specialization in pipelines. Oil

will most certainly increase in value until the reserves have dried, and upcoming plans for new pipelines through the United States should help stock in this company increase in value over the course of the experiment. Domino's Pizza Incorporated has seen very steady growth in the past year, and the prepared food industry is sure to see a rise in sales during the summer months. The Microsoft Corporation has recently started to produce hardware to match its newest software and is currently working to broaden its app market. Google Incorporated has been very successful with its Android smartphone operating system over the past two years and is pushing the envelope of new technology; it would be surprising to see Google stock value decline any time soon. Bank of America Corporation and Goldman Sachs Group Incorporated are extremely successful companies in the banking sector. Shares in these two companies are some of the most stable, unless another banking crisis should occur during the simulation. Wendy's Company was chosen both because of the expected increase in business for the prepared food industry and a surprising increase in its stock value over the past year. Pharmacyclics Incorporated was chosen to bring the pharmaceutical industry into the experiment. Finally, Harley Davidson Incorporated was chosen to have an outlet in the automotive industry, while at the same time capitalize on a type of vehicle which sees more demand during the summer months, the motorcycle.

These companies were also reviewed to ensure that they have been experiencing relatively steady growth lately. As one of the strategies being explored in this experiment will later describe, buying stocks which have been experiencing growth is generally a good idea. The portfolio has also been carefully designed to be diversified. Buying stock in companies across several industrial spectrums is a profitable move. Should one sector do poorly, the others likely will not, and hopefully the gains will not only balance the losses, but exceed them.

Chapter 2. COMPANY HISTORIES

The stock is a share in the ownership of the company. The value of the stock therefore greatly depends on the value of the company and how well that company can meet the demands of its customers. Understanding whether the business practices and results of a company are worth an investment can come only with an understanding of the history of that company. The more information an investor can acquire about the history of a company, the more he can understand the current fluctuations in stock value. Whether business practices are improving, remaining the same, or declining, the current business practices are dependent on the history to this point. Sometimes, the history of a company is repeated; sometimes, lessons are learned from it. Regardless, it is intrinsically connected to the stock value and how that value will change.

2.1 *Southwest Airlines Company*

The Southwest Airlines Company is one of the largest airlines in the United States. It was founded in 1967 and began operating under its current name on June 18, 1971. The fleet utilized by Southwest has been completely comprised of Boeing aircraft since then. During the 1970s and 1980s, a small number of Boeing 727s were used, but otherwise the airline has relied solely on the Boeing 737. Over 550 of these aircraft are currently in service, each making multiple flights every day. The reliability of these American-made planes has helped Southwest Airlines to carry the most domestic passengers daily of any airline in the United States as of 2011 [7].

The original name of the company was Air Southwest, founded by Rollin King and Herb Kelleher. It was intended to be an airline solely for travel within the state of Texas to avoid federal regulation. Competing airlines attempted to bring legal action against Southwest for this effort to take advantage of a flaw in the system with no success. The Supreme Court of Texas

upheld the company's right to fly within the borders of Texas. This allowed Southwest to quickly beat out its native competition [7].

In 1978, the company began to plan for expansion to interstate travel. Laws governing the major airport in Dallas, Love Field, would force Southwest to wait, however. In 1979, Southwest began to offer flights from Dallas to Alabama, Mississippi, and Kansas. Through the 1980s, the company continued to expand through mergers and acquisitions. In 1995, Southwest became one of the first airlines with a website where customers could check on arrival and departure times along with other information about the company. Quite a large amount of money was also spent on upgrading their headquarters through the 1990s, and on expanding their footprint on Love Field, which was the inspiration for their ticker symbol, LUV [7].

In 2006, after a few years of legal work, Southwest Airlines would repeal the Wright Amendment, relieving itself of all legal restrictions on where it could fly its planes within the United States. This gave Southwest the capability to expand its operations and offer flights nationwide. In 2010, Southwest acquired AirTran Airways in a transaction worth about $3.2 billion. This allowed Southwest to open flights to a few new destinations including Atlanta, Mexico, and the Caribbean [7].

Currently, Southwest Airlines Company has 46,000 employees and serves over 100 million customers each year. They pride themselves on customer satisfaction and have recently added an "eco-friendly cabin interior" along with other features such as satellite-based Wi-Fi connectivity, which allows internet access during flights, and live television, including sports, news, and movies. Southwest also pays heavy attention to its investors and recognizes their importance to the company. "In 2012, Southwest returned $422 million to Shareholders through

repurchasing $400 million of common stock (approximately 46 million shares) and distributing $22 million in dividends" [7].

After forty years of growth, it would seem that Southwest Airlines Company would be a reliable investment opportunity, whether long or short term. For this reason, primarily, it has been selected as a member of the portfolio for this experiment. Below is a chart showing the fluctuations in stock value for the past year.

Figure 2.1 Southwest Airlines Company 6/3/2012 – 6/3/2013 [23]

2.2 *Diana Containerships Incorporated*

Diana Containerships Incorporated is a relatively small company specializing in the ownership and operation of containerships. It was founded in 2010 and its headquarters is in the Marshall Islands. They seek to expand their investments by purchasing containerships from other companies, shipyards and lending institutions, along with the possibility of branching into the ship building industry. Currently, the company owns eight Panamax container vessels. The ownership of the company is primarily Greek; Symeon Palios is the Chief Execute Officer and Anastasios Margaronis is the President of the company [2].

The eight ships operated by Diana Containerships Incorporated, from the newest to the oldest, are the *Sagitta*, the *Centaurus*, the *Cap Domingo*, the *Cap Doukato*, the *APL Sardonyx*, the *APL Garnet*, the *APL Spinel*, and the *Hanjin Malta*. The *Sagitta* and *Centaurus* are of German make and were built in 2010. The rest of the containerships are slightly larger than these two and are all South Korean in origin. The build dates for the six South Korean vessels range from 1993 to 2002. Diana Containerships operates a relatively small fleet, but sells its ships and replaces them with more reliable models as often as possible [2].

The primary motivating factor in adding this company to the portfolio for this experiment was diversification of the overall portfolio. The freight moved by Diana Containerships is primarily related to the oil and gas sector, whether it be crude or refined oil or pipeline construction material. Were these commodities to increase in value, it would be logical to assume that the stock value for the company would likely increase as well. Oil and gas sector investments are by no means "a sure thing," the commodity value fluctuates unpredictably much like stock values, but generally when other investment sectors are doing poorly, the trend will balance itself and oil and gas will see a spike. This is why diversification is so important; when one sector in which an investor invests himself does poorly, his saving grace will be his simultaneous investment in other sectors which will likely do well, given that they are unrelated or loosely related.

As a young company, there is very little information to be found about Diana Containerships, but this can sometimes be an interesting investment opportunity if the company quickly begins making money. It will be traded carefully during the simulation. Below is a chart showing the fluctuations in stock value over the past year.

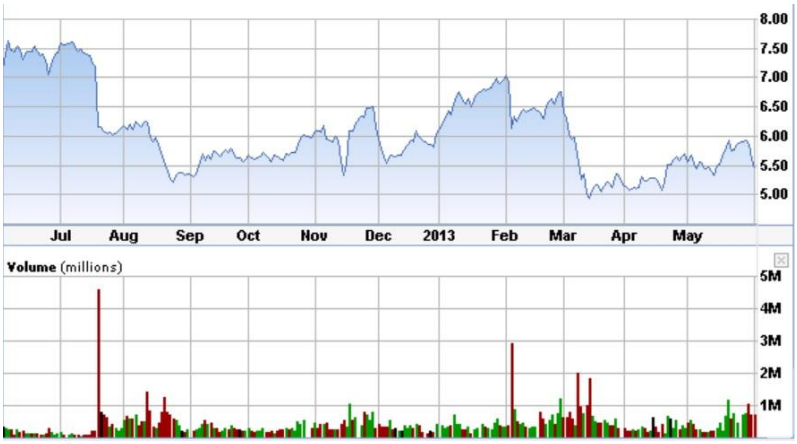


Figure 2.2 Diana Containerships Incorporated 6/3/2012 – 6/3/2013 [10]

2.3 *Domino's Pizza Incorporated*

Domino's Pizza Incorporated finds its origin in 1960. Tom and James Monaghan purchased a pizza shop called "DomiNick's" in Ypsilanti, Michigan for five hundred dollars, which Tom borrowed. In 1961, James sold his share of the company to his brother for a Volkswagen Beetle. Four years later in 1965, Tom renamed the company Domino's Pizza Inc. and began planning to open new franchise stores. The first franchise opened in Ypsilanti in 1967 and by 1968, Monaghan had opened several new stores across Michigan and the first store outside of the state had opened in Burlington, Vermont. Around the same time, the headquarters in Ypsilanti was destroyed in a fire, but Monaghan would not give up so easily. By 1978, there were over 200 Domino's franchise restaurants [1].

In 1975, the company faced a copyright infringement lawsuit brought on by Amstar Corporation, maker of Domino Sugar. Five years later, a federal court would rule in favor of Domino's Pizza Incorporated, and officially no copyright infringement was made. The 1980 court ruling opened the door for an extremely fast-paced period of growth in the 1980s for Domino's. In 1983, Monaghan opened his one-thousandth store along with the first international

stores in Winnipeg, Canada and Queensland, Australia. Then two years later, in 1985, Domino's opened 954 stores, for a total of 2,841. One of the stores opened that year was in Luton, England, another in Minato, Japan. In 1988, Domino's opened its first store in South America, located in Bogota, Colombia. By 1989, there were five thousand Domino's locations around the world [1].

Through the 1990s, Domino's found itself in a very comfortable position. They were able to try new menu items, including breadsticks, buffalo wings, and pizzas with flavored crusts, many of which are still sold. In 1998, Tom Monaghan retired and sold the company to Bain Capitol; the following year, David A. Brandon was named Chairman and Chief Executive Officer of Domino's Pizza Incorporated [1].

By 2000, the company opened its two thousandth store outside the United States. In 2001, Domino's entered into a two year partnership with the Make-a-Wish Foundation of America, and, during the September 11th tragedy, gave twelve thousand pizzas to relief workers. They also assisted the American Red Cross financially after the attack and donated $350,000 to the Disaster Relief Effort. In 2003, Domino's was named "The Official Pizza of NASCAR," and, throughout the decade, took advantage of new marketing strategies and campaigns to bolster its position over its competitors. It also continued to partner itself with charities including Saint Jude Children's Research Hospital. Public image is clearly very important for Domino's Pizza Incorporated, and public image is very important in ensuring a stable investment [1].

In 2009, Domino's faced troubling news as its pizza was receiving poor rating in consumer review polling. Bain Capitol sold the company and J. Patrick Doyle took over as CEO. Doyle launched a surprisingly unique advertising campaign focusing on what terrible reviews the pizza was receiving. Generally, it would be ill advised for a company to advertise its product as less than fantastic, but in this instance it achieved great success. During this ad campaign, Doyle

changed the Domino's pizza recipe, and marketed it as a "new and inspired pizza." The quarter saw one of the best returns the company had ever experienced [1].

Currently, J. Patrick Doyle is still the acting CEO of Domino's Pizza Incorporated. The company employs 145,000 workers, operating over ten thousand stores worldwide. There are Domino's Pizza stores on every continent except Antarctica. It earns $1.425 billion a year, not bad for a business originally purchased on $500 of borrowed money [1]. Below is a chart showing the fluctuations in stock value over the past year.

Figure 2.3 Domino's Pizza Incorporated 6/3/2012 – 6/3/2013 [11]

2.4 *Microsoft Corporation*

Bill Gates and Paul Allen founded Microsoft in 1975 after successfully establishing themselves in the computer industry by building a "BASIC interpreter" for the Altair 8800 microcomputer, sold by Micro Instrumentation and Telemetry Systems (MITS). The "Altair Basic" was also distributed by MITS, but Gates and Allen used their earnings to create their own company. The first operating system distributed by Microsoft was called Xenix, but the first successful operating system was released in 1981, MS-DOS 1.0. IBM had awarded Microsoft a contract to design the operating system for their IBM Personal Computer (IBM PC). Microsoft did not

actually design MS-DOS themselves; they purchased 86-DOS from a company called Seattle Computer Products and renamed it. They managed to preserve the rights to the system after the deal with IBM, and when other manufacturers began to release reverse-engineered personal computers based on the IBM PC, they still needed to go through Microsoft for the operating system software. This allowed Microsoft to become a dominant player in the computer industry. In 1983, Paul Allen resigned after a positive diagnosis for Hodgkin's disease [13].

Microsoft released Microsoft Windows, a visual extension for MS-DOS, in late 1985, and in early 1986, it moved its headquarters to Redmond, Virginia and started trading publically. A joint project with IBM allowed Microsoft to release an operating system called OS/2 to original equipment manufacturers (OEMs) in 1987, but it used this system to start designing Microsoft Windows NT, a 32-bit operating system which IBM held no rights over. In 1990, Microsoft released Office, its line of productivity programs including Microsoft Word and Excel. In 1993, it released Microsoft Windows NT, severing its ties with IBM [13].

In 1995, Microsoft began to shift its focus towards computer connectivity and the internet. Windows 95 was released alongside a new application called Internet Explorer, a web browser. Windows 95 was a 32-bit operating system focused on multitasking, running more than one application at a time. The Federal Trade Commission and the U.S. Department of Justice took legal action against Microsoft for bundling Internet Explorer with their Windows 95 software, resulting in later settlements. In 1996, Microsoft partnered with NBC Universal to create the 24/7 news network, MSNBC. Windows 98 was released on the year of its name as an upgraded version of Windows 95. In early 2000, Bill Gates relinquished his title as CEO to Steve Ballmer, a friend and longtime employee of Microsoft. Gates named himself Chief Software

Architect and continued to work in different roles without leaving the company. His current title is Chairman [13].

In 2001, Microsoft released Windows XP, a far more streamlined and capable operating system than its predecessors. The same year, the company also branched into the video game console arena with the release of the Xbox, a system which could compete with industry giants Nintendo and Sony. Windows Vista, the next Microsoft operating system, was released in 2007 alongside Microsoft Office 2007. Microsoft also began building a multi-core server in 2007 and, in 2008, created Azure Services Platform in an effort to provide cloud computing services to Windows users. A new user-interface system made Vista a significant leap beyond Windows XP, however there were several problems with the system, and Windows 7 was released in 2009 as an overhaul of all of the significant system malfunctions. The same year, the first Windows Store was opened, Microsoft's first venture into the retail market [13].

In 2007, Windows released its early version of the smart phone, Windows Mobile, but quickly began losing to Android phones and the iPhone. Three years later, they replaced it with the Windows Phone OS, the first models of which were made by Nokia and HTC. In 2012, they released the Windows Phone 8, with Microsoft hardware. Despite the fact that Microsoft finds itself at a disadvantage with a smaller app market than Apple and Google, the new systems are perfectly capable of competing with Android phones and the iPhone [13].

Despite constant legal trouble, Microsoft has proven that, as a company, it is a game changer. Microsoft software has changed the world beyond a shadow of a doubt, and the company continues to push the envelope on what is possible. In 2013, they released their first tablet with Microsoft built hardware, the Surface. They offer two separate models, the Surface RT and the Surface Pro. They are capable of running Microsoft Office, accessing the internet via

familiar browsers, and the Pro model has essentially the same capabilities as a standard laptop, but with a touchscreen and stylus [13]. In fact, the entirety of this project was completed using a Surface Pro tablet. Very few tablets on the market today can boast these abilities. Microsoft has proven itself as a worthwhile company and a solid investment. Below is a chart showing the fluctuations in stock value over the past year.

Figure 2.4 Microsoft Corporation 6/3/2012 – 6/3/2013 [20]

2.5 *Google Incorporated*

Google was founded by Larry Page and Sergey Brin in 1998, first operating out of a garage in Menlo Park. The two men met each other at Stanford University in 1995 and developed a search engine called BackRub which operated on Standford servers from 1996 until 1997. The dedicated bandwidth necessary to continue running the site eventually exceeded the university's ability to provide. It was at this point when the co-founder of Sun Microsystems, Andy Bechtolsheim, invested $100,000 in the computer science grads to form Google Incorporated, coincidentally before the company actually incorporated. Then came another offering: "Our first press release announces a $25 million round from Sequoia Capital and Kleiner Perkins; John

Doerr and Michael Moritz join the board. The release quotes Moritz describing ‘Googlers’ as ‘people who use Google’,” Google says on its own history page [21].

By 2000, Google’s search engine supported searching in fifteen languages, they had partnered with Yahoo! to become their default search provider, and they had created a browser plug-in to allow for searching the engine without visiting the site. The company and its specialized search algorithm were also able to achieve a one billion-URL index by this point as well; users were able to instantly access over 560 million full-text indexed pages and 500 million partially indexed URLs, for free. In 2001, Google named Eric Schmidt its CEO. The company started out offering massive capability, and in the years following, continued to expand upon that capability at an exponential rate. By the end of 2001, the index size had already reached 3 billion pages [21].

In 2002, Google had partnerships with major internet providers CompuServe, Netscape, and AOL which gave easy access to 34 million customers. By 2004, the searchable index included 6 billion pages, and Google had added features such as the ability to search in categories such as images, products, and books, with plans to continue expansion. They set up their own research and development facilities to begin working on their later projects. In 2005, they released Google Maps, a map of the entire earth, searchable with Google technology and integrated with GPS satellite imagery. This allowed users to search for directions from virtually anywhere to virtually anywhere, and everywhere in between. They would go on to add videos as part of the search engine as well. The company made numerous acquisitions of other companies, whether to discourage competition or to take advantage of resources. Google also created Gmail, an e-mail service, and Google Docs, a collaborative program similar to Microsoft Word [21].

In 2005, Google Incorporated bought Android Inc., and would later take advantage of their operating systems to launch themselves into the smartphone industry, competing very well with Apple and their iPhone. In 2008, Google released Google Chrome, a web browser to rival Internet Explorer and Mozilla Firefox. In 2011, Google made its largest acquisition ever, purchasing Motorola Mobility for $12.5 billion. The patent portfolio controlled by Motorola helped to defend Google from lawsuits brought on by its competitors in the smartphone industry, Microsoft and Apple, ensuring that Android could continue to be successful [21].

Google Incorporated has one of the most expensive stocks on the market, currently valued close to $900/share. This can scare many investors away, but Google's track record of growth has been as exponential as their increases in processing capability. It was primarily for this reason that Google was chosen for this experiment. Below is a chart showing the fluctuations in stock value over the past year.

Figure 2.5 Google Incorporated 6/3/2012 – 6/3/2013 [16]

2.6 *Bank of America Corporation*

Bank of America Corporation is the largest bank in the United States and one of the five most valuable companies in the country. It was formed from the merger of banks dating back over two

hundred years. The primary banks which comprise what is now the Bank of America Corporation were the Bank of Italy, founded in 1904 by Amadeo Giannini, and Bank of America, Los Angeles, found in 1923 by Orra E. Monnette. These companies merged in 1929 to form BankAmerica, which served only California at inception. Giannini was the head of the company and Monnette served as co-chair. The bank spread quickly across California as more locations were opened [4].

By 1958, the company had developed the technology to wire credit card purchases directly to its accounts, releasing the BankAmericard, the predecessor to VISA. Other California banks would join together to create the Master Charge in an effort to compete with BankAmericard; this would eventually be renamed MasterCard. In 1983, BankAmerica expanded beyond the borders of California with the purchase of the Seattle-based Seafirst Corporation and its subsidiary, Seattle-First National Bank. In 1992, they acquired Security Pacific Corporation and its subsidiary, Security Pacific National Bank in California, along with other banks in Idaho, Arizona, Washington, and Oregon. Later the same year, they purchased Valley Bank of Nevada, expanding into yet another state. In 1994, BankAmerica would acquire Continental Illinois National Bank and Trust Co. from the federal government [4].

In 1998, NationsBank attempted to purchase BankAmerica. However, BankAmerica had loaned a large hedge fund to D.E. Shaw & Co., which the company was unable to pay off. NationsBank was forced to structure the purchase as a merger and therefore the name of the company was changed to Bank of America Corporation, and the headquarters was moved to Charlotte, North Carolina. The company at this point controlled assets worth $570 billion and 4,800 branches spanning 22 states [4].

In 2008, Bank of America purchased Countrywide Financial for $4.1 billion. This purchase made Bank of America the leading mortgage provider in the United States. Later the same year, the company purchased Merrill Lynch & Co. in a stock deal worth about $50 billion. This purchase made Bank of America the largest financial service provider in the world [4]. Despite concerns about companies like this having too much power in the United States, Bank of America has proven itself to be a worthwhile asset to a stock portfolio given its track record of growth. Decisions made in stock trading must be made impersonally; it is just business, after all. The purchases made in 2008 by Bank of America raised a lot of eyebrows especially after the housing market collapse and the recession which followed, not to mention the federal bank bailout. The company was deemed "too big to fail." If it started hurting, it was so large that it would hurt everyone. This gives investors a feeling of security in putting their money back into the company, and it will surely see no reluctance to grow any time soon. Below is a chart showing the stock value fluctuations over the past year.

Figure 2.6 Bank of America Corporation 6/3/2012 – 6/3/2013 [3]

2.7 *Goldman Sachs Group Incorporated*

Marcus Goldman, a Jewish German immigrant, founded the company in New York in 1869, but it did not adopt its current name until 1885, after Goldman invited his son-in-law, Samuel Sachs, to join the venture. The initial business involved the sale of commercial paper to entrepreneurs. This is not to be confused with copy paper; commercial paper represents a short-term, unsecured promissory note issued by a corporation or bank to help businesses pay their debts. Goldman Sachs was so successful in this field of risky investment that the NYSE invited the company to join in 1896 [15].

In the early 20th century, Goldman Sachs was primarily interested in the Initial Public Offering (IPO) market, in which private companies could open themselves for public investment. One of the largest IPO deals worked out by Goldman Sachs was that of Sears, Roebuck and Company in 1906; another was the IPO for the Ford Motor Company in 1956. In 1930, Sidney Weinberg became a senior partner and began to shift the primary focus of the company towards investment banking and risk arbitrage, the business of arbitrating mergers between companies. Essentially, Weinberg wanted the firm to play the role of the middleman in financial transactions. In 1950, a competitor within the company would rise to challenge Weinberg's vision. Gus Levy was a successful securities dealer who wanted to shift the company's focus once again, this time towards block trading and securities. Where Weinberg sought to play the middleman in the transactions of others, Levy wanted Goldman Sachs to be an active player in the market, buying and selling securities in quantities of which an individual could never dream, and turning massive profits. The competition between the fundamentals of investment banking and securities dealing would remain undecided at Goldman, and, in the meantime, the company

reaped the benefits of both strategies. Levy and Weinberg established a tradition of co-leadership at the firm which would be continued in later years [15].

