Exploring Investor Attention in Financial Models

The Honors Program
Senior Capstone Project
Student's Name: Anna Rodier
Faculty Sponsor: Rick Smith
Editorial Reviewer: A. Can Inci
Student Editorial Reviewer: Joel Moffit
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ABSTRACT

The purpose of this study is to investigate whether stock prices are influenced by investor attention and how this, in turn, can be used to better advise the financial decisions of the everyday investor. Using weekly adjusted close data, weekly traded volumes, and weekly company searches using Google Trends, I tested my hypothesis that including the frequency of company searches, found through consumers using Google, in financial models will help better predict stock returns. Using S&P 500 company data from February 2012 to February 2017, frequency is a better predictor of price in comparison to trading volumes. But, to maximize predictability, both frequency and volume should be used to predict price. Further investigation revealed that the Health Care and Energy sectors tend to have the strongest correlation between frequency and volume, compared to the Consumer Staples and Utilities sectors, which tend to attract individual investors.

INTRODUCTION

Since early civilization, humans have used trade and barter systems. Centuries later, the stock market was installed and Wall Street became a word in everyday vernacular. Since the modern day stock market's creation, financial professionals have been trying to find models to accurately predict the price of stocks. Several models are accepted today, including the Capital Asset Pricing Model, the Fama-French three-factor model, and the Carhart four-factor model. These models include factors such as market risk, size, value, and momentum factors, all in an effort to accurately predict price. Even with these strong, widely accepted price predicting models, there is still variation between stocks' predicted price and real price. Elements influencing the difference between predicted and real price have been studied, but not identified explicitly. Through this study, I hope to find additional factors to help better eliminate the variation in predicted price.

A major issue when predicting price is the constant volatility of the stock market. Stock exchanges, such as the New York Stock Exchange (NYSE) and the National Association of Securities Dealers Automated Quotations (NASDAQ), are centers that host billions of trades each month. Options to buy or sell, in short or long positions, create many choices for investors. Markets are volatile by nature and reflect business changes, economic expansion or contraction, and shifts in perceived risks. When entering into the stock market, the investor must determine and accept the amount of risk they are willing to take when purchasing shares of stock. Changes in a business, such as department shifts or mergers and acquisitions, can cause huge discrepancies in price. Sharp rises or drops in price are central to market volatility. Additionally, the U.S. economy is unpredictable. It is dependent on the world economy and can either expand or contract due to world finances. Economic expansion

or contraction causes market volatility. Risk could fluctuate due to impending business success or failures, but is unavoidable. When determining a company's price, risk is taken into account, but its effects will never be eliminated from price. Therefore, risk causes market volatility. While volatility is unavoidable, finance professionals hope to eliminate some of the variation and better predict stock prices through more accurate models.

The stock market is open to any willing individual interested in investing. Investors have different approaches, such as active or passive strategies, is related to the time commitment each wants to devote to investing. Strategies and assets are tailored towards the varying types of investors and their wide range of commitment levels. With different types of strategies, investors, and commitments, the stock market can be quite chaotic and, at times, even scary.

Investors participate in the market for different reasons. Some simply look to speculate and make a quick dollar, and some invest for more weighty reasons such as funding their retirement. When analysts think about the reasons why someone is investing, they also consider what age groups are participating in the stock market. The baby boomers are now bordering retirement age, hopefully, influencing them to invest more conservatively. Conversely, millennials who are now entering the market have more leeway in holding riskier stocks because they have more time to recover from any adverse investing results. The divergent needs of baby boomers and millennials lead them to be interested in vastly different stocks, and this can contribute to stock market volatility.

Financial intermediaries have grown in popularity over the past few decades. With more Americans busier than ever but still interested in the stock market, financial advisors and stock brokers are necessary experts for this complicated market. In a survey conducted

by Certified Financial Planners across America, Americans agreed "with more complexity and uncertainty in today's economy… they need better financial guidance" (News & Events). These institutions are considerable in size, owning about 85 percent of stocks in the market, and hold large portfolios that can help eliminate some volatility. While they do own a larger percentage than individuals, these institutions are acting on behalf of their clients and performing trades in their favor. Institutions, however, work specifically to find profitable returns; they have the time and resources to research companies extensively and build strong portfolios. For the purpose of this study, I will be focusing on individual investors, who own about 15 percent of the market. These individuals have to make a decision on what to purchase in order to build a strong portfolio. These individuals do not have the resources an institution would readily have, and, therefore, are seen to be at a disadvantage in this study.

With institutional and individual investors trading in the same market, volatility can easily occur due to the resources each have. There are different methods investors use when gathering information before they buy or sell shares of stock. Active investors might track a company's every move, from product and price changes, to department shifts, to mergers and acquisitions. Passive investors tend to put their money in safer stocks with a guaranteed, but lower, return. Investors that want to make a quick profit will focus on truly volatile stocks, while investors focusing on retirement accounts will have safer investments.

Any type of news reported on, or by, a company is reflected in its stock price, but delays in processing information can occur. In a study completed by Vlastakis and Markellos in 2009, the two researchers claimed "the internet has nowadays revolutionized the production, intermediation, dissemination and consumption of information in the financial industry." Various studies conducted by financial analysts have shown that there often are

informed investors and uninformed investors. Informed investors make decisions based on the information they have gathered. Uninformed investors tend to follow the market, but they do not realize the underlying reasons why. When uninformed investors try to fix their actions afterwards, they tend to cause volatility in the markets. The excess or lack of information investors have can heavily influence the volatility in the stock market.

The combination of stock market volatility, different types and strategies of investors, and the dissemination of information continually cause instability in stock market returns. Financial models have been tested and widely accepted to better predict prices. However, with uncertainty in the markets and a variety of investors, there is always variation between predicted and real prices. The purpose of this study is to derive new factors to help provide further explanation for variances in predicted prices.

LITERATURE REVIEW

In order to complete my testing and fully develop a hypothesis that would enable more accurate prediction of returns, I had to invest myself in literature concerning the topic. By looking at widely accepted pricing models, previous studies completed by financial analysts, and surveys completed by certified associations across America, I was able to develop a more refined viewpoint as to what could be missing from pricing models. Currently, there is no way to account for the popularity of a stock due to news announcements. While the efficient market hypothesis states that news is automatically reflected in the price and that beating the market is impossible, volatility still occurs due to gaps in information and arbitrage opportunities.

With a wavering economy and dynamic investors involved in the market, there seem to be many factors driving the unexplained gap between predicted and real returns. Throughout my literature review, I found four main areas that cause concern when pricing the returns of stocks. These four areas were pricing models, individual investors, implications in the industry and in information about companies in the market, and differing investment advice.

Pricing Models

In 2015, researchers John Goddard, Arben Kita, and Qingwei Wang observed the amount of time and effort individual investors required to research their investment options and make their portfolio investment decisions based on the attention a firm received in the news (79). They researched foreign exchange markets and found a positive, significant relationship between investor attention and volatility. Investors' attention changes with the increases and decreases in trading volume for a particular stock and affects the risk-aversion of some investors (95). For example, an investor will pay more attention to a stock if there are many trades occurring around a news outbreak. Some investors may be caused to stray away from the risk, and others to be drawn towards the risk. Regardless, search volume indices will increase during news and earnings announcements, which means investors are heavily researching any released public information. Goddard, Kita, and Wang claim "Standard asset pricing models have difficulty in explaining some stylized empirical facts on price dynamics that are unrelated to fundamentals." Another researcher, Tijmen Kampman,

states that finance professions have been studying financial models for years in hopes of better predicting future returns and valuing investments (4).

An important theory to include and analyze in this study is the efficient market hypothesis, which states that prices are adjusted instantaneously as news is released about a company. The EMH states that it is impossible to beat the market because the price reflects all current and known information about a stock. The limitation of the EMH is that news is unpredictable; the U.S. and global economies can change suddenly or businesses can merge. Each event causes unknown shifts in our market and volatility in stock prices. Financial models today do not account for these nuances, and the uncertainty that is unavoidable.

Individual Investors

As stated before, the purpose of this study is to identify the different types of investors and their strategies in the market, and then to watch how they could consequently affect market volatility through their trades. According to Gallup, a research-based consulting company, fifty-five percent of Americans participate in the stock market. While this percentage fluctuates, it has been on the lower end in the past few decades due to other investment options, such as ETFs, bonds, and mutual funds. A study conducted by Investment Trends U.S. concluded that seventy-five percent of millennials believe the economy is strengthening and are more apt to optimistically invest in the stock market (Investment Trends).

A few researchers have taken new approaches by looking at investor attention theory. In 2007, Brad M. Barber and Terrance Odean explored the individual investor's buying

decisions and discovered that individual investors tend to buy "attention-grabbing" stocks (785). They argued there is only so much information an individual investor is willing to digest, and there are only few common stocks in an individual investor's portfolio. Barber and Odean believe investors use the "news, unusual trading volume, and extreme returns" as information to buy or sell their stocks (787). Results of this study concluded that "attention-based purchases by many investors could temporarily inflate stock's price," and that investor attention is important when predicting the returns of stocks (788).

Another study conducted by researchers Henrik Cronqvist and Stephan Siegel concluded that individuals exhibit investment biases because their environments, experiences, and events shape their investment choices. Cronqvist and Siegel explained this occurrence stating:

> In a hunter-gatherer society, it may generally have been harmful for humans to explore or invest in the unfamiliar, which may explain a strong preference for investing in the familiar, even today.

In 2014, Xunan Feng and Na Hu studied how individual investor behavior is influenced by attention; they discovered that attention is selective because of the limited capacity an investor can give to specific firms due to the excessive time and effort required to research a stock (289). "Attention becomes crucial" when allocating limited attention to certain firms and their stocks (290). Feng and Hu concluded that attention can severely affect a stock's price because investors focus solely on the news of a specific firm.

An example in Feng and Hu's study declared that certain outlets and news mediums carry more weight with individual investors. Previously, it was assumed all investors received the

same amount of information about a company at the same time, but Feng and Hu realized that information is disseminated differently. For example, in November 1997, a scientific magazine reported a medical company produced a new anti-cancer drug, which consequently increased the price of the stock slightly (290). In May of 1998 (six months later), the *New York Times* reported the news of the new anti-cancer drug on the front page of the paper. The company closed at $12 on Friday and opened at $52 on the following Monday. Feng and Hu concluded that investor attention is the "driving factor" simply because "investors pay more attention to *New York Times* than *Nature*" (291).

Implications

As I aim to better the current financial models predicting stocks, it is important that I look at what problems past researchers have faced when completing these models in the first place. A study completed by Investments Trends U.S. claims that "the investing industry is facing many challenges: investors are getting younger, technology is playing a greater role, and people are becoming more optimistic about the economy as it continues to improve". An additional study, completed in 2007, looked at the thirty stocks with the highest market value in the NYSE (Vlastakis & Markellos). This study collected the supply and demand of these thirty stocks simultaneously and found that market information demand has a significant relationship with volatility in price and trading volume. This means that when investors are demanding and searching for more information on a given stock, the price of that stock follows the level of demand. If a stock has a major news story leak, investors will try to find out as much information as possible and make appropriate investment decisions. The

researchers state "the internet has nowadays revolutionized the production, intermediation, dissemination and consumption of the information in the financial industry."

