

Stock_Value_at_Risk_Chart

September 29, 2021

1 Stock Value-At-Risk Chart

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

import warnings
warnings.filterwarnings("ignore")

from pandas_datareader import data as pdr
import yfinance as yf
yf.pdr_override()

[2]: start = '2019-01-01' #input
end = '2020-07-01' #input
symbol1 = '^GSPC' #input
symbol2 = 'AMD' #input

[3]: market = yf.download(symbol1, start=start, end=end)['Adj Close']
stocks = yf.download(symbol2, start=start, end=end)['Adj Close']

[*****100%*****] 1 of 1 completed
[*****100%*****] 1 of 1 completed

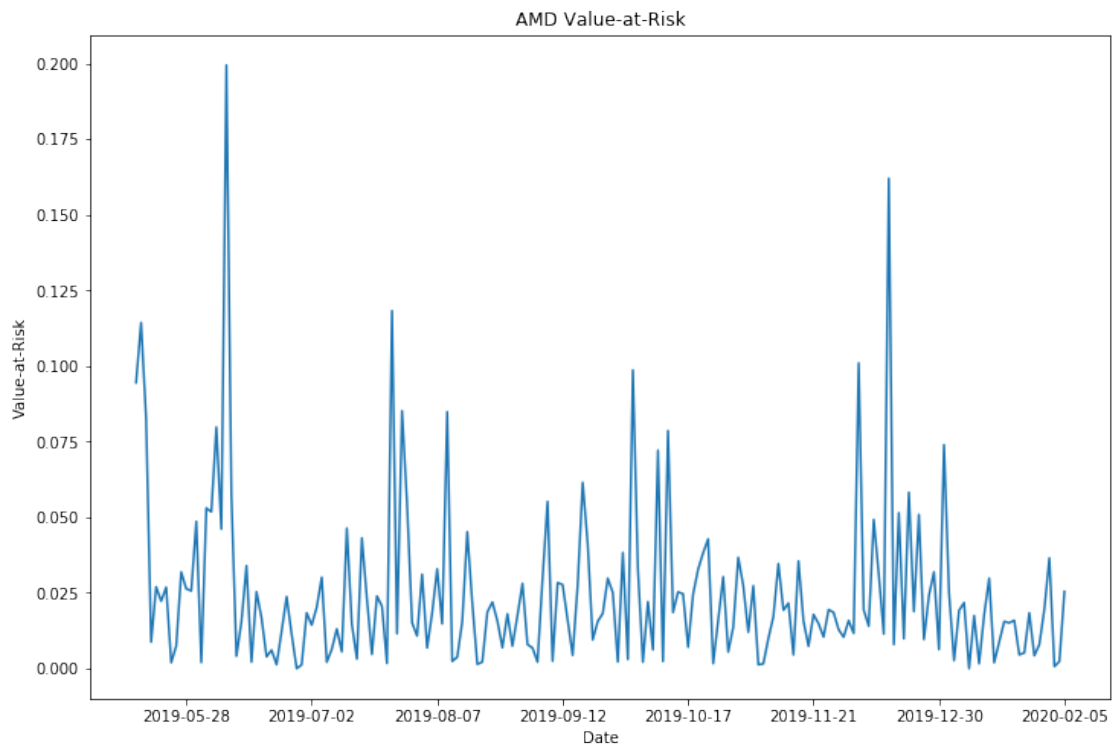
[4]: market_returns = market.pct_change().dropna()
stocks_returns = stocks.pct_change().dropna()

[5]: def var(stock_returns, market_returns):
    m = np.matrix([stock_returns, market_returns])
    beta = np.cov(m)[0][1] / np.std(market_returns)
    alpha = np.mean(stock_returns) - beta * np.mean(market_returns)
    sorted_returns = np.sort(stock_returns)
    index = int(alpha * len(sorted_returns))
    VaR = abs(stock_returns[index])
    return VaR
```

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[6]: # Compute the running Value-at-Risk
running = [var(stocks_returns[i-90:i], market_returns[i-90:i]) for i in
↳range(90, len(stocks_returns))]

# Plot running Value-at-Risk up to 100 days before the end of the data set
_, ax1 = plt.subplots(figsize=(12,8))
ax1.plot(range(90, len(stocks_returns)-100), running[:100])
ticks = ax1.get_xticks()
ax1.set_xticklabels([stocks.index[int(i)].date() for i in ticks[:-1]]) # Label
↳x-axis with dates
plt.title(symbol2 + ' Value-at-Risk')
plt.xlabel('Date')
plt.ylabel('Value-at-Risk')
```

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[6]: Text(0, 0.5, 'Value-at-Risk')
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[7]: stock_var = var(stocks_returns, market_returns)
stock_var
```

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[7]: 0.11436955133117288
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[8]: running = [var(stocks_returns[i-90:i], market_returns[i-90:i]) for i in
↳range(90, len(stocks_returns))]
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running
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