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())
```

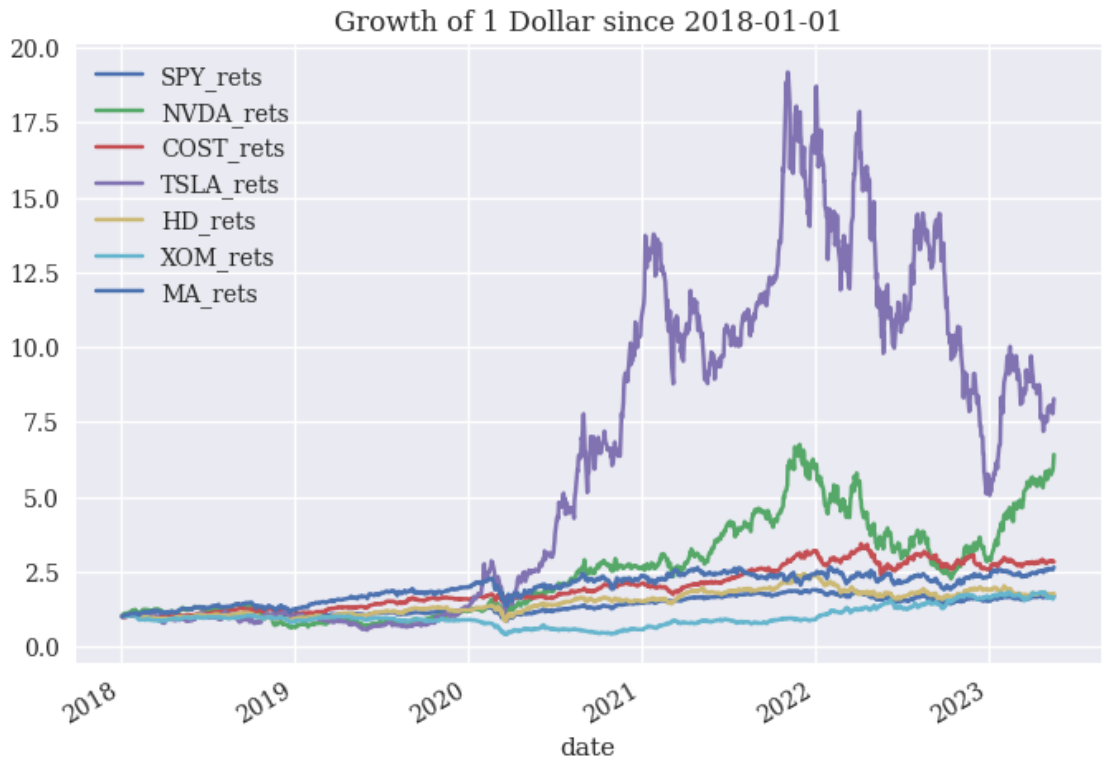
```
        if not log_normal:
            df['rets'] = df['adj_close'].pct_change()
            if to_monthly:
                df = df.resample('m').last()[:-1]
                df['rets'] = df['adj_close'].pct_change()
        if drop_price_col:
            df = df.drop(columns = {'adj_close'})
            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)
```

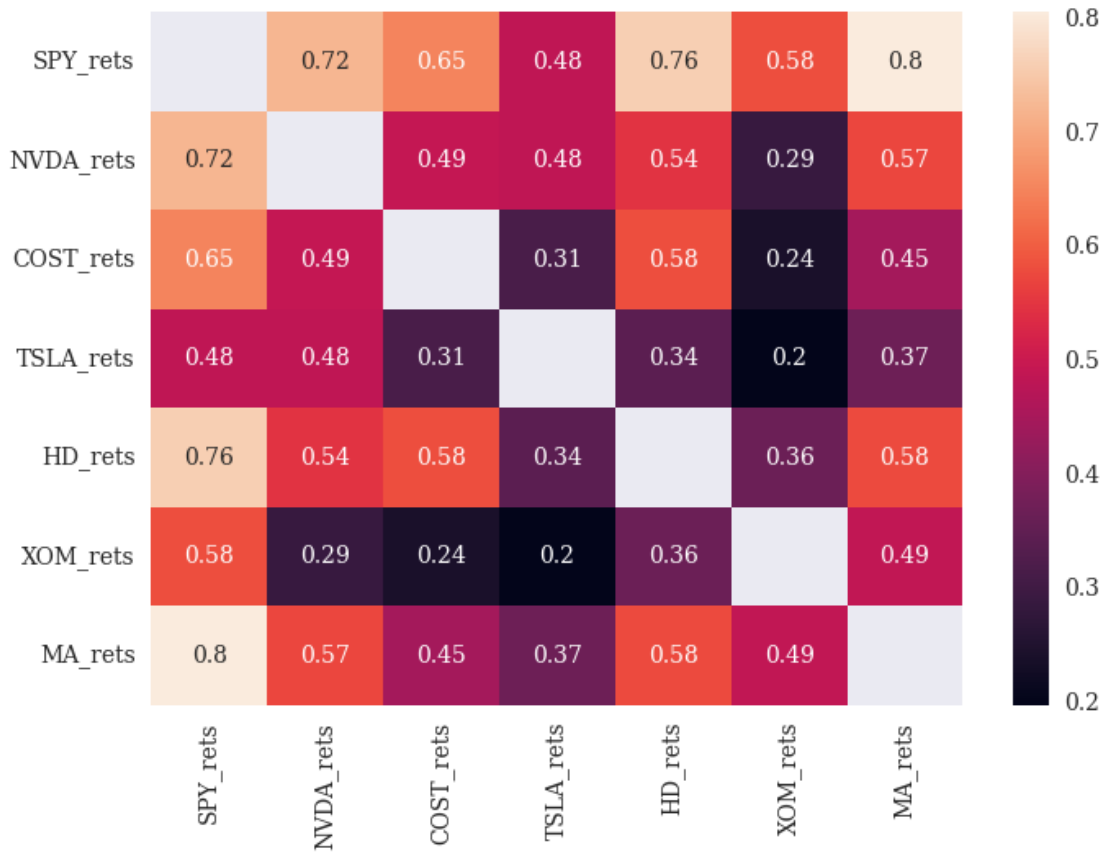
[ ]:
```
((1+ret_df).cumprod()).plot(title=f'Growth of 1 Dollar since {start_date}')
```

[ ]:
```
<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)
```

	α_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%.

	μ_i	σ_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

	μ_i	σ_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)
```

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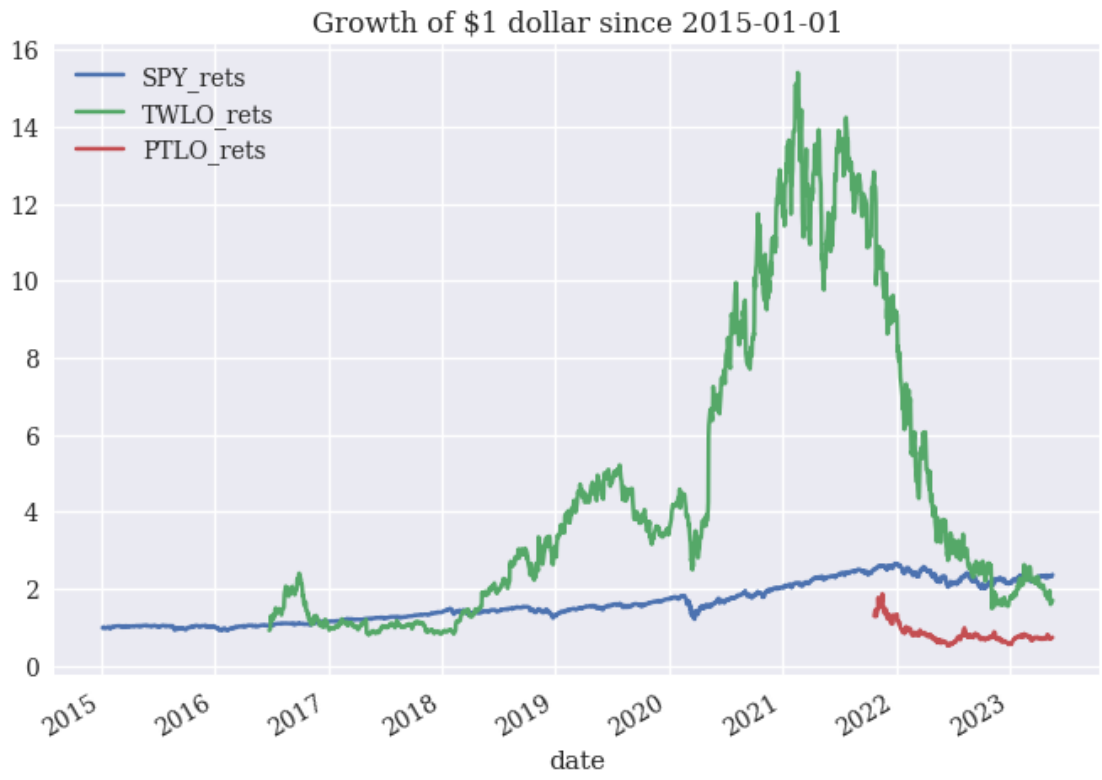
```
           Skewness   Kurtosis  VaR (0.05)  CVaR (0.05)  Max Drawdown  \
SPY_rets  -0.519693  10.498791   -0.020501    -0.032694     -0.336999
NVDA_rets -0.166157   3.124234   -0.049924    -0.072944     -0.663352
COST_rets -0.183400   8.512073   -0.021769    -0.034541     -0.314042
TSLA_rets  0.179972   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

[ ]:
```
tick = ['SPY', 'TWLO','PTLO']
rt_df = pd.DataFrame(data =None)
st_time = '2015-01-01'
for asset in tick:
    object = Price_DF(asset = asset,start_date = st_time)
    temp_df = object.
 ↪ret_df(log_normal=lognormal,to_monthly=to_monthly,drop_price_col=drop_price_col)
    rt_df = pd.concat([rt_df,temp_df],axis=1)
```

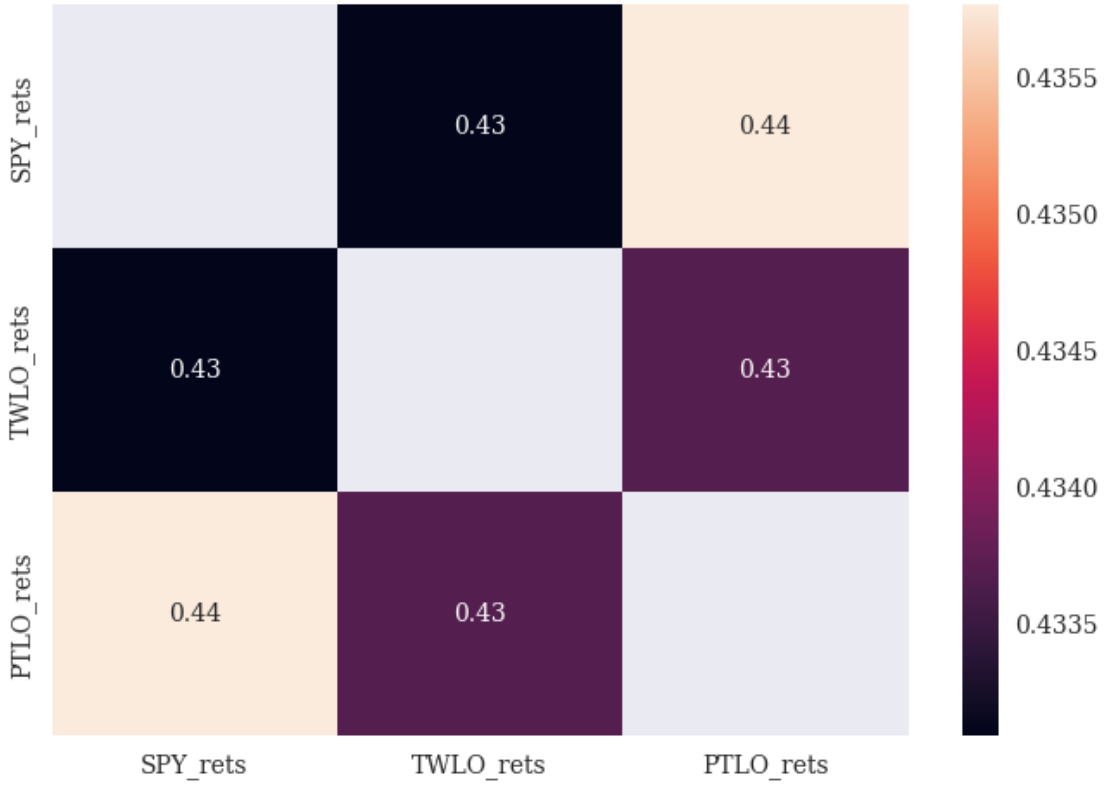
[ ]:
```
((1+rt_df).cumprod()).plot(title = f"Growth of $1 dollar since {st_time}")
```

[ ]:
```
<AxesSubplot:title={'center':'Growth of $1 dollar since 2015-01-01'},
xlabel='date'>
```



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

```
MIN Correlation pair is ('SPY_rets', 'TWLO_rets')
MAX Correlation pair is ('PTLO_rets', 'SPY_rets')
```



	alpha	SPY_rets	r-squared	Treynor Ratio	Info Ratio
TWLO_rets	0.12446	1.45933	0.187564	0.280784	0.178135
PTLO_rets	0.0646066	1.37841	0.189894	0.0252753	0.0882409

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

[ ]:
```
            Skewness   Kurtosis  VaR (0.05)  CVaR (0.05)  Max Drawdown  \
SPY_rets   -0.540731  12.337513   -0.017729    -0.028631     -0.336999
TWLO_rets   0.668329  13.885420   -0.060529    -0.084487     -0.903628
PTLO_rets   0.976350   5.948271   -0.066596    -0.083948     -0.723718

                Peak     Bottom    Recover Duration (to Recover)
SPY_rets  2020-02-19 2020-03-23 2020-08-10              173 days
TWLO_rets 2021-02-18 2022-11-04        NaT                   NaT
```

```
PTLO_rets 2021-11-17 2022-06-16        NaT                    NaT
```

	Mean	Vol	Sharpe	Min	Max
SPY_rets	0.173884	0.222537	0.78137	-0.109424	0.0906033
TWLO_rets	0.409755	0.775152	0.528613	-0.346083	0.39616
PTLO_rets	0.0348397	0.81346	0.0428291	-0.129571	0.286254

	tangency weights
SPY_rets	1.97935
TWLO_rets	-1.41956
PTLO_rets	0.440208

	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
TWLO_rets	-0.903628	2021-02-18 00:00:00	2022-11-04 00:00:00	NaT	NaT
PTLO_rets	-0.723718	2021-11-17 00:00:00	2022-06-16 00:00:00	NaT	NaT