Weinberg retired in 1969, leaving Levy as the senior partner. Securities trading, at this point, became the firm's primary objective. In 1970, the first international office was opened in London. Throughout the early 1970s, Goldman Sachs tried to promote its reputation as an honest investment advisor by refusing to take part in hostile takeovers, a merger where the targeted company refuses to willingly take part [15].

1976 saw a new pair assume the roles of senior partners at Goldman Sachs. Sidney Weinberg's song, John L. Weinberg, and John C. Whitehead continued to perpetuate the dichotomy between investment banking and securities dealing, a dichotomy which had served the firm well. In 1981, Goldman Sachs acquired J. Aron and Company. This firm was a commodities dealer which became part of the Goldman Sachs Fixed Income division. In 1986, the company underwrote the IPO for Microsoft and joined the London Stock Exchange along with the NIKKEI 225. In 1990, the pair of partners would change again [15].

Under Robert Rubin and Stephen Friedman, the firm shifted its focus towards globalization through mergers and acquisitions along with trading. They introduced paperless trading to the NYSE and launched the Goldman Sachs Commodity Index (GSCI). They also opened an office in the capitol of China in 1994. Later that same year, Jon Corzine would take over the company as CEO; Rubin and Friedman would leave the firm as the last pair of senior partners. From that time on, one person would sit in control of the massive corporation [15].

In 1999, under CEO Henry Paulson, the firm carried out its own IPO, but only a small percentage of the company was opened for sale to the public, the majority of its ownership still rested within the circle of partners and private investors who had controlled it before the IPO.

The current CEO of the firm is Lloyd Blankfield, formerly of J. Aron and Company [15]. In the past decade, the company has continued to show stable growth, which is impressive for a financial institution often profiting from risky investments. It is another of the large institutions now deemed "too big to fail." This allows investors to take confidence that the United States government will intervene should Goldman ever come close to the brink of collapse. For the purposes of this experiment, the firm seems like a solid investment. Below is a chart showing the stock value fluctuations over the past year.

Figure 2.7 Goldman Sachs Group Incorporated 6/3/2012 – 6/3/2013 [14]

2.8 *Wendy's Company*

The Wendy's Company has an interesting dual history as it is, officially, a holding company dating back to 1884 whose current holding happens to be in the Wendy's Old Fashioned Hamburgers restaurant chain founded in 1969 by Dave Thomas. Since the company interests are currently wholly invested in the chain, each has just as much relevance to the stock value as the other.

Dave Thomas was abandoned by his biological parents at birth in Atlantic City, New Jersey in 1932. A couple from Michigan adopted him, but his adoptive mother would die shortly

after, and his adoptive father would need to move across the country so often for work that Dave started out on his own at the age of fifteen. After learning cooking in the military, he was able to start working in the restaurant industry. In 1956, Thomas partnered with Phil Clauss and began running KFC franchise restaurants. Clauss owned four failing restaurants in Columbus, Ohio, and in 1962, he offered Thomas a large stake in the ownership of those restaurants if he could turn them around. Thomas did Clauss one better; he turned them all around and was able to open four additional restaurants in the area. He received a promotion to regional operations director. In 1968, Thomas would sell his stake in the KFC franchises for $1.5 million. He had been born with nothing and achieved millionaire status by the age of thirty-five [28].

On November 15, 1969, Dave Thomas used his newly acquired wealth to open the first Wendy's Old Fashioned Hamburgers in Columbus. Within a year, he was able to open a second restaurant, and, in 1972, he began to franchise. Early on, new franchises were opening at a rate of about ten each month. By 1975, one hundred restaurants had been opened and the first international store had appeared in Canada. A year later, the company began trading publically, initially offering one million shares worth $28 each, and five hundred locations had been opened. In 1977, the chain began advertising across the United States, and by 1978, one thousand Wendy's restaurants were running smoothly. The 1970s proved to be extremely profitable for Dave Thomas; Wendy's was the first fast food restaurant chain to surpass $1 billion in annual sales within the first ten years. By the end of the decade, there were more than 1,767 stores open in the United States, Canada, Puerto Rico, and Europe [28].

In the 1980s, the growth rate began to slow as the economy dipped into recession. Dave Thomas relinquished his position as CEO in 1982, stepping down to the role of senior chairman. The 1984 "Where's the Beef?" ad campaign would help to stabilize sales, while still competing

with the two larger chains, McDonald's and Burger King. This commercial was the most popular in the country the year it came out; through it, Wendy's hoped to show how their fresh beef was superior to their competition's frozen variety. Sales in 1985 were promising, but the trend would not last for very long. 1986 was a terrible year for the company; they tried a new sit-down breakfast theme which was a great drain on funds and relatively unsuccessful. Around the same time, franchise managers began to develop bad habits as a result of less rigid control structure. Some would never enter their own restaurants; many would ignore cleanliness and quality standards. As a result, the company experienced a $4.9 million loss in 1986 [28].

Dave Thomas was forced to step in at this point to appoint new leadership. James Near was a competitor of Thomas in the late 1960s, as he also operated a successful restaurant chain out of Columbus. Thomas obviously respected the man and appointed him president and chief operating officer, while Thomas himself remained in an active advisory role. Near began a massive selective layoff of many people in managerial positions. New benefits and stock options were offered to the remaining employees, wages were increased, and the company was able to generate a good retention rate for valuable employees. Standards were upheld with more vigor and new managerial systems were set in place. The menu was also revamped. By 1995, the company had turned around the majority of its problems. The stock value surpassed the record high from 1985 [28].

By 1996, there were more than four thousand stores and the company planned to open four hundred new stores each year. James Near had stepped down from his position in 1994 to be replaced by Gordon Teter, but he was credited for much of the drastic turnaround. Teter kept the forward progress up after the success. He employed discipline to maintain growth, although it was slower. His main goal was to increase the number of international stores. The restaurant

chain Tim Horton's was purchased to increase a presence in Canada. In 1999, profits for the chain internationally reached $6 billion [28].

In December of 1999, Gordon Teter unexpectedly died at the age of 56. He was replaced by John Schuessler in 2000. In the early part of the decade, Wendy's spent around $500 million in the pursuit of profitable mergers and acquisitions, including a bistro called CafÁ Express. Dave Thomas passed away due to complications with liver cancer in 2002. Schuessler would continue expansion both internationally and within the United States [28].

In 2008, a holding company called Triarc purchased Wendy's International along with Arby's to form a holding company called Wendy's/Arby's Group Inc. In 2011, the company relinquished control of the Arby's chain and became the Wendy's Company. The history of the holding company started in 1884 with Deisel-Wemmer Co. In 1929, it became the Deisel-Wemmer-Gilbert Corporation. 1946 saw the company change names once more to DWG Cigar Corporation. In 1966, the company became the DWG Corporation, and in 1993, it became Triarc Companies Inc. [27]. The background for this holding company had very little to do with the restaurant industry, but it had proven itself to be a strong contender as a holding company. Below is a chart showing the stock value fluctuations over the past year.

Figure 2.8 Wendy's Company 6/3/2012 – 6/3/2013 [26]

2.9 *Pharmacyclics Incorporated*

Pharmacyclics Incorporated has very little information available concerning the history of the company. It began trading publically in 1995 and was co-founded by Jonathan Sessler. They specialize in creating drugs that work with expanded porphyrins, which are small molecules. These drugs are used in the treatment of cancer and immune system diseases. Some of the drugs currently in development at Pharmacyclics include Ibrutinib for the treatment of B-cell hematologic malignancies, PCI-27483, which is being studied in the treatment of pancreatic cancer, Abexinostat hydrochloride, which treats solid tumors, BTK Inhibitor compounds which treat autoimmune diseases, and Isoform selective HDAC8 inhibitors. The current CEO of the company is Robert W. Duggan, the chief operating officer is Maky Zanganeh, D.D.S., and the chief medical officer is Lori Kunkel, MD. All of these individuals have vast experience in their respective fields [12].

This company was chosen primarily to promote a diverse portfolio; as a pharmaceutical company it would fall into that sector, which has thus far been unexplored. Also, as a smaller, lesser-known company, it represents a diversification from the large, stable companies which comprise much of the portfolio. Below is a chart showing the fluctuations in stock value over the past year.

Figure 2.9 Pharmacyclics Incorporated 6/3/2012 – 6/3/2013 [22]

2.10 *Harley Davidson Incorporated*

Harley Davidson is an iconic American motorcycle company founded in the early 1900s in Milwaukee, Wisconsin by William S. Harley, Arthur Davidson, and Walter Davidson. They began designing motorcycles in 1901 and built their first factory in 1906, which remains the corporate headquarters to this day. The company incorporated in September of 1907 and began selling motorcycles to police departments. They produced 450 bikes in 1908, but production ramped up to output over 1,000 the following year [24].

During World War I, Harley Davidson sold the military around fifteen thousand motorcycles for use in combat. By 1920, the company was the largest motorcycle manufacturer in the world, having produced just over twenty-eight thousand machines and establishing a presence in sixty-seven countries around the world. The name of the company spoke volumes to the reliability of their product, which only helped them to increase their sales further. Though the Great Depression took its toll on production, with the number of motorcycles built dropping from over twenty thousand in 1929 to less than four thousand in 1933, the company managed to stay well afloat by constructing industrial power-plants and the "Servi-Car," a three wheeled

delivery vehicle. By World War II, Harley Davidson was one of only two American motorcycle manufacturers to survive the Great Depression [24].

For the fight against the Axis Powers, Harley Davidson produced a large number of 45 cubic inch motorcycles called the WLA. Over ninety thousand motorcycles were contributed to the Allies, including around thirty thousand to the Soviet Union through Roosevelt's Lend-Lease program. The production of the WLA would end with the war, but would be resumed later during the Korean War. Harley Davidson also produced a small number of XA models, which were reverse engineered from cooler-running BMW motorcycles, but they were relatively insignificant to the war effort as the needs of the Allies were met mostly by the Jeep and the WLA [24].

After the war, Harley Davidson produced a few lines of smaller motorcycles reverse engineered from German designs acquired during the overthrow of the Axis Powers. In 1960, these lines were combined to produce the Super-10; the same year, Harley Davidson purchased a fifty percent stake in Aermacchi's motorcycle company and used the newly acquired designs to produce high quality, two-stroke motorcycles. In 1969, Harley Davidson was purchased by American Machine and Foundry (AMF) and its reputation took a hit as the labor force was cut and the quality of motorcycles diminished. In 1974, they took full ownership of Aermacchi's, but would sell the company and the facility that came with it in 1978 [24].

In 1981, a group of investors including Willie G. Davidson and Vaughn Beals purchased Harley Davidson from AMF for $80 million. They pursued a tariff, approved by President Reagan in 1983, to limit the sale of Japanese motorcycles in the United States. They also raised quality standards and lowered prices by outsourcing components to foreign manufacturers, while avoiding the tariff. The new owners focused heavily on the appeal of retro styling during a time

when Japanese street racers were flooding the market. Inventory was closely monitored, and the reputation of the company was slowly rebuilt. “Softail” designs implementing a swing-arm rear suspension were introduced in 1984. In 1986, Harley Davidson purchased the motorhome manufacturing company, Holiday Rambler, which it would sell to the Monaco Coach Corporation ten years later. Through the 1990s and early 2000s, Harley Davidson would begin associating itself with other vehicle manufacturers including the Buell Motorcycle Company and the Ford Motor Company, producing joint vehicles. In 1998, the first international Harley Davidson factory was built in Brazil [24].

