Predicting Stock Prices

September 9, 2019

In [107]:
```
import pandas as pd
import datetime
import pandas_datareader.data as web
from pandas import Series, DataFrame


start = datetime.datetime(2010, 1, 1)
end = datetime.datetime(2019, 8, 31)

df = web.DataReader("AAPL", 'yahoo', start, end)
df.tail()
```

Out[107]:

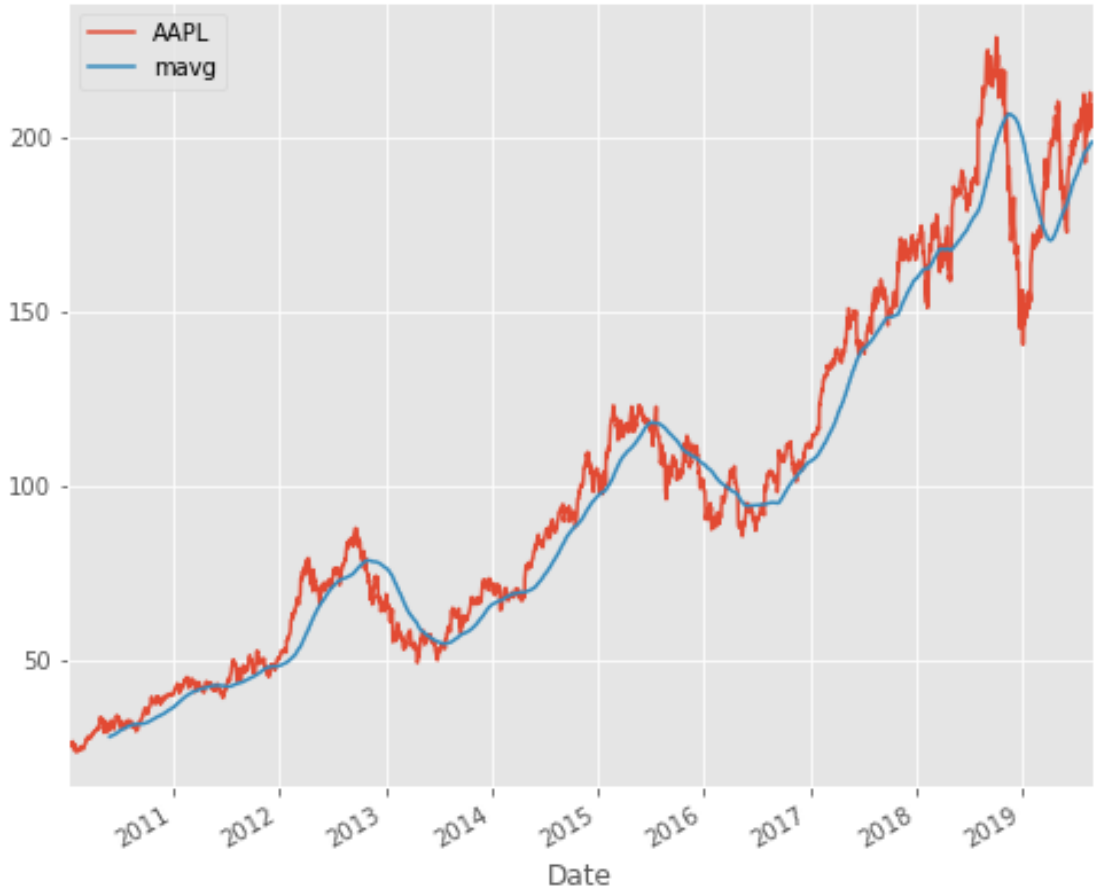
Date	High	Low	Open	Close	Volume	Adj Close
2019-08-26	207.190002	205.059998	205.860001	206.490005	26043600.0	206.490005
2019-08-27	208.550003	203.529999	207.860001	204.160004	25873300.0	204.160004
2019-08-28	205.720001	203.320007	204.100006	205.529999	15938800.0	205.529999
2019-08-29	209.320007	206.660004	208.500000	209.009995	20990500.0	209.009995
2019-08-30	210.449997	207.199997	210.160004	208.740005	21143400.0	208.740005