A difficult implication that deals with the dissemination of information is that "traditional asset pricing models assume that information is instantaneously incorporated into prices when it arrives" (Da, Engelberg, &Gao, 1461) In 2011, researchers Zhi Da, Joseph Engelberg, and Pengjie Gao focused on trying to directly measure investor attention and assumption revealed in Google searches (1461). They believe Google is an unambiguous way to look into research because it is commonly used by all Americans and is a good source to distribute information because it is less sophisticated for individual investors to use. Da, Engelberg, and Gao believe that Google searches are a clear cut way to measure investor attention and frequency rather than indirect methods, like news outbreaks and extreme returns, which cannot be disseminated at the same time (1497). These researchers were the first to propose using Google's Search Volume Index as a way to measure investor attention- for the remainder of this study, I will follow their mode of thought and use Google's calculation of the frequency of searches in order to obtain data pertaining to investor attention.

Investment Advice

The stock market tends to be chaotic and scary for many investors. With the market crash in 2008 and the ensuing pessimism, individuals tend to be nervous about investing. While financial advisers and intermediaries can be helpful, many individuals need help with their finances and how to properly plan for their future. A quote taken from a survey completed by the Certified Financial Planners board states that "with more complexity and

uncertainty in today's economy, Americans are saying they need better financial guidance." Through this study, I hope to provide better guidance for individuals interested in investing.

HYPOTHESIS

With the vary uncertainty in the market, different types of investors involved in trading, and the dissemination of information, I hypothesize that investor attention should be used to predict stock prices. Investor attention, as measured by the **frequency** of company **searches,** can be an additional factor used in financial models to help better **predict the returns** from stocks in the S&P 500. Further, **trading volume** can be used, in addition to the frequency of searches, to provide more effective **investment decisions**.

METHOD

In order to test my hypothesis, I needed to collect data on various stocks to see if I could find a pattern. After looking at a variety of stock indices, I decided the S&P 500 would be the best representation for this study. The S&P 500 includes 500 different stocks, varying in sector, industry, and market capitalization. By using this variety, I am able to test if investor attention and trading volume can predict price.

The main purpose of this project is to examine the types of investors in the market, how they receive information, and how their reactions consequently affect stock price. The next piece of data I had to collect was the percentage of total shares per stock that are owned by institutional investors. By identifying this, I could later determine which stocks are less

dominated by institutional investors. Because of this, these stocks would be more influenced by the actions of individual investors, and I would expect the price to fluctuate the most. I was able to gather this data using Google Finance.

The next important piece of data I needed to determine was the time frame. I decided five years would be a long enough period in the stock market. Five years covers a wide range of time; it is longer than the term of the President and can show the effects of politics, and it is longer than the term of the chairman of the Federal Reserve and can truly show the effects of a wavering economy. I gathered data from February 2012 to February 2017.

To predict price using frequency of company searches and trading volume, I needed to gather this data and test. I collected the weekly adjusted closing price and weekly trading volumes for each company in the S&P 500 using Yahoo Finance.

To gather investor attention data, measured by the frequency of company searches, I used Google Trends, an offspring of the search engine Google. Google is a main source used by individual investors to gather information; it is a direct measure to see what kind of information people are truly searching for. According to Da, Engelberg, and Gao, it is a "revealed attention" measure because people have to actively seek out information about a specific search term. Additionally, Google is one of the largest search engines in the world. With around 3.5 billion searches a day, and with almost 81 percent of searches worldwide being completed on Google's search engine (Appendix 1), gathering Google data will provide me with the best measure of investor attention. Google Trends reports the frequency of a search term per week over a specified time period. When entering a search term, Google Trends produces a graph, in which one can see the highest and lowest popularity by week over the 5 year span.

To quantitatively test the frequency of searches, these graphical values must be able to be compared. Appendix 2A shows an example of Apple's five year graph of the frequency of company searches. The highest point, or points, on the graph over the five years is given a value of 100 (Appendix 2B). This value means this week had the most amount of searches compared to any other week over the five years. Simply stating, 100 means the most popular week. Each point following the peak point, or points, on the graph is relative to the highest. This means that subsequent points are measured through comparison to the most popular point in time. For example, in Appendix 2C, a point marked 75 means this week was 75 percent as popular as the most popular week in time over the five years. In other words, this week had 75 percent of the amount of searches completed on the highest searched week during this time period.

When collecting data, I used the same time period to ensure I was comparing similar economic times and news events. This methodology works when quantitatively assigning values to the frequency because it gives companies, no matter how many searches are completed on them, a relationship that could be compared to each other. Companies like Apple and Alphabet might be searched more often, but ranking these companies based on their own search popularity allows me to best compare and see what is truly affecting their price.

In order to test my hypothesis, I completed regression testing to see if the independent variables could properly predict the dependent variables. More specifically, I will be looking at the R^2 values to see if the predictor is a good fit for the dependent variable. An R^2 that is closer to 1 is perfect, meaning the independent variable is a great predictor of the dependent variable and there is no gap. Due to the uncertainty and chaos surrounding the stock market, I

am not expecting extremely high R^2 values because there is much variation between real and predicted price in the stock market.

I completed two simple regressions to predict price. In the first regression I ran, I set the independent variable equal to the weekly frequency of company searches and used this to predict the dependent variable weekly adjusted closing price. I ran a second simple regression where I set the independent variable equal to the weekly trading volume and the dependent variable equal to the weekly adjusted closing price. According to my hypothesis, these simple regressions are significant in predicting price.

The next step from this was to complete a multiple regression using my two original independent variables, weekly frequency of company searches and weekly trading volume, to predict the dependent variable of weekly adjusted closing price. According to my hypothesis, I would expect the multiple regression R^2 to be higher than either of the two simple regressions, showing that using both independent variables is more useful and better predicts price.

RESULTS

After running two simple regressions for every company in the S&P 500, I determined that frequency of company searches produced a higher adjusted R^2 than trading volume 55 percent of the time. This means that frequency is a slightly better predictor than trading volume, but is not a conclusive answer.

When analyzing the multiple regressions, I found that seventy-four percent of all the multiple regressions run had a higher adjusted R^2 than either of the two simple regressions

run. This is to be predicted because additional independent factors that forecast the dependent variable should produce better predictions when combined. This means that both frequency of searches and trading volume together should be used to predict price. There were some complications in my results due to adjusting the coefficient of determination (R^2) when it was lower than either of the simple regressions R^2. This can occur when one of the variables takes away from the other, or they are perfectly correlated. While this did not occur the majority of the time, this is something to consider.

Observation 1

When looking at the simple and multiple regression analysis, nothing stood out. I looked deeper in the data and realized that 31 percent of all stocks in the S&P 500 have a higher adjusted R^2 from the multiple regression than the sum of the two simple regressions. This simply reveals that the multiple regression explains away much more variation in price using two independent variables than using either of the two independent variables separately. By using both the frequency of company searches and trading volume to predict price, there is more accuracy and a better fit overall.

When looking at the thirty-one percent of the S&P 500 stocks that have a higher multi regression than sum, these stocks tended to have a high-to-moderate inter-correlation between frequency and volume. I found the Pearson correlation coefficient y looking at the linear relationship between the two independent variables. A high-to-moderate inter-correlation is to be expected because these two independent variables are best at predicting price by working together, showing that they have a significant relationship. As the difference between the

multiple regression adjusted R^2 and the sum of the simple regression adjusted R^2's decreased, the inter-correlation became less significant. This decrease means that as the gap declines, so does the strength of the relationship between the two independent variables, frequency of company searches and trading volume.

Observation 2

A pattern that I had noticed and wanted to investigate further dealt with the different sectors in the stock market. I found after further investigation that individual investors are not investing in stocks that are highly predicted using the frequency of company searches and volume. To determine this, I used the percentage of ownership by individual investors for each stock in the S&P 500, and their sector information.

In order to determine which stocks in the S&P 500 were most influenced by individual investors, I had to determine who owned what stocks. In the S&P 500, institutional ownership ranges from two percent to one hundred percent. I took an average of the ownership among every stock in the S&P 500 and found institutional ownership averaged 85 percent. When looking deeper into my results to determine which stocks were most affected by individual investors, I felt that 85 percent was too high to really be affected by individuals.

I completed further research, and found that one of the Commissioners from the Securities and Exchange Commission claimed that in 2009 the 25 largest market valued U.S. corporations had an average of over 60 percent institutional ownership. Further, the top 1,000 market valued U.S. corporations had 73 percent owned by institutional investors. I felt this value was more relevant to my study, and determined that any stock in the S&P 500 that had

less than 73 percent institutional ownership was less dominated by institutional investors. In other words, stocks with less than 73 percent institutional ownership were more influenced by individual investors compared to other stocks in the S&P 500.

In Appendix 3, two separate charts are presented. The chart on the right displays the total amount of stocks in the S&P 500 that have less than 73 percent institutional ownership. This totals 93 companies out of the 500 in this stock index that are more influenced by individual investors. The chart on the left in Appendix 3 shows the total amount of stocks in the S&P 500 that have a higher multiple regression adjusted R^2 than the sum of simple regressions adjusted R^2. This totals 155 companies. I have ordered these graphs according to sectors in order to see what stocks individual investors tend to invest in, and if they are the same as the best performing sectors according to my study.

In Appendix 4, I examine what stocks individual investors are investing in and expecting to perform well, and determine if these stocks actually do. Sectors, such as consumer staples, telecommunication, and utilities tend to be more backed by individual investors. Due to research completed, these sectors tend to be familiar to individual investors and are generally less risky to invest in. When comparing the sectors individual investors are investing in to the sectors in my study that predict price well, these sectors do not line up. For example, the 51.85 percent of utilities stocks in the S&P 500 are less dominated by institutional investors, and consequently, more influenced by individual investors. However, only 18.52 percent of utilities stocks in the S&P 500 have a higher multiple regression adjusted R^2 than sum of the simple regressions adjusted R^2. This shows that the utilities sector is not as highly predicted by frequency and trade by this study, and that individual

investors might have a difficult time making investment decisions in this sector due to the uncertainty.

Appendix 5 shows the sectors that this study predicts well. The chart on the right shows what sectors will perform well due to significant predictions using both independent variables to predict the dependent variable in my study. The sectors I would predict to perform successfully in the market are energy, healthcare, industrials, and telecommunication. But, when looking at the chart on the left and examining the individual ownership per each sector, many individual investors are not investing in these well-performing sectors. For example, only 12.07 percent of healthcare stocks in the S&P 500 are less dominated by institutional investors, but 46.55 percent of stocks in this sector have a higher multiple regressions adjusted R^2 than the sum of the simple regressions adjusted R^2. This is important because the healthcare sector can be best predicted using both the frequency of company searches and trading volume, but many individual investors are not taking advantage of this benefit. Additionally, 22.22 percent of energy stocks in the S&P 500 are less dominated by institutional investors, and more influenced by individual investors. But the energy sector in the S&P 500 has a 41.67 percent higher multiple regression adjusted R^2 than sum of simple regression R^2, which shows that the energy sector can best be predicted using both of the independent variables.

Through Observation 2, I was able to see what sectors were more influenced by individual investors, and, consequently, can see which sectors can best predict price. This is interesting because the sectors that are less dominated by institutional investors tend not to be as significant when predicting price using both of the independent variables. Further research would have to be completed to examine why these sectors do not predict price as well,

compared to the other sectors in the S&P 500. Additionally, one should see if individual investors truly account for why these stocks aren't as highly predicted. Following my research and hypothesis, I would argue individual investors are one of the many driving factors in the volatility of stock prices because they are not investing in sectors that are highly predicted.

Observation 3

When looking further into the simple regression results, I noticed that many adjusted R^2 values were not significant. Moreover, almost every pair of simple regressions had one significant R^2 value, while the other was not. In Observation 3, I saw that only 17 companies, out of the entire S&P 500, had both significant adjusted R^2 values over 30 percent. A significant R^2 shows that the variable explains a good amount of discrepancy when predicting the dependent variable. With so few companies producing both significant values, I wanted to look at the sector information. I found that 6 out of the 17 companies were Information Technology companies. I conclude that Information Technology companies in the S&P 500 tend to have significant simple regression coefficient of determination, which tends to explain away more variability when predicting price.

LIMITATIONS AND FUTURE RESEARCH

When completing a project of this scope, I had to determine a stock index to use in order to fully encompass the nature of the market. I decided to use the S&P 500 because it

includes a variety of well-performing stocks with different market capitalizations and sector information. To make this study more robust in the future, I would urge one to look at other stock indices, such as the Russell 3000 or Wilshire 5000. I believe these indices might provide similar results, but regardless will help to provide more research surrounding the topic of investor attention in the stock market.

Additionally, I decided to use a five year time period from February 2012 to February 2017. I decided to use this five year term to have a long enough time period for individual stocks to be able to bounce back after significant, negative news releases or positive company outcomes. I wanted to ensure I gathered "normal" stock movement data, and I felt that I needed to use a long enough time period to reflect any company changes. In future research, one could look at a longer or shorter time period. This might provide similar or different results, but would ultimately shed greater light on my findings. Further, I used recent years where the economy has been relatively stable with wavering optimism. It would be interesting to look at different time periods, like during the 1990s and early 2000s, when there was high financial optimism, and the stock market was brimming with popularity. Also, looking at the years 2007 and 2008 during the stock market crash would be interesting to see if investor attention affected some of the chaos in the market. I believe that looking at different time periods might provide similar results to my study and will help to better view investor attention in the market.

I used weekly compiled data throughout my study in order to see the effects of frequency and volume on price. I believe daily data might produce a more accurate result when looking at investor attention and volume due to the daily decisions an investor has to make in their portfolio. While weekly data does produce the result I was looking for, I

believe intraday trading and attention paid to a company would result in more precise measures of investor attention. Future research should look into this claim and examine the differences between weekly compiled data and daily data.

CONCLUSION AND DISCUSSION

In summary, I have found that frequency of searches tends to produce a higher adjusted R^2 than the trading volume. This occurred in 55 percent of S&P 500 stocks, so frequency is only a slightly better predictor than trading volume. When combined together, frequency and trading volume work well together to best predict price. It is important for individual investors, because they have fewer resources and time when making investment decisions, to use these two factors when investing to truly maximize their expected returns.

Additionally, I found that investors are investing in sectors they are familiar with, like Utilities and Consumer Staples sectors. However, these sectors do not seem to be best predicted using frequency of searches and trading volume. Sectors, like Healthcare and Energy, are best predicted using frequency and volume, but individual investors do not tend to invest in these sectors. There could be a deeper, underlying issue here that individual investors are so heavily influencing sectors, like Consumer Staples and Utilities, that these sectors are no longer predictable. Investment advice would show that individual investors should focus on specific sectors this study produced, such as Healthcare and Energy sectors, to truly invest in better predicted stocks.

Lastly, I saw that very few companies in the S&P 500 produced two significant simple regressions adjusted R^2 values, showing that only one of the independent variables was

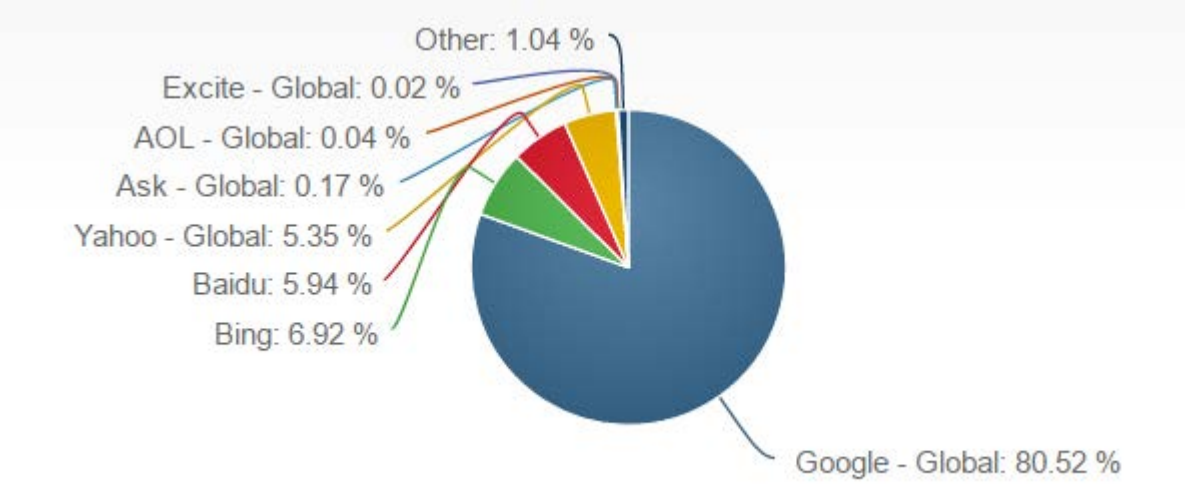
really working to predict price. Only 17 companies out of 500 in this stock index produced significant values. Moreover, 6 out of the 17 were Information Technology companies. This shows that frequency and volume are important factors in explaining price in IT companies and can help best predict price. More research should be completed in this sector to see if most IT companies follow this trend.

In conclusion, when an individual investor is trying to make an important investment decision and maximize their portfolio's earnings, they should look at the intercorrelation between frequency of company searches and trading volume. If the intercorrelation is moderate to highly intercorrelated, the relationship between independent variables is strong and will, therefore, better predict the dependent variable. Some of the volatility will be eliminated by using both independent factors to predict price. Additionally, sectors that are highly influenced by individual investors tend to not predict price as well as sectors that are more dominated by institutional investors. It is important to note that individual investors might be a driving factor in this variation, but individual investors can benefit from this disparity by switching to highly dominated institutional investor stocks.

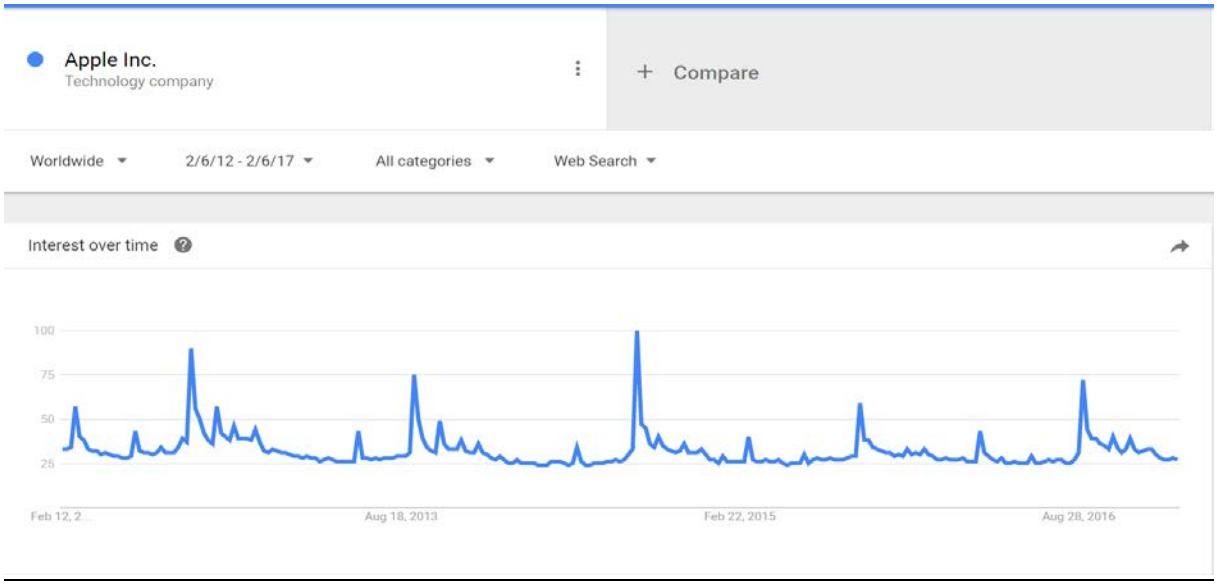
With wavering financial optimism and younger investors in the market, stock prices seem to be unpredictable. However, significant factors surrounding investor attention, such as the frequency of company searches and trading volume, can possibly lead to stronger price predictions in the future. Researcher Tijmen Kampan claims that "being able to explain the returns might give you a better idea about how the stock will perform in the future." With extended research and future outlooks on the involvement of investor attention in stock prices, individual investors could make stronger investment decisions and help improve predictability of the market.

APPENDICES

Appendix 1



Appendix 2A



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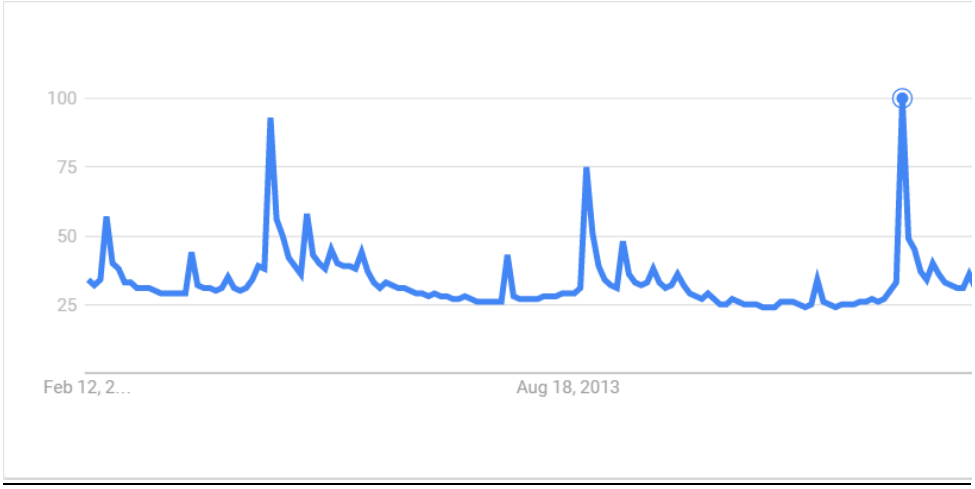

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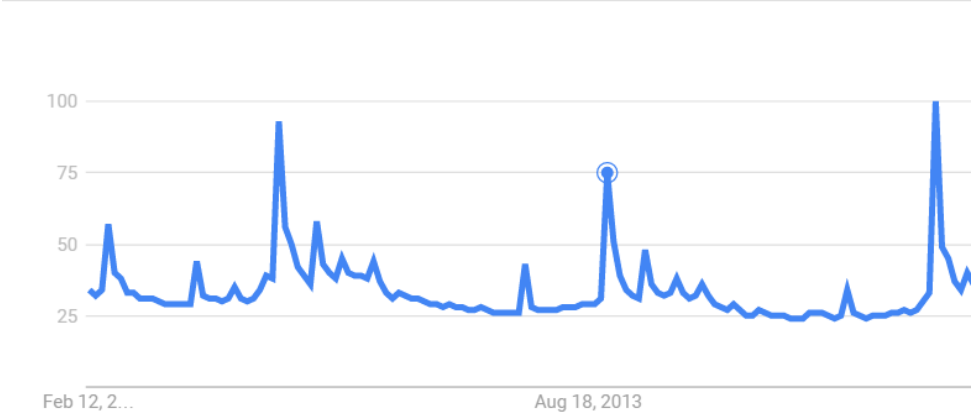

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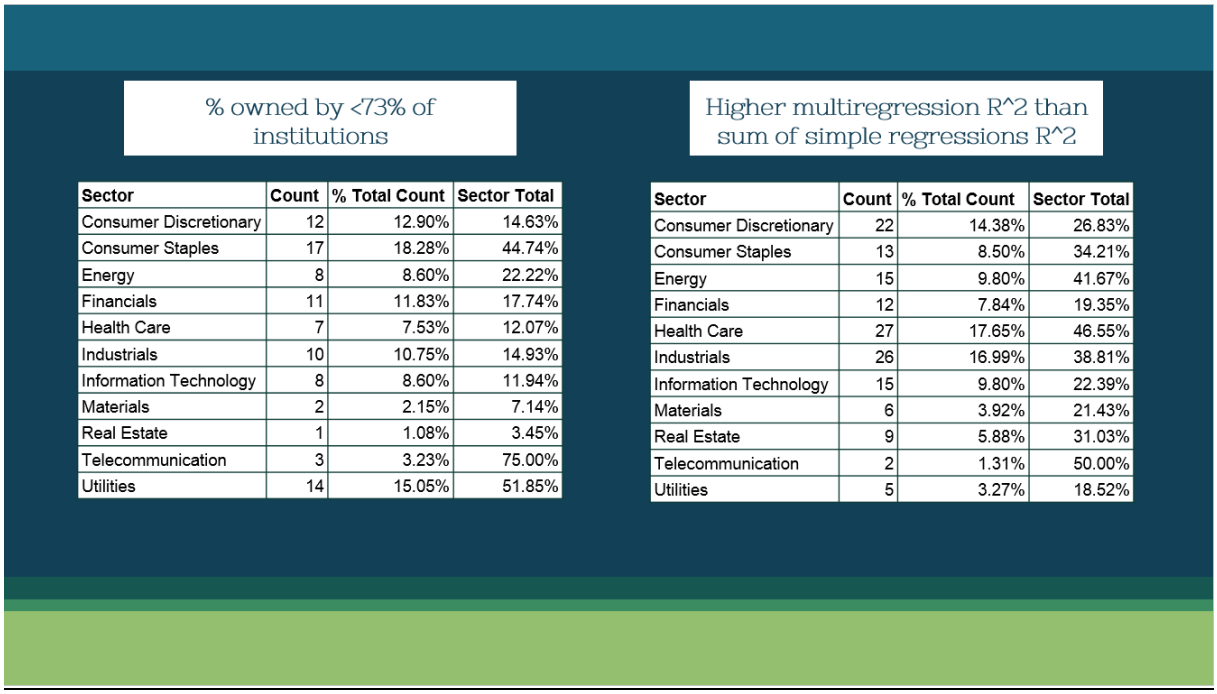
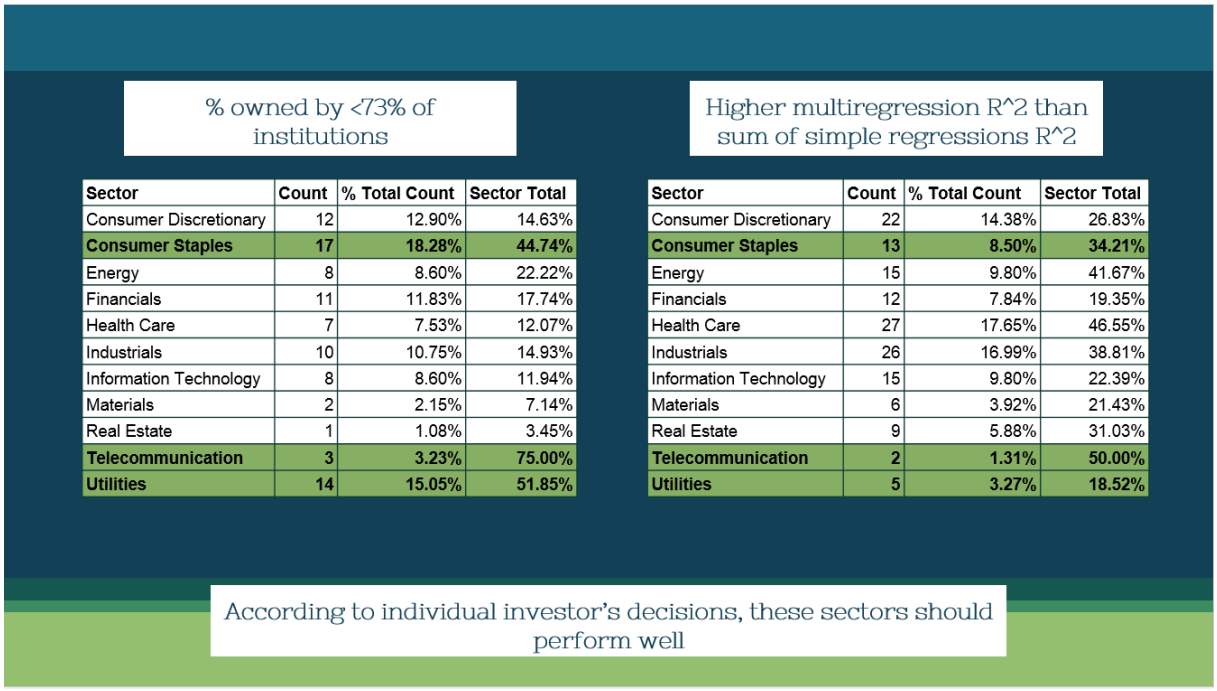


Sector	Count	% Total Count	Sector Total
Consumer Discretionary	12	12.90%	14.63%
Consumer Staples	17	18.28%	44.74%
Energy	8	8.60%	22.22%
Financials	11	11.83%	17.74%
Health Care	7	7.53%	12.07%
Industrials	10	10.75%	14.93%
Information Technology	8	8.60%	11.94%
Materials	2	2.15%	7.14%
Real Estate	1	1.08%	3.45%
Telecommunication	3	3.23%	75.00%
Utilities	14	15.05%	51.85%

Sector	Count	% Total Count	Sector Total
Consumer Discretionary	22	14.38%	26.83%
Consumer Staples	13	8.50%	34.21%
Energy	15	9.80%	41.67%
Financials	12	7.84%	19.35%
Health Care	27	17.65%	46.55%
Industrials	26	16.99%	38.81%
Information Technology	15	9.80%	22.39%
Materials	6	3.92%	21.43%
Real Estate	9	5.88%	31.03%
Telecommunication	2	1.31%	50.00%
Utilities	5	3.27%	18.52%

Appendix 4



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Materials	2	2.15%	7.14%
Real Estate	1	1.08%	3.45%
Telecommunication	**3**	**3.23%**	**75.00%**
Utilities	**14**	**15.05%**	**51.85%**

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Consumer Discretionary	22	14.38%	26.83%
Consumer Staples	**13**	**8.50%**	**34.21%**
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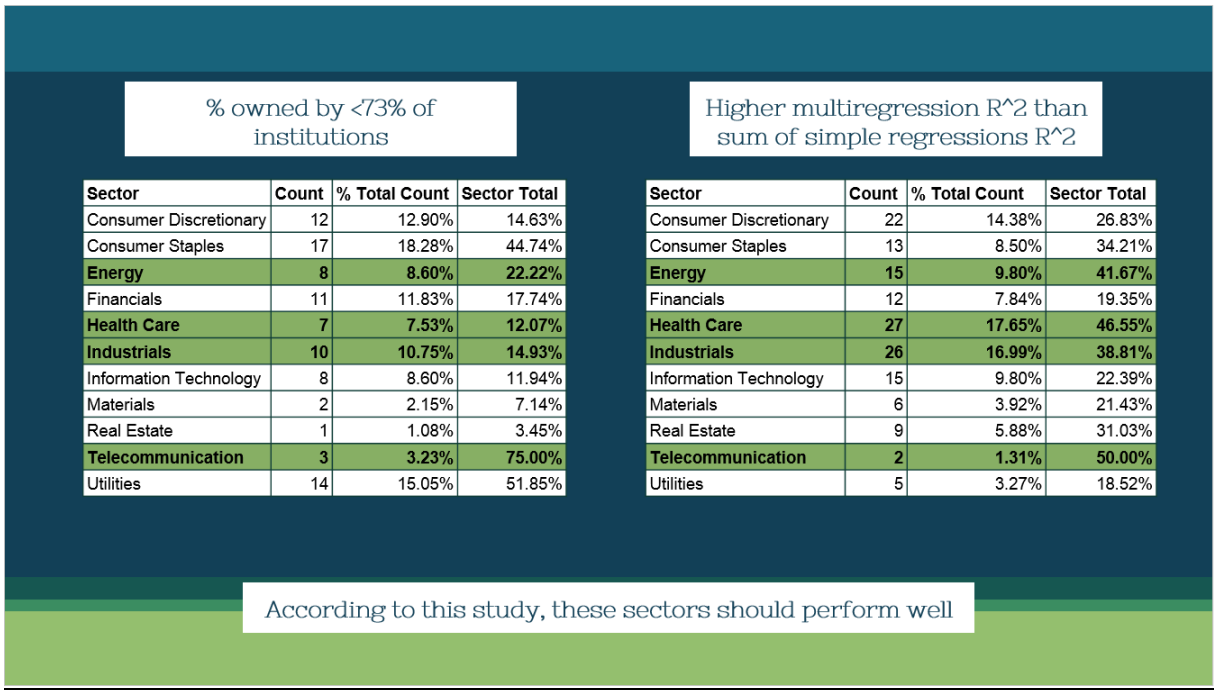
Real Estate	9	5.88%	31.03%
Telecommunication	**2**	**1.31%**	**50.00%**
Utilities	**5**	**3.27%**	**18.52%**

Appendix 5



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Telecommunication	**2**	**1.31%**	**50.00%**
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