python-stock-market-analysis

August 1, 2023

1 Python Stock Market Analysis

1.1 Introduction

- We've all heard of the stock market, right? Stock is essentially a share in a specific company. The stock market is a risky game, but with the appropriate strategies and research, an investor can create generational wealth. This project is just a tiny fraction of analyzing stock market data with the help of Python since stock analysis includes both technical and fundamental analysis.
- This short python stock analysis of three significant stocks in the Indian stock market will point you in the correct direction for developing data analysis and visualization skills.

1.1.1 Data Set and Data Description

- The data set I have used in this project has been downloaded from Kaggle (NIFTY-50 Stock Market Data (2000 – 2021)).
- This data set consists of a number of companies' stock data from 2000-2021 including Adani Ports, Bajaj Finance, Wipro, Infosys, and many more. But for this project, we will be analyzing three Tata stocks – Tata Motors, Tata Steel, and Tata Consultancy Services (TCS).
- The data in the data set consists of Date, Symbol, Prev Close, Open, High, Low, Last, Close, VWAP, Turnover, Trades, Deliverable Volume, and % Deliverable.

[1]:

```
#Importing packages

import pandas as pd
import numpy as np

import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:

```
#Importing Dataset

tata_motors = pd.read_csv('TATAMOTORS.csv')
tata_steel = pd.read_csv('TATASTEEL.csv')
tcs = pd.read_csv('TCS.csv')

tata_motors.head()
```

```
[2]:          Date Symbol Series  Prev Close   Open    High    Low   Last   Close  \
     0  2000-01-03  TELCO     EQ      201.60  207.4  217.25  207.4  217.0  216.75
     1  2000-01-04  TELCO     EQ      216.75  217.0  219.00  206.0  211.9  208.20
     2  2000-01-05  TELCO     EQ      208.20  194.0  217.80  194.0  213.1  213.25
     3  2000-01-06  TELCO     EQ      213.25  215.0  229.90  215.0  222.0  222.10
     4  2000-01-07  TELCO     EQ      222.10  224.0  239.90  223.1  239.9  239.90

          VWAP   Volume      Turnover  Trades  Deliverable Volume  %Deliverble
     0  214.28   676126  1.448775e+13     NaN                 NaN          NaN
     1  209.50   679215  1.422962e+13     NaN                 NaN          NaN
     2  210.33  1120951  2.357684e+13     NaN                 NaN          NaN
     3  225.29  1968998  4.435932e+13     NaN                 NaN          NaN
     4  236.32  2199431  5.197636e+13     NaN                 NaN          NaN
```

```
[3]: tata_steel.head()
```

```
[3]:          Date Symbol Series  Prev Close    Open   High     Low    Last  \
     0  2000-01-03  TISCO     EQ      142.35  148.00  153.2  146.10  152.50
     1  2000-01-04  TISCO     EQ      152.45  150.10  153.0  143.05  151.95
     2  2000-01-05  TISCO     EQ      150.80  144.60  162.9  144.60  158.00
     3  2000-01-06  TISCO     EQ      156.55  158.95  169.1  158.95  169.00
     4  2000-01-07  TISCO     EQ      168.25  173.40  179.0  166.30  170.55

         Close    VWAP   Volume      Turnover  Trades  Deliverable Volume  \
     0  152.45  150.92  2003185  3.023164e+13     NaN                 NaN
     1  150.80  151.03  1555136  2.348785e+13     NaN                 NaN
     2  156.55  156.85  3840284  6.023364e+13     NaN                 NaN
     3  168.25  167.61  2560449  4.291530e+13     NaN                 NaN
     4  171.95  173.89  3641691  6.332459e+13     NaN                 NaN

        %Deliverble
     0          NaN
     1          NaN
     2          NaN
     3          NaN
     4          NaN
```

```
[4]: tcs.head()
```

```
[4]:          Date Symbol Series  Prev Close    Open    High     Low    Last  \
     0  2004-08-25    TCS     EQ      850.00  1198.7  1198.7  979.00  985.00
     1  2004-08-26    TCS     EQ      987.95   992.0   997.0  975.30  976.85
     2  2004-08-27    TCS     EQ      979.00   982.4   982.4  958.55  961.20
     3  2004-08-30    TCS     EQ      962.65   969.9   990.0  965.00  986.40
     4  2004-08-31    TCS     EQ      986.75   986.5   990.0  976.00  987.80

