Calculating Risk Measures (VAR) Expected Shortfall

December 8, 2020

```python
[13]: import matplotlib.pyplot as plt
      import pandas as pd
      from pandas_datareader import data as pdr
      import yfinance as yf
      import numpy as np
      import datetime as dt
      import matplotlib as mpl

      import scipy.stats as scs
```

```python
[23]: tickers = ['HD']
      start = dt.datetime(2020,1,1)
      end = dt.datetime(2020,12,31)
      ST = pdr.get_data_yahoo(tickers, start, end=dt.date.today())['Adj Close']
```

```python
[24]: ST.head()
```

```
[24]: Symbols            HD
      Date
      2020-01-02 214.597031
      2020-01-03 213.883835
      2020-01-06 214.890106
      2020-01-07 213.483307
      2020-01-08 216.677917
```

```
[45]:
```
```python
[44]: S0 = 200
```

```python
ST
```

```
[45]: Symbols            HD
      Date
      2020-01-02 214.597031
      2020-01-03 213.883835
      2020-01-06 214.890106
      2020-01-07 213.483307
      2020-01-08 216.677917
      …                 …
      2020-12-01 275.100006
      2020-12-02 271.100006
```

```
2020-12-03  268.140015
2020-12-04  263.989990
2020-12-07  262.640015

[236 rows x 1 columns]
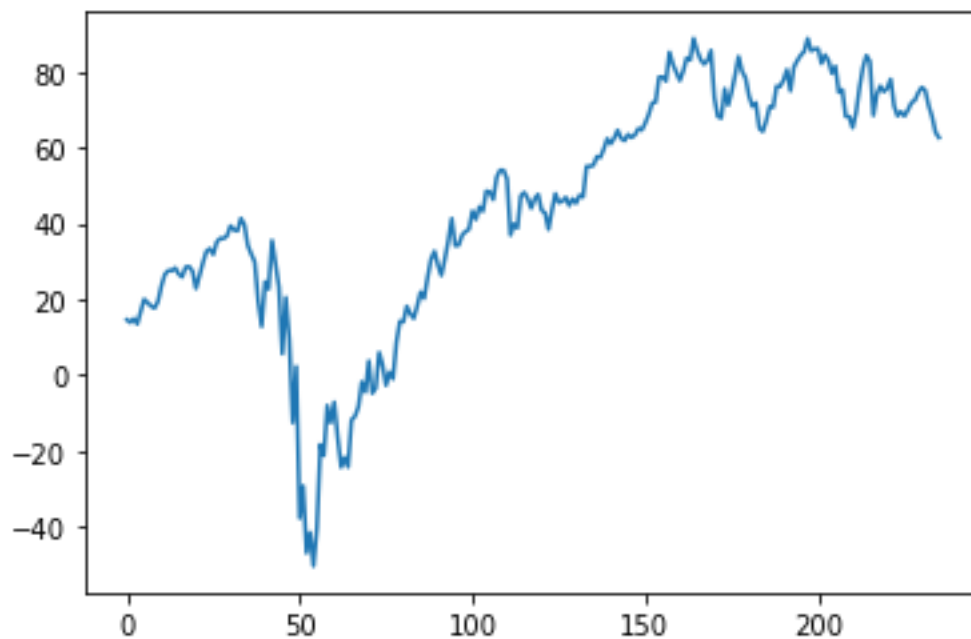```

[46]: `Returns = np.sort(ST - S0)`

[47]: `Returns`

[47]:
```
array([[
14.59703064], [
 13.88383484],
 [14.8901062],
 [13.48330688],
 [16.67791748],
 [19.99954224],
 [19.05192566],
 [18.19218445],
 [17.67440796],
 [19.41339111],
 [23.54589844],
 [… Truncated]])
```

[48]: `plt.plot(Ret_S)`

[48]: `[<matplotlib.lines.Line2D at 0x1ab3a0123a0>]`

## 0.1 Extraction of the VaR value from the array

```
[49]: Please Inquire about Professional
      Services…
```

```python
print('%14.2f %14.2f' %(100 - pair[0], -pair[1]))
  Confidence Level         VaR
  ------------------------------
          99.00       41.10
          97.50       24.93
          95.00       13.54
```

0.2 Expected Shortfall

```
[50]: Please Inquire about Professional Services…
```

```
        Worst X%ile          ES
      ------------------------------
         -1.00             46.28
         -2.50             41.02
         -5.00             31.03
```

```
[43]: plt.plot(ES)
```

```
[43]: [<matplotlib.lines.Line2D at
0x1ab39fb0190>]
```