Harley Davidson has one of the richest corporate histories of any motorcycle company in the world. Though concerns over stock value manipulation were raised around 2004, there were no significant actions taken by legal institutions against the company. Below is a chart showing the fluctuations in stock value over the past year.

Figure 2.10 Harley Davidson Incorporated 6/3/2012 – 6/3/2013 [17]

Chapter 3. TRADING STRATEGIES

The strategy employed by an investor, in terms of how, when, and why they choose to make each trade, is the most important element in determining whether an investor will achieve success. Strategy is everything the investor has direct control over; the stock value and almost everything else is still left partially to chance. Remembering the gambler's mentality, the best strategy is the most reliable one, the one which will lose low and win high, lose least and win often. A shrewd investor, much like a poker player, knows that any hand can win, any stock has a slim chance of making a fortune, but the trades worth making are the ones that have a more reliable chance of making more money more often. Investors will draw from multiple strategies at once to maximize the gains while at the same time minimizing the losses which result from the shortcomings of a particular strategy. For the purposes of this experiment, three separate simulations will be conducted, dividing three distinctive strategies, and the results will allow for accurate analysis of how each strategy fared relative to the rest. From this, one may better understand the level of priority these strategies should take in a cohesive trading system, which would include a mixture of all three.

3.1 *Buy and Hold*

The buy and hold strategy has been widely regarded for many years as the most reliable system for earning money from stocks. Essentially all other stock transactions can be classified as speculation in comparison to buy and hold. The central idea of the strategy is to buy a stock with a plan to hold it for a set amount of time, and then sell. Over long periods of time, this strategy pays very high dividends. Speculative investment over the short-term can result in heavy losses, but over a longer span of time, the company is almost guaranteed to grow or fail. If reliable

companies are chosen, the investor is nearly guaranteed to profit [6]. To be fair, however, skilled speculative investors can make much more money, much faster. The risk is simply much lower with the buy and hold strategy. By using this strategy for one of my three experiments, it will allow for a better analysis of how successful the other two strategies were. This will function as a control test.

3.2 *Day Trading*

Some investors prefer to keep their holding over various stocks limited only to the times when the market is open. This means they buy stock, and sell all their holdings before the end of the day. Day trading, as it is known, has been deemed one of the easiest ways for new investors to lose large sums of money in a short amount of time. However, when an investor is skilled enough day trading can be one of the most lucrative strategies. Stocks values fluctuate in value rapidly on a minute to minute basis, and these fluctuations can be taken advantage of the same way long term fluctuations are. A cautious investor might hesitate to take advantage of these short term changes, but a skilled day trader can make millions. For the purposes of the experiment, this strategy, as will be discussed in more detail later, must be approached conservatively to avoid losing too much too fast; though, in general, day trading is a highly aggressive strategy in comparison to more passive tactics such as buy and hold [9].

3.3 *Trend Following*

Where buy and hold represents a passive strategy and day trading represents an aggressive active strategy, trend following represents a cautious active strategy. In the interest of conducting a good experiment, testing three strategies which differ as much as possible in the level of activity

and approach should offer a broader range of results for analysis. Trend following involves the history of a particular stock value. When the value of a stock is on the rise, the investor should buy the stock. When the value of the stock is declining, the investor should sell. Thereby, he follows the trend of the value. Over time, this strategy allows the investor to buy during times of gain and sell during times of loss; hypothetically, once the stock was purchased, it would continue to increase in value until the investor detected it was decreasing, and be sold for a value at least somewhat higher than the original value. Of course, the stock could immediately decrease in value once purchased, or it could unexpectedly drop in value during an upward trend, which would result in loss. In order to fight these eventualities, the skilled investor would analyze trends more deeply. In addition to observing the long term trends, an investor could analyze the rates of increase and decrease in stock value, and patterns in trends which can be indicators of what will happen next [25].

Chapter 4. SIMULATION ONE: BUY AND HOLD

4.1 *Application of Buy and Hold*

4.1.1 Methodology and Approach

The application of the buy and hold strategy for the simulation is very simple. On the first day of the simulation, one tenth of the total budget ($25,000) will be spent on stock in each of the ten companies in the portfolio. The stocks will be held for the remainder of the seven weeks. At the end of the simulation, the stocks will be sold and the gains and losses will be recorded. This approach will yield as much gain as possible for the buy and hold strategy over such a short period of time.

Buy and Hold Schedule	
6/3/2013	Buy $25,000 worth of stock in each of the ten companies in the portfolio.
7/19/2013	Sell all holdings.

Figure 4.1 Buy and Hold Schedule

4.1.2 Progress and Results

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/3/2013							$250,000.00	
6/3/2013	LUV	Buy	$14.13	1769	-$24,996.00		$225,004.00	
6/3/2013	DCIX	Buy	$5.61	4456	-$24,998.20		$200,005.80	
6/3/2013	DPZ	Buy	$59.27	421	-$24,952.70		$175,053.10	
6/3/2013	MSFT	Buy	$34.90	716	-$24,988.40		$150,064.70	
6/3/2013	GOOG	Buy	$871.22	28	-$24,394.20		$125,670.50	
6/3/2013	BAC	Buy	$13.66	1830	-$24,997.80		$100,672.70	
6/3/2013	GS	Buy	$161.08	155	-$24,967.40		$75,705.30	
6/3/2013	WEN	Buy	$5.95	4201	-$24,995.95		$50,709.35	
6/3/2013	PCYC	Buy	$91.64	272	-$24,926.08		$25,783.27	
6/3/2013	HOG	Buy	$54.54	458	-$24,979.32		$803.95	
6/19/2013	LUV	Sell	$13.88	1769	$24,553.72	-$442.28	$25,357.67	-$442.28
6/19/2013	DCIX	Sell	$4.58	4456	$20,408.48	-$4,589.72	$45,766.15	-$5,032.00
6/19/2013	DPZ	Sell	$63.65	421	$26,796.65	$1,843.95	$72,562.80	-$3,188.05
6/19/2013	MSFT	Sell	$35.31	716	$25,281.96	$293.56	$97,844.76	-$2,894.49
6/19/2013	GOOG	Sell	$908.37	28	$25,434.36	$1,040.16	$123,279.12	-$1,854.33
6/19/2013	BAC	Sell	$14.75	1830	$26,992.50	$1,994.70	$150,271.62	$140.37
6/19/2013	GS	Sell	$164.85	155	$25,551.75	$584.35	$175,823.37	$724.72
6/19/2013	WEN	Sell	$6.80	4201	$28,566.80	$3,570.85	$204,390.17	$4,295.57
6/19/2013	PCYC	Sell	$109.29	272	$29,726.88	$4,800.80	$234,117.05	$9,096.37
6/19/2013	HOG	Sell	$55.88	458	$25,593.04	$613.72	$259,710.09	$9,710.09

Figure 4.2 Buy and Hold Simulation Results

4.2 ***Analysis of Experimental Results***

Overall, this simulation was successful. Utilizing a total of $249,196.05 from a budget of a quarter million dollars, in seven weeks the buy and hold strategy produced a total profit of $9,710.09, close to ten thousand dollars, with only twenty trades including purchases and sales. Normally, selling a stock after holding it for only seven weeks would not be considered the implementation of buy and hold as it is still a short term trade. Stocks should usually be held for a few years, but time was a limiting factor in this experiment. The profits made from this simulation should serve as a control for the results obtained in the other two simulations. Using close to the entire budget, which is the same in all three simulations, distributed as evenly as possible between the ten companies in the portfolio, which are also the same for all three

simulations, ten thousand dollars represents close to the total increase in the value of the portfolio over the seven weeks. Not every stock produced a profit, but losses were counteracted by larger and more frequent gains.

Only two companies saw drops in stock value from the first day of the simulation to the last. These were Southwest Airlines Company (LUV) and Diana Containerships Incorporated (DCIX). LUV fell $0.25, from $14.13 to $13.88, after 1769 shares were purchased for $24,996.00. This resulted in a loss of $442.28; the final value at which the shares were sold was $24,553.72. DCIX saw a much more dramatic drop in value. 4456 shares were purchased at a value of $5.61 each for $24,998.20. These shares saw a decrease in value of $1.03 for a final value of $4.58. The holdings were sold for $20,408.48, resulting in a loss of $4,589.72. These were the first two earnings values calculated on the final day of the simulation, and together they resulted in a loss of over five thousand dollars. Fortunately, my portfolio would prove to be diverse enough to recover from these losses.

The company to generate the smallest profit, but a profit nonetheless, was the Microsoft Corporation (MSFT), which saw an increase in stock value of $0.41, purchased at $34.90 and sold at $35.31. The 716 shares purchased for $24,988.40 were sold for $25,281.96, generating a profit of $293.56. Goldman Sachs Group Incorporated (GS) saw the second smallest profit, with a stock value increase of $3.77, from $161.08 to $164.85. The expensive stock price allowed for the purchase of only 155 shares, increasing in total value from $24,967.40 to $25,551.75, for a profit of $584.35. Continuing from lowest to highest gains, Harley Davidson Incorporated (HOG) had a stock value increase of $1.34, from $54.54 to $55.88. The initial cost of the 458 shares was $24,979.32 and they were sold for $25,593.04, resulting in a gain of $613.72. The remaining five companies all saw profits of at least one thousand dollars. Google Incorporated

(GOOG) had by far the most expensive shares in the simulation, starting at a value of $871.22 and ending at $908.37, seeing an increase of $37.15 in seven weeks. Only 28 shares were purchased for $24,394.20 and sold for $25,434.36, resulting in a profit of $1,040.16. Domino's Pizza Incorporated (DPZ) saw positive stock value fluctuation of $4.38, from $59.27 to $63.65. A total of 421 shares were purchased for $24,952.70 and sold for $26,796.65, with a profit of $1,843.95. Bank of America Corporation (BAC) saw an increase in stock value of $1.09, from $13.66 to $14.75. 1830 shares were purchased for $24,997.80 and sold for $26,992.50, generating a profit of $1,994.70. The second highest gains in the simulation came from the Wendy's Company (WEN) which saw an increase in their stock value of $0.85, from $5.95 to $6.80. Because the shares were so inexpensive to begin with, an increase of eighty-five cents is a high percentage increase. 4201 shares were purchased for $24,995.96 and sold for $28,566.80, for a profit of $3,570.85. The most lucrative stock in this simulation came as a surprise. Pharmacyclics Incorporated (PCYC), the pharmaceutical company with patents on only a handful of primarily experimental drugs, saw an increase in its stock value of $17.65, from $91.64 to $109.29. 272 shares were purchased at $24,926.08 and finally sold for $29,726.88, resulting in a massive profit of $4,800.80. The eight companies which saw profits in this buy and hold simulation contributed to a total gain of $14,742.09, but because of the two companies generating a total loss of $5,032.00, the final profit for the simulation was $9,710.00. I feel this is an accurate baseline from which to judge the efficiency of the active strategy simulations.

4.3 *Further Information about Buy and Hold*

4.3.1 Modern Relevance

Buy and hold is largely considered the most stable strategy for earning money in the stock market. The projected growth trends for companies over several years result in the highest and most consistent profits for investors willing to wait for the value to rise. These investors must have the patience and faith to weather the ups and downs of their stocks, which generally means they are extremely careful about which companies to invest in. Using analytics software and terabytes of metadata, they often scrutinize companies to the highest degree possible before making large investments. If the value falls steadily for six months, an investor with enough experience and information would likely wait for the stock to recover, and continue to hold the stock until his initial investment paid off.