         Close     VWAP   Volume      Turnover  Trades  Deliverable Volume  \
0  987.95  1008.32  17116372  1.725876e+15     NaN              5206360
1  979.00   985.65   5055400  4.982865e+14     NaN              1294899
2  962.65   969.94   3830750  3.715586e+14     NaN               976527
3  986.75   982.65   3058151  3.005106e+14     NaN               701664
4  988.10   982.18   2649332  2.602133e+14     NaN               695234

   %Deliverble
0       0.3042
1       0.2561
2       0.2549
3       0.2294
4       0.2624
```

1.1.2 Checking Size of Data

```
[5]: tata_motors.shape
```

```
[5]: (5306, 15)
```

```
[6]: tata_steel.shape
```

```
[6]: (5306, 15)
```

```
[7]: tcs.shape
```

```
[7]: (4139, 15)
```

Here,look at the data set. 5306 represents a number of rows and 15 represents a number of columns.

After executing the tata_steel.shape and tcs.shape functions, you will see the size i.e the number of rows x columns of the Tata Steel and TCS dataset respectively.

1.1.3 Viewing Datatypes of all columns

```
[8]: tata_motors.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5306 entries, 0 to 5305
Data columns (total 15 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Date                5306 non-null   object
 1   Symbol              5306 non-null   object
 2   Series              5306 non-null   object
 3   Prev Close          5306 non-null   float64
 4   Open                5306 non-null   float64
 5   High                5306 non-null   float64
 6   Low                 5306 non-null   float64
 7   Last                5306 non-null   float64
 8   Close               5306 non-null   float64
 9   VWAP                5306 non-null   float64
 10  Volume              5306 non-null   int64
 11  Turnover            5306 non-null   float64
 12  Trades              2456 non-null   float64
 13  Deliverable Volume  4792 non-null   float64
 14  %Deliverble         4792 non-null   float64
dtypes: float64(11), int64(1), object(3)
memory usage: 621.9+ KB
```

[9]:
```
tata_steel.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5306 entries, 0 to 5305
Data columns (total 15 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Date                5306 non-null   object
 1   Symbol              5306 non-null   object
 2   Series              5306 non-null   object
 3   Prev Close          5306 non-null   float64
 4   Open                5306 non-null   float64
 5   High                5306 non-null   float64
 6   Low                 5306 non-null   float64
 7   Last                5306 non-null   float64
 8   Close               5306 non-null   float64
 9   VWAP                5306 non-null   float64
 10  Volume              5306 non-null   int64
 11  Turnover            5306 non-null   float64
 12  Trades              2456 non-null   float64
 13  Deliverable Volume  4792 non-null   float64
 14  %Deliverble         4792 non-null   float64
dtypes: float64(11), int64(1), object(3)
memory usage: 621.9+ KB
```

[10]:
```
tcs.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4139 entries, 0 to 4138
Data columns (total 15 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Date                4139 non-null   object
 1   Symbol              4139 non-null   object
 2   Series              4139 non-null   object
 3   Prev Close          4139 non-null   float64
 4   Open                4139 non-null   float64
 5   High                4139 non-null   float64
 6   Low                 4139 non-null   float64
 7   Last                4139 non-null   float64
 8   Close               4139 non-null   float64
 9   VWAP                4139 non-null   float64
 10  Volume              4139 non-null   int64
 11  Turnover            4139 non-null   float64
 12  Trades              2456 non-null   float64
 13  Deliverable Volume  4139 non-null   int64
 14  %Deliverble         4139 non-null   float64
dtypes: float64(10), int64(2), object(3)
memory usage: 485.2+ KB
```

1.1.4 Checking for Null Values

[11]:
```
tata_motors.isnull().sum()
```

[11]:
```
Date                     0
Symbol                   0
Series                   0
Prev Close               0
Open                     0
High                     0
Low                      0
Last                     0
Close                    0
VWAP                     0
Volume                   0
Turnover                 0
Trades                2850
Deliverable Volume     514
%Deliverble            514
dtype: int64
```

[12]:
```
tata_steel.isnull().sum()
```

[12]:
```
Date                     0
Symbol                   0
Series                   0
Prev Close               0
Open                     0
High                     0
Low                      0
Last                     0
Close                    0
VWAP                     0
Volume                   0
```

```
Turnover                0
Trades               2850
Deliverable Volume    514
%Deliverble           514
dtype: int64
```

```
[13]: tcs.isnull().sum()
```

```
[13]: Date                  0
      Symbol                0
      Series                0
      Prev Close            0
      Open                  0
      High                  0
      Low                   0
      Last                  0
      Close                 0
      VWAP                  0
      Volume                0
      Turnover              0
      Trades             1683
      Deliverable Volume    0
      %Deliverble           0
      dtype: int64
```

```
[14]: print(tata_motors.columns)
```

```
Index(['Date', 'Symbol', 'Series', 'Prev Close', 'Open', 'High', 'Low', 'Last',
       'Close', 'VWAP', 'Volume', 'Turnover', 'Trades', 'Deliverable Volume',
       '%Deliverble'],
      dtype='object')
```

```
[15]: print(tata_steel.columns)
```

```
Index(['Date', 'Symbol', 'Series', 'Prev Close', 'Open', 'High', 'Low', 'Last',
       'Close', 'VWAP', 'Volume', 'Turnover', 'Trades', 'Deliverable Volume',
       '%Deliverble'],
      dtype='object')
```

```
[16]: print(tcs.columns)
```

```
Index(['Date', 'Symbol', 'Series', 'Prev Close', 'Open', 'High', 'Low', 'Last',
       'Close', 'VWAP', 'Volume', 'Turnover', 'Trades', 'Deliverable Volume',
       '%Deliverble'],
      dtype='object')
```

[17]:
```
# Correct column names with spaces
columns_to_drop = ['Trades', 'Deliverable Volume', '%Deliverable']
```

[18]:
```
#Checking for Duplicate Values

tata_motors.duplicated().sum()

tata_steel.duplicated().sum()

tcs.duplicated().sum()
```

[18]:
```
0
```

The output for each of the above codes comes as 0, which indicates there are no duplicate values present in the data set.

1.1.5 Description of Data in the Dataframe and rounding its values up to two decimal places

[19]:
```
tata_motors.describe().round(2)
```

[19]:
```
       Prev Close     Open     High      Low     Last    Close     VWAP  \
count     5306.00  5306.00  5306.00  5306.00  5306.00  5306.00  5306.00
mean       409.43   410.15   417.12   402.18   409.45   409.45   409.76
std        272.48   272.97   277.02   268.03   272.52   272.47   272.49
min         58.80    58.00    60.70    57.55    58.75    58.80    59.24
25%        174.60   174.76   178.82   171.01   174.72   174.60   175.18
50%        377.25   378.90   384.75   372.60   377.52   377.25   378.46
75%        523.15   523.48   530.80   515.91   523.49   523.15   523.72
max       1365.15  1361.00  1382.00  1347.00  1362.00  1365.15  1362.15

             Volume      Turnover      Trades  Deliverable Volume  %Deliverble
count  5.306000e+03  5.306000e+03     2456.00             4792.00      4792.00
mean   1.046560e+07  2.790772e+14   128439.98          2805962.22         0.36
std    2.185034e+07  4.674351e+14   104954.58          3579713.03         0.16
min    1.235100e+04  1.069384e+11     3434.00            12351.00         0.04
25%    1.668994e+06  7.049025e+13    75478.25           646920.00         0.23
50%    4.141648e+06  1.967418e+14   100034.00          1636751.50         0.36
75%    8.706037e+06  3.175959e+14   142064.75          3761212.25         0.48
max    3.905778e+08  9.365671e+15  1318669.00         73338482.00         1.00
```

[20]:
```
tata_steel.describe().round(2)
```

[20]:
```
       Prev Close     Open     High      Low     Last    Close     VWAP  \
count     5306.00  5306.00  5306.00  5306.00  5306.00  5306.00  5306.00
mean       403.39   404.25   411.21   396.51   403.47   403.55   404.06
std        187.15   187.56   190.79   183.86   187.27   187.31   187.44
```

```
min       67.25    66.00    69.70    66.00    67.30    67.25    67.97
25%      275.77   275.60   284.41   270.00   275.81   275.94   276.94
50%      402.85   403.00   409.38   396.65   402.70   402.90   403.43
75%      523.99   525.00   534.72   516.49   523.95   524.08   525.23
max     1031.35  1024.00  1052.60  1011.10  1035.00  1034.00  1031.95

            Volume      Turnover     Trades  Deliverable Volume  %Deliverble
count      5306.00  5.306000e+03    2456.00             4792.00      4792.00
mean    6165253.31  2.664876e+14   93969.27          1550749.81         0.26
std     5329084.46  3.012861e+14   58218.86          1215813.11         0.11
min       23291.00  2.159165e+11    2796.00            24158.00         0.05
25%     2801379.50  1.118719e+14   57557.25           769850.00         0.18
50%     4800300.50  1.949303e+14   79400.00          1250946.50         0.25
75%     7833888.00  3.379640e+14  110710.25          2018065.50         0.33
max    64284599.00  4.881124e+15  626502.00         26434718.00         0.97
```

[21]:
```
tcs.describe().round(2)
```

[21]:
```
       Prev Close     Open     High      Low     Last    Close