# nvidia

May 19, 2023

[ ]:
```
import pandas as pd
import scipy.stats as stats
from scipy.stats import beta
import numpy as np
import matplotlib.pyplot as plt
import matplotlib as mpl
from Binomial_Fixed import portfolio_cmds
%matplotlib inline
plt.style.use('seaborn')
mpl.rcParams['font.family'] = 'serif'
import quandl
apikey = 'J_fXGeVW_zC6RaDeJSQv'
quandl.ApiConfig.api_key = apikey
```

[ ]:
```
class Price_DF:
    def __init__(self, asset:str,start_date=None,end_date = None):
        self.asset = asset
        self.start_date = start_date
        self.end_date = end_date

        if self.start_date == None:
            self.start_date = '2018-01-01'
        else:
            self.start_date = start_date
        if self.end_date != None:
            self.end_dte = end_date


    def ret_df(self,log_normal=False,to_monthly=False,drop_price_col = False):
        df = quandl.get_table('QUOTEMEDIA/PRICES', ticker = [self.asset],qopts␣
 ↪= {"columns": ['date','adj_close']}, date = {'gte':self.start_date,'lte':
 ↪self.end_date}).set_index('date').sort_index()
        if log_normal:
            df['rets'] = np.log(df['adj_close']/df['adj_close'].shift())
            if to_monthly:
                df = df.resample('m').last()[:-1]
                df['rets'] = np.log(df['adj_close']/df['adj_close'].shift())
```

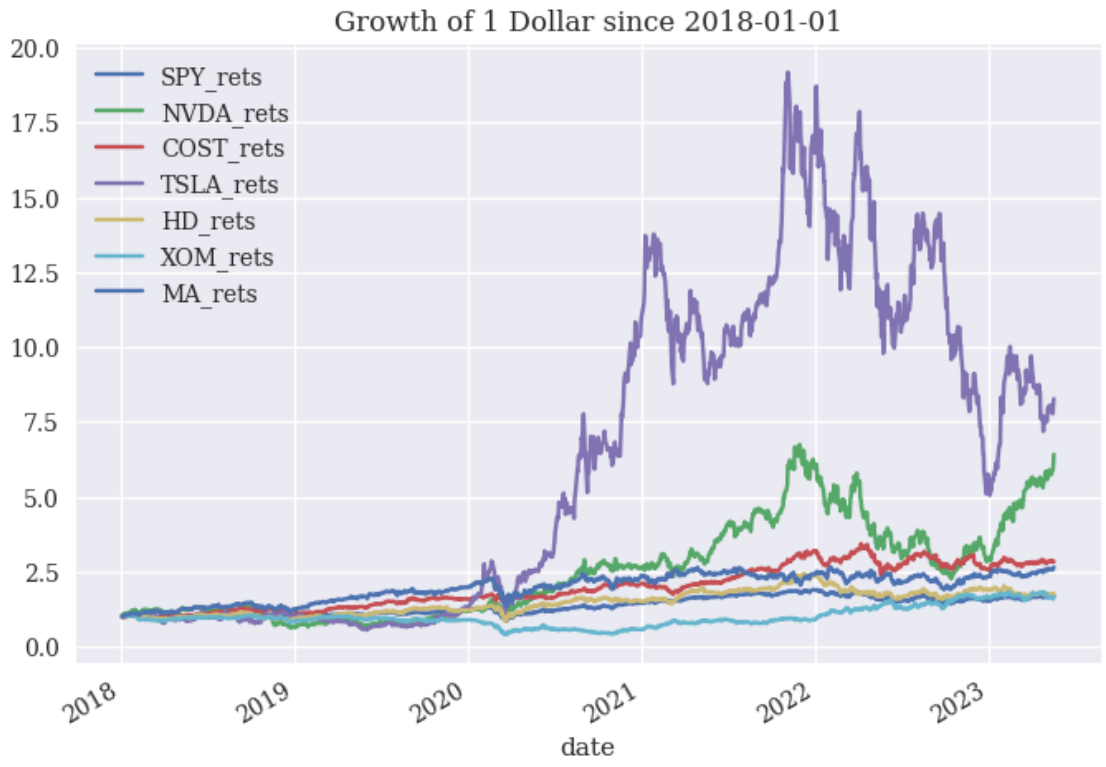
```
        if not log_normal:
            df['rets'] = df['adj_close'].pct_change()
            if to_monthly:
                df = df.resample('m').last()[:-1]
                df['rets'] = df['adj_close'].pct_change()
        if drop_price_col:
            df = df.drop(columns = {'adj_close'})
            df.columns = [f"{self.asset}_rets"]
        if not drop_price_col:
            df.columns = ["Price",f"{self.asset}_rets"]

        return df.dropna()
```