4.3.2 Evolution and Advanced Approaches

Several of today's most successful and well-known investors have gained attention for their use of the buy and hold strategy. Warren Buffet, often regarded as the closest competition to Microsoft's Bill Gates for the wealthiest man in the world, and his partner at Berkshire Hathaway, Charlie Munger, are two of the most famous proponents of long-term strategy in investment. They both prefer investing in companies with strong fundamentals and tend to consider technical value analysis to be less useful. They are derisive of derivative investments, gambles on stock values attached to separate trades, and of short-term investment in general. Another investor who shares this view is Sir John Templeton, who became a billionaire from globally diversified mutual funds. Templeton had a strong view of the difference between speculation and investment, commenting "the stock market is not a casino." These investors

cannot buy and hold forever on every stock of course; Warren Buffet does not “buy and hold blindly,” and he has been known to cut his losses on certain investments where he believed the value would not recover. Other successful investors known to primarily utilize the buy and hold strategy include Benjamin Graham and John Bogle [19]. In the future, it is likely that more successful investors will also profit greatly by way of the buy and hold strategy.

Chapter 5. SIMULATION TWO: DAY TRADING

5.1 *Application of Day Trading*

5.1.1 Methodology and Approach

The application of day trading to the simulation will need to be somewhat more complicated than the implementation of the first strategy. Because so much money can be lost using this strategy, a reserved number of trades must be made. Stocks from between zero and six companies will be purchased at the beginning of the day every three business days and sold some time before the end of the same day. This way, there are no holdings outside of the market hours. Gains and losses will be recorded.

Day Trading Schedule	
6/3/2013	Buy stock in as many as 6 companies. Sell all holdings by the end of the day.
6/6/2013	Same as previous.
6/11/2013	Same as previous.
6/14/2013	Same as previous.
6/19/2013	Same as previous.
6/24/2013	Same as previous.
6/27/2013	Same as previous.
7/2/2013	Same as previous.
7/5/2013	Same as previous.
7/10/2013	Same as previous.
7/15/2013	Same as previous.
7/18/2013	Same as previous.

Figure 5.1 Day Trading Schedule

5.1.2 Progress and Results

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/3/2013							$250,000.00	
6/3/2013	BAC	Buy	$13.66	500	-$6,830.00		$243,170.00	
6/3/2013	GS	Buy	$161.08	25	-$4,027.00		$239,143.00	
6/3/2013	PCYC	Buy	$91.64	30	-$2,749.20		$236,393.80	
6/3/2013	GS	Sell	$163.56	25	$4,089.00	$62.00	$240,482.80	$62.00
6/3/2013	PCYC	Sell	$88.29	30	$2,648.70	-$100.50	$243,131.50	-$38.50
6/3/2013	BAC	Sell	$13.55	500	$6,775.00	-$55.00	$249,906.50	-$93.50
6/6/2013	GS	Buy	$158.96	30	-$4,768.80		$245,137.70	
6/6/2013	WEN	Buy	$5.68	200	-$1,136.00		$244,001.70	
6/6/2013	GOOG	Buy	$860.98	10	-$8,609.80		$235,391.90	
6/6/2013	WEN	Sell	$5.72	200	$1,144.00	$8.00	$236,535.90	-$85.50
6/6/2013	GOOG	Sell	$864.64	10	$8,646.40	$36.60	$245,182.30	-$48.90
6/6/2013	GS	Sell	$159.68	30	$4,790.40	$21.60	$249,972.70	-$27.30
6/11/2013	LUV	Buy	$14.01	700	-$9,807.00		$240,165.70	
6/11/2013	HOG	Buy	$53.52	300	-$16,056.00		$224,109.70	
6/11/2013	MSFT	Buy	$35.12	500	-$17,560.00		$206,549.70	
6/11/2013	LUV	Sell	$14.04	700	$9,828.00	$21.00	$216,377.70	-$6.30
6/11/2013	HOG	Sell	$53.55	300	$16,065.00	$9.00	$232,442.70	$2.70
6/11/2013	MSFT	Sell	$35.13	500	$17,565.00	$5.00	$250,007.70	$7.70
6/19/2013	GOOG	Buy	$900.50	25	-$22,521.50		$227,486.20	
6/19/2013	DPZ	Buy	$60.47	100	-$6,047.00		$221,439.20	
6/19/2013	MSFT	Buy	$34.81	200	-$6,962.00		$214,477.20	
6/19/2013	GOOG	Sell	$904.85	25	$22,621.25	$99.75	$237,098.45	$107.45
6/19/2013	DPZ	Sell	$60.75	100	$6,075.00	$28.00	$243,173.45	$135.45
6/19/2013	MSFT	Sell	$35.03	200	$7,006.00	$44.00	$250,179.45	$179.45
6/24/2013	PCYC	Buy	$78.80	100	-$7,880.00		$242,299.45	
6/24/2013	MSFT	Buy	$33.52	200	-$6,704.00		$235,595.45	
6/24/2013	PCYC	Sell	$81.20	100	$8,120.00	$240.00	$243,715.45	$419.45
6/24/2013	MSFT	Sell	$34.08	200	$6,816.00	$112.00	$250,531.45	$531.45
6/27/2013	LUV	Buy	$12.90	300	-$3,627.00		$246,904.45	
6/27/2013	LUV	Sell	$13.05	300	$3,915.00	$288.00	$250,819.45	$819.45
7/5/2013	BAC	Buy	$12.95	300	-$3,885.00		$246,934.45	
7/5/2013	GS	Buy	$151.89	50	-$7,594.50		$239,339.95	
7/5/2013	BAC	Sell	$13.07	300	$3,921.00	$36.00	$243,260.95	$855.45
7/5/2013	GS	Sell	$153.24	50	$7,662.00	$67.50	$250,922.95	$922.95
7/10/2013	LUV	Buy	$13.00	150	-$1,950.00		$248,972.95	
7/10/2013	LUV	Sell	$13.22	150	$1,983.00	$33.00	$250,955.95	$955.95
7/15/2013	HOG	Buy	$55.03	500	-$27,515.00		$223,440.95	
7/15/2013	HOG	Sell	$55.72	500	$27,860.00	$345.00	$251,300.95	$1,300.95
7/18/2013	LUV	Buy	$13.58	500	-$6,790.00		$244,510.95	
7/18/2013	LUV	Sell	$13.88	500	$6,940.00	$150.00	$251,450.95	$1,450.95

Figure 5.2 Day Trading Simulation Results

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/3/2013							$250,000.00	
6/3/2013	BAC	Buy	$13.66	500	-$6,830.00		$243,170.00	
6/3/2013	GS	Buy	$161.08	25	-$4,027.00		$239,143.00	
6/3/2013	PCYC	Buy	$91.64	30	-$2,749.20		$236,393.80	
6/3/2013	GS	Sell	$163.56	25	$4,089.00	$62.00	$240,482.80	$62.00
6/3/2013	PCYC	Sell	$88.29	30	$2,648.70	-$100.50	$243,131.50	-$38.50
6/3/2013	BAC	Sell	$13.55	500	$6,775.00	-$55.00	$249,906.50	-$93.50
6/6/2013	GS	Buy	$158.96	30	-$4,768.80		$245,137.70	
6/6/2013	WEN	Buy	$5.68	200	-$1,136.00		$244,001.70	
6/6/2013	GOOG	Buy	$860.98	10	-$8,609.80		$235,391.90	
6/6/2013	WEN	Sell	$5.72	200	$1,144.00	$8.00	$236,535.90	-$85.50
6/6/2013	GOOG	Sell	$864.64	10	$8,646.40	$36.60	$245,182.30	-$48.90
6/6/2013	GS	Sell	$159.68	30	$4,790.40	$21.60	$249,972.70	-$27.30

Figure 5.3 Day Trading Week One Results

During the first week of the simulation, the risks of day trading quickly became apparent. On the first scheduled day of trading, $93.50 was lost. Luckily, during the second day of trading a gain of $66.20 moved the total loss down to only -$27.30. Making trades in a more reserved manner, with fewer shares bought from each respective company, but spreading across several different companies, seems to be the best way to avoid losing a large amount of money on one stock value.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/11/2013	LUV	Buy	$14.01	700	-$9,807.00		$240,165.70	
6/11/2013	HOG	Buy	$53.52	300	-$16,056.00		$224,109.70	
6/11/2013	MSFT	Buy	$35.12	500	-$17,560.00		$206,549.70	
6/11/2013	LUV	Sell	$14.04	700	$9,828.00	$21.00	$216,377.70	-$6.30
6/11/2013	HOG	Sell	$53.55	300	$16,065.00	$9.00	$232,442.70	$2.70
6/11/2013	MSFT	Sell	$35.13	500	$17,565.00	$5.00	$250,007.70	$7.70

Figure 5.4 Day Trading Week Two Results

During the second week of trading, my goal was to mitigate the losses made in the first week. I was able to accomplish this goal within the opening and closing times for trading on the first scheduled day. As a result, I decided not to buy any stock on the second scheduled day of trading for the week, given that more trades than I initially anticipated have been made and the market seemed to be in a downward turn in the past week, which is not conducive to day trading. When stock values are low, it is better to buy them and keep them until they rise. With day trading, this is not usually possible because a day trader must relieve himself of all holdings by the end of the day. In this circumstance, it was better not to trade.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/19/2013	GOOG	Buy	$900.50	25	-$22,521.50		$227,486.20	
6/19/2013	DPZ	Buy	$60.47	100	-$6,047.00		$221,439.20	
6/19/2013	MSFT	Buy	$34.81	200	-$6,962.00		$214,477.20	
6/19/2013	GOOG	Sell	$904.85	25	$22,621.25	$99.75	$237,098.45	$107.45
6/19/2013	DPZ	Sell	$60.75	100	$6,075.00	$28.00	$243,173.45	$135.45
6/19/2013	MSFT	Sell	$35.03	200	$7,006.00	$44.00	$250,179.45	$179.45

Figure 5.5 Day Trading Week Three Results

On the only scheduled day of trading for week three, I was scheduled for trend following and day trading, which was helpful in identifying companies that were doing well. Google was identified by both simulations as a lucrative growth trend was appearing. Google's stocks are some of the most expensive on the market today so a purchase of 25 was made, which still cost over twenty thousand dollars. A four dollar fluctuation in value yielded a profit of $99.75 later in the day. In an effort to increase the volume of my trading, purchases were made of 100 and 200 shares in DPZ and MSFT respectively, both costing about six thousand dollars. Selling later in the day, these two stocks yielded over seventy dollars in profit.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/24/2013	PCYC	Buy	$78.80	100	-$7,880.00		$242,299.45	
6/24/2013	MSFT	Buy	$33.52	200	-$6,704.00		$235,595.45	
6/24/2013	PCYC	Sell	$81.20	100	$8,120.00	$240.00	$243,715.45	$419.45
6/24/2013	MSFT	Sell	$34.08	200	$6,816.00	$112.00	$250,531.45	$531.45
6/27/2013	LUV	Buy	$12.90	300	-$3,627.00		$246,904.45	
6/27/2013	LUV	Sell	$13.05	300	$3,915.00	$288.00	$250,819.45	$819.45

Figure 5.6 Day Trading Week Four Results

On the first day of trading for the week, PCYC was purchased after a drastic dip early in the day followed by a growth spurt which was considered to be a continuing trend. MSFT was also purchased during what seemed to be an upward growth period. Both stocks were sold later in the day as the growth trends began to diminish. On the second day of trading, 300 shares of LUV were purchased during a rise in value. Selling these shares later in the day as the trend began to wear off yielded a profit of $288.00.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/5/2013	BAC	Buy	$12.95	300	-$3,885.00		$246,934.45	
7/5/2013	GS	Buy	$151.89	50	-$7,594.50		$239,339.95	
7/5/2013	BAC	Sell	$13.07	300	$3,921.00	$36.00	$243,260.95	$855.45
7/5/2013	GS	Sell	$153.24	50	$7,662.00	$67.50	$250,922.95	$922.95

Figure 5.7 Day Trading Week Five Results

On the first scheduled day of trading for week five, very few promising trends appeared. No stocks were purchased or sold on July 2nd. On the second day of trading for week five, BAC and

GS showed significant growth from the stock values at the opening of the day. Both were purchased early and monitored, then sold by the end of the day.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/10/2013	LUV	Buy	$13.00	150	-$1,950.00		$248,972.95	
7/10/2013	LUV	Sell	$13.22	150	$1,983.00	$33.00	$250,955.95	$955.95

Figure 5.8 Day Trading Week Six Results

I decided to make one trade on the scheduled day of trading for week six. I purchased LUV during dip in the morning and sold after it recovered later in the day for a small profit. Otherwise, there were very few opportunities to make money on this trading day.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/15/2013	HOG	Buy	$55.03	500	-$27,515.00		$223,440.95	
7/15/2013	HOG	Sell	$55.72	500	$27,860.00	$345.00	$251,300.95	$1,300.95
7/18/2013	LUV	Buy	$13.58	500	-$6,790.00		$244,510.95	
7/18/2013	LUV	Sell	$13.88	500	$6,940.00	$150.00	$251,450.95	$1,450.95

Figure 5.9 Day Trading Week Seven Results

On the first scheduled day of trading for week seven, I continued to employ a basic tactic which has helped me to continually generate small profits. I watched as HOG dipped and recovered back to its original value, and as the growth trend appeared to be continuing I bought it. I was able to sell it later in the day for a relatively large profit of $345.00. On the second day of trading for week seven, I used the same basic strategy on LUV. It took a dip and recovered, I purchased it as the growth trend seemed to be continuing, and sold it later in the day for a profit of $150.00. The total profit for the day trading simulation was $1,450.95.

5.2 *Analysis of Experimental Results*

The day trading simulation was conducted to the best of my limited ability within a short time frame. I believe it is an accurate representation of a careful approach using a large budget. Only a total of $155.50 was lost overall; the total gains were $1,606.45. The total amount of money spent was $173,019.80, close to seventy percent of the total budget, spread throughout forty trades. The primary method by which I made trades in this simulation would be to watch for a short drop in the stock value and purchase stocks once they had recovered, hoping, and usually finding, that the growth trend would continue. I would then sell later in the day. I would never spend an extremely high percentage of my total budget on one trade, which meant I would see smaller gains than I hypothetically could have, and I had to make a large number of trades. The effort involved in day trading is significant compared to passive strategies, and sometimes very few opportunities will present themselves. This was especially troublesome for me as I would only trade one of every four business days, and sometimes I would go almost a full week without making any trades.

The heaviest loss was taken on June 3rd, the first day of the simulation, after 30 shares of Pharmacyclics Incorporated (PCYC) was purchased for $2,749.20 at a rate of $91.64 per share. Later that same day the stock value fell $3.35, and the shares were sold for $2,648.70, sustaining a loss of $100.50. The only other loss taken during the simulation was on Bank of America Corporation (BAC) the same day. 500 shares were purchased at a value of $13.66 per share, and sold later in the day at a value of $13.55 per share. This resulted in a loss of $55.00.

The highest profit made on a single trade during the simulation was on Harley Davidson Incorporated (HOG) on July 15th. 500 shares were purchased at a stock value of $55.03 for $27,515, the highest amount spent during a single trade. They were sold later the same day at a

rate of $55.72 per share, for a profit of $345.00. The next highest profit made was on Southwest Airlines Company (LUV) on June 27th. 300 shares were purchase for $12.90 each and sold later in the day for $13.05 each. This trade generated a gain of $288.00. Another significant profit was made on June 24th on Pharmacyclics Incorporated (PCYC). 100 shares were purchased for $78.80 and sold later the same day for $81.20. A profit of $240.00 was more than enough to counteract the losses made on PCYC during the first day of trading. Numerous other small profits were made during the day trading simulation as well.

Overall, day trading seems like a risky strategy that, on average, generates smaller profits than it is worth. It forces investors to make fast, sometimes reckless, decisions on trades since all holdings must be sold by the end of the day. However, in some instances, day trading can be exceptionally lucrative and useful for creating capital quickly to be used in long-term investments.

5.3 *Further Information about Day Trading*

5.3.1 Modern Relevance

As previously stated, many successful investors have a negative view towards day trading, given that it represents speculation as opposed to investment, and because commissions and fees often outweigh profits when a large number of trades must be executed. Short-term speculation often also leads to riskier forms of trading including the exchange of derivatives, the equivalent of side-betting in a casino. These practices can have adverse effects on the stock market as a whole, and when the stock market is doing poorly, or worse, crashes, the effects on the United States economy can cause long depressions. When a large number of short-term investors start selling large amounts of stock in the same companies at the same time, the volume of stock for sale will

skyrocket, which will then signal to other investors a lack of faith in the company, and cause the stock value to plummet. Short-term stock speculation and bad deals led to the stock market crash in 1929, which resulted in the Great Depression. Nevertheless, day trading can be useful for some investors, and it would be hard to outlaw the practice given that the free market must be open to these sorts of trades. Any kind of regulation of it would likely give unfair advantages to special interest groups who would be able to cope better with rules imposed. Plenty of investors are able to amass small fortunes from day trading, and so it is still a strategy worth some consideration.

5.3.2 Evolution and Advanced Approaches

There are few well-known investors, at least the kind who use their real names, who tout day trading as the most reliable strategy. Most of the investors who wholeheartedly believe in day trading are known by internet screen names, since most of their trading happens behind a computer screen. These individuals practice stock trading with an entirely different mindset than most investors. They do not pay attention to the long-term fluctuations in the stock market, whether it is at a high point or a low point, whether it is on the rise or on the fall. They hope for the market to be as volatile as possible. Day traders seek to sell their holdings on the shortest possible timescale that will make them money. They analyze stock values, stock volumes, stock histories, and use different software and analytics tools to determine which stocks to buy, how much, and when. Where most investors are looking for value in the long-term, day traders are looking for value in the extreme short-term [18]. As much as mainstream investors believe the day traders are playing with the odds against them, the day traders feel that the careful investors

are the ones guaranteed to lose. All in all, neither side is completely right. All investors, no matter what strategy is used, are playing at a game which involves chance and luck.

Chapter 6. SIMULATION THREE: TREND FOLLOWING

6.1 *Application of Trend Following*

6.1.1 Methodology and Approach

The application of trend following to the simulation should be defined in concrete terms to ensure an accurate experiment. Starting on the first day of the simulation, stock will be purchased in companies where a positive trend has occurred for four days or more. On the fourth day of the experiment, the trend for the previous four days will be analyzed for each company in the portfolio. Once again, stock will be purchased in companies showing an upward trend, but this time stock in companies with a decreasing trend will be sold. This will be repeated every four business days throughout the simulation.

Trend Following Schedule	
6/3/2013	Buy stock in companies where a positive trend has occurred in the previous four days.
6/7/2013	Buy stock in companies where a positive trend has occurred in the previous four days. Sell stock in companies where a negative trend has occurred in the previous four days.
6/13/2013	Same as previous.
6/19/2013	Same as previous.
6/25/2013	Same as previous.
7/1/2013	Same as previous.
7/5/2013	Same as previous.
7/11/2013	Same as previous.
7/17/2013	Same as previous.

Figure 6.1 Trend Following Schedule

6.1.2 Progress and Results

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/3/2013							$250,000.00	
6/3/2013	BAC	Buy	$13.66	1000	-$13,660.00		$236,340.00	
6/3/2013	GS	Buy	$161.08	50	-$8,054.00		$228,286.00	
6/3/2013	PCYC	Buy	$91.64	60	-$5,498.40		$222,787.60	
6/7/2013	GS	Sell	$159.68	50	$7,984.00	-$70.00	$230,771.60	-$70.00
6/7/2013	PCYC	Sell	$87.09	60	$5,225.40	-$273.00	$235,997.00	-$343.00
6/7/2013	MSFT	Buy	$34.96	400	-$13,984.00		$222,013.00	
6/13/2013	WEN	Buy	$5.94	150	-$891.00		$221,122.00	
6/13/2013	HOG	Buy	$53.12	500	-$26,560.00		$194,562.00	
6/13/2013	HOG	Sell	$53.47	500	$26,735.00	$175.00	$221,297.00	-$168.00
6/19/2013	MSFT	Sell	$35.03	400	$14,020.00	$36.00	$235,317.00	-$132.00
6/19/2013	WEN	Sell	$6.00	150	$900.00	$9.00	$236,217.00	-$123.00
6/19/2013	GOOG	Buy	$900.50	50	-$45,025.00		$191,192.00	
7/1/2013	DPZ	Buy	$58.60	300	-$17,580.00		$173,612.00	
7/5/2013	DPZ	Sell	$61.15	300	$18,345.00	$765.00	$191,957.00	$642.00
7/5/2013	MSFT	Buy	$33.70	200	-$6,740.00		$185,217.00	
7/11/2013	MSFT	Sell	$35.74	200	$7,148.00	$408.00	$192,365.00	$1,050.00
7/11/2013	GOOG	Sell	$920.36	50	$46,018.00	$993.00	$238,383.00	$2,043.00
7/11/2013	WEN	Buy	$6.14	100	-$614.00		$237,769.00	
7/17/2013	WEN	Sell	$6.65	100	$665.00	$51.00	$238,434.00	$2,094.00
7/17/2013	BAC	Sell	$14.44	1000	$14,440.00	$780.00	$252,874.00	$2,874.00

Figure 6.2 Trend Following Simulation Results

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/3/2013							$250,000.00	
6/3/2013	BAC	Buy	$13.66	1000	-$13,660.00		$236,340.00	
6/3/2013	GS	Buy	$161.08	50	-$8,054.00		$228,286.00	
6/3/2013	PCYC	Buy	$91.64	60	-$5,498.40		$222,787.60	
6/7/2013	GS	Sell	$159.68	50	$7,984.00	-$70.00	$230,771.60	-$70.00
6/7/2013	PCYC	Sell	$87.09	60	$5,225.40	-$273.00	$235,997.00	-$343.00
6/7/2013	MSFT	Buy	$34.96	400	-$13,984.00		$222,013.00	

Figure 6.3 Trend Following Week One Results

During the first week of the simulation, a large sum was lost from the implementation of trend following. Two of the companies purchased on the first scheduled day for trading, Goldman Sachs and Pharmacyclics, saw dramatic downward trends during the four day waiting period.

These two companies tallied up a loss of $343.00. In order to try and compensate for these losses, a large number of Microsoft stocks were purchased in accordance with the rapidly increasing trend evident over the four day waiting period.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/13/2013	WEN	Buy	$5.94	150	-$891.00		$221,122.00	
6/13/2013	HOG	Buy	$53.12	500	-$26,560.00		$194,562.00	
6/13/2013	HOG	Sell	$53.47	500	$26,735.00	$175.00	$221,297.00	-$168.00

Figure 6.4 Trend Following Week Two Results

There was only one day of trading scheduled for the second week of the experiment for the application of the trend following strategy. Having lost a significant amount of money in the first week, I tried to make the most of this one day of trading in the second week. The trends during the previous four business days were looking poor on all of my stocks, so I made a careful purchase of two stocks, HOG and WEN, and decided not to sell the stock I continue to hold in MSFT and BAC. I noticed that the Harley Davidson stock had dropped significantly since I had made a small profit in my day trading exercises. I decided to buy a large amount, and, as I had hoped, the stock rebounded tremendously within the very same day. At this point, I decided to sell in hopes of cutting down on my overall loss. I still hold stocks in WEN, MSFT, and BAC.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
6/19/2013	MSFT	Sell	$35.03	400	$14,020.00	$36.00	$235,317.00	-$132.00
6/19/2013	WEN	Sell	$6.00	150	$900.00	$9.00	$236,217.00	-$123.00
6/19/2013	GOOG	Buy	$900.50	50	-$45,025.00		$191,192.00	

Figure 6.5 Trend Following Week Three Results

On the scheduled day of trading for week three, the four day trend for MSFT showed a slight decrease; fortunately, it was sold during a short spike. WEN had shown some growth, but trends were looking unsteady over the four day waiting period. It was sold in hopes of cutting total losses. BAC continues to show relatively steady growth over four days, but is still recovering from a large drop after the initial purchase. GOOG has been on a very steady growth trend for the past four days, and for the past month for that matter. A large purchase was made.

On the first day of trading for week four I elected not to make any trades. My current holdings in GOOG and BAC seem to have taken heavy losses, but appear to be growing back to the levels they were at when purchased. There are no other promising growth trends over the past four days.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/1/2013	DPZ	Buy	$58.60	300	-$17,580.00		$173,612.00	
7/5/2013	DPZ	Sell	$61.15	300	$18,345.00	$765.00	$191,957.00	$642.00
7/5/2013	MSFT	Buy	$33.70	200	-$6,740.00		$185,217.00	

Figure 6.6 Trend Following Week Five Results

On the first scheduled day of trading for trend following during week five, the values for BAC and GOOG had still not climbed back to their values when purchased. If they still do not produce a profit by next week, I plan to cut my losses. I purchased 300 shares of DPZ as it seemed to be on a dramatic rise. On the second day of trading for this week, I sold stock in DPZ, as the upward trend seems to have diminished, for a profit of $765.00, taking me out of the red. I also purchased MSFT again, as it seems to have hit a low point, closely followed by a growth trend.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/11/2013	MSFT	Sell	$35.74	200	$7,148.00	$408.00	$192,365.00	$1,050.00
7/11/2013	GOOG	Sell	$920.36	50	$46,018.00	$993.00	$238,383.00	$2,043.00
7/11/2013	WEN	Buy	$6.14	100	-$614.00		$237,769.00	

Figure 6.7 Trend Following Week Six Results

On the first and only scheduled day of trading for week six, I finally sold my holdings in GOOG for a large profit, and sold my recently purchased stock in MSFT for a gain as well. BAC seems to be on a path to make a profit by the next day of trading. I decided to purchase WEN after noticing a promising trend over the past four days. Current holdings are in BAC and WEN.

Date	Symbol	Buy/ Sell	Price	Shares	NetCost/ Proceeds	Profit/ Loss	Total Cash	Total Profit
7/17/2013	WEN	Sell	$6.65	100	$665.00	$51.00	$238,434.00	$2,094.00
7/17/2013	BAC	Sell	$14.44	1000	$14,440.00	$780.00	$252,874.00	$2,874.00

Figure 6.8 Trend Following Week Seven Results

During the final scheduled day of trading for the trend following simulation, holdings in BAC and WEN were both sold for a profit. Waiting for the value of BAC to increase paid off heavily in the end, as 1000 shares were purchased at the beginning of the experiment. Final profit for the simulation was $2,810.00.

6.2 *Analysis of Experimental Results*

The trend following simulation was executed to the best of my ability, following the initial rules as closely as possible. I found that the more time I spent analyzing trends during the simulation,

the better I became at knowing what would follow. Four day trends were not very useful individually, but once I could see multiple four day trends for any given company, I had a better sense of how certain fluctuations might repeat themselves. For this reason, my heaviest losses were accrued during the first week, and my largest gains were made after my longest holds.

The largest loss in the simulation was taken on 60 shares of Pharmacyclics Incorporated (PCYC) purchased on the first day of trading, June 3rd, and sold on the second day of trading, June 7th. The share price fell $4.55 from $91.64 to $87.09. I was forced to immediately cut my losses after such a miserable four day trend, the rules of this specific simulation preventing me from selling any sooner. Purchasing the shares for a total of $5,498.40, I sold them for $5225.40, for a loss of $273.00. The only other loss in the simulation was taken during the same time period of the first four days. 50 shares of Goldman Sachs Group Incorporated were purchased for $8,054.00 on June 3rd at a stock value of $161.08. The next four days saw the price drop $1.40 to $159.68, and the shares were sold for $7,984.00, resulting in a loss of $70.00. Fortunately, no other losses were made and the gains outweighed them heavily.

The largest gain made during the trend following simulation was on Google Incorporated (GOOG), after holding 50 shares for sixteen days. GOOG being one of the most expensive stocks in the portfolio, 50 shares were initially purchased for a hefty sum of $45,025.00, eighteen percent of the total initial budget of $250,000.00, on June 19th. The stock value did take heavy losses at one point, but I decided to wait because I had noticed patterns in GOOG shares where they would drop and then rebound to a higher value. This instinct paid off on July 11th when I sold the shares for a profit of $993.00. The second highest profit made in this simulation was made on 1000 shares of Bank of America Corporation (BAC), through which I held for thirty-two days, from the first day of the simulation to the last. The stock value dropped heavily, but,

after holding for about sixteen days, I noticed it beginning to climb back up again. Had this downward trend continued any longer, I would have cut my losses. The total rise in stock price from June 3rd to July 17th was $0.78, resulting in a profit of $780.00. Another large gain was made on Domino's Pizza Incorporated (DPZ) after holding 300 shares for only four days. They were purchased for $17,580.00 on July 1st at a price of $58.60 per share. After four days the value per share had increased by $2.55 and I was not sure the trend would continue so I sold for $18,345.00, generating a gain of $765.00. Microsoft Corporation (MSFT) also allowed me to earn a large profit. 200 shares were purchased at a stock value of $33.70 on July 5th for $6,740.00. On July 11th, these shares were sold for $7,148.00, after an increase in stock value of $2.04. This resulted in a profit of $408.00

Losses in the trend following simulation totaled $343.00 and gains totaled $3,217.00, for a final total profit of $2,874.00. About 55.4% of the total budget was spent, $138,606.00 out of $250,000.00, and a total of 20 trades, counting purchases and sales separately, were made. Trend following allows an investor to try to anticipate what is coming next. Given the time limitations of this simulation, trend following in actuality involves holding stocks for longer periods than four days, and it also is less restrictive in terms of what days the investor is allowed to take action. A shrewd trend follower will watch the stock value every day, with the option to take action, but will normally opt to maintain his holdings for a longer period of time to accrue more value. I feel that, though I am not a master of any of the trading strategies tested in this experiment, this simulation has improved my confidence in understanding the way trends repeat themselves and how to determine which stocks to buy, how long to hold them, and when to sell.

6.3 *Further Information about Trend Following*

6.3.1 Modern Relevance

Trend following, in comparison to the other strategies in question, lies between the hyperactive day trading and the epitomical passive buy and hold. It lies between extreme short-term and extreme long-term. Where in this spectrum a particular trend following investor falls is entirely his decision. Short-term trend following, such as the four-day system used in this simulation, would be frowned upon by the upstanding members of the investing community as yet another example of speculation over investment, and can lead to some of the same problems as day trading. However, trend followers can use any timeframe they believe will produce profits. Some will hold shares for one year, other will hold for five; others will determine the length of their hold by closely following the trend, open to any avenue which will result in the most stable end. In essence, trend followers have something in common with the largest group of successful poker players. These players will almost always either raise or fold. They are looking to produce as much value as possible when they win, without having to lose an exorbitant amount between wins. They stay in control of the situation, without thinking they have to play every hand, ready to get out of a losing situation and get into a winning one at a moment's notice.

6.3.2 Evolution and Advanced Approaches

There are several well respected trend followers who have made large amounts of money in relatively short periods of time. They believe it is only natural to thoroughly analyze short-term and long-term value histories to determine what will happen next. For most trend followers, the immediate present moment can tell them nothing about where the stock price is going, for that you need previous data points. In fact, those previous data points are the only thing you have to

try to figure out what the value will do, and therefore nearly all of the decision making process should stem from that data.

Trend following is not without success stories. Bill Dunn is a trend follower who made $80 million in 2008 alone; Kenneth Tropin made $120 million that same year. Another trader named Michael Marcus turned $30,000 into $80 million using the strategy. Yet another trend follower named Ed Seykota turned $5,000 into $15 million over the course of twelve years [8]. No matter how many investors have successfully used a strategy, it does not guarantee success for others. However, as far as reliability is concerned, trend following is regarded as worthwhile by many investors, even beyond those who use it exclusively. The same cannot be said for every strategy.

Chapter 7. ANALYSIS OF RESULTS

Each strategy has been analyzed individually, but a cohesive analysis comparing the results is clearly necessary. There are several important pieces of data which can supply a wealth of additional information. These, the profit, total gain, total loss, total amount of money spent, the number of trades, and the percent of the budget spent are listed below.

Strategy	Profit	Total Gain	Total Loss	Total Spent	Number of Trades	Percent of Budget Spent
Buy and Hold	**$9,710.09**	**$14,742.09**	**-$5,032.00**	**$249,196.05**	**20**	**99.7%**
Day Trading	**$1,450.95**	**$1,606.45**	**-$155.50**	**$173,019.80**	**40**	**69.2%**
Trend Following	**$2,874.00**	**$3,217.00**	**-$343.00**	**$138,606.00**	**20**	**55.4%**

Figure 7.1 Initial Comparison Data

Using these relevant pieces of data, the comparison of the three strategies becomes much simpler. It is clear that the buy and hold simulation generated the largest profits, with trending following coming in second, and day trading third. This conclusively answers the basic preliminary question of which strategy is the most lucrative. However, there are other pieces of information which can be derived from these points of data that can further help to clarify the results. Only a certain percentage of the budget was spent in each simulation, and a comparison of the total profits does not take this factor into account. If the total profit is divided by the total spent, the result will show how much was profited by each dollar spent. The following table shows this operation.

Strategy	Profit per Dollar Spent
Buy and Hold	**$0.0389**
Day Trading	**$0.0084**
Trend Following	**$0.0207**

Figure 7.2 Profit per Dollar Spent

These results tell a similar tale to the one told by the total profits. Buy and hold produced the greatest returns per dollar, trend following came in second, and day trading produced the weakest results. However, the differences between these values are in a different proportion than the results for total profit. This proportion will be taken into consideration later, but there are also other pieces of data to determine which will help in the final analysis. The number of trades is an important factor to consider because it has a certain bearing on the ethical impact on the market overall, and also commissions and fees can build to extreme levels when a higher volume of trades is conducted. The average profit per trade is therefore also an important consideration. The following table shows these statistics.

Strategy	Average Profit per Trade
Buy and Hold	**$485.50**
Day Trading	**$36.27**
Trend Following	**$143.70**

Figure 7.3 Average Profit per Trade

Once again, buy and hold has the best results, trend following coming in second, and day trading has the worst results. However, once again, the proportional comparison of these three data points is slightly different. One final piece of data to consider is the total gain over the total loss, which speaks to the question of which strategy wins more than it loses. These data points are listed below.

Strategy	Total Gain/Total Loss
Buy and Hold	**2.93**
Day Trading	**10.33**
Trend Following	**8.38**

Figure 7.4 Total Gain/Total Loss

These results are slightly counterintuitive. In this instance, day trading proved to have the best results, trend following once again coming in second, and with buy and hold coming in last. It is also worth consideration to realize that this is the first statistic to not take total profits directly into account.

We now have four highly relevant points of data with which to consider how to place our strategies into a cohesive super-strategy. This is where the proportions will finally become important. To better understand these proportional values, each statistic is displayed below in pie chart format, where each value represents a fraction, for that particular strategy, of the whole, where all three are added together.

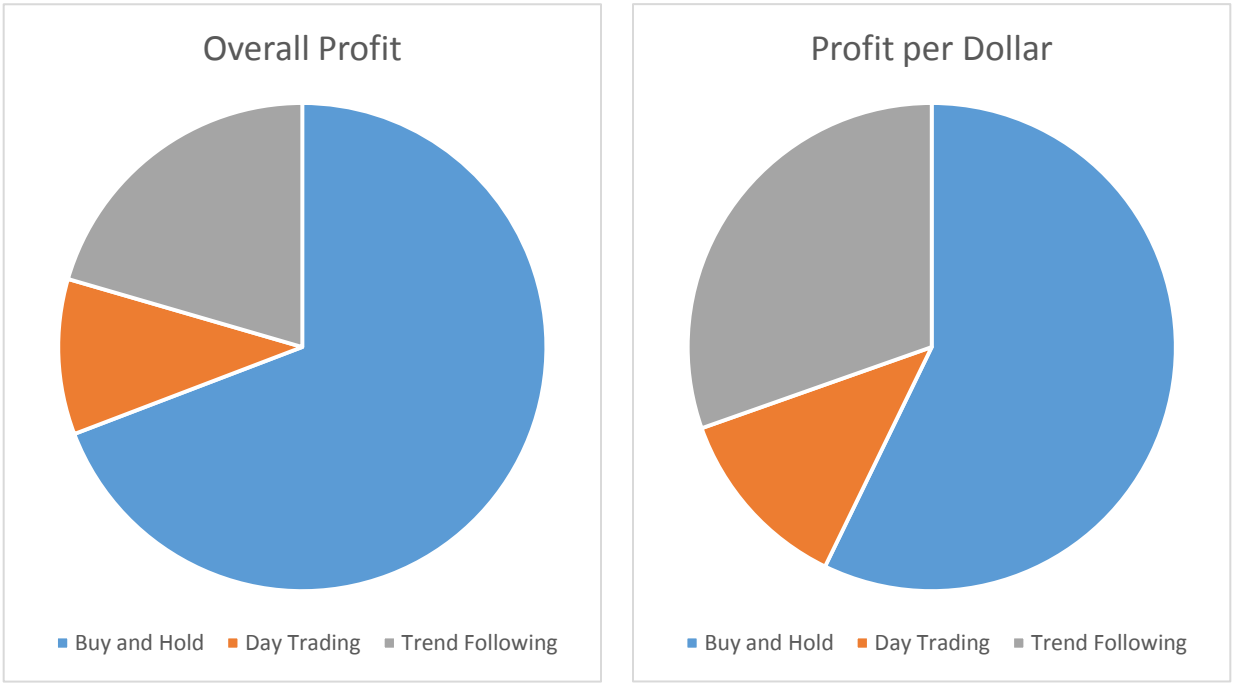
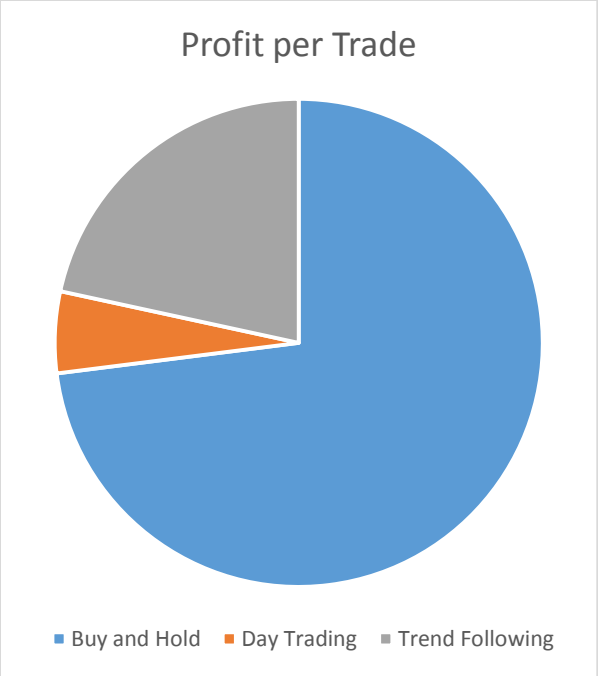


Figure 7.5 Overall Profit and Profit per Dollar



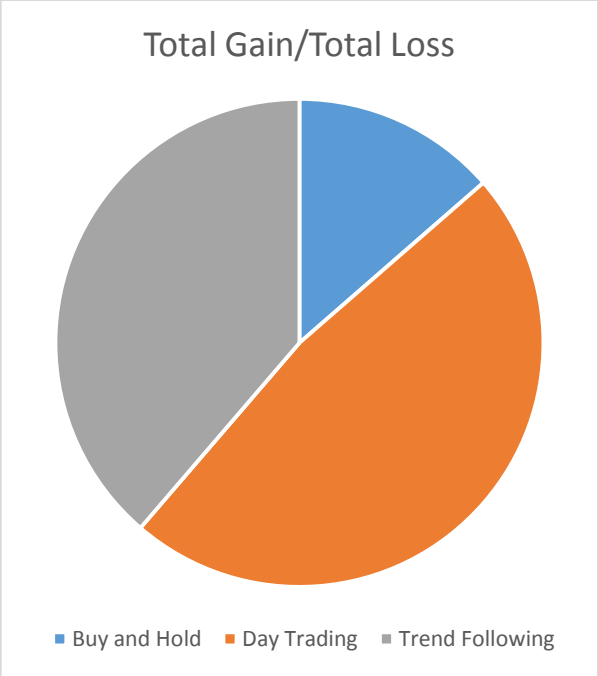


Figure 7.6 Profit per Trade and Total Gain/Total Loss

These diagrams are helpful visual representations. For the total profit chart, the total profit for all three simulations was $14,035.04, and each fraction represents the total profit of the particular simulation divided by this value. It is also useful to see these percentages in writing; they are displayed in the chart below.

Strategy	Overall Profit Percentage	Profit per Dollar Percentage	Profit per Trade Percentage	Total Gain/Total Loss Percentage
Buy and Hold	**69.2%**	**57.2%**	**73.0%**	**13.6%**
Day Trading	**10.3%**	**12.4%**	**5.4%**	**47.7%**
Trend Following	**20.5%**	**30.4%**	**21.6%**	**38.7%**

Figure 7.7 Percentages for Result Charts

I believe that these pieces of data are extremely relevant to the final conclusion of the experiment. In order to determine the percentage each strategy should occupy in the final trading

super-system, each of these data points will be given equal weight and subsequently averaged together to create a single percentage value for each strategy, and one final pie chart of the system. Both of these results can be seen below.

Strategy	Final Super-System Percentage
Buy and Hold	53.25%
Day Trading	18.95%
Trend Following	27.8%

Figure 7.8 Super-System Percentages

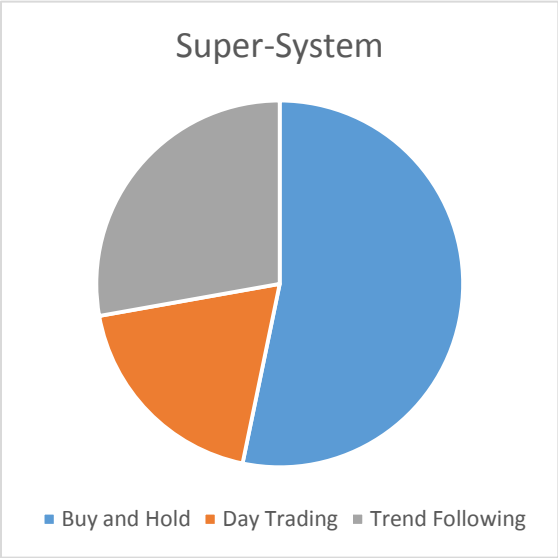


Figure 7.9 Super-System Chart

The following charts show the fluctuation in stock value for each of the ten companies in the portfolio over the course of the seven week simulation.

Figure 7.10 Southwest Airlines Company 6/1/2013 – 7/19/2013 [23]

Figure 7.11 Diana Containerships Incorporated 6/1/2013 – 7/19/2013 [10]

Figure 7.12 Domino's Pizza Incorporated 6/1/2013 – 7/19/2013 [11]

Figure 7.13 Microsoft Corporation 6/1/2013 – 7/19/2013 [20]

Figure 7.14 Google Incorporated 6/1/2013 – 7/19/2013 [16]

Figure 7.15 Bank of America Corporation 6/1/2013 – 7/19/2013 [3]

Figure 7.16 Goldman Sachs Group Incorporated 6/1/2013 – 7/19/2013 [14]

Figure 7.17 Wendy's Company 6/1/2013 – 7/19/2013 [26]

Figure 7.18 Pharmacyclics Incorporated 6/1/2013 – 7/19/2013 [22]

Figure 7.19 Harley Davidson Incorporated 6/1/2013 – 7/19/2013 [17]

Chapter 8. CONCLUSION

The stock market, in many ways, could be considered legalized gambling. At the same time, it allows average people to purchase pieces of companies which supply them with goods and services. If an individual feels a company is doing well, the stock market gives that person an opportunity to get involved, and share in the profits. An investor seeking to make as much money as possible, however, needs a plan of action. This experiment has resulted in a super trading system combining buy and hold, day trading, and trend following in a very specifically proportioned combination. In this super-system, 53.25% of the time, money, and effort would go into buy and hold, 18.95% would go to day trading, and 27.8% would go to trend following. These values take experiment results into as much consideration as possible, representing an average of several important data distributions. The experiment itself was also carried out to the best of my ability, with as many controls as possible. The three simulations were executed simultaneously using the same ten company portfolio, which would eliminate variables resulting from timeframe and portfolio choice. Rules were established to make sure the trades executed in each simulation were within the realm of the particular trading strategy.

I consider this experiment to be successful. I feel that the results are accurate and reliable, and I believe that they speak truthfully to the reliability of each strategy tested. I still do not consider myself an expert on the stock market, but I feel that I am more knowledgeable than when I began this project. I also feel better prepared to enter the world of stock trading with less apprehension and more confidence. The super-system established by this experiment would likely be the strategy I would primarily take advantage of if and when I decide to start trading legitimately.

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