In [108]:
```
close_px = df['Adj Close']
mavg = close_px.rolling(window=100).mean()
```

In [109]:
```
%matplotlib inline
import matplotlib.pyplot as plt
from matplotlib import style

# Adjusting the size of matplotlib
import matplotlib as mpl
mpl.rc('figure', figsize=(8, 7))
```

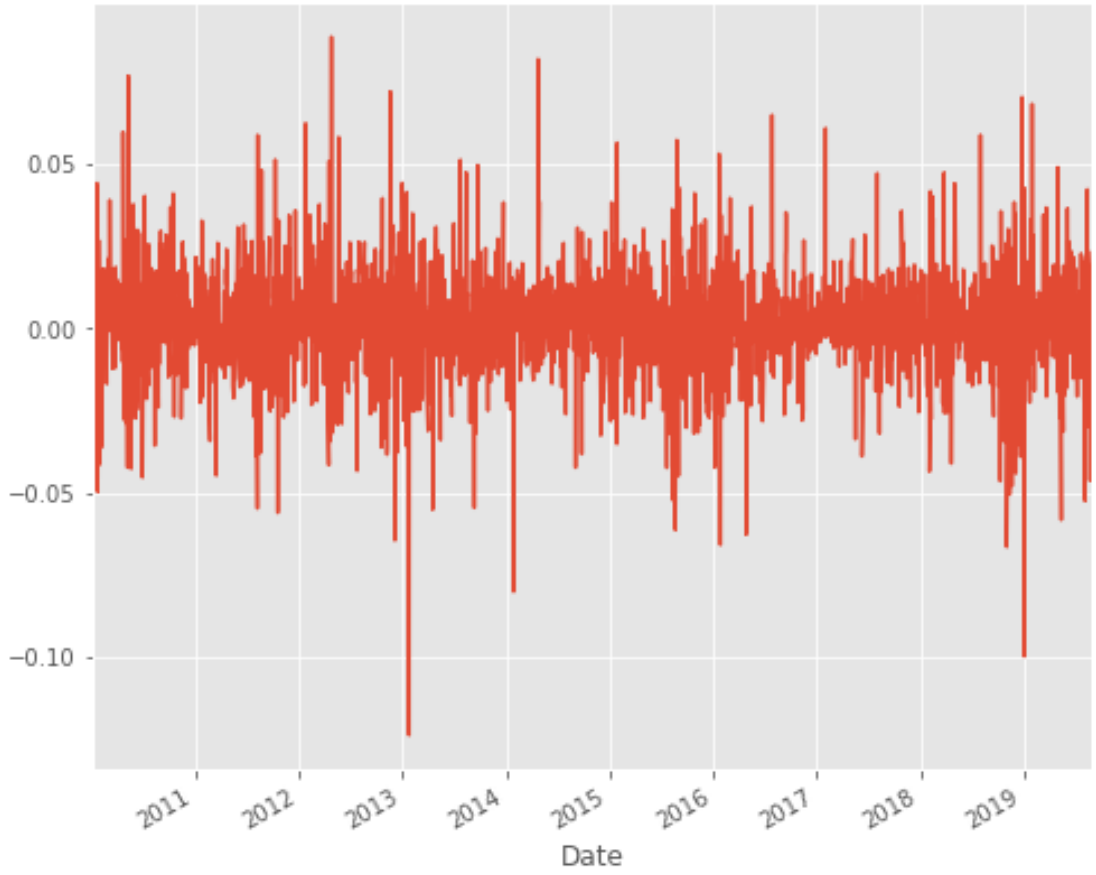
```
mpl.__version__

# Adjusting the style of matplotlib
style.use('ggplot')

close_px.plot(label='AAPL')
mavg.plot(label='mavg')
plt.legend()
```

```
Out[109]: <matplotlib.legend.Legend at 0x1115f3748>
```