[ ]:
```
tickers = ['SPY','NVDA','COST','TSLA','HD','XOM','MA']
ret_df = pd.DataFrame(data = None)
lognormal = False
to_monthly = False
drop_price_col = True
start_date = '2018-01-01'
```

[ ]:
```
for asset in tickers:
    object = Price_DF(asset = asset,start_date = start_date)
    temp_df = object.
 ↪ret_df(log_normal=lognormal,to_monthly=to_monthly,drop_price_col=drop_price_col)
    ret_df = pd.concat([ret_df,temp_df],axis=1)
```

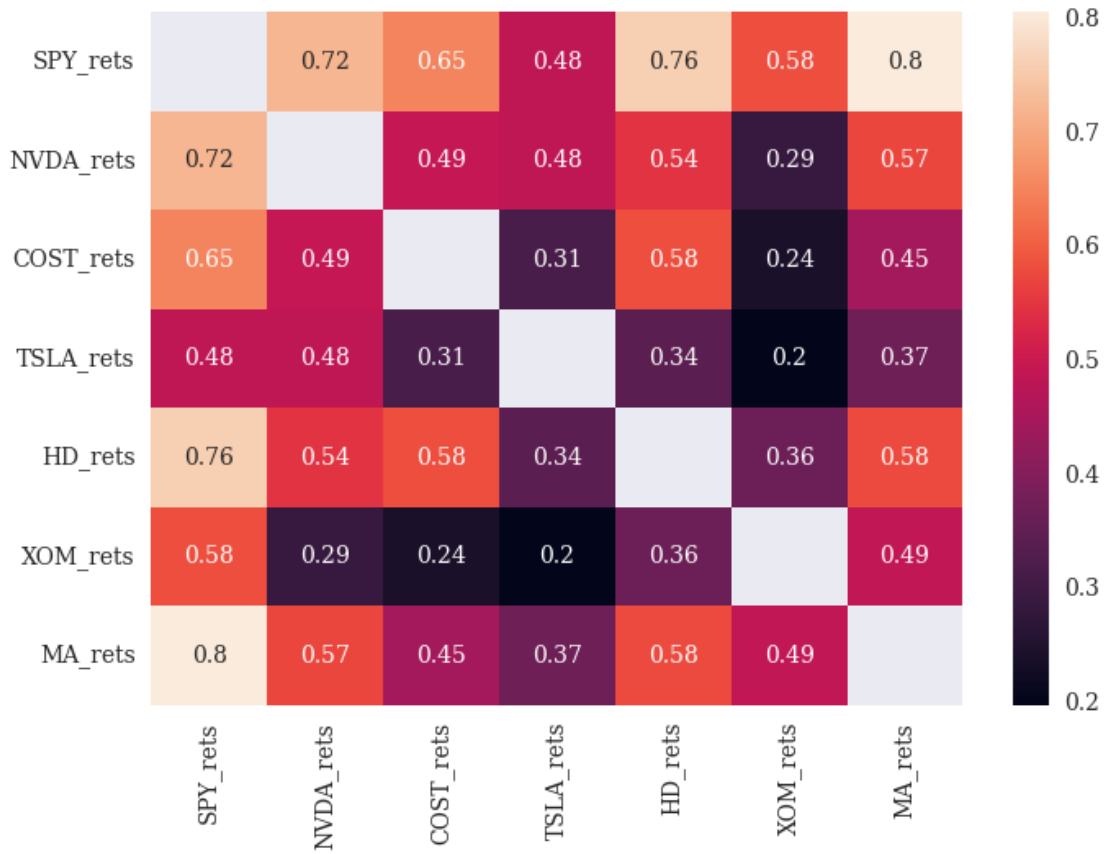
[ ]:
```
((1+ret_df).cumprod()).plot(title=f'Growth of 1 Dollar since {start_date}')
```

[ ]:
```
<AxesSubplot:title={'center':'Growth of 1 Dollar since 2018-01-01'},
xlabel='date'>
```




[ ]:
```
portfolio_cmds.display_correlation(ret_df)
```

```
MIN Correlation pair is ('TSLA_rets', 'XOM_rets')
MAX Correlation pair is ('MA_rets', 'SPY_rets')
```




[ ]:
```
ols_df = portfolio_cmds.get_ols_metrics(regressors=ret_df.iloc[:
↪,0],targets=ret_df.iloc[:,1:],annualization=365)
```

| | $\alpha_i$ | $\beta_{i,spy}$ | r-squared | Treynor Ratio | Info Ratio |
|---|---|---|---|---|---|
| NVDA_rets | 0.386779 | 1.76091 | 0.519615 | 0.395436 | 0.896409 |
| COST_rets | 0.194122 | 0.739105 | 0.421812 | 0.438433 | 0.880296 |
| TSLA_rets | 0.617293 | 1.48804 | 0.232536 | 0.590625 | 0.896041 |
| HD_rets | 0.0356425 | 1.02048 | 0.575282 | 0.210716 | 0.15951 |
| XOM_rets | 0.0542095 | 0.918562 | 0.336359 | 0.234804 | 0.164868 |
| MA_rets | 0.122974 | 1.22922 | 0.646828 | 0.275831 | 0.531277 |

- Nividia earns 38.67% return in excess of the market. Its beta coefficient is large. If the market declines by 1%, then the expected return for Nividia on that particular day is $-1.76\%$.

| | $\mu_i$ | $\sigma_i$ | Sharpe | Min | Max |
|---|---|---|---|---|---|
| SPY_rets | 0.175789 | 0.254838 | 0.689805 | -0.109424 | 0.0906033 |
| NVDA_rets | 0.696328 | 0.622533 | 1.11854 | -0.187559 | 0.171564 |
| COST_rets | 0.324048 | 0.290009 | 1.11737 | -0.124513 | 0.0995945 |

| | $\mu_i$ | $\sigma_i$ | Sharpe | Min | Max |
|---|---|---|---|---|---|
| TSLA_rets | 0.878873 | 0.786383 | 1.11761 | -0.210628 | 0.198949 |
| HD_rets | 0.215032 | 0.34287 | 0.627152 | -0.197938 | 0.137508 |
| XOM_rets | 0.215682 | 0.403619 | 0.534371 | -0.122248 | 0.126868 |
| MA_rets | 0.339056 | 0.389492 | 0.870509 | -0.127255 | 0.166109 |

| | Max Drawdown | Peak | Bottom | Recover | Duration (to Recover) |
|---|---|---|---|---|---|
| SPY_rets | -0.336999 | 2020-02-19 00:00:00 | 2020-03-23 00:00:00 | 2020-08-10 00:00:00 | 173 days 00:00:00 |
| NVDA_rets | -0.663352 | 2021-11-29 00:00:00 | 2022-10-14 00:00:00 | NaT | NaT |
| COST_rets | -0.314042 | 2022-04-07 00:00:00 | 2022-05-20 00:00:00 | NaT | NaT |
| TSLA_rets | -0.736322 | 2021-11-04 00:00:00 | 2023-01-03 00:00:00 | NaT | NaT |
| HD_rets | -0.379718 | 2020-02-20 00:00:00 | 2020-03-20 00:00:00 | 2020-05-18 00:00:00 | 88 days 00:00:00 |
| XOM_rets | -0.609936 | 2018-09-24 00:00:00 | 2020-03-23 00:00:00 | 2022-01-11 00:00:00 | 1205 days 00:00:00 |
| MA_rets | -0.409972 | 2020-02-19 00:00:00 | 2020-03-23 00:00:00 | 2020-08-24 00:00:00 | 187 days 00:00:00 |

[ ]:
```
portfolio_cmds.tailMetrics(returns=ret_df)
```

[ ]:
```
           Skewness   Kurtosis  VaR (0.05)  CVaR (0.05)  Max Drawdown  \
SPY_rets  -0.519693  10.498791   -0.020501    -0.032694     -0.336999
NVDA_rets -0.166157   3.124234   -0.049924    -0.072944     -0.663352
COST_rets -0.183400   8.512073   -0.021769    -0.034541     -0.314042
TSLA_rets  0.179972   3.376619   -0.063206    -0.090557     -0.736322
HD_rets   -0.994406  17.117933   -0.025269    -0.042548     -0.379718
XOM_rets   0.043817   4.859421   -0.031473    -0.047577     -0.609936
MA_rets    0.328850   7.805150   -0.031655    -0.046673     -0.409972

                Peak     Bottom    Recover Duration (to Recover)
SPY_rets  2020-02-19 2020-03-23 2020-08-10              173 days
NVDA_rets 2021-11-29 2022-10-14        NaT                   NaT
COST_rets 2022-04-07 2022-05-20        NaT                   NaT
TSLA_rets 2021-11-04 2023-01-03        NaT                   NaT
HD_rets   2020-02-20 2020-03-20 2020-05-18               88 days
XOM_rets  2018-09-24 2020-03-23 2022-01-11             1205 days
MA_rets   2020-02-19 2020-03-23 2020-08-24              187 days
```

| | tangency weights |
|---|---|
| SPY_rets | -9.91899 |
| NVDA_rets | 1.50003 |
| COST_rets | 3.78646 |
| TSLA_rets | 0.911277 |
| HD_rets | 0.603612 |
| XOM_rets | 1.62024 |
| MA_rets | 2.49736 |