DPO

September 29, 2021

1 Detrended Price Oscillator (DPO)

https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:detrended_price_osci

```python
[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()
```

```python
[2]: # input
     symbol = 'AAPL'
     start = '2017-01-01'
     end = '2019-01-01'

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

     # View Columns
     df.head()
```

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

```
[2]:                 Open        High         Low       Close    Adj Close  \
     Date
     2017-01-03  115.800003  116.330002  114.760002  116.150002  112.140007
     2017-01-04  115.849998  116.510002  115.750000  116.019997  112.014503
     2017-01-05  115.919998  116.860001  115.809998  116.610001  112.584129
     2017-01-06  116.779999  118.160004  116.470001  117.910004  113.839249
     2017-01-09  117.949997  119.430000  117.940002  118.989998  114.881950

                     Volume
     Date
```

```
2017-01-03    28781900
2017-01-04    21118100
2017-01-05    22193600
2017-01-06    31751900
2017-01-09    33561900
```

[3]:
```python
n = 15
df['DPO'] = df['Adj Close'].shift(int((0.5 * n) + 1)) - df['Adj Close'].
 ↪rolling(n).mean()
```

[4]: `df.head(20)`

[4]:

	Open	High	Low	Close	Adj Close \
Date					
2017-01-03	115.800003	116.330002	114.760002	116.150002	112.140007
2017-01-04	115.849998	116.510002	115.750000	116.019997	112.014503
2017-01-05	115.919998	116.860001	115.809998	116.610001	112.584129
2017-01-06	116.779999	118.160004	116.470001	117.910004	113.839249
2017-01-09	117.949997	119.430000	117.940002	118.989998	114.881950
2017-01-10	118.769997	119.379997	118.300003	119.110001	114.997818
2017-01-11	118.739998	119.930000	118.599998	119.750000	115.615723
2017-01-12	118.900002	119.300003	118.209999	119.250000	115.132988
2017-01-13	119.110001	119.620003	118.809998	119.040001	114.930237
2017-01-17	118.339996	120.239998	118.220001	120.000000	115.857086
2017-01-18	120.000000	120.500000	119.709999	119.989998	115.847435
2017-01-19	119.400002	120.089996	119.370003	119.779999	115.644691
2017-01-20	120.449997	120.449997	119.730003	120.000000	115.857086
2017-01-23	120.000000	120.809998	119.769997	120.080002	115.934326
2017-01-24	119.550003	120.099998	119.500000	119.970001	115.828125
2017-01-25	120.419998	122.099998	120.279999	121.879997	117.672188
2017-01-26	121.669998	122.440002	121.599998	121.940002	117.730118
2017-01-27	122.139999	122.349998	121.599998	121.949997	117.739769
2017-01-30	120.930000	121.629997	120.660004	121.629997	117.430817
2017-01-31	121.150002	121.389999	120.620003	121.349998	117.160492

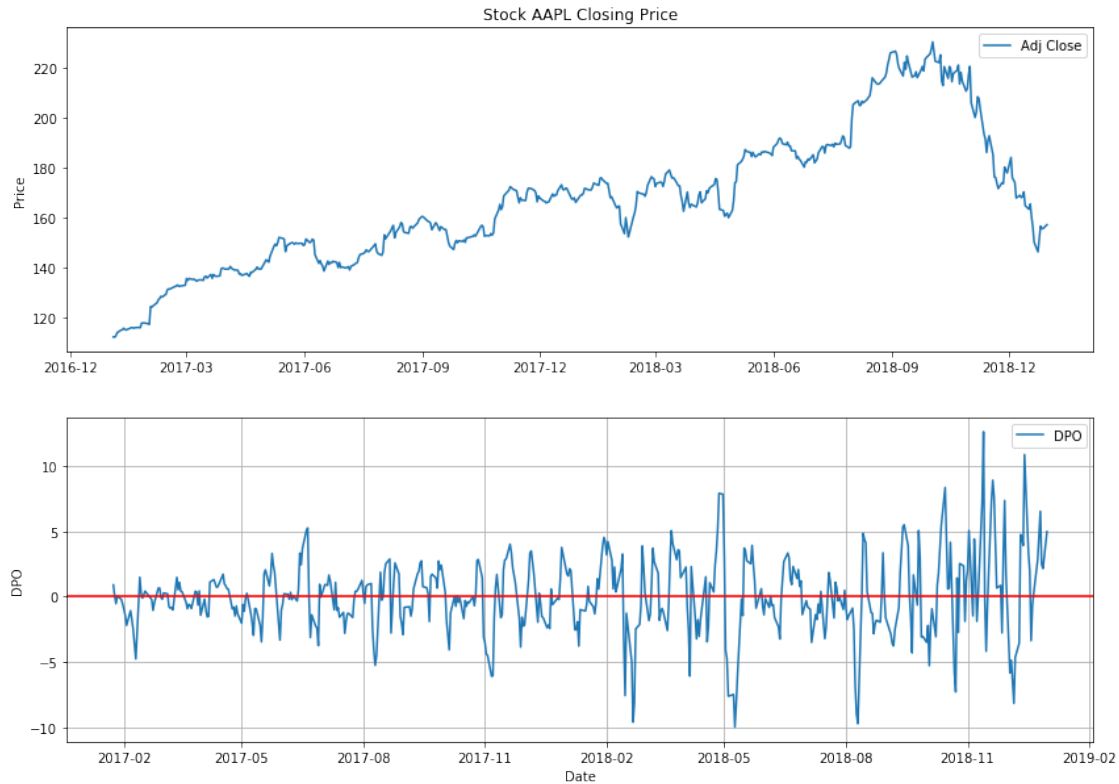|	Volume	DPO
Date		
2017-01-03	28781900	NaN
2017-01-04	21118100	NaN
2017-01-05	22193600	NaN
2017-01-06	31751900	NaN
2017-01-09	33561900	NaN
2017-01-10	24462100	NaN
2017-01-11	27588600	NaN
2017-01-12	27086200	NaN
2017-01-13	26111900	NaN
2017-01-17	34439800	NaN

```
2017-01-18   23713000        NaN
2017-01-19   25597300        NaN
2017-01-20   32597900        NaN
2017-01-23   22050200        NaN
2017-01-24   23211000   0.875366
2017-01-25   32377600   0.023819
2017-01-26   26337600  -0.559973
2017-01-27   20562900   0.023167
2017-01-30   30377500  -0.225922
2017-01-31   49201000  -0.580569
```

[5]:
```python
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')
ax1.legend(loc='best')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['DPO'], label='DPO')
ax2.axhline(y=0, color='red')
ax2.grid()
ax2.legend()
ax2.set_ylabel('DPO')
ax2.set_xlabel('Date')
```

[5]: Text(0.5,0,'Date')
```
```

1.1 Candlestick with DPO

```
[6]: 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'] = mdates.date2num(dfc['Date'].astype(dt.date))
     dfc.head()
```

```
[6]:        Date        Open        High         Low       Close    Adj Close  \
     0  736332.0  115.800003  116.330002  114.760002  116.150002  112.140007
     1  736333.0  115.849998  116.510002  115.750000  116.019997  112.014503
     2  736334.0  115.919998  116.860001  115.809998  116.610001  112.584129
     3  736335.0  116.779999  118.160004  116.470001  117.910004  113.839249
     4  736338.0  117.949997  119.430000  117.940002  118.989998  114.881950

          Volume  DPO  VolumePositive
     0  28781900  NaN           False
     1  21118100  NaN           False
```

4

```
2  22193600  NaN         False
3  31751900  NaN         False
4  33561900  NaN         False
```

```python
[7]: 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['DPO'], label='DPO')
ax2.axhline(y=0, color='red')
ax2.grid()
ax2.set_ylabel('DPO')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

```
[7]: <matplotlib.legend.Legend at 0x1970fcde470>
```

Stock AAPL Closing Price