In [699]:

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
from sklearn.linear_model import LogisticRegressionCV
import sklearn.metrics as metrics
from sklearn.metrics import r2_score
from sklearn.preprocessing import PolynomialFeatures
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis
from sklearn.discriminant_analysis import QuadraticDiscriminantAnalysis
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import cross_val_score
from sklearn.metrics import accuracy_score
import sklearn.discriminant_analysis as da
import sklearn.neighbors as knn
from sklearn.model_selection import KFold
from sklearn.linear_model import LogisticRegression
from sklearn.linear_model import LinearRegression
from sklearn.metrics import confusion_matrix
from sklearn.metrics import roc_curve, auc
from sklearn.linear_model import Ridge
from sklearn.linear_model import Lasso
from sklearn.linear_model import RidgeCV
from sklearn.linear_model import LassoCV
from statsmodels.api import OLS
from statsmodels.api import add_constant
import statsmodels.api as sm
import datetime

#import pydotplus
#import io
from sklearn.tree import export_graphviz
from IPython.display import Image
from IPython.display import display
%matplotlib inline
from matplotlib import pyplot
default_dims = (13, 10)
import seaborn.apionly as sns #sets up styles and gives us more plotting
 options
sns.set_style("whitegrid")
sns.set_context("poster")
sns.reset_orig()
```

In [701]:

```
five_factor_df = pd.read_csv('F-F_Research_Data_5_Factors_2x3_daily.CSV', index_col = 'Date')
nan_rows = five_factor_df.isnull().T.any().T
five_factor_df = five_factor_df[~nan_rows]
print(np.shape(five_factor_df))
five_factor_df.head()
```

```
(13657, 6)
```

Out[701]:

	Mkt-RF	SMB	HML	RMW	CMA	RF
Date						
19630701	-0.67	0.00	-0.32	0.01	0.15	0.012
19630702	0.79	-0.27	0.27	-0.08	-0.19	0.012
19630703	0.63	-0.17	-0.09	0.19	-0.33	0.012
19630705	0.40	0.08	-0.28	0.07	-0.33	0.012
19630708	-0.63	0.04	-0.17	-0.31	0.13	0.012

In [702]:

```
five_factor_df.index = pd.to_datetime(five_factor_df.index,format='%Y%m%d')
```

In [703]:

```
three_factor_df = pd.read_csv('F-F_Research_Data_Factors_daily.CSV', index_col = 'Date')
nan_rows = three_factor_df.isnull().T.any().T
three_factor_df = three_factor_df[~nan_rows]
print(np.shape(three_factor_df))
three_factor_df.head()
```

```
(24077, 4)
```

Out[703]:

	Mkt-RF	SMB	HML	RF
Date				
19260701	0.10	-0.24	-0.28	0.009
19260702	0.45	-0.32	-0.08	0.009
19260706	0.17	0.27	-0.35	0.009
19260707	0.09	-0.59	0.03	0.009
19260708	0.21	-0.36	0.15	0.009

In [704]:

```
three_factor_df.index = pd.to_datetime(three_factor_df.index,format='%Y%m%d')
```

In [705]:

```
three_factors = [x for x in three_factor_df.columns if x != 'Date' and x != 'RF']
five_factors = [x for x in five_factor_df.columns if x != 'Date' and x != 'RF']
```

In [706]:

```
# stocks_held = ['USAK', 'RHDGF', 'DXLG', 'NUSMF', 'LEE', 'AXLE']
stocks_held = ['USAK', 'RHDGF', 'DXLG', 'NUSMF', 'LEE']
```

In [707]:

```
# quantities = [180, 110, 1000, 8000, 425, 2000]
quantities = [180, 110, 1000, 8000, 425]
```

In [708]:

```
ptf_dict = {stocks_held[i]: quantities[i] for i in
range(len(quantities))}
```

In [709]:

```
dfs = []
for stock in stocks_held:
    stock_df = pd.read_csv('{}.csv'.format(stock), index_col = None)
    stock_df['Stock'] = stock
    dfs.append(stock_df)

# Adds in last dataframe at the end to keep them in order
df = pd.concat(dfs)
df.head()
```

Out[709]:

	Date	Open	High	Low	Close	Adj Close	Volume	Stock
0	1992-03-19	7.5	7.5	7	7.125	7.125	1256400	USAK
1	1992-03-20	7.375	7.625	7.125	7.25	7.25	262800	USAK
2	1992-03-23	7.25	7.625	7.25	7.25	7.25	43800	USAK
3	1992-03-24	7.5	7.625	7.25	7.5	7.5	73600	USAK
4	1992-03-25	7.625	7.625	7.25	7.625	7.625	28000	USAK

In [710]:

```
df['Date'] = pd.to_datetime(df['Date'])
```

In [711]:

```
df = df.convert_objects(convert_numeric=True)
```

```
/anaconda/lib/python3.6/site-packages/ipykernel_launcher.py:1: FutureWa
rning: convert_objects is deprecated.  Use the data-type specific conve
rters pd.to_datetime, pd.to_timedelta and pd.to_numeric.
  """Entry point for launching an IPython kernel.
```

In [712]:

```
df.index = range(len(df))
df['Open'] = [df['Open'][i] * ptf_dict[df['Stock'][i]] for i in range(len(df))]
df['Close'] = [df['Close'][i] * ptf_dict[df['Stock'][i]] for i in range(len(df))]
df.head()
```

Out[712]:

	Date	Open	High	Low	Close	Adj Close	Volume	Stock
0	1992-03-19	1350.0	7.500	7.000	1282.5	7.125	1256400.0	USAK
1	1992-03-20	1327.5	7.625	7.125	1305.0	7.250	262800.0	USAK
2	1992-03-23	1305.0	7.625	7.250	1305.0	7.250	43800.0	USAK
3	1992-03-24	1350.0	7.625	7.250	1350.0	7.500	73600.0	USAK
4	1992-03-25	1372.5	7.625	7.250	1372.5	7.625	28000.0	USAK

In [776]:

```
df['Returns'] = np.log(df['Close']) - np.log(df['Open'])
```

In [777]:

```
df = df[df['Date'] >= datetime.datetime(2009, 9, 11)]
```

In [778]:

```
three_factor_df = three_factor_df[three_factor_df.index >= datetime.datetime(2009, 9, 11)]
```

In [779]:

```
five_factor_df = five_factor_df[five_factor_df.index >= datetime.datetime(2009, 9, 11)]
```

In [780]:

```
grouped_by_stock = df.groupby('Stock')
```

In [781]:

```
grouped_by_date = df.groupby('Date')
```

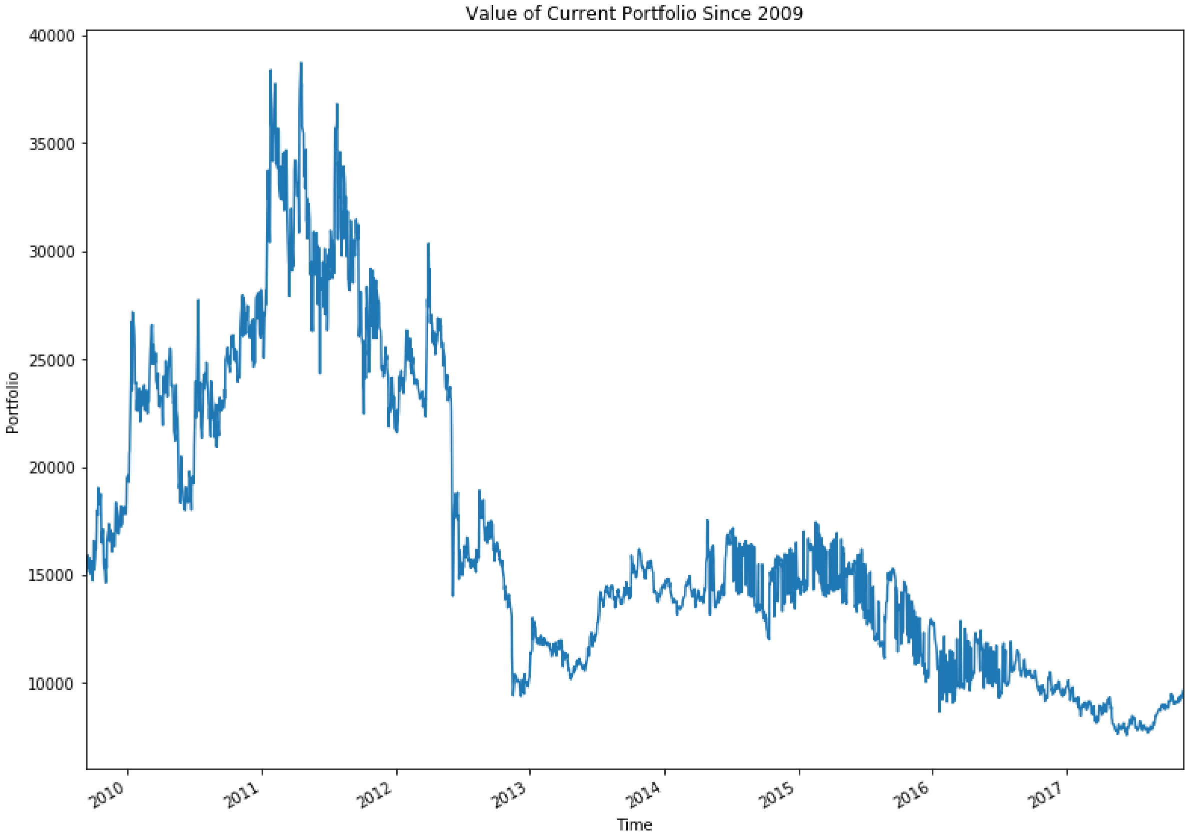
In [782]:

```
portfolio_values = grouped_by_date.sum()
portfolio_values.head()
```

Out[782]:

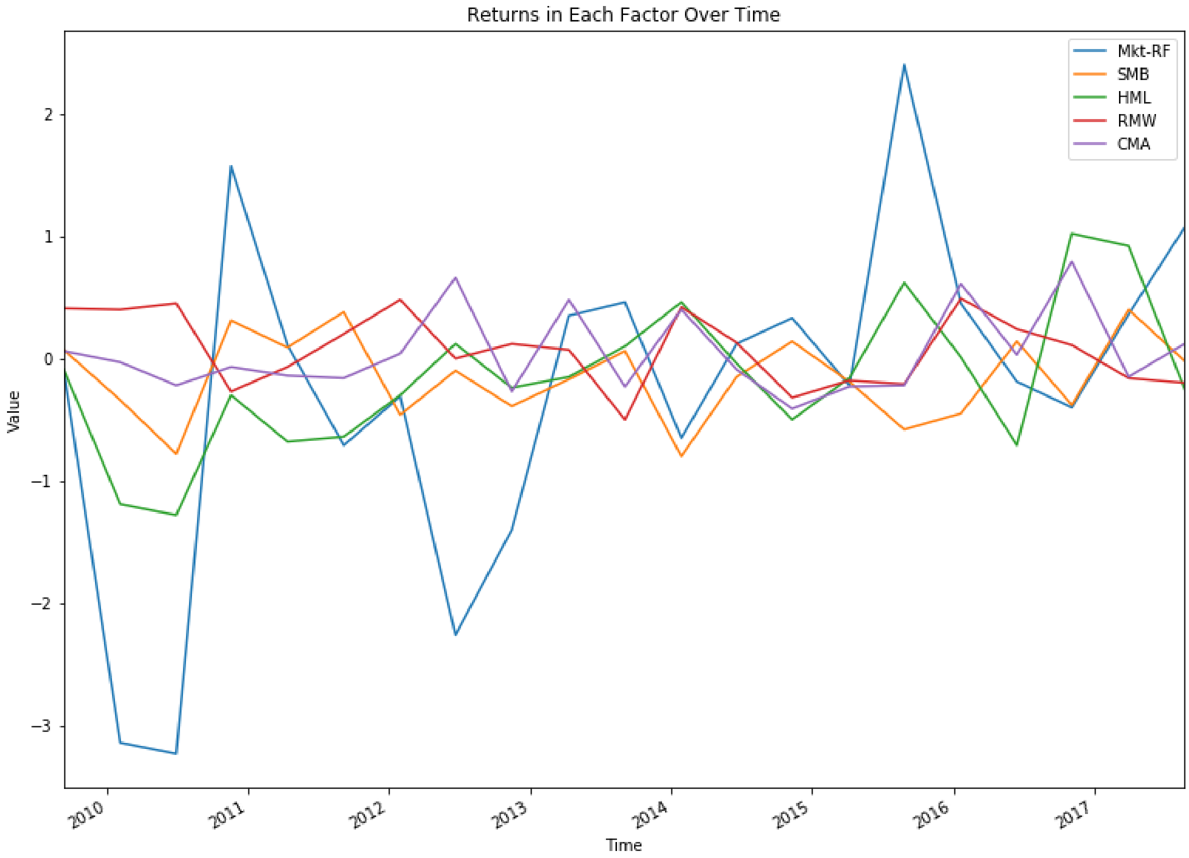
	Open	High	Low	Close	Adj Close	Volume	Returns
Date							
2009-09-11	15094.50	22.97	22.19	15479.95	21.855906	725882.0	0.118931
2009-09-14	15180.00	19.30	18.40	15461.35	19.030000	543800.0	0.111881
2009-09-15	15318.10	19.29	18.54	15476.15	18.930000	397800.0	0.032476
2009-09-16	15921.00	23.33	22.55	15816.60	22.315906	498060.0	-0.001339
2009-09-17	15350.55	19.50	18.86	15783.15	19.220000	393800.0	0.056506

In [783]:
```
fig, ax = plt.subplots(figsize=default_dims)
portfolio_values['Open'].plot();
ax.set_xlabel('Time');
ax.set_ylabel('Portfolio');
ax.set_title('Value of Current Portfolio Since 2009');
```



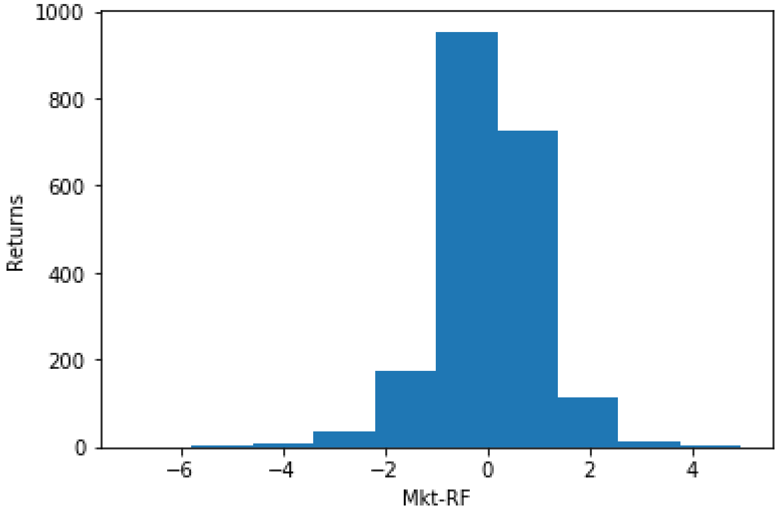
In [784]:

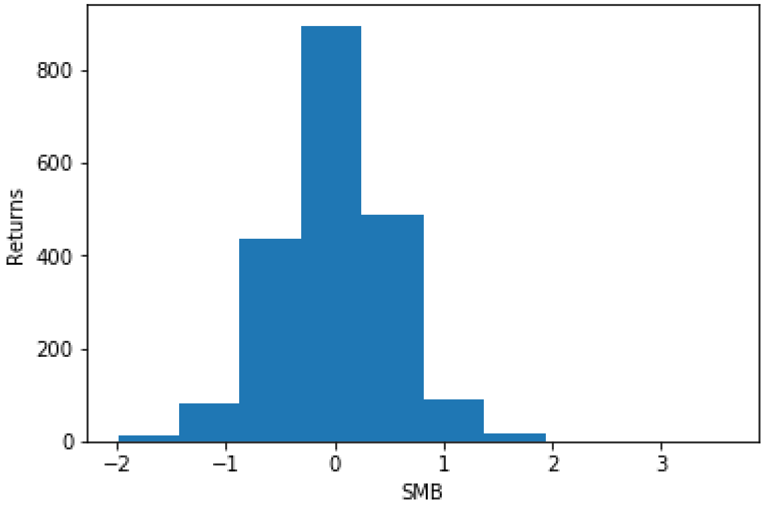
```
msk = [True if i % 100 ==0 else False for i in
range(len(three_factor_df))]
fig, ax = plt.subplots(figsize=default_dims)
for factor in five_factors:
    five_factor_df[factor][msk].plot(legend = True);
ax.set_xlabel('Time');
ax.set_ylabel('Value');
ax.set_title('Returns in Each Factor Over Time');
```

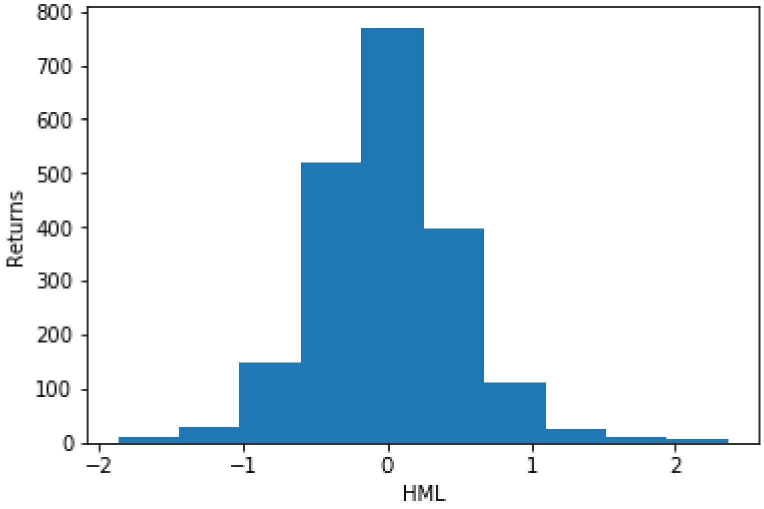


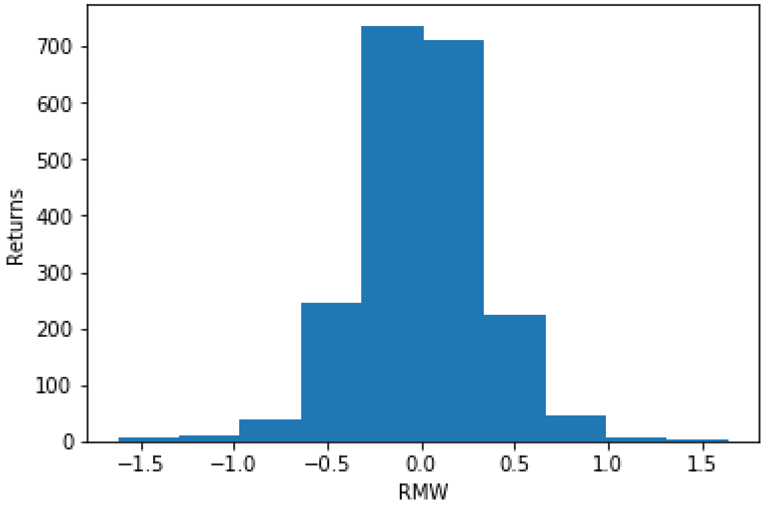
In [785]:

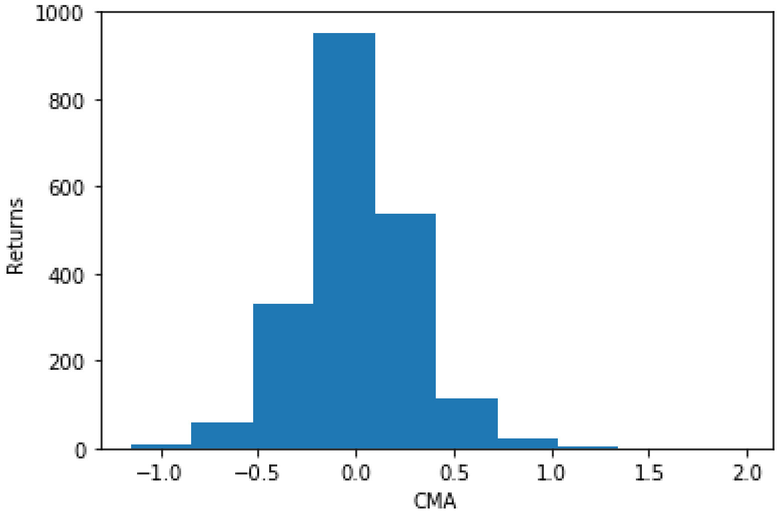
```
for factor in five_factors:
    fig, ax = pyplot.subplots()
    plt.hist(five_factor_df[factor])
    ax.set_xlabel(factor);
    ax.set_ylabel('Returns');
```


1000
800
600
400
200
0
Returns
−6
−4
−2
0
2
4
Mkt-RF


800
600
400
200
0
Returns
−2
−1
0
1
2
3
SMB


800
700
600
500
400
300
200
100
0
Returns
−2
−1
0
1
2
HML