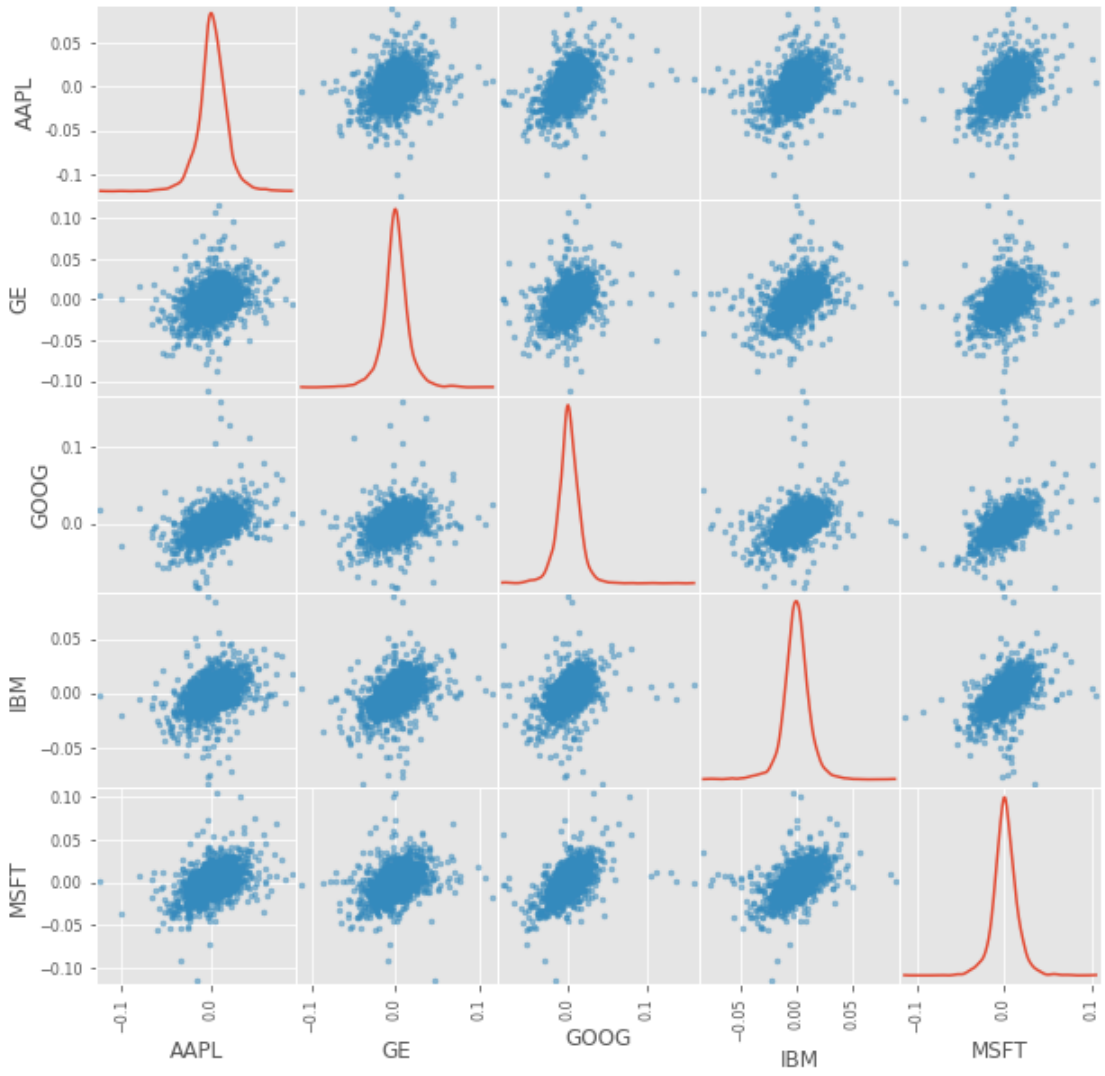

```
In [110]: rets = close_px / close_px.shift(1) - 1
          rets.plot(label='return')
```

```
Out[110]: <matplotlib.axes._subplots.AxesSubplot at 0x112eac4a8>
```

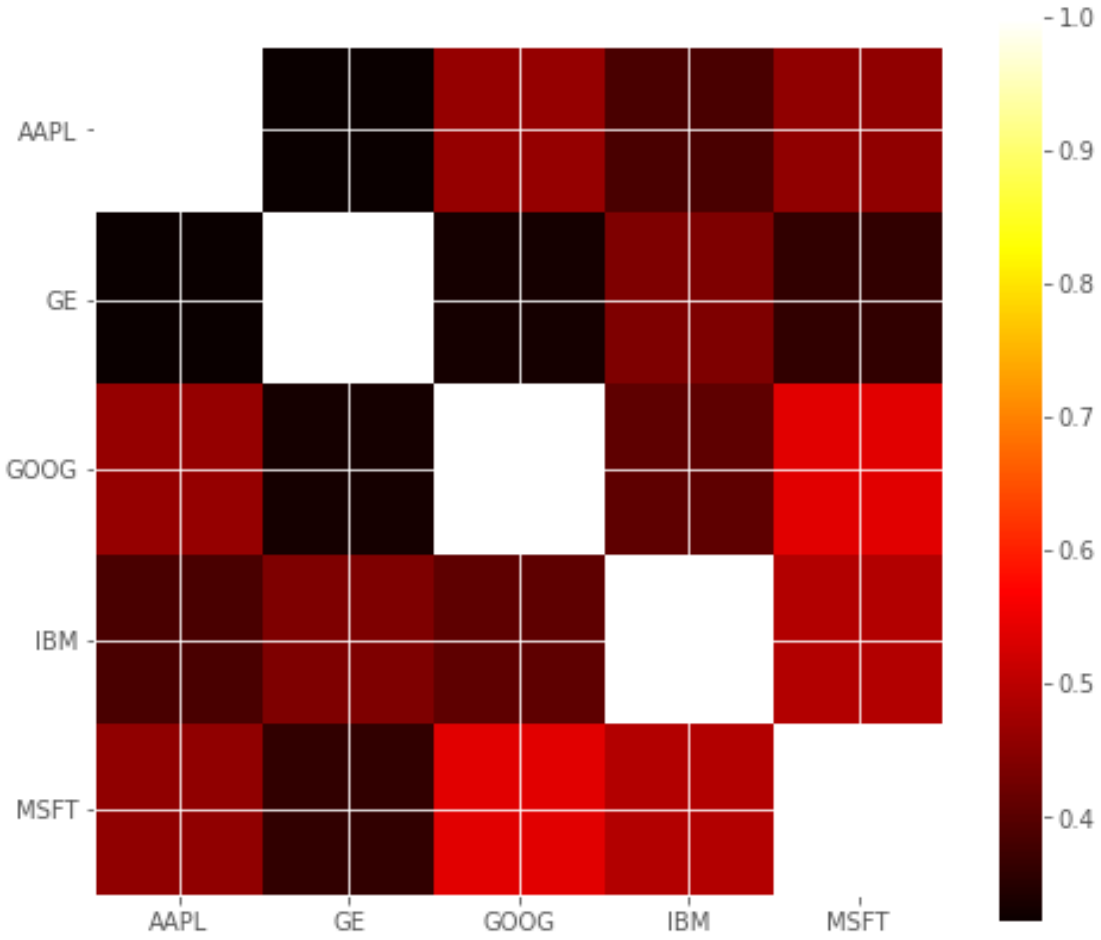



```
In [111]: dfcomp = web.DataReader(['AAPL', 'GE', 'GOOG', 'IBM', 'MSFT'],'yahoo',sta

In [112]: retscomp = dfcomp.pct_change()

          corr = retscomp.corr()

In [113]: plt.scatter(retscomp.AAPL, retscomp.GE)
          plt.xlabel("Returns_AAPL")
          plt.ylabel("Returns_GE")

Out[113]: <matplotlib.text.Text at 0x114f88860>
```

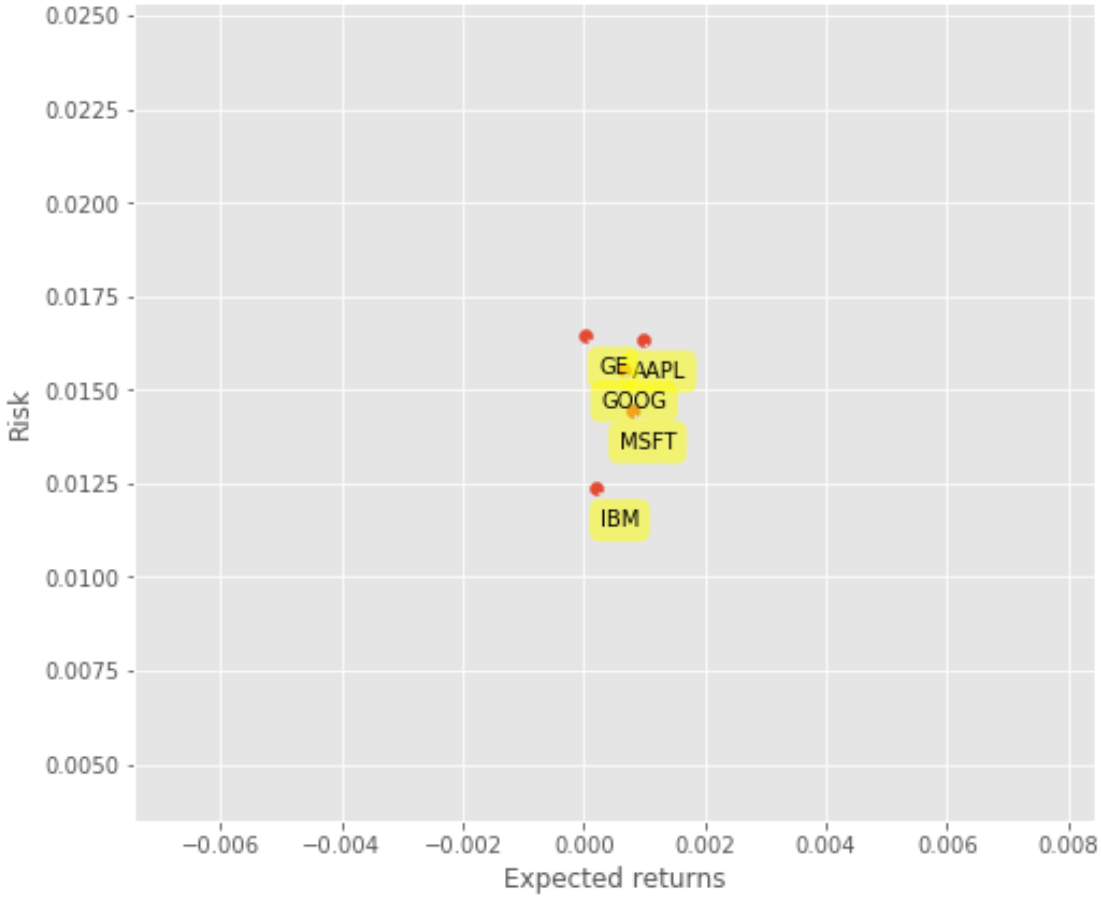

```
In [114]: pd.scatter_matrix(retscomp, diagonal='kde', figsize=(10, 10));
```




```
In [115]: plt.imshow(corr, cmap='hot', interpolation='none')
          plt.colorbar()
          plt.xticks(range(len(corr)), corr.columns)
          plt.yticks(range(len(corr)), corr.columns);
```




```
In [116]: plt.scatter(retscomp.mean(), retscomp.std())
          plt.xlabel('Expected returns')
          plt.ylabel('Risk')
          for label, x, y in zip(retscomp.columns, retscomp.mean(), retscomp.std()):
              plt.annotate(
                  label,
                  xy = (x, y), xytext = (20, -20),
                  textcoords = 'offset points', ha = 'right', va = 'bottom',
                  bbox = dict(boxstyle = 'round,pad=0.5', fc = 'yellow', alpha = 0.
                  arrowprops = dict(arrowstyle = '->', connectionstyle = 'arc3,rad=
```



In [117]:
```
dfreg = df.loc[:,["Adj Close","Volume"]]
dfreg["HL_PCT"] = (df["High"] - df["Low"]) / df["Close"] * 100.0
dfreg["PCT_change"] = (df["Close"] - df["Open"]) / df["Open"] * 100.0
```

In [118]:
```
import math
import numpy as np
from sklearn import preprocessing
# Drop missing value
dfreg.fillna(value=-99999, inplace=True)
# We want to separate 1 percent of the data to forecast
forecast_out = int(math.ceil(0.01 * len(dfreg)))
# Separating the label here, we want to predict the AdjClose
forecast_col = 'Adj Close'
dfreg['label'] = dfreg[forecast_col].shift(-forecast_out)
X = np.array(dfreg.drop(['label'], 1))
# Scale the X so that everyone can have the same distribution for linear
X = preprocessing.scale(X)
# Finally We want to find Data Series of late X and early X (train) for m
X_lately = X[-forecast_out:]
```

```
X = X[:-forecast_out]
# Separate label and identify it as y
y = np.array(dfreg['label'])
y = y[:-forecast_out]
```

In [119]:
```
from sklearn.linear_model import LinearRegression
from sklearn.neighbors import KNeighborsRegressor

from sklearn.linear_model import Ridge
from sklearn.preprocessing import PolynomialFeatures
from sklearn.pipeline import make_pipeline
```

In [120]:
```
# Linear regression
clfreg = LinearRegression(n_jobs=-1)
clfreg.fit(X, y)
# Quadratic Regression 2
clfpoly2 = make_pipeline(PolynomialFeatures(2), Ridge())
clfpoly2.fit(X, y)

# Quadratic Regression 3
clfpoly3 = make_pipeline(PolynomialFeatures(3), Ridge())
clfpoly3.fit(X, y)
```

Out[120]:
```
Pipeline(steps=[('polynomialfeatures', PolynomialFeatures(degree=3, inclu
   normalize=False, random_state=None, solver='auto', tol=0.001))])
```

In [121]:
```
# KNN Regression
clfknn = KNeighborsRegressor(n_neighbors=3)
clfknn.fit(X, y)
```

Out[121]:
```
KNeighborsRegressor(algorithm='auto', leaf_size=30, metric='minkowski',
          metric_params=None, n_jobs=1, n_neighbors=3, p=2,
          weights='uniform')
```

