Explaining Excess Stock Return Through Options Market Sentiment

The Honors Program

Senior Capstone Project

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ABSTRACT

Option markets are a fascinating area of study and in recent years research has indicated that information obtained from the options market can be used to explain price returns in the underlying stock market. Building on existing asset pricing models such as the Fama-French Three Factor, Carhart Four Factor, and Fama-French Five Factor Models, this research tests if the put to call ratio can be used as an additional factor in explaining excess returns. Ordinary least squares models are run on all Dow Jones 30 stocks using more than ten years of data and the model results are compared. The results conclude that in a majority of cases, asset pricing models which include the ratio of put options to call options better explain excess stock returns than models which do not include information from the options market. These results provide supporting evidence that information from the options market contains valuable information into underlying stock price performance.

INTRODUCTION

Equity options are derivative securities which allow the owner the right, but not the obligation, to buy or sell an underlying asset. Their unique characteristics allow investors to structure trades which cannot be replicated through traditional stock trading. Put options provide the owner the right to sell an underlying security at a specific price and call options provide the owner the right to buy a security at a specific price, within a certain time frame. Due to these desirable characteristics, option markets have seen impressive growth over the last several years including the release of weekly option contracts, long term equity appreciation contracts, and extended trading hours.

Their small complexities have also led researchers to investigate if information from the options market can be used to explain future movements in the underlying security.

Some of the earliest research into the information value of equity options began in 1981 with Patell and Wolfson who found that call option prices reflect investors' anticipation of forthcoming earnings announcements and that investors could attempt to estimate the magnitude of a price change using the options market. Patell and Wolfson's research served as a starting point for further research into the information quality of options markets. Donders, Kouqenberg, and Vorst confirmed previous research when they found option volume to be higher around earnings announcement days and hypothesized that option traders might have possibly short lived private information (2000). Additionally, they proclaim that information from the options market contains value because of the inherent leverage affect inherent in options. Each option contract contains the right to one hundred underlying shares, thus informed traders may prefer to trade stock options as opposed to the underlying stock.

These findings were expanded beyond earnings announcements and volume by Poteshman and Pan who observed the ratio of put to call options traded for a given security. They found that stocks with low put-call ratios outperformed those with high put-call ratios (2004). If a put option represents a bearish trade, and a call option a bullish trade, then the ratio of put options to call options could serve as an indicator of trader sentiment. If the ratio is high, then informed traders are bearish on the underlying and purchase more put options. If the ratio is low, then investors are trading more call options which could be indicative of a bullish movement in the underlying security. It is now very common to hear financial media outlets reference the put to call ratio when discussing investor sentiment on the market.

Ten years after the publication of Pan and Poteshman's research, Blau, Nguyen and Whitby re-affirmed Poteshman and Pan's findings. They again found that put-call ratios contain predictability about future daily returns and to some extent, future weekly returns. The primary reason for this explanatory power is that informed investors prefer to trade derivatives because of their inherent leverage. This prior research laid the foundation and inspiration for the research in this report. With validation that option markets contain information relating to price action, this paper investigates whether the put to call ratio can be used to improve existing asset pricing models to further explain excess returns for individual equities.

Asset pricing models first gained traction in the 1960s with the emergence of the Capital Asset Pricing Model from Treynor, Sharpe and Lintner. The model considered an asset's sensitivity to non-diversifiable risk as well as the expected return of the market and a theoretical risk-free asset. This model served as the boiler plate for future models which

included more and more factors attempting to explain excess stock return, defined as a stocks' return less the risk-free interest rate. The first of these prominent models that expanded upon the CAPM model was the Fama-French Three Factor Model.

The Fama-French Three Factor model aimed to explain the excess return of a stock using an overall market factor and factors which relate to the size of the firm and the book-to-market value of the firm (1992) This model drastically improved the Capital Asset Pricing Model and during the time of the its release was able to explain roughly eighty percent of a stock's excess return. A few years later the model was improved again using an additional factor.

In 1997 Mark Carhart proposed an additional factor be added to the Fama-French Three Factor Model; momentum. He demonstrated that funds with high returns in the previous year have higher-than-average expected returns for the current year. This insight provided an additional factor to help explain excess stock returns and encouraged researchers to look beyond traditional valuation metrics.

Then several years later, Fama and French proposed a five-factor asset pricing model. Building off the original Three Factor Model they included factors for profitability and investment. The authors wrote "with the addition of profitability and investment factors, the value factor of the FF three-factor model becomes redundant for describing average returns in the sample we examine" (2014).

This research builds off the findings from option researchers that information from the options market can be used to explain asset returns and combines that fact with existing asset pricing models to test whether information regarding the put call ratio improves the accuracy of these models. Incorporating the put to call ratio of an assets' options allows pricing models to

include a measure of investor sentiment, a critical factor to consider as Donders, Kouwenberg and Vorst wrote, "the options market is more informative than the stock market" (2000). The empirical results from this study strongly indicate that incorporating the put to call ratio improves existing asset pricing models when explaining excess return.

This research also encourages further investigation into the quality of information represented in the options market. Beyond looking at the volume of put and call options trading researchers may wish to consider the number of contracts sold versus the number of contracts purchased, or the strike price at which most options are being traded. These avenues could further explain the direction of a stock's movement or the magnitude of a price movement prior to a pre-determined event like an earnings call.

LITERATURE REVIEW

A plethora of research has been published observing the dynamics of option markets and their relation to the underlying asset. The earliest of this research stems from James Patell and Mark Wolfson who conducted an analysis of pre-earnings announcements option prices and discussed the relationship between stock and option prices (1981). From there, a multitude of research was released relating to option prices and earnings announcements, the implied volatilities of options on equity returns, and option specific ratios and equity performance. All of these ideas form the foundation for this research which investigates the relationship between the ratio of put to call options traded and underlying asset price performance.

In their research, James Patell and Mark Wolfson analyzed preannouncement option prices in order to discern investors' beliefs. After their analysis, they conclude that "the average standard deviations to expiration implied by preannouncement option prices exhibit a time-series profile which anticipates the stock price behavior. Furthermore, the correspondence between option and stock price measures may extend to ordinal properties; larger realized stock price changes appear to be preceded by larger increases in implied average standard deviations" (1981). Thus, investors could attempt to estimate the magnitude of an underlying's price change related to an earnings announcement by observing characteristics in the options market.

One area of concern for Patell and Wolfson's study is their relatively small sample size. The researchers only used fourteen months of data for 96 different securities. Although the researchers viewed quarterly earnings announcements for 96 companies, markets change over

time and it is all too easy to encounter trends by chance. This research report eliminates that concern by studying more than ten years of financial data for thirty underlying securities. The conclusions found in Patell and Wolfons's study was revisited on multiple occasions. One such report by Monique Donders et al confirmed the relationship between option prices and expected post-earnings price movements. The authors conclude that "trading volume in options reacts both faster and stronger to earnings announcements than stock volume. This shows that investors not only anticipate price-reactions in the underlying stock using the leverage of options contracts, but also place volatility-bets" (2000). Donders et al also determine a broader conclusion; "the options market is more informative than the stock market". They attribute that options market to be more informative than the stock market for three reasons.

1. The leverage affect; Each option controls the right to buy or sell one hundred shares of the underlying security.
2. Trading in options can overcome possible short selling restrictions.
3. Open interest is endogenous as opposed to the number of shared.

After discovering that action in the options market can be used to forecast the magnitude of stock movements prior to earnings announcements, researchers dove deeper into the options market, investigating the impacts of options volume on equity returns. David Easley et al found that negative and positive option volumes contain information about future stock prices (1998). Following Easley, Rafiqul Bhuyan and Mo Chaudhury discovered findings that support those of Easley. Although Bhuyan and Chaudhury critically evaluate the assumptions made by Easley (1998), after running a series of trading strategy simulations, they find that

"non-price measures of activity in the derivatives market such as the open interest contain information about the future level of the underlying asset" (2001). Similar to the research by Patell and Wolfson, the sample size for their study was relatively small.

Bhuyan and Chaudhury utilized CBOE options data for 30 companies from February through July of 1999. Similarly, Easley only examined 50 stocks from October to November of 1990. Neither research paper clarifies why the time frame is so short. This is concerning because financial markets rapidly adjust to eliminate trading advantages and the findings from 1999 and 2001 could be outdated.

After assessing broad measures of option volume, such as open interest, researchers looked at more granular metrics in the options marketplace to better evaluate the quality of information. Rather than just looking at the total amount of options traded, Jun Pan and Allen Poteshman separated option volume into its two components, put option volume and call option volume. Breaking volume into sub components allowed Pan and Poteshman to separate volume into bullish (call) and bearish (put) demand. Using this information, they constructed a put to call ratio to gauge option trader sentiment (2003).

In addition to looking at more granular option metrics, Pan and Poteshman also expanded their sample period. They used daily records of trading volume activity for all CBOE listed options from the beginning of January 1990 through the end of 2001. Beyond this, the data they used was also defined by four trade types: open buys, open sells, close buys, and close sells. Improving the quality observations allowed the researchers two key advantages.

1. It allowed the researchers to know the "sign" of the trading volume which had previously been inferred using an equation.

2. It allowed the researchers to know whether a position was being opened or closed, a key difference in trade strategy.

The research by Pan and Poteshman served as a large stepping stone in the study of equity and index options because it paved the way for longer term option related studies, and also pushed the research to a more granular level in uncovering the relationship between option and stock markets.

The most recent research related to this paper assesses the information content of option ratios in equity performance by Benjamin Blau et al (2014). The basis of their research is to build off previous research from Pan and Poteshman (2006) and Johnson and So (2012) who demonstrated that certain option ratios can be used to predict underlying stock returns. Blau et al updated the previous tests by comparing the predictive powers of the put to call ratio and the option-to-stock volume ratio (O/S), first tested by Johnson and So (2012). The sample data ranges from 1996 – 2012 and contains data on nearly 2,000 stocks. As the most recent, and extensive study so far, their results carry a lot of weight. The results of Blau et al conclude that the put to call ratio contains more predictability about future stock returns at the daily level while the option to stock volume ratio contains more predictive power at weekly and monthly levels.

This prior research that the option market contains valuable insight into stock performance validates the original claim made by Black in 1975; informed traders will prefer to trade options. The research in this paper builds off previous researchers by adding the put to call volume ratio, as a metric of investor sentiment, to existing asset pricing models to better explain excess return for all Dow Jones 30 Stocks over the previous ten years.

RESEARCH METHODOLOGY

The analysis portion of this project utilizes the Python programming language and a variety of open source packages including Pandas, NumPy, Matplotlib, and Statsmodels. These packages support a variety of tools for data analysis, visualization, and statistical testing. Python allows for user defined functions and quicker testing for a variety of models. Using functions and the pre-defined models defined in Statsmodels I am able to quickly test a multitude of different models.

To test the hypothesis that the put to call ratio can be used to improve existing asset pricing models this research will follow the framework by Fama and French who originally tested their explanatory factors on excess returns. This research runs several models, the Fama French Three Factor, Carhart Four Factor, and Fama French Five Factor Models, comparing them to the Fama French Three Factor + put to call ratio and Fama French Five Factor + put to call ratio. In all cases, the models are compared by observing the adjusted R2 for each model.

DATA COLLECTION

This study is designed to compare different asset pricing models on a variety of equity underlying's and determine if the volume of put to call options traded provides any insight into explaining excess stock return. Two primary sources of data are used for the tests; data for the underlying stock price and put to call option volume and data for the previous asset pricing models. Data for the underlying stock prices and their respective put to call ratios was obtained via a Bloomberg Terminal. Price and put to call option volume was downloaded for all Dow Jones Industrial Average 30 stocks. The securities tested in the analysis can be seen in Table 1.

The Boeing Company (BA)	The Goldman Sachs Group, Inc. (GS)	3M Company (MMM)	UnitedHealth Group Incorporated (UNH)	The Home Depot, Inc. (HD)
Apple Inc. (AAPL)	International Business Machines Corporation (IBM)	McDonald's Corporation (MCD)	Caterpillar Inc. (CAT)	The Travelers Companies, Inc. (TRV)
Johnson & Johnson (JNJ)	United Technologies Corporation (UTX)	Visa Inc. (V)	JPMorgan Chase & Co. (JPM)	Chevron Corporation (CVX)
The Walt Disney Company (DIS)	American Express Company (AXP)	Microsoft Corporation (MSFT)	Walmart Inc. (WMT)	The Proctor & Gamble Company (PG)
Exxon Mobil Corporation (XOM)	DowDuPont Inc. (DWDP)	NIKE, Inc. (NKE)	Merck & Co., Inc. (MRK)	Intel Corporation (INTC)
Verizon Communications Inc. (VZ)	The Coca-Cola Company (KO)	Cisco Systems, Inc. (CSCO)	Pfizer Inc. (PFE)	General Electric Company (GE)

Table 1 Stocks Used in Analysis

The underlying stock prices and respective put to call ratios data was downloaded for the generic date range January 2nd, 1980 until March 6th, 2018. This created a data set with some older companies like IBM having price data from 1980 but other such as AAPL not having price data until 1982. Additionally, not all companies had data for the put to call volume ratio available for the same period. This misalignment of data was corrected for prior to running the models and is explained in the Model Specifications section.

Data for the traditional asset pricing models was obtained through the Kenneth French Data Library website hosted by Dartmouth College. Values for the Fama French Three Factor, Carhart Four Factor, and Fama French Five Factor models ranged from July 1st, 1963 to July 31st, 2017. These factors, as explained in the literature by Fama, French, and Carhart are market risk, small minus big, book to market value, momentum, profitability, and investment. These factors are holistic and can be used to explain excess returns for any security. Thus, this research combined the general asset pricing factors with the specific underlying's put to call volume ratio to provide deeper insight into the stock's price performance.

MODEL SPECIFICATIONS

The models used in this research were the Fama French Three Factor, the Carhart Four Factor, and the Fama French Five Factor. These models were tested on each of the thirty underlying securities for each stock's unique data range and the adjusted R squared values were compared. The higher the adjusted R squared value, the better the model was in explaining excess returns for that stock. The traditional asset pricing model specifications are as follows:

Fama French Three Factor Model:

$$R = (r_m - r_{rf})b_1 + r_{SMB}b_2 + r_{HML}b_3$$

Carhart Four Factor Model:

$$R = (r_m - r_{rf})b_1 + r_{SMB}b_2 + r_{HML}b_3 + r_{Mom}b_4$$

Fama French Five Factor Mode:

$$R = (r_m - r_{rf})b_1 + r_{SMB}b_2 + r_{HML}b_3 + r_{RMW}b_4 + r_{CMA}b_5$$

The variables for each model are defined as:

R = Excess Return

$(r_m - r_{rf})b_1$ = Market Risk

r_{SMB} = Small Minus Big

r_{HML} = High Book/Market Value

r_{Mom} = Momentum

r_{RMW} = Profitability

r_{CMA} = Investment

These traditional asset pricing models were then compared to models which contained the put to call option volume ratios for the underlying security. The two models which includes the put to call option volume ratios are as follows:

Fama French Three Factor Model + PC Ratio:

$$R = (r_m - r_{rf})b_1 + r_{SMB}b_2 + r_{HML}b_3 + r_{PC}b_4$$

Fama French Five Factor Model + PC Ratio:

$$R = (r_m - r_{rf})b_1 + r_{SMB}b_2 + r_{HML}b_3 + r_{RMW}b_4 + r_{CMA}b_5 + r_{PC}b_6$$

Where r_{PC} represents the put to call ratio of the underlying security.

Each model was run using the ordinary least squares method in the Python Statsmodels package. No missing values were contained in each model and the data was merged to align dates and values. This method of alignment was used for both models with and without the put to call ratio to ensure identical samples when comparing models. The Python script used to perform these tests can be seen in Figures 1 and 2.

Import Libraries

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import statsmodels.api as sm
%matplotlib inline
```

Read In the Equities and Factors Data

```
# Read in Factor Data
factors = pd.read_csv('Factors.csv')

# Reclassify 'Date' to a date time object
factors['Date'] = pd.to_datetime(factors['Date'], format = "%Y%m%d")

# Change format from Y/m/d to m/d/Y
factors['Date'] = factors['Date'].dt.strftime('%m/%d/%Y')

# Read in Equity Data
equities = pd.read_csv('new_djia_pc_data.csv')
equities['Date'] = pd.to_datetime(equities['Date'], format="%m/%d/%y")
equities['Date'] = equities['Date'].dt.strftime('%m/%d/%Y')
```

Figure 1

Define a Function to Run the Analysis

```
def runAnalysis(equity, xvars, factors=factors, equities=equities):

    # Build new dataframe with specific equity data
    df = pd.DataFrame(data = [equities['Date'],
                              equities['{}_Price'.format(equity)],
                              equities['{}_Total Call Open Interest'.format(equity)],
                              equities['{}_Total Put Open Interest'.format(equity)],
                              equities['{}_Put Call Volume Ratio - Current Day'.format(equity)]]).transpose()
    df.rename(columns={'{}_Put Call Volume Ratio - Current Day'.format(equity): '{}_PC'.format(equity)}, inplace=True)
    df = pd.merge(df, factors, on='Date', how='left')
    df.dropna(subset=['{}_PC'.format(equity)], inplace=True)
    df.dropna(subset=['{}_Price'.format(equity)], inplace=True)

    # Calculate equity return and excess return
    df['return'] = df['{}_Price'.format(equity)].pct_change(1)
    df['xreturn'] = (df['return'] - df['RF'])

    # Drop the first row...
    df.dropna(subset=['xreturn'], inplace=True)

    # Build, fit, and print the model results
    y = df['xreturn']
    X = df.iloc[:,variables]
    X = sm.add_constant(X)

    model = sm.OLS(y.astype(float), X.astype(float)).fit()
    print(equity,"Model")
    print(df['Date'].min(), '-', df['Date'].max())
    print(model.summary(),'\n')
```

Figure 2

INTERPRETATION OF MODEL RESULTS

For easier interpretation, the results of comparison models are represented by clustered column charts. In Figure 3 the x-axis contains the individual securities, and the y-axis contains the adjusted R squared values for each model. For the time period and stocks tested, the traditional Fama-French Model + PC Ratio outperformed the traditional Fama-French Model 100% of the time. Additionally, in 66% of the cases the Fama-French Model + PC Ratio outperformed the Carhart Four Factor Model.

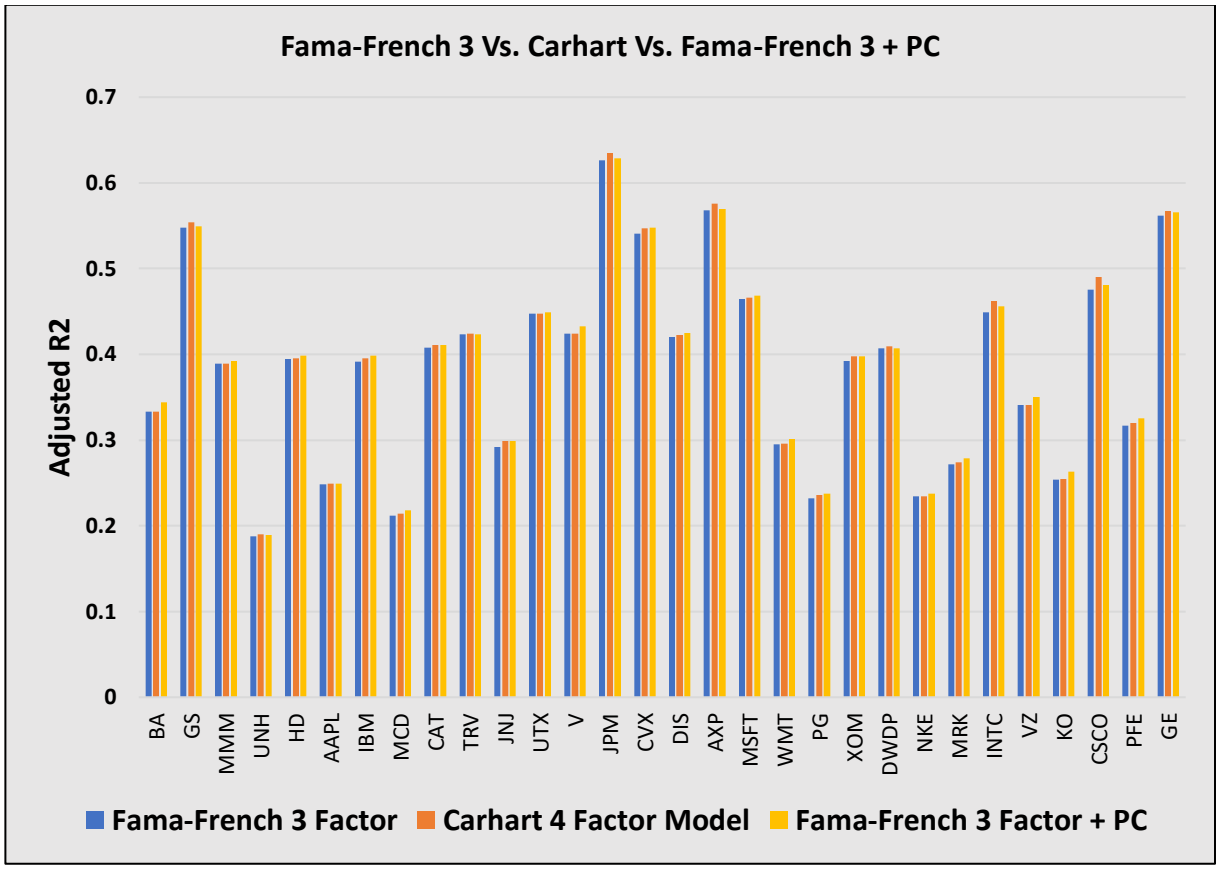

Figure 3 Adjusted R2 of Fama French Three Factor, Carhart, and Fama French Three + Put Call Ratio

The explanatory power of the put to call option volume ratio is also seen when comparing the Fama-French Five Factor models. As can be seen in Figure 4, the Fama French Five Factor + PC Ratio outperformed the traditional Fama French Five Factor Model in 100% of the tests.

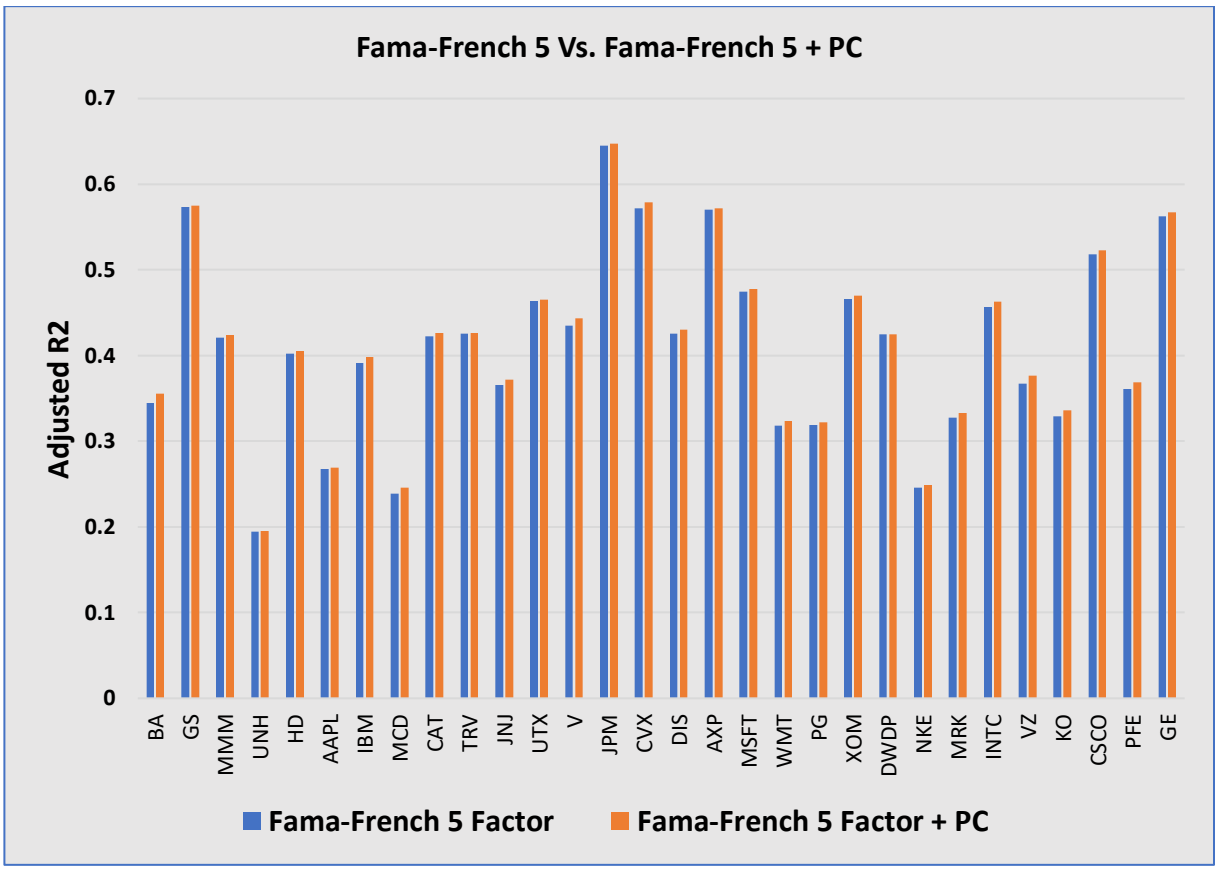

Figure 4 Adjusted R2 of Fama French Five Factor and Fama French Five + Put Call Ratio

The results can be seen most clearly in Figure 5 which represents just the differences in adjusted R squared values for models. Each column represents the difference between the adjusted R squared for models with and without the put to call volume ratio. In other words, when the value is greater than zero the model with the put to call ratio outperformed the model not including the ratio. For consistency, the same models are compared as in the

previous section. In the vast majority of cases models which included the put to call ratio outperformed those that failed to include this factor.

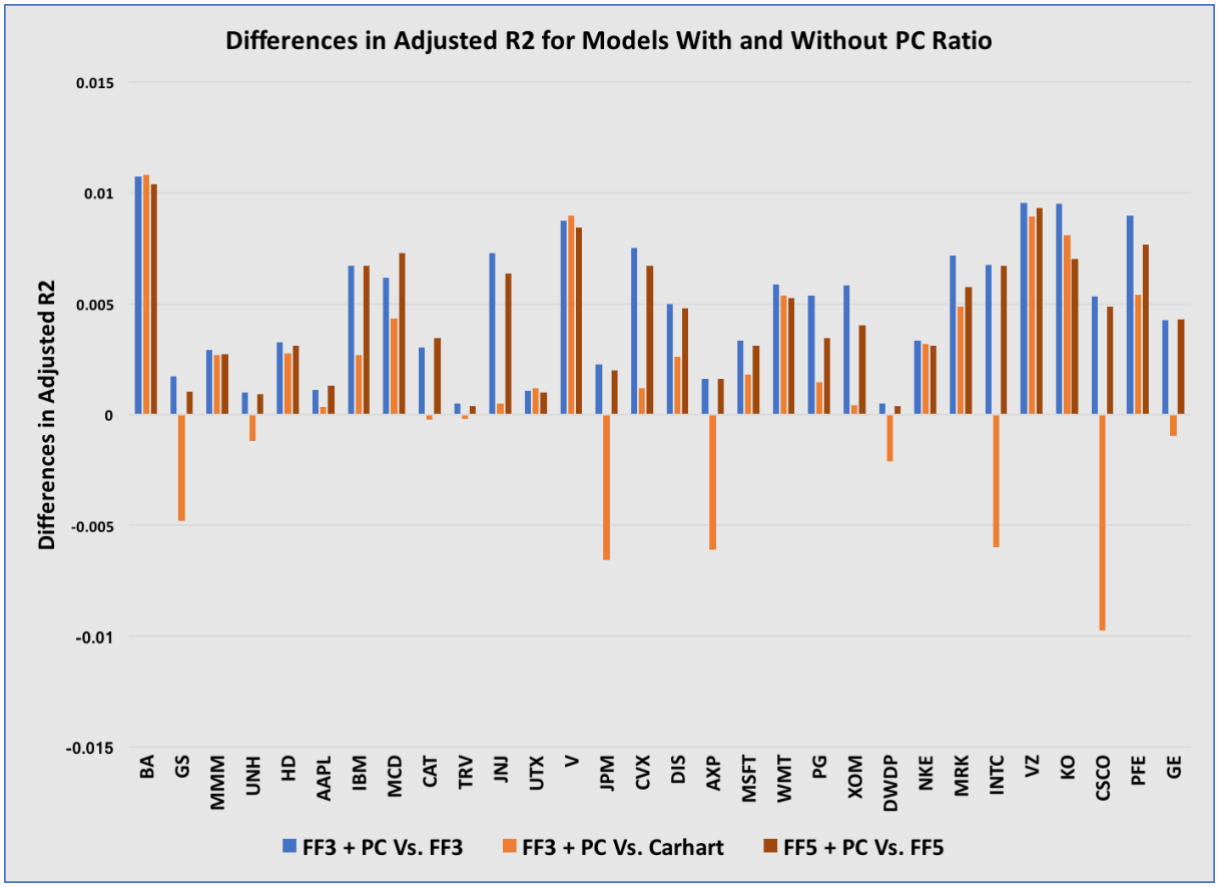

Figure 5 Differences in Adjusted R Squared Values

These results build on the belief that information from the options market can be used to better explain price performance in the underlying security. Another important detail is that the coefficient for the put to call ratio aligns with the theoretical models. In theory, practice, and financial media, the put to call ratio is viewed as a sentiment indicator. The higher the put to call ratio, the more bearish investors are about the stock's future price performance. This trend is seen in Figure 6 which plots the put to call ratio on the x-axis and excess return on the

y-axis. The higher the put to call ratio, the lower the excess return. Although this figure only represents the put to call ratio and excess return for Boeing, the same shape holds true for all thirty underlying securities.

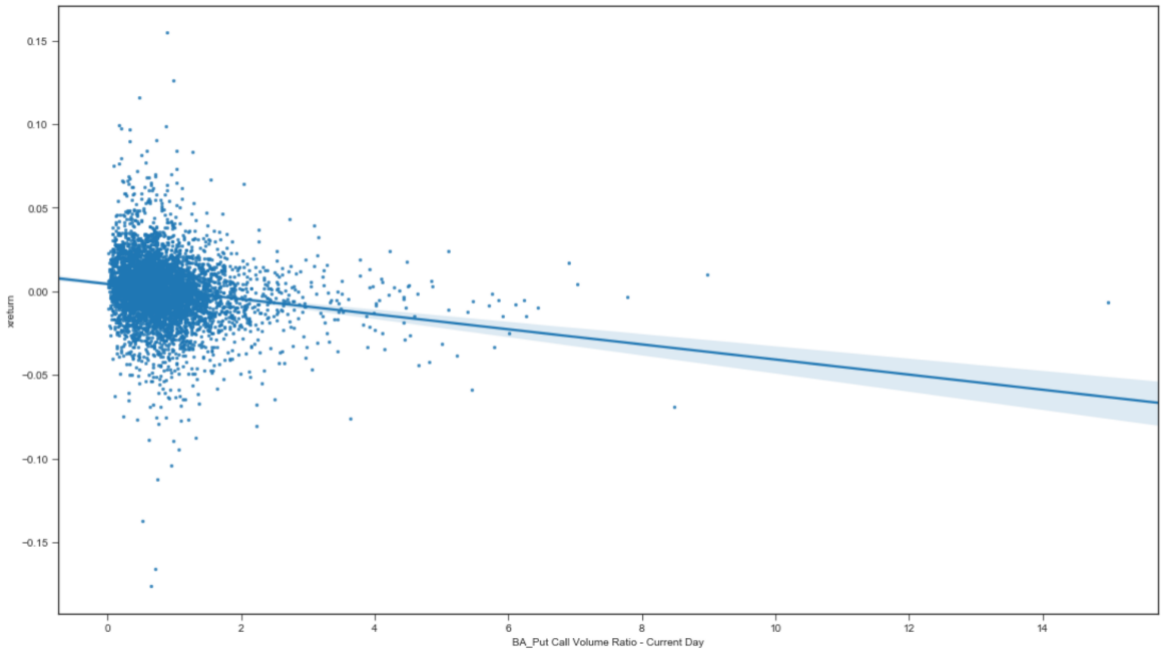

Figure 6 Put to Call Ratio Versus Excess Returns for BA

This relationship between the put to call ratio and excess returns is also demonstrated in the Statsmodels model summary for both the Fama French Three Factor + PC and the Fama French Five Factor + PC models. As seen in Figure 7 and Figure 8, the coefficient for the put to call ratio is negative, signifying a negative relationship between the put to call ratio and excess return. Additionally, the relationship is statistically significant per the parameters p value.

BA Model
01/02/1996 - 12/31/2015

OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.345
Model:	OLS	Adj. R-squared:	0.344
Method:	Least Squares	F-statistic:	722.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	20:55:07	Log-Likelihood:	15035.
No. Observations:	5505	AIC:	-3.006e+04
Df Residuals:	5500	BIC:	-3.003e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0026	0.000	7.775	0.000	0.002	0.003
Mkt_rf	0.9195	0.018	51.427	0.000	0.884	0.955
SMB	-0.0436	0.035	-1.240	0.215	-0.113	0.025
HML	0.1749	0.033	5.305	0.000	0.110	0.240
BA_PC	-0.0028	0.000	-9.534	0.000	-0.003	-0.002

Omnibus:	809.584	Durbin-Watson:	1.976
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12483.258
Skew:	-0.076	Prob(JB):	0.00
Kurtosis:	10.376	Cond. No.	238.

Figure 7 Fama French Three Factor + PC Model Results for BA

BA Model
01/02/1996 - 12/31/2015

OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.356
Model:	OLS	Adj. R-squared:	0.355
Method:	Least Squares	F-statistic:	506.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	20:55:55	Log-Likelihood:	15084.
No. Observations:	5505	AIC:	-3.015e+04
Df Residuals:	5498	BIC:	-3.011e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0025	0.000	7.369	0.000	0.002	0.003
Mkt_rf	1.0174	0.020	49.871	0.000	0.977	1.057
SMB	0.0142	0.037	0.382	0.702	-0.059	0.087
HML	0.0092	0.038	0.243	0.808	-0.065	0.084
BA_PC	-0.0028	0.000	-9.472	0.000	-0.003	-0.002
RMW	0.2680	0.049	5.419	0.000	0.171	0.365
CMA	0.4353	0.060	7.293	0.000	0.318	0.552

Omnibus:	842.791	Durbin-Watson:	1.979
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13665.523
Skew:	-0.128	Prob(JB):	0.00
Kurtosis:	10.714	Cond. No.	438.

Figure 8 Fama French Five Factor + PC Model Results for BA

CONCLUSION

Potential Research Issues

This research paper compared the explanatory power of varying asset pricing models for thirty underlying securities, each containing more than ten years of daily price data. Although this is one of the more extensive investigations of the explanatory power of the put to call ratio, there are still some areas of the test which could be expanded upon and require additional attention.

The primary concern of this research is the sample size of the test. The number of underlying securities tested is only thirty. This list could be expanded to include all S&P 500 companies. Additionally, although this list contains thirty of the largest companies in the United States, no attention was given to the liquidity of each respective securities' option market. Informed traders may prefer to trade liquid products, and not screening the underlying stocks for a given liquidity threshold could have led to adverse model results.

Future Areas for Research

The results of this research are clear; the put to call ratio of an underlying asset does contain information into that assets excess return. However, a variety of additional tests could be performed to further understand this dynamic.

Firstly, the data could be partitioned into smaller sections. As financial markets are dynamic it would be interesting to see the explanatory power of the put to call ratio over the last two years relative to the last ten years. Perhaps the explanatory power has decreased as markets become more efficient.

Secondly, it would be interesting to explore the put to call ratio more deeply. Rather than use the aggregate of all contracts traded, one could investigate the number of contracts written versus purchased. If option traders are writing more contracts than they are purchasing this could also provide value on how traders feel about the underlying volatility of the security. Thirdly, researchers could investigate the 'outlier' put to call ratio values. As the put to call ratio is very popular in financial media, one might assume that when the ratio reaches an extreme that it may indicate the opposite from normal market conditions. The results to these questions would be interesting and require further analysis.

General Conclusion

The put to call ratio of individual equities has long been viewed as an indicator of investor sentiment in the market. In the past researchers have used its level to forecast underlying asset returns. This research builds off prior research by investigating the ability of the put to call ratio in explaining excess through traditional asset pricing models. Unlike previous tests, this research includes a long sample period of more than ten years' worth of daily financial data for thirty underlying securities. In the vast majority of cases it appears that the put to call ratio is a significant factor to consider when explaining excess returns and its inclusion in traditional asset pricing models improved model accuracy.

APPENDICES

Appendix A – Fama French Three Factor Model Results

BA Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.334
Model:	OLS	Adj. R-squared:	0.333
Method:	Least Squares	F-statistic:	918.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:40	Log-Likelihood:	14990.
No. Observations:	5505	AIC:	-2.997e+04
Df Residuals:	5501	BIC:	-2.995e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.609	0.543	-0.000	0.001
Mkt_rf	0.9383	0.018	52.370	0.000	0.903	0.973
SMB	-0.0384	0.035	-1.084	0.279	-0.108	0.031
HML	0.1726	0.033	5.193	0.000	0.107	0.238

Omnibus:	794.212	Durbin-Watson:	1.976
Prob(Omnibus):	0.000	Jarque-Bera (JB):	11937.394
Skew:	-0.040	Prob(JB):	0.00
Kurtosis:	10.214	Cond. No.	167.

GS Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.548
Model:	OLS	Adj. R-squared:	0.548
Method:	Least Squares	F-statistic:	1827.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:41	Log-Likelihood:	12230.
No. Observations:	4521	AIC:	-2.445e+04
Df Residuals:	4517	BIC:	-2.443e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.532	0.595	-0.000	0.001
Mkt_rf	1.4037	0.020	71.454	0.000	1.365	1.442
SMB	-0.2149	0.040	-5.381	0.000	-0.293	-0.137
HML	0.5425	0.036	15.065	0.000	0.472	0.613

Omnibus:	929.408	Durbin-Watson:	2.078
Prob(Omnibus):	0.000	Jarque-Bera (JB):	23987.652
Skew:	0.331	Prob(JB):	0.00
Kurtosis:	14.265	Cond. No.	167.

MMM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.389
Model:	OLS	Adj. R-squared:	0.389
Method:	Least Squares	F-statistic:	1169.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:41	Log-Likelihood:	16675.
No. Observations:	5505	AIC:	-3.334e+04
Df Residuals:	5501	BIC:	-3.332e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.784	0.433	-0.000	0.000
Mkt_rf	0.7713	0.013	58.465	0.000	0.745	0.797
SMB	-0.1871	0.026	-7.163	0.000	-0.238	-0.136
HML	0.2456	0.024	10.035	0.000	0.198	0.294

Omnibus:	801.086	Durbin-Watson:	2.050
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12266.136
Skew:	0.037	Prob(JB):	0.00
Kurtosis:	10.312	Cond. No.	167.

UNH Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.188
Model:	OLS	Adj. R-squared:	0.188
Method:	Least Squares	F-statistic:	425.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	8.38e-249
Time:	11:06:42	Log-Likelihood:	13675.
No. Observations:	5505	AIC:	-2.734e+04
Df Residuals:	5501	BIC:	-2.731e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0005	0.000	1.949	0.051	-3.22e-06	0.001
Mkt_rf	0.8021	0.023	35.257	0.000	0.758	0.847
SMB	-0.2388	0.045	-5.300	0.000	-0.327	-0.150
HML	0.2338	0.042	5.539	0.000	0.151	0.317

Omnibus:	2075.395	Durbin-Watson:	2.001
Prob(Omnibus):	0.000	Jarque-Bera (JB):	171248.136
Skew:	-0.895	Prob(JB):	0.00
Kurtosis:	30.265	Cond. No.	167.

HD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.395
Model:	OLS	Adj. R-squared:	0.395
Method:	Least Squares	F-statistic:	1198.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:42	Log-Likelihood:	15093.
No. Observations:	5505	AIC:	-3.018e+04
Df Residuals:	5501	BIC:	-3.015e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.383	0.167	-0.000	0.001
Mkt_rf	1.0525	0.018	59.853	0.000	1.018	1.087
SMB	-0.1899	0.035	-5.453	0.000	-0.258	-0.122
HML	0.0520	0.033	1.593	0.111	-0.012	0.116

Omnibus:	1797.106	Durbin-Watson:	2.022
Prob(Omnibus):	0.000	Jarque-Bera (JB):	77205.507
Skew:	-0.835	Prob(JB):	0.00
Kurtosis:	21.270	Cond. No.	167.

AAPL Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.249
Model:	OLS	Adj. R-squared:	0.248
Method:	Least Squares	F-statistic:	607.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:43	Log-Likelihood:	12520.
No. Observations:	5505	AIC:	-2.503e+04
Df Residuals:	5501	BIC:	-2.501e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0009	0.000	2.688	0.007	0.000	0.002
Mkt_rf	1.1237	0.028	40.049	0.000	1.069	1.179
SMB	0.0601	0.056	1.081	0.280	-0.049	0.169
HML	-0.6950	0.052	-13.349	0.000	-0.797	-0.593

Omnibus:	1929.954	Durbin-Watson:	1.988
Prob(Omnibus):	0.000	Jarque-Bera (JB):	381185.016
Skew:	-0.480	Prob(JB):	0.00
Kurtosis:	43.754	Cond. No.	167.

IBM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.392
Model:	OLS	Adj. R-squared:	0.391
Method:	Least Squares	F-statistic:	1181.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:43	Log-Likelihood:	15766.
No. Observations:	5505	AIC:	-3.152e+04
Df Residuals:	5501	BIC:	-3.150e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	0.865	0.387	-0.000	0.001
Mkt_rf	0.8963	0.016	57.607	0.000	0.866	0.927
SMB	-0.2410	0.031	-7.822	0.000	-0.301	-0.181
HML	-0.3321	0.029	-11.503	0.000	-0.389	-0.275

Omnibus:	1109.237	Durbin-Watson:	1.952
Prob(Omnibus):	0.000	Jarque-Bera (JB):	38282.015
Skew:	0.011	Prob(JB):	0.00
Kurtosis:	15.919	Cond. No.	167.

MCD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.212
Model:	OLS	Adj. R-squared:	0.212
Method:	Least Squares	F-statistic:	494.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	2.02e-284
Time:	11:06:44	Log-Likelihood:	15845.
No. Observations:	5505	AIC:	-3.168e+04
Df Residuals:	5501	BIC:	-3.166e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.235	0.217	-0.000	0.001
Mkt_rf	0.5813	0.015	37.901	0.000	0.551	0.611
SMB	-0.2436	0.030	-8.022	0.000	-0.303	-0.184
HML	0.0357	0.028	1.256	0.209	-0.020	0.092

Omnibus:	760.157	Durbin-Watson:	2.015
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9651.682
Skew:	0.158	Prob(JB):	0.00
Kurtosis:	9.479	Cond. No.	167.

CAT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.408
Model:	OLS	Adj. R-squared:	0.408
Method:	Least Squares	F-statistic:	1265.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:44	Log-Likelihood:	14945.
No. Observations:	5505	AIC:	-2.988e+04
Df Residuals:	5501	BIC:	-2.986e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	7.58e-05	0.000	0.351	0.726	-0.000	0.000
Mkt_rf	1.0934	0.018	60.532	0.000	1.058	1.129
SMB	0.0547	0.036	1.528	0.127	-0.015	0.125
HML	0.4241	0.034	12.655	0.000	0.358	0.490

Omnibus:	773.001	Durbin-Watson:	2.013
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10933.499
Skew:	0.057	Prob(JB):	0.00
Kurtosis:	9.903	Cond. No.	167.

TRV Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.423
Model:	OLS	Adj. R-squared:	0.423
Method:	Least Squares	F-statistic:	1345.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:45	Log-Likelihood:	15669.
No. Observations:	5497	AIC:	-3.133e+04
Df Residuals:	5493	BIC:	-3.130e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.956e-06	0.000	0.010	0.992	-0.000	0.000
Mkt_rf	0.9460	0.016	59.969	0.000	0.915	0.977
SMB	-0.3494	0.031	-11.184	0.000	-0.411	-0.288
HML	0.6217	0.029	21.238	0.000	0.564	0.679

Omnibus:	1478.349	Durbin-Watson:	1.983
Prob(Omnibus):	0.000	Jarque-Bera (JB):	33041.259
Skew:	0.751	Prob(JB):	0.00
Kurtosis:	14.916	Cond. No.	167.

JNJ Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.292
Model:	OLS	Adj. R-squared:	0.292
Method:	Least Squares	F-statistic:	757.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:45	Log-Likelihood:	17032.
No. Observations:	5505	AIC:	-3.406e+04
Df Residuals:	5501	BIC:	-3.403e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.454	0.146	-7.5e-05	0.001
Mkt_rf	0.5504	0.012	44.521	0.000	0.526	0.575
SMB	-0.4448	0.024	-18.172	0.000	-0.493	-0.397
HML	-0.0111	0.023	-0.482	0.630	-0.056	0.034

Omnibus:	911.207	Durbin-Watson:	1.947
Prob(Omnibus):	0.000	Jarque-Bera (JB):	18364.780
Skew:	-0.068	Prob(JB):	0.00
Kurtosis:	11.947	Cond. No.	167.

UTX Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.448
Model:	OLS	Adj. R-squared:	0.448
Method:	Least Squares	F-statistic:	1488.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:46	Log-Likelihood:	16246.
No. Observations:	5505	AIC:	-3.248e+04
Df Residuals:	5501	BIC:	-3.246e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.038	0.299	-0.000	0.001
Mkt_rf	0.9480	0.014	66.475	0.000	0.920	0.976
SMB	-0.1447	0.028	-5.123	0.000	-0.200	-0.089
HML	0.2193	0.026	8.288	0.000	0.167	0.271

Omnibus:	2146.349	Durbin-Watson:	2.093
Prob(Omnibus):	0.000	Jarque-Bera (JB):	142960.209
Skew:	-1.019	Prob(JB):	0.00
Kurtosis:	27.882	Cond. No.	167.

V Model
01/02/2009 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.425
Model:	OLS	Adj. R-squared:	0.424
Method:	Least Squares	F-statistic:	578.1
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	2.67e-281
Time:	11:06:46	Log-Likelihood:	6598.2
No. Observations:	2351	AIC:	-1.319e+04
Df Residuals:	2347	BIC:	-1.317e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0005	0.000	1.816	0.069	-4.38e-05	0.001
Mkt_rf	0.9649	0.026	37.013	0.000	0.914	1.016
SMB	-0.1008	0.052	-1.946	0.052	-0.202	0.001
HML	0.0221	0.045	0.491	0.623	-0.066	0.111

Omnibus:	503.259	Durbin-Watson:	2.091
Prob(Omnibus):	0.000	Jarque-Bera (JB):	15558.793
Skew:	0.268	Prob(JB):	0.00
Kurtosis:	15.591	Cond. No.	173.

JPM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.626
Model:	OLS	Adj. R-squared:	0.626
Method:	Least Squares	F-statistic:	3073.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:47	Log-Likelihood:	15235.
No. Observations:	5505	AIC:	-3.046e+04
Df Residuals:	5501	BIC:	-3.044e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0001	0.000	-0.547	0.585	-0.001	0.000
Mkt_rf	1.5310	0.017	89.352	0.000	1.497	1.565
SMB	-0.3035	0.034	-8.944	0.000	-0.370	-0.237
HML	1.2018	0.032	37.801	0.000	1.139	1.264

Omnibus:	1190.765	Durbin-Watson:	1.967
Prob(Omnibus):	0.000	Jarque-Bera (JB):	26259.369
Skew:	0.476	Prob(JB):	0.00
Kurtosis:	13.657	Cond. No.	167.

CVX Model
01/02/2002 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.541
Model:	OLS	Adj. R-squared:	0.541
Method:	Least Squares	F-statistic:	1561.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:47	Log-Likelihood:	12319.
No. Observations:	3977	AIC:	-2.463e+04
Df Residuals:	3973	BIC:	-2.461e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	7.671e-06	0.000	0.044	0.965	-0.000	0.000
Mkt_rf	0.9955	0.015	65.430	0.000	0.966	1.025
SMB	-0.3447	0.031	-11.097	0.000	-0.406	-0.284
HML	0.0618	0.029	2.101	0.036	0.004	0.120

Omnibus:	367.720	Durbin-Watson:	2.028
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2616.544
Skew:	0.001	Prob(JB):	0.00
Kurtosis:	6.974	Cond. No.	181.

DIS Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.420
Model:	OLS	Adj. R-squared:	0.420
Method:	Least Squares	F-statistic:	1330.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:48	Log-Likelihood:	15424.
No. Observations:	5505	AIC:	-3.084e+04
Df Residuals:	5501	BIC:	-3.081e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	7.53e-05	0.000	0.380	0.704	-0.000	0.000
Mkt_rf	1.0456	0.017	63.144	0.000	1.013	1.078
SMB	-0.1165	0.033	-3.553	0.000	-0.181	-0.052
HML	0.1000	0.031	3.256	0.001	0.040	0.160

Omnibus:	1116.105	Durbin-Watson:	2.068
Prob(Omnibus):	0.000	Jarque-Bera (JB):	28223.867
Skew:	0.325	Prob(JB):	0.00
Kurtosis:	14.074	Cond. No.	167.

AXP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.569
Model:	OLS	Adj. R-squared:	0.568
Method:	Least Squares	F-statistic:	2416.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:48	Log-Likelihood:	15322.
No. Observations:	5505	AIC:	-3.064e+04
Df Residuals:	5501	BIC:	-3.061e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.539e-05	0.000	0.076	0.939	-0.000	0.000
Mkt_rf	1.3946	0.017	82.675	0.000	1.362	1.428
SMB	-0.3705	0.033	-11.093	0.000	-0.436	-0.305
HML	0.6775	0.031	21.647	0.000	0.616	0.739

Omnibus:	1223.581	Durbin-Watson:	2.087
Prob(Omnibus):	0.000	Jarque-Bera (JB):	32770.211
Skew:	0.434	Prob(JB):	0.00
Kurtosis:	14.921	Cond. No.	167.

MSFT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.465
Model:	OLS	Adj. R-squared:	0.465
Method:	Least Squares	F-statistic:	1595.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:49	Log-Likelihood:	15424.
No. Observations:	5505	AIC:	-3.084e+04
Df Residuals:	5501	BIC:	-3.081e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.518	0.129	-8.77e-05	0.001
Mkt_rf	1.0906	0.017	65.863	0.000	1.058	1.123
SMB	-0.3072	0.033	-9.370	0.000	-0.372	-0.243
HML	-0.5304	0.031	-17.265	0.000	-0.591	-0.470

Omnibus:	1020.089	Durbin-Watson:	1.943
Prob(Omnibus):	0.000	Jarque-Bera (JB):	27370.996
Skew:	-0.067	Prob(JB):	0.00
Kurtosis:	13.923	Cond. No.	167.

WMT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.296
Model:	OLS	Adj. R-squared:	0.295
Method:	Least Squares	F-statistic:	770.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:49	Log-Likelihood:	15764.
No. Observations:	5505	AIC:	-3.152e+04
Df Residuals:	5501	BIC:	-3.149e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.097	0.273	-0.000	0.001
Mkt_rf	0.7009	0.016	45.030	0.000	0.670	0.731
SMB	-0.5012	0.031	-16.261	0.000	-0.562	-0.441
HML	-0.1607	0.029	-5.565	0.000	-0.217	-0.104

Omnibus:	723.320	Durbin-Watson:	2.033
Prob(Omnibus):	0.000	Jarque-Bera (JB):	7345.130
Skew:	0.249	Prob(JB):	0.00
Kurtosis:	8.637	Cond. No.	167.

PG Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.233
Model:	OLS	Adj. R-squared:	0.232
Method:	Least Squares	F-statistic:	556.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	9.17e-316
Time:	11:06:50	Log-Likelihood:	16292.
No. Observations:	5505	AIC:	-3.258e+04
Df Residuals:	5501	BIC:	-3.255e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	0.894	0.371	-0.000	0.000
Mkt_rf	0.5309	0.014	37.546	0.000	0.503	0.559
SMB	-0.4788	0.028	-17.099	0.000	-0.534	-0.424
HML	0.1219	0.026	4.647	0.000	0.070	0.173

Omnibus:	3875.795	Durbin-Watson:	2.013
Prob(Omnibus):	0.000	Jarque-Bera (JB):	707304.382
Skew:	-2.392	Prob(JB):	0.00
Kurtosis:	58.324	Cond. No.	167.

XOM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.392
Model:	OLS	Adj. R-squared:	0.392
Method:	Least Squares	F-statistic:	1184.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:50	Log-Likelihood:	16501.
No. Observations:	5505	AIC:	-3.299e+04
Df Residuals:	5501	BIC:	-3.297e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	3.76e-05	0.000	0.231	0.818	-0.000	0.000
Mkt_rf	0.7897	0.014	58.005	0.000	0.763	0.816
SMB	-0.3388	0.027	-12.567	0.000	-0.392	-0.286
HML	0.2802	0.025	11.093	0.000	0.231	0.330

Omnibus:	705.660	Durbin-Watson:	2.072
Prob(Omnibus):	0.000	Jarque-Bera (JB):	7387.909
Skew:	0.198	Prob(JB):	0.00
Kurtosis:	8.661	Cond. No.	167.

DWDP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.407
Model:	OLS	Adj. R-squared:	0.407
Method:	Least Squares	F-statistic:	1259.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:51	Log-Likelihood:	14849.
No. Observations:	5505	AIC:	-2.969e+04
Df Residuals:	5501	BIC:	-2.966e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0001	0.000	-0.560	0.575	-0.001	0.000
Mkt_rf	1.0819	0.018	58.860	0.000	1.046	1.118
SMB	0.0565	0.036	1.554	0.120	-0.015	0.128
HML	0.6478	0.034	18.996	0.000	0.581	0.715

Omnibus:	1199.516	Durbin-Watson:	2.045
Prob(Omnibus):	0.000	Jarque-Bera (JB):	40189.676
Skew:	0.296	Prob(JB):	0.00
Kurtosis:	16.224	Cond. No.	167.

NKE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.235
Model:	OLS	Adj. R-squared:	0.234
Method:	Least Squares	F-statistic:	562.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	7.82e-319
Time:	11:06:51	Log-Likelihood:	14325.
No. Observations:	5505	AIC:	-2.864e+04
Df Residuals:	5501	BIC:	-2.862e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0004	0.000	1.548	0.122	-9.98e-05	0.001
Mkt_rf	0.8289	0.020	41.003	0.000	0.789	0.869
SMB	0.0286	0.040	0.716	0.474	-0.050	0.107
HML	0.0970	0.038	2.585	0.010	0.023	0.171

Omnibus:	1105.887	Durbin-Watson:	2.026
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35529.579
Skew:	0.139	Prob(JB):	0.00
Kurtosis:	15.443	Cond. No.	167.

MRK Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.272
Model:	OLS	Adj. R-squared:	0.271
Method:	Least Squares	F-statistic:	684.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:52	Log-Likelihood:	15308.
No. Observations:	5505	AIC:	-3.061e+04
Df Residuals:	5501	BIC:	-3.058e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	2.647e-05	0.000	0.131	0.896	-0.000	0.000
Mkt_rf	0.7356	0.017	43.497	0.000	0.702	0.769
SMB	-0.4684	0.033	-13.989	0.000	-0.534	-0.403
HML	0.0115	0.031	0.367	0.714	-0.050	0.073

Omnibus:	2316.136	Durbin-Watson:	1.947
Prob(Omnibus):	0.000	Jarque-Bera (JB):	166265.209
Skew:	-1.149	Prob(JB):	0.00
Kurtosis:	29.825	Cond. No.	167.

INTC Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.450
Model:	OLS	Adj. R-squared:	0.449
Method:	Least Squares	F-statistic:	1497.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:52	Log-Likelihood:	14327.
No. Observations:	5505	AIC:	-2.865e+04
Df Residuals:	5501	BIC:	-2.862e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	0.621	0.535	-0.000	0.001
Mkt_rf	1.2898	0.020	63.827	0.000	1.250	1.329
SMB	-0.2340	0.040	-5.847	0.000	-0.312	-0.156
HML	-0.6653	0.037	-17.745	0.000	-0.739	-0.592

Omnibus:	1318.815	Durbin-Watson:	1.978
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35960.055
Skew:	-0.531	Prob(JB):	0.00
Kurtosis:	15.476	Cond. No.	167.

VZ Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.341
Model:	OLS	Adj. R-squared:	0.341
Method:	Least Squares	F-statistic:	740.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:53	Log-Likelihood:	12683.
No. Observations:	4295	AIC:	-2.536e+04
Df Residuals:	4291	BIC:	-2.533e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-6.374e-05	0.000	-0.330	0.741	-0.000	0.000
Mkt_rf	0.7408	0.016	46.235	0.000	0.709	0.772
SMB	-0.4060	0.034	-11.890	0.000	-0.473	-0.339
HML	0.0692	0.030	2.330	0.020	0.011	0.127

Omnibus:	759.848	Durbin-Watson:	1.945
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13223.332
Skew:	0.314	Prob(JB):	0.00
Kurtosis:	11.573	Cond. No.	179.

KO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.254
Model:	OLS	Adj. R-squared:	0.253
Method:	Least Squares	F-statistic:	624.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:53	Log-Likelihood:	16408.
No. Observations:	5505	AIC:	-3.281e+04
Df Residuals:	5501	BIC:	-3.278e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	4.148e-05	0.000	0.250	0.802	-0.000	0.000
Mkt_rf	0.5563	0.014	40.175	0.000	0.529	0.583
SMB	-0.4753	0.027	-17.335	0.000	-0.529	-0.422
HML	0.0657	0.026	2.559	0.011	0.015	0.116

Omnibus:	759.978	Durbin-Watson:	1.929
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10512.440
Skew:	0.005	Prob(JB):	0.00
Kurtosis:	9.770	Cond. No.	167.

CSCO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.476
Model:	OLS	Adj. R-squared:	0.476
Method:	Least Squares	F-statistic:	1664.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:54	Log-Likelihood:	14108.
No. Observations:	5505	AIC:	-2.821e+04
Df Residuals:	5501	BIC:	-2.818e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.157	0.247	-0.000	0.001
Mkt_rf	1.3826	0.021	65.750	0.000	1.341	1.424
SMB	-0.1672	0.042	-4.015	0.000	-0.249	-0.086
HML	-0.9170	0.039	-23.504	0.000	-0.994	-0.841

Omnibus:	1027.381	Durbin-Watson:	2.066
Prob(Omnibus):	0.000	Jarque-Bera (JB):	23523.415
Skew:	0.245	Prob(JB):	0.00
Kurtosis:	13.115	Cond. No.	167.

PFE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.317
Model:	OLS	Adj. R-squared:	0.317
Method:	Least Squares	F-statistic:	851.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:54	Log-Likelihood:	15615.
No. Observations:	5505	AIC:	-3.122e+04
Df Residuals:	5501	BIC:	-3.120e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	9.047e-05	0.000	0.473	0.636	-0.000	0.000
Mkt_rf	0.7807	0.016	48.819	0.000	0.749	0.812
SMB	-0.4563	0.032	-14.410	0.000	-0.518	-0.394
HML	-0.0022	0.030	-0.073	0.942	-0.060	0.056

Omnibus:	782.623	Durbin-Watson:	1.961
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9884.747
Skew:	-0.209	Prob(JB):	0.00
Kurtosis:	9.551	Cond. No.	167.

GE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.562
Model:	OLS	Adj. R-squared:	0.562
Method:	Least Squares	F-statistic:	2353.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:06:55	Log-Likelihood:	16377.
No. Observations:	5505	AIC:	-3.275e+04
Df Residuals:	5501	BIC:	-3.272e+04
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0001	0.000	-0.808	0.419	-0.000	0.000
Mkt_rf	1.1540	0.014	82.868	0.000	1.127	1.181
SMB	-0.3638	0.028	-13.192	0.000	-0.418	-0.310
HML	0.3193	0.026	12.356	0.000	0.269	0.370

Omnibus:	1454.154	Durbin-Watson:	2.010
Prob(Omnibus):	0.000	Jarque-Bera (JB):	87046.051
Skew:	0.366	Prob(JB):	0.00
Kurtosis:	22.467	Cond. No.	167.

Appendix B – Carhart Four Factor Model Results

BA Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.334
Model:	OLS	Adj. R-squared:	0.333
Method:	Least Squares	F-statistic:	688.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:27	Log-Likelihood:	14990.
No. Observations:	5505	AIC:	-2.997e+04
Df Residuals:	5500	BIC:	-2.994e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.596	0.551	-0.000	0.001
Mkt_rf	0.9399	0.019	50.380	0.000	0.903	0.976
SMB	-0.0390	0.036	-1.099	0.272	-0.109	0.031
HML	0.1766	0.036	4.962	0.000	0.107	0.246
Mom	0.0079	0.025	0.313	0.755	-0.041	0.057

Omnibus:	794.904	Durbin-Watson:	1.975
Prob(Omnibus):	0.000	Jarque-Bera (JB):	11972.510
Skew:	-0.039	Prob(JB):	0.00
Kurtosis:	10.224	Cond. No.	179.

GS Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.555
Model:	OLS	Adj. R-squared:	0.554
Method:	Least Squares	F-statistic:	1407.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:28	Log-Likelihood:	12263.
No. Observations:	4521	AIC:	-2.452e+04
Df Residuals:	4516	BIC:	-2.448e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	0.773	0.439	-0.000	0.001
Mkt_rf	1.3491	0.021	65.470	0.000	1.309	1.390
SMB	-0.1730	0.040	-4.328	0.000	-0.251	-0.095
HML	0.4383	0.038	11.552	0.000	0.364	0.513
Mom	-0.2179	0.027	-8.196	0.000	-0.270	-0.166

Omnibus:	898.584	Durbin-Watson:	2.076
Prob(Omnibus):	0.000	Jarque-Bera (JB):	23828.218
Skew:	0.259	Prob(JB):	0.00
Kurtosis:	14.235	Cond. No.	176.

MMM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.390
Model:	OLS	Adj. R-squared:	0.389
Method:	Least Squares	F-statistic:	878.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:28	Log-Likelihood:	16677.
No. Observations:	5505	AIC:	-3.334e+04
Df Residuals:	5500	BIC:	-3.331e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.850	0.395	-0.000	0.000
Mkt_rf	0.7647	0.014	55.681	0.000	0.738	0.792
SMB	-0.1847	0.026	-7.062	0.000	-0.236	-0.133
HML	0.2295	0.026	8.760	0.000	0.178	0.281
Mom	-0.0319	0.019	-1.722	0.085	-0.068	0.004

Omnibus:	800.370	Durbin-Watson:	2.049
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12257.924
Skew:	0.027	Prob(JB):	0.00
Kurtosis:	10.310	Cond. No.	179.

UNH Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.191
Model:	OLS	Adj. R-squared:	0.190
Method:	Least Squares	F-statistic:	324.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	6.82e-251
Time:	11:10:29	Log-Likelihood:	13683.
No. Observations:	5505	AIC:	-2.736e+04
Df Residuals:	5500	BIC:	-2.732e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0005	0.000	1.795	0.073	-4.5e-05	0.001
Mkt_rf	0.8284	0.024	35.017	0.000	0.782	0.875
SMB	-0.2484	0.045	-5.513	0.000	-0.337	-0.160
HML	0.2981	0.045	6.604	0.000	0.210	0.387
Mom	0.1271	0.032	3.986	0.000	0.065	0.190

Omnibus:	2073.212	Durbin-Watson:	2.000
Prob(Omnibus):	0.000	Jarque-Bera (JB):	172850.138
Skew:	-0.890	Prob(JB):	0.00
Kurtosis:	30.394	Cond. No.	179.

HD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.396
Model:	OLS	Adj. R-squared:	0.395
Method:	Least Squares	F-statistic:	901.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:29	Log-Likelihood:	15095.
No. Observations:	5505	AIC:	-3.018e+04
Df Residuals:	5500	BIC:	-3.015e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.475	0.140	-0.000	0.001
Mkt_rf	1.0404	0.018	56.845	0.000	1.005	1.076
SMB	-0.1854	0.035	-5.320	0.000	-0.254	-0.117
HML	0.0223	0.035	0.639	0.523	-0.046	0.091
Mom	-0.0587	0.025	-2.380	0.017	-0.107	-0.010

Omnibus:	1816.951	Durbin-Watson:	2.021
Prob(Omnibus):	0.000	Jarque-Bera (JB):	77622.705
Skew:	-0.854	Prob(JB):	0.00
Kurtosis:	21.316	Cond. No.	179.

AAPL Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.250
Model:	OLS	Adj. R-squared:	0.249
Method:	Least Squares	F-statistic:	457.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:30	Log-Likelihood:	12524.
No. Observations:	5505	AIC:	-2.504e+04
Df Residuals:	5500	BIC:	-2.500e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0009	0.000	2.786	0.005	0.000	0.002
Mkt_rf	1.1030	0.029	37.774	0.000	1.046	1.160
SMB	0.0676	0.056	1.216	0.224	-0.041	0.177
HML	-0.7455	0.056	-13.383	0.000	-0.855	-0.636
Mom	-0.1000	0.039	-2.542	0.011	-0.177	-0.023

Omnibus:	1941.530	Durbin-Watson:	1.989
Prob(Omnibus):	0.000	Jarque-Bera (JB):	384535.579
Skew:	-0.493	Prob(JB):	0.00
Kurtosis:	43.933	Cond. No.	179.

IBM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.396
Model:	OLS	Adj. R-squared:	0.396
Method:	Least Squares	F-statistic:	901.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:30	Log-Likelihood:	15785.
No. Observations:	5505	AIC:	-3.156e+04
Df Residuals:	5500	BIC:	-3.153e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.105	0.269	-0.000	0.001
Mkt_rf	0.8687	0.016	53.799	0.000	0.837	0.900
SMB	-0.2309	0.031	-7.508	0.000	-0.291	-0.171
HML	-0.3997	0.031	-12.976	0.000	-0.460	-0.339
Mom	-0.1338	0.022	-6.149	0.000	-0.176	-0.091

Omnibus:	1108.760	Durbin-Watson:	1.963
Prob(Omnibus):	0.000	Jarque-Bera (JB):	38206.690
Skew:	-0.014	Prob(JB):	0.00
Kurtosis:	15.906	Cond. No.	179.

MCD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.214
Model:	OLS	Adj. R-squared:	0.214
Method:	Least Squares	F-statistic:	375.1
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	4.61e-286
Time:	11:10:31	Log-Likelihood:	15852.
No. Observations:	5505	AIC:	-3.169e+04
Df Residuals:	5500	BIC:	-3.166e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.091	0.275	-0.000	0.001
Mkt_rf	0.5979	0.016	37.484	0.000	0.567	0.629
SMB	-0.2497	0.030	-8.220	0.000	-0.309	-0.190
HML	0.0763	0.030	2.509	0.012	0.017	0.136
Mom	0.0803	0.021	3.737	0.000	0.038	0.122

Omnibus:	769.924	Durbin-Watson:	2.012
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9935.444
Skew:	0.166	Prob(JB):	0.00
Kurtosis:	9.573	Cond. No.	179.

CAT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.412
Model:	OLS	Adj. R-squared:	0.411
Method:	Least Squares	F-statistic:	961.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:31	Log-Likelihood:	14961.
No. Observations:	5505	AIC:	-2.991e+04
Df Residuals:	5500	BIC:	-2.988e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.568	0.570	-0.000	0.001
Mkt_rf	1.0641	0.019	56.737	0.000	1.027	1.101
SMB	0.0653	0.036	1.829	0.067	-0.005	0.135
HML	0.3526	0.036	9.855	0.000	0.282	0.423
Mom	-0.1414	0.025	-5.595	0.000	-0.191	-0.092

Omnibus:	766.117	Durbin-Watson:	2.016
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10759.135
Skew:	0.015	Prob(JB):	0.00
Kurtosis:	9.849	Cond. No.	179.

TRV Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.424
Model:	OLS	Adj. R-squared:	0.424
Method:	Least Squares	F-statistic:	1012.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:32	Log-Likelihood:	15672.
No. Observations:	5497	AIC:	-3.133e+04
Df Residuals:	5492	BIC:	-3.130e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-1.8e-05	0.000	-0.095	0.924	-0.000	0.000
Mkt_rf	0.9584	0.016	58.387	0.000	0.926	0.991
SMB	-0.3540	0.031	-11.321	0.000	-0.415	-0.293
HML	0.6522	0.031	20.823	0.000	0.591	0.714
Mom	0.0604	0.022	2.728	0.006	0.017	0.104

Omnibus:	1493.440	Durbin-Watson:	1.983
Prob(Omnibus):	0.000	Jarque-Bera (JB):	33222.445
Skew:	0.766	Prob(JB):	0.00
Kurtosis:	14.946	Cond. No.	179.

JNJ Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.299
Model:	OLS	Adj. R-squared:	0.299
Method:	Least Squares	F-statistic:	586.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:32	Log-Likelihood:	17059.
No. Observations:	5505	AIC:	-3.411e+04
Df Residuals:	5500	BIC:	-3.408e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.174	0.240	-0.000	0.000
Mkt_rf	0.5767	0.013	45.015	0.000	0.552	0.602
SMB	-0.4544	0.024	-18.627	0.000	-0.502	-0.407
HML	0.0532	0.024	2.176	0.030	0.005	0.101
Mom	0.1271	0.017	7.361	0.000	0.093	0.161

Omnibus:	903.129	Durbin-Watson:	1.949
Prob(Omnibus):	0.000	Jarque-Bera (JB):	17972.785
Skew:	-0.046	Prob(JB):	0.00
Kurtosis:	11.851	Cond. No.	179.

UTX Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.448
Model:	OLS	Adj. R-squared:	0.448
Method:	Least Squares	F-statistic:	1116.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:33	Log-Likelihood:	16246.
No. Observations:	5505	AIC:	-3.248e+04
Df Residuals:	5500	BIC:	-3.245e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.034	0.301	-0.000	0.001
Mkt_rf	0.9484	0.015	63.860	0.000	0.919	0.977
SMB	-0.1448	0.028	-5.119	0.000	-0.200	-0.089
HML	0.2201	0.028	7.768	0.000	0.165	0.276
Mom	0.0016	0.020	0.078	0.938	-0.038	0.041

Omnibus:	2146.668	Durbin-Watson:	2.093
Prob(Omnibus):	0.000	Jarque-Bera (JB):	143057.974
Skew:	-1.019	Prob(JB):	0.00
Kurtosis:	27.890	Cond. No.	179.

V Model
01/02/2009 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.425
Model:	OLS	Adj. R-squared:	0.424
Method:	Least Squares	F-statistic:	433.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	6.71e-280
Time:	11:10:33	Log-Likelihood:	6598.3
No. Observations:	2351	AIC:	-1.319e+04
Df Residuals:	2346	BIC:	-1.316e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0005	0.000	1.815	0.070	-4.42e-05	0.001
Mkt_rf	0.9632	0.027	36.048	0.000	0.911	1.016
SMB	-0.1007	0.052	-1.944	0.052	-0.202	0.001
HML	0.0149	0.052	0.286	0.775	-0.087	0.117
Mom	-0.0099	0.036	-0.277	0.782	-0.080	0.060

Omnibus:	502.517	Durbin-Watson:	2.090
Prob(Omnibus):	0.000	Jarque-Bera (JB):	15547.116
Skew:	0.264	Prob(JB):	0.00
Kurtosis:	15.587	Cond. No.	187.

JPM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.635
Model:	OLS	Adj. R-squared:	0.635
Method:	Least Squares	F-statistic:	2394.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:34	Log-Likelihood:	15302.
No. Observations:	5505	AIC:	-3.059e+04
Df Residuals:	5500	BIC:	-3.056e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-2.109e-05	0.000	-0.104	0.917	-0.000	0.000
Mkt_rf	1.4742	0.018	83.622	0.000	1.440	1.509
SMB	-0.2827	0.034	-8.420	0.000	-0.348	-0.217
HML	1.0627	0.034	31.598	0.000	0.997	1.129
Mom	-0.2750	0.024	-11.576	0.000	-0.322	-0.228

Omnibus:	1096.084	Durbin-Watson:	1.966
Prob(Omnibus):	0.000	Jarque-Bera (JB):	24500.244
Skew:	0.359	Prob(JB):	0.00
Kurtosis:	13.310	Cond. No.	179.

CVX Model
01/02/2002 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.547
Model:	OLS	Adj. R-squared:	0.547
Method:	Least Squares	F-statistic:	1201.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:34	Log-Likelihood:	12347.
No. Observations:	3977	AIC:	-2.468e+04
Df Residuals:	3972	BIC:	-2.465e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-1.303e-05	0.000	-0.076	0.940	-0.000	0.000
Mkt_rf	1.0324	0.016	64.973	0.000	1.001	1.064
SMB	-0.3654	0.031	-11.797	0.000	-0.426	-0.305
HML	0.1522	0.032	4.814	0.000	0.090	0.214
Mom	0.1600	0.021	7.511	0.000	0.118	0.202

Omnibus:	364.406	Durbin-Watson:	2.040
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2553.830
Skew:	0.028	Prob(JB):	0.00
Kurtosis:	6.925	Cond. No.	197.

DIS Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.423
Model:	OLS	Adj. R-squared:	0.422
Method:	Least Squares	F-statistic:	1008.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:35	Log-Likelihood:	15435.
No. Observations:	5505	AIC:	-3.086e+04
Df Residuals:	5500	BIC:	-3.083e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.568	0.570	-0.000	0.001
Mkt_rf	1.0224	0.017	59.421	0.000	0.989	1.056
SMB	-0.1080	0.033	-3.297	0.001	-0.172	-0.044
HML	0.0433	0.033	1.320	0.187	-0.021	0.108
Mom	-0.1121	0.023	-4.835	0.000	-0.158	-0.067

Omnibus:	1113.912	Durbin-Watson:	2.070
Prob(Omnibus):	0.000	Jarque-Bera (JB):	28307.062
Skew:	0.320	Prob(JB):	0.00
Kurtosis:	14.091	Cond. No.	179.

AXP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.576
Model:	OLS	Adj. R-squared:	0.576
Method:	Least Squares	F-statistic:	1870.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:36	Log-Likelihood:	15371.
No. Observations:	5505	AIC:	-3.073e+04
Df Residuals:	5500	BIC:	-3.070e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	9.331e-05	0.000	0.466	0.641	-0.000	0.000
Mkt_rf	1.3460	0.017	77.324	0.000	1.312	1.380
SMB	-0.3528	0.033	-10.641	0.000	-0.418	-0.288
HML	0.5585	0.033	16.818	0.000	0.493	0.624
Mom	-0.2354	0.023	-10.034	0.000	-0.281	-0.189

Omnibus:	1131.216	Durbin-Watson:	2.083
Prob(Omnibus):	0.000	Jarque-Bera (JB):	29771.148
Skew:	0.326	Prob(JB):	0.00
Kurtosis:	14.374	Cond. No.	179.

MSFT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.467
Model:	OLS	Adj. R-squared:	0.466
Method:	Least Squares	F-statistic:	1204.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:37	Log-Likelihood:	15432.
No. Observations:	5505	AIC:	-3.085e+04
Df Residuals:	5500	BIC:	-3.082e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.677	0.094	-5.6e-05	0.001
Mkt_rf	1.0710	0.017	62.206	0.000	1.037	1.105
SMB	-0.3001	0.033	-9.151	0.000	-0.364	-0.236
HML	-0.5785	0.033	-17.611	0.000	-0.643	-0.514
Mom	-0.0950	0.023	-4.093	0.000	-0.140	-0.049

Omnibus:	1030.639	Durbin-Watson:	1.943
Prob(Omnibus):	0.000	Jarque-Bera (JB):	28192.939
Skew:	-0.084	Prob(JB):	0.00
Kurtosis:	14.085	Cond. No.	179.

WMT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.296
Model:	OLS	Adj. R-squared:	0.296
Method:	Least Squares	F-statistic:	579.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:37	Log-Likelihood:	15766.
No. Observations:	5505	AIC:	-3.152e+04
Df Residuals:	5500	BIC:	-3.149e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.010	0.313	-0.000	0.001
Mkt_rf	0.7110	0.016	43.886	0.000	0.679	0.743
SMB	-0.5049	0.031	-16.364	0.000	-0.565	-0.444
HML	-0.1361	0.031	-4.402	0.000	-0.197	-0.075
Mom	0.0488	0.022	2.235	0.025	0.006	0.092

Omnibus:	729.384	Durbin-Watson:	2.033
Prob(Omnibus):	0.000	Jarque-Bera (JB):	7399.039
Skew:	0.259	Prob(JB):	0.00
Kurtosis:	8.656	Cond. No.	179.

PG Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.237
Model:	OLS	Adj. R-squared:	0.236
Method:	Least Squares	F-statistic:	426.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	1.06e-320
Time:	11:10:38	Log-Likelihood:	16307.
No. Observations:	5505	AIC:	-3.260e+04
Df Residuals:	5500	BIC:	-3.257e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0001	0.000	0.686	0.493	-0.000	0.000
Mkt_rf	0.5531	0.015	37.661	0.000	0.524	0.582
SMB	-0.4869	0.028	-17.408	0.000	-0.542	-0.432
HML	0.1761	0.028	6.285	0.000	0.121	0.231
Mom	0.1072	0.020	5.415	0.000	0.068	0.146

Omnibus:	3891.538	Durbin-Watson:	2.014
Prob(Omnibus):	0.000	Jarque-Bera (JB):	734368.271
Skew:	-2.399	Prob(JB):	0.00
Kurtosis:	59.379	Cond. No.	179.

XOM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.398
Model:	OLS	Adj. R-squared:	0.397
Method:	Least Squares	F-statistic:	908.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:38	Log-Likelihood:	16526.
No. Observations:	5505	AIC:	-3.304e+04
Df Residuals:	5500	BIC:	-3.301e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-7.013e-06	0.000	-0.043	0.966	-0.000	0.000
Mkt_rf	0.8176	0.014	57.931	0.000	0.790	0.845
SMB	-0.3490	0.027	-12.984	0.000	-0.402	-0.296
HML	0.3484	0.027	12.939	0.000	0.296	0.401
Mom	0.1347	0.019	7.085	0.000	0.097	0.172

Omnibus:	708.437	Durbin-Watson:	2.076
Prob(Omnibus):	0.000	Jarque-Bera (JB):	7360.224
Skew:	0.209	Prob(JB):	0.00
Kurtosis:	8.649	Cond. No.	179.

DWDP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.410
Model:	OLS	Adj. R-squared:	0.409
Method:	Least Squares	F-statistic:	954.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:39	Log-Likelihood:	14862.
No. Observations:	5505	AIC:	-2.971e+04
Df Residuals:	5500	BIC:	-2.968e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-8.036e-05	0.000	-0.366	0.714	-0.001	0.000
Mkt_rf	1.0551	0.019	55.252	0.000	1.018	1.093
SMB	0.0663	0.036	1.824	0.068	-0.005	0.138
HML	0.5823	0.036	15.983	0.000	0.511	0.654
Mom	-0.1296	0.026	-5.038	0.000	-0.180	-0.079

Omnibus:	1167.398	Durbin-Watson:	2.048
Prob(Omnibus):	0.000	Jarque-Bera (JB):	38106.080
Skew:	0.260	Prob(JB):	0.00
Kurtosis:	15.879	Cond. No.	179.

NKE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.235
Model:	OLS	Adj. R-squared:	0.234
Method:	Least Squares	F-statistic:	422.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	7.02e-318
Time:	11:10:39	Log-Likelihood:	14326.
No. Observations:	5505	AIC:	-2.864e+04
Df Residuals:	5500	BIC:	-2.861e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0004	0.000	1.603	0.109	-8.64e-05	0.001
Mkt_rf	0.8204	0.021	38.979	0.000	0.779	0.862
SMB	0.0318	0.040	0.792	0.428	-0.047	0.110
HML	0.0761	0.040	1.896	0.058	-0.003	0.155
Mom	-0.0412	0.028	-1.454	0.146	-0.097	0.014

Omnibus:	1102.959	Durbin-Watson:	2.027
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35087.078
Skew:	0.142	Prob(JB):	0.00
Kurtosis:	15.365	Cond. No.	179.

MRK Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.274
Model:	OLS	Adj. R-squared:	0.274
Method:	Least Squares	F-statistic:	519.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:40	Log-Likelihood:	15317.
No. Observations:	5505	AIC:	-3.062e+04
Df Residuals:	5500	BIC:	-3.059e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-7.368e-06	0.000	-0.036	0.971	-0.000	0.000
Mkt_rf	0.7567	0.018	43.044	0.000	0.722	0.791
SMB	-0.4762	0.033	-14.222	0.000	-0.542	-0.411
HML	0.0632	0.034	1.884	0.060	-0.003	0.129
Mom	0.1022	0.024	4.314	0.000	0.056	0.149

Omnibus:	2317.165	Durbin-Watson:	1.947
Prob(Omnibus):	0.000	Jarque-Bera (JB):	171150.019
Skew:	-1.142	Prob(JB):	0.00
Kurtosis:	30.220	Cond. No.	179.

INTC Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.462
Model:	OLS	Adj. R-squared:	0.462
Method:	Least Squares	F-statistic:	1182.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:40	Log-Likelihood:	14392.
No. Observations:	5505	AIC:	-2.877e+04
Df Residuals:	5500	BIC:	-2.874e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.072	0.284	-0.000	0.001
Mkt_rf	1.2235	0.021	58.831	0.000	1.183	1.264
SMB	-0.2097	0.040	-5.296	0.000	-0.287	-0.132
HML	-0.8276	0.040	-20.858	0.000	-0.905	-0.750
Mom	-0.3208	0.028	-11.448	0.000	-0.376	-0.266

Omnibus:	1357.818	Durbin-Watson:	1.990
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35031.769
Skew:	-0.589	Prob(JB):	0.00
Kurtosis:	15.302	Cond. No.	179.

VZ Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.342
Model:	OLS	Adj. R-squared:	0.341
Method:	Least Squares	F-statistic:	557.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:41	Log-Likelihood:	12685.
No. Observations:	4295	AIC:	-2.536e+04
Df Residuals:	4290	BIC:	-2.533e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-5.353e-05	0.000	-0.278	0.781	-0.000	0.000
Mkt_rf	0.7259	0.017	41.945	0.000	0.692	0.760
SMB	-0.3992	0.034	-11.654	0.000	-0.466	-0.332
HML	0.0508	0.031	1.649	0.099	-0.010	0.111
Mom	-0.0499	0.022	-2.269	0.023	-0.093	-0.007

Omnibus:	755.916	Durbin-Watson:	1.944
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13125.897
Skew:	0.308	Prob(JB):	0.00
Kurtosis:	11.542	Cond. No.	184.

KO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.255
Model:	OLS	Adj. R-squared:	0.255
Method:	Least Squares	F-statistic:	471.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:41	Log-Likelihood:	16414.
No. Observations:	5505	AIC:	-3.282e+04
Df Residuals:	5500	BIC:	-3.278e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.991e-05	0.000	0.120	0.904	-0.000	0.000
Mkt_rf	0.5698	0.014	39.555	0.000	0.542	0.598
SMB	-0.4802	0.027	-17.505	0.000	-0.534	-0.426
HML	0.0987	0.027	3.591	0.000	0.045	0.153
Mom	0.0651	0.019	3.356	0.001	0.027	0.103

Omnibus:	768.979	Durbin-Watson:	1.930
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10873.356
Skew:	0.020	Prob(JB):	0.00
Kurtosis:	9.885	Cond. No.	179.

CSCO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.491
Model:	OLS	Adj. R-squared:	0.491
Method:	Least Squares	F-statistic:	1326.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:42	Log-Likelihood:	14189.
No. Observations:	5505	AIC:	-2.837e+04
Df Residuals:	5500	BIC:	-2.834e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0004	0.000	1.669	0.095	-7.23e-05	0.001
Mkt_rf	1.3057	0.022	60.510	0.000	1.263	1.348
SMB	-0.1391	0.041	-3.385	0.001	-0.220	-0.059
HML	-1.1051	0.041	-26.844	0.000	-1.186	-1.024
Mom	-0.3719	0.029	-12.791	0.000	-0.429	-0.315

Omnibus:	955.206	Durbin-Watson:	2.076
Prob(Omnibus):	0.000	Jarque-Bera (JB):	19338.968
Skew:	0.196	Prob(JB):	0.00
Kurtosis:	12.174	Cond. No.	179.

PFE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.321
Model:	OLS	Adj. R-squared:	0.320
Method:	Least Squares	F-statistic:	649.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:42	Log-Likelihood:	15630.
No. Observations:	5505	AIC:	-3.125e+04
Df Residuals:	5500	BIC:	-3.122e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	5.016e-05	0.000	0.263	0.793	-0.000	0.000
Mkt_rf	0.8059	0.017	48.524	0.000	0.773	0.838
SMB	-0.4655	0.032	-14.718	0.000	-0.527	-0.403
HML	0.0594	0.032	1.875	0.061	-0.003	0.122
Mom	0.1218	0.022	5.441	0.000	0.078	0.166

Omnibus:	760.710	Durbin-Watson:	1.971
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9551.969
Skew:	-0.169	Prob(JB):	0.00
Kurtosis:	9.444	Cond. No.	179.

GE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.567
Model:	OLS	Adj. R-squared:	0.567
Method:	Least Squares	F-statistic:	1803.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:10:43	Log-Likelihood:	16410.
No. Observations:	5505	AIC:	-3.281e+04
Df Residuals:	5500	BIC:	-3.278e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-8.183e-05	0.000	-0.494	0.622	-0.000	0.000
Mkt_rf	1.1210	0.014	77.780	0.000	1.093	1.149
SMB	-0.3517	0.027	-12.814	0.000	-0.406	-0.298
HML	0.2386	0.027	8.679	0.000	0.185	0.293
Mom	-0.1594	0.019	-8.210	0.000	-0.198	-0.121

Omnibus:	1426.418	Durbin-Watson:	2.012
Prob(Omnibus):	0.000	Jarque-Bera (JB):	88939.286
Skew:	0.305	Prob(JB):	0.00
Kurtosis:	22.682	Cond. No.	179.

Appendix C - Fama French Three Factor + PC Model Results

BA Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.345
Model:	OLS	Adj. R-squared:	0.344
Method:	Least Squares	F-statistic:	722.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:03	Log-Likelihood:	15035.
No. Observations:	5505	AIC:	-3.006e+04
Df Residuals:	5500	BIC:	-3.003e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0026	0.000	7.775	0.000	0.002	0.003
Mkt_rf	0.9195	0.018	51.427	0.000	0.884	0.955
SMB	-0.0436	0.035	-1.240	0.215	-0.113	0.025
HML	0.1749	0.033	5.305	0.000	0.110	0.240
BA_PC	-0.0028	0.000	-9.534	0.000	-0.003	-0.002

Omnibus:	809.584	Durbin-Watson:	1.976
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12483.258
Skew:	-0.076	Prob(JB):	0.00
Kurtosis:	10.376	Cond. No.	238.

GS Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.550
Model:	OLS	Adj. R-squared:	0.550
Method:	Least Squares	F-statistic:	1380.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:03	Log-Likelihood:	12239.
No. Observations:	4521	AIC:	-2.447e+04
Df Residuals:	4516	BIC:	-2.444e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	3.370	0.001	0.000	0.002
Mkt_rf	1.3948	0.020	70.747	0.000	1.356	1.433
SMB	-0.2129	0.040	-5.343	0.000	-0.291	-0.135
HML	0.5481	0.036	15.240	0.000	0.478	0.619
GS_PC	-0.0010	0.000	-4.297	0.000	-0.001	-0.001

Omnibus:	953.925	Durbin-Watson:	2.081
Prob(Omnibus):	0.000	Jarque-Bera (JB):	24262.442
Skew:	0.377	Prob(JB):	0.00
Kurtosis:	14.324	Cond. No.	271.

MMM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.392
Model:	OLS	Adj. R-squared:	0.392
Method:	Least Squares	F-statistic:	887.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:04	Log-Likelihood:	16689.
No. Observations:	5505	AIC:	-3.337e+04
Df Residuals:	5500	BIC:	-3.333e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0007	0.000	3.741	0.000	0.000	0.001
Mkt_rf	0.7678	0.013	58.267	0.000	0.742	0.794
SMB	-0.1871	0.026	-7.179	0.000	-0.238	-0.136
HML	0.2414	0.024	9.880	0.000	0.193	0.289
MMM_PC	-0.0005	9.41e-05	-5.227	0.000	-0.001	-0.000

Omnibus:	798.136	Durbin-Watson:	2.054
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12153.373
Skew:	0.027	Prob(JB):	0.00
Kurtosis:	10.279	Cond. No.	365.

UNH Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.190
Model:	OLS	Adj. R-squared:	0.189
Method:	Least Squares	F-statistic:	321.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	3.76e-249
Time:	11:12:04	Log-Likelihood:	13679.
No. Observations:	5505	AIC:	-2.735e+04
Df Residuals:	5500	BIC:	-2.731e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0008	0.000	2.738	0.006	0.000	0.001
Mkt_rf	0.8002	0.023	35.175	0.000	0.756	0.845
SMB	-0.2377	0.045	-5.280	0.000	-0.326	-0.149
HML	0.2342	0.042	5.551	0.000	0.151	0.317
UNH_PC	-0.0002	7.21e-05	-2.800	0.005	-0.000	-6.05e-05

Omnibus:	2080.606	Durbin-Watson:	2.005
Prob(Omnibus):	0.000	Jarque-Bera (JB):	172620.306
Skew:	-0.898	Prob(JB):	0.00
Kurtosis:	30.374	Cond. No.	669.

HD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.399
Model:	OLS	Adj. R-squared:	0.398
Method:	Least Squares	F-statistic:	911.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:05	Log-Likelihood:	15108.
No. Observations:	5505	AIC:	-3.021e+04
Df Residuals:	5500	BIC:	-3.017e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0014	0.000	4.862	0.000	0.001	0.002
Mkt_rf	1.0452	0.018	59.430	0.000	1.011	1.080
SMB	-0.1953	0.035	-5.622	0.000	-0.263	-0.127
HML	0.0500	0.033	1.538	0.124	-0.014	0.114
HD_PC	-0.0014	0.000	-5.545	0.000	-0.002	-0.001

Omnibus:	1833.923	Durbin-Watson:	2.026
Prob(Omnibus):	0.000	Jarque-Bera (JB):	79203.495
Skew:	-0.866	Prob(JB):	0.00
Kurtosis:	21.501	Cond. No.	234.

AAPL Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.250
Model:	OLS	Adj. R-squared:	0.249
Method:	Least Squares	F-statistic:	458.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:06	Log-Likelihood:	12525.
No. Observations:	5505	AIC:	-2.504e+04
Df Residuals:	5500	BIC:	-2.501e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0018	0.000	4.003	0.000	0.001	0.003
Mkt_rf	1.1194	0.028	39.870	0.000	1.064	1.174
SMB	0.0614	0.056	1.106	0.269	-0.047	0.170
HML	-0.6952	0.052	-13.363	0.000	-0.797	-0.593
AAPL_PC	-0.0013	0.000	-3.008	0.003	-0.002	-0.000

Omnibus:	1939.456	Durbin-Watson:	1.992
Prob(Omnibus):	0.000	Jarque-Bera (JB):	383489.273
Skew:	-0.491	Prob(JB):	0.00
Kurtosis:	43.877	Cond. No.	220.

IBM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.399
Model:	OLS	Adj. R-squared:	0.398
Method:	Least Squares	F-statistic:	911.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:06	Log-Likelihood:	15797.
No. Observations:	5505	AIC:	-3.158e+04
Df Residuals:	5500	BIC:	-3.155e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0029	0.000	7.367	0.000	0.002	0.004
Mkt_rf	0.8791	0.016	56.252	0.000	0.848	0.910
SMB	-0.2461	0.031	-8.030	0.000	-0.306	-0.186
HML	-0.3248	0.029	-11.308	0.000	-0.381	-0.269
IBM_PC	-0.0029	0.000	-7.895	0.000	-0.004	-0.002

Omnibus:	1108.032	Durbin-Watson:	1.955
Prob(Omnibus):	0.000	Jarque-Bera (JB):	38131.045
Skew:	-0.003	Prob(JB):	0.00
Kurtosis:	15.893	Cond. No.	236.

MCD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.219
Model:	OLS	Adj. R-squared:	0.218
Method:	Least Squares	F-statistic:	384.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	1.16e-292
Time:	11:12:07	Log-Likelihood:	15867.
No. Observations:	5505	AIC:	-3.172e+04
Df Residuals:	5500	BIC:	-3.169e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	4.861	0.000	0.001	0.002
Mkt_rf	0.5748	0.015	37.545	0.000	0.545	0.605
SMB	-0.2449	0.030	-8.096	0.000	-0.304	-0.186
HML	0.0396	0.028	1.397	0.162	-0.016	0.095
MCD_PC	-0.0009	0.000	-6.675	0.000	-0.001	-0.001

Omnibus:	768.742	Durbin-Watson:	2.027
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9885.715
Skew:	0.167	Prob(JB):	0.00
Kurtosis:	9.556	Cond. No.	295.

CAT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.411
Model:	OLS	Adj. R-squared:	0.411
Method:	Least Squares	F-statistic:	961.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:07	Log-Likelihood:	14960.
No. Observations:	5505	AIC:	-2.991e+04
Df Residuals:	5500	BIC:	-2.988e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0009	0.000	3.491	0.000	0.000	0.001
Mkt_rf	1.0858	0.018	60.084	0.000	1.050	1.121
SMB	0.0520	0.036	1.456	0.145	-0.018	0.122
HML	0.4282	0.033	12.807	0.000	0.363	0.494
CAT_PC	-0.0007	0.000	-5.396	0.000	-0.001	-0.000

Omnibus:	781.220	Durbin-Watson:	2.019
Prob(Omnibus):	0.000	Jarque-Bera (JB):	11215.650
Skew:	0.072	Prob(JB):	0.00
Kurtosis:	9.991	Cond. No.	376.

TRV Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.424
Model:	OLS	Adj. R-squared:	0.424
Method:	Least Squares	F-statistic:	1011.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:08	Log-Likelihood:	15671.
No. Observations:	5497	AIC:	-3.133e+04
Df Residuals:	5492	BIC:	-3.130e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	4.348e-05	0.000	0.229	0.819	-0.000	0.000
Mkt_rf	0.9466	0.016	60.026	0.000	0.916	0.977
SMB	-0.3484	0.031	-11.157	0.000	-0.410	-0.287
HML	0.6209	0.029	21.217	0.000	0.564	0.678
TRV_PC	-1.265e-05	5.32e-06	-2.378	0.017	-2.31e-05	-2.22e-06

Omnibus:	1477.223	Durbin-Watson:	1.985
Prob(Omnibus):	0.000	Jarque-Bera (JB):	33155.353
Skew:	0.749	Prob(JB):	0.00
Kurtosis:	14.938	Cond. No.	5.97e+03

JNJ Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.300
Model:	OLS	Adj. R-squared:	0.299
Method:	Least Squares	F-statistic:	588.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:08	Log-Likelihood:	17061.
No. Observations:	5505	AIC:	-3.411e+04
Df Residuals:	5500	BIC:	-3.408e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0014	0.000	6.562	0.000	0.001	0.002
Mkt_rf	0.5423	0.012	43.932	0.000	0.518	0.567
SMB	-0.4453	0.024	-18.287	0.000	-0.493	-0.398
HML	-0.0094	0.023	-0.412	0.680	-0.054	0.035
JNJ_PC	-0.0014	0.000	-7.619	0.000	-0.002	-0.001

Omnibus:	928.172	Durbin-Watson:	1.949
Prob(Omnibus):	0.000	Jarque-Bera (JB):	19123.081
Skew:	-0.106	Prob(JB):	0.00
Kurtosis:	12.128	Cond. No.	242.

UTX Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.449
Model:	OLS	Adj. R-squared:	0.449
Method:	Least Squares	F-statistic:	1121.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:09	Log-Likelihood:	16252.
No. Observations:	5505	AIC:	-3.249e+04
Df Residuals:	5500	BIC:	-3.246e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0005	0.000	2.529	0.011	0.000	0.001
Mkt_rf	0.9447	0.014	66.148	0.000	0.917	0.973
SMB	-0.1466	0.028	-5.194	0.000	-0.202	-0.091
HML	0.2212	0.026	8.366	0.000	0.169	0.273
UTX_PC	-0.0003	9e-05	-3.428	0.001	-0.000	-0.000

Omnibus:	2149.907	Durbin-Watson:	2.094
Prob(Omnibus):	0.000	Jarque-Bera (JB):	143195.129
Skew:	-1.022	Prob(JB):	0.00
Kurtosis:	27.902	Cond. No.	370.

V Model
01/02/2009 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.434
Model:	OLS	Adj. R-squared:	0.433
Method:	Least Squares	F-statistic:	449.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	7.08e-288
Time:	11:12:09	Log-Likelihood:	6616.7
No. Observations:	2351	AIC:	-1.322e+04
Df Residuals:	2346	BIC:	-1.319e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0038	0.001	6.203	0.000	0.003	0.005
Mkt_rf	0.9495	0.026	36.527	0.000	0.898	1.000
SMB	-0.0968	0.051	-1.884	0.060	-0.198	0.004
HML	0.0253	0.045	0.566	0.571	-0.062	0.113
V_PC	-0.0043	0.001	-6.095	0.000	-0.006	-0.003

Omnibus:	498.405	Durbin-Watson:	2.092
Prob(Omnibus):	0.000	Jarque-Bera (JB):	15867.094
Skew:	0.228	Prob(JB):	0.00
Kurtosis:	15.719	Cond. No.	222.

JPM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.629
Model:	OLS	Adj. R-squared:	0.628
Method:	Least Squares	F-statistic:	2327.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:10	Log-Likelihood:	15253.
No. Observations:	5505	AIC:	-3.050e+04
Df Residuals:	5500	BIC:	-3.046e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	3.744	0.000	0.001	0.002
Mkt_rf	1.5201	0.017	88.462	0.000	1.486	1.554
SMB	-0.2974	0.034	-8.787	0.000	-0.364	-0.231
HML	1.2026	0.032	37.941	0.000	1.140	1.265
JPM_PC	-0.0011	0.000	-5.882	0.000	-0.002	-0.001

Omnibus:	1206.713	Durbin-Watson:	1.972
Prob(Omnibus):	0.000	Jarque-Bera (JB):	26350.634
Skew:	0.497	Prob(JB):	0.00
Kurtosis:	13.672	Cond. No.	281.

CVX Model
01/02/2002 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.549
Model:	OLS	Adj. R-squared:	0.548
Method:	Least Squares	F-statistic:	1207.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:10	Log-Likelihood:	12353.
No. Observations:	3977	AIC:	-2.470e+04
Df Residuals:	3972	BIC:	-2.466e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0021	0.000	6.768	0.000	0.001	0.003
Mkt_rf	0.9820	0.015	64.697	0.000	0.952	1.012
SMB	-0.3470	0.031	-11.262	0.000	-0.407	-0.287
HML	0.0535	0.029	1.832	0.067	-0.004	0.111
CVX_PC	-0.0022	0.000	-8.183	0.000	-0.003	-0.002

Omnibus:	375.542	Durbin-Watson:	2.029
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2748.040
Skew:	-0.012	Prob(JB):	0.00
Kurtosis:	7.072	Cond. No.	259.

DIS Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.426
Model:	OLS	Adj. R-squared:	0.425
Method:	Least Squares	F-statistic:	1018.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:11	Log-Likelihood:	15448.
No. Observations:	5505	AIC:	-3.089e+04
Df Residuals:	5500	BIC:	-3.085e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0015	0.000	5.320	0.000	0.001	0.002
Mkt_rf	1.0321	0.017	62.173	0.000	1.000	1.065
SMB	-0.1223	0.033	-3.746	0.000	-0.186	-0.058
HML	0.0958	0.031	3.132	0.002	0.036	0.156
DIS_PC	-0.0018	0.000	-6.966	0.000	-0.002	-0.001

Omnibus:	1105.919	Durbin-Watson:	2.070
Prob(Omnibus):	0.000	Jarque-Bera (JB):	28644.434
Skew:	0.298	Prob(JB):	0.00
Kurtosis:	14.159	Cond. No.	229.

AXP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.570
Model:	OLS	Adj. R-squared:	0.570
Method:	Least Squares	F-statistic:	1824.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:11	Log-Likelihood:	15332.
No. Observations:	5505	AIC:	-3.065e+04
Df Residuals:	5500	BIC:	-3.062e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0007	0.000	2.888	0.004	0.000	0.001
Mkt_rf	1.3874	0.017	82.049	0.000	1.354	1.421
SMB	-0.3697	0.033	-11.090	0.000	-0.435	-0.304
HML	0.6731	0.031	21.536	0.000	0.612	0.734
AXP_PC	-0.0007	0.000	-4.624	0.000	-0.001	-0.000

Omnibus:	1231.641	Durbin-Watson:	2.084
Prob(Omnibus):	0.000	Jarque-Bera (JB):	32976.771
Skew:	0.443	Prob(JB):	0.00
Kurtosis:	14.957	Cond. No.	297.

MSFT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.469
Model:	OLS	Adj. R-squared:	0.468
Method:	Least Squares	F-statistic:	1213.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:12	Log-Likelihood:	15441.
No. Observations:	5505	AIC:	-3.087e+04
Df Residuals:	5500	BIC:	-3.084e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0020	0.000	5.747	0.000	0.001	0.003
Mkt_rf	1.0804	0.017	65.107	0.000	1.048	1.113
SMB	-0.3092	0.033	-9.459	0.000	-0.373	-0.245
HML	-0.5230	0.031	-17.063	0.000	-0.583	-0.463
MSFT_PC	-0.0025	0.000	-5.952	0.000	-0.003	-0.002

Omnibus:	1027.550	Durbin-Watson:	1.947
Prob(Omnibus):	0.000	Jarque-Bera (JB):	28170.924
Skew:	-0.063	Prob(JB):	0.00
Kurtosis:	14.082	Cond. No.	208.

WMT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.302
Model:	OLS	Adj. R-squared:	0.301
Method:	Least Squares	F-statistic:	594.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:12	Log-Likelihood:	15788.
No. Observations:	5505	AIC:	-3.157e+04
Df Residuals:	5500	BIC:	-3.153e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0016	0.000	5.818	0.000	0.001	0.002
Mkt_rf	0.6931	0.016	44.597	0.000	0.663	0.724
SMB	-0.4978	0.031	-16.217	0.000	-0.558	-0.438
HML	-0.1587	0.029	-5.517	0.000	-0.215	-0.102
WMT_PC	-0.0018	0.000	-6.877	0.000	-0.002	-0.001

Omnibus:	712.474	Durbin-Watson:	2.040
Prob(Omnibus):	0.000	Jarque-Bera (JB):	7538.069
Skew:	0.204	Prob(JB):	0.00
Kurtosis:	8.718	Cond. No.	228.

PG Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.238
Model:	OLS	Adj. R-squared:	0.238
Method:	Least Squares	F-statistic:	430.1
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	5.93e-323
Time:	11:12:13	Log-Likelihood:	16312.
No. Observations:	5505	AIC:	-3.261e+04
Df Residuals:	5500	BIC:	-3.258e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0012	0.000	5.150	0.000	0.001	0.002
Mkt_rf	0.5253	0.014	37.198	0.000	0.498	0.553
SMB	-0.4778	0.028	-17.124	0.000	-0.533	-0.423
HML	0.1202	0.026	4.597	0.000	0.069	0.171
PG_PC	-0.0011	0.000	-6.309	0.000	-0.001	-0.001

Omnibus:	3921.621	Durbin-Watson:	2.016
Prob(Omnibus):	0.000	Jarque-Bera (JB):	730304.122
Skew:	-2.435	Prob(JB):	0.00
Kurtosis:	59.215	Cond. No.	262.

XOM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.398
Model:	OLS	Adj. R-squared:	0.398
Method:	Least Squares	F-statistic:	910.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:13	Log-Likelihood:	16528.
No. Observations:	5505	AIC:	-3.305e+04
Df Residuals:	5500	BIC:	-3.301e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0012	0.000	5.198	0.000	0.001	0.002
Mkt_rf	0.7837	0.014	57.729	0.000	0.757	0.810
SMB	-0.3371	0.027	-12.563	0.000	-0.390	-0.284
HML	0.2741	0.025	10.895	0.000	0.225	0.323
XOM_PC	-0.0015	0.000	-7.365	0.000	-0.002	-0.001

Omnibus:	710.252	Durbin-Watson:	2.079
Prob(Omnibus):	0.000	Jarque-Bera (JB):	7624.508
Skew:	0.189	Prob(JB):	0.00
Kurtosis:	8.753	Cond. No.	227.

DWDP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.408
Model:	OLS	Adj. R-squared:	0.407
Method:	Least Squares	F-statistic:	946.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:14	Log-Likelihood:	14852.
No. Observations:	5505	AIC:	-2.969e+04
Df Residuals:	5500	BIC:	-2.966e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	6.632e-05	0.000	0.283	0.777	-0.000	0.001
Mkt_rf	1.0801	0.018	58.741	0.000	1.044	1.116
SMB	0.0577	0.036	1.586	0.113	-0.014	0.129
HML	0.6471	0.034	18.983	0.000	0.580	0.714
DWDP_PC	-0.0002	7.32e-05	-2.361	0.018	-0.000	-2.93e-05

Omnibus:	1197.954	Durbin-Watson:	2.046
Prob(Omnibus):	0.000	Jarque-Bera (JB):	40225.114
Skew:	0.292	Prob(JB):	0.00
Kurtosis:	16.230	Cond. No.	539.

NKE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.238
Model:	OLS	Adj. R-squared:	0.238
Method:	Least Squares	F-statistic:	429.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	7.41e-323
Time:	11:12:14	Log-Likelihood:	14338.
No. Observations:	5505	AIC:	-2.867e+04
Df Residuals:	5500	BIC:	-2.863e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0010	0.000	3.565	0.000	0.000	0.001
Mkt_rf	0.8270	0.020	40.995	0.000	0.787	0.867
SMB	0.0252	0.040	0.630	0.529	-0.053	0.103
HML	0.0956	0.037	2.553	0.011	0.022	0.169
NKE_PC	-0.0005	9.88e-05	-5.011	0.000	-0.001	-0.000

Omnibus:	1107.305	Durbin-Watson:	2.030
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35754.189
Skew:	0.138	Prob(JB):	0.00
Kurtosis:	15.482	Cond. No.	460.

MRK Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.279
Model:	OLS	Adj. R-squared:	0.279
Method:	Least Squares	F-statistic:	532.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:15	Log-Likelihood:	15335.
No. Observations:	5505	AIC:	-3.066e+04
Df Residuals:	5500	BIC:	-3.063e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0015	0.000	5.344	0.000	0.001	0.002
Mkt_rf	0.7285	0.017	43.222	0.000	0.695	0.762
SMB	-0.4699	0.033	-14.102	0.000	-0.535	-0.405
HML	0.0166	0.031	0.533	0.594	-0.045	0.078
MRK_PC	-0.0019	0.000	-7.466	0.000	-0.002	-0.001

Omnibus:	2346.956	Durbin-Watson:	1.957
Prob(Omnibus):	0.000	Jarque-Bera (JB):	171405.603
Skew:	-1.171	Prob(JB):	0.00
Kurtosis:	30.236	Cond. No.	228.

INTC Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.456
Model:	OLS	Adj. R-squared:	0.456
Method:	Least Squares	F-statistic:	1154.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:15	Log-Likelihood:	14362.
No. Observations:	5505	AIC:	-2.871e+04
Df Residuals:	5500	BIC:	-2.868e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0035	0.000	7.480	0.000	0.003	0.004
Mkt_rf	1.2707	0.020	62.867	0.000	1.231	1.310
SMB	-0.2419	0.040	-6.080	0.000	-0.320	-0.164
HML	-0.6584	0.037	-17.665	0.000	-0.731	-0.585
INTC_PC	-0.0049	0.001	-8.327	0.000	-0.006	-0.004

Omnibus:	1380.779	Durbin-Watson:	1.989
Prob(Omnibus):	0.000	Jarque-Bera (JB):	37707.541
Skew:	-0.592	Prob(JB):	0.00
Kurtosis:	15.767	Cond. No.	207.

VZ Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.351
Model:	OLS	Adj. R-squared:	0.350
Method:	Least Squares	F-statistic:	579.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:16	Log-Likelihood:	12715.
No. Observations:	4295	AIC:	-2.542e+04
Df Residuals:	4290	BIC:	-2.539e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0016	0.000	5.650	0.000	0.001	0.002
Mkt_rf	0.7321	0.016	45.918	0.000	0.701	0.763
SMB	-0.4021	0.034	-11.863	0.000	-0.469	-0.336
HML	0.0691	0.029	2.342	0.019	0.011	0.127
VZ_PC	-0.0019	0.000	-8.004	0.000	-0.002	-0.001

Omnibus:	769.308	Durbin-Watson:	1.947
Prob(Omnibus):	0.000	Jarque-Bera (JB):	12596.386
Skew:	0.360	Prob(JB):	0.00
Kurtosis:	11.359	Cond. No.	260.

KO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.264
Model:	OLS	Adj. R-squared:	0.263
Method:	Least Squares	F-statistic:	492.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:16	Log-Likelihood:	16444.
No. Observations:	5505	AIC:	-3.288e+04
Df Residuals:	5500	BIC:	-3.284e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0015	0.000	6.291	0.000	0.001	0.002
Mkt_rf	0.5458	0.014	39.512	0.000	0.519	0.573
SMB	-0.4716	0.027	-17.309	0.000	-0.525	-0.418
HML	0.0669	0.026	2.619	0.009	0.017	0.117
KO_PC	-0.0017	0.000	-8.477	0.000	-0.002	-0.001

Omnibus:	766.390	Durbin-Watson:	1.941
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10778.156
Skew:	-0.005	Prob(JB):	0.00
Kurtosis:	9.855	Cond. No.	239.

CSCO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.481
Model:	OLS	Adj. R-squared:	0.481
Method:	Least Squares	F-statistic:	1275.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:17	Log-Likelihood:	14137.
No. Observations:	5505	AIC:	-2.826e+04
Df Residuals:	5500	BIC:	-2.823e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0034	0.000	7.061	0.000	0.002	0.004
Mkt_rf	1.3625	0.021	64.610	0.000	1.321	1.404
SMB	-0.1727	0.041	-4.168	0.000	-0.254	-0.091
HML	-0.9097	0.039	-23.429	0.000	-0.986	-0.834
CSCO_PC	-0.0051	0.001	-7.576	0.000	-0.006	-0.004

Omnibus:	1027.662	Durbin-Watson:	2.074
Prob(Omnibus):	0.000	Jarque-Bera (JB):	23688.841
Skew:	0.241	Prob(JB):	0.00
Kurtosis:	13.151	Cond. No.	198.

PFE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.326
Model:	OLS	Adj. R-squared:	0.326
Method:	Least Squares	F-statistic:	665.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:17	Log-Likelihood:	15652.
No. Observations:	5505	AIC:	-3.129e+04
Df Residuals:	5500	BIC:	-3.126e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0019	0.000	6.689	0.000	0.001	0.002
Mkt_rf	0.7713	0.016	48.438	0.000	0.740	0.803
SMB	-0.4507	0.031	-14.325	0.000	-0.512	-0.389
HML	-0.0024	0.029	-0.080	0.936	-0.060	0.055
PFE_PC	-0.0028	0.000	-8.605	0.000	-0.003	-0.002

Omnibus:	804.099	Durbin-Watson:	1.971
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9904.410
Skew:	-0.262	Prob(JB):	0.00
Kurtosis:	9.550	Cond. No.	208.

GE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.566
Model:	OLS	Adj. R-squared:	0.566
Method:	Least Squares	F-statistic:	1796.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:12:18	Log-Likelihood:	16404.
No. Observations:	5505	AIC:	-3.280e+04
Df Residuals:	5500	BIC:	-3.277e+04
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0015	0.000	5.383	0.000	0.001	0.002
Mkt_rf	1.1388	0.014	81.289	0.000	1.111	1.166
SMB	-0.3607	0.027	-13.144	0.000	-0.415	-0.307
HML	0.3223	0.026	12.533	0.000	0.272	0.373
GE_PC	-0.0021	0.000	-7.408	0.000	-0.003	-0.002

Omnibus:	1472.851	Durbin-Watson:	2.022
Prob(Omnibus):	0.000	Jarque-Bera (JB):	87015.365
Skew:	0.397	Prob(JB):	0.00
Kurtosis:	22.461	Cond. No.	220.

Appendix D – Fama French Five Factor Model Results

BA Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.346
Model:	OLS	Adj. R-squared:	0.345
Method:	Least Squares	F-statistic:	580.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:42	Log-Likelihood:	15040.
No. Observations:	5505	AIC:	-3.007e+04
Df Residuals:	5499	BIC:	-3.003e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.092e-05	0.000	0.051	0.959	-0.000	0.000
Mkt_rf	1.0373	0.020	50.711	0.000	0.997	1.077
SMB	0.0206	0.037	0.550	0.583	-0.053	0.094
HML	0.0051	0.038	0.133	0.894	-0.070	0.080
RMW	0.2734	0.050	5.485	0.000	0.176	0.371
CMA	0.4396	0.060	7.307	0.000	0.322	0.558

Omnibus:	822.732	Durbin-Watson:	1.980
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13041.017
Skew:	-0.087	Prob(JB):	0.00
Kurtosis:	10.538	Cond. No.	308.

GS Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.574
Model:	OLS	Adj. R-squared:	0.574
Method:	Least Squares	F-statistic:	1217.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:42	Log-Likelihood:	12364.
No. Observations:	4521	AIC:	-2.472e+04
Df Residuals:	4515	BIC:	-2.468e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0004	0.000	1.513	0.130	-0.000	0.001
Mkt_rf	1.2256	0.022	55.773	0.000	1.183	1.269
SMB	-0.3077	0.041	-7.504	0.000	-0.388	-0.227
HML	0.8082	0.040	20.222	0.000	0.730	0.887
RMW	-0.5460	0.052	-10.443	0.000	-0.648	-0.443
CMA	-0.7116	0.066	-10.800	0.000	-0.841	-0.582

Omnibus:	898.078	Durbin-Watson:	2.090
Prob(Omnibus):	0.000	Jarque-Bera (JB):	25566.879
Skew:	0.209	Prob(JB):	0.00
Kurtosis:	14.643	Cond. No.	304.

MMM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.422
Model:	OLS	Adj. R-squared:	0.421
Method:	Least Squares	F-statistic:	801.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:43	Log-Likelihood:	16825.
No. Observations:	5505	AIC:	-3.364e+04
Df Residuals:	5499	BIC:	-3.360e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-3.279e-05	0.000	-0.213	0.831	-0.000	0.000
Mkt_rf	0.8986	0.015	60.757	0.000	0.870	0.928
SMB	-0.1001	0.027	-3.697	0.000	-0.153	-0.047
HML	0.0452	0.028	1.634	0.102	-0.009	0.100
RMW	0.3905	0.036	10.833	0.000	0.320	0.461
CMA	0.5095	0.044	11.713	0.000	0.424	0.595

Omnibus:	837.204	Durbin-Watson:	2.062
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13856.554
Skew:	0.077	Prob(JB):	0.00
Kurtosis:	10.771	Cond. No.	308.

UNH Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.195
Model:	OLS	Adj. R-squared:	0.194
Method:	Least Squares	F-statistic:	266.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	1.21e-255
Time:	11:13:43	Log-Likelihood:	13697.
No. Observations:	5505	AIC:	-2.738e+04
Df Residuals:	5499	BIC:	-2.734e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0004	0.000	1.554	0.120	-0.000	0.001
Mkt_rf	0.8880	0.026	34.013	0.000	0.837	0.939
SMB	-0.1693	0.048	-3.543	0.000	-0.263	-0.076
HML	0.1135	0.049	2.323	0.020	0.018	0.209
RMW	0.3011	0.064	4.731	0.000	0.176	0.426
CMA	0.2887	0.077	3.760	0.000	0.138	0.439

Omnibus:	2120.337	Durbin-Watson:	2.002
Prob(Omnibus):	0.000	Jarque-Bera (JB):	170926.207
Skew:	-0.942	Prob(JB):	0.00
Kurtosis:	30.233	Cond. No.	308.

HD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.403
Model:	OLS	Adj. R-squared:	0.402
Method:	Least Squares	F-statistic:	742.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:44	Log-Likelihood:	15128.
No. Observations:	5505	AIC:	-3.024e+04
Df Residuals:	5499	BIC:	-3.020e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	0.902	0.367	-0.000	0.001
Mkt_rf	1.1254	0.020	55.912	0.000	1.086	1.165
SMB	-0.0890	0.037	-2.415	0.016	-0.161	-0.017
HML	0.0069	0.038	0.184	0.854	-0.067	0.081
RMW	0.4027	0.049	8.207	0.000	0.306	0.499
CMA	0.0339	0.059	0.573	0.567	-0.082	0.150

Omnibus:	1905.959	Durbin-Watson:	2.021
Prob(Omnibus):	0.000	Jarque-Bera (JB):	91327.237
Skew:	-0.900	Prob(JB):	0.00
Kurtosis:	22.873	Cond. No.	308.

AAPL Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.268
Model:	OLS	Adj. R-squared:	0.268
Method:	Least Squares	F-statistic:	403.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:44	Log-Likelihood:	12593.
No. Observations:	5505	AIC:	-2.517e+04
Df Residuals:	5499	BIC:	-2.513e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	3.270	0.001	0.000	0.002
Mkt_rf	0.9598	0.032	30.088	0.000	0.897	1.022
SMB	0.0235	0.058	0.402	0.688	-0.091	0.138
HML	-0.3343	0.060	-5.598	0.000	-0.451	-0.217
RMW	-0.2382	0.078	-3.063	0.002	-0.391	-0.086
CMA	-1.0362	0.094	-11.044	0.000	-1.220	-0.852

Omnibus:	1904.713	Durbin-Watson:	1.989
Prob(Omnibus):	0.000	Jarque-Bera (JB):	385718.888
Skew:	-0.439	Prob(JB):	0.00
Kurtosis:	43.998	Cond. No.	308.

IBM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.392
Model:	OLS	Adj. R-squared:	0.391
Method:	Least Squares	F-statistic:	708.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:45	Log-Likelihood:	15766.
No. Observations:	5505	AIC:	-3.152e+04
Df Residuals:	5499	BIC:	-3.148e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	0.872	0.383	-0.000	0.001
Mkt_rf	0.8940	0.018	49.878	0.000	0.859	0.929
SMB	-0.2378	0.033	-7.246	0.000	-0.302	-0.173
HML	-0.3220	0.034	-9.595	0.000	-0.388	-0.256
RMW	0.0097	0.044	0.221	0.825	-0.076	0.095
CMA	-0.0333	0.053	-0.631	0.528	-0.137	0.070

Omnibus:	1108.852	Durbin-Watson:	1.952
Prob(Omnibus):	0.000	Jarque-Bera (JB):	38232.470
Skew:	0.010	Prob(JB):	0.00
Kurtosis:	15.910	Cond. No.	308.

MCD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.240
Model:	OLS	Adj. R-squared:	0.239
Method:	Least Squares	F-statistic:	346.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	1.48e-323
Time:	11:13:45	Log-Likelihood:	15942.
No. Observations:	5505	AIC:	-3.187e+04
Df Residuals:	5499	BIC:	-3.183e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	7.233e-05	0.000	0.400	0.689	-0.000	0.000
Mkt_rf	0.7016	0.017	40.412	0.000	0.668	0.736
SMB	-0.1345	0.032	-4.230	0.000	-0.197	-0.072
HML	-0.1167	0.033	-3.592	0.000	-0.180	-0.053
RMW	0.4637	0.042	10.956	0.000	0.381	0.547
CMA	0.3450	0.051	6.757	0.000	0.245	0.445

Omnibus:	770.529	Durbin-Watson:	2.014
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10318.684
Skew:	0.131	Prob(JB):	0.00
Kurtosis:	9.702	Cond. No.	308.

CAT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.423
Model:	OLS	Adj. R-squared:	0.423
Method:	Least Squares	F-statistic:	807.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:46	Log-Likelihood:	15016.
No. Observations:	5505	AIC:	-3.002e+04
Df Residuals:	5499	BIC:	-2.998e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-8.095e-05	0.000	-0.379	0.705	-0.001	0.000
Mkt_rf	1.2146	0.021	59.128	0.000	1.174	1.255
SMB	0.1695	0.038	4.508	0.000	0.096	0.243
HML	0.2772	0.038	7.209	0.000	0.202	0.353
RMW	0.4842	0.050	9.671	0.000	0.386	0.582
CMA	0.3229	0.060	5.344	0.000	0.204	0.441

Omnibus:	777.003	Durbin-Watson:	2.020
Prob(Omnibus):	0.000	Jarque-Bera (JB):	11181.046
Skew:	0.036	Prob(JB):	0.00
Kurtosis:	9.981	Cond. No.	308.

TRV Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.426
Model:	OLS	Adj. R-squared:	0.426
Method:	Least Squares	F-statistic:	815.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:46	Log-Likelihood:	15682.
No. Observations:	5497	AIC:	-3.135e+04
Df Residuals:	5491	BIC:	-3.131e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-2.624e-05	0.000	-0.139	0.889	-0.000	0.000
Mkt_rf	0.9748	0.018	53.770	0.000	0.939	1.010
SMB	-0.3605	0.033	-10.857	0.000	-0.426	-0.295
HML	0.5344	0.034	15.746	0.000	0.468	0.601
RMW	-0.0195	0.044	-0.440	0.660	-0.106	0.067
CMA	0.2706	0.053	5.073	0.000	0.166	0.375

Omnibus:	1543.586	Durbin-Watson:	1.989
Prob(Omnibus):	0.000	Jarque-Bera (JB):	36654.286
Skew:	0.791	Prob(JB):	0.00
Kurtosis:	15.551	Cond. No.	308.

JNJ Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.366
Model:	OLS	Adj. R-squared:	0.365
Method:	Least Squares	F-statistic:	635.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:47	Log-Likelihood:	17335.
No. Observations:	5505	AIC:	-3.466e+04
Df Residuals:	5499	BIC:	-3.462e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	2.95e-06	0.000	0.021	0.983	-0.000	0.000
Mkt_rf	0.7195	0.013	53.380	0.000	0.693	0.746
SMB	-0.3120	0.025	-12.641	0.000	-0.360	-0.264
HML	-0.2535	0.025	-10.048	0.000	-0.303	-0.204
RMW	0.5794	0.033	17.635	0.000	0.515	0.644
CMA	0.5891	0.040	14.859	0.000	0.511	0.667

Omnibus:	890.036	Durbin-Watson:	1.976
Prob(Omnibus):	0.000	Jarque-Bera (JB):	17233.537
Skew:	0.010	Prob(JB):	0.00
Kurtosis:	11.668	Cond. No.	308.

UTX Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.465
Model:	OLS	Adj. R-squared:	0.464
Method:	Least Squares	F-statistic:	954.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:47	Log-Likelihood:	16330.
No. Observations:	5505	AIC:	-3.265e+04
Df Residuals:	5499	BIC:	-3.261e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	4.518e-05	0.000	0.268	0.789	-0.000	0.000
Mkt_rf	1.0530	0.016	65.077	0.000	1.021	1.085
SMB	-0.0605	0.030	-2.043	0.041	-0.119	-0.002
HML	0.0712	0.030	2.351	0.019	0.012	0.131
RMW	0.3654	0.039	9.266	0.000	0.288	0.443
CMA	0.3569	0.048	7.500	0.000	0.264	0.450

Omnibus:	2295.082	Durbin-Watson:	2.112
Prob(Omnibus):	0.000	Jarque-Bera (JB):	170169.601
Skew:	-1.121	Prob(JB):	0.00
Kurtosis:	30.145	Cond. No.	308.

V Model
01/02/2009 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.436
Model:	OLS	Adj. R-squared:	0.435
Method:	Least Squares	F-statistic:	362.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	1.51e-288
Time:	11:13:48	Log-Likelihood:	6621.4
No. Observations:	2351	AIC:	-1.323e+04
Df Residuals:	2345	BIC:	-1.320e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0006	0.000	2.103	0.036	4.27e-05	0.001
Mkt_rf	0.9019	0.028	32.675	0.000	0.848	0.956
SMB	-0.1222	0.053	-2.285	0.022	-0.227	-0.017
HML	0.0732	0.051	1.432	0.152	-0.027	0.174
RMW	-0.2449	0.097	-2.525	0.012	-0.435	-0.055
CMA	-0.6229	0.103	-6.043	0.000	-0.825	-0.421

Omnibus:	509.501	Durbin-Watson:	2.101
Prob(Omnibus):	0.000	Jarque-Bera (JB):	15310.745
Skew:	0.307	Prob(JB):	0.00
Kurtosis:	15.487	Cond. No.	368.

JPM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.645
Model:	OLS	Adj. R-squared:	0.645
Method:	Least Squares	F-statistic:	2002.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:48	Log-Likelihood:	15380.
No. Observations:	5505	AIC:	-3.075e+04
Df Residuals:	5499	BIC:	-3.071e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	7.415e-05	0.000	0.371	0.711	-0.000	0.000
Mkt_rf	1.3742	0.019	71.470	0.000	1.336	1.412
SMB	-0.3836	0.035	-10.896	0.000	-0.453	-0.315
HML	1.4854	0.036	41.270	0.000	1.415	1.556
RMW	-0.3861	0.047	-8.239	0.000	-0.478	-0.294
CMA	-0.7639	0.057	-13.507	0.000	-0.875	-0.653

Omnibus:	1070.051	Durbin-Watson:	1.968
Prob(Omnibus):	0.000	Jarque-Bera (JB):	18653.677
Skew:	0.437	Prob(JB):	0.00
Kurtosis:	11.975	Cond. No.	308.

CVX Model
01/02/2002 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.572
Model:	OLS	Adj. R-squared:	0.572
Method:	Least Squares	F-statistic:	1063.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:49	Log-Likelihood:	12460.
No. Observations:	3977	AIC:	-2.491e+04
Df Residuals:	3971	BIC:	-2.487e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0002	0.000	-0.906	0.365	-0.000	0.000
Mkt_rf	1.0926	0.016	68.481	0.000	1.061	1.124
SMB	-0.2359	0.031	-7.661	0.000	-0.296	-0.175
HML	0.1305	0.030	4.354	0.000	0.072	0.189
RMW	0.7702	0.045	17.031	0.000	0.682	0.859
CMA	0.1358	0.055	2.472	0.013	0.028	0.243

Omnibus:	340.930	Durbin-Watson:	2.030
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2084.262
Skew:	-0.114	Prob(JB):	0.00
Kurtosis:	6.539	Cond. No.	335.

DIS Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.426
Model:	OLS	Adj. R-squared:	0.426
Method:	Least Squares	F-statistic:	816.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:49	Log-Likelihood:	15451.
No. Observations:	5505	AIC:	-3.089e+04
Df Residuals:	5499	BIC:	-3.085e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	6.508e-05	0.000	0.329	0.742	-0.000	0.000
Mkt_rf	1.0661	0.019	56.161	0.000	1.029	1.103
SMB	-0.1645	0.035	-4.732	0.000	-0.233	-0.096
HML	-0.0167	0.036	-0.470	0.638	-0.086	0.053
RMW	-0.1545	0.046	-3.339	0.001	-0.245	-0.064
CMA	0.3947	0.056	7.069	0.000	0.285	0.504

Omnibus:	1126.219	Durbin-Watson:	2.064
Prob(Omnibus):	0.000	Jarque-Bera (JB):	28825.146
Skew:	0.333	Prob(JB):	0.00
Kurtosis:	14.190	Cond. No.	308.

AXP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.570
Model:	OLS	Adj. R-squared:	0.570
Method:	Least Squares	F-statistic:	1461.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:50	Log-Likelihood:	15334.
No. Observations:	5505	AIC:	-3.066e+04
Df Residuals:	5499	BIC:	-3.062e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.227e-05	0.000	0.061	0.952	-0.000	0.000
Mkt_rf	1.3883	0.019	71.599	0.000	1.350	1.426
SMB	-0.3297	0.036	-9.287	0.000	-0.399	-0.260
HML	0.7491	0.036	20.638	0.000	0.678	0.820
RMW	0.1390	0.047	2.941	0.003	0.046	0.232
CMA	-0.2534	0.057	-4.443	0.000	-0.365	-0.142

Omnibus:	1209.377	Durbin-Watson:	2.083
Prob(Omnibus):	0.000	Jarque-Bera (JB):	33386.168
Skew:	0.404	Prob(JB):	0.00
Kurtosis:	15.037	Cond. No.	308.

MSFT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.475
Model:	OLS	Adj. R-squared:	0.475
Method:	Least Squares	F-statistic:	996.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:50	Log-Likelihood:	15476.
No. Observations:	5505	AIC:	-3.094e+04
Df Residuals:	5499	BIC:	-3.090e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0004	0.000	1.797	0.072	-3.21e-05	0.001
Mkt_rf	1.0342	0.019	54.736	0.000	0.997	1.071
SMB	-0.2771	0.035	-8.009	0.000	-0.345	-0.209
HML	-0.3480	0.035	-9.840	0.000	-0.417	-0.279
RMW	0.0679	0.046	1.475	0.140	-0.022	0.158
CMA	-0.5723	0.056	-10.296	0.000	-0.681	-0.463

Omnibus:	999.638	Durbin-Watson:	1.948
Prob(Omnibus):	0.000	Jarque-Bera (JB):	25148.888
Skew:	-0.087	Prob(JB):	0.00
Kurtosis:	13.469	Cond. No.	308.

WMT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.319
Model:	OLS	Adj. R-squared:	0.319
Method:	Least Squares	F-statistic:	515.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:51	Log-Likelihood:	15857.
No. Observations:	5505	AIC:	-3.170e+04
Df Residuals:	5499	BIC:	-3.166e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	5.066e-05	0.000	0.276	0.783	-0.000	0.000
Mkt_rf	0.8164	0.018	46.302	0.000	0.782	0.851
SMB	-0.3738	0.032	-11.580	0.000	-0.437	-0.311
HML	-0.2761	0.033	-8.367	0.000	-0.341	-0.211
RMW	0.5243	0.043	12.199	0.000	0.440	0.609
CMA	0.2168	0.052	4.180	0.000	0.115	0.318

Omnibus:	703.732	Durbin-Watson:	2.019
Prob(Omnibus):	0.000	Jarque-Bera (JB):	6770.245
Skew:	0.250	Prob(JB):	0.00
Kurtosis:	8.410	Cond. No.	308.

PG Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.319
Model:	OLS	Adj. R-squared:	0.319
Method:	Least Squares	F-statistic:	516.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:51	Log-Likelihood:	16622.
No. Observations:	5505	AIC:	-3.323e+04
Df Residuals:	5499	BIC:	-3.319e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0001	0.000	-0.656	0.512	-0.000	0.000
Mkt_rf	0.7323	0.015	47.724	0.000	0.702	0.762
SMB	-0.3057	0.028	-10.881	0.000	-0.361	-0.251
HML	-0.1462	0.029	-5.090	0.000	-0.203	-0.090
RMW	0.7423	0.037	19.847	0.000	0.669	0.816
CMA	0.6255	0.045	13.859	0.000	0.537	0.714

Omnibus:	4051.894	Durbin-Watson:	2.047
Prob(Omnibus):	0.000	Jarque-Bera (JB):	912202.816
Skew:	-2.523	Prob(JB):	0.00
Kurtosis:	65.861	Cond. No.	308.

XOM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.466
Model:	OLS	Adj. R-squared:	0.466
Method:	Least Squares	F-statistic:	960.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:52	Log-Likelihood:	16858.
No. Observations:	5505	AIC:	-3.370e+04
Df Residuals:	5499	BIC:	-3.366e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0002	0.000	-1.396	0.163	-0.001	8.64e-05
Mkt_rf	0.9906	0.015	67.382	0.000	0.962	1.019
SMB	-0.1842	0.027	-6.845	0.000	-0.237	-0.131
HML	-0.0122	0.028	-0.443	0.658	-0.066	0.042
RMW	0.6768	0.036	18.887	0.000	0.607	0.747
CMA	0.7162	0.043	16.562	0.000	0.631	0.801

Omnibus:	656.685	Durbin-Watson:	2.060
Prob(Omnibus):	0.000	Jarque-Bera (JB):	5919.776
Skew:	0.212	Prob(JB):	0.00
Kurtosis:	8.062	Cond. No.	308.

DWDP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.425
Model:	OLS	Adj. R-squared:	0.425
Method:	Least Squares	F-statistic:	814.1
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:52	Log-Likelihood:	14935.
No. Observations:	5505	AIC:	-2.986e+04
Df Residuals:	5499	BIC:	-2.982e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0003	0.000	-1.333	0.183	-0.001	0.000
Mkt_rf	1.2172	0.021	58.391	0.000	1.176	1.258
SMB	0.1474	0.038	3.861	0.000	0.073	0.222
HML	0.4327	0.039	11.088	0.000	0.356	0.509
RMW	0.4093	0.051	8.055	0.000	0.310	0.509
CMA	0.5496	0.061	8.964	0.000	0.429	0.670

Omnibus:	1178.791	Durbin-Watson:	2.041
Prob(Omnibus):	0.000	Jarque-Bera (JB):	39907.402
Skew:	0.256	Prob(JB):	0.00
Kurtosis:	16.180	Cond. No.	308.

NKE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.247
Model:	OLS	Adj. R-squared:	0.246
Method:	Least Squares	F-statistic:	360.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:53	Log-Likelihood:	14368.
No. Observations:	5505	AIC:	-2.872e+04
Df Residuals:	5499	BIC:	-2.869e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0002	0.000	1.004	0.316	-0.000	0.001
Mkt_rf	0.9261	0.023	40.080	0.000	0.881	0.971
SMB	0.1512	0.042	3.575	0.000	0.068	0.234
HML	0.0206	0.043	0.477	0.633	-0.064	0.105
RMW	0.4952	0.056	8.793	0.000	0.385	0.606
CMA	0.1054	0.068	1.550	0.121	-0.028	0.239

Omnibus:	1100.602	Durbin-Watson:	2.030
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35639.820
Skew:	0.112	Prob(JB):	0.00
Kurtosis:	15.463	Cond. No.	308.

MRK Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.328
Model:	OLS	Adj. R-squared:	0.327
Method:	Least Squares	F-statistic:	536.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:53	Log-Likelihood:	15528.
No. Observations:	5505	AIC:	-3.104e+04
Df Residuals:	5499	BIC:	-3.100e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0002	0.000	-1.088	0.277	-0.001	0.000
Mkt_rf	0.9312	0.019	49.745	0.000	0.894	0.968
SMB	-0.3432	0.034	-10.015	0.000	-0.410	-0.276
HML	-0.3076	0.035	-8.780	0.000	-0.376	-0.239
RMW	0.5703	0.046	12.500	0.000	0.481	0.660
CMA	0.8247	0.055	14.979	0.000	0.717	0.933

Omnibus:	2289.992	Durbin-Watson:	1.948
Prob(Omnibus):	0.000	Jarque-Bera (JB):	174953.652
Skew:	-1.108	Prob(JB):	0.00
Kurtosis:	30.529	Cond. No.	308.

INTC Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.457
Model:	OLS	Adj. R-squared:	0.456
Method:	Least Squares	F-statistic:	925.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:54	Log-Likelihood:	14364.
No. Observations:	5505	AIC:	-2.872e+04
Df Residuals:	5499	BIC:	-2.868e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.129	0.259	-0.000	0.001
Mkt_rf	1.1912	0.023	51.515	0.000	1.146	1.237
SMB	-0.3032	0.042	-7.161	0.000	-0.386	-0.220
HML	-0.5128	0.043	-11.846	0.000	-0.598	-0.428
RMW	-0.3089	0.056	-5.480	0.000	-0.419	-0.198
CMA	-0.3850	0.068	-5.660	0.000	-0.518	-0.252

Omnibus:	1348.115	Durbin-Watson:	1.979
Prob(Omnibus):	0.000	Jarque-Bera (JB):	36223.057
Skew:	-0.566	Prob(JB):	0.00
Kurtosis:	15.516	Cond. No.	308.

VZ Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.368
Model:	OLS	Adj. R-squared:	0.367
Method:	Least Squares	F-statistic:	499.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:55	Log-Likelihood:	12772.
No. Observations:	4295	AIC:	-2.553e+04
Df Residuals:	4289	BIC:	-2.549e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0002	0.000	-1.115	0.265	-0.001	0.000
Mkt_rf	0.8482	0.018	47.225	0.000	0.813	0.883
SMB	-0.4032	0.034	-11.712	0.000	-0.471	-0.336
HML	-0.1097	0.033	-3.352	0.001	-0.174	-0.046
RMW	0.2559	0.044	5.760	0.000	0.169	0.343
CMA	0.5944	0.054	11.022	0.000	0.489	0.700

Omnibus:	756.583	Durbin-Watson:	1.941
Prob(Omnibus):	0.000	Jarque-Bera (JB):	14074.874
Skew:	0.271	Prob(JB):	0.00
Kurtosis:	11.852	Cond. No.	308.

KO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.330
Model:	OLS	Adj. R-squared:	0.329
Method:	Least Squares	F-statistic:	540.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:55	Log-Likelihood:	16703.
No. Observations:	5505	AIC:	-3.339e+04
Df Residuals:	5499	BIC:	-3.335e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0002	0.000	-1.227	0.220	-0.001	0.000
Mkt_rf	0.7432	0.015	49.148	0.000	0.714	0.773
SMB	-0.3276	0.028	-11.832	0.000	-0.382	-0.273
HML	-0.2009	0.028	-7.099	0.000	-0.256	-0.145
RMW	0.6435	0.037	17.458	0.000	0.571	0.716
CMA	0.6464	0.044	14.534	0.000	0.559	0.734

Omnibus:	816.915	Durbin-Watson:	1.948
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13088.457
Skew:	-0.008	Prob(JB):	0.00
Kurtosis:	10.554	Cond. No.	308.

CSCO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.519
Model:	OLS	Adj. R-squared:	0.518
Method:	Least Squares	F-statistic:	1186.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:56	Log-Likelihood:	14344.
No. Observations:	5505	AIC:	-2.868e+04
Df Residuals:	5499	BIC:	-2.864e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0006	0.000	2.520	0.012	0.000	0.001
Mkt_rf	1.1278	0.023	48.590	0.000	1.082	1.173
SMB	-0.3606	0.042	-8.484	0.000	-0.444	-0.277
HML	-0.5427	0.043	-12.490	0.000	-0.628	-0.457
RMW	-0.8491	0.057	-15.008	0.000	-0.960	-0.738
CMA	-0.9213	0.068	-13.494	0.000	-1.055	-0.787

Omnibus:	948.847	Durbin-Watson:	2.057
Prob(Omnibus):	0.000	Jarque-Bera (JB):	18399.290
Skew:	0.216	Prob(JB):	0.00
Kurtosis:	11.946	Cond. No.	308.

PFE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.362
Model:	OLS	Adj. R-squared:	0.361
Method:	Least Squares	F-statistic:	623.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:56	Log-Likelihood:	15802.
No. Observations:	5505	AIC:	-3.159e+04
Df Residuals:	5499	BIC:	-3.155e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0001	0.000	-0.646	0.518	-0.000	0.000
Mkt_rf	0.9523	0.018	53.480	0.000	0.917	0.987
SMB	-0.3421	0.033	-10.494	0.000	-0.406	-0.278
HML	-0.2765	0.033	-8.294	0.000	-0.342	-0.211
RMW	0.5155	0.043	11.876	0.000	0.430	0.601
CMA	0.7024	0.052	13.410	0.000	0.600	0.805

Omnibus:	797.306	Durbin-Watson:	1.966
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10851.307
Skew:	-0.182	Prob(JB):	0.00
Kurtosis:	9.868	Cond. No.	308.

GE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.563
Model:	OLS	Adj. R-squared:	0.563
Method:	Least Squares	F-statistic:	1418.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:13:57	Log-Likelihood:	16384.
No. Observations:	5505	AIC:	-3.276e+04
Df Residuals:	5499	BIC:	-3.272e+04
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0002	0.000	-1.033	0.302	-0.000	0.000
Mkt_rf	1.1829	0.016	73.822	0.000	1.151	1.214
SMB	-0.3354	0.029	-11.432	0.000	-0.393	-0.278
HML	0.2857	0.030	9.524	0.000	0.227	0.344
RMW	0.1190	0.039	3.046	0.002	0.042	0.196
CMA	0.0717	0.047	1.522	0.128	-0.021	0.164

Omnibus:	1479.025	Durbin-Watson:	2.009
Prob(Omnibus):	0.000	Jarque-Bera (JB):	94040.692
Skew:	0.371	Prob(JB):	0.00
Kurtosis:	23.234	Cond. No.	308.

Appendix E - Fama French Five Factor + PC Model Results

BA Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.356
Model:	OLS	Adj. R-squared:	0.355
Method:	Least Squares	F-statistic:	506.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:05	Log-Likelihood:	15084.
No. Observations:	5505	AIC:	-3.015e+04
Df Residuals:	5498	BIC:	-3.011e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0025	0.000	7.369	0.000	0.002	0.003
Mkt_rf	1.0174	0.020	49.871	0.000	0.977	1.057
SMB	0.0142	0.037	0.382	0.702	-0.059	0.087
HML	0.0092	0.038	0.243	0.808	-0.065	0.084
RMW	0.2680	0.049	5.419	0.000	0.171	0.365
CMA	0.4353	0.060	7.293	0.000	0.318	0.552
BA_PC	-0.0028	0.000	-9.472	0.000	-0.003	-0.002

Omnibus:	842.791	Durbin-Watson:	1.979
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13665.523
Skew:	-0.128	Prob(JB):	0.00
Kurtosis:	10.714	Cond. No.	438.

GS Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.575
Model:	OLS	Adj. R-squared:	0.575
Method:	Least Squares	F-statistic:	1019.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:06	Log-Likelihood:	12370.
No. Observations:	4521	AIC:	-2.473e+04
Df Residuals:	4514	BIC:	-2.468e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	3.490	0.000	0.000	0.002
Mkt_rf	1.2209	0.022	55.524	0.000	1.178	1.264
SMB	-0.3043	0.041	-7.427	0.000	-0.385	-0.224
HML	0.8100	0.040	20.292	0.000	0.732	0.888
RMW	-0.5367	0.052	-10.264	0.000	-0.639	-0.434
CMA	-0.7061	0.066	-10.728	0.000	-0.835	-0.577
GS_PC	-0.0008	0.000	-3.457	0.001	-0.001	-0.000

Omnibus:	911.618	Durbin-Watson:	2.091
Prob(Omnibus):	0.000	Jarque-Bera (JB):	25769.991
Skew:	0.245	Prob(JB):	0.00
Kurtosis:	14.686	Cond. No.	493.

MMM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.424
Model:	OLS	Adj. R-squared:	0.424
Method:	Least Squares	F-statistic:	675.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:06	Log-Likelihood:	16838.
No. Observations:	5505	AIC:	-3.366e+04
Df Residuals:	5498	BIC:	-3.362e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0006	0.000	2.923	0.003	0.000	0.001
Mkt_rf	0.8948	0.015	60.571	0.000	0.866	0.924
SMB	-0.1008	0.027	-3.733	0.000	-0.154	-0.048
HML	0.0411	0.028	1.489	0.137	-0.013	0.095
RMW	0.3876	0.036	10.775	0.000	0.317	0.458
CMA	0.5102	0.043	11.756	0.000	0.425	0.595
MMM_PC	-0.0005	9.17e-05	-5.205	0.000	-0.001	-0.000

Omnibus:	834.420	Durbin-Watson:	2.066
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13762.001
Skew:	0.070	Prob(JB):	0.00
Kurtosis:	10.745	Cond. No.	671.

UNH Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.196
Model:	OLS	Adj. R-squared:	0.195
Method:	Least Squares	F-statistic:	223.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	5.84e-256
Time:	11:15:07	Log-Likelihood:	13700.
No. Observations:	5505	AIC:	-2.739e+04
Df Residuals:	5498	BIC:	-2.734e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0007	0.000	2.327	0.020	0.000	0.001
Mkt_rf	0.8854	0.026	33.911	0.000	0.834	0.937
SMB	-0.1686	0.048	-3.529	0.000	-0.262	-0.075
HML	0.1153	0.049	2.360	0.018	0.020	0.211
RMW	0.2997	0.064	4.713	0.000	0.175	0.424
CMA	0.2848	0.077	3.710	0.000	0.134	0.435
UNH_PC	-0.0002	7.18e-05	-2.678	0.007	-0.000	-5.16e-05

Omnibus:	2125.515	Durbin-Watson:	2.005
Prob(Omnibus):	0.000	Jarque-Bera (JB):	172272.522
Skew:	-0.945	Prob(JB):	0.00
Kurtosis:	30.340	Cond. No.	1.23e+03

HD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.406
Model:	OLS	Adj. R-squared:	0.406
Method:	Least Squares	F-statistic:	626.8
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:07	Log-Likelihood:	15143.
No. Observations:	5505	AIC:	-3.027e+04
Df Residuals:	5498	BIC:	-3.023e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0013	0.000	4.446	0.000	0.001	0.002
Mkt_rf	1.1174	0.020	55.512	0.000	1.078	1.157
SMB	-0.0953	0.037	-2.591	0.010	-0.167	-0.023
HML	0.0058	0.038	0.156	0.876	-0.068	0.080
RMW	0.3988	0.049	8.148	0.000	0.303	0.495
CMA	0.0324	0.059	0.549	0.583	-0.083	0.148
HD_PC	-0.0014	0.000	-5.445	0.000	-0.002	-0.001

Omnibus:	1942.362	Durbin-Watson:	2.025
Prob(Omnibus):	0.000	Jarque-Bera (JB):	93544.551
Skew:	-0.931	Prob(JB):	0.00
Kurtosis:	23.109	Cond. No.	431.

AAPL Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.270
Model:	OLS	Adj. R-squared:	0.269
Method:	Least Squares	F-statistic:	338.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:08	Log-Likelihood:	12599.
No. Observations:	5505	AIC:	-2.518e+04
Df Residuals:	5498	BIC:	-2.514e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0020	0.000	4.639	0.000	0.001	0.003
Mkt_rf	0.9548	0.032	29.922	0.000	0.892	1.017
SMB	0.0262	0.058	0.450	0.653	-0.088	0.141
HML	-0.3319	0.060	-5.563	0.000	-0.449	-0.215
RMW	-0.2340	0.078	-3.011	0.003	-0.386	-0.082
CMA	-1.0451	0.094	-11.144	0.000	-1.229	-0.861
AAPL_PC	-0.0014	0.000	-3.307	0.001	-0.002	-0.001

Omnibus:	1914.604	Durbin-Watson:	1.992
Prob(Omnibus):	0.000	Jarque-Bera (JB):	388255.657
Skew:	-0.451	Prob(JB):	0.00
Kurtosis:	44.132	Cond. No.	406.

IBM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.399
Model:	OLS	Adj. R-squared:	0.398
Method:	Least Squares	F-statistic:	607.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:08	Log-Likelihood:	15797.
No. Observations:	5505	AIC:	-3.158e+04
Df Residuals:	5498	BIC:	-3.153e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0029	0.000	7.362	0.000	0.002	0.004
Mkt_rf	0.8782	0.018	48.961	0.000	0.843	0.913
SMB	-0.2418	0.033	-7.409	0.000	-0.306	-0.178
HML	-0.3169	0.033	-9.496	0.000	-0.382	-0.251
RMW	0.0144	0.043	0.331	0.741	-0.071	0.100
CMA	-0.0277	0.052	-0.529	0.597	-0.131	0.075
IBM_PC	-0.0029	0.000	-7.889	0.000	-0.004	-0.002

Omnibus:	1107.795	Durbin-Watson:	1.955
Prob(Omnibus):	0.000	Jarque-Bera (JB):	38097.293
Skew:	-0.005	Prob(JB):	0.00
Kurtosis:	15.888	Cond. No.	434.

MCD Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.247
Model:	OLS	Adj. R-squared:	0.246
Method:	Least Squares	F-statistic:	300.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:09	Log-Likelihood:	15969.
No. Observations:	5505	AIC:	-3.192e+04
Df Residuals:	5498	BIC:	-3.188e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0010	0.000	4.562	0.000	0.001	0.001
Mkt_rf	0.6971	0.017	40.320	0.000	0.663	0.731
SMB	-0.1342	0.032	-4.243	0.000	-0.196	-0.072
HML	-0.1168	0.032	-3.611	0.000	-0.180	-0.053
RMW	0.4710	0.042	11.181	0.000	0.388	0.554
CMA	0.3561	0.051	7.004	0.000	0.256	0.456
MCD_PC	-0.0010	0.000	-7.365	0.000	-0.001	-0.001

Omnibus:	780.145	Durbin-Watson:	2.029
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10646.570
Skew:	0.138	Prob(JB):	0.00
Kurtosis:	9.807	Cond. No.	543.

CAT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.427
Model:	OLS	Adj. R-squared:	0.426
Method:	Least Squares	F-statistic:	682.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:09	Log-Likelihood:	15033.
No. Observations:	5505	AIC:	-3.005e+04
Df Residuals:	5498	BIC:	-3.001e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0008	0.000	3.154	0.002	0.000	0.001
Mkt_rf	1.2082	0.021	58.910	0.000	1.168	1.248
SMB	0.1687	0.037	4.499	0.000	0.095	0.242
HML	0.2801	0.038	7.305	0.000	0.205	0.355
RMW	0.4926	0.050	9.864	0.000	0.395	0.591
CMA	0.3253	0.060	5.400	0.000	0.207	0.443
CAT_PC	-0.0007	0.000	-5.834	0.000	-0.001	-0.000

Omnibus:	784.254	Durbin-Watson:	2.027
Prob(Omnibus):	0.000	Jarque-Bera (JB):	11454.287
Skew:	0.049	Prob(JB):	0.00
Kurtosis:	10.066	Cond. No.	693.

TRV Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.427
Model:	OLS	Adj. R-squared:	0.426
Method:	Least Squares	F-statistic:	681.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:10	Log-Likelihood:	15684.
No. Observations:	5497	AIC:	-3.135e+04
Df Residuals:	5490	BIC:	-3.131e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.326e-05	0.000	0.070	0.944	-0.000	0.000
Mkt_rf	0.9744	0.018	53.765	0.000	0.939	1.010
SMB	-0.3602	0.033	-10.853	0.000	-0.425	-0.295
HML	0.5352	0.034	15.773	0.000	0.469	0.602
RMW	-0.0223	0.044	-0.505	0.614	-0.109	0.064
CMA	0.2666	0.053	4.996	0.000	0.162	0.371
TRV_PC	-1.168e-05	5.32e-06	-2.197	0.028	-2.21e-05	-1.26e-06

Omnibus:	1541.293	Durbin-Watson:	1.991
Prob(Omnibus):	0.000	Jarque-Bera (JB):	36690.348
Skew:	0.788	Prob(JB):	0.00
Kurtosis:	15.558	Cond. No.	1.10e+04

JNJ Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.373
Model:	OLS	Adj. R-squared:	0.372
Method:	Least Squares	F-statistic:	544.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:10	Log-Likelihood:	17364.
No. Observations:	5505	AIC:	-3.471e+04
Df Residuals:	5498	BIC:	-3.467e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	5.521	0.000	0.001	0.002
Mkt_rf	0.7109	0.013	52.819	0.000	0.685	0.737
SMB	-0.3140	0.025	-12.788	0.000	-0.362	-0.266
HML	-0.2515	0.025	-10.019	0.000	-0.301	-0.202
RMW	0.5732	0.033	17.529	0.000	0.509	0.637
CMA	0.5894	0.039	14.942	0.000	0.512	0.667
JNJ_PC	-0.0013	0.000	-7.541	0.000	-0.002	-0.001

Omnibus:	899.865	Durbin-Watson:	1.979
Prob(Omnibus):	0.000	Jarque-Bera (JB):	17824.038
Skew:	-0.031	Prob(JB):	0.00
Kurtosis:	11.815	Cond. No.	446.

UTX Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.466
Model:	OLS	Adj. R-squared:	0.465
Method:	Least Squares	F-statistic:	798.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:11	Log-Likelihood:	16336.
No. Observations:	5505	AIC:	-3.266e+04
Df Residuals:	5498	BIC:	-3.261e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0003	0.000	1.822	0.069	-2.64e-05	0.001
Mkt_rf	1.0495	0.016	64.791	0.000	1.018	1.081
SMB	-0.0626	0.030	-2.113	0.035	-0.121	-0.005
HML	0.0734	0.030	2.424	0.015	0.014	0.133
RMW	0.3647	0.039	9.255	0.000	0.287	0.442
CMA	0.3562	0.048	7.490	0.000	0.263	0.449
UTX_PC	-0.0003	8.87e-05	-3.372	0.001	-0.000	-0.000

Omnibus:	2298.486	Durbin-Watson:	2.113
Prob(Omnibus):	0.000	Jarque-Bera (JB):	170455.627
Skew:	-1.124	Prob(JB):	0.00
Kurtosis:	30.168	Cond. No.	681.

V Model
01/02/2009 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.445
Model:	OLS	Adj. R-squared:	0.443
Method:	Least Squares	F-statistic:	313.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	4.22e-295
Time:	11:15:11	Log-Likelihood:	6639.6
No. Observations:	2351	AIC:	-1.327e+04
Df Residuals:	2344	BIC:	-1.322e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0038	0.001	6.302	0.000	0.003	0.005
Mkt_rf	0.8874	0.027	32.273	0.000	0.834	0.941
SMB	-0.1188	0.053	-2.237	0.025	-0.223	-0.015
HML	0.0745	0.051	1.467	0.143	-0.025	0.174
RMW	-0.2460	0.096	-2.556	0.011	-0.435	-0.057
CMA	-0.6119	0.102	-5.980	0.000	-0.813	-0.411
V_PC	-0.0042	0.001	-6.044	0.000	-0.006	-0.003

Omnibus:	503.852	Durbin-Watson:	2.100
Prob(Omnibus):	0.000	Jarque-Bera (JB):	15676.241
Skew:	0.266	Prob(JB):	0.00
Kurtosis:	15.639	Cond. No.	471.

JPM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.648
Model:	OLS	Adj. R-squared:	0.647
Method:	Least Squares	F-statistic:	1683.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:12	Log-Likelihood:	15396.
No. Observations:	5505	AIC:	-3.078e+04
Df Residuals:	5498	BIC:	-3.073e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0012	0.000	4.256	0.000	0.001	0.002
Mkt_rf	1.3650	0.019	70.943	0.000	1.327	1.403
SMB	-0.3770	0.035	-10.733	0.000	-0.446	-0.308
HML	1.4845	0.036	41.361	0.000	1.414	1.555
RMW	-0.3825	0.047	-8.184	0.000	-0.474	-0.291
CMA	-0.7597	0.056	-13.470	0.000	-0.870	-0.649
JPM_PC	-0.0011	0.000	-5.687	0.000	-0.001	-0.001

Omnibus:	1085.609	Durbin-Watson:	1.972
Prob(Omnibus):	0.000	Jarque-Bera (JB):	18816.719
Skew:	0.457	Prob(JB):	0.00
Kurtosis:	12.011	Cond. No.	517.

CVX Model
01/02/2002 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.579
Model:	OLS	Adj. R-squared:	0.579
Method:	Least Squares	F-statistic:	910.9
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:12	Log-Likelihood:	12492.
No. Observations:	3977	AIC:	-2.497e+04
Df Residuals:	3970	BIC:	-2.493e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0018	0.000	6.077	0.000	0.001	0.002
Mkt_rf	1.0788	0.016	67.756	0.000	1.048	1.110
SMB	-0.2396	0.031	-7.844	0.000	-0.300	-0.180
HML	0.1211	0.030	4.068	0.000	0.063	0.179
RMW	0.7601	0.045	16.934	0.000	0.672	0.848
CMA	0.1384	0.055	2.539	0.011	0.032	0.245
CVX_PC	-0.0021	0.000	-8.004	0.000	-0.003	-0.002

Omnibus:	347.854	Durbin-Watson:	2.031
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2170.159
Skew:	-0.120	Prob(JB):	0.00
Kurtosis:	6.611	Cond. No.	478.

DIS Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.431
Model:	OLS	Adj. R-squared:	0.430
Method:	Least Squares	F-statistic:	694.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:13	Log-Likelihood:	15474.
No. Observations:	5505	AIC:	-3.093e+04
Df Residuals:	5498	BIC:	-3.089e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0015	0.000	5.223	0.000	0.001	0.002
Mkt_rf	1.0521	0.019	55.346	0.000	1.015	1.089
SMB	-0.1699	0.035	-4.908	0.000	-0.238	-0.102
HML	-0.0188	0.035	-0.531	0.595	-0.088	0.051
RMW	-0.1540	0.046	-3.342	0.001	-0.244	-0.064
CMA	0.3884	0.056	6.984	0.000	0.279	0.497
DIS_PC	-0.0018	0.000	-6.885	0.000	-0.002	-0.001

Omnibus:	1115.979	Durbin-Watson:	2.065
Prob(Omnibus):	0.000	Jarque-Bera (JB):	29291.804
Skew:	0.305	Prob(JB):	0.00
Kurtosis:	14.284	Cond. No.	423.

AXP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.572
Model:	OLS	Adj. R-squared:	0.572
Method:	Least Squares	F-statistic:	1225.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:13	Log-Likelihood:	15345.
No. Observations:	5505	AIC:	-3.068e+04
Df Residuals:	5498	BIC:	-3.063e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0007	0.000	2.880	0.004	0.000	0.001
Mkt_rf	1.3805	0.019	71.065	0.000	1.342	1.419
SMB	-0.3294	0.035	-9.297	0.000	-0.399	-0.260
HML	0.7453	0.036	20.568	0.000	0.674	0.816
RMW	0.1368	0.047	2.899	0.004	0.044	0.229
CMA	-0.2548	0.057	-4.476	0.000	-0.366	-0.143
AXP_PC	-0.0007	0.000	-4.633	0.000	-0.001	-0.000

Omnibus:	1216.707	Durbin-Watson:	2.081
Prob(Omnibus):	0.000	Jarque-Bera (JB):	33592.724
Skew:	0.413	Prob(JB):	0.00
Kurtosis:	15.074	Cond. No.	547.

MSFT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.479
Model:	OLS	Adj. R-squared:	0.478
Method:	Least Squares	F-statistic:	841.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:14	Log-Likelihood:	15493.
No. Observations:	5505	AIC:	-3.097e+04
Df Residuals:	5498	BIC:	-3.093e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0020	0.000	5.777	0.000	0.001	0.003
Mkt_rf	1.0257	0.019	54.278	0.000	0.989	1.063
SMB	-0.2784	0.034	-8.071	0.000	-0.346	-0.211
HML	-0.3433	0.035	-9.731	0.000	-0.412	-0.274
RMW	0.0707	0.046	1.540	0.124	-0.019	0.161
CMA	-0.5657	0.055	-10.207	0.000	-0.674	-0.457
MSFT_PC	-0.0024	0.000	-5.794	0.000	-0.003	-0.002

Omnibus:	1006.840	Durbin-Watson:	1.952
Prob(Omnibus):	0.000	Jarque-Bera (JB):	25885.090
Skew:	-0.083	Prob(JB):	0.00
Kurtosis:	13.622	Cond. No.	384.

WMT Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.325
Model:	OLS	Adj. R-squared:	0.324
Method:	Least Squares	F-statistic:	440.4
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:14	Log-Likelihood:	15879.
No. Observations:	5505	AIC:	-3.174e+04
Df Residuals:	5498	BIC:	-3.170e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0014	0.000	5.072	0.000	0.001	0.002
Mkt_rf	0.8072	0.018	45.818	0.000	0.773	0.842
SMB	-0.3716	0.032	-11.554	0.000	-0.435	-0.309
HML	-0.2711	0.033	-8.243	0.000	-0.336	-0.207
RMW	0.5196	0.043	12.137	0.000	0.436	0.604
CMA	0.2085	0.052	4.035	0.000	0.107	0.310
WMT_PC	-0.0017	0.000	-6.619	0.000	-0.002	-0.001

Omnibus:	692.912	Durbin-Watson:	2.026
Prob(Omnibus):	0.000	Jarque-Bera (JB):	6932.419
Skew:	0.207	Prob(JB):	0.00
Kurtosis:	8.482	Cond. No.	420.

PG Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.323
Model:	OLS	Adj. R-squared:	0.322
Method:	Least Squares	F-statistic:	437.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:15	Log-Likelihood:	16637.
No. Observations:	5505	AIC:	-3.326e+04
Df Residuals:	5498	BIC:	-3.321e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0008	0.000	3.419	0.001	0.000	0.001
Mkt_rf	0.7257	0.015	47.265	0.000	0.696	0.756
SMB	-0.3068	0.028	-10.948	0.000	-0.362	-0.252
HML	-0.1452	0.029	-5.067	0.000	-0.201	-0.089
RMW	0.7343	0.037	19.668	0.000	0.661	0.807
CMA	0.6201	0.045	13.772	0.000	0.532	0.708
PG_PC	-0.0009	0.000	-5.398	0.000	-0.001	-0.001

Omnibus:	4094.313	Durbin-Watson:	2.047
Prob(Omnibus):	0.000	Jarque-Bera (JB):	937092.028
Skew:	-2.565	Prob(JB):	0.00
Kurtosis:	66.711	Cond. No.	482.

XOM Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.470
Model:	OLS	Adj. R-squared:	0.470
Method:	Least Squares	F-statistic:	813.7
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:16	Log-Likelihood:	16879.
No. Observations:	5505	AIC:	-3.374e+04
Df Residuals:	5498	BIC:	-3.370e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0007	0.000	3.452	0.001	0.000	0.001
Mkt_rf	0.9833	0.015	66.937	0.000	0.954	1.012
SMB	-0.1852	0.027	-6.907	0.000	-0.238	-0.133
HML	-0.0149	0.027	-0.544	0.587	-0.069	0.039
RMW	0.6669	0.036	18.663	0.000	0.597	0.737
CMA	0.7113	0.043	16.508	0.000	0.627	0.796
XOM_PC	-0.0013	0.000	-6.544	0.000	-0.002	-0.001

Omnibus:	656.904	Durbin-Watson:	2.066
Prob(Omnibus):	0.000	Jarque-Bera (JB):	6000.736
Skew:	0.203	Prob(JB):	0.00
Kurtosis:	8.099	Cond. No.	418.

DWDP Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.426
Model:	OLS	Adj. R-squared:	0.425
Method:	Least Squares	F-statistic:	679.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:17	Log-Likelihood:	14937.
No. Observations:	5505	AIC:	-2.986e+04
Df Residuals:	5498	BIC:	-2.981e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0001	0.000	-0.524	0.600	-0.001	0.000
Mkt_rf	1.2152	0.021	58.256	0.000	1.174	1.256
SMB	0.1482	0.038	3.885	0.000	0.073	0.223
HML	0.4330	0.039	11.099	0.000	0.356	0.509
RMW	0.4085	0.051	8.042	0.000	0.309	0.508
CMA	0.5471	0.061	8.924	0.000	0.427	0.667
DWDP_PC	-0.0002	7.21e-05	-2.121	0.034	-0.000	-1.16e-05

Omnibus:	1177.648	Durbin-Watson:	2.042
Prob(Omnibus):	0.000	Jarque-Bera (JB):	39942.178
Skew:	0.253	Prob(JB):	0.00
Kurtosis:	16.186	Cond. No.	993.

NKE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.250
Model:	OLS	Adj. R-squared:	0.249
Method:	Least Squares	F-statistic:	305.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:17	Log-Likelihood:	14380.
No. Observations:	5505	AIC:	-2.875e+04
Df Residuals:	5498	BIC:	-2.870e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0008	0.000	3.009	0.003	0.000	0.001
Mkt_rf	0.9232	0.023	40.024	0.000	0.878	0.968
SMB	0.1467	0.042	3.474	0.001	0.064	0.230
HML	0.0204	0.043	0.474	0.636	-0.064	0.105
RMW	0.4903	0.056	8.722	0.000	0.380	0.601
CMA	0.1030	0.068	1.519	0.129	-0.030	0.236
NKE_PC	-0.0005	9.81e-05	-4.860	0.000	-0.001	-0.000

Omnibus:	1101.717	Durbin-Watson:	2.034
Prob(Omnibus):	0.000	Jarque-Bera (JB):	35824.798
Skew:	0.110	Prob(JB):	0.00
Kurtosis:	15.495	Cond. No.	847.

MRK Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.334
Model:	OLS	Adj. R-squared:	0.333
Method:	Least Squares	F-statistic:	459.0
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:18	Log-Likelihood:	15552.
No. Observations:	5505	AIC:	-3.109e+04
Df Residuals:	5498	BIC:	-3.104e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	4.120	0.000	0.001	0.002
Mkt_rf	0.9226	0.019	49.394	0.000	0.886	0.959
SMB	-0.3448	0.034	-10.102	0.000	-0.412	-0.278
HML	-0.2979	0.035	-8.530	0.000	-0.366	-0.229
RMW	0.5682	0.045	12.506	0.000	0.479	0.657
CMA	0.8095	0.055	14.754	0.000	0.702	0.917
MRK_PC	-0.0017	0.000	-6.960	0.000	-0.002	-0.001

Omnibus:	2318.866	Durbin-Watson:	1.957
Prob(Omnibus):	0.000	Jarque-Bera (JB):	180161.399
Skew:	-1.129	Prob(JB):	0.00
Kurtosis:	30.935	Cond. No.	421.

INTC Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.464
Model:	OLS	Adj. R-squared:	0.463
Method:	Least Squares	F-statistic:	792.3
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:19	Log-Likelihood:	14399.
No. Observations:	5505	AIC:	-2.878e+04
Df Residuals:	5498	BIC:	-2.874e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0036	0.000	7.751	0.000	0.003	0.005
Mkt_rf	1.1728	0.023	50.803	0.000	1.128	1.218
SMB	-0.3094	0.042	-7.352	0.000	-0.392	-0.227
HML	-0.5051	0.043	-11.739	0.000	-0.589	-0.421
RMW	-0.3027	0.056	-5.403	0.000	-0.412	-0.193
CMA	-0.3890	0.068	-5.755	0.000	-0.522	-0.256
INTC_PC	-0.0049	0.001	-8.343	0.000	-0.006	-0.004

Omnibus:	1411.037	Durbin-Watson:	1.989
Prob(Omnibus):	0.000	Jarque-Bera (JB):	37912.550
Skew:	-0.627	Prob(JB):	0.00
Kurtosis:	15.795	Cond. No.	382.

VZ Model
01/02/2001 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.378
Model:	OLS	Adj. R-squared:	0.377
Method:	Least Squares	F-statistic:	433.5
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:19	Log-Likelihood:	12805.
No. Observations:	4295	AIC:	-2.560e+04
Df Residuals:	4288	BIC:	-2.555e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0014	0.000	5.154	0.000	0.001	0.002
Mkt_rf	0.8396	0.018	47.010	0.000	0.805	0.875
SMB	-0.3983	0.034	-11.655	0.000	-0.465	-0.331
HML	-0.1081	0.032	-3.327	0.001	-0.172	-0.044
RMW	0.2602	0.044	5.899	0.000	0.174	0.347
CMA	0.5875	0.054	10.974	0.000	0.483	0.693
VZ_PC	-0.0019	0.000	-8.071	0.000	-0.002	-0.001

Omnibus:	762.161	Durbin-Watson:	1.944
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13147.732
Skew:	0.322	Prob(JB):	0.00
Kurtosis:	11.547	Cond. No.	447.

KO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.337
Model:	OLS	Adj. R-squared:	0.336
Method:	Least Squares	F-statistic:	465.2
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:20	Log-Likelihood:	16732.
No. Observations:	5505	AIC:	-3.345e+04
Df Residuals:	5498	BIC:	-3.340e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0011	0.000	4.707	0.000	0.001	0.002
Mkt_rf	0.7313	0.015	48.360	0.000	0.702	0.761
SMB	-0.3273	0.028	-11.883	0.000	-0.381	-0.273
HML	-0.1967	0.028	-6.984	0.000	-0.252	-0.141
RMW	0.6315	0.037	17.208	0.000	0.560	0.703
CMA	0.6395	0.044	14.450	0.000	0.553	0.726
KO_PC	-0.0015	0.000	-7.697	0.000	-0.002	-0.001

Omnibus:	820.951	Durbin-Watson:	1.959
Prob(Omnibus):	0.000	Jarque-Bera (JB):	13263.145
Skew:	-0.026	Prob(JB):	0.00
Kurtosis:	10.604	Cond. No.	439.

CSCO Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.524
Model:	OLS	Adj. R-squared:	0.523
Method:	Least Squares	F-statistic:	1008.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:20	Log-Likelihood:	14372.
No. Observations:	5505	AIC:	-2.873e+04
Df Residuals:	5498	BIC:	-2.868e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0036	0.000	7.772	0.000	0.003	0.004
Mkt_rf	1.1099	0.023	47.813	0.000	1.064	1.155
SMB	-0.3645	0.042	-8.621	0.000	-0.447	-0.282
HML	-0.5373	0.043	-12.427	0.000	-0.622	-0.453
RMW	-0.8437	0.056	-14.988	0.000	-0.954	-0.733
CMA	-0.9178	0.068	-13.512	0.000	-1.051	-0.785
CSCO_PC	-0.0049	0.001	-7.570	0.000	-0.006	-0.004

Omnibus:	947.155	Durbin-Watson:	2.065
Prob(Omnibus):	0.000	Jarque-Bera (JB):	18502.419
Skew:	0.207	Prob(JB):	0.00
Kurtosis:	11.972	Cond. No.	364.

PFE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.370
Model:	OLS	Adj. R-squared:	0.369
Method:	Least Squares	F-statistic:	537.6
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:21	Log-Likelihood:	15836.
No. Observations:	5505	AIC:	-3.166e+04
Df Residuals:	5498	BIC:	-3.161e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0016	0.000	5.666	0.000	0.001	0.002
Mkt_rf	0.9412	0.018	53.022	0.000	0.906	0.976
SMB	-0.3389	0.032	-10.458	0.000	-0.402	-0.275
HML	-0.2732	0.033	-8.246	0.000	-0.338	-0.208
RMW	0.5069	0.043	11.747	0.000	0.422	0.592
CMA	0.6942	0.052	13.332	0.000	0.592	0.796
PFE_PC	-0.0026	0.000	-8.244	0.000	-0.003	-0.002

Omnibus:	813.760	Durbin-Watson:	1.975
Prob(Omnibus):	0.000	Jarque-Bera (JB):	10873.019
Skew:	-0.227	Prob(JB):	0.00
Kurtosis:	9.870	Cond. No.	384.

GE Model
01/02/1996 - 12/31/2015
OLS Regression Results

Dep. Variable:	xreturn	R-squared:	0.567
Model:	OLS	Adj. R-squared:	0.567
Method:	Least Squares	F-statistic:	1202.
Date:	Sun, 29 Apr 2018	Prob (F-statistic):	0.00
Time:	11:15:21	Log-Likelihood:	16411.
No. Observations:	5505	AIC:	-3.281e+04
Df Residuals:	5498	BIC:	-3.276e+04
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.0014	0.000	5.264	0.000	0.001	0.002
Mkt_rf	1.1679	0.016	72.665	0.000	1.136	1.199
SMB	-0.3315	0.029	-11.355	0.000	-0.389	-0.274
HML	0.2892	0.030	9.687	0.000	0.231	0.348
RMW	0.1218	0.039	3.134	0.002	0.046	0.198
CMA	0.0696	0.047	1.484	0.138	-0.022	0.162
GE_PC	-0.0021	0.000	-7.438	0.000	-0.003	-0.002

Omnibus:	1498.378	Durbin-Watson:	2.022
Prob(Omnibus):	0.000	Jarque-Bera (JB):	94067.203
Skew:	0.403	Prob(JB):	0.00
Kurtosis:	23.235	Cond. No.	405.

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