```
In [786]: three_factors
```

```
Out[786]: ['Mkt-RF', 'SMB', 'HML']
```

In-sample evaluation

```
In [787]: df_three = pd.concat([portfolio_values, three_factor_df], axis=1,
          join='inner')
```

```
In [788]: df_five = pd.concat([portfolio_values, five_factor_df], axis=1, join='in
          ner')
```

```
In [789]: x_three = df_three[three_factors]
```

```
In [790]: x_five = df_five[five_factors]
```

```
In [791]: y = df_three['Returns']
```

In [792]:

```
three_factor_OLS = sm.OLS(y, x_three.values)
three_factor_results = three_factor_OLS.fit()
three_factor_results.summary(xname = three_factors)
```

Out[792]:

OLS Regression Results

Dep. Variable:	Returns	**R-squared:**	0.109
Model:	OLS	**Adj. R-squared:**	0.107
Method:	Least Squares	**F-statistic:**	82.16
Date:	Thu, 16 Nov 2017	**Prob (F-statistic):**	3.67e-50
Time:	09:25:07	**Log-Likelihood:**	1945.8
No. Observations:	2028	**AIC:**	-3886.
Df Residuals:	2025	**BIC:**	-3869.
Df Model:	3		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
Mkt-RF	0.0205	0.002	8.576	0.000	0.016	0.025
SMB	0.0343	0.004	8.001	0.000	0.026	0.043
HML	0.0074	0.004	1.703	0.089	-0.001	0.016

Omnibus:	1042.026	**Durbin-Watson:**	1.889
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	36476.619
Skew:	1.778	**Prob(JB):**	0.00
Kurtosis:	23.470	**Cond. No.**	2.32

In [793]:

```
five_factor_OLS = sm.OLS(y, x_five.values)
five_factor_results = five_factor_OLS.fit()
five_factor_results.summary(xname = five_factors)
```

Out[793]:

OLS Regression Results

Dep. Variable:	Returns	**R-squared:**	0.116
Model:	OLS	**Adj. R-squared:**	0.114
Method:	Least Squares	**F-statistic:**	53.16
Date:	Thu, 16 Nov 2017	**Prob (F-statistic):**	5.74e-52
Time:	09:25:08	**Log-Likelihood:**	1954.5
No. Observations:	2028	**AIC:**	-3899.
Df Residuals:	2023	**BIC:**	-3871.
Df Model:	5		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
Mkt-RF	0.0234	0.003	9.105	0.000	0.018	0.028
SMB	0.0364	0.004	8.114	0.000	0.028	0.045
HML	-0.0055	0.006	-0.984	0.325	-0.016	0.005
RMW	0.0124	0.007	1.659	0.097	-0.002	0.027
CMA	0.0302	0.009	3.343	0.001	0.012	0.048

Omnibus:	1061.255	**Durbin-Watson:**	1.886
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	38251.625
Skew:	1.818	**Prob(JB):**	0.00
Kurtosis:	23.963	**Cond. No.**	4.98

In [794]:

```
capm_df = pd.read_csv('SPY.csv',index_col = 'Date')
```

In [795]:

```
capm_df.index = pd.to_datetime(capm_df.index)
```

In [796]:

```
df_train_capm = portfolio_values
df_train_capm['Market'] = np.log(capm_df['Close']) - np.log(capm_df['Open'])
```

In [797]:

```
x_capm = df_train_capm['Market']
y_capm = df_train_capm['Returns']
```

In [798]:

```
capm_OLS = sm.OLS(y_capm, x_capm)
capm_results = capm_OLS.fit()
capm_results.summary()
```

Out[798]:

OLS Regression Results

Dep. Variable:	Returns	**R-squared:**	0.099
Model:	OLS	**Adj. R-squared:**	0.098
Method:	Least Squares	**F-statistic:**	225.2
Date:	Thu, 16 Nov 2017	**Prob (F-statistic):**	2.20e-48
Time:	09:25:16	**Log-Likelihood:**	1976.4
No. Observations:	2061	**AIC:**	-3951.
Df Residuals:	2060	**BIC:**	-3945.
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Market	4.3173	0.288	15.006	0.000	3.753	4.882

Omnibus:	976.092	**Durbin-Watson:**	1.873
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	29296.292
Skew:	1.621	**Prob(JB):**	0.00
Kurtosis:	21.184	**Cond. No.**	1.00

Out-of-sample evaluation

In [799]:

```
def split(x,y):
    np.random.seed(9001)
    msk = np.random.rand(len(x)) < .75
    return x[msk], x[~msk], y[msk], y[~msk]
```

In [800]:

```
x_train_three, x_test_three, y_train, y_test = split(x_three, y)
```

In [801]:

```
three_factor_OLS = sm.OLS(y_train, x_train_three.values)
results_sm = three_factor_OLS.fit()
print('Three factor test r2 of {}'.format(r2_score(y_test, results_sm.pr
edict(x_test_three.values))))
```

```
Three factor test r2 of 0.12050916425090707
```

In [802]:

```
x_train_five, x_test_five, y_train, y_test = split(x_five, y)
```

In [803]:
```
five_factor_OLS = sm.OLS(y_train, x_train_five.values)
results_sm = five_factor_OLS.fit()
print('Five factor test r2 of {}'.format(r2_score(y_test, results_sm.predict(x_test_five.values))))
```

```
Five factor test r2 of 0.12595466382666898
```

In [804]:
```
x_train_capm, x_test_capm, y_train_capm, y_test_capm = split(x_capm, y_capm)
```

In [805]:
```
capm_OLS = sm.OLS(y_train_capm, x_train_capm.values)
results_sm = capm_OLS.fit()
print('CAPM test r2 of {}'.format(r2_score(y_test_capm, results_sm.predict(x_test_capm.values))))
```

```
CAPM test r2 of 0.1306707400174345
```

EDA for Value Factor

In [806]:
```
value_df = pd.read_csv('RZV.csv', index_col = 'Date')
```

In [807]:
```
value_df.index = pd.to_datetime(value_df.index)
```

In [808]:
```
df_value = portfolio_values
df_value['Value'] = np.log(value_df['Close']) - np.log(value_df['Open'])
df_value = df_value.dropna()
```

In [809]:
```
x_value = df_value['Value']
y_value = df_value['Returns']
```

In [810]:

```
value_OLS = sm.OLS(y_value, x_value)
value_results = value_OLS.fit()
value_results.summary()
```

Out[810]:

OLS Regression Results

Dep. Variable:	Returns	**R-squared:**	0.079
Model:	OLS	**Adj. R-squared:**	0.078
Method:	Least Squares	**F-statistic:**	133.1
Date:	Thu, 16 Nov 2017	**Prob (F-statistic):**	1.34e-29
Time:	09:25:34	**Log-Likelihood:**	1565.6
No. Observations:	1557	**AIC:**	-3129.
Df Residuals:	1556	**BIC:**	-3124.
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
Value	2.3535	0.204	11.536	0.000	1.953	2.754

Omnibus:	885.945	**Durbin-Watson:**	2.053
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	49205.855
Skew:	1.902	**Prob(JB):**	0.00
Kurtosis:	30.276	**Cond. No.**	1.00

In [811]:

```
x_train_value, x_test_value, y_train_value, y_test_value =
split(x_value, y_value)
value_OLS = sm.OLS(y_train_value.values, x_train_value.values)
results_sm = value_OLS.fit()
print('Value factor test r2 of {}'.format(r2_score(y_test_value, results
_sm.predict(x_test_value.values))))
```

```
Value factor test r2 of 0.0679348059461744
```

In [812]:

```
x_value = df_five['SMB']
y_value = df_five['Returns']
```

In [813]:

```
x_train_value, x_test_value, y_train_value, y_test_value =
split(x_value, y_value)
value_OLS = sm.OLS(y_train_value.values, x_train_value.values)
results_sm = value_OLS.fit()
print('Value factor test r2 of {}'.format(r2_score(y_test_value, results
_sm.predict(x_test_value.values))))
```

```
Value factor test r2 of 0.07922111202152493
```

In [842]:

```
for stock in stocks_held:
    stock_group =
grouped_by_stock.get_group(stock).groupby('Date').sum()
    temp_df = pd.concat([stock_group, five_factor_df], axis=1, join='inn
er').dropna()
    x = temp_df[five_factors]
    y = temp_df['Returns']
    x_train, x_test, y_train, y_test = split(x, y)
    OLS = sm.OLS(y_train, x_train)
    results = OLS.fit()
    print(results.summary(title=stock))
```

```
                                    USAK

==============================================================================
=======
Dep. Variable:                Returns   R-squared:
  0.079
Model:                            OLS   Adj. R-squared:
  0.076
Method:                 Least Squares   F-statistic:
  25.91
Date:                Thu, 16 Nov 2017   Prob (F-statistic):
 3.59e-25
Time:                        09:32:46   Log-Likelihood:
3232.6
No. Observations:                1523   AIC:
-6455.
Df Residuals:                    1518   BIC:
-6429.
Df Model:                           5

Covariance Type:            nonrobust

==============================================================================
=======
                 coef    std err          t      P>|t|      [0.025
0.975]
------------------------------------------------------------------------------
-------
Mkt-RF         0.0034      0.001      3.721      0.000       0.002
  0.005
SMB            0.0125      0.002      7.596      0.000       0.009
  0.016
HML            0.0026      0.002      1.298      0.194      -0.001
  0.007
RMW            0.0043      0.003      1.590      0.112      -0.001
  0.010
CMA            0.0067      0.003      2.038      0.042       0.000
  0.013
==============================================================================
=======
Omnibus:                      362.835   Durbin-Watson:
  1.956
Prob(Omnibus):                  0.000   Jarque-Bera (JB):             5
578.240
Skew:                          -0.676   Prob(JB):
   0.00
Kurtosis:                      12.278   Cond. No.
   5.10
==============================================================================
=======

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is
 correctly specified.
                                   RHDGF

==============================================================================
=======
Dep. Variable:                Returns   R-squared:
  0.004
Model:                            OLS   Adj. R-squared:
-0.000
Method:                 Least Squares   F-statistic:
0.9121
Date:                Thu, 16 Nov 2017   Prob (F-statistic):
  0.472
Time:                        09:32:46   Log-Likelihood:
2122.8
No. Observations:                1159   AIC:
-4236.
Df Residuals:                    1154   BIC:
-4210.
Df Model:                           5

Covariance Type:            nonrobust

========================================================================
=======
                 coef    std err          t      P>|t|      [0.025
0.975]
------------------------------------------------------------------------
-------
Mkt-RF         0.0015      0.001      1.030      0.303      -0.001
  0.004
SMB           -0.0028      0.003     -1.092      0.275      -0.008
  0.002
HML           -0.0049      0.003     -1.590      0.112      -0.011
  0.001
RMW            0.0017      0.004      0.406      0.685      -0.006
  0.010
CMA            0.0061      0.005      1.229      0.219      -0.004
  0.016
========================================================================
=======
Omnibus:                     1697.655   Durbin-Watson:
  1.311
Prob(Omnibus):                  0.000   Jarque-Bera (JB):          968
012.439
Skew:                           8.130   Prob(JB):
   0.00
Kurtosis:                     143.644   Cond. No.
   4.72
========================================================================
=======

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is
 correctly specified.
                                    DXLG

========================================================================
=======
Dep. Variable:                Returns   R-squared:
  0.125
```

```
Model:                            OLS   Adj. R-squared:
  0.122
Method:                 Least Squares   F-statistic:
  43.40
Date:                Thu, 16 Nov 2017   Prob (F-statistic):
 6.46e-42
Time:                        09:32:46   Log-Likelihood:
3239.8
No. Observations:                1523   AIC:
-6470.
Df Residuals:                    1518   BIC:
-6443.
Df Model:                           5

Covariance Type:            nonrobust

=======================================================================
=======
                 coef    std err          t      P>|t|      [0.025
0.975]
-----------------------------------------------------------------------
-------
Mkt-RF         0.0042      0.001      4.584      0.000       0.002
  0.006
SMB            0.0168      0.002     10.294      0.000       0.014
  0.020
HML            0.0039      0.002      1.937      0.053   -5.01e-05
  0.008
RMW            0.0050      0.003      1.864      0.063      -0.000
  0.010
CMA            0.0032      0.003      0.982      0.326      -0.003
  0.010
=======================================================================
=======
Omnibus:                      216.195   Durbin-Watson:
  2.063
Prob(Omnibus):                  0.000   Jarque-Bera (JB):             2
068.813
Skew:                           0.313   Prob(JB):
   0.00
Kurtosis:                       8.675   Cond. No.
   5.10
=======================================================================
=======

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is
 correctly specified.
                                    NUSMF

=======================================================================
=======
Dep. Variable:                Returns   R-squared:
  0.011
Model:                            OLS   Adj. R-squared:
  0.008
Method:                 Least Squares   F-statistic:
  3.412
Date:                Thu, 16 Nov 2017   Prob (F-statistic):
 0.00453
Time:                        09:32:46   Log-Likelihood:
2157.9
No. Observations:                1523   AIC:
-4306.
Df Residuals:                    1518   BIC:
-4279.
Df Model:                           5

Covariance Type:            nonrobust

=======================================================================
=======
                 coef    std err          t      P>|t|      [0.025
0.975]
-----------------------------------------------------------------------
-------
Mkt-RF         0.0066      0.002      3.536      0.000       0.003
  0.010
SMB           -0.0048      0.003     -1.437      0.151      -0.011
  0.002
HML           -0.0093      0.004     -2.254      0.024      -0.017
-0.001
RMW           -0.0031      0.005     -0.570      0.569      -0.014
  0.008
CMA            0.0132      0.007      1.983      0.048       0.000
  0.026
=======================================================================
=======
Omnibus:                     1483.355   Durbin-Watson:
  2.097
Prob(Omnibus):                  0.000   Jarque-Bera (JB):           429
027.947
Skew:                           3.903   Prob(JB):
   0.00
Kurtosis:                      84.853   Cond. No.
   5.10
=======================================================================
=======

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is
 correctly specified.
                                     LEE

=======================================================================
=======
Dep. Variable:                Returns   R-squared:
  0.056
Model:                            OLS   Adj. R-squared:
  0.053
Method:                 Least Squares   F-statistic:
  18.00
Date:                Thu, 16 Nov 2017   Prob (F-statistic):
 2.21e-17
```

```
Time:                        09:32:46   Log-Likelihood:
2663.8
No. Observations:                1523   AIC:
-5318.
Df Residuals:                    1518   BIC:
-5291.
Df Model:                           5

Covariance Type:            nonrobust

=======================================================================
=======
                 coef    std err          t      P>|t|      [0.025
0.975]
-----------------------------------------------------------------------
-------
Mkt-RF         0.0055      0.001      4.103      0.000       0.003
  0.008
SMB            0.0132      0.002      5.516      0.000       0.008
  0.018
HML            0.0011      0.003      0.374      0.709      -0.005
  0.007
RMW            0.0021      0.004      0.521      0.602      -0.006
  0.010
CMA            0.0051      0.005      1.074      0.283      -0.004
  0.015
=======================================================================
=======
Omnibus:                      388.445   Durbin-Watson:
  2.038
Prob(Omnibus):                  0.000   Jarque-Bera (JB):             7
016.316
Skew:                           0.707   Prob(JB):
   0.00
Kurtosis:                      13.420   Cond. No.
   5.10
=======================================================================
=======

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is
 correctly specified.
```

In [ ]: