Beta_Indicator

September 29, 2021

1 Beta Indicator

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings("ignore")

# fix_yahoo_finance is used to fetch data
import fix_yahoo_finance as yf
yf.pdr_override()
```

[2]:
```
# input
symbol = 'AAPL'
market = '^GSPC'
start = '2018-08-01'
end = '2019-01-01'

# Read data
df = yf.download(symbol,start,end)
mk = yf.download(market,start,end)
```

```
[**********************100%**********************]  1 of 1 downloaded
[**********************100%**********************]  1 of 1 downloaded
```

[3]:
```
df.head()
```

[3]:

Date	Open	High	Low	Close	Adj Close	Volume
2018-08-01	199.130005	201.759995	197.309998	201.500000	198.478760	
2018-08-02	200.580002	208.380005	200.350006	207.389999	204.280457	
2018-08-03	207.029999	208.740005	205.479996	207.990005	204.871445	
2018-08-06	208.000000	209.250000	207.070007	209.070007	205.935257	
2018-08-07	209.320007	209.500000	206.759995	207.110001	204.004639	

```
2018-08-01  67935700
2018-08-02  62404000
2018-08-03  33447400
2018-08-06  25425400
2018-08-07  25587400
```

[4]:
```
mk.head()
```

[4]:
```
                  Open         High          Low        Close    Adj Close  \
Date
2018-08-01  2821.169922  2825.830078  2805.850098  2813.360107  2813.360107
2018-08-02  2800.479980  2829.909912  2796.340088  2827.219971  2827.219971
2018-08-03  2829.620117  2840.379883  2827.370117  2840.350098  2840.350098
2018-08-06  2840.290039  2853.290039  2835.979980  2850.399902  2850.399902
2018-08-07  2855.919922  2863.429932  2855.919922  2858.449951  2858.449951

                Volume
Date
2018-08-01  -797977296
2018-08-02  -827587296
2018-08-03 -1264577296
2018-08-06 -1420427296
2018-08-07 -1132197296
```

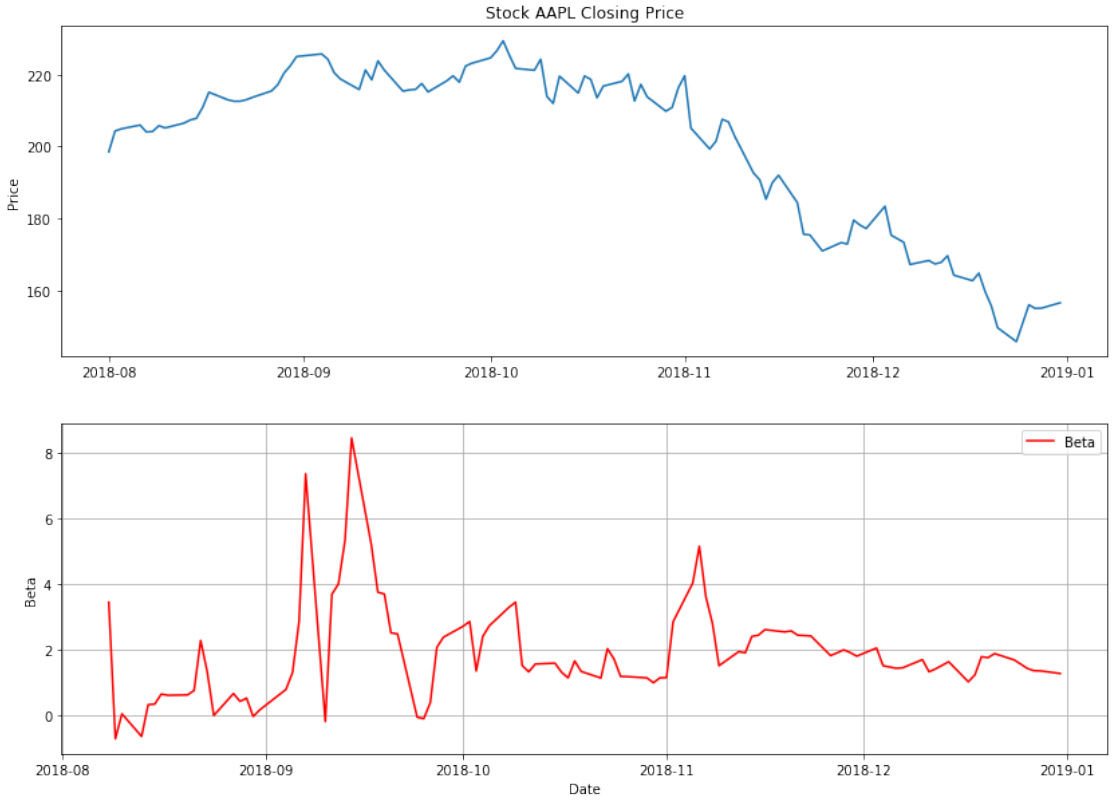
[5]:
```
df['Returns'] = df['Adj Close'].pct_change().dropna()
mk['Returns'] = mk['Adj Close'].pct_change().dropna()
```

[6]:
```
n = 5
covar = df['Returns'].rolling(n).cov(mk['Returns'])
variance = mk['Returns'].rolling(n).var()
df['Beta'] = covar / variance
```

[7]:
```
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['Beta'], label='Beta', color='red')
#ax2.axhline(y=0, color='blue', linestyle='--')
ax2.grid()
ax2.set_ylabel('Beta')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[7]:
```
<matplotlib.legend.Legend at 0x24c5f710160>
```



1.1 Candlestick with Beta

[8]:
```
from matplotlib import dates as mdates
import datetime as dt

dfc = df.copy()
dfc['VolumePositive'] = dfc['Open'] < dfc['Adj Close']
#dfc = dfc.dropna()
dfc = dfc.reset_index()
dfc['Date'] = pd.to_datetime(dfc['Date'])
dfc['Date'] = dfc['Date'].apply(mdates.date2num)
dfc.head()
```

[8]:

	Date	Open	High	Low	Close	Adj Close	\
0	736907.0	199.130005	201.759995	197.309998	201.500000	198.478760	
1	736908.0	200.580002	208.380005	200.350006	207.389999	204.280457	
2	736909.0	207.029999	208.740005	205.479996	207.990005	204.871445	
3	736912.0	208.000000	209.250000	207.070007	209.070007	205.935257	
4	736913.0	209.320007	209.500000	206.759995	207.110001	204.004639	

	Volume	Returns	Beta	VolumePositive

```
0  67935700       NaN   NaN          False
1  62404000  0.029231   NaN           True
2  33447400  0.002893   NaN          False
3  25425400  0.005193   NaN          False
4  25587400 -0.009375   NaN          False
```

[9]:
```
from mpl_finance import candlestick_ohlc

fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
↪0)
ax1.xaxis_date()
ax1.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
ax1.grid(True, which='both')
ax1.minorticks_on()
ax1v = ax1.twinx()
colors = dfc.VolumePositive.map({True: 'g', False: 'r'})
ax1v.bar(dfc.Date, dfc['Volume'], color=colors, alpha=0.4)
ax1v.axes.yaxis.set_ticklabels([])
ax1v.set_ylim(0, 3*df.Volume.max())
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['Beta'], label='Beta', color='red')
#ax2.axhline(y=0, color='blue', linestyle='--')
ax2.grid()
ax2.set_ylabel('Beta')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[9]:
```
<matplotlib.legend.Legend at 0x24c5f977940>
```


Stock AAPL Closing Price
Price
220
200
180
160
01-08-2018
01-09-2018
01-10-2018
01-11-2018
01-12-2018
01-01-2019
Beta
8
6
4
2
0
2018-08
2018-09
2018-10
2018-11
2018-12
2019-01
Date