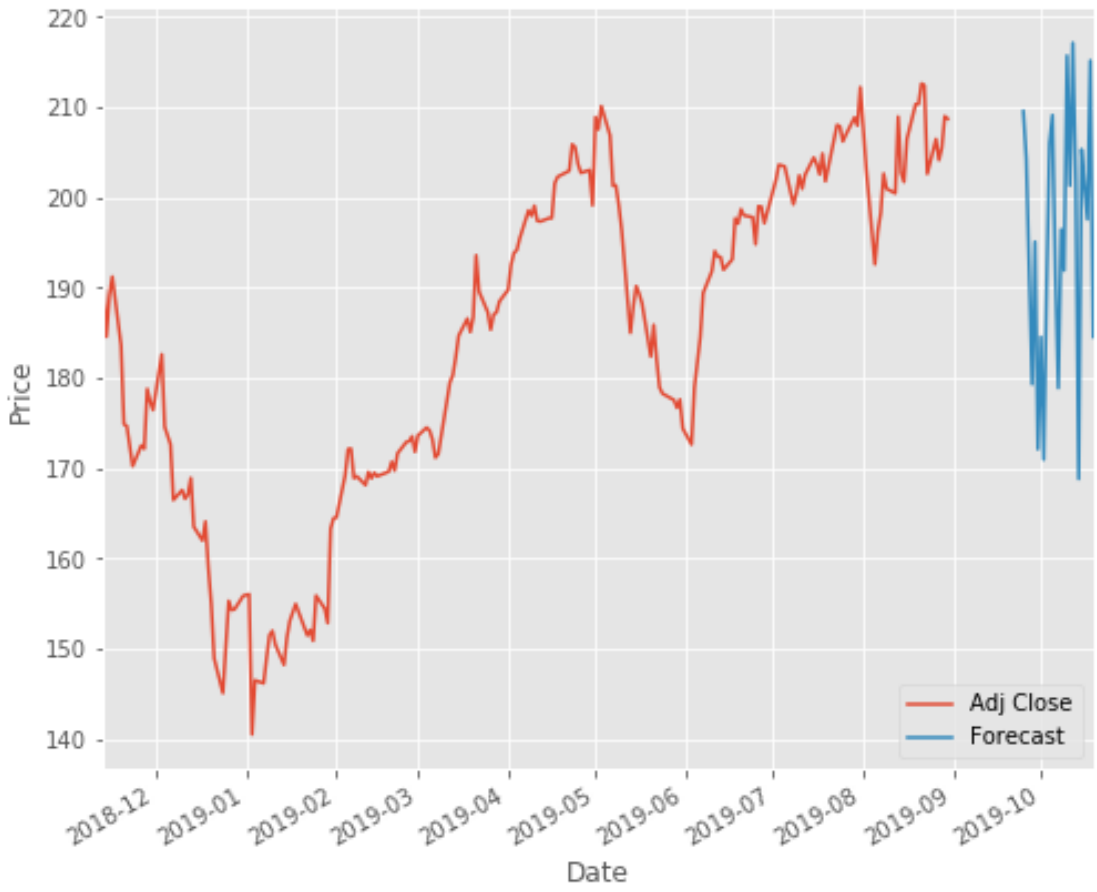
In [122]:
```
confidencereg = clfreg.score(X, y)
confidencepoly2 = clfpoly2.score(X, y)
confidencepoly3 = clfpoly3.score(X, y)
confidenceknn = clfknn.score(X, y)
# results
print('The linear regression confidence is ', confidencereg)
print('The quadratic regression 2 confidence is ', confidencepoly2)
print('The quadratic regression 3 confidence is ', confidencepoly3)
print('The knn regression confidence is ', confidenceknn)
```

```
The linear regression confidence is  0.967129293567
The quadratic regression 2 confidence is  0.968911975083
The quadratic regression 3 confidence is  0.971361801328
The knn regression confidence is  0.979883604603
```

```
In [125]: forecast_set = clfknn.predict(X_lately)
          dfreg['Forecast'] = np.nan
          print(forecast_set)
```

```
[ 209.56981405  204.36005147  192.00984701  179.32147725  195.10597738
  172.11277771  184.57727559  170.96696472  190.38150533  206.01508077
  209.14449565  191.83034261  178.89909363  196.48121643  191.91978963
  215.7403005   201.33017985  217.15348816  201.7023112   168.82302348
  205.35243734  201.19228617  197.58846537  215.19373576  184.57869975]
```

```
In [126]: last_date = dfreg.iloc[-1].name
          last_unix = last_date
          next_unix = last_unix + datetime.timedelta(days=1)

          for i in forecast_set:
              next_date = next_unix
              next_unix += datetime.timedelta(days=1)
              dfreg.loc[next_date] = [np.nan for _ in range(len(dfreg.columns)-1)]+
          dfreg['Adj Close'].tail(250).plot()
          dfreg['Forecast'].tail(250).plot()
          plt.legend(loc=4)
          plt.xlabel('Date')
          plt.ylabel('Price')
          plt.show()
```


220
210
200
190
180
170
160
150
140
Price
2018-12
2019-01
2019-02
2019-03
2019-04
2019-05
2019-06
2019-07
2019-08
2019-09
2019-10
Date
Adj Close
Forecast

In [ ]: