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A Stock Market Simulation

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By

Zachary J Palanchian

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This report represents the work of one or more WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on the web without editorial or peer review

Abstract

By means of spreadsheet software and various online resources of information, this project sought to conduct and analyze a 90-day simulation of several trading strategies as compared to investing with passive mutual funds. The same twelve companies were traded through the use of four different trading strategies over the same 90-day period. The results indicate that it is quite difficult to outperform a primary stock index with active trading strategies. This project provided great insight into investing, as well as the stock market, and will prove to be valuable for investing in my future.

Acknowledgements

I would like to thank professor Dalin Tang for his assistance and support in completing this project as well as the both of my parents, for their support, feedback, and encouragement. Lastly, I would like to sincerely thank Professor John Sullivan for his help throughout the process of my IQP and my WPI experience.

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Chapter 1. Introduction

1.1 Primary Stock Indexes

US stock indexes serve as small samples of the market at large and are excellent for diversifying investments through the use of passive mutual funds. Primary stock indexes are also excellent indicators of the performance of their markets; if an index went up or down by $X\%$ it would indicate that, on average, the stocks that make up that index also changed by $X\%$.

There is a myriad of indexes for the U.S. and other stock markets though the Dow Jones Industrial Average, S&P 500 Index, and Russell 3000 are the primary indexes for the U.S. market. The primary indexes for Germany, the UK, China, and Japan are DAX, FTSE 100, SSE Composite, and the Nikkei 225, respectively.

Figure 1.1 below illustrates the similarities between the S&P 500 and the DJIA. Both indexes respond to the same U.S. market changes and therefore, their fractional change in price over time are equivalent. For most indexes, the companies who comprise the index are weighted according to their market capitalization. However, the DJIA on the other hand, weighs companies based on their stock price.

To conclude, a stock index is a catalog of stocks, an index's price is based on the average value of its stocks, and indexes are good measures of market performance.

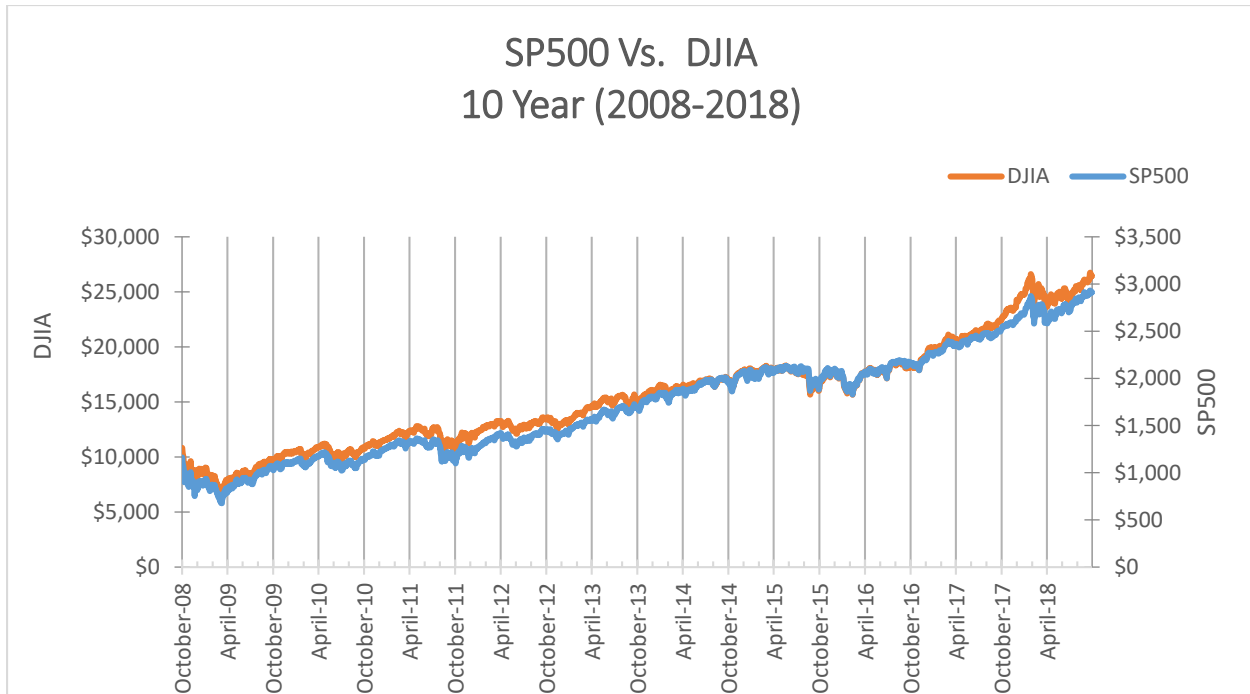


Figure 1.1 S&P500 Vs. DJIA – 10 Year

1.2 The Changing Dow Jones Industrial Average Components

“The DJIA, or Dow Jones Industrial Average, is a price-weighted average of 30 significant stocks traded on the New York Stock Exchange and the Nasdaq.” Originally, the index only included 12 companies, which worked in the cotton, tobacco, sugar, oil, and railroad industries, but later expanded to include 30 components. Until recently, June of 2018, General Electric was the only company that had remained a part of the DJIA since its inception. The index has continually changed over time in response to market changes and trends by replacing components that lose performance, become symbolic of the economy at large, and/or “when a broader economic shift occurs and a change needs to be made to reflect it.”

Starting three months after it was created, the DJIA index has added or replaced components over 50 times. One of the largest of such changes occurred in 1932 when

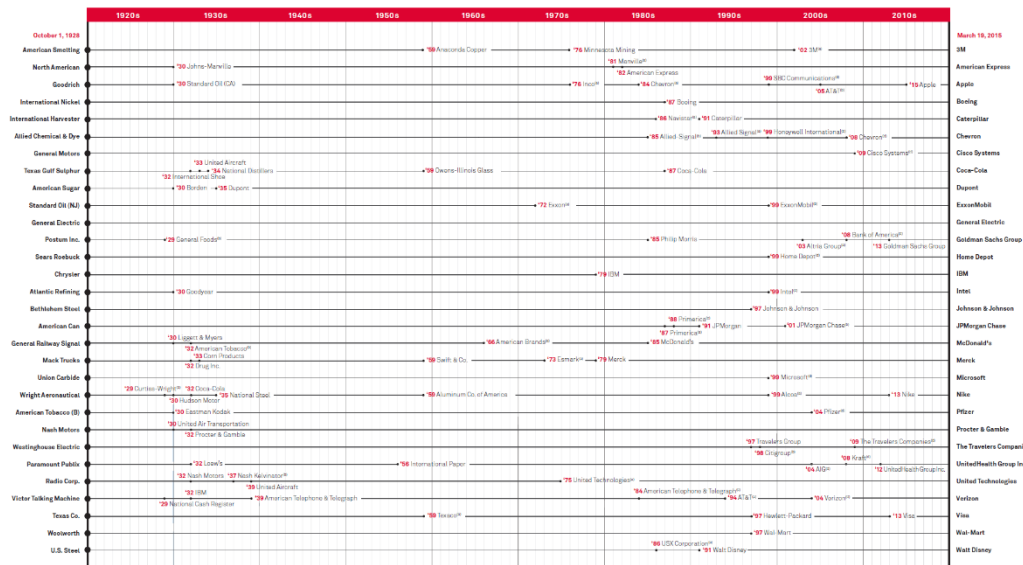
eight stocks were replaced. Furthermore, two of the companies added during that exchange are still included in the DJIA today: The Coca-Cola Company and Procter & Gamble Co. More recently, in 1997 and again in 1999, four components were changed.

As of June 26th, 2018, the Dow Jones Industrial Average includes the following components:

3M Company, American Express Company, Apple Inc., The Boeing Company, Caterpillar Inc., Chevron Corporation, Cisco Systems, Inc., The Coca-Cola Company, DowDuPont Inc., Exxon Mobile Corporation, The Goldman Sachs Group, Inc., The Home Depot, Inc., Intel Corporation, International Business Machines Corporation, Johnson and Johnson, JPMorgan Chase and Co., McDonald's Corporation, Merck and Co., Inc., Microsoft Corporation, Nike, Inc., Pfizer Inc., The Procter & Gamble Company, The Travelers Companies, Inc., UnitedHealth Group Inc., United Technologies Corporation, Verizon Communications, Inc., Visa Inc., Walgreens Boots Alliance, Inc., Walmart Inc., and The Walt Disney Company.

The historical changes and components of the DJIA index from the 1920's to 2015 can be seen in below, in Figure 1.2.

The Changing Dow Jones Industrial Average®



How to read this chart

To track changes in components, begin in this column for 1926 and work across. For instance, American Sugar was replaced by Borden in 1930, which in turn was replaced by DuPont in 1935. Year of change is shown in red, bold face.

a Denotes name change
 b Denotes a takeover or merger resulting in a name change
 c Indicates that a new company has adopted the name of a prior component
 d Indicates stocks that were added to the Dow® not as one-for-one replacement of departing stocks, but rather as part of a broader review

More info: spji.com/djia/20000

S&P Dow Jones Indices

A Division of S&P Global

Source: S&P Dow Jones Indices LLC
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Figure 1.2 The Changing Dow Jones Industrial Average

1.3 The Changing DJIA

As evidenced by Figure 1.3 and Figure 1.4 below, the DJIA index consistently increases in value over time on average. Furthermore, also on average, “bull” markets which indicate rising markets, last longer than “bear” markets which indicate falling markets.

The “bull” and “bear” market periods since 1926 for the S&P 500 index can be seen below in Figure 1.5, as discussed above. Made apparent by Figure 1.1, the S&P 500 and the DJIA follow each other very closely. Therefore, the bull and bear market periods were very similar for both indexes.

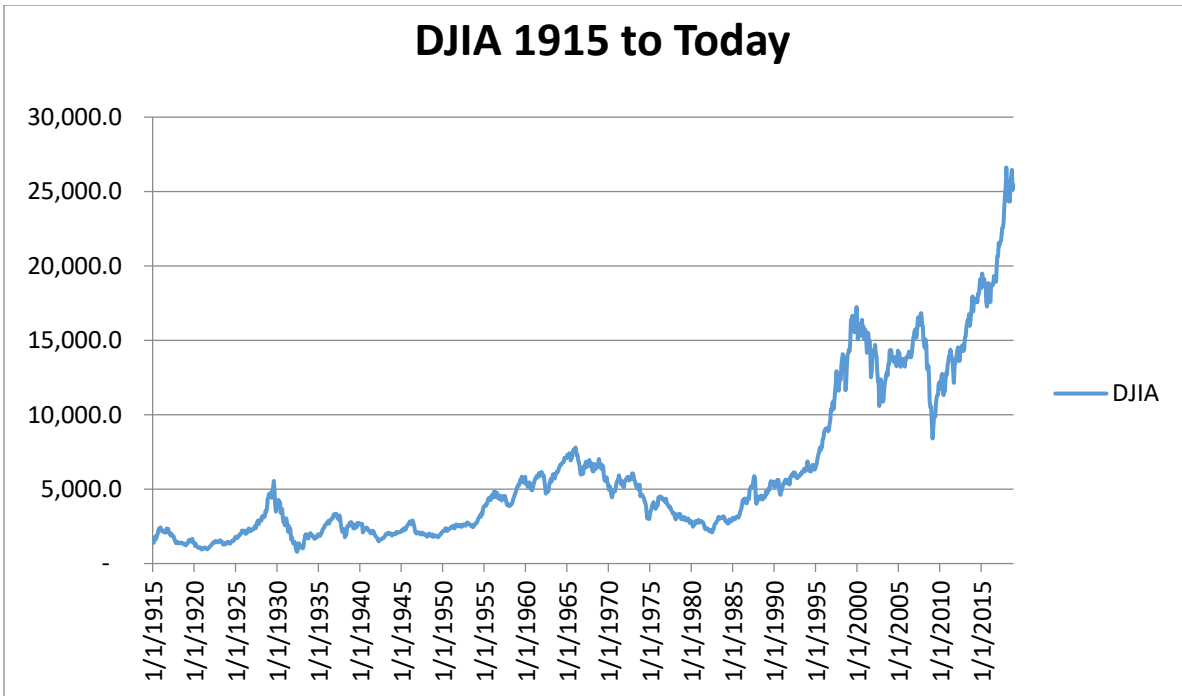


Figure 1.3 Dow Jones Industrial Average Price: 1915-2018

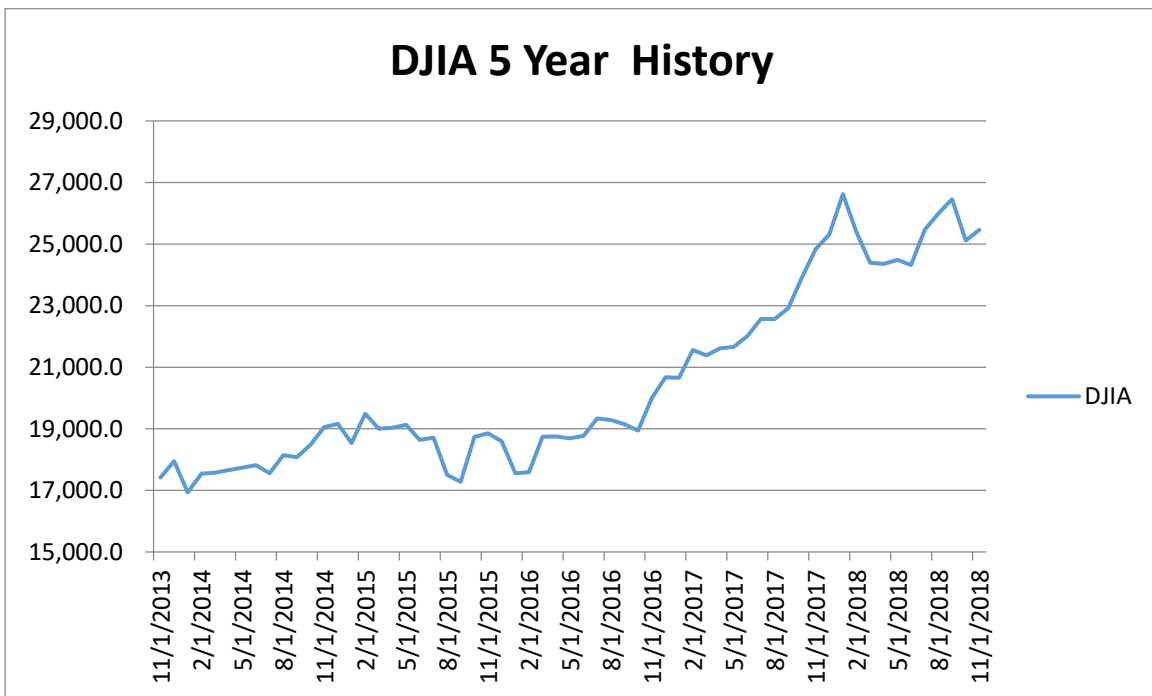


Figure 1.4 Dow Jones Industrial Average Price: 2013-2018

1.4 Major Periods of Economic Recession and Expansion

Perhaps the most noteworthy economic crisis in United States history is the Great Depression, which lasted from 1929-1938. “Unemployment reached 25 percent in 1933 and remained at 19 percent in 1938.” Franklin D. Roosevelt’s New Deal economic policy coupled with the conclusion of the drought that fueled the Dust Bowl, and increased spending after World War 2 helped to end the worst recession in the history of the U.S.

The period from 1961 to 1969 marked a 106-month-long period of expansion that saw annual increases in employment, GDP, and incomes. Expansive fiscal policy, due to the Vietnam War, helped fuel this expansion at the cost of inflation later on.

From 1973 to 1975, a 16-month recession resulted from the OPEC oil embargo, newly introduced “wage-price controls,” and the removal of the gold standard in the U.S. Together, these factors heavily increased oil prices, raised prices thereby reducing demand, and severely diminished the value of the dollar.

Another period of expansion, 1975 to 1980, followed the 16-month recession of 1973. This expansion saw healthy increases in employment and GDP before ending with record high oil prices.

From 1980 to 1982 two recessions occurred: the first, due to the “FED raising the interest rate to combat inflation” and the second, due to the Iranian oil embargo. The increased interest rates lowered business spending, while the oil embargo raised oil prices by reducing U.S. oil supplies.

One of the longest periods of expansion, 1982 to 1990, saw a rise in employment rates, GDP, and income due to down and steady oil prices and increasing private

investment. Another long period of expansion lasting from 1991 to 2001, came at the tail of a short recession. Improving home prices, the dot-com bubble, low interest rates, and later on a tax cut continually pushed up the economy.

The burst of the dot-com bubble, and later the economic repercussions stemming from the terrorist attacks of 9/11, brought about an eight-month recession in 2001. Internet businesses that were overvalued caused a bubble which eventually failed, weakening the market, and the attack then worsened things.

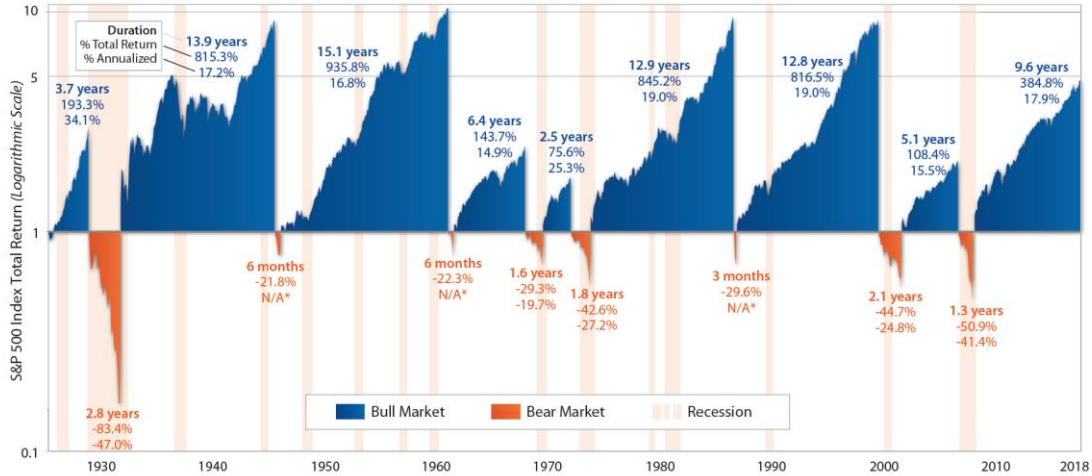
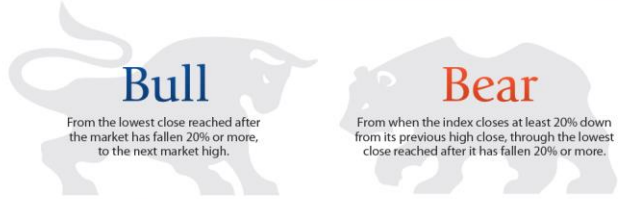
The period from 2008 to 2009 marked the Great Recession, the worst recession since the Great Depression. The subprime mortgage crisis led to a global banking crisis which culminated in a recession once the credit crisis spread to the general economy. The market declined for 5 quarters and by the end of 2008, GDP was down by 8.4%. The American Recovery and Reinvestment Act stimulus package helped bring an end to the recession in 2009.

Another long expansion began following the great recession and is still continuing as of late 2018 though the GDP has not risen by more than 3% for any calendar year. Additionally, this expansion has seen more disparity in the distribution of economic growth as compared to most other expansions, with a larger share going to top earners.

History of U.S. Bear & Bull Markets Since 1926

This chart shows historical performance of the S&P 500 Index throughout the U.S. Bull and Bear Markets from 1926 through September 2018. Although past performance is no guarantee of future results, we believe looking at the history of the market's expansions and recessions helps to gain a fresh perspective on the benefits of investing for the long-term.

- The average **Bull Market** period lasted 9.1 years with an average cumulative total return of 480%.
- The average **Bear Market** period lasted 1.4 years with an average cumulative loss of -41%.



Source: First Trust Advisors L.P., Morningstar, Returns from 1926 - 9/28/18. *Not applicable since duration is less than one year. These results are based on monthly returns—returns using different periods would produce different results. The S&P 500 Index is an unmanaged index of 500 stocks used to measure large-cap U.S. stock market performance. Investors cannot invest directly in an index. Index returns do not reflect any fees, expenses, or sales charges. This chart is for illustrative purposes only and not indicative of any actual investment. These returns were the result of certain market factors and events which may not be repeated in the future. Past performance is no guarantee of future results. The information presented is not intended to constitute an investment recommendation for, or advice to, any specific person. By providing this information, First Trust is not undertaking to give advice in any fiduciary capacity within the meaning of ERISA and the Internal Revenue Code. First Trust has no knowledge of and has not been provided any information regarding any investor. Financial advisors must determine whether particular investments are appropriate for their clients. First Trust believes the financial advisor is a fiduciary, is capable of evaluating investment risks independently and is responsible for exercising independent judgment with respect to its retirement plan clients.

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Figure 1.5 History of U.S. Bear and Bull Markets Since 1926

1.5 Interim Conclusions

Stock prices increase and decrease over time for a large number of reasons. Over time some companies go out of business and their stocks fall to zero, and new companies tend to emerge to replace them. *On average and over longer periods of time*, such as in Figure 1.3 and Figure 1.4, a basket of stocks (such as the DJIA) increases *substantially more* than it decreases.

Companies can and do go out of business due to unforeseen events and human trends. Considering such, it would seem prudent to work to aim to own a large number

of diverse stocks so as to ensure that inevitable losing stocks are offset by winning stocks on average.

Chapter 2. Equity Investment Alternatives

Having considered the history of the stock market and the fact that significant appreciation in stock values have occurred over almost all substantial windows of time (i.e. most individual investors' long-term investment horizons), it now seems reasonable to think that it would be wise to start saving and investing in equities as early in life as possible. The one obvious logical argument against doing so would be if an investor thinks that the future should for some reason or reasons be markedly different from the past such that the "glory days" of equity investing is now over. However, if this was an investor's belief, then there are probably much more dire things that he or she should be considering, such as how our society will function if the capital and finance systems that have been in place for hundreds of years no longer operate as they have. For the purpose of this paper, and for my actual savings, and also for investment decisions in the short-to-intermediate term, I am going to assume that the future will not be in stark contrast to the past, and that it is reasonable to be optimistic that it will remain, until strong and convincing evidence suggests otherwise.

With the desire to save and invest having been made, I see a small number of alternatives as actually available to someone such as myself:

1. Invest in stocks of my own selection for the long term with an eye towards minimizing buys and sells to keep transaction costs as low as possible.
2. Invest in stocks of my own and choosing with the intent of buying and selling stocks more frequently. This would be more akin to stock trading than to stock investing.

3. Invest in mutual funds that employ professional money managers to do the above for me. The advantage being their education, experience, and expertise, and the disadvantage being that they will undoubtedly expect to be paid in return for their services.

4. Invest in mutual funds that seek to minimize costs, and track a broad stock market index such as the Dow Jones Industrial Average (30 large companies), the S&P 500 (500 large and medium sized companies), or one of several broader and more inclusive stock indexes (can include large and medium-sized companies as well as a thousand or more smaller companies.)

This paper, by design, will examine my hypothetical performance – within a necessarily limited window of time – in seeking to invest in alternatives 1 and 2 above, which are guided by personal market understanding and research. What I will also consider here is a comparison of alternatives 3 and 4, guided by the more conservative trend that mutual funds which often track primary indexes will generate value on average, something it would seem smart to do given my hunch that the former exercise is not going to have me discovering some sort of remarkable talent for stock investing.

Some very basic Google searches quickly made it obvious that Vanguard was one of the first mutual fund companies to bring index investing to the public in a mainstream manner. So I decided to start on Vanguard's website to investigate the history of index funds versus active funds, while keeping in mind that Vanguard has an obvious interest in promoting stock index investing. What I noted immediately were some very important distinctions between these two styles, distinctions that with just a small amount of hindsight seem quite obvious:

1. Index Funds seek to track an index's performance as closely as possible while minimizing costs. Active funds seek to outperform their most relevant indexes.

2. Index funds buy all or a logical subset of the stocks contained in an index and only sell stocks to fund investor withdrawals or if necessary to rebalance holdings to match the relevant index stock holdings. Active funds buy and sell stocks in an attempt to beat the relevant index (as well as to contend with investor withdrawals) and as a result, they buy and sell stocks more frequently than index funds.

3. Because index funds minimize stock sales, they tend to trigger lower capital gains for tax purposes for their investors - especially short-term gains. The opposite result is true for active funds: more stock buying and selling is almost certain to cause higher capital gains for investors. The consequence is that with index investing an investor is going to be able to pay taxes later in time and, as a result, have more money invested over time. This would seem to provide an obvious advantage to index funds returns.

With just the above three general concepts in mind, the “engineer in me” quickly comes to some important conclusions. First, the only apparent reason for someone to invest in an active fund is to *earn a superior return* than if he/she had invested in the most comparable index fund. Second, index fund investors will likely pay a combination of lower/later taxes and lower/fewer fees, the combination of which will tend to increase returns. Third, it would seem reasonable to think that active fund managers would need to be extraordinarily good at what they do in order to beat their indexes given their tax and cost disadvantages. Fourth, there is a very obvious question that begs to be asked – How many of, and how often have, active funds *actually been successful* in beating the returns of their index fund competitors?

Continuing to read on Vanguard's website, I noted various statistical claims about how low Vanguard's index fund fees are, and how obviously superior their indexed funds performances have been when compared to the significant majority of comparable stock mutual fund alternatives. However, given Vanguard's obvious self-interest in promoting index fund investing, I continued my search for other sources of fund performance data that are more likely to be objective. Here are certain notable items that I found:

According to an 8/11/18 article in "Motley Fool" by Michael Douglass, over 90% of stock mutual funds have "lost" compared to their benchmarks over the past 15 years, as have 82% of all funds (when including bond funds.)

According to an 8/1/14 article in "Market Watch" by Rob Isbitts, stock index funds *only* beat 60% of active stock funds (my emphasis) – with consideration of several different time periods and through both bull and bear markets. I noted that this article was written as a counter-argument to index funds being preferable to active funds and, even so, the conclusion still seems to strongly favor indexed stock funds. While some might suggest that 60% odds (of superior returns) don't seem very strong, a consistent 60/40 odds advantage that is applied over time seems to be quite compelling and virtually certain to win. I can't help but think of 60% odds being considered in the context of casino operations. I am under the impression that casinos are by-and-large extremely profitable through the consistent application of odds that are much closer to parity than 60/40, and that it would probably be illegal in some way for a casino to put itself at a 60/40 advantage to the public.

A letter written by Warren Buffet – a man made famous across the globe by his extraordinarily successful history of stock and investment picking – told Berkshire

Hathaway shareholders in his 2016 Letter to Investors that “investors.....will do better with a low-cost index fund.”

An article in The Economist on June 24, 2017, “Fund Managers Rarely Outperform the Market for Long,” considered how long top-performing active funds remain top-performing. The article considered what percentage of funds in the top quartile in 2013 remained in the top quartile in subsequent years. More specifically, about 25% of 2013’s top-quartile funds remained in the top quartile through 2014; less than 5% continued their top-quartile performance through 2015, and less than 1% remained so into 2016.

An article in “The Financial Times” by Chris Newlands and Madison Marriage on 10/23/16 cites an analysis of data provided by S&P Dow Jones showing that “Almost all US, Global, and Emerging Market funds have failed to beat their benchmark [indices] since 2006.” The article goes on further to state that “over 99% of actively managed US equity funds have failed to beat the S&P 500 over the past 10 years...”

While the above do not constitute an exhaustive study of the topic, I find it very difficult not to conclude that (i) stock index funds perform better than a significant majority of active stock funds during any given year, and (ii) for the small minority of funds that do outperform their indexes in a given year, very few continue to do so in later years. After considering my research and all the evidence it provided, I am of the firm view that even the best professional stock pickers have had great difficulty in their attempts to earn returns superior to those of the relevant stock indexes and associated index funds. And given the fact that I have not had the training and experience associated with being an investment professional, it would seem exceedingly unlikely that I could manage my own stock investments to beat stock market index funds.

Chapter 3. 90-Day Simulation of Equity Investment Strategies

In order to test a small number of investing strategies that I developed as well as to test my own stock-picking skills (or perhaps my own stock-picking luck), I performed a simulation that began on July 2, 2018 and ended on September 28, 2018. This simulation tested the economic performance of all of the strategies described below and compared them to the performance of buying and holding an equity index fund would have been for the same period.

My simulation considered certain assumptions, which were necessary to effect hypothetical investment strategy simulations in a manner as realistic as reasonably possible.

3.1 Assumptions

The following assumptions were made to balance the realism of the simulation scenarios with some simplicity in order to more easily draw conclusions about the relative performance between the active trading strategies and the passive strategy.

I chose 12 stocks divided equally into three categories to invest in, \$100,000 each and \$1,200,000 in total:

- “FANG” stocks – Facebook, Amazon, Netflix, Google
- Industrial stocks – Boeing, GE, General Motors, Raytheon
- Financial stocks – Goldman Sachs, Citigroup, MetLife, Bank of America

I chose these 12 stocks, quite frankly, without the extensive analysis and reasoning that I would like to think that any trained professional would have applied beforehand.

Having said this and *after* having chosen these 12 stocks I did do a fair amount of research into each that is summarized in sections that follow.

When entering my 12 stock positions on July 2, I assumed that my purchase prices were, in each case, the average of the stocks' open and close for that day. I did this because I figured that if I had actually made the simulated investments, I would have bought at some particular time *other than* either the open and close.

I assumed that I exited stocks at the end of the simulation on September 28 at the stocks' closing prices. I did this because I thought that if I was actually going to invest for this 90-day period, I would stay in to the end of the period and thereby sell at each stock's closing price.

I assumed a commission of \$10 for each stock purchase (\$120 total) and that my stock purchase prices would each be marked up by .05% to simulate the fact that a brokerage always buys from an investor at slightly lower than the published price, and also sells slightly higher, in order to earn a modest profit. These costs slightly reduced the amount I invested in each stock and therefore the number of shares that I would have purchased with \$100,000.

In order to compare my strategies to what an index stock fund would have done for the same period, I "bought" the S&P 500 and DJIA indexes on June 2 and sold on Sept 28, investing all \$1,200,000 in each. I assumed that the price mark-up and commission would be a reasonable approximation of whatever fees that I would have had to pay for the index mutual funds, and that the funds would otherwise exactly track their indexes.

For my 12 stocks, as well as for my stock index investments, I did not include the effect of dividends that may have been received. I did this because I came to realize that inclusion in my simulations would become very complex. I would need to make a number of other assumptions for when and whether dividends would have been payable on a given date during my simulations and when I would have had to buy the stock to be entitled to the dividend. In the case of a simulation that involved selling a stock before Sept 28, whether I would still have been entitled to receive a dividend, whether each of my 12 companies had declared a dividend to be payable or not, and what the 500 stocks of the S&P and/or 30 stocks of the DJIA also had done for dividends, or not.

3.2 My Twelve Stocks

3.2.1 My “FANG” Stocks

Facebook

Facebook began as a social media software application developed by Mark Zuckerberg for use at Ivy League and other prestigious universities. Facebook was later expanded for use by the general public, becoming the one of the most popular and widely used online social media and social networking platforms in the U.S.

Facebook was formally founded in 2004 and went public in 2012. Facebook trades on NASDAQ under the ticker FB with a recent market capitalization of approx. \$380B and with a PE Ratio of ~20. Facebook’s market capitalization on June 1, 2018, one month prior to the start of my simulation, was \$549B. Revenue for 2017 was \$40B. Facebook has not, and does not presently pay dividends. Facebook’s key competitors are Twitter, Google, Snapchat, and LinkedIn.

Amazon

Amazon is a multinational technology company and lands in second place among both the largest e-commerce marketplaces and cloud computing services as of 2018. In addition to its online marketplace which draws more than 310 million customers globally and its cloud computing services, Amazon offers publishing, original consumer electronics, media services, has dealings with artificial intelligence, and produces its own original television shows as well as movies.

Amazon was founded in 1994 and went public in 1997. Amazon trades on NASDAQ under the ticker AMZN with a recent market capitalization of \$722B and PE of ~82. Amazon's market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$817B. Revenue for 2017 was \$177B. Amazon has not, and does not presently pay dividends. Amazon's key competitors are Alibaba, Otto, Citrix, Walmart, Google, Salesforce.com, and Microsoft – although not all of these competitors have identical business models.

Netflix

Netflix, coupled with its partner iQiyi in China, is the largest media streaming service in the world. Netflix's streaming service is subscription based and offers a wide collection of television shows, movies, and original content that it produced directly and for its own use.

Netflix was founded in 1997 and went public in 2002. Netflix trades on NASDAQ under the ticker NFLX with a recent market capitalization of \$111B and PE of ~91. Netflix' market capitalization on June 1, 2018, a month prior to the start of my simulation, was

\$156B. Revenue for 2017 was \$11B. Netflix has not, and does not presently pay dividends. Netflix' main competitors are Amazon, Hulu, YouTube, and Direct TV.

Google

Founded in 1998 by two Stanford University students, Google has since become to be the most widely used internet search engine in the world. Alphabet, Inc., the owner of the Google search engine platform, went public in 2004. Alphabet, Inc. trades on NASDAQ under the ticker GOOG with a recent market capitalization of \$724B and PE of ~39. Alphabet, Inc.'s market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$1,120B. Revenue for 2017 was \$110B. Alphabet, Inc. has not, and does not presently pay dividends. Alphabet, Inc.'s key competitors are Amazon, Microsoft, and Facebook.

3.2.2 My Industrial Stocks

Boeing

Boeing is a multinational corporation that both designs and produces rockets, missiles, rotorcraft, aircraft, and satellites, throughout the globe. Boeing is one of the two largest aircraft manufactures in the world.

Boeing was founded in 1916 and went public in 1978. Boeing was added to the DJIA in 1987 and trades on the NYSE under ticker BA with a recent market capitalization of \$180B and PE of ~19. Boeing's market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$215B. Revenue for 2017 was \$94B. Boeing has been a long-time dividend-paying stock with a recent quarterly dividend of \$1,71/share and with

current yield recently showing as 2.63%. Boeing's key competitors are Airbus Group, Lockheed Martin, Bombardier Inc., and General Dynamics.

General Electric

General Electric's continues to be a conglomerate with principal areas of business that either are, or have been, power systems equipment, oil and gas exploration and development equipment, defense equipment, renewable energy equipment (wind turbines and systems), aircraft engines and aviation equipment, healthcare and medical technology, financial services, lighting, and transportation equipment.

General Electric is currently in significantly fewer lines of business as in times past as it has struggled to remain competitive in several lines of business since the 2008 financial crisis. Perhaps most notably, its once industry-dominant financial services have been substantially divested or exited as General Electric seeks to again become principally dependent on its manufacturing businesses for profitability.

General Electric was founded and went public in 1892. General Electric was one of the 12 original members of the DJIA and trades on the NYSE under ticker GE. GE was removed from the DJIA in 2018 after having been the longest member of the DJIA at 122 years. GE was replaced in the DJIA by the drugstore chain Walgreen's. General Electric had a recent market capitalization of \$65B and has no meaningful PE because it is not currently making a profit. GE's market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$120B. Revenue for 2017 was \$122B.

GE has been a long-time dividend-paying stock. However, its recent business troubles have prompted it to reduce its quarterly dividend to \$.04/share, with a current

yield recently showing as 0.52%. General Electric's most significant competitors are Hitachi, Siemens, 3M Company, Emerson Electric Company, United Technologies, and Rockwell Automation.

General Motors

General Motors is a transnational corporation that designs and manufactures motor vehicles in 37 countries and markets and distributes its vehicles throughout the world.

General Motors was founded in 1908 and went public in 1916. General Motors trades on the NYSE under ticker GM and was a member of the DJIA until 2008. General Motors had a recent market capitalization of \$48B and a PE of 65. General Motors market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$62B. Revenue for 2017 was \$145B. General Motors has been a long-time dividend-paying stock with a recent quarterly dividend of \$0.38/share and with a current yield recently showing as 4.4%. General Motors' key competitors are Ford, Toyota, Volkswagen, and Honda.

Raytheon

Raytheon is principally a U.S. weapons systems manufacturer and a manufacturer of various other military and commercial electronics systems. Raytheon was founded in 1922 and went public in 1952. Raytheon trades on the NYSE under ticker RTN and had a recent market capitalization of \$43B and a PE of 18. Raytheon market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$61B. Revenue for 2017 was \$25B. Raytheon has been a long-time dividend-paying stock with a recent quarterly

dividend of \$0.8675/share and with a current yield recently showing as 2.26%. Raytheon's key competitors are BAE Systems, Boeing, General Dynamics, and Lockheed Martin.

3.2.3 My Financial Stocks

Goldman Sachs

Goldman Sachs is a multinational investment firm and one of the most world-renowned banking enterprises in the world. Goldman Sachs is a primary dealer and dominant market-maker in U.S. Treasuries. Other notable lines of business include investment and brokerage services, securities underwriting, and investment and securities management services.

Goldman Sachs was founded in 1869 and operated as a private partnership until it went public in 1999. Goldman Sachs was one of the financial institutions that were bailed out after the financial crisis of 2007 and 2008. Goldman Sachs is on the list of global systematically important banks which are considered too important to fail.

Goldman Sachs trades on the NYSE under ticker GS and had a recent market capitalization of \$60B and a PE of 12. Goldman Sachs' market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$85B. Revenue for 2017 was \$32B. GS is a dividend-paying stock with a recent quarterly dividend of \$0.80/share and with a current yield recently showing as 1.9%. Goldman Sachs' most noteworthy competitors are Wells Fargo, Citigroup, JPMorgan Chase, US Bancorp, Morgan Stanley, and Bank of America.

Citigroup

Citigroup is a multinational investment bank that offers a wide range of investment and financial services and products. These services include investment banking, loans and deposits, wealth management, and brokerage.

Citigroup was founded in 1812 and went public in 1998. Citigroup was one of the financial institutions that received bailout funds from the United States Government following the financial crisis of 2007&2008. Citigroup is on the list of global systematically important banks which are considered too important to fail.

Citigroup trades on the NYSE under ticker C and had a recent market capitalization of \$126B and has no meaningful PE because it is not currently making a profit. Citigroup's market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$175B. Revenue for 2017 was \$71B. Citigroup is a dividend-paying stock with a recent quarterly dividend of \$0.45/share and with a current yield recently showing as 3.1%. Citigroup's key competitors are JPMorgan Chase, Wells Fargo, and Bank of America.

Metlife

Metlife is one of the largest financial services corporations across the globe. Metlife is in the principal businesses of insurance, employee benefit programs, asset management, and annuities.

Metlife was founded in 1868 and was a mutualized insurance company until it went public in 2000. Metlife trades on the NYSE under ticker MET and had a recent market capitalization of \$40B and a PE of 8. Metlife's market capitalization on June 1, 2018, one month prior to the start of my simulation, was \$48B. Revenue for 2017 was \$62B. Metlife is a dividend-paying stock with a recent quarterly dividend of \$0.42/share and with a

current yield recently showing as 4.27%. Metlife's key competitors are AIG, Brighthouse Financial, Prudent Financial, and Sun Life Financial.

Bank of America

Bank of America is a world-class financial institution and offers asset and wealth management, investment banking and services, and banking among other related services to corporate and individual customers. Bank of America is the U.S.'s second largest bank by market capitalization, behind only JPMorgan Chase.

Bank of America was founded in 1904 and went public in 1978. Bank of America was one of the financial institutions that were bailed out after the financial crisis of 2007&2008. Bank of America is on the list of global systematically important banks which are considered too important to fail.

Bank of America on the NYSE under ticker BAC and had a recent market capitalization of \$239B and a PE of 11.6. Bank of America's market capitalization on June 1, 2018, a month prior to the start of my simulation, was \$307B. Revenue for 2017 was \$100B. Bank of America is a dividend-paying stock with a recent quarterly dividend of \$0.15/share and with a current yield recently showing as 2.49%. Bank of America's noteworthy competitors include JPMorgan Chase, Wells Fargo, and Citigroup.

3.3 Methodology

Operating under the above assumptions and considering my choice of 12 stocks to invest in, I then simulated these strategies:

Buy and Hold

“Buy and Hold” my 12 stocks for entire simulation period. This was very straightforward.

Buy and Rebalance

“Buy and Rebalance” each of my 12 stock holdings at the end of each month. At the onset I bought \$100,000 of each stock, and then at the end of each month I sold and bought each as needed to “reset” my holdings in each stock to 1/12 of my then-current total investment. For my 90-day simulation I did this exercise twice, for the end of July and end of August.

Buy and Hold with Stop Loss

“Buy and Hold” my 12 stocks subject to a specified “stop loss” limit for each stock; if a stock was exited due to reaching its stop-loss limit, then the amount then invested was converted to cash for the rest of the simulation period. I assumed no interest was earned while cash was held, and I used a single percentage loss, **3%**, on each stock’s price (compared to the price that I bought each at) as the stop-loss limit for each.

I subsequently added math to my simulation to allow me to apply different stop-loss limits, in order to do a number of “what if” simulations, i.e. for percentage stop-loss limits larger and smaller than 3%.

Buy and Rebalance to Increase Investment in Winners

“Buy and Rebalance to Increase Investment in Winners.” For this strategy I sold a single percentage – **15%** - of each losing stock at the end of the month, and used the proceeds to invest more in the other stocks. I thought of this strategy as a kind of “double

down” strategy – to reduce my bets in stocks that have lost, and to increase my bets in stocks that have won. Noteworthy is the word “bet” I did think that this strategy would arguably be my riskiest and least investment-like strategy.

I subsequently added math to my simulation to allow me to apply different percentage sales of my losing stocks, for percentages higher and lower than 15%. The full details as setup in an Excel spreadsheet can be found in the appendix.

Chapter 4. Buy and Hold

My “Buy and Hold” strategy yielded a positive return of 1.1% for the simulation period, which *annualizes to 4.5%*. While 4.5% might not sound too horrible, horrible is what my stock selection performance was in comparison to what return I could have had if I had invested in *either an S&P 500 index fund or a DJIA index fund whose simulation period returns annualized to 33.3% and 43.1% respectively*. These comparisons can be readily seen in Figure 4.1, in which the S&P 500 and DJIA indexes outperform my total portfolio.

So, the obvious question to ask is this one - Why did I do so horribly? The answer is that while Amazon and Boeing were big winners, GE, GM, and Facebook were even bigger losers - while the rest of my stocks' values moved much more modestly. The general performance of my three different categories can be observed in Figure 4.2, where the Financial stocks outperformed the Industrial and FANG stocks during the simulation period.

My key takeaways from this simulation are (i) primarily, I was a poor picker of stocks and (ii) that perhaps a 12 stock portfolio is not sufficiently diverse to offer some shelter from a particularly unwise, or unlucky, choice of a few stocks. Another takeaway is that both the S&P 500 and DJIA index funds would have had outstanding returns during my simulation period - and I sure wish I had been actually invested in those during that timeframe!

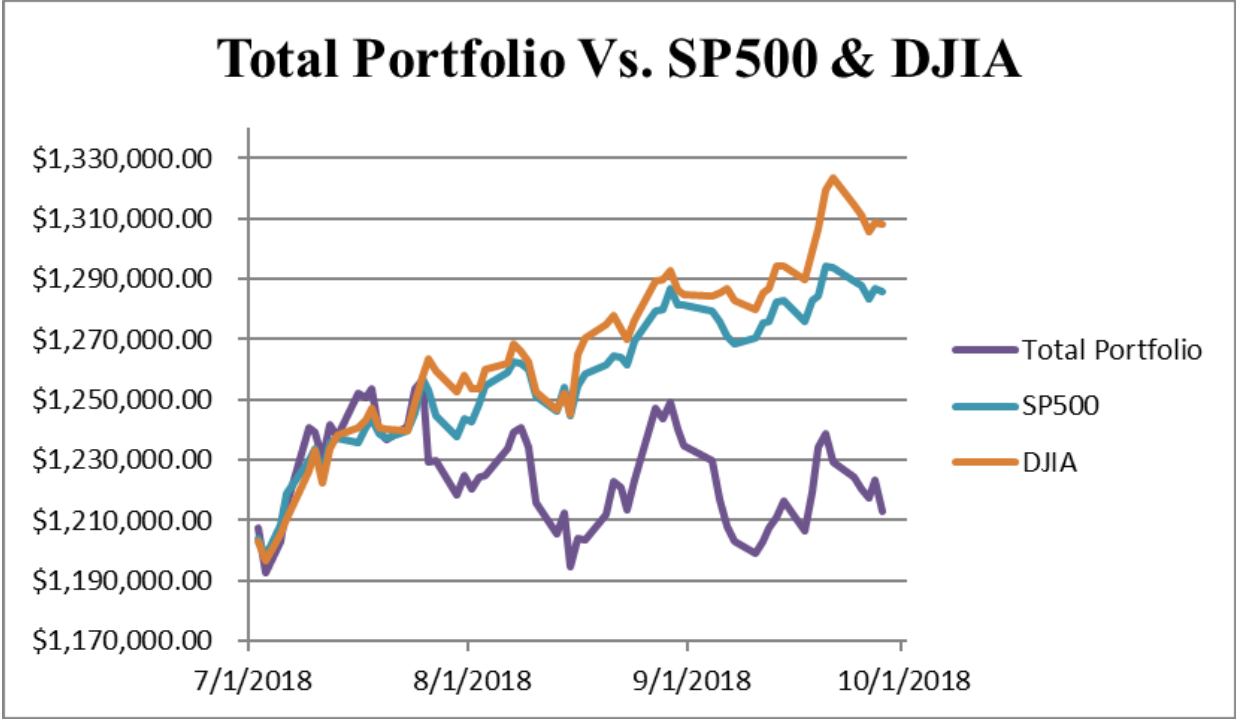


Figure 4.1 Buy and Hold - Total Portfolio Vs. S&P500 & DJIA

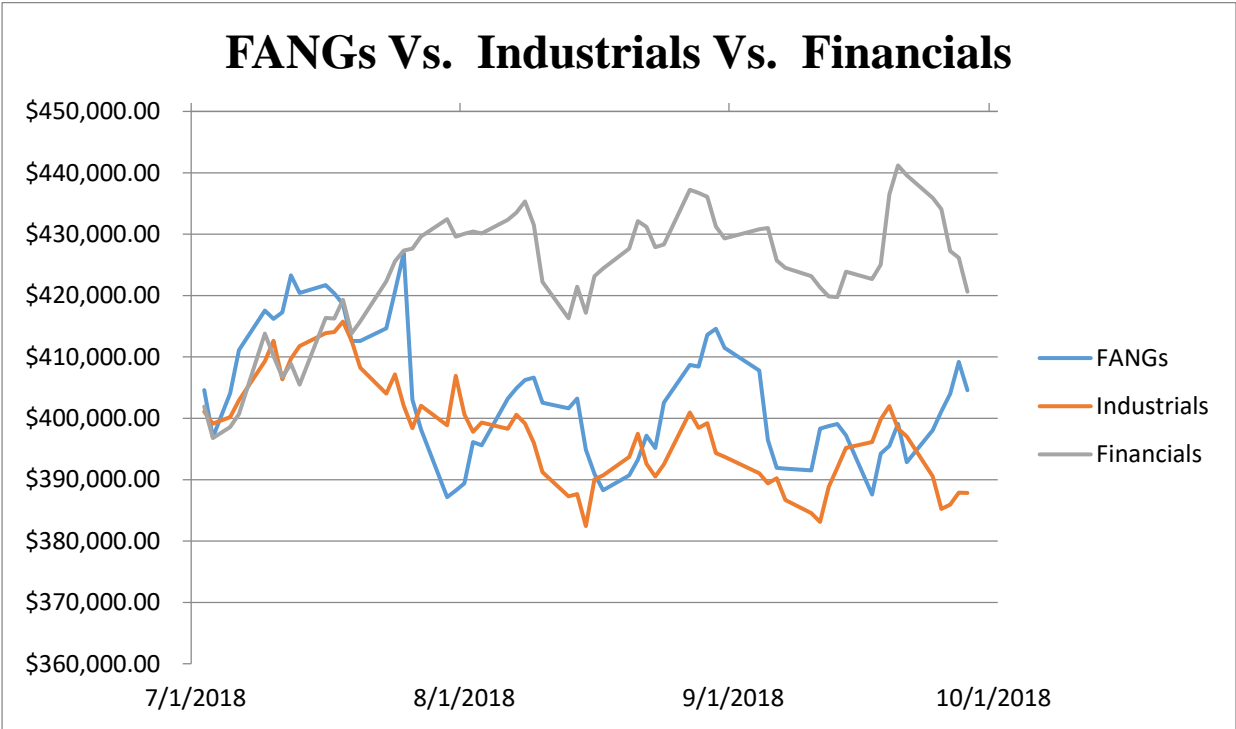


Figure 4.2 Buy and Hold - FANGs Vs. Industrial Vs. Financials

Table 4.1 Buy and Hold – Data Summary

| | Date | FANGs | Industrials | Financials | Total Portfolio | SP500 | DJIA |
|--------------|-----------|---------------|---------------|---------------|------------------------|------------------------|------------------------|
| ENTRY | 7/2/2018 | \$ 404,596.20 | \$ 401,082.41 | \$ 401,929.03 | \$ 1,207,607.64 | \$ 1,204,195.23 | \$ 1,202,994.52 |
| | 7/3/2018 | \$ 396,901.71 | \$ 399,120.31 | \$ 396,793.74 | \$ 1,192,815.76 | \$ 1,198,237.66 | \$ 1,196,443.88 |
| | 7/5/2018 | \$ 404,094.16 | \$ 400,191.17 | \$ 398,570.08 | \$ 1,202,855.40 | \$ 1,208,567.43 | \$ 1,205,447.34 |
| | 7/6/2018 | \$ 411,123.25 | \$ 402,935.96 | \$ 400,694.24 | \$ 1,214,753.45 | \$ 1,218,817.63 | \$ 1,210,383.61 |
| | 7/9/2018 | \$ 417,546.85 | \$ 409,298.97 | \$ 413,809.32 | \$ 1,240,655.14 | \$ 1,229,571.24 | \$ 1,226,226.25 |
| | 7/10/2018 | \$ 416,210.75 | \$ 412,644.63 | \$ 410,162.46 | \$ 1,239,017.84 | \$ 1,233,841.87 | \$ 1,233,306.99 |
| | 7/11/2018 | \$ 417,266.74 | \$ 406,358.33 | \$ 406,727.68 | \$ 1,230,352.75 | \$ 1,225,088.75 | \$ 1,222,457.95 |
| | 7/12/2018 | \$ 423,298.59 | \$ 409,711.08 | \$ 408,879.96 | \$ 1,241,889.62 | \$ 1,235,807.10 | \$ 1,233,565.85 |
| | 7/13/2018 | \$ 420,433.59 | \$ 411,773.46 | \$ 405,494.26 | \$ 1,237,701.31 | \$ 1,237,140.83 | \$ 1,238,243.75 |
| | 7/16/2018 | \$ 421,692.71 | \$ 413,876.17 | \$ 416,364.77 | \$ 1,251,933.65 | \$ 1,235,868.88 | \$ 1,240,468.35 |
| | 7/17/2018 | \$ 420,351.12 | \$ 414,067.36 | \$ 416,251.01 | \$ 1,250,669.49 | \$ 1,240,779.85 | \$ 1,243,216.66 |
| | 7/18/2018 | \$ 418,597.70 | \$ 415,771.92 | \$ 419,296.48 | \$ 1,253,666.10 | \$ 1,243,460.57 | \$ 1,247,146.19 |
| | 7/19/2018 | \$ 412,604.44 | \$ 412,652.27 | \$ 413,832.52 | \$ 1,239,089.22 | \$ 1,238,545.18 | \$ 1,240,475.31 |
| | 7/20/2018 | \$ 412,598.62 | \$ 408,247.40 | \$ 415,794.89 | \$ 1,236,640.90 | \$ 1,237,370.49 | \$ 1,240,159.51 |
| | 7/23/2018 | \$ 414,665.42 | \$ 404,019.05 | \$ 422,320.68 | \$ 1,241,005.15 | \$ 1,239,644.83 | \$ 1,239,475.04 |
| | 7/24/2018 | \$ 420,652.45 | \$ 407,164.36 | \$ 425,585.92 | \$ 1,253,402.73 | \$ 1,245,571.47 | \$ 1,249,257.02 |
| | 7/25/2018 | \$ 426,940.72 | \$ 402,024.77 | \$ 427,339.61 | \$ 1,256,305.10 | \$ 1,256,908.17 | \$ 1,257,777.45 |
| | 7/26/2018 | \$ 403,043.34 | \$ 398,404.75 | \$ 427,648.75 | \$ 1,229,096.85 | \$ 1,253,096.85 | \$ 1,263,368.52 |
| | 7/27/2018 | \$ 398,200.12 | \$ 402,052.98 | \$ 429,620.13 | \$ 1,229,873.22 | \$ 1,244,873.76 | \$ 1,259,606.70 |
| | 7/30/2018 | \$ 387,152.31 | \$ 398,859.34 | \$ 432,457.09 | \$ 1,218,468.74 | \$ 1,237,710.55 | \$ 1,252,468.54 |
| | 7/31/2018 | \$ 388,237.61 | \$ 406,913.65 | \$ 429,600.82 | \$ 1,224,752.08 | \$ 1,243,756.43 | \$ 1,257,831.39 |
| | 8/1/2018 | \$ 389,407.06 | \$ 400,639.59 | \$ 430,069.77 | \$ 1,220,116.42 | \$ 1,242,462.49 | \$ 1,253,804.32 |
| | 8/2/2018 | \$ 396,120.67 | \$ 397,794.57 | \$ 430,427.57 | \$ 1,224,342.81 | \$ 1,248,583.41 | \$ 1,253,425.21 |
| | 8/3/2018 | \$ 395,613.57 | \$ 399,300.90 | \$ 430,134.33 | \$ 1,225,048.80 | \$ 1,254,382.06 | \$ 1,260,176.82 |
| | 8/6/2018 | \$ 403,191.79 | \$ 398,297.68 | \$ 432,349.19 | \$ 1,233,838.65 | \$ 1,258,820.35 | \$ 1,262,136.65 |
| | 8/7/2018 | \$ 404,895.58 | \$ 400,584.36 | \$ 433,508.02 | \$ 1,238,987.96 | \$ 1,262,375.49 | \$ 1,268,408.71 |
| | 8/8/2018 | \$ 406,239.09 | \$ 399,142.74 | \$ 435,333.25 | \$ 1,240,715.08 | \$ 1,262,044.26 | \$ 1,266,173.68 |
| | 8/9/2018 | \$ 406,635.82 | \$ 395,992.33 | \$ 431,516.49 | \$ 1,234,144.64 | \$ 1,260,224.81 | \$ 1,262,485.61 |
| | 8/10/2018 | \$ 402,547.28 | \$ 391,223.65 | \$ 422,221.69 | \$ 1,215,992.62 | \$ 1,251,259.71 | \$ 1,252,780.86 |
| | 8/13/2018 | \$ 401,625.93 | \$ 387,303.90 | \$ 416,308.27 | \$ 1,205,238.10 | \$ 1,246,247.17 | \$ 1,246,572.60 |
| | 8/14/2018 | \$ 403,210.33 | \$ 387,648.59 | \$ 421,441.02 | \$ 1,212,299.94 | \$ 1,254,209.76 | \$ 1,252,126.55 |
| | 8/15/2018 | \$ 394,905.61 | \$ 382,449.73 | \$ 417,185.86 | \$ 1,194,541.20 | \$ 1,244,675.05 | \$ 1,245,321.01 |
| | 8/16/2018 | \$ 390,945.91 | \$ 390,046.07 | \$ 423,151.61 | \$ 1,204,143.59 | \$ 1,254,532.14 | \$ 1,264,935.43 |
| | 8/17/2018 | \$ 388,292.31 | \$ 390,700.25 | \$ 424,409.99 | \$ 1,203,402.55 | \$ 1,258,701.10 | \$ 1,270,408.66 |
| | 8/20/2018 | \$ 390,707.41 | \$ 393,695.22 | \$ 427,656.82 | \$ 1,212,059.46 | \$ 1,261,757.25 | \$ 1,274,831.66 |
| | 8/21/2018 | \$ 393,236.22 | \$ 397,493.70 | \$ 432,135.03 | \$ 1,222,864.94 | \$ 1,264,367.24 | \$ 1,277,979.29 |
| | 8/22/2018 | \$ 397,172.25 | \$ 392,583.22 | \$ 431,204.50 | \$ 1,220,959.97 | \$ 1,263,863.83 | \$ 1,273,589.93 |
| | 8/23/2018 | \$ 395,156.72 | \$ 390,534.97 | \$ 427,877.67 | \$ 1,213,569.37 | \$ 1,261,726.30 | \$ 1,269,797.95 |
| | 8/24/2018 | \$ 402,581.46 | \$ 392,499.64 | \$ 428,325.38 | \$ 1,223,406.48 | \$ 1,269,547.54 | \$ 1,276,398.56 |
| | 8/27/2018 | \$ 408,700.41 | \$ 400,965.14 | \$ 437,244.29 | \$ 1,246,909.83 | \$ 1,279,285.49 | \$ 1,289,231.22 |
| | 8/28/2018 | \$ 408,428.44 | \$ 398,463.39 | \$ 436,707.61 | \$ 1,243,599.45 | \$ 1,279,629.98 | \$ 1,289,942.85 |
| | 8/29/2018 | \$ 413,600.60 | \$ 399,207.03 | \$ 436,102.74 | \$ 1,248,910.37 | \$ 1,286,925.70 | \$ 1,292,939.59 |
| | 8/30/2018 | \$ 414,578.58 | \$ 394,339.39 | \$ 431,249.42 | \$ 1,240,167.38 | \$ 1,281,224.20 | \$ 1,286,127.09 |
| | 8/31/2018 | \$ 411,488.69 | \$ 393,723.68 | \$ 429,320.50 | \$ 1,234,532.86 | \$ 1,281,396.49 | \$ 1,285,033.35 |
| | 9/4/2018 | \$ 407,785.04 | \$ 391,038.54 | \$ 430,789.47 | \$ 1,229,613.05 | \$ 1,279,276.65 | \$ 1,284,422.64 |
| | 9/5/2018 | \$ 396,455.98 | \$ 389,400.04 | \$ 431,001.59 | \$ 1,216,857.61 | \$ 1,275,690.68 | \$ 1,285,536.67 |
| | 9/6/2018 | \$ 391,925.22 | \$ 390,246.47 | \$ 425,720.85 | \$ 1,207,892.54 | \$ 1,271,031.46 | \$ 1,286,570.00 |
| | 9/7/2018 | \$ 391,791.73 | \$ 386,691.02 | \$ 424,523.66 | \$ 1,203,006.41 | \$ 1,268,218.23 | \$ 1,282,643.85 |
| | 9/10/2018 | \$ 391,520.42 | \$ 384,564.47 | \$ 423,165.39 | \$ 1,199,250.27 | \$ 1,270,625.09 | \$ 1,279,700.66 |
| | 9/11/2018 | \$ 398,313.81 | \$ 383,134.76 | \$ 421,330.88 | \$ 1,202,779.46 | \$ 1,275,377.03 | \$ 1,285,342.19 |
| | 9/12/2018 | \$ 398,736.75 | \$ 388,826.21 | \$ 419,840.38 | \$ 1,207,403.35 | \$ 1,275,831.92 | \$ 1,286,720.99 |
| | 9/13/2018 | \$ 399,065.66 | \$ 391,948.46 | \$ 419,756.82 | \$ 1,210,770.94 | \$ 1,282,571.19 | \$ 1,293,999.69 |
| | 9/14/2018 | \$ 397,231.54 | \$ 395,195.31 | \$ 423,890.97 | \$ 1,216,317.82 | \$ 1,282,924.51 | \$ 1,294,429.26 |
| | 9/17/2018 | \$ 387,579.35 | \$ 396,139.91 | \$ 422,690.10 | \$ 1,206,409.36 | \$ 1,275,778.98 | \$ 1,289,848.80 |
| | 9/18/2018 | \$ 394,256.14 | \$ 399,821.50 | \$ 425,038.64 | \$ 1,219,116.29 | \$ 1,282,628.66 | \$ 1,298,996.86 |
| | 9/19/2018 | \$ 395,517.15 | \$ 401,995.48 | \$ 436,489.06 | \$ 1,234,001.69 | \$ 1,284,236.14 | \$ 1,306,856.03 |
| | 9/20/2018 | \$ 399,092.11 | \$ 398,329.22 | \$ 441,197.91 | \$ 1,238,619.24 | \$ 1,294,305.31 | \$ 1,319,289.27 |
| | 9/21/2018 | \$ 392,858.55 | \$ 397,034.85 | \$ 439,593.02 | \$ 1,229,486.41 | \$ 1,293,828.32 | \$ 1,323,571.24 |
| | 9/24/2018 | \$ 398,067.19 | \$ 390,545.12 | \$ 435,917.85 | \$ 1,224,530.16 | \$ 1,289,279.62 | \$ 1,314,591.08 |
| | 9/25/2018 | \$ 401,143.31 | \$ 385,221.56 | \$ 434,074.41 | \$ 1,220,439.28 | \$ 1,287,596.99 | \$ 1,311,134.61 |
| | 9/26/2018 | \$ 403,986.41 | \$ 385,944.20 | \$ 427,258.12 | \$ 1,217,188.73 | \$ 1,283,361.72 | \$ 1,305,842.42 |
| | 9/27/2018 | \$ 409,189.32 | \$ 387,902.54 | \$ 426,152.18 | \$ 1,223,244.05 | \$ 1,286,908.02 | \$ 1,308,547.14 |
| EXIT | 9/28/2018 | \$ 404,578.01 | \$ 387,839.49 | \$ 420,643.23 | \$ 1,212,940.72 | \$ 1,286,016.97 | \$ 1,308,193.46 |

Chapter 5. Buy and Rebalance

My “Buy and Rebalance” strategy yielded essentially identical results to my Buy and Hold strategy, so they were again horrible. Compare the Figure 4.1 to Figure 5.1, as well as Table 4.1 and Table 5.1 to see the roughly equivalent performance. From a mathematical perspective, it is obvious that the benefits of my monthly rebalancing were almost exactly offset by the incremental transaction costs associated with the additional stock buying and selling that this strategy required.

It is interesting to note the resulting comparisons of my three categories as seen in the plots of Figure 4.2 and Figure 5.2. The FANG stocks final performance was somewhat similar, indicating no real benefit or drawback from the rebalancing strategy. However, it would seem money was taken from the well performing Financial stocks and given to the underperforming Industrial stocks during the rebalancing.

My key takeaways from this simulation are (i) that my poor choice of stocks was again the root cause of my poor performance, and (ii) that periodic rebalancing may be a wise thing to include in an otherwise sound investment strategy, but the periodicity of such rebalancing probably needs to be considerably less frequent than monthly so that the increased costs do not materially offset the benefits. I am thinking that perhaps an annual rebalancing would be wise, or perhaps a rebalancing that is done only when investment proportions exceed some pre-established metric would be better still. Further analysis and study would of course be needed to be able to reach a supportable conclusion.

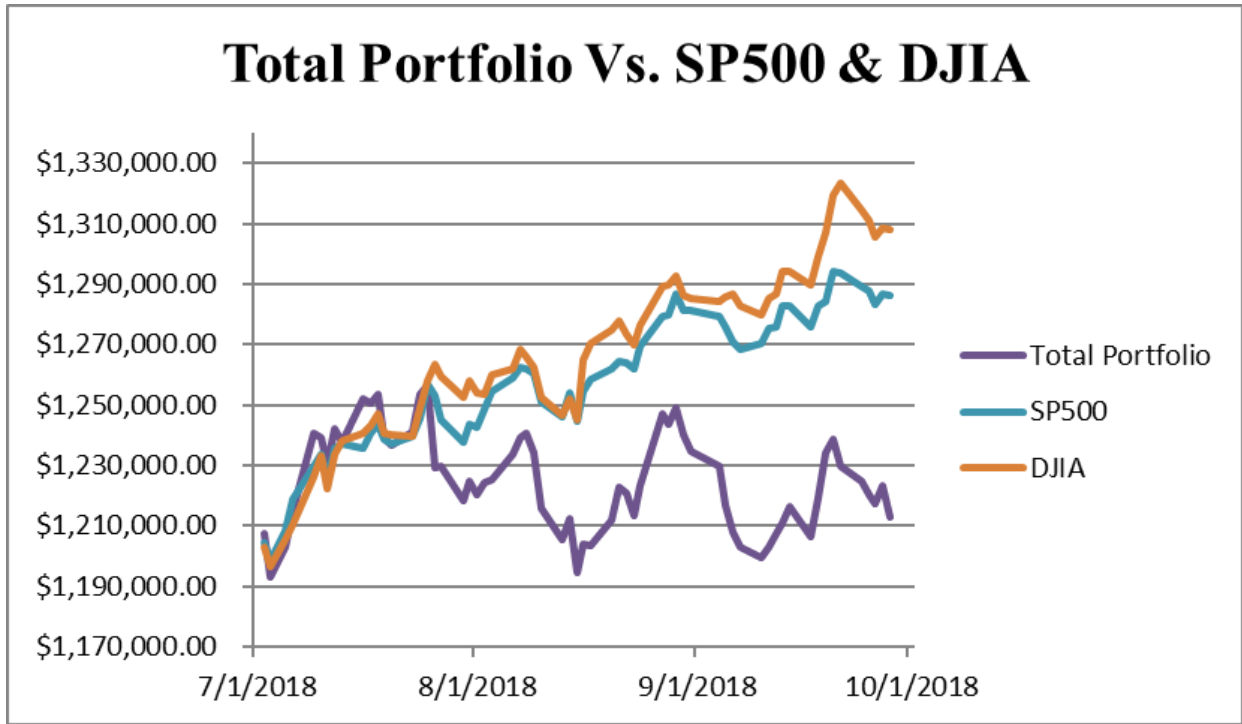


Figure 5.1 Hold and Rebalance - Total Portfolio Vs. S&P500 & DJIA

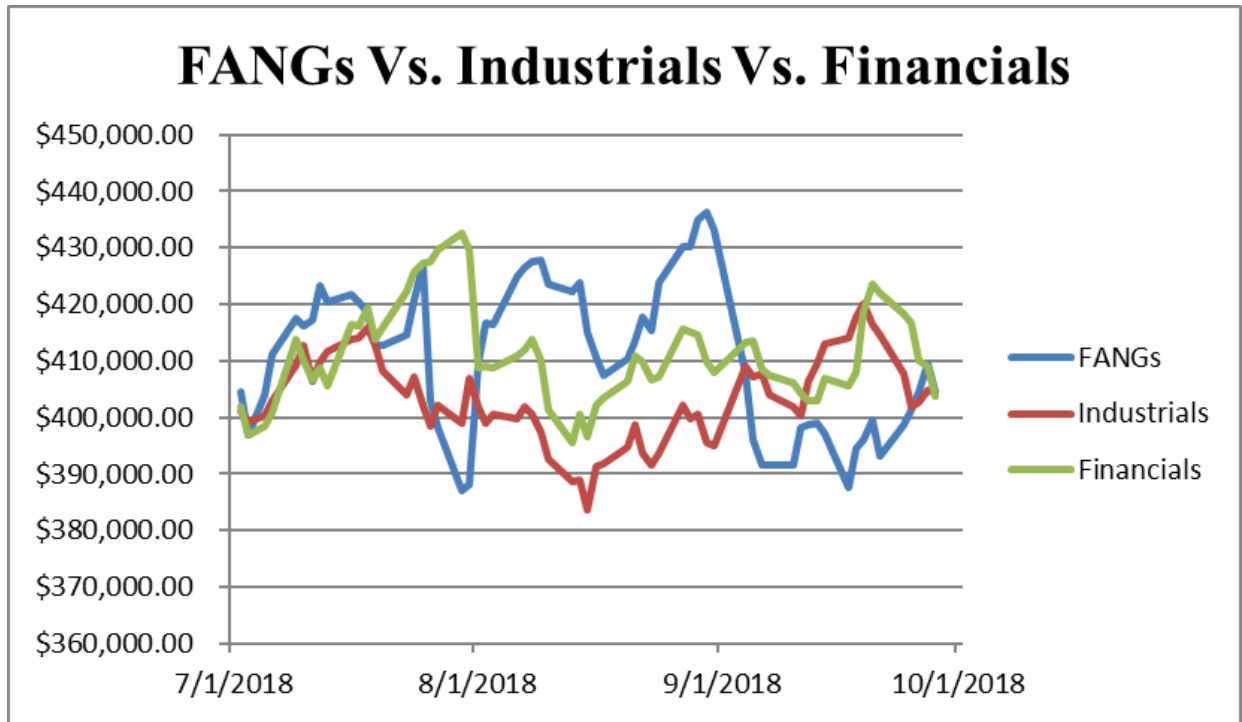


Figure 5.2 Hold and Rebalance - FANGs Vs. Industrial Vs. Financials

Table 5.1 Hold and Rebalance - Data Summary

| ENTRY | Date | FANGs | Industrials | Financials | Total Portfolio | SP500 | DJIA |
|-------|-----------|---------------|---------------|---------------|------------------------|------------------------|------------------------|
| | 7/2/2018 | \$ 404,596.20 | \$ 401,082.41 | \$ 401,929.03 | \$ 1,207,607.64 | \$ 1,204,195.23 | \$ 1,202,994.52 |
| | 7/3/2018 | \$ 396,901.71 | \$ 399,120.31 | \$ 396,793.74 | \$ 1,198,237.76 | \$ 1,198,237.66 | \$ 1,196,443.88 |
| | 7/5/2018 | \$ 404,094.16 | \$ 400,191.17 | \$ 398,570.08 | \$ 1,202,855.40 | \$ 1,208,567.43 | \$ 1,205,447.34 |
| | 7/6/2018 | \$ 411,123.25 | \$ 402,935.96 | \$ 400,694.24 | \$ 1,214,753.45 | \$ 1,218,817.63 | \$ 1,210,383.61 |
| | 7/9/2018 | \$ 417,546.85 | \$ 409,298.97 | \$ 413,809.32 | \$ 1,240,655.14 | \$ 1,229,571.24 | \$ 1,226,226.25 |
| | 7/10/2018 | \$ 416,210.75 | \$ 412,644.63 | \$ 410,162.46 | \$ 1,239,017.84 | \$ 1,233,841.87 | \$ 1,233,306.99 |
| | 7/11/2018 | \$ 417,266.74 | \$ 406,358.33 | \$ 406,727.68 | \$ 1,230,352.75 | \$ 1,225,088.75 | \$ 1,222,457.95 |
| | 7/12/2018 | \$ 423,298.59 | \$ 409,711.08 | \$ 408,879.96 | \$ 1,241,889.62 | \$ 1,235,807.10 | \$ 1,233,565.85 |
| | 7/13/2018 | \$ 420,433.59 | \$ 411,773.46 | \$ 405,494.26 | \$ 1,237,701.31 | \$ 1,237,140.83 | \$ 1,238,243.75 |
| | 7/16/2018 | \$ 412,692.71 | \$ 413,876.17 | \$ 416,364.77 | \$ 1,251,933.65 | \$ 1,235,868.88 | \$ 1,234,368.35 |
| | 7/17/2018 | \$ 420,351.12 | \$ 414,067.36 | \$ 416,251.01 | \$ 1,250,669.49 | \$ 1,240,779.85 | \$ 1,243,216.66 |
| | 7/18/2018 | \$ 418,597.70 | \$ 415,771.92 | \$ 419,296.48 | \$ 1,253,666.10 | \$ 1,243,460.57 | \$ 1,247,146.19 |
| | 7/19/2018 | \$ 412,604.44 | \$ 412,652.27 | \$ 413,832.52 | \$ 1,239,089.22 | \$ 1,238,545.18 | \$ 1,240,475.31 |
| | 7/20/2018 | \$ 412,598.62 | \$ 408,247.40 | \$ 415,794.89 | \$ 1,236,640.90 | \$ 1,237,370.49 | \$ 1,240,159.51 |
| | 7/23/2018 | \$ 414,665.42 | \$ 404,019.05 | \$ 422,320.68 | \$ 1,241,005.15 | \$ 1,239,644.83 | \$ 1,239,475.04 |
| | 7/24/2018 | \$ 420,652.45 | \$ 407,164.36 | \$ 425,585.92 | \$ 1,253,402.73 | \$ 1,245,571.47 | \$ 1,249,257.02 |
| | 7/25/2018 | \$ 426,940.72 | \$ 402,024.77 | \$ 427,339.61 | \$ 1,256,305.10 | \$ 1,256,908.17 | \$ 1,257,777.45 |
| | 7/26/2018 | \$ 403,043.34 | \$ 398,404.75 | \$ 427,648.75 | \$ 1,229,096.85 | \$ 1,253,096.85 | \$ 1,263,368.52 |
| | 7/27/2018 | \$ 398,200.12 | \$ 402,052.98 | \$ 429,620.13 | \$ 1,229,873.22 | \$ 1,244,873.76 | \$ 1,259,606.70 |
| | 7/30/2018 | \$ 387,152.31 | \$ 398,859.34 | \$ 432,457.09 | \$ 1,218,468.74 | \$ 1,237,710.55 | \$ 1,252,468.54 |
| | 7/31/2018 | \$ 388,237.61 | \$ 406,913.65 | \$ 429,600.82 | \$ 1,224,752.08 | \$ 1,243,756.43 | \$ 1,257,831.39 |
| | 8/1/2018 | \$ 409,528.50 | \$ 401,856.64 | \$ 408,739.11 | \$ 1,220,124.26 | \$ 1,242,462.49 | \$ 1,253,804.32 |
| | 8/2/2018 | \$ 416,823.31 | \$ 398,972.03 | \$ 409,101.11 | \$ 1,224,896.45 | \$ 1,248,583.41 | \$ 1,253,425.21 |
| | 8/3/2018 | \$ 416,392.18 | \$ 400,660.21 | \$ 408,766.52 | \$ 1,225,818.91 | \$ 1,254,382.06 | \$ 1,260,176.82 |
| | 8/6/2018 | \$ 424,937.30 | \$ 399,660.67 | \$ 410,899.07 | \$ 1,235,497.04 | \$ 1,258,820.35 | \$ 1,262,136.65 |
| | 8/7/2018 | \$ 426,409.32 | \$ 401,889.97 | \$ 412,009.46 | \$ 1,240,308.75 | \$ 1,262,375.49 | \$ 1,268,408.71 |
| | 8/8/2018 | \$ 427,606.72 | \$ 400,495.19 | \$ 413,736.28 | \$ 1,241,838.18 | \$ 1,262,044.26 | \$ 1,266,173.68 |
| | 8/9/2018 | \$ 427,881.59 | \$ 397,373.15 | \$ 410,111.57 | \$ 1,235,366.30 | \$ 1,260,224.81 | \$ 1,262,485.61 |
| | 8/10/2018 | \$ 423,485.05 | \$ 392,517.90 | \$ 401,240.79 | \$ 1,217,243.74 | \$ 1,251,259.71 | \$ 1,252,780.86 |
| | 8/13/2018 | \$ 422,330.38 | \$ 388,534.56 | \$ 395,658.00 | \$ 1,206,522.93 | \$ 1,246,247.17 | \$ 1,246,572.60 |
| | 8/14/2018 | \$ 423,741.83 | \$ 388,869.22 | \$ 400,545.76 | \$ 1,213,156.81 | \$ 1,254,209.76 | \$ 1,252,126.55 |
| | 8/15/2018 | \$ 414,998.09 | \$ 383,726.90 | \$ 396,524.13 | \$ 1,195,249.12 | \$ 1,244,675.05 | \$ 1,245,321.01 |
| | 8/16/2018 | \$ 410,503.21 | \$ 391,185.60 | \$ 402,203.10 | \$ 1,203,891.90 | \$ 1,254,532.14 | \$ 1,264,935.43 |
| | 8/17/2018 | \$ 407,546.09 | \$ 391,847.07 | \$ 403,414.41 | \$ 1,202,807.57 | \$ 1,258,701.10 | \$ 1,270,408.66 |
| | 8/20/2018 | \$ 410,347.33 | \$ 394,840.80 | \$ 406,498.78 | \$ 1,211,686.91 | \$ 1,261,757.25 | \$ 1,274,831.66 |
| | 8/21/2018 | \$ 413,403.98 | \$ 398,633.83 | \$ 410,776.41 | \$ 1,222,814.21 | \$ 1,264,367.24 | \$ 1,277,979.29 |
| | 8/22/2018 | \$ 417,663.80 | \$ 393,651.53 | \$ 409,877.85 | \$ 1,221,193.18 | \$ 1,263,863.83 | \$ 1,273,589.93 |
| | 8/23/2018 | \$ 415,351.72 | \$ 391,573.13 | \$ 406,703.16 | \$ 1,213,628.01 | \$ 1,261,726.30 | \$ 1,269,797.95 |
| | 8/24/2018 | \$ 423,761.00 | \$ 393,550.70 | \$ 407,145.05 | \$ 1,224,456.75 | \$ 1,269,547.54 | \$ 1,276,398.56 |
| | 8/27/2018 | \$ 430,222.97 | \$ 402,226.91 | \$ 415,624.19 | \$ 1,248,074.07 | \$ 1,279,285.49 | \$ 1,289,231.22 |
| | 8/28/2018 | \$ 430,097.38 | \$ 399,704.76 | \$ 415,111.05 | \$ 1,244,913.19 | \$ 1,279,629.98 | \$ 1,289,942.85 |
| | 8/29/2018 | \$ 435,018.30 | \$ 400,441.54 | \$ 414,544.05 | \$ 1,250,003.90 | \$ 1,286,925.70 | \$ 1,292,939.59 |
| | 8/30/2018 | \$ 436,330.41 | \$ 395,497.03 | \$ 409,905.40 | \$ 1,241,732.84 | \$ 1,281,224.20 | \$ 1,286,127.09 |
| | 8/31/2018 | \$ 433,039.08 | \$ 394,897.50 | \$ 408,064.74 | \$ 1,236,001.33 | \$ 1,281,396.49 | \$ 1,285,033.35 |
| | 9/4/2018 | \$ 407,743.14 | \$ 409,010.31 | \$ 413,363.35 | \$ 1,230,116.80 | \$ 1,279,276.65 | \$ 1,284,422.64 |
| | 9/5/2018 | \$ 395,952.26 | \$ 407,218.01 | \$ 413,569.58 | \$ 1,216,739.85 | \$ 1,275,690.68 | \$ 1,285,536.67 |
| | 9/6/2018 | \$ 391,566.97 | \$ 407,757.87 | \$ 408,499.65 | \$ 1,207,824.50 | \$ 1,271,031.46 | \$ 1,286,570.00 |
| | 9/7/2018 | \$ 391,609.88 | \$ 403,996.65 | \$ 407,342.43 | \$ 1,202,948.96 | \$ 1,268,218.23 | \$ 1,282,643.85 |
| | 9/10/2018 | \$ 391,518.12 | \$ 401,909.68 | \$ 406,036.88 | \$ 1,199,464.68 | \$ 1,270,625.09 | \$ 1,279,700.66 |
| | 9/11/2018 | \$ 398,195.20 | \$ 400,357.04 | \$ 404,258.61 | \$ 1,202,810.85 | \$ 1,275,377.03 | \$ 1,285,342.19 |
| | 9/12/2018 | \$ 398,731.17 | \$ 406,289.62 | \$ 402,856.05 | \$ 1,207,876.84 | \$ 1,275,831.92 | \$ 1,286,720.99 |
| | 9/13/2018 | \$ 398,902.61 | \$ 409,525.08 | \$ 402,816.91 | \$ 1,211,244.60 | \$ 1,282,571.19 | \$ 1,293,999.69 |
| | 9/14/2018 | \$ 397,215.70 | \$ 412,878.57 | \$ 406,807.39 | \$ 1,216,901.65 | \$ 1,282,924.51 | \$ 1,294,429.26 |
| | 9/17/2018 | \$ 387,640.54 | \$ 413,953.66 | \$ 405,651.54 | \$ 1,207,245.74 | \$ 1,275,778.98 | \$ 1,289,848.80 |
| | 9/18/2018 | \$ 394,450.58 | \$ 417,645.05 | \$ 407,936.91 | \$ 1,220,032.54 | \$ 1,282,628.66 | \$ 1,298,996.86 |
| | 9/19/2018 | \$ 395,960.72 | \$ 420,120.03 | \$ 418,918.80 | \$ 1,234,999.55 | \$ 1,284,236.14 | \$ 1,306,856.03 |
| | 9/20/2018 | \$ 399,496.06 | \$ 416,356.10 | \$ 423,457.52 | \$ 1,239,309.68 | \$ 1,294,305.31 | \$ 1,319,289.27 |
| | 9/21/2018 | \$ 393,261.23 | \$ 414,677.37 | \$ 421,937.77 | \$ 1,229,876.38 | \$ 1,293,828.32 | \$ 1,323,571.24 |
| | 9/24/2018 | \$ 398,679.60 | \$ 407,783.53 | \$ 418,412.46 | \$ 1,224,875.59 | \$ 1,289,279.62 | \$ 1,314,591.08 |
| | 9/25/2018 | \$ 401,346.00 | \$ 401,841.29 | \$ 416,631.37 | \$ 1,219,818.66 | \$ 1,287,596.99 | \$ 1,311,134.61 |
| | 9/26/2018 | \$ 404,573.08 | \$ 402,681.10 | \$ 410,094.82 | \$ 1,217,349.00 | \$ 1,283,361.72 | \$ 1,305,842.42 |
| | 9/27/2018 | \$ 409,620.90 | \$ 404,694.89 | \$ 409,040.49 | \$ 1,223,356.28 | \$ 1,286,908.02 | \$ 1,308,547.14 |
| EXIT | 9/28/2018 | \$ 404,600.49 | \$ 404,510.43 | \$ 403,773.18 | \$ 1,212,764.10 | \$ 1,286,016.97 | \$ 1,308,193.46 |

Note: Rebalance data shown at end of months of July and August with bold borders

Chapter 6. Buy and Hold With “Stop Loss”

My “Buy and Hold” subject to stop-loss limits yielded a positive return of 4.3% for the simulation period, which *annualizes to 19.1%*. To state the obvious, this simulation showed a vast improvement in my portfolios’ return compared to the much simpler “Buy and Hold.” Having said this, my return was still significantly worse than what an S&P 500 or DJIA index fund investment would have been, as can be seen in Figure 6.1.

Insert 1 paragraph here referencing Figure 6.2 and Table 6.1 discussing how each of the FANG, Financial, and Industrial stocks performed in comparison to the “Buy and Hold” strategy, notably how Stop Loss improved the Industrials final value from \$387,000 in “Buy and Hold” to \$412,000 in “Stop Loss.”

While the return improvement is quite obvious, I did consider what stop-loss limits could cause that would be unfavorable, or less favorable, by performing several other iterations with different stop percentages. In the extreme case, a very high percentage (say, 50%) causes the portfolio to perform the same as my simple Buy and Hold - because the stop-loss limit is never reached. On the other hand, a very low stop-loss percentage could cause a stock to be sold too soon due to very small and almost-certain-to-occur downward price fluctuations. The extreme case of this would be to cause essentially all investments to be exited unless they do nothing but go straight up. This thought then leads one to consider that the overall direction of stocks is likely to have a large effect on how wise the stop loss limit strategy would be. If the market moves notably lower overall, almost any strategy that causes stocks to be sold will be better than one that does not. A similar and evident thought is that if the market in general is moving strongly up, tight

stop-loss limits that cause a stock's exit to be premature, say due to a small price variability in the downward direction, could cause large subsequent stock price gains to be missed.

My original choice was for a 3% loss limit, and with the benefit of hindsight I can see that the broad market, as evidenced by the S&P 500 and DJIA, was strongly upward during the timeframe of my simulation. Not too surprisingly, when I repeated my simulation with a lower percentage of 2%, my results got slightly better. This is because losing stocks were sold slightly sooner. I also noted that with a higher percentage of 5%, my results got slightly worse. This is because losing stocks were sold slightly later.

My overall takeaway from this simulation is that the use of stop-loss limits, in some manner, is probably a very good idea, a wise way to ensure that poor stock selections do not drag down portfolio results to an excessive extent in both a rising or a falling market.

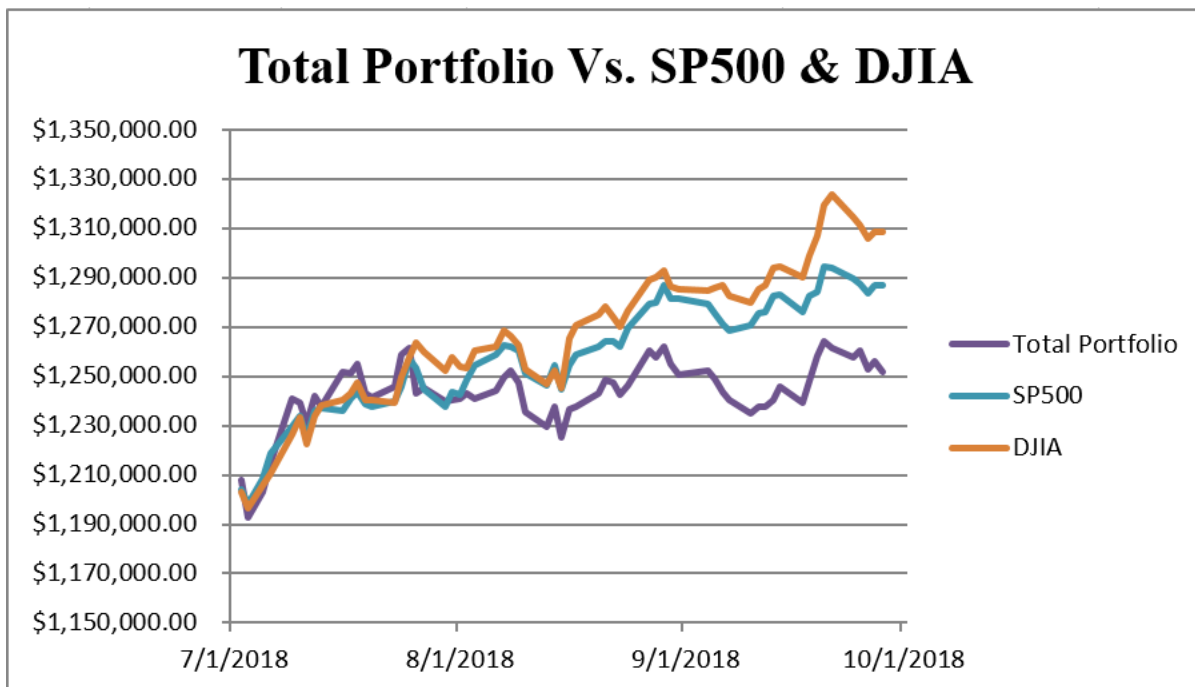


Figure 6.1 Buy and Hold With "Stop Loss" - Total Portfolio Vs. S&P500 & DJIA

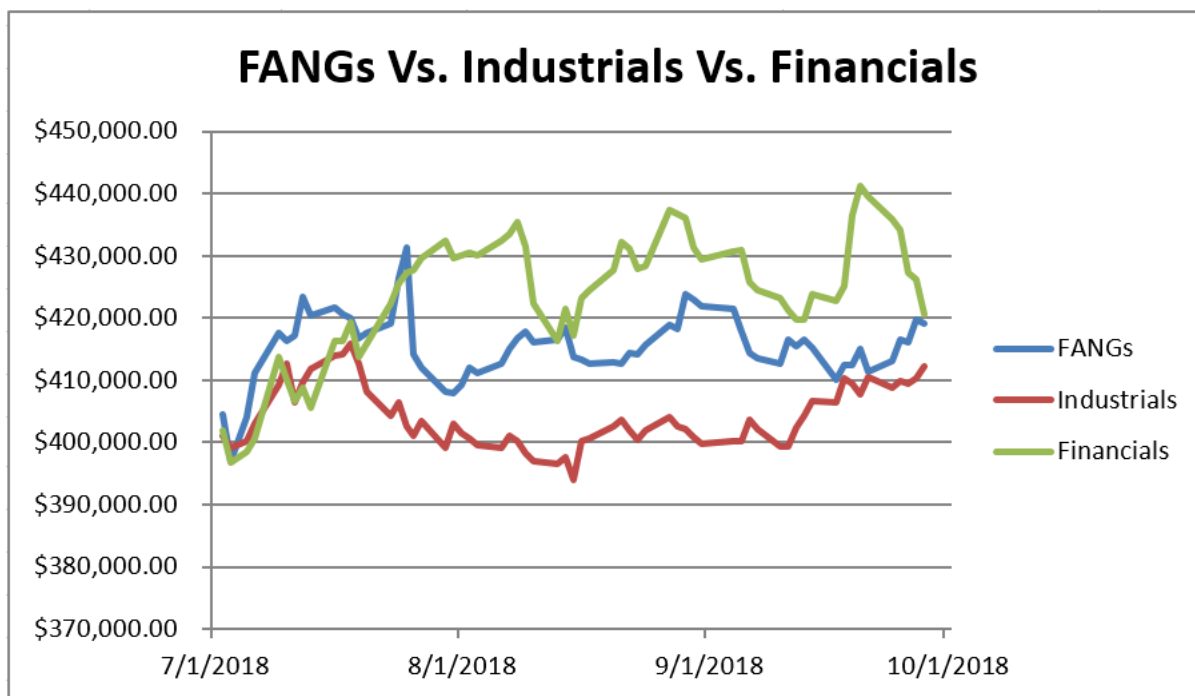


Figure 6.2 Buy and Hold With "Stop Loss" - FANGs Vs. Industrial Vs. Financials

Table 6.1 Buy and Hold With “Stop Loss” - Data Summary

| | Date | FANGs | Industrials | Financials | Total Portfolio | SP500 | DJIA |
|--------------|-----------|---------------|---------------|---------------|-----------------|-----------------|-----------------|
| ENTRY | 7/2/2018 | \$ 404,596.20 | \$ 401,082.41 | \$ 401,929.03 | \$ 1,207,607.64 | \$ 1,204,195.23 | \$ 1,202,994.52 |
| 2 | 7/3/2018 | \$ 396,901.71 | \$ 399,120.31 | \$ 396,793.74 | \$ 1,192,815.76 | \$ 1,198,237.66 | \$ 1,196,443.88 |
| 3 | 7/5/2018 | \$ 404,094.16 | \$ 400,191.17 | \$ 398,570.08 | \$ 1,202,855.40 | \$ 1,208,567.43 | \$ 1,205,447.34 |
| 4 | 7/6/2018 | \$ 411,123.25 | \$ 402,935.96 | \$ 400,694.24 | \$ 1,214,753.45 | \$ 1,218,817.63 | \$ 1,210,383.61 |
| 5 | 7/9/2018 | \$ 417,546.85 | \$ 409,298.97 | \$ 413,809.32 | \$ 1,240,655.14 | \$ 1,229,571.24 | \$ 1,226,226.25 |
| 6 | 7/10/2018 | \$ 416,210.75 | \$ 412,644.63 | \$ 410,162.46 | \$ 1,239,017.84 | \$ 1,233,841.87 | \$ 1,233,306.99 |
| 7 | 7/11/2018 | \$ 417,266.74 | \$ 406,358.33 | \$ 406,727.68 | \$ 1,230,352.75 | \$ 1,225,088.75 | \$ 1,222,457.95 |
| 8 | 7/12/2018 | \$ 423,298.59 | \$ 409,711.08 | \$ 408,879.96 | \$ 1,241,889.62 | \$ 1,235,807.10 | \$ 1,233,565.85 |
| 9 | 7/13/2018 | \$ 420,433.59 | \$ 411,773.46 | \$ 405,494.26 | \$ 1,237,701.31 | \$ 1,237,140.83 | \$ 1,238,243.75 |
| 10 | 7/16/2018 | \$ 421,692.71 | \$ 413,876.17 | \$ 416,364.77 | \$ 1,251,933.65 | \$ 1,235,868.88 | \$ 1,240,468.35 |
| 11 | 7/17/2018 | \$ 420,547.67 | \$ 414,067.36 | \$ 416,251.01 | \$ 1,250,866.04 | \$ 1,240,779.85 | \$ 1,243,216.66 |
| 12 | 7/18/2018 | \$ 419,903.80 | \$ 415,771.92 | \$ 419,296.48 | \$ 1,254,972.20 | \$ 1,243,460.57 | \$ 1,247,146.19 |
| 13 | 7/19/2018 | \$ 416,690.79 | \$ 412,652.27 | \$ 413,832.52 | \$ 1,243,175.58 | \$ 1,238,545.18 | \$ 1,240,475.31 |
| 14 | 7/20/2018 | \$ 417,496.10 | \$ 408,247.40 | \$ 415,794.89 | \$ 1,241,538.39 | \$ 1,237,370.49 | \$ 1,240,159.51 |
| 15 | 7/23/2018 | \$ 419,152.24 | \$ 404,307.60 | \$ 422,320.68 | \$ 1,245,780.52 | \$ 1,239,644.83 | \$ 1,239,475.04 |
| 16 | 7/24/2018 | \$ 426,501.34 | \$ 406,485.15 | \$ 425,585.92 | \$ 1,258,572.41 | \$ 1,245,571.47 | \$ 1,249,257.02 |
| 17 | 7/25/2018 | \$ 431,373.98 | \$ 402,641.86 | \$ 427,339.61 | \$ 1,261,355.44 | \$ 1,256,908.17 | \$ 1,257,777.45 |
| 18 | 7/26/2018 | \$ 414,244.02 | \$ 401,013.36 | \$ 427,648.75 | \$ 1,242,906.13 | \$ 1,253,096.85 | \$ 1,263,368.52 |
| 19 | 7/27/2018 | \$ 412,111.57 | \$ 403,347.52 | \$ 429,620.13 | \$ 1,245,079.23 | \$ 1,244,873.76 | \$ 1,259,606.70 |
| 20 | 7/30/2018 | \$ 408,188.18 | \$ 399,053.35 | \$ 432,457.09 | \$ 1,239,698.62 | \$ 1,237,710.55 | \$ 1,252,468.54 |
| 21 | 7/31/2018 | \$ 407,860.79 | \$ 402,998.34 | \$ 429,600.82 | \$ 1,240,459.95 | \$ 1,243,756.43 | \$ 1,257,831.39 |
| 22 | 8/1/2018 | \$ 409,268.77 | \$ 401,586.19 | \$ 430,069.77 | \$ 1,240,924.73 | \$ 1,242,462.49 | \$ 1,253,804.32 |
| 23 | 8/2/2018 | \$ 412,006.82 | \$ 400,584.97 | \$ 430,427.57 | \$ 1,243,019.36 | \$ 1,248,583.41 | \$ 1,253,425.21 |
| 24 | 8/3/2018 | \$ 411,138.07 | \$ 399,491.17 | \$ 430,134.33 | \$ 1,240,763.57 | \$ 1,254,382.06 | \$ 1,260,176.82 |
| 25 | 8/6/2018 | \$ 412,672.69 | \$ 399,116.40 | \$ 432,349.19 | \$ 1,244,138.27 | \$ 1,258,820.35 | \$ 1,262,136.65 |
| 26 | 8/7/2018 | \$ 415,106.10 | \$ 401,007.28 | \$ 433,508.02 | \$ 1,249,621.41 | \$ 1,262,375.49 | \$ 1,268,408.71 |
| 27 | 8/8/2018 | \$ 416,825.18 | \$ 400,181.05 | \$ 435,333.25 | \$ 1,252,339.48 | \$ 1,262,044.26 | \$ 1,266,173.68 |
| 28 | 8/9/2018 | \$ 417,844.68 | \$ 398,231.07 | \$ 431,516.49 | \$ 1,247,592.24 | \$ 1,260,224.81 | \$ 1,262,485.61 |
| 29 | 8/10/2018 | \$ 416,094.03 | \$ 397,068.08 | \$ 422,221.69 | \$ 1,235,383.80 | \$ 1,251,259.71 | \$ 1,252,780.86 |
| 30 | 8/13/2018 | \$ 416,443.22 | \$ 396,624.28 | \$ 416,308.27 | \$ 1,229,375.78 | \$ 1,246,247.17 | \$ 1,246,572.60 |
| 31 | 8/14/2018 | \$ 418,459.74 | \$ 397,611.66 | \$ 421,441.02 | \$ 1,237,512.42 | \$ 1,254,209.76 | \$ 1,252,126.55 |
| 32 | 8/15/2018 | \$ 413,792.00 | \$ 394,041.91 | \$ 417,185.86 | \$ 1,225,019.77 | \$ 1,244,675.05 | \$ 1,245,321.01 |
| 33 | 8/16/2018 | \$ 413,313.19 | \$ 400,152.42 | \$ 423,151.61 | \$ 1,236,617.22 | \$ 1,254,532.14 | \$ 1,264,935.43 |
| 34 | 8/17/2018 | \$ 412,563.67 | \$ 400,577.68 | \$ 424,409.99 | \$ 1,237,551.34 | \$ 1,258,701.10 | \$ 1,270,408.66 |
| 35 | 8/20/2018 | \$ 412,850.79 | \$ 402,580.63 | \$ 427,656.82 | \$ 1,243,088.24 | \$ 1,261,757.25 | \$ 1,274,831.66 |
| 36 | 8/21/2018 | \$ 412,693.55 | \$ 403,566.36 | \$ 432,135.03 | \$ 1,248,394.95 | \$ 1,264,367.24 | \$ 1,277,979.29 |
| 37 | 8/22/2018 | \$ 414,470.24 | \$ 401,831.02 | \$ 431,204.50 | \$ 1,247,505.76 | \$ 1,263,863.83 | \$ 1,273,589.93 |
| 38 | 8/23/2018 | \$ 414,177.49 | \$ 400,431.76 | \$ 427,877.67 | \$ 1,242,486.92 | \$ 1,261,726.30 | \$ 1,269,797.95 |
| 39 | 8/24/2018 | \$ 415,694.88 | \$ 401,981.97 | \$ 428,325.38 | \$ 1,246,002.24 | \$ 1,269,547.54 | \$ 1,276,398.56 |
| 40 | 8/27/2018 | \$ 418,907.16 | \$ 404,011.56 | \$ 437,244.29 | \$ 1,260,163.00 | \$ 1,279,285.49 | \$ 1,289,231.22 |
| 41 | 8/28/2018 | \$ 418,251.75 | \$ 402,525.40 | \$ 436,707.61 | \$ 1,257,484.76 | \$ 1,279,629.98 | \$ 1,289,942.85 |
| 42 | 8/29/2018 | \$ 423,722.84 | \$ 402,214.46 | \$ 436,102.74 | \$ 1,262,040.04 | \$ 1,286,925.70 | \$ 1,292,939.59 |
| 43 | 8/30/2018 | \$ 423,060.80 | \$ 400,768.85 | \$ 431,249.42 | \$ 1,255,079.08 | \$ 1,281,224.20 | \$ 1,286,127.09 |
| 44 | 8/31/2018 | \$ 421,789.72 | \$ 399,676.15 | \$ 429,320.50 | \$ 1,250,786.37 | \$ 1,281,396.49 | \$ 1,285,033.35 |
| 45 | 9/4/2018 | \$ 421,464.56 | \$ 400,145.62 | \$ 430,789.47 | \$ 1,252,399.65 | \$ 1,279,276.65 | \$ 1,284,422.64 |
| 46 | 9/5/2018 | \$ 417,890.15 | \$ 400,114.52 | \$ 431,001.59 | \$ 1,249,006.26 | \$ 1,275,690.68 | \$ 1,285,536.67 |
| 47 | 9/6/2018 | \$ 414,391.36 | \$ 403,647.89 | \$ 425,720.85 | \$ 1,243,760.10 | \$ 1,271,031.46 | \$ 1,286,570.00 |
| 48 | 9/7/2018 | \$ 413,430.72 | \$ 402,106.83 | \$ 424,523.66 | \$ 1,240,061.22 | \$ 1,268,218.23 | \$ 1,282,643.85 |
| 49 | 9/10/2018 | \$ 412,645.11 | \$ 399,263.15 | \$ 423,165.39 | \$ 1,235,073.64 | \$ 1,270,625.09 | \$ 1,279,700.66 |
| 50 | 9/11/2018 | \$ 416,620.04 | \$ 399,427.78 | \$ 421,330.88 | \$ 1,237,378.71 | \$ 1,275,377.03 | \$ 1,285,342.19 |
| 51 | 9/12/2018 | \$ 415,482.43 | \$ 402,297.17 | \$ 419,840.38 | \$ 1,237,619.98 | \$ 1,275,831.92 | \$ 1,286,720.99 |
| 52 | 9/13/2018 | \$ 416,597.86 | \$ 404,191.69 | \$ 419,756.82 | \$ 1,240,546.37 | \$ 1,282,571.19 | \$ 1,293,999.69 |
| 53 | 9/14/2018 | \$ 415,188.34 | \$ 406,695.28 | \$ 423,890.97 | \$ 1,245,774.59 | \$ 1,282,924.51 | \$ 1,294,429.26 |
| 54 | 9/17/2018 | \$ 410,050.80 | \$ 406,498.98 | \$ 422,690.10 | \$ 1,239,239.87 | \$ 1,275,778.98 | \$ 1,289,848.80 |
| 55 | 9/18/2018 | \$ 412,458.13 | \$ 410,274.85 | \$ 425,038.64 | \$ 1,247,771.62 | \$ 1,282,628.66 | \$ 1,298,996.86 |
| 56 | 9/19/2018 | \$ 412,483.24 | \$ 409,357.47 | \$ 436,489.06 | \$ 1,258,329.76 | \$ 1,284,236.14 | \$ 1,306,856.03 |
| 57 | 9/20/2018 | \$ 414,952.11 | \$ 407,778.65 | \$ 441,197.91 | \$ 1,263,928.67 | \$ 1,294,305.31 | \$ 1,319,289.27 |
| 58 | 9/21/2018 | \$ 411,362.89 | \$ 410,576.31 | \$ 439,593.02 | \$ 1,261,532.22 | \$ 1,293,828.32 | \$ 1,323,571.24 |
| 59 | 9/24/2018 | \$ 413,155.19 | \$ 408,737.52 | \$ 435,917.85 | \$ 1,257,810.56 | \$ 1,289,279.62 | \$ 1,314,591.08 |
| 60 | 9/25/2018 | \$ 416,533.00 | \$ 409,965.17 | \$ 434,074.41 | \$ 1,260,572.58 | \$ 1,287,596.99 | \$ 1,311,134.61 |
| 61 | 9/26/2018 | \$ 416,177.19 | \$ 409,336.64 | \$ 427,258.12 | \$ 1,252,771.95 | \$ 1,283,361.72 | \$ 1,305,842.42 |
| 62 | 9/27/2018 | \$ 419,691.42 | \$ 410,405.40 | \$ 426,152.18 | \$ 1,256,249.00 | \$ 1,286,908.02 | \$ 1,308,547.14 |
| EXIT | 9/28/2018 | \$ 418,999.07 | \$ 412,128.98 | \$ 420,643.23 | \$ 1,251,771.28 | \$ 1,286,908.02 | \$ 1,308,547.14 |

Chapter 7. Buy and Rebalance to Winners

My “Buy and Rebalance to Increase Investment in Winners” using a 15% rebalance proportion yielded a positive return of 1.6% for the simulation period, which *annualizes to 6.6%*. This is very slightly better than my “Buy and Hold” but very much worse than the return of my 3% stop-loss strategy, as can be seen comparing Figure 4.1, Figure 6.1, and Figure 7.1. Looking a bit more closely at what this strategy actually caused to happen shows that the big stock losers (from Buy/Hold) still lost and adversely impacted the portfolio, and the reinvestment of loser proceeds into stocks that went up only modestly increased the average gains on my stocks that went up.

With the performance of permutations using rebalance percentages higher and lower than 15%, I noted the following: Higher percentages generally increase returns, such as a 50% rebalance percentage increasing the annualized return to 10%. This is intuitive in that the strategy then devolves to very significantly concentrating bets away from past losers and on to past winners. I can envision the extreme case where, say, 100% of my investment could wind up being made in one stock. This would not seem very wise, or beneficial, certainly in the case that the single stock subsequently goes down a lot!

In the other direction, the lower rebalance percentage of 5% causes the annualized return to go down to 5.2%, and of course a 0% rebalance causes the return to be the same as my Buy/Hold return (as it should).

My takeaway from this simulation is that it is simply a strategy to shift money away from prior losers and concentrate it into prior winners, with the necessary result – even if

no other - of causing a significant reduction in portfolio diversity. When viewed with those effects in mind, it becomes apparent that the success or failure of the strategy will be determined by whether prior winners continue to win, and of course by whether prior losers would have otherwise continued to lose. Since it would seem unlikely like winners are likely to win forever, or losers lose forever, this strategy seems, to me, to do little else besides reduce portfolio diversity while increasing transaction costs and is therefore not a particularly good strategy to incorporate.

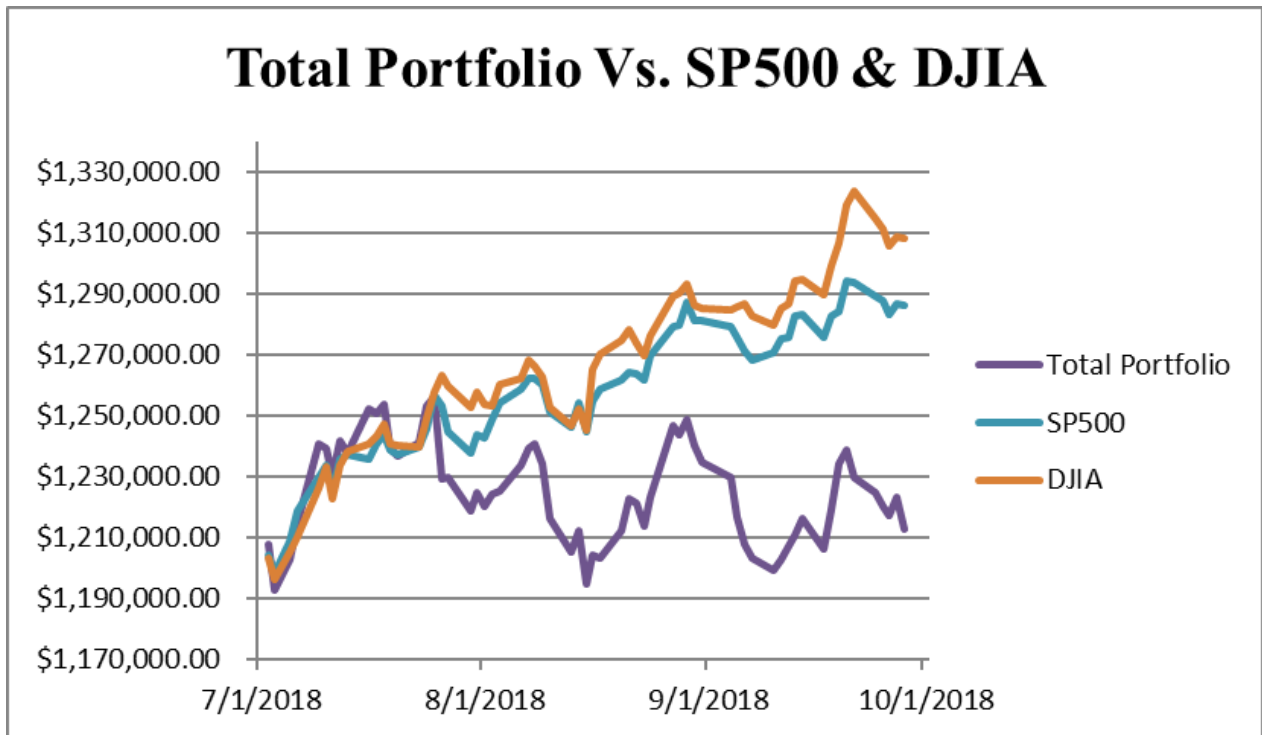


Figure 7.1 Buy and Rebalance to Winners - Total Portfolio Vs. S&P500 & DJIA

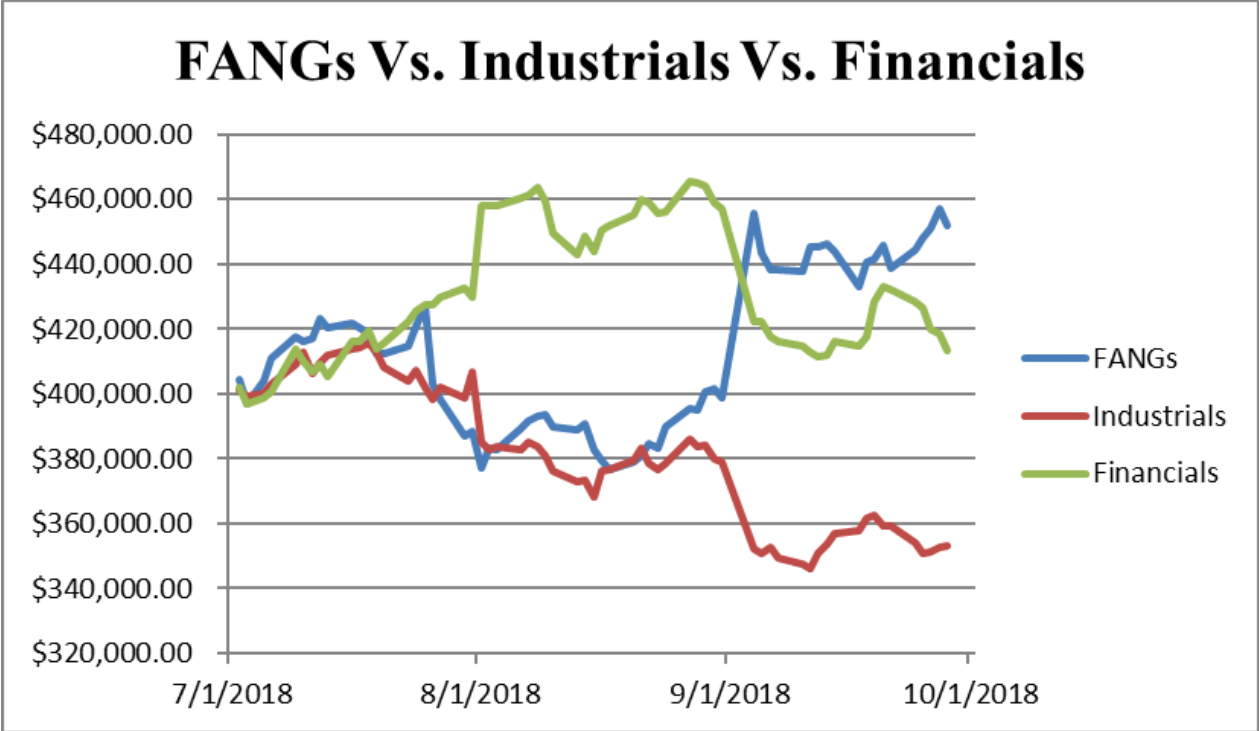


Figure 7.2 Buy and Rebalance to Winners - FANGs Vs. Industrial Vs. Financials

Table 7.1: Buy and Rebalance to Winners - Data Summary

| | Date | FANGs | Industrials | Financials | Total Portfolio | SP500 | DJIA |
|--------------|-----------|---------------|---------------|---------------|------------------------|------------------------|------------------------|
| ENTRY | 7/2/2018 | \$ 404,596.20 | \$ 401,082.41 | \$ 401,929.03 | \$ 1,207,607.64 | \$ 1,204,797.33 | \$ 1,203,596.02 |
| | 7/3/2018 | \$ 396,901.71 | \$ 399,120.31 | \$ 396,793.74 | \$ 1,192,815.76 | \$ 1,198,836.78 | \$ 1,197,042.10 |
| | 7/5/2018 | \$ 404,094.16 | \$ 400,191.17 | \$ 398,570.08 | \$ 1,202,855.40 | \$ 1,209,171.71 | \$ 1,206,050.06 |
| | 7/6/2018 | \$ 411,123.25 | \$ 402,935.96 | \$ 400,694.24 | \$ 1,214,753.45 | \$ 1,219,427.04 | \$ 1,210,988.81 |
| | 7/9/2018 | \$ 417,546.85 | \$ 409,298.97 | \$ 413,809.32 | \$ 1,240,655.14 | \$ 1,230,186.03 | \$ 1,226,839.36 |
| | 7/10/2018 | \$ 416,210.75 | \$ 412,644.63 | \$ 410,162.46 | \$ 1,239,017.84 | \$ 1,234,458.79 | \$ 1,233,923.64 |
| | 7/11/2018 | \$ 417,266.74 | \$ 406,358.33 | \$ 406,727.68 | \$ 1,230,352.75 | \$ 1,225,701.29 | \$ 1,223,069.18 |
| | 7/12/2018 | \$ 423,298.59 | \$ 409,711.08 | \$ 408,879.96 | \$ 1,241,889.62 | \$ 1,236,425.00 | \$ 1,234,182.64 |
| | 7/13/2018 | \$ 420,433.59 | \$ 411,773.46 | \$ 405,494.26 | \$ 1,237,701.31 | \$ 1,237,759.40 | \$ 1,238,862.87 |
| | 7/16/2018 | \$ 421,692.71 | \$ 413,876.17 | \$ 416,364.77 | \$ 1,251,933.65 | \$ 1,236,486.82 | \$ 1,241,088.58 |
| | 7/17/2018 | \$ 420,351.12 | \$ 414,067.36 | \$ 416,251.01 | \$ 1,250,669.49 | \$ 1,241,400.24 | \$ 1,243,838.27 |
| | 7/18/2018 | \$ 418,597.70 | \$ 415,771.92 | \$ 419,296.48 | \$ 1,253,666.10 | \$ 1,244,082.30 | \$ 1,247,769.77 |
| | 7/19/2018 | \$ 412,604.44 | \$ 412,652.27 | \$ 413,832.52 | \$ 1,239,089.22 | \$ 1,239,164.45 | \$ 1,241,095.54 |
| | 7/20/2018 | \$ 412,598.62 | \$ 408,247.40 | \$ 415,794.89 | \$ 1,236,640.90 | \$ 1,237,989.17 | \$ 1,240,779.59 |
| | 7/23/2018 | \$ 414,665.42 | \$ 404,019.05 | \$ 422,320.68 | \$ 1,241,005.15 | \$ 1,240,264.66 | \$ 1,240,094.78 |
| | 7/24/2018 | \$ 420,652.45 | \$ 407,164.36 | \$ 425,585.92 | \$ 1,253,402.73 | \$ 1,246,194.25 | \$ 1,249,881.65 |
| | 7/25/2018 | \$ 426,940.72 | \$ 402,024.77 | \$ 427,339.61 | \$ 1,256,305.10 | \$ 1,257,536.62 | \$ 1,258,406.34 |
| | 7/26/2018 | \$ 403,043.34 | \$ 398,404.75 | \$ 427,648.75 | \$ 1,229,096.85 | \$ 1,253,723.40 | \$ 1,264,000.21 |
| | 7/27/2018 | \$ 398,200.12 | \$ 402,052.98 | \$ 429,620.13 | \$ 1,229,873.22 | \$ 1,245,496.20 | \$ 1,260,236.50 |
| | 7/30/2018 | \$ 387,152.31 | \$ 398,859.34 | \$ 432,457.09 | \$ 1,218,468.74 | \$ 1,238,329.40 | \$ 1,253,094.78 |
| | 7/31/2018 | \$ 388,237.61 | \$ 406,913.65 | \$ 429,600.82 | \$ 1,224,752.08 | \$ 1,244,378.31 | \$ 1,258,460.31 |
| | 8/1/2018 | \$ 377,093.85 | \$ 385,341.66 | \$ 457,839.48 | \$ 1,220,274.99 | \$ 1,243,083.72 | \$ 1,254,431.23 |
| | 8/2/2018 | \$ 383,387.25 | \$ 382,709.06 | \$ 458,221.91 | \$ 1,224,318.22 | \$ 1,249,207.70 | \$ 1,254,051.93 |
| | 8/3/2018 | \$ 382,768.66 | \$ 383,751.21 | \$ 457,905.75 | \$ 1,224,425.61 | \$ 1,255,009.25 | \$ 1,260,806.90 |
| | 8/6/2018 | \$ 389,535.74 | \$ 382,819.21 | \$ 460,265.58 | \$ 1,232,620.53 | \$ 1,259,449.76 | \$ 1,262,767.72 |
| | 8/7/2018 | \$ 391,506.83 | \$ 385,171.27 | \$ 461,499.90 | \$ 1,238,178.00 | \$ 1,263,006.67 | \$ 1,269,042.92 |
| | 8/8/2018 | \$ 393,020.90 | \$ 383,770.14 | \$ 463,442.37 | \$ 1,240,233.41 | \$ 1,262,675.29 | \$ 1,266,806.76 |
| | 8/9/2018 | \$ 393,578.23 | \$ 380,671.89 | \$ 459,379.25 | \$ 1,233,629.36 | \$ 1,260,854.92 | \$ 1,263,116.85 |
| | 8/10/2018 | \$ 389,729.40 | \$ 376,372.21 | \$ 449,481.43 | \$ 1,215,583.05 | \$ 1,251,885.34 | \$ 1,253,407.25 |
| | 8/13/2018 | \$ 389,024.17 | \$ 372,950.60 | \$ 443,189.00 | \$ 1,205,163.76 | \$ 1,246,870.30 | \$ 1,247,195.88 |
| | 8/14/2018 | \$ 390,806.45 | \$ 373,460.67 | \$ 448,653.89 | \$ 1,212,921.01 | \$ 1,254,836.87 | \$ 1,252,752.61 |
| | 8/15/2018 | \$ 382,748.65 | \$ 368,270.64 | \$ 444,125.49 | \$ 1,195,144.78 | \$ 1,245,297.39 | \$ 1,245,943.67 |
| | 8/16/2018 | \$ 379,284.77 | \$ 376,048.36 | \$ 450,477.12 | \$ 1,205,810.25 | \$ 1,255,159.41 | \$ 1,265,567.89 |
| | 8/17/2018 | \$ 376,870.74 | \$ 376,696.98 | \$ 451,817.87 | \$ 1,205,385.59 | \$ 1,259,330.45 | \$ 1,271,043.87 |
| | 8/20/2018 | \$ 378,980.78 | \$ 379,676.29 | \$ 455,274.39 | \$ 1,213,931.46 | \$ 1,262,388.13 | \$ 1,275,469.08 |
| | 8/21/2018 | \$ 381,094.10 | \$ 383,111.38 | \$ 460,043.39 | \$ 1,224,248.87 | \$ 1,264,999.42 | \$ 1,278,618.28 |
| | 8/22/2018 | \$ 384,820.13 | \$ 378,565.06 | \$ 459,051.75 | \$ 1,222,436.95 | \$ 1,264,495.76 | \$ 1,274,226.73 |
| | 8/23/2018 | \$ 383,046.24 | \$ 376,519.49 | \$ 455,509.19 | \$ 1,215,074.92 | \$ 1,262,357.17 | \$ 1,270,432.85 |
| | 8/24/2018 | \$ 389,674.23 | \$ 378,527.30 | \$ 455,986.92 | \$ 1,224,188.44 | \$ 1,270,182.32 | \$ 1,277,036.76 |
| | 8/27/2018 | \$ 395,562.06 | \$ 386,156.45 | \$ 465,482.10 | \$ 1,247,200.60 | \$ 1,279,925.13 | \$ 1,289,875.84 |
| | 8/28/2018 | \$ 395,190.85 | \$ 383,707.78 | \$ 464,910.57 | \$ 1,243,809.19 | \$ 1,280,269.79 | \$ 1,290,587.82 |
| | 8/29/2018 | \$ 400,767.11 | \$ 384,269.13 | \$ 464,267.31 | \$ 1,249,303.56 | \$ 1,287,569.16 | \$ 1,293,586.06 |
| | 8/30/2018 | \$ 401,455.82 | \$ 379,822.89 | \$ 459,098.55 | \$ 1,240,377.26 | \$ 1,281,864.81 | \$ 1,286,770.15 |
| | 8/31/2018 | \$ 398,561.50 | \$ 379,061.71 | \$ 457,044.54 | \$ 1,234,667.75 | \$ 1,282,037.19 | \$ 1,285,675.87 |
| | 9/4/2018 | \$ 455,803.46 | \$ 352,021.47 | \$ 422,168.44 | \$ 1,229,993.37 | \$ 1,279,916.29 | \$ 1,285,064.85 |
| | 9/5/2018 | \$ 443,664.23 | \$ 350,784.63 | \$ 422,501.07 | \$ 1,216,949.93 | \$ 1,276,328.52 | \$ 1,286,179.44 |
| | 9/6/2018 | \$ 438,408.96 | \$ 352,719.38 | \$ 417,371.90 | \$ 1,208,500.23 | \$ 1,271,666.98 | \$ 1,287,213.28 |
| | 9/7/2018 | \$ 438,094.49 | \$ 349,575.49 | \$ 416,211.14 | \$ 1,203,881.12 | \$ 1,268,852.34 | \$ 1,283,285.17 |
| | 9/10/2018 | \$ 437,679.34 | \$ 347,321.07 | \$ 414,890.26 | \$ 1,199,890.66 | \$ 1,271,260.40 | \$ 1,280,340.51 |
| | 9/11/2018 | \$ 445,298.23 | \$ 346,056.84 | \$ 412,962.23 | \$ 1,204,317.31 | \$ 1,276,014.72 | \$ 1,285,984.86 |
| | 9/12/2018 | \$ 445,491.79 | \$ 350,821.14 | \$ 411,403.41 | \$ 1,207,716.34 | \$ 1,276,469.84 | \$ 1,287,364.35 |
| | 9/13/2018 | \$ 446,035.59 | \$ 353,821.87 | \$ 411,758.88 | \$ 1,211,616.34 | \$ 1,283,212.47 | \$ 1,294,646.69 |
| | 9/14/2018 | \$ 443,922.43 | \$ 357,003.37 | \$ 416,209.86 | \$ 1,217,135.65 | \$ 1,283,565.98 | \$ 1,295,076.47 |
| | 9/17/2018 | \$ 433,195.45 | \$ 357,947.30 | \$ 414,883.81 | \$ 1,206,026.56 | \$ 1,276,416.87 | \$ 1,290,493.72 |
| | 9/18/2018 | \$ 440,394.48 | \$ 361,766.93 | \$ 417,445.88 | \$ 1,219,607.29 | \$ 1,283,269.97 | \$ 1,299,646.36 |
| | 9/19/2018 | \$ 441,691.13 | \$ 362,724.72 | \$ 428,444.64 | \$ 1,232,860.49 | \$ 1,284,878.26 | \$ 1,307,509.46 |
| | 9/20/2018 | \$ 445,783.56 | \$ 359,093.21 | \$ 433,197.52 | \$ 1,238,074.29 | \$ 1,294,952.46 | \$ 1,319,948.92 |
| | 9/21/2018 | \$ 438,791.97 | \$ 359,105.41 | \$ 432,006.35 | \$ 1,229,903.73 | \$ 1,294,475.23 | \$ 1,324,233.03 |
| | 9/24/2018 | \$ 444,404.60 | \$ 353,912.04 | \$ 428,350.81 | \$ 1,226,667.44 | \$ 1,289,924.26 | \$ 1,315,248.37 |
| | 9/25/2018 | \$ 448,144.24 | \$ 350,756.57 | \$ 426,401.45 | \$ 1,225,302.26 | \$ 1,288,240.79 | \$ 1,311,790.18 |
| | 9/26/2018 | \$ 450,959.18 | \$ 351,170.09 | \$ 419,721.74 | \$ 1,221,851.01 | \$ 1,284,003.40 | \$ 1,306,495.34 |
| | 9/27/2018 | \$ 456,885.89 | \$ 352,890.63 | \$ 418,517.27 | \$ 1,228,293.80 | \$ 1,287,551.47 | \$ 1,309,201.42 |
| EXIT | 9/28/2018 | \$ 452,076.87 | \$ 353,283.20 | \$ 413,407.58 | \$ 1,218,647.65 | \$ 1,286,659.98 | \$ 1,308,847.56 |

Note: Rebalance data shown at end of months of July and August with bold borders

Chapter 8. Investment Strategy Conclusions

At the conclusion of my investment simulations and after having had the benefit of thinking about various things above that stemmed from the exercise, I have come to conclude the following. Overall, and evidently, my choice of 12 stocks was quite poor – certainly for the time period in question. The reasons for this fact are arguably twofold.

First, I did not apply the level of regimen that would seem to be required in order to be a professional stock picker. This was due to my obvious lack of education and experience and to the limited amount of time that I spent on stock research versus formulating my strategies and performing my various simulations.

Second, my stock-picking luck was obviously quite poor as well. Said another way, one might reasonably expect that a reasonably large number of stocks chosen at random, and with no skill whatsoever, should on average earn a return that is somewhat close to broad market indexes such as the S&P 500 and DJIA. My stocks did not, and I arguably did worse than if I had chosen them at random.

Somewhat related to the above, and as a significant buffer to either poor choices and/or bad luck, diversity almost certainly matters and a portfolio of just 12 stocks is probably far too small to stand a chance of matching or beating the S&P 500 or DJIA unless the investor is either extremely skilled or extremely lucky. Since luck generally can't be counted on and since such skill could also be applied to more than a 12-stock selection, a proper portfolio should have a fairly large number of stocks.

To state the obvious and at the risk of giving away my final conclusion too soon, the S&P 500 is comprised of a fairly large number of stocks.

I believe that if an investor is going to pick stocks and assemble his/her own portfolio for the purpose of attempting to beat the stock market index(es), he/she should incorporate one or more stop-loss limit strategy elements. And taking this same general concept one step further, she/he should also include a “stop gain” strategy as well, one that provides for an exit from certain stocks if individual stock appreciation targets are met. Doing so would allow for the periodic harvest of gains for reinvestment into fresh stock ideas, on a rolling and continuing basis.

My stop-loss simulation was based upon a loss level from original cost. This would obviously be a static strategy if it was used for lengthier periods of time. On the other hand, adjusting stop-loss limits upward as individual (and successful) stocks appreciate would have the ultimate effect of putting into place the equivalent of the “stop gain” limit mentioned above.

Essentially all of my research and simulation work done for this project has led me to believe that investing in a stock index fund such as one that seeks to match the performance of the S&P 500 *is much more likely than not* to produce better investment returns than a professional selection of stocks, i.e. an actively managed mutual fund. I have found that the S&P 500 has been shown to be extremely difficult for the vast majority of professional investors to beat or even match, and of the very small number of professional investors that have managed to do so for a given year, extraordinarily few have managed to continue to do so for significant periods of time.

An interesting thing to consider is whether it might be wise to invest in a large number of active mutual funds to gain diversification benefits, much as can be shown for stock diversification. However, this logic breaks down when one considers that the while

the very well-diversified return on stock picks is, almost by definition, quite likely to converge on the performance of the S&P 500, the very well-diversified return on active mutual funds is virtually certain to result in a portfolio return below the S&P 500. This would be because of increased costs and fees, because of tax inefficiencies, and because, well, history has already shown this to be the case.

As a final conclusion, investing in the S&P 500 is even more likely to produce superior results when compared to my own stock selections because if few or no professionals can consistently do better than the S&P 500, I have no reasonable basis to think that I could consistently do better than the S&P 500.

Chapter 9. Overall Conclusions and Closing

While doing research for this IQP, some of which was guided by my father, I became aware that my father actually saved all of the money that he used to pay for my WPI education via his execution of a “Buy and Hold” strategy in the S&P 500. He opened an account for me very shortly after I was born and funded it with a lump sum (i) that he saved for many years prior to my birth, and (ii) that he calculated would be sufficient to pay for his then-estimate of my college education costs, if that sum was left untouched for 18 years. Very fortunately for me, his estimate and action plan was successful. This is not surprising given the fact that the S&P 500 index was 481.92 on 2/1/1995 and went up to 1993.23 at the time I entered WPI as a freshman. The Index also continued higher over the course of my WPI education, so as a result of the fact that my father only liquidated fund shares as needed to pay my bills over time, a portion of the money that was present when I entered WPI continued to appreciate.

In case the reader is wondering, my father did the same thing for my sister born 3 years after me. My father says that we were born 3 years apart for a very simple and straightforward reason; it took him about 3 years to again save enough money to do the same thing for a second child.

A final anecdote was that my grandparents on my father’s side employed a similar strategy for my father’s education, as well as for my uncle. These examples resonate with the conclusions drawn from my simulation experiment about the relative wisdom of having investments in diverse primary index stocks versus actively traded stocks.

I am looking forward to graduating from WPI and being professionally employed as a mechanical engineer. After having completed this IQP, I can now add an additional and very important reason to be looking forward to this: So that I can invest in the S&P 500 Stock Index, for the future and for a number of important needs, including for when and if I have children of my own. I believe that I will most likely choose to invest in Dreyfus' S&P 500 fund, ticker "PEOPX", based on my current research.

Appendix A. Simulation Details

Buy and Hold – Detailed Price, Value, and Return Data

Table A.1 Buy and Hold - Detailed Price, Value, and Return Data - Part 1

| | | Facebook | | | Amazon | | | Netflix | | | Google | | |
|-----------|----------------------------|---------------|-------|-------------|---------------|-------|-------------|---------------|-------|-------------|---------------|-------|-------------|
| | | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value |
| 7/2/2018 | Investment | \$ 100,000.00 | | | \$ 100,000.00 | | | \$ 100,000.00 | | | \$ 100,000.00 | | |
| | Investment Less Commission | \$ 99,990.00 | | | \$ 99,990.00 | | | \$ 99,990.00 | | | \$ 99,990.00 | | |
| | Nominal Price | 195.36 | | | 1,698.24 | | | 391.82 | | | 1,113.23 | | |
| | Market Spread | 0.10 | | | 0.85 | | | 0.20 | | | 0.56 | | |
| | Actual Price | \$ 195.46 | | | \$ 1,699.09 | | | \$ 392.01 | | | \$ 1,113.79 | | |
| | Shares Purchased | 511.56 | | | 58.85 | | | 255.07 | | | 89.77 | | |
| 9/28/2018 | Sell Price | \$ 164.46 | | | \$ 2,003.00 | | | \$ 374.13 | | | \$ 1,193.47 | | |
| | Net Price | \$ 164.46 | | | \$ 2,003.00 | | | \$ 374.13 | | | \$ 1,193.47 | | |
| | Gross Proceeds | \$ 84,130.41 | | | \$ 117,874.91 | | | \$ 95,429.13 | | | \$ 107,143.56 | | |
| | Net Proceeds | \$ 84,120.41 | | | \$ 117,864.91 | | | \$ 95,419.13 | | | \$ 107,133.56 | | |
| | Period Return | -15.9% | | | 17.9% | | | -4.6% | | | 7.1% | | |

| | | Facebook | | | Amazon | | | Netflix | | | Google | | |
|-----------|--|-----------|-----------|---------------|-------------|-------------|---------------|-----------|-----------|---------------|-------------|-------------|---------------|
| | | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value |
| 7/2/2018 | | \$ 193.37 | \$ 197.36 | \$ 100,960.58 | \$ 1,682.70 | \$ 1,713.78 | \$ 100,854.55 | \$ 385.45 | \$ 398.18 | \$ 101,563.54 | \$ 1,099.00 | \$ 1,127.46 | \$ 101,217.52 |
| 7/3/2018 | | \$ 194.55 | \$ 192.73 | \$ 98,592.08 | \$ 1,723.96 | \$ 1,693.96 | \$ 99,688.15 | \$ 399.49 | \$ 390.52 | \$ 99,609.71 | \$ 1,125.82 | \$ 1,102.89 | \$ 99,011.76 |
| 7/5/2018 | | \$ 194.74 | \$ 198.45 | \$ 101,518.18 | \$ 1,705.38 | \$ 1,699.73 | \$ 100,027.71 | \$ 393.80 | \$ 398.39 | \$ 101,617.11 | \$ 1,110.53 | \$ 1,124.27 | \$ 100,931.15 |
| 7/6/2018 | | \$ 198.45 | \$ 203.23 | \$ 103,963.41 | \$ 1,696.00 | \$ 1,710.63 | \$ 100,669.17 | \$ 397.45 | \$ 408.25 | \$ 104,132.10 | \$ 1,123.58 | \$ 1,140.17 | \$ 102,358.57 |
| 7/9/2018 | | \$ 204.93 | \$ 204.74 | \$ 104,735.87 | \$ 1,724.05 | \$ 1,739.02 | \$ 102,339.90 | \$ 415.95 | \$ 418.97 | \$ 106,866.44 | \$ 1,148.48 | \$ 1,154.05 | \$ 103,604.64 |
| 7/10/2018 | | \$ 204.50 | \$ 203.54 | \$ 104,121.99 | \$ 1,738.53 | \$ 1,743.07 | \$ 102,578.24 | \$ 417.24 | \$ 415.63 | \$ 106,014.51 | \$ 1,156.98 | \$ 1,152.84 | \$ 103,496.01 |
| 7/11/2018 | | \$ 202.22 | \$ 202.54 | \$ 103,610.44 | \$ 1,737.99 | \$ 1,755.00 | \$ 103,280.31 | \$ 411.34 | \$ 418.65 | \$ 106,784.82 | \$ 1,144.59 | \$ 1,153.90 | \$ 103,591.18 |
| 7/12/2018 | | \$ 203.43 | \$ 206.92 | \$ 105,851.05 | \$ 1,764.51 | \$ 1,796.62 | \$ 105,729.61 | \$ 415.16 | \$ 413.50 | \$ 105,471.21 | \$ 1,159.89 | \$ 1,183.48 | \$ 106,246.71 |
| 7/13/2018 | | \$ 207.81 | \$ 207.32 | \$ 106,055.68 | \$ 1,803.93 | \$ 1,813.03 | \$ 106,695.33 | \$ 409.19 | \$ 395.80 | \$ 100,956.48 | \$ 1,185.00 | \$ 1,188.82 | \$ 106,726.11 |
| 7/16/2018 | | \$ 207.50 | \$ 207.23 | \$ 106,009.63 | \$ 1,821.95 | \$ 1,822.49 | \$ 107,252.04 | \$ 398.98 | \$ 400.48 | \$ 102,150.21 | \$ 1,189.39 | \$ 1,183.86 | \$ 106,280.83 |
| 7/17/2018 | | \$ 204.90 | \$ 209.99 | \$ 107,421.53 | \$ 1,811.56 | \$ 1,843.93 | \$ 108,513.77 | \$ 346.95 | \$ 379.48 | \$ 96,793.75 | \$ 1,172.22 | \$ 1,198.80 | \$ 107,622.07 |
| 7/18/2018 | | \$ 209.82 | \$ 209.36 | \$ 107,099.25 | \$ 1,848.00 | \$ 1,842.92 | \$ 108,454.33 | \$ 381.24 | \$ 375.13 | \$ 95,684.20 | \$ 1,196.56 | \$ 1,195.88 | \$ 107,359.92 |
| 7/19/2018 | | \$ 208.77 | \$ 208.09 | \$ 106,449.57 | \$ 1,829.46 | \$ 1,812.97 | \$ 106,691.80 | \$ 371.06 | \$ 364.23 | \$ 92,903.94 | \$ 1,191.00 | \$ 1,186.96 | \$ 106,559.13 |
| 7/20/2018 | | \$ 208.85 | \$ 209.94 | \$ 107,395.95 | \$ 1,825.01 | \$ 1,813.70 | \$ 106,734.75 | \$ 364.92 | \$ 361.05 | \$ 92,092.82 | \$ 1,186.96 | \$ 1,184.91 | \$ 106,375.09 |
| 7/23/2018 | | \$ 210.58 | \$ 210.91 | \$ 107,892.16 | \$ 1,812.21 | \$ 1,802.00 | \$ 106,046.22 | \$ 359.15 | \$ 362.66 | \$ 92,503.48 | \$ 1,181.01 | \$ 1,205.50 | \$ 108,223.56 |
| 7/24/2018 | | \$ 215.11 | \$ 214.67 | \$ 109,815.61 | \$ 1,829.01 | \$ 1,829.24 | \$ 107,649.27 | \$ 366.94 | \$ 357.32 | \$ 91,141.41 | \$ 1,262.59 | \$ 1,248.08 | \$ 110,046.16 |
| 7/25/2018 | | \$ 215.72 | \$ 217.50 | \$ 111,263.31 | \$ 1,829.30 | \$ 1,863.61 | \$ 109,671.92 | \$ 357.57 | \$ 362.87 | \$ 92,557.04 | \$ 1,239.13 | \$ 1,263.70 | \$ 113,448.45 |
| 7/26/2018 | | \$ 174.89 | \$ 176.26 | \$ 90,166.76 | \$ 1,839.00 | \$ 1,808.00 | \$ 106,399.32 | \$ 358.19 | \$ 363.09 | \$ 92,613.16 | \$ 1,251.00 | \$ 1,268.33 | \$ 113,864.10 |
| 7/27/2018 | | \$ 179.87 | \$ 174.89 | \$ 89,465.99 | \$ 1,876.05 | \$ 1,817.27 | \$ 106,944.85 | \$ 366.85 | \$ 355.21 | \$ 90,609.21 | \$ 1,271.00 | \$ 1,236.50 | \$ 111,186.12 |
| 7/30/2018 | | \$ 175.30 | \$ 171.06 | \$ 87,506.67 | \$ 1,827.33 | \$ 1,779.22 | \$ 104,705.64 | \$ 351.93 | \$ 334.96 | \$ 85,438.05 | \$ 1,228.01 | \$ 1,219.74 | \$ 109,501.95 |
| 7/31/2018 | | \$ 170.67 | \$ 172.58 | \$ 88,284.24 | \$ 1,786.49 | \$ 1,777.44 | \$ 104,600.88 | \$ 331.51 | \$ 337.45 | \$ 86,073.18 | \$ 1,220.01 | \$ 1,217.26 | \$ 109,279.31 |
| 8/1/2018 | | \$ 173.93 | \$ 171.65 | \$ 87,808.49 | \$ 1,784.00 | \$ 1,797.17 | \$ 105,761.98 | \$ 335.87 | \$ 338.38 | \$ 86,310.40 | \$ 1,228.00 | \$ 1,220.01 | \$ 109,526.19 |
| 8/2/2018 | | \$ 170.68 | \$ 176.37 | \$ 90,223.03 | \$ 1,788.77 | \$ 1,834.33 | \$ 107,948.81 | \$ 337.23 | \$ 344.50 | \$ 87,871.42 | \$ 1,205.90 | \$ 1,226.15 | \$ 110,077.41 |
| 8/3/2018 | | \$ 177.69 | \$ 177.78 | \$ 90,944.33 | \$ 1,837.74 | \$ 1,823.29 | \$ 107,299.12 | \$ 347.75 | \$ 343.09 | \$ 87,511.77 | \$ 1,229.62 | \$ 1,223.71 | \$ 109,858.35 |
| 8/6/2018 | | \$ 178.97 | \$ 185.69 | \$ 94,990.73 | \$ 1,825.81 | \$ 1,847.75 | \$ 108,738.57 | \$ 342.87 | \$ 350.92 | \$ 89,508.97 | \$ 1,225.00 | \$ 1,224.77 | \$ 109,953.52 |
| 8/7/2018 | | \$ 186.50 | \$ 183.81 | \$ 94,029.01 | \$ 1,854.53 | \$ 1,862.48 | \$ 109,605.42 | \$ 353.23 | \$ 351.83 | \$ 89,741.07 | \$ 1,237.00 | \$ 1,242.22 | \$ 110,520.08 |
| 8/8/2018 | | \$ 184.75 | \$ 185.18 | \$ 94,729.84 | \$ 1,861.00 | \$ 1,886.52 | \$ 110,020.16 | \$ 352.21 | \$ 347.61 | \$ 88,664.68 | \$ 1,240.47 | \$ 1,245.61 | \$ 111,824.42 |
| 8/9/2018 | | \$ 185.85 | \$ 183.09 | \$ 93,660.69 | \$ 1,882.00 | \$ 1,898.52 | \$ 111,726.35 | \$ 347.96 | \$ 349.36 | \$ 89,111.05 | \$ 1,249.90 | \$ 1,249.10 | \$ 112,137.74 |
| 8/10/2018 | | \$ 182.04 | \$ 180.26 | \$ 92,212.98 | \$ 1,888.51 | \$ 1,886.30 | \$ 111,007.21 | \$ 346.91 | \$ 345.87 | \$ 88,220.86 | \$ 1,243.00 | \$ 1,237.61 | \$ 111,106.22 |
| 8/13/2018 | | \$ 180.10 | \$ 180.05 | \$ 92,105.56 | \$ 1,898.50 | \$ 1,896.20 | \$ 111,589.81 | \$ 339.89 | \$ 341.31 | \$ 87,057.75 | \$ 1,236.98 | \$ 1,235.01 | \$ 110,872.81 |
| 8/14/2018 | | \$ 180.71 | \$ 181.11 | \$ 92,647.81 | \$ 1,919.39 | \$ 1,919.65 | \$ 112,969.83 | \$ 342.09 | \$ 337.49 | \$ 86,083.38 | \$ 1,235.19 | \$ 1,242.10 | \$ 111,509.31 |
| 8/15/2018 | | \$ 179.34 | \$ 179.53 | \$ 91,839.55 | \$ 1,909.55 | \$ 1,882.62 | \$ 110,790.64 | \$ 334.03 | \$ 326.40 | \$ 83,254.66 | \$ 1,229.26 | \$ 1,214.38 | \$ 109,020.76 |
| 8/16/2018 | | \$ 180.42 | \$ 174.70 | \$ 89,368.74 | \$ 1,903.94 | \$ 1,886.52 | \$ 111,020.16 | \$ 329.90 | \$ 322.44 | \$ 82,244.59 | \$ 1,224.73 | \$ 1,206.49 | \$ 108,312.43 |
| 8/17/2018 | | \$ 174.50 | \$ 173.80 | \$ 88,908.34 | \$ 1,885.80 | \$ 1,882.22 | \$ 110,767.10 | \$ 319.01 | \$ 316.78 | \$ 80,800.89 | \$ 1,202.03 | \$ 1,200.96 | \$ 107,815.97 |
| 8/20/2018 | | \$ 174.04 | \$ 172.50 | \$ 88,243.32 | \$ 1,890.57 | \$ 1,876.71 | \$ 110,442.84 | \$ 314.64 | \$ 327.73 | \$ 83,593.91 | \$ 1,205.02 | \$ 1,207.77 | \$ 108,427.35 |
| 8/21/2018 | | \$ 172.81 | \$ 172.62 | \$ 88,304.70 | \$ 1,880.00 | \$ 1,883.42 | \$ 110,837.72 | \$ 331.00 | \$ 338.02 | \$ 86,218.57 | \$ 1,208.00 | \$ 1,201.62 | \$ 107,875.23 |
| 8/22/2018 | | \$ 172.21 | \$ 173.64 | \$ 88,826.49 | \$ 1,876.64 | \$ 1,904.90 | \$ 112,101.80 | \$ 338.49 | \$ 344.44 | \$ 87,856.12 | \$ 1,200.00 | \$ 1,207.33 | \$ 108,387.84 |
| 8/23/2018 | | \$ 173.09 | \$ 172.90 | \$ 88,447.93 | \$ 1,907.17 | \$ 1,902.30 | \$ 111,948.11 | \$ 348.11 | \$ 339.17 | \$ 86,511.90 | \$ 1,207.14 | \$ 1,205.38 | \$ 108,212.78 |
| 8/24/2018 | | \$ 173.70 | \$ 174.65 | \$ 89,343.16 | \$ 1,910.51 | \$ 1,905.39 | \$ 112,130.64 | \$ 346.00 | \$ 338.82 | \$ 91,524.02 | \$ 1,208.82 | \$ 1,220.65 | \$ 109,583.65 |
| 8/27/2018 | | \$ 175.99 | \$ 177.46 | \$ 90,780.63 | \$ 1,915.00 | \$ 1,927.68 | \$ 113,442.39 | \$ 367.15 | \$ 364.58 | \$ 92,993.21 | \$ 1,227.60 | \$ 1,241.82 | \$ 111,484.17 |
| 8/28/2018 | | \$ 178.10 | \$ 176.26 | \$ 90,166.76 | \$ 1,937.73 | \$ 1,932.82 | \$ 113,744.87 | \$ 367.23 | \$ 368.49 | \$ 93,990.53 | \$ 1,241.29 | \$ 1,231.15 | \$ 110,526.28 |
| 8/29/2018 | | \$ 176.30 | \$ 175.90 | \$ 89,982.60 | \$ 1,953.45 | \$ 1,998.10 | \$ 117,586.54 | \$ 367.20 | \$ 368.04 | \$ 93,875.76 | \$ 1,237.45 | \$ 1,249.30 | \$ 112,155.70 |
| 8/30/2018 | | \$ 175.90 | \$ 177.64 | \$ 90,872.71 | \$ 1,997.42 | \$ 2,002.38 | \$ 117,838.42 | \$ 365.00 | \$ 370.98 | \$ 94,625.66 | \$ 1,244.23 | \$ 1,239.12 | \$ 111,241.78 |
| 8/31/2018 | | \$ 177.15 | \$ 175.73 | \$ 89,895.64 | \$ 2,007.00 | \$ 2,012.71 | \$ 118,446.33 | \$ 370.66 | \$ 367.68 | \$ 93,783.93 | \$ 1,234.98 | \$ 1,218.19 | \$ 109,362.79 |
| 9/4/2018 | | \$ 173.50 | \$ 171.16 | \$ 87,557.83 | \$ 2,026.50 | \$ 2,039.51 | \$ 120,023.49 | \$ 366.47 | \$ 363.60 | \$ 92,743.25 | \$ 1,204.27 | \$ 1,197.00 | \$ 107,460.47 |
| 9/5/2018 | | \$ 169.49 | \$ 167.18 | \$ 85,521.84 | \$ 2,038.11 | \$ 1,994.82 | \$ 117,393.52 | \$ 360.00 | \$ 341.18 | \$ 87,024.59 | \$ 1,193.80 | \$ 1,186.48 | \$ 106,516.04 |
| 9/6/2018 | | \$ 166.98 | \$ 162.53 | \$ 83,143.11 | \$ 2,006.51 | \$ 1,958.31 | \$ 115,244.94 | \$ 347.44 | \$ 346.46 | \$ 88,371.35 | \$ 1,186.30 | \$ 1,171.44 | \$ 105,165.82 |
| 9/7/2018 | | \$ 160.31 | \$ 163.04 | \$ 83,404.00 | \$ 1,938.71 | \$ 1,952.07 | \$ 114,877.71 | \$ 342.20 | \$ 348.68 | \$ 88,937.61 | \$ 1,158.67 | \$ 1,164.83 | \$ 104,572.41 |
| 9/10/2018 | | \$ 163.51 | \$ 164.18 | \$ 83,987.17 | \$ 1,971.00 | \$ 1,939.01 | \$ 114,109.15 | \$ 352.27 | \$ 348.41 | \$ 88,868.74 | \$ 1,172.19 | \$ 1,164.64 | \$ 104,555.36 |
| 9/11/2018 | | \$ 163.94 | \$ 165.94 | \$ 84,887.51 | \$ 1,928.27 | \$ 1,987.15 | \$ 116,942.15 | \$ 344.67 | \$ 355.93 | \$ 90,786.86 | \$ 1,161.63 | \$ 1,177.36 | \$ 105,697.29 |
| 9/12/2018 | | \$ 163.25 | \$ 162.00 | \$ 82,871.98 | \$ 1,994.00 | \$ 1,990.00 | \$ 117,109.87 | \$ 359.08 | \$ 369.95 | \$ 94,362.94 | \$ 1,172.72 | \$ 1,162.82 | \$ 104,391.96 |
| 9/13/2018 | | \$ 162.00 | \$ 161.36 | \$ 82,544.59 | \$ 2,000.0 | | | | | | | | |

Table A.8 Buy and Hold With Stop Loss - Detailed Price, Value, and Return Data - Part 2

| | | Boeing | | | | GE | | | | GM | | | | Raytheon | | | |
|-----------|----------------------------|---------------|-------|----------------|------------|---------------|-------|----------------|------------|---------------|-------|----------------|------------|---------------|-------|----------------|------------|
| | | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value |
| 7/2/2018 | Investment | \$ 100,000.00 | | | | \$ 100,000.00 | | | | \$ 100,000.00 | | | | \$ 100,000.00 | | | |
| 7/2/2018 | Investment Loss Commission | | | | | | | | | | | | | | | | |
| | Nominal Price | 333.38 | | | | 13.43 | | | | 39.29 | | | | 183.64 | | | |
| | Market Spread | 0.17 | | | | 0.08 | | | | 0.02 | | | | 0.03 | | | |
| | Actual Price | \$ 333.55 | | | | \$ 13.41 | | | | \$ 39.31 | | | | \$ 183.55 | | | |
| | Shares Purchased | 299.77 | | | | 7,444.32 | | | | 2,543.65 | | | | 516.13 | | | |
| 9/28/2018 | Sell Price | | | | | | | | | | | | | | | | |
| | Net Price | \$ 111.485.81 | | | | \$ 96,990.30 | | | | \$ 96,990.30 | | | | \$ 106,662.37 | | | |
| | Gross Proceeds | \$ 111,485.81 | | | | \$ 96,990.30 | | | | \$ 96,990.30 | | | | \$ 106,662.37 | | | |
| | Net Proceeds | \$ 111,485.81 | | | | \$ 96,990.30 | | | | \$ 96,990.30 | | | | \$ 106,662.37 | | | |
| | Period Return | 11.5% | | | | -3.0% | | | | -3.0% | | | | 6.7% | | | |

| | | Boeing | | | | GE | | | | GM | | | | Raytheon | | | |
|-----------|----|--------|-----------|----------------|------------|----------|----------|----------------|--------------|----------|----------|----------------|--------------|-----------|-----------|----------------|------------|
| | | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value |
| 7/2/2018 | \$ | 330.69 | \$ 336.08 | \$ 100,747.93 | - | \$ 13.48 | \$ 13.37 | \$ 95,539.59 | - | \$ 39.50 | \$ 39.50 | \$ 100,474.19 | - | \$ 192.88 | \$ 184.49 | \$ 100,370.70 | - |
| 7/3/2018 | \$ | 338.18 | \$ 332.93 | \$ 99,833.63 | - | \$ 13.35 | \$ 13.37 | \$ 95,539.59 | - | \$ 39.53 | \$ 39.71 | \$ 99,126.06 | - | \$ 192.10 | \$ 185.03 | \$ 100,660.02 | - |
| 7/5/2018 | \$ | 336.15 | \$ 333.18 | \$ 99,928.58 | - | \$ 13.38 | \$ 13.43 | \$ 95,772.25 | - | \$ 39.57 | \$ 39.63 | \$ 99,387.89 | - | \$ 195.81 | \$ 183.63 | \$ 99,937.45 | - |
| 7/6/2018 | \$ | 332.84 | \$ 334.64 | \$ 100,146.25 | - | \$ 13.37 | \$ 13.85 | \$ 103,103.87 | - | \$ 39.58 | \$ 39.38 | \$ 99,609.35 | - | \$ 193.16 | \$ 193.37 | \$ 99,906.48 | - |
| 7/9/2018 | \$ | 337.30 | \$ 341.92 | \$ 102,480.40 | - | \$ 13.04 | \$ 13.99 | \$ 103,846.30 | - | \$ 39.58 | \$ 39.75 | \$ 101,110.11 | - | \$ 193.11 | \$ 197.42 | \$ 101,841.96 | - |
| 7/10/2018 | \$ | 342.78 | \$ 347.16 | \$ 104,949.41 | - | \$ 14.00 | \$ 14.17 | \$ 105,486.05 | - | \$ 39.58 | \$ 39.64 | \$ 101,874.95 | - | \$ 193.11 | \$ 195.19 | \$ 101,114.22 | - |
| 7/11/2018 | \$ | 341.73 | \$ 340.69 | \$ 102,102.30 | - | \$ 14.06 | \$ 13.99 | \$ 104,146.07 | - | \$ 39.58 | \$ 39.30 | \$ 99,965.46 | - | \$ 194.96 | \$ 194.63 | \$ 100,143.90 | - |
| 7/12/2018 | \$ | 345.28 | \$ 346.03 | \$ 103,730.49 | - | \$ 14.05 | \$ 13.99 | \$ 104,146.07 | - | \$ 39.58 | \$ 39.27 | \$ 99,898.55 | - | \$ 195.49 | \$ 197.32 | \$ 101,945.18 | - |
| 7/13/2018 | \$ | 347.09 | \$ 350.79 | \$ 105,113.59 | - | \$ 13.97 | \$ 13.89 | \$ 103,401.64 | - | \$ 39.58 | \$ 39.11 | \$ 99,386.36 | - | \$ 197.72 | \$ 199.75 | \$ 103,096.14 | - |
| 7/16/2018 | \$ | 353.97 | \$ 356.10 | \$ 106,749.39 | - | \$ 13.89 | \$ 13.96 | \$ 103,474.08 | - | \$ 39.58 | \$ 39.31 | \$ 100,626.82 | - | \$ 200.00 | \$ 199.61 | \$ 103,023.88 | - |
| 7/17/2018 | \$ | 357.41 | \$ 356.88 | \$ 106,982.12 | - | \$ 13.85 | \$ 13.60 | \$ 102,812.78 | - | \$ 39.58 | \$ 39.50 | \$ 101,822.31 | - | \$ 200.44 | \$ 200.44 | \$ 103,349.04 | - |
| 7/18/2018 | \$ | 359.00 | \$ 360.23 | \$ 107,987.46 | - | \$ 13.74 | \$ 13.74 | \$ 102,393.43 | - | \$ 39.58 | \$ 39.87 | \$ 101,415.34 | - | \$ 200.87 | \$ 201.32 | \$ 104,009.88 | - |
| 7/19/2018 | \$ | 357.69 | \$ 358.33 | \$ 106,184.56 | - | \$ 13.72 | \$ 13.73 | \$ 102,233.55 | - | \$ 39.58 | \$ 39.11 | \$ 99,990.00 | - | \$ 201.09 | \$ 201.37 | \$ 103,931.26 | - |
| 7/20/2018 | \$ | 353.07 | \$ 354.90 | \$ 106,389.96 | - | \$ 13.72 | \$ 13.12 | \$ 97,669.51 | - | \$ 39.58 | \$ 39.40 | \$ 100,219.83 | - | \$ 201.11 | \$ 201.44 | \$ 103,968.39 | - |
| 7/23/2018 | \$ | 358.00 | \$ 357.27 | \$ 105,810.08 | - | \$ 13.02 | \$ 12.98 | \$ 96,761.75 | \$ 96,990.30 | \$ 39.58 | \$ 39.27 | \$ 99,888.65 | - | \$ 201.64 | \$ 201.67 | \$ 104,527.12 | - |
| 7/24/2018 | \$ | 356.75 | \$ 358.27 | \$ 107,399.90 | - | \$ 13.02 | \$ 13.12 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 39.48 | \$ 100,423.32 | - | \$ 201.62 | \$ 201.62 | \$ 104,671.63 | - |
| 7/25/2018 | \$ | 355.52 | \$ 355.92 | \$ 106,693.43 | - | \$ 13.13 | \$ 13.13 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.45 | \$ 95,768.45 | \$ 96,990.30 | \$ 198.00 | \$ 197.66 | \$ 103,965.82 | - |
| 7/26/2018 | \$ | 355.38 | \$ 359.32 | \$ 107,744.66 | - | \$ 13.10 | \$ 13.11 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 38.75 | \$ 96,990.30 | \$ 96,990.30 | \$ 192.00 | \$ 192.43 | \$ 99,118.09 | - |
| 7/27/2018 | \$ | 361.06 | \$ 360.65 | \$ 108,113.36 | - | \$ 13.12 | \$ 13.06 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.53 | \$ 96,990.30 | \$ 96,990.30 | \$ 193.55 | \$ 196.18 | \$ 103,253.17 | - |
| 7/30/2018 | \$ | 361.99 | \$ 361.66 | \$ 105,282.53 | - | \$ 13.04 | \$ 12.81 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.67 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.23 | \$ 193.63 | \$ 99,824.22 | - |
| 7/31/2018 | \$ | 354.38 | \$ 356.30 | \$ 106,809.34 | - | \$ 13.19 | \$ 13.63 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.79 | \$ 97,911 | \$ 96,990.30 | \$ 194.12 | \$ 198.03 | \$ 102,208.40 | - |
| 8/1/2018 | \$ | 354.09 | \$ 352.76 | \$ 105,748.15 | - | \$ 13.05 | \$ 13.24 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.14 | \$ 96,990.30 | \$ 96,990.30 | \$ 197.62 | \$ 197.35 | \$ 103,677.44 | - |
| 8/2/2018 | \$ | 346.82 | \$ 349.73 | \$ 104,949.83 | - | \$ 13.17 | \$ 13.17 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 38.62 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.28 | \$ 197.17 | \$ 103,764.33 | - |
| 8/3/2018 | \$ | 340.50 | \$ 348.44 | \$ 104,453.12 | - | \$ 13.15 | \$ 13.14 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.73 | \$ 96,990.30 | \$ 96,990.30 | \$ 195.00 | \$ 195.80 | \$ 103,077.44 | - |
| 8/6/2018 | \$ | 347.37 | \$ 346.57 | \$ 103,933.25 | - | \$ 13.22 | \$ 13.22 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.57 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.16 | \$ 196.16 | \$ 103,242.25 | - |
| 8/7/2018 | \$ | 348.05 | \$ 350.76 | \$ 105,148.60 | - | \$ 13.12 | \$ 13.16 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.70 | \$ 97,588 | \$ 96,990.30 | \$ 196.01 | \$ 197.89 | \$ 103,878.08 | - |
| 8/8/2018 | \$ | 350.50 | \$ 347.78 | \$ 104,253.27 | - | \$ 13.19 | \$ 13.05 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.66 | \$ 96,990.30 | \$ 96,990.30 | \$ 197.50 | \$ 197.52 | \$ 103,345.38 | - |
| 8/9/2018 | \$ | 346.07 | \$ 343.72 | \$ 103,018.18 | - | \$ 13.03 | \$ 12.94 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.61 | \$ 96,990.30 | \$ 96,990.30 | \$ 197.49 | \$ 196.35 | \$ 103,712.28 | - |
| 8/10/2018 | \$ | 341.00 | \$ 339.41 | \$ 101,246.11 | - | \$ 12.91 | \$ 12.77 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.32 | \$ 96,990.30 | \$ 96,990.30 | \$ 195.81 | \$ 196.35 | \$ 103,341.31 | - |
| 8/13/2018 | \$ | 339.40 | \$ 338.16 | \$ 101,140.40 | - | \$ 12.72 | \$ 12.61 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.59 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.00 | \$ 196.00 | \$ 103,212.28 | - |
| 8/14/2018 | \$ | 339.12 | \$ 339.14 | \$ 101,645.23 | - | \$ 12.48 | \$ 12.31 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.25 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.58 | \$ 197.56 | \$ 103,965.82 | - |
| 8/15/2018 | \$ | 336.17 | \$ 331.76 | \$ 99,432.30 | - | \$ 12.27 | \$ 12.22 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.34 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.84 | \$ 194.93 | \$ 100,600.41 | - |
| 8/16/2018 | \$ | 339.06 | \$ 345.98 | \$ 103,716.58 | - | \$ 12.26 | \$ 12.30 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.29 | \$ 96,990.30 | \$ 96,990.30 | \$ 196.08 | \$ 198.15 | \$ 102,456.14 | - |
| 8/17/2018 | \$ | 346.00 | \$ 346.40 | \$ 103,843.58 | - | \$ 12.26 | \$ 12.26 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.38 | \$ 96,990.30 | \$ 96,990.30 | \$ 198.51 | \$ 199.09 | \$ 102,755.49 | - |
| 8/20/2018 | \$ | 348.60 | \$ 350.74 | \$ 105,140.40 | - | \$ 12.27 | \$ 12.30 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.43 | \$ 96,990.30 | \$ 96,990.30 | \$ 199.79 | \$ 200.45 | \$ 103,467.43 | - |
| 8/21/2018 | \$ | 351.00 | \$ 353.77 | \$ 106,050.91 | - | \$ 12.34 | \$ 12.61 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.75 | \$ 96,990.30 | \$ 96,990.30 | \$ 200.12 | \$ 200.60 | \$ 103,834.85 | - |
| 8/22/2018 | \$ | 354.12 | \$ 350.03 | \$ 104,919.76 | - | \$ 12.61 | \$ 12.47 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.13 | \$ 96,990.30 | \$ 96,990.30 | \$ 200.08 | \$ 199.41 | \$ 103,020.66 | - |
| 8/23/2018 | \$ | 349.88 | \$ 348.48 | \$ 104,151.56 | - | \$ 12.41 | \$ 12.51 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.67 | \$ 96,990.30 | \$ 96,990.30 | \$ 199.15 | \$ 198.18 | \$ 102,261.82 | - |
| 8/24/2018 | \$ | 348.77 | \$ 349.38 | \$ 104,734.91 | - | \$ 12.52 | \$ 12.50 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.95 | \$ 96,990.30 | \$ 96,990.30 | \$ 198.19 | \$ 200.08 | \$ 103,266.46 | - |
| 8/27/2018 | \$ | 352.11 | \$ 353.74 | \$ 105,642.62 | - | \$ 12.48 | \$ 12.77 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.69 | \$ 96,990.30 | \$ 96,990.30 | \$ 200.09 | \$ 201.48 | \$ 103,993.93 | - |
| 8/28/2018 | \$ | 355.00 | \$ 351.21 | \$ 105,283.49 | - | \$ 12.77 | \$ 12.76 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.32 | \$ 96,990.30 | \$ 96,990.30 | \$ 200.07 | \$ 200.07 | \$ 103,261.30 | - |
| 8/29/2018 | \$ | 352.26 | \$ 352.19 | \$ 104,973.73 | - | \$ 12.77 | \$ 12.77 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 37.12 | \$ 96,990.30 | \$ 96,990.30 | \$ 200.43 | \$ 200.66 | \$ 103,256.14 | - |
| 8/30/2018 | \$ | 350.35 | \$ 346.90 | \$ 103,917.47 | - | \$ 12.87 | \$ 12.79 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.70 | \$ 96,990.30 | \$ 96,990.30 | \$ 199.76 | \$ 199.17 | \$ 102,796.78 | - |
| 8/31/2018 | \$ | 345.05 | \$ 342.79 | \$ 102,794.54 | - | \$ 12.73 | \$ 12.74 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.20 | \$ 96,990.30 | \$ 96,990.30 | \$ 198.12 | \$ 199.44 | \$ 102,836.14 | - |
| 9/1/2018 | \$ | 341.60 | \$ 346.25 | \$ 103,796.62 | - | \$ 12.88 | \$ 12.67 | \$ 96,990.30 | \$ 96,990.30 | \$ 39.58 | \$ 36.40 | \$ 96,990.30 | \$ 96,990.30 | \$ 199.00 | \$ 198.84 | \$ 102,366.40 | - |
| 9/2/2018 | \$ | 345.77 | \$ 346.68 | | | | | | | | | | | | | | |

Table A.9 Buy and Hold With Stop Loss - Detailed Price, Value, and Return Data - Part 3

| | | Goldman | | | | Gilttop | | | | MetLife | | | | BOA | | | |
|-----------|----------------------------|---------------|--------|----------------|------------|---------------|-------|----------------|------------|---------------|-------|----------------|------------|---------------|-------|----------------|------------|
| | | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value |
| 7/2/2018 | Investment | \$ 100,000.00 | | | | \$ 100,000.00 | | | | \$ 100,000.00 | | | | \$ 100,000.00 | | | |
| 7/2/2018 | Investment Less Commission | \$ 99,999.50 | | | | \$ 99,999.50 | | | | \$ 99,999.50 | | | | \$ 99,999.50 | | | |
| 7/2/2018 | Nominal Price | 221.50 | | | | 66.69 | | | | 43.45 | | | | 28.92 | | | |
| 7/2/2018 | Market Spread | 0.11 | | | | 0.02 | | | | 0.02 | | | | 0.01 | | | |
| 7/2/2018 | Actual Price | \$ 221.62 | | | | \$ 66.73 | | | | \$ 43.47 | | | | \$ 28.93 | | | |
| 7/2/2018 | Shares Purchased | 451.19 | | | | 1,498.69 | | | | 2,300.38 | | | | 3,546.49 | | | |
| 9/28/2018 | Net Price | | | | | | | | | | | | | | | | |
| 9/28/2018 | Gross Proceeds | \$ 101,174.00 | | | | \$ 107,515.89 | | | | \$ 107,473.77 | | | | \$ 104,479.53 | | | |
| 9/28/2018 | Net Proceeds | \$ 101,164.00 | | | | \$ 107,505.89 | | | | \$ 107,463.77 | | | | \$ 104,469.53 | | | |
| 9/28/2018 | Period Return | 1.2% | | | | 7.5% | | | | 7.5% | | | | 4.5% | | | |
| | | Goldman | | | | Gilttop | | | | MetLife | | | | BOA | | | |
| | | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value | Open | Close | Pre-Stop Value | Stop Value |
| 7/2/2018 | | 219.75 | 223.26 | 100,731.86 | 100,731.86 | 66.21 | 67.16 | 100,651.51 | 100,651.51 | 43.34 | 43.58 | 100,250.58 | 100,250.58 | 28.88 | 28.28 | 100,294.68 | 100,294.68 |
| 7/3/2018 | | 224.46 | 220.38 | 99,432.45 | 99,432.45 | 67.45 | 66.06 | 99,003.34 | 99,003.34 | 43.63 | 43.40 | 99,836.51 | 99,836.51 | 28.33 | 27.78 | 98,521.44 | 98,521.44 |
| 7/5/2018 | | 221.50 | 220.74 | 99,504.88 | 99,504.88 | 66.44 | 65.56 | 99,752.69 | 99,752.69 | 43.73 | 43.59 | 100,004.57 | 100,004.57 | 27.95 | 27.92 | 99,017.94 | 99,017.94 |
| 7/6/2018 | | 220.54 | 221.78 | 100,068.62 | 100,068.62 | 66.23 | 67.44 | 100,621.65 | 100,621.65 | 43.84 | 43.73 | 100,516.63 | 100,516.63 | 28.03 | 28.03 | 99,406.06 | 99,406.06 |
| 7/9/2018 | | 223.36 | 227.99 | 102,865.98 | 102,865.98 | 67.50 | 68.94 | 103,319.57 | 103,319.57 | 44.45 | 45.47 | 104,598.30 | 104,598.30 | 28.23 | 29.05 | 103,025.47 | 103,025.47 |
| 7/10/2018 | | 228.00 | 226.85 | 102,814.62 | 102,814.62 | 68.23 | 68.23 | 102,855.51 | 102,855.51 | 45.53 | 44.91 | 103,103.08 | 103,103.08 | 29.22 | 28.83 | 102,245.25 | 102,245.25 |
| 7/11/2018 | | 225.76 | 225.66 | 101,814.71 | 101,814.71 | 67.97 | 67.91 | 101,775.93 | 101,775.93 | 44.59 | 44.09 | 101,423.77 | 101,423.77 | 28.88 | 28.88 | 101,713.27 | 101,713.27 |
| 7/12/2018 | | 227.04 | 227.22 | 101,518.56 | 101,518.56 | 68.89 | 68.83 | 101,475.14 | 101,475.14 | 44.42 | 44.10 | 101,653.81 | 101,653.81 | 28.80 | 28.77 | 101,032.46 | 101,032.46 |
| 7/13/2018 | | 226.63 | 226.41 | 101,513.07 | 101,513.07 | 67.99 | 67.95 | 101,421.11 | 101,421.11 | 44.55 | 44.20 | 101,678.90 | 101,678.90 | 28.54 | 28.55 | 101,271.23 | 101,271.23 |
| 7/15/2018 | | 227.20 | 231.44 | 104,422.57 | 104,422.57 | 67.36 | 69.46 | 104,098.89 | 104,098.89 | 44.18 | 44.44 | 102,228.90 | 102,228.90 | 29.78 | 29.78 | 105,614.41 | 105,614.41 |
| 7/17/2018 | | 231.48 | 231.02 | 104,210.07 | 104,210.07 | 69.05 | 69.03 | 103,934.03 | 103,934.03 | 44.55 | 44.49 | 101,643.81 | 101,643.81 | 29.89 | 30.03 | 106,430.03 | 106,430.03 |
| 7/18/2018 | | 232.34 | 231.24 | 104,323.33 | 104,323.33 | 69.22 | 69.85 | 104,483.37 | 104,483.37 | 44.22 | 44.96 | 103,425.10 | 103,425.10 | 29.92 | 30.13 | 106,855.68 | 106,855.68 |
| 7/19/2018 | | 231.11 | 228.63 | 103,405.63 | 103,405.63 | 69.80 | 68.89 | 103,394.40 | 103,394.40 | 44.79 | 44.17 | 101,607.80 | 101,607.80 | 29.83 | 29.47 | 105,224.30 | 105,224.30 |
| 7/20/2018 | | 229.01 | 231.09 | 104,516.36 | 104,516.36 | 68.79 | 69.22 | 103,739.20 | 103,739.20 | 44.00 | 43.76 | 100,664.64 | 100,664.64 | 29.62 | 30.13 | 106,855.68 | 106,855.68 |
| 7/23/2018 | | 231.80 | 233.76 | 105,409.32 | 105,409.32 | 69.16 | 70.21 | 105,222.90 | 105,222.90 | 43.76 | 44.09 | 102,573.96 | 102,573.96 | 30.14 | 30.75 | 109,054.50 | 109,054.50 |
| 7/24/2018 | | 234.75 | 235.88 | 106,451.84 | 106,451.84 | 70.40 | 71.07 | 106,511.78 | 106,511.78 | 44.63 | 45.74 | 102,428.08 | 102,428.08 | 30.85 | 30.83 | 110,138.22 | 110,138.22 |
| 7/25/2018 | | 235.01 | 236.69 | 106,791.30 | 106,791.30 | 70.82 | 71.72 | 107,485.02 | 107,485.02 | 44.84 | 44.72 | 102,873.01 | 102,873.01 | 30.70 | 31.07 | 110,189.38 | 110,189.38 |
| 7/26/2018 | | 237.00 | 237.11 | 106,809.79 | 106,809.79 | 71.25 | 71.84 | 107,654.64 | 107,654.64 | 44.09 | 43.22 | 104,020.20 | 104,020.20 | 31.19 | 30.94 | 109,738.24 | 109,738.24 |
| 7/27/2018 | | 237.96 | 237.64 | 107,219.92 | 107,219.92 | 71.36 | 71.69 | 107,440.97 | 107,440.97 | 45.32 | 45.56 | 104,805.33 | 104,805.33 | 30.99 | 31.06 | 111,253.91 | 111,253.91 |
| 7/30/2018 | | 238.00 | 238.05 | 107,203.96 | 107,203.96 | 71.80 | 72.29 | 108,340.18 | 108,340.18 | 46.04 | 45.76 | 105,265.40 | 105,265.40 | 31.14 | 31.31 | 111,040.53 | 111,040.53 |
| 7/31/2018 | | 239.50 | 237.43 | 107,351.57 | 107,351.57 | 72.20 | 71.89 | 107,740.79 | 107,740.79 | 46.06 | 45.74 | 105,228.40 | 105,228.40 | 31.36 | 30.88 | 109,515.54 | 109,515.54 |
| 8/1/2018 | | 238.50 | 236.04 | 106,498.02 | 106,498.02 | 72.50 | 71.93 | 107,800.61 | 107,800.61 | 46.98 | 46.62 | 104,943.35 | 104,943.35 | 31.22 | 31.25 | 110,827.75 | 110,827.75 |
| 8/2/2018 | | 239.50 | 239.89 | 106,573.09 | 106,573.09 | 71.84 | 71.81 | 107,665.70 | 107,665.70 | 46.00 | 46.19 | 105,245.57 | 105,245.57 | 30.88 | 31.28 | 110,824.44 | 110,824.44 |
| 8/3/2018 | | 234.44 | 234.09 | 105,618.21 | 105,618.21 | 71.64 | 72.39 | 108,490.04 | 108,490.04 | 46.70 | 45.33 | 104,276.25 | 104,276.25 | 31.18 | 31.51 | 111,749.83 | 111,749.83 |
| 8/6/2018 | | 234.14 | 235.93 | 106,448.39 | 106,448.39 | 72.16 | 72.80 | 108,405.05 | 108,405.05 | 46.31 | 46.01 | 105,610.46 | 105,610.46 | 31.45 | 31.52 | 111,785.30 | 111,785.30 |
| 8/7/2018 | | 237.25 | 237.83 | 107,361.61 | 107,361.61 | 72.57 | 72.61 | 108,200.01 | 108,200.01 | 46.50 | 46.05 | 105,929.52 | 105,929.52 | 31.55 | 31.51 | 112,749.83 | 112,749.83 |
| 8/8/2018 | | 238.12 | 236.37 | 106,649.61 | 106,649.61 | 73.14 | 72.89 | 109,239.39 | 109,239.39 | 46.05 | 46.37 | 106,668.64 | 106,668.64 | 31.51 | 31.80 | 112,778.31 | 112,778.31 |
| 8/9/2018 | | 236.35 | 233.78 | 105,478.34 | 105,478.34 | 72.81 | 72.81 | 107,875.90 | 107,875.90 | 46.37 | 46.12 | 106,003.54 | 106,003.54 | 31.73 | 31.40 | 112,000.63 | 112,000.63 |
| 8/10/2018 | | 230.97 | 229.61 | 103,596.90 | 103,596.90 | 70.63 | 70.24 | 105,297.84 | 105,297.84 | 46.60 | 46.45 | 102,711.99 | 102,711.99 | 31.28 | 31.19 | 110,614.96 | 110,614.96 |
| 8/13/2018 | | 229.40 | 228.86 | 103,193.11 | 103,193.11 | 70.20 | 69.34 | 103,449.29 | 103,449.29 | 44.47 | 44.03 | 102,200.90 | 102,200.90 | 31.08 | 30.48 | 108,096.91 | 108,096.91 |
| 8/14/2018 | | 227.35 | 229.56 | 103,714.84 | 103,714.84 | 69.80 | 70.01 | 104,921.71 | 104,921.71 | 44.12 | 43.10 | 101,747.15 | 101,747.15 | 30.61 | 30.79 | 109,195.37 | 109,195.37 |
| 8/15/2018 | | 229.35 | 229.25 | 103,424.47 | 103,424.47 | 69.23 | 68.65 | 102,884.95 | 102,884.95 | 44.63 | 44.86 | 103,155.07 | 103,155.07 | 30.48 | 30.36 | 107,671.38 | 107,671.38 |
| 8/16/2018 | | 230.67 | 233.00 | 105,124.42 | 105,124.42 | 69.24 | 69.54 | 104,489.79 | 104,489.79 | 45.19 | 45.57 | 104,833.13 | 104,833.13 | 30.66 | 30.72 | 109,348.05 | 109,348.05 |
| 8/17/2018 | | 232.51 | 233.38 | 105,397.87 | 105,397.87 | 69.42 | 69.87 | 104,413.61 | 104,413.61 | 45.44 | 45.94 | 105,679.47 | 105,679.47 | 30.66 | 30.74 | 109,019.04 | 109,019.04 |
| 8/20/2018 | | 234.13 | 235.78 | 106,380.73 | 106,380.73 | 69.46 | 70.53 | 105,702.85 | 105,702.85 | 45.94 | 46.13 | 105,605.54 | 105,605.54 | 30.89 | 30.87 | 109,480.38 | 109,480.38 |
| 8/21/2018 | | 235.29 | 238.65 | 107,675.62 | 107,675.62 | 70.63 | 71.24 | 106,765.55 | 106,765.55 | 46.08 | 46.81 | 107,680.81 | 107,680.81 | 30.91 | 31.02 | 110,012.05 | 110,012.05 |
| 8/22/2018 | | 237.89 | 239.34 | 107,889.94 | 107,889.94 | 71.16 | 71.12 | 106,586.71 | 106,586.71 | 46.76 | 46.41 | 106,760.65 | 106,760.65 | 30.92 | 30.98 | 108,870.19 | 108,870.19 |
| 8/23/2018 | | 239.05 | 236.34 | 106,633.38 | 106,633.38 | 71.03 | 70.81 | 106,121.15 | 106,121.15 | 46.26 | 45.97 | 105,788.49 | 105,788.49 | 30.84 | 30.84 | 109,373.69 | 109,373.69 |
| 8/24/2018 | | 237.36 | 235.11 | 106,178.42 | 106,178.42 | 70.60 | 69.87 | 105,912.30 | 105,912.30 | 46.21 | 46.42 | 106,783.65 | 106,783.65 | 30.94 | 30.89 | 109,551.01 | 109,551.01 |
| 8/27/2018 | | 236.99 | 242.60 | 106,657.81 | 106,657.81 | 71.07 | 72.38 | 108,490.04 | 108,490.04 | 46.65 | 47.06 | 108,255.90 | 108,255.90 | 31.03 | 31.31 | 110,042.53 | 110,042.53 |
| 8/28/2018 | | 243.06 | 242.37 | 106,403.43 | 106,403.43 | 72.57 | 73.78 | 108,475.05 | 108,475.05 | 47.25 | 46.94 | 107,979.85 | 107,979.85 | 31.36 | 31.27 | 110,898.68 | 110,898.68 |
| 8/29/2018 | | 242.05 | 241.40 | 106,193.38 | 106,193.38 | 72.20 | 72.53 | 108,099.96 | 108,099.96 | 46.93 | 46.97 | 108,048.87 | 108,048.87 | 31.24 | 31.14 | 110,437.63 | 110,437.63 |
| 8/30/2018 | | 240.80 | 239.40 | 105,840.40 | 105,840.40 | 71.89 | 71.45 | 107,096.26 | 107,096.26 | 46.82 | 46.65 | 106,162.66 | 106,162.66 | 31.02 | | | |

Monthly Rebalance to Increase Winners - Detailed Price, Value, and Return Data

Table A.10 Monthly Rebalance to Increase Winners - Detailed Price, Value, and Return Data - Part 1

| | | Period Change -12.15% | | | 2.81% | | | Period Change 4.93% | | | 12.79% | | | Period Change -14.63% | | | 10.37% | | | Period Change 9.47% | | | 0.65% | | |
|-----------------------------|----------------------------|-----------------------|----------------------|----------------------|-------------|----------------------|----------------------|---------------------|----------------------|----------------------|-------------|----------------------|----------------------|-----------------------|----------------------|----------------------|-------------|----------------------|----------------------|---------------------|----------------------|----------------------|-------|--|--|
| | | Sell | | | Buy | | | Buy | | | Buy | | | Sell | | | Buy | | | Buy | | | Buy | | |
| | | Initial | After 1st Re-Balance | After 2nd Re-Balance | Initial | After 1st Re-Balance | After 2nd Re-Balance | Initial | After 1st Re-Balance | After 2nd Re-Balance | Initial | After 1st Re-Balance | After 2nd Re-Balance | Initial | After 1st Re-Balance | After 2nd Re-Balance | Initial | After 1st Re-Balance | After 2nd Re-Balance | Initial | After 1st Re-Balance | After 2nd Re-Balance | | | |
| 7/2/2018 Investment | | Facebook | Facebook | Facebook | Amazon | Amazon | Amazon | NetFlx | NetFlx | NetFlx | Google | Google | Google | Google | Google | Google | Google | Google | Google | Google | Google | Google | | | |
| | Nominal Price | \$ 100,000 | \$ (13,243) | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ (12,911) | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | | | |
| | Investment less Commission | \$ 99,990 | \$ (13,253) | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ (12,921) | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | | | |
| | Market Spread | \$ 195.36 | \$ 171.63 | \$ 176.44 | \$ 1,698.24 | \$ 1,781.96 | \$ 2,009.85 | \$ 391.82 | \$ 334.48 | \$ 369.17 | \$ 1,113.23 | \$ 1,216.64 | \$ 1,276.58 | \$ 1,113.23 | \$ 1,216.64 | \$ 1,276.58 | \$ 1,113.23 | \$ 1,216.64 | \$ 1,276.58 | \$ 1,113.23 | \$ 1,216.64 | \$ 1,276.58 | | | |
| | Actual Price | \$ 195.46 | \$ 171.71 | \$ 176.53 | \$ 1,699.09 | \$ 1,782.86 | \$ 2,010.86 | \$ 392.01 | \$ 334.65 | \$ 369.35 | \$ 1,113.79 | \$ 1,217.24 | \$ 1,277.10 | \$ 1,113.79 | \$ 1,217.24 | \$ 1,277.10 | \$ 1,113.79 | \$ 1,217.24 | \$ 1,277.10 | \$ 1,113.79 | \$ 1,217.24 | \$ 1,277.10 | | | |
| | Shares Purchased | 511.56 | (77.18) | 86.84 | 58.85 | 3.91 | 7.62 | 255.07 | (38.61) | 41.50 | 89.77 | 5.72 | 12.49 | 89.77 | 5.72 | 12.49 | 89.77 | 5.72 | 12.49 | 89.77 | 5.72 | 12.49 | | | |
| | | | 434.38 | 521.21 | | 62.76 | 70.38 | | 216.46 | 257.96 | | 95.49 | 107.98 | | | | | | | | | | | | |
| 9/28/2018 Sell Price | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Net Price | \$ 164.46 | | | \$ 2,003.00 | | | \$ 374.13 | | | \$ 1,193.47 | | | \$ 374.13 | | | \$ 1,193.47 | | | \$ 1,193.47 | | | | | |
| | Gross Proceeds | \$ 85,718 | | | \$ 140,974 | | | \$ 96,511 | | | \$ 128,874 | | | \$ 96,511 | | | \$ 128,874 | | | \$ 128,874 | | | | | |
| | Net Proceeds | \$ 85,708 | | | \$ 140,964 | | | \$ 96,501 | | | \$ 128,864 | | | \$ 96,501 | | | \$ 128,864 | | | \$ 128,864 | | | | | |
| | Period Return | -14.3% | | | 41.0% | | | -3.5% | | | 28.9% | | | | | | | | | | | | | | |
| | | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | | | |
| 7/2/2018 | | \$ 193.37 | \$ 197.36 | \$ 100,960.58 | \$ 1,682.70 | \$ 1,713.78 | \$ 100,854.55 | \$ 385.45 | \$ 398.18 | \$ 101,563.54 | \$ 1,099.00 | \$ 1,127.46 | \$ 101,217.52 | \$ 193.37 | \$ 197.36 | \$ 100,960.58 | \$ 1,682.70 | \$ 1,713.78 | \$ 100,854.55 | \$ 385.45 | \$ 398.18 | \$ 101,563.54 | | | |
| 7/5/2018 | | \$ 194.55 | \$ 192.73 | \$ 90,559.18 | \$ 1,723.96 | \$ 1,691.96 | \$ 99,680.15 | \$ 389.49 | \$ 350.52 | \$ 99,690.71 | \$ 1,135.82 | \$ 1,102.89 | \$ 101,176.96 | \$ 194.55 | \$ 192.73 | \$ 90,559.18 | \$ 1,723.96 | \$ 1,691.96 | \$ 99,680.15 | \$ 389.49 | \$ 350.52 | \$ 99,690.71 | | | |
| 7/5/2018 | | \$ 194.74 | \$ 198.45 | \$ 101,518.18 | \$ 1,705.38 | \$ 1,699.73 | \$ 100,027.71 | \$ 393.80 | \$ 398.39 | \$ 101,617.11 | \$ 1,110.53 | \$ 1,124.27 | \$ 100,931.15 | \$ 194.74 | \$ 198.45 | \$ 101,518.18 | \$ 1,705.38 | \$ 1,699.73 | \$ 100,027.71 | \$ 393.80 | \$ 398.39 | \$ 101,617.11 | | | |
| 7/6/2018 | | \$ 198.45 | \$ 203.23 | \$ 103,963.41 | \$ 1,696.00 | \$ 1,710.63 | \$ 100,669.17 | \$ 397.45 | \$ 408.25 | \$ 104,132.10 | \$ 1,123.58 | \$ 1,140.17 | \$ 102,358.57 | \$ 198.45 | \$ 203.23 | \$ 103,963.41 | \$ 1,696.00 | \$ 1,710.63 | \$ 100,669.17 | \$ 397.45 | \$ 408.25 | \$ 104,132.10 | | | |
| 7/9/2018 | | \$ 204.93 | \$ 204.74 | \$ 104,735.87 | \$ 1,724.05 | \$ 1,739.02 | \$ 102,339.90 | \$ 415.95 | \$ 418.97 | \$ 106,866.44 | \$ 1,148.48 | \$ 1,154.05 | \$ 103,604.61 | \$ 204.93 | \$ 204.74 | \$ 104,735.87 | \$ 1,724.05 | \$ 1,739.02 | \$ 102,339.90 | \$ 415.95 | \$ 418.97 | \$ 106,866.44 | | | |
| 7/10/2018 | | \$ 204.50 | \$ 203.54 | \$ 104,121.99 | \$ 1,738.53 | \$ 1,743.07 | \$ 102,578.24 | \$ 417.24 | \$ 415.63 | \$ 106,014.51 | \$ 1,156.98 | \$ 1,152.84 | \$ 103,496.01 | \$ 204.50 | \$ 203.54 | \$ 104,121.99 | \$ 1,738.53 | \$ 1,743.07 | \$ 102,578.24 | \$ 417.24 | \$ 415.63 | \$ 106,014.51 | | | |
| 7/11/2018 | | \$ 202.22 | \$ 202.54 | \$ 103,610.44 | \$ 1,737.99 | \$ 1,755.00 | \$ 103,280.31 | \$ 411.34 | \$ 418.65 | \$ 106,784.82 | \$ 1,144.59 | \$ 1,153.90 | \$ 103,991.18 | \$ 202.22 | \$ 202.54 | \$ 103,610.44 | \$ 1,737.99 | \$ 1,755.00 | \$ 103,280.31 | \$ 411.34 | \$ 418.65 | \$ 106,784.82 | | | |
| 7/12/2018 | | \$ 203.43 | \$ 206.92 | \$ 105,831.05 | \$ 1,764.54 | \$ 1,796.62 | \$ 105,279.61 | \$ 415.16 | \$ 413.50 | \$ 105,471.21 | \$ 1,159.89 | \$ 1,163.48 | \$ 106,246.71 | \$ 203.43 | \$ 206.92 | \$ 105,831.05 | \$ 1,764.54 | \$ 1,796.62 | \$ 105,279.61 | \$ 415.16 | \$ 413.50 | \$ 105,471.21 | | | |
| 7/13/2018 | | \$ 207.81 | \$ 207.32 | \$ 106,055.68 | \$ 1,803.93 | \$ 1,813.03 | \$ 106,695.33 | \$ 409.19 | \$ 395.80 | \$ 100,956.48 | \$ 1,185.00 | \$ 1,188.82 | \$ 106,726.11 | \$ 207.81 | \$ 207.32 | \$ 106,055.68 | \$ 1,803.93 | \$ 1,813.03 | \$ 106,695.33 | \$ 409.19 | \$ 395.80 | \$ 100,956.48 | | | |
| 7/16/2018 | | \$ 207.50 | \$ 207.23 | \$ 106,009.63 | \$ 1,821.95 | \$ 1,822.49 | \$ 107,252.04 | \$ 398.98 | \$ 400.48 | \$ 102,150.21 | \$ 1,189.39 | \$ 1,183.86 | \$ 106,280.83 | \$ 207.50 | \$ 207.23 | \$ 106,009.63 | \$ 1,821.95 | \$ 1,822.49 | \$ 107,252.04 | \$ 398.98 | \$ 400.48 | \$ 102,150.21 | | | |
| 7/17/2018 | | \$ 204.90 | \$ 209.99 | \$ 107,421.53 | \$ 1,811.56 | \$ 1,843.93 | \$ 108,513.77 | \$ 346.95 | \$ 379.48 | \$ 96,793.75 | \$ 1,172.22 | \$ 1,198.80 | \$ 107,622.07 | \$ 204.90 | \$ 209.99 | \$ 107,421.53 | \$ 1,811.56 | \$ 1,843.93 | \$ 108,513.77 | \$ 346.95 | \$ 379.48 | \$ 96,793.75 | | | |
| 7/18/2018 | | \$ 209.82 | \$ 209.36 | \$ 107,099.25 | \$ 1,848.00 | \$ 1,842.92 | \$ 108,454.33 | \$ 381.24 | \$ 375.13 | \$ 95,684.20 | \$ 1,196.56 | \$ 1,195.88 | \$ 107,359.92 | \$ 209.82 | \$ 209.36 | \$ 107,099.25 | \$ 1,848.00 | \$ 1,842.92 | \$ 108,454.33 | \$ 381.24 | \$ 375.13 | \$ 95,684.20 | | | |
| 7/19/2018 | | \$ 208.77 | \$ 208.09 | \$ 106,449.57 | \$ 1,829.46 | \$ 1,812.97 | \$ 106,691.80 | \$ 371.06 | \$ 364.23 | \$ 92,903.94 | \$ 1,191.00 | \$ 1,186.96 | \$ 106,559.13 | \$ 208.77 | \$ 208.09 | \$ 106,449.57 | \$ 1,829.46 | \$ 1,812.97 | \$ 106,691.80 | \$ 371.06 | \$ 364.23 | \$ 92,903.94 | | | |
| 7/20/2018 | | \$ 208.85 | \$ 209.94 | \$ 107,395.95 | \$ 1,825.01 | \$ 1,813.70 | \$ 106,734.75 | \$ 364.92 | \$ 361.05 | \$ 92,092.82 | \$ 1,186.96 | \$ 1,184.91 | \$ 106,375.09 | \$ 208.85 | \$ 209.94 | \$ 107,395.95 | \$ 1,825.01 | \$ 1,813.70 | \$ 106,734.75 | \$ 364.92 | \$ 361.05 | \$ 92,092.82 | | | |
| 7/23/2018 | | \$ 210.58 | \$ 210.91 | \$ 107,892.16 | \$ 1,812.21 | \$ 1,802.00 | \$ 106,046.22 | \$ 359.15 | \$ 362.66 | \$ 92,503.48 | \$ 1,181.01 | \$ 1,205.50 | \$ 108,223.56 | \$ 210.58 | \$ 210.91 | \$ 107,892.16 | \$ 1,812.21 | \$ 1,802.00 | \$ 106,046.22 | \$ 359.15 | \$ 362.66 | \$ 92,503.48 | | | |
| 7/24/2018 | | \$ 215.11 | \$ 214.67 | \$ 109,815.61 | \$ 1,829.01 | \$ 1,829.24 | \$ 107,649.27 | \$ 366.94 | \$ 357.32 | \$ 91,141.41 | \$ 1,262.59 | \$ 1,248.08 | \$ 110,246.16 | \$ 215.11 | \$ 214.67 | \$ 109,815.61 | \$ 1,829.01 | \$ 1,829.24 | \$ 107,649.27 | \$ 366.94 | \$ 357.32 | \$ 91,141.41 | | | |
| 7/25/2018 | | \$ 215.72 | \$ 217.50 | \$ 111,263.31 | \$ 1,829.30 | \$ 1,863.61 | \$ 109,671.92 | \$ 357.57 | \$ 362.87 | \$ 92,557.04 | \$ 1,239.13 | \$ 1,263.70 | \$ 113,448.45 | \$ 215.72 | \$ 217.50 | \$ 111,263.31 | \$ 1,829.30 | \$ 1,863.61 | \$ 109,671.92 | \$ 357.57 | \$ 362.87 | \$ 92,557.04 | | | |
| 7/26/2018 | | \$ 174.89 | \$ 176.26 | \$ 90,166.76 | \$ 1,839.00 | \$ 1,808.00 | \$ 106,399.32 | \$ 358.19 | \$ 363.09 | \$ 92,613.16 | \$ 1,251.00 | \$ 1,268.33 | \$ 113,864.10 | \$ 174.89 | \$ 176.26 | \$ 90,166.76 | \$ 1,839.00 | \$ 1,808.00 | \$ 106,399.32 | \$ 358.19 | \$ 363.09 | \$ 92,613.16 | | | |
| 7/27/2018 | | \$ 179.87 | \$ 174.89 | \$ 89,465.93 | \$ 1,876.05 | \$ 1,817.27 | \$ 106,944.85 | \$ 366.85 | \$ 355.21 | \$ 90,603.21 | \$ 1,271.00 | \$ 1,238.50 | \$ 111,186.12 | \$ 179.87 | \$ 174.89 | \$ 89,465.93 | \$ 1,876.05 | \$ 1,817.27 | \$ 106,944.85 | \$ 366.85 | \$ 355.21 | \$ 90,603.21 | | | |
| 7/30/2018 | | \$ 175.30 | \$ 171.06 | \$ 87,506.67 | \$ 1,827.33 | \$ 1,775.22 | \$ 104,705.64 | \$ 351.93 | \$ 334.96 | \$ 85,438.05 | \$ 1,228.01 | \$ 1,219.74 | \$ 109,501.95 | \$ 175.30 | \$ 171.06 | \$ 87,506.67 | \$ 1,827.33 | \$ 1,775.22 | \$ 104,705.64 | \$ 351.93 | \$ 334.96 | \$ 85,438.05 | | | |
| 7/31/2018 | | \$ 170.67 | \$ 172.58 | \$ 88,284.24 | \$ 1,786.49 | \$ 1,777.44 | \$ 104,600.88 | \$ 331.51 | \$ 337.45 | \$ 86,073.18 | \$ 1,220.01 | \$ 1,217.26 | \$ 109,279.31 | \$ 170.67 | \$ 172.58 | \$ 88,284.24 | \$ 1,786.49 | \$ 1,777.44 | \$ 104,600.88 | \$ 331.51 | \$ 337.45 | \$ 86,073.18 | | | |
| 8/1/2018 | | \$ 173.93 | \$ 171.65 | \$ 74,560.55 | \$ 1,784.00 | \$ 1,797.17 | \$ 112,787.69 | \$ 335.87 | \$ 338.38 | \$ 73,245.29 | \$ 1,228.00 | \$ 1,220.01 | \$ 116,500.32 | \$ 173.93 | \$ 171.65 | \$ 74,560.55 | \$ 1,784.00 | \$ 1,797.17 | \$ 112,787.69 | \$ 335.87 | \$ 338.38 | \$ 73,245.29 | | | |
| 8/2/2018 | | \$ 170.68 | \$ 176.37 | \$ 76,610.80 | \$ 1,788.77 | \$ 1,834.33 | \$ 115,119.79 | \$ 337.23 | \$ 344.50 | \$ 74,570.02 | \$ 1,205.90 | \$ 1,226.15 | \$ 117,086.63 | \$ 170.68 | \$ 176.37 | \$ 76,610.80 | \$ 1,788.77 | \$ 1,834.33 | \$ 115,119.79 | \$ 337.23 | \$ 344.50 | \$ 74,570.02 | | | |
| 8/3/2018 | | \$ 177.69 | \$ 177.78 | \$ 77,213.27 | \$ 1,837.74 | \$ 1,823.29 | \$ 114,426.94 | \$ 347.75 | \$ 343.09 | \$ 74,264.81 | \$ 1,229.62 | \$ 1,223.71 | \$ 116,853.63 | \$ 177.69 | \$ 177.78 | \$ 77,213.27 | \$ 1,837.74 | \$ 1,823.29 | \$ 114,426.94 | \$ 347.75 | \$ 343.09 | \$ 74,264.81 | | | |
| 8/6/2018 | | \$ 185.69 | \$ 185.69 | \$ 80,559.18 | \$ 1,825.84 | \$ 1,847.75 | \$ 115,963.01 | \$ 342.87 | \$ 350.92 | \$ 75,959.69 | \$ 1,225.80 | \$ 1,202.87 | \$ 116,954.96 | \$ 185.69 | \$ 185.69 | \$ 80,559.18 | \$ 1,825.84 | \$ 1,847.75 | \$ 115,963.01 | \$ 342.87 | \$ 350.92 | \$ 75,959.69 | | | |
| 8/7/2018 | | \$ 186.50 | \$ 183.81 | \$ 79,842.56 | \$ 1,854.53 | \$ 1,862.48 | \$ 116,886.44 | \$ 353.23 | \$ 351.83 | \$ 76,156.66 | \$ 1,237.00 | \$ 1,242.22 | \$ 118,621.17 | \$ 186.50 | \$ 183.81 | \$ 79,842.56 | \$ 1,854.53 | \$ 1,862.48 | \$ 116,886.44 | \$ 353.23 | \$ 351.83 | \$ 76,156.66 | | | |
| 8/8/2018 | | \$ 184.75 | \$ 185.18 | \$ 80,437.65 | \$ 1,861.00 | \$ 1,886.52 | \$ 118,395.16 | \$ 352.21 | | | | | | | | | | | | | | | | | |

Table A.11 Monthly Rebalance to Increase Winners - Detailed Price, Value, and Return Data - Part 2

| | Period Change | 6.59% | -3.21% | Period Change | -0.11% | -4.29% | Period Change | -3.67% | -4.56% | Period Change | 1.26% | 1.38% | | | | |
|-----------------------------|---------------|----------------------|----------------------|---------------|----------------------|----------------------|---------------|----------------------|----------------------|---------------|----------------------|----------------------|----|---------|--------|----------|
| | | Buy | Sell | | Sell | Sell | | Sell | Sell | | Buy | Buy | | | | |
| | | After 1st Re-balance | After 2nd Re-balance | | After 1st Re-balance | After 2nd Re-balance | | After 1st Re-balance | After 2nd Re-balance | | After 1st Re-balance | After 2nd Re-balance | | | | |
| 7/2/2018 Investment | | | | | | | | | | | | | | | | |
| Investment less Commission | \$ | 100.000 | 6,980 | (16,422) | \$ | 100.000 | (15,220) | (12,246) | \$ | 100.000 | (14,464) | (11,688) | \$ | 100.000 | 6,980 | (15,339) |
| Nominal Price | \$ | 99.990 | 6,970 | (16,432) | \$ | 99.990 | (15,230) | (12,256) | \$ | 99.990 | (14,474) | (11,698) | \$ | 99.990 | 6,970 | (15,329) |
| Market Spread | \$ | 333.38 | 355.34 | 343.92 | \$ | 13.43 | 13.41 | 12.84 | \$ | 39.29 | 37.85 | 36.13 | \$ | 193.64 | 196.07 | 198.78 |
| Actual Price | \$ | 0.17 | 0.18 | 0.17 | \$ | 0.01 | 0.01 | 0.01 | \$ | 0.02 | 0.02 | 0.02 | \$ | 0.10 | 0.10 | 0.10 |
| Shares Purchased | \$ | 333.55 | 355.52 | 344.09 | \$ | 13.43 | 13.42 | 12.84 | \$ | 39.31 | 37.87 | 36.14 | \$ | 193.73 | 196.17 | 198.88 |
| | | 299.77 | 19.60 | (47.75) | | 7,444.32 | (1,135.15) | (954.42) | | 2,543.65 | (382.23) | (323.66) | | 516.13 | 35.53 | 77.08 |
| | | | 319.38 | 271.62 | | | 6,309.18 | 5,354.76 | | | 2,161.42 | 1,837.77 | | | 551.65 | 628.73 |
| 9/28/2018 Sell Price | | | | | | | | | | | | | | | | |
| Net Price | \$ | 371.90 | | | \$ | 11.29 | | | \$ | 33.67 | | | \$ | 206.66 | | |
| Gross Proceeds | \$ | 371.90 | | | \$ | 11.29 | | | \$ | 33.67 | | | \$ | 206.66 | | |
| Net Proceeds | \$ | 101.017 | | | \$ | 60.455 | | | \$ | 61.878 | | | \$ | 129.933 | | |
| Period Return | \$ | 101.007 | | | \$ | 60.445 | | | \$ | 61.868 | | | \$ | 129.923 | | |
| | | 1.0% | | | | -39.6% | | | | -38.1% | | | | 29.9% | | |

| | Boeing | | | GE | | | GM | | | Raytheon | | |
|-----------|-----------|-----------|---------------|----------|----------|---------------|----------|----------|---------------|-----------|-----------|---------------|
| | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value |
| 7/2/2018 | \$ 330.69 | \$ 336.08 | \$ 100,747.92 | \$ 13.48 | \$ 13.37 | \$ 99,530.59 | \$ 39.08 | \$ 39.50 | \$ 100,474.19 | \$ 192.88 | \$ 194.39 | \$ 100,329.70 |
| 7/3/2018 | \$ 338.18 | \$ 332.93 | \$ 99,803.63 | \$ 13.35 | \$ 13.37 | \$ 99,530.59 | \$ 39.71 | \$ 38.97 | \$ 99,126.06 | \$ 195.24 | \$ 195.03 | \$ 100,660.02 |
| 7/5/2018 | \$ 336.15 | \$ 333.18 | \$ 99,878.58 | \$ 13.38 | \$ 13.43 | \$ 99,977.25 | \$ 39.61 | \$ 39.47 | \$ 100,397.89 | \$ 195.81 | \$ 193.63 | \$ 99,937.45 |
| 7/6/2018 | \$ 332.84 | \$ 334.64 | \$ 100,316.25 | \$ 13.37 | \$ 13.85 | \$ 103,103.87 | \$ 39.38 | \$ 39.16 | \$ 99,609.35 | \$ 193.16 | \$ 193.57 | \$ 99,906.48 |
| 7/9/2018 | \$ 337.50 | \$ 341.92 | \$ 102,498.60 | \$ 13.94 | \$ 13.95 | \$ 103,848.30 | \$ 39.38 | \$ 39.75 | \$ 101,110.11 | \$ 194.33 | \$ 197.32 | \$ 101,841.96 |
| 7/10/2018 | \$ 342.78 | \$ 347.16 | \$ 104,069.41 | \$ 14.00 | \$ 14.17 | \$ 105,486.05 | \$ 39.84 | \$ 40.09 | \$ 101,974.95 | \$ 197.31 | \$ 195.91 | \$ 101,114.22 |
| 7/11/2018 | \$ 341.73 | \$ 340.60 | \$ 102,102.90 | \$ 14.06 | \$ 13.99 | \$ 104,146.07 | \$ 39.50 | \$ 39.30 | \$ 99,965.46 | \$ 194.96 | \$ 194.03 | \$ 100,143.90 |
| 7/12/2018 | \$ 345.28 | \$ 346.03 | \$ 103,730.67 | \$ 14.05 | \$ 13.99 | \$ 104,146.07 | \$ 39.60 | \$ 39.27 | \$ 99,889.15 | \$ 195.49 | \$ 197.52 | \$ 101,945.18 |
| 7/13/2018 | \$ 347.00 | \$ 350.79 | \$ 105,157.59 | \$ 13.97 | \$ 13.89 | \$ 103,401.64 | \$ 39.11 | \$ 39.36 | \$ 100,118.09 | \$ 197.72 | \$ 199.75 | \$ 103,096.14 |
| 7/16/2018 | \$ 353.97 | \$ 356.10 | \$ 106,749.39 | \$ 13.89 | \$ 13.90 | \$ 103,476.08 | \$ 39.31 | \$ 39.56 | \$ 100,626.82 | \$ 200.00 | \$ 199.61 | \$ 103,023.88 |
| 7/17/2018 | \$ 357.61 | \$ 356.88 | \$ 106,983.21 | \$ 13.85 | \$ 13.69 | \$ 101,912.78 | \$ 39.50 | \$ 40.03 | \$ 101,822.33 | \$ 199.56 | \$ 200.24 | \$ 103,349.04 |
| 7/18/2018 | \$ 359.00 | \$ 360.23 | \$ 107,987.46 | \$ 13.74 | \$ 13.75 | \$ 103,359.43 | \$ 40.06 | \$ 39.87 | \$ 101,415.34 | \$ 200.87 | \$ 201.52 | \$ 104,009.68 |
| 7/19/2018 | \$ 357.69 | \$ 355.33 | \$ 106,518.56 | \$ 13.72 | \$ 13.73 | \$ 102,210.55 | \$ 39.58 | \$ 39.31 | \$ 99,990.00 | \$ 201.09 | \$ 201.37 | \$ 103,932.26 |
| 7/20/2018 | \$ 353.04 | \$ 354.90 | \$ 106,389.66 | \$ 13.72 | \$ 13.12 | \$ 97,669.51 | \$ 39.07 | \$ 39.40 | \$ 100,219.83 | \$ 201.11 | \$ 201.44 | \$ 103,968.39 |
| 7/23/2018 | \$ 355.00 | \$ 353.27 | \$ 105,901.03 | \$ 13.02 | \$ 12.99 | \$ 96,701.75 | \$ 39.20 | \$ 39.27 | \$ 99,889.15 | \$ 201.64 | \$ 196.71 | \$ 101,527.12 |
| 7/24/2018 | \$ 356.75 | \$ 358.27 | \$ 107,399.90 | \$ 12.92 | \$ 13.12 | \$ 97,669.51 | \$ 39.87 | \$ 39.48 | \$ 100,423.32 | \$ 198.09 | \$ 196.99 | \$ 101,671.63 |
| 7/25/2018 | \$ 351.52 | \$ 355.92 | \$ 106,695.43 | \$ 13.13 | \$ 13.11 | \$ 97,595.07 | \$ 37.45 | \$ 37.65 | \$ 95,768.45 | \$ 196.80 | \$ 197.56 | \$ 101,965.82 |
| 7/26/2018 | \$ 355.38 | \$ 359.32 | \$ 107,714.66 | \$ 13.10 | \$ 13.15 | \$ 97,892.84 | \$ 37.07 | \$ 36.75 | \$ 93,479.16 | \$ 192.43 | \$ 192.43 | \$ 99,318.09 |
| 7/27/2018 | \$ 361.06 | \$ 360.65 | \$ 108,113.36 | \$ 13.12 | \$ 13.06 | \$ 97,222.85 | \$ 36.83 | \$ 37.53 | \$ 95,463.20 | \$ 193.55 | \$ 196.18 | \$ 101,253.57 |
| 7/30/2018 | \$ 361.99 | \$ 351.06 | \$ 105,238.53 | \$ 13.04 | \$ 13.16 | \$ 97,967.28 | \$ 37.66 | \$ 37.67 | \$ 95,819.31 | \$ 196.23 | \$ 193.43 | \$ 99,834.22 |
| 7/31/2018 | \$ 354.38 | \$ 356.30 | \$ 106,809.34 | \$ 13.19 | \$ 13.63 | \$ 101,466.12 | \$ 37.79 | \$ 37.91 | \$ 96,429.79 | \$ 194.12 | \$ 198.03 | \$ 102,208.40 |
| 8/1/2018 | \$ 354.09 | \$ 352.76 | \$ 112,663.84 | \$ 13.55 | \$ 13.24 | \$ 83,533.50 | \$ 37.89 | \$ 37.14 | \$ 80,275.32 | \$ 197.62 | \$ 197.35 | \$ 108,869.01 |
| 8/2/2018 | \$ 348.62 | \$ 349.73 | \$ 111,696.12 | \$ 13.17 | \$ 13.17 | \$ 83,091.86 | \$ 37.00 | \$ 36.62 | \$ 79,151.38 | \$ 196.28 | \$ 197.17 | \$ 108,769.70 |
| 8/3/2018 | \$ 349.50 | \$ 348.44 | \$ 111,284.12 | \$ 13.15 | \$ 13.14 | \$ 82,902.58 | \$ 36.65 | \$ 37.73 | \$ 81,550.57 | \$ 197.50 | \$ 195.80 | \$ 108,013.94 |
| 8/6/2018 | \$ 347.37 | \$ 346.57 | \$ 110,686.88 | \$ 13.12 | \$ 13.10 | \$ 82,650.21 | \$ 37.57 | \$ 37.60 | \$ 81,669.58 | \$ 196.16 | \$ 196.16 | \$ 108,212.54 |
| 8/7/2018 | \$ 348.05 | \$ 350.76 | \$ 112,025.08 | \$ 13.12 | \$ 13.16 | \$ 83,028.76 | \$ 37.70 | \$ 37.58 | \$ 81,226.36 | \$ 196.01 | \$ 197.39 | \$ 108,891.07 |
| 8/8/2018 | \$ 350.50 | \$ 347.78 | \$ 111,073.33 | \$ 13.10 | \$ 13.05 | \$ 82,334.76 | \$ 37.61 | \$ 37.66 | \$ 81,399.27 | \$ 197.50 | \$ 197.52 | \$ 108,962.79 |
| 8/9/2018 | \$ 346.07 | \$ 343.72 | \$ 109,776.65 | \$ 13.01 | \$ 12.94 | \$ 81,640.75 | \$ 37.67 | \$ 37.51 | \$ 81,075.05 | \$ 197.49 | \$ 196.10 | \$ 108,179.44 |
| 8/10/2018 | \$ 341.00 | \$ 339.41 | \$ 108,400.14 | \$ 12.91 | \$ 12.77 | \$ 80,568.19 | \$ 37.32 | \$ 36.59 | \$ 79,086.54 | \$ 195.81 | \$ 196.35 | \$ 108,317.35 |
| 8/13/2018 | \$ 339.60 | \$ 338.36 | \$ 108,064.78 | \$ 12.72 | \$ 12.45 | \$ 78,549.25 | \$ 36.59 | \$ 36.16 | \$ 78,157.13 | \$ 196.06 | \$ 196.10 | \$ 108,179.44 |
| 8/14/2018 | \$ 339.12 | \$ 339.14 | \$ 108,313.91 | \$ 12.48 | \$ 12.35 | \$ 77,918.33 | \$ 36.25 | \$ 36.20 | \$ 78,243.59 | \$ 196.58 | \$ 197.56 | \$ 108,984.85 |
| 8/15/2018 | \$ 336.57 | \$ 331.76 | \$ 105,956.90 | \$ 12.27 | \$ 12.22 | \$ 77,098.14 | \$ 35.82 | \$ 35.94 | \$ 77,681.61 | \$ 196.94 | \$ 196.93 | \$ 107,533.99 |
| 8/16/2018 | \$ 339.06 | \$ 345.98 | \$ 110,498.45 | \$ 12.26 | \$ 12.30 | \$ 77,602.87 | \$ 36.18 | \$ 36.29 | \$ 78,438.12 | \$ 196.68 | \$ 198.51 | \$ 109,508.92 |
| 8/17/2018 | \$ 346.00 | \$ 346.40 | \$ 110,632.59 | \$ 12.26 | \$ 12.30 | \$ 77,602.87 | \$ 36.08 | \$ 36.38 | \$ 78,632.64 | \$ 198.51 | \$ 199.09 | \$ 109,828.88 |
| 8/20/2018 | \$ 348.60 | \$ 350.74 | \$ 112,018.69 | \$ 12.27 | \$ 12.30 | \$ 77,602.87 | \$ 36.63 | \$ 36.77 | \$ 79,475.60 | \$ 199.79 | \$ 200.45 | \$ 110,579.13 |
| 8/21/2018 | \$ 351.00 | \$ 353.77 | \$ 112,986.40 | \$ 12.34 | \$ 12.63 | \$ 79,684.90 | \$ 36.75 | \$ 36.91 | \$ 79,778.20 | \$ 200.12 | \$ 200.60 | \$ 110,661.88 |
| 8/22/2018 | \$ 354.32 | \$ 350.03 | \$ 111,791.93 | \$ 12.61 | \$ 12.47 | \$ 78,675.43 | \$ 36.60 | \$ 36.13 | \$ 78,092.29 | \$ 200.38 | \$ 199.41 | \$ 110,005.41 |
| 8/23/2018 | \$ 349.15 | \$ 347.48 | \$ 110,977.52 | \$ 12.41 | \$ 12.54 | \$ 79,117.08 | \$ 35.95 | \$ 35.67 | \$ 77,098.03 | \$ 199.15 | \$ 198.18 | \$ 109,326.87 |
| 8/24/2018 | \$ 348.77 | \$ 349.38 | \$ 111,584.34 | \$ 12.52 | \$ 12.50 | \$ 78,864.71 | \$ 35.95 | \$ 35.95 | \$ 77,033.23 | \$ 198.19 | \$ 200.08 | \$ 110,375.02 |
| 8/27/2018 | \$ 352.11 | \$ 353.74 | \$ 112,976.82 | \$ 12.48 | \$ 12.77 | \$ 80,568.19 | \$ 36.29 | \$ 37.69 | \$ 81,464.11 | \$ 200.99 | \$ 201.48 | \$ 111,147.33 |
| 8/28/2018 | \$ 355.00 | \$ 351.21 | \$ 112,168.79 | \$ 12.77 | \$ 12.76 | \$ 80,505.09 | \$ 37.85 | \$ 37.32 | \$ 80,664.38 | \$ 202.00 | \$ 200.07 | \$ 110,369.51 |
| 8/29/2018 | \$ 352.26 | \$ 350.19 | \$ 111,843.03 | \$ 12.77 | \$ 12.97 | \$ 81,830.02 | \$ 37.39 | \$ 37.12 | \$ 80,232.09 | \$ 200.43 | \$ 200.06 | \$ 110,363.98 |
| 8/30/2018 | \$ 350.35 | \$ 346.90 | \$ 110,792.28 | \$ 12.87 | \$ 12.77 | \$ 80,568.19 | \$ 37.00 | \$ 36.36 | \$ 78,589.42 | \$ 199.76 | \$ 199.17 | \$ 109,873.01 |
| 8/31/2018 | \$ 345.05 | \$ 342.79 | \$ 109,479.64 | \$ 12.73 | \$ 12.94 | \$ 81,640.75 | \$ 36.20 | \$ 36.05 | \$ 77,919.37 | \$ 198.12 | \$ 199.44 | \$ 110,021.96 |
| 9/4/2018 | \$ 341.60 | \$ 346.25 | \$ 94,040.68 | \$ 12.88 | \$ 12.67 | \$ 87,844.76 | \$ 36.00 | \$ 35.60 | \$ 65,424.59 | \$ 199.00 | \$ 198.34 | \$ 124,702.44 |
| 9/5/2018 | \$ 345.77 | \$ 346.68 | \$ 94,166.48 | \$ 12.45 | \$ 12.56 | \$ 87,255.74 | \$ 35.60 | \$ 35.29 | \$ 64,854.88 | \$ 197.88 | \$ 198.03 | \$ 124,507.54 |
| 9/6/2018 | \$ 347.55 | \$ 351.27 | \$ 95,413.23 | \$ 12.50 | \$ 12.51 | \$ 86,988.00 | \$ 35.00 | \$ 34.38 | \$ 63,182.51 | \$ 198.50 | \$ 202.21 | \$ 127,135.64 |
| 9/7/2018 | \$ 348.82 | \$ 349.28 | \$ 94,872.70 | \$ 12.39 | \$ 12.40 | \$ 86,398.98 | \$ 34.35 | \$ 33.91 | \$ 62,318.76 | \$ 201.62 | \$ 200.38 | \$ 125,985.06 |
| 9/10/2018 | \$ 349.49 | \$ 341.86 | \$ 92,857.25 | \$ 12.36 | \$ 12.51 | \$ 86,988.00 | \$ 33.92 | \$ 33.87 | \$ 62,245.25 | \$ 200.99 | \$ 199.18 | \$ 125,230.57 |
| 9/11/2018 | \$ 339.01 | \$ 345.25 | \$ 93,778.06 | \$ 12.44 | \$ 12.33 | \$ 86,024.14 | \$ 33.92 | \$ 33.77 | \$ 62,061.47 | \$ 198.49 | \$ 197.53 | \$ 124,193.17 |
| 9/12/2018 | \$ 345.00 | \$ 353.41 | \$ 95,994.51 | \$ 12.30 | \$ 12.61 | \$ 87,523.48 | \$ 33.70 | \$ 34.06 | \$ 62,594.43 | \$ 197.67 | \$ 198.35 | \$ 124,708.73 |
| 9/13/2018 | \$ 356.36 | \$ 355.46 | \$ 96,551.33 | \$ 12.67 | \$ 12.71 | \$ 88,058.95 | \$ 34.26 | \$ 34.25 | \$ 62,943.60 | \$ 199.04 | \$ | |

Table A.12 Monthly Rebalance to Increase Winners - Detailed Price, Value, and Return Data - Part 3

| | Period Change 7.66% | | | -0.04% | | | Period Change 8.04% | | | -1.25% | | | Period Change 5.65% | | | 0.09% | | | Period Change 10.43% | | | -0.69% | | |
|-----------------------------|---------------------|----------------------|----------------------|------------|----------------------|----------------------|---------------------|----------------------|----------------------|------------|----------------------|----------------------|---------------------|----------------------|----------------------|------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------|----------------------|----------------------|
| | Buy | | | Sell | | | Buy | | | Sell | | | Buy | | | Buy | | | Buy | | | Sell | | |
| | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance | Initial | After 1st Re-balance | After 2nd Re-balance |
| 7/2/2018 Investment | Goldman | Goldman | Goldman | Citigroup | Citigroup | Citigroup | MetLife | MetLife | MetLife | BOA | BOA | BOA | | | | | | | | | | | | |
| Investment less Commission | \$ 100,000 | \$ 6,980 | \$ (17,137) | \$ 100,000 | \$ 6,980 | \$ (17,048) | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ 15,339 | \$ 100,000 | \$ 6,980 | \$ (17,492) | \$ 100,000 | \$ 6,980 | \$ (17,502) |
| Nominal Price | \$ 99,990 | \$ 6,970 | \$ (17,147) | \$ 99,990 | \$ 6,970 | \$ (17,058) | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ 15,329 | \$ 99,990 | \$ 6,970 | \$ (17,502) | \$ 99,990 | \$ 6,970 | \$ (17,502) |
| Market Spread | \$ 221.50 | \$ 238.46 | \$ 238.38 | \$ 66.69 | \$ 72.04 | \$ 71.15 | \$ 43.45 | \$ 45.90 | \$ 45.94 | \$ 28.18 | \$ 31.12 | \$ 30.90 | \$ 28.18 | \$ 31.12 | \$ 30.90 | \$ 28.18 | \$ 31.12 | \$ 30.90 | \$ 28.18 | \$ 31.12 | \$ 30.90 | \$ 28.18 | \$ 31.12 | \$ 30.90 |
| Actual Price | \$ 0.11 | \$ 0.12 | \$ 0.12 | \$ 0.03 | \$ 0.04 | \$ 0.04 | \$ 0.02 | \$ 0.02 | \$ 0.02 | \$ 0.01 | \$ 0.02 | \$ 0.02 | \$ 0.01 | \$ 0.02 | \$ 0.02 | \$ 0.01 | \$ 0.02 | \$ 0.02 | \$ 0.01 | \$ 0.02 | \$ 0.02 | \$ 0.01 | \$ 0.02 | \$ 0.02 |
| Shares Purchased | \$ 221.62 | \$ 238.58 | \$ 238.49 | \$ 66.72 | \$ 72.08 | \$ 71.18 | \$ 43.47 | \$ 45.92 | \$ 45.96 | \$ 28.19 | \$ 31.14 | \$ 30.92 | \$ 28.19 | \$ 31.14 | \$ 30.92 | \$ 28.19 | \$ 31.14 | \$ 30.92 | \$ 28.19 | \$ 31.14 | \$ 30.92 | \$ 28.19 | \$ 31.14 | \$ 30.92 |
| | 451.19 | 29.21 | (71.90) | 1,498.69 | 96.69 | (239.65) | 2,300.38 | 151.77 | 333.50 | 3,546.49 | 223.85 | (566.05) | | | | | | | | | | | | |
| | | 480.40 | 408.50 | | 1,595.38 | 1,355.73 | | 2,452.15 | 2,785.66 | | 3,770.34 | 3,204.29 | | | | | | | | | | | | |
| 9/28/2018 Sell Price | | | | | | | | | | | | | | | | | | | | | | | | |
| Net Price | \$ 224.24 | | | \$ 71.74 | | | \$ 46.72 | | | \$ 29.46 | | | \$ 29.46 | | | | | | \$ 29.46 | | | | | |
| Gross Proceeds | \$ 224.24 | | | \$ 71.74 | | | \$ 46.72 | | | \$ 29.46 | | | \$ 29.46 | | | | | | \$ 29.46 | | | | | |
| Net Proceeds | \$ 91,603 | | | \$ 97,260 | | | \$ 130,146 | | | \$ 94,398 | | | \$ 94,388 | | | | | | \$ 94,388 | | | | | |
| Period Return | -8.4% | | | -2.7% | | | 30.1% | | | -5.6% | | | | | | | | | | | | | | |

| | Goldman | | | Citigroup | | | MetLife | | | BOA | | |
|-----------|-----------|-----------|---------------|-----------|----------|---------------|----------|----------|---------------|----------|----------|---------------|
| | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value | Open | Close | Close Value |
| 7/2/2018 | \$ 219.75 | \$ 223.26 | \$ 100,731.86 | \$ 66.21 | \$ 67.16 | \$ 100,651.91 | \$ 43.31 | \$ 43.58 | \$ 100,250.58 | \$ 28.08 | \$ 28.28 | \$ 100,294.68 |
| 7/3/2018 | \$ 224.46 | \$ 220.38 | \$ 99,432.45 | \$ 67.45 | \$ 66.06 | \$ 99,003.34 | \$ 43.63 | \$ 43.40 | \$ 99,836.51 | \$ 28.33 | \$ 27.78 | \$ 98,521.44 |
| 7/5/2018 | \$ 221.50 | \$ 220.74 | \$ 99,594.88 | \$ 66.44 | \$ 66.56 | \$ 99,752.69 | \$ 43.73 | \$ 43.56 | \$ 100,204.57 | \$ 27.95 | \$ 27.92 | \$ 99,017.94 |
| 7/6/2018 | \$ 220.54 | \$ 221.79 | \$ 100,058.62 | \$ 66.22 | \$ 67.14 | \$ 100,621.93 | \$ 43.34 | \$ 43.73 | \$ 100,595.63 | \$ 27.81 | \$ 28.03 | \$ 99,408.06 |
| 7/9/2018 | \$ 223.36 | \$ 227.99 | \$ 102,865.98 | \$ 67.50 | \$ 68.94 | \$ 103,319.57 | \$ 44.45 | \$ 45.47 | \$ 104,598.30 | \$ 28.23 | \$ 29.05 | \$ 103,025.47 |
| 7/10/2018 | \$ 228.00 | \$ 226.85 | \$ 102,351.62 | \$ 69.23 | \$ 68.23 | \$ 102,255.51 | \$ 45.53 | \$ 44.91 | \$ 103,310.08 | \$ 29.22 | \$ 28.83 | \$ 102,245.25 |
| 7/11/2018 | \$ 225.76 | \$ 225.66 | \$ 101,814.71 | \$ 67.97 | \$ 67.91 | \$ 101,775.93 | \$ 44.59 | \$ 44.09 | \$ 101,423.77 | \$ 28.67 | \$ 28.68 | \$ 101,713.27 |
| 7/12/2018 | \$ 227.64 | \$ 227.22 | \$ 102,518.56 | \$ 68.36 | \$ 68.51 | \$ 102,675.14 | \$ 44.42 | \$ 44.19 | \$ 101,653.81 | \$ 28.90 | \$ 28.77 | \$ 102,032.46 |
| 7/13/2018 | \$ 226.63 | \$ 226.41 | \$ 102,153.10 | \$ 67.99 | \$ 67.00 | \$ 100,412.11 | \$ 44.02 | \$ 44.20 | \$ 101,676.82 | \$ 28.62 | \$ 28.55 | \$ 101,252.23 |
| 7/16/2018 | \$ 227.20 | \$ 231.44 | \$ 104,422.57 | \$ 67.36 | \$ 69.46 | \$ 104,098.89 | \$ 44.18 | \$ 44.44 | \$ 102,228.90 | \$ 28.78 | \$ 29.78 | \$ 105,614.41 |
| 7/17/2018 | \$ 231.48 | \$ 231.02 | \$ 104,233.07 | \$ 69.50 | \$ 69.35 | \$ 103,934.03 | \$ 44.55 | \$ 44.19 | \$ 101,653.81 | \$ 29.89 | \$ 30.01 | \$ 106,430.10 |
| 7/18/2018 | \$ 232.34 | \$ 231.24 | \$ 104,332.33 | \$ 69.22 | \$ 69.85 | \$ 104,683.37 | \$ 44.22 | \$ 44.96 | \$ 103,425.10 | \$ 29.92 | \$ 30.13 | \$ 106,855.68 |
| 7/19/2018 | \$ 231.11 | \$ 229.63 | \$ 103,605.92 | \$ 69.50 | \$ 68.99 | \$ 103,394.50 | \$ 44.79 | \$ 44.17 | \$ 101,607.80 | \$ 29.93 | \$ 29.67 | \$ 105,224.30 |
| 7/20/2018 | \$ 229.01 | \$ 231.69 | \$ 104,535.36 | \$ 68.79 | \$ 69.22 | \$ 103,739.20 | \$ 44.00 | \$ 43.76 | \$ 100,664.64 | \$ 29.62 | \$ 30.13 | \$ 106,855.68 |
| 7/23/2018 | \$ 231.80 | \$ 233.76 | \$ 105,469.32 | \$ 69.16 | \$ 70.21 | \$ 105,222.90 | \$ 43.76 | \$ 44.59 | \$ 102,573.96 | \$ 30.14 | \$ 30.75 | \$ 109,054.50 |
| 7/24/2018 | \$ 234.75 | \$ 235.88 | \$ 106,425.84 | \$ 70.40 | \$ 71.07 | \$ 106,511.78 | \$ 44.63 | \$ 44.91 | \$ 103,310.08 | \$ 30.85 | \$ 30.83 | \$ 109,336.22 |
| 7/25/2018 | \$ 235.01 | \$ 236.69 | \$ 106,791.30 | \$ 70.82 | \$ 71.72 | \$ 107,485.92 | \$ 44.84 | \$ 44.72 | \$ 102,873.01 | \$ 30.70 | \$ 31.07 | \$ 110,189.38 |
| 7/26/2018 | \$ 237.00 | \$ 237.11 | \$ 106,980.79 | \$ 71.75 | \$ 71.34 | \$ 106,916.42 | \$ 45.03 | \$ 45.22 | \$ 104,023.20 | \$ 31.19 | \$ 30.94 | \$ 109,728.34 |
| 7/27/2018 | \$ 237.96 | \$ 237.64 | \$ 107,219.92 | \$ 71.36 | \$ 71.69 | \$ 107,440.97 | \$ 45.32 | \$ 45.56 | \$ 104,805.33 | \$ 30.99 | \$ 31.06 | \$ 110,153.91 |
| 7/30/2018 | \$ 238.00 | \$ 238.95 | \$ 107,810.98 | \$ 71.86 | \$ 72.29 | \$ 108,340.18 | \$ 45.64 | \$ 45.76 | \$ 105,265.40 | \$ 31.14 | \$ 31.31 | \$ 111,040.53 |
| 7/31/2018 | \$ 239.50 | \$ 237.43 | \$ 107,125.17 | \$ 72.20 | \$ 71.89 | \$ 107,740.70 | \$ 46.06 | \$ 45.74 | \$ 105,219.40 | \$ 31.36 | \$ 30.88 | \$ 109,515.54 |
| 8/1/2018 | \$ 238.50 | \$ 236.04 | \$ 113,393.45 | \$ 72.50 | \$ 71.93 | \$ 114,755.80 | \$ 45.98 | \$ 45.62 | \$ 111,867.12 | \$ 31.22 | \$ 31.25 | \$ 117,823.11 |
| 8/2/2018 | \$ 233.93 | \$ 233.99 | \$ 112,408.63 | \$ 71.34 | \$ 71.84 | \$ 114,612.20 | \$ 46.00 | \$ 46.19 | \$ 113,264.85 | \$ 30.88 | \$ 31.28 | \$ 117,936.23 |
| 8/3/2018 | \$ 234.44 | \$ 234.09 | \$ 112,456.67 | \$ 71.64 | \$ 72.39 | \$ 115,489.67 | \$ 45.70 | \$ 45.33 | \$ 111,156.01 | \$ 31.18 | \$ 31.51 | \$ 118,803.40 |
| 8/6/2018 | \$ 234.14 | \$ 235.93 | \$ 113,340.60 | \$ 72.16 | \$ 72.40 | \$ 115,505.63 | \$ 45.31 | \$ 45.91 | \$ 112,578.25 | \$ 31.45 | \$ 31.52 | \$ 118,841.11 |
| 8/7/2018 | \$ 237.25 | \$ 237.83 | \$ 114,253.37 | \$ 72.57 | \$ 72.41 | \$ 115,521.58 | \$ 46.10 | \$ 46.05 | \$ 112,921.55 | \$ 31.55 | \$ 31.51 | \$ 118,803.40 |
| 8/8/2018 | \$ 238.12 | \$ 236.37 | \$ 113,551.98 | \$ 72.14 | \$ 72.89 | \$ 116,287.36 | \$ 46.05 | \$ 46.37 | \$ 113,706.24 | \$ 31.51 | \$ 31.80 | \$ 119,896.80 |
| 8/9/2018 | \$ 236.35 | \$ 233.78 | \$ 112,307.75 | \$ 72.44 | \$ 71.98 | \$ 114,835.57 | \$ 46.37 | \$ 46.12 | \$ 113,093.20 | \$ 31.73 | \$ 31.60 | \$ 119,142.73 |
| 8/10/2018 | \$ 230.97 | \$ 229.61 | \$ 110,304.48 | \$ 70.63 | \$ 70.26 | \$ 112,091.51 | \$ 45.80 | \$ 44.65 | \$ 109,488.54 | \$ 31.23 | \$ 31.19 | \$ 117,596.90 |
| 8/13/2018 | \$ 229.49 | \$ 226.86 | \$ 108,983.39 | \$ 70.20 | \$ 69.16 | \$ 110,336.59 | \$ 44.47 | \$ 44.43 | \$ 108,949.07 | \$ 31.08 | \$ 30.48 | \$ 114,919.95 |
| 8/14/2018 | \$ 227.35 | \$ 229.56 | \$ 110,280.46 | \$ 69.30 | \$ 70.01 | \$ 111,692.67 | \$ 44.52 | \$ 45.10 | \$ 110,592.00 | \$ 30.61 | \$ 30.79 | \$ 116,088.76 |
| 8/15/2018 | \$ 229.35 | \$ 229.25 | \$ 110,131.54 | \$ 69.23 | \$ 68.65 | \$ 109,522.95 | \$ 44.63 | \$ 44.86 | \$ 110,003.49 | \$ 30.48 | \$ 30.36 | \$ 114,467.52 |
| 8/16/2018 | \$ 230.67 | \$ 233.00 | \$ 111,933.04 | \$ 69.16 | \$ 69.56 | \$ 110,974.74 | \$ 45.19 | \$ 45.57 | \$ 111,744.52 | \$ 30.56 | \$ 30.72 | \$ 115,824.83 |
| 8/17/2018 | \$ 232.51 | \$ 233.38 | \$ 112,115.59 | \$ 69.42 | \$ 69.67 | \$ 111,150.23 | \$ 45.44 | \$ 45.94 | \$ 112,651.81 | \$ 30.66 | \$ 30.74 | \$ 115,900.24 |
| 8/20/2018 | \$ 234.13 | \$ 235.78 | \$ 113,268.55 | \$ 69.46 | \$ 70.53 | \$ 112,522.26 | \$ 45.94 | \$ 46.12 | \$ 113,093.20 | \$ 30.69 | \$ 30.87 | \$ 116,390.39 |
| 8/21/2018 | \$ 235.29 | \$ 238.65 | \$ 114,647.29 | \$ 70.63 | \$ 71.24 | \$ 113,654.98 | \$ 46.08 | \$ 46.81 | \$ 114,785.19 | \$ 30.91 | \$ 31.02 | \$ 116,955.94 |
| 8/22/2018 | \$ 237.89 | \$ 239.34 | \$ 114,978.77 | \$ 71.16 | \$ 71.12 | \$ 113,463.54 | \$ 46.76 | \$ 46.41 | \$ 113,804.32 | \$ 30.92 | \$ 30.98 | \$ 116,805.12 |
| 8/23/2018 | \$ 239.05 | \$ 236.34 | \$ 113,537.57 | \$ 71.03 | \$ 70.81 | \$ 112,968.96 | \$ 46.35 | \$ 45.97 | \$ 112,725.38 | \$ 30.94 | \$ 30.84 | \$ 116,277.27 |
| 8/24/2018 | \$ 237.36 | \$ 235.11 | \$ 112,946.68 | \$ 70.60 | \$ 70.67 | \$ 112,745.61 | \$ 46.21 | \$ 46.42 | \$ 113,828.84 | \$ 30.94 | \$ 30.89 | \$ 116,465.79 |
| 8/27/2018 | \$ 236.99 | \$ 242.60 | \$ 116,544.87 | \$ 71.07 | \$ 72.39 | \$ 115,489.67 | \$ 46.65 | \$ 47.06 | \$ 115,398.22 | \$ 31.03 | \$ 31.31 | \$ 118,049.33 |
| 8/28/2018 | \$ 243.06 | \$ 242.37 | \$ 116,434.38 | \$ 72.57 | \$ 72.38 | \$ 115,473.71 | \$ 47.25 | \$ 46.94 | \$ 115,103.96 | \$ 31.36 | \$ 31.27 | \$ 117,898.52 |
| 8/29/2018 | \$ 242.05 | \$ 241.40 | \$ 115,968.39 | \$ 72.30 | \$ 72.53 | \$ 115,713.02 | \$ 46.93 | \$ 46.97 | \$ 115,177.53 | \$ 31.24 | \$ 31.14 | \$ 117,408.37 |
| 8/30/2018 | \$ 240.80 | \$ 239.40 | \$ 115,007.59 | \$ 72.09 | \$ 71.46 | \$ 114,005.96 | \$ 46.82 | \$ 46.15 | \$ 113,166.77 | \$ 31.02 | \$ 31.01 | \$ 116,918.23 |
| 8/31/2018 | \$ 238.94 | \$ 237.81 | \$ 114,243.76 | \$ 71.05 | \$ 71.24 | \$ 113,654.98 | \$ 45.99 | \$ 45.89 | \$ 112,529.20 | \$ 30.88 | \$ 30.93 | \$ 116,616.60 |
| 9/4/2018 | \$ 237.76 | \$ 237.66 | \$ 97,085.11 | \$ 70.99 | \$ 71.40 | \$ 96,799.41 | \$ 45.76 | \$ 46.13 | \$ 128,502.31 | \$ 30.91 | \$ 31.14 | \$ 99,781.61 |
| 9/5/2018 | \$ 237.01 | \$ 237.56 | \$ 97,044.26 | \$ 71.20 | \$ 71.17 | \$ 96,487.59 | \$ 46.17 | \$ 46.33 | \$ 129,059.44 | \$ 31.07 | \$ 31.18 | \$ 99,909.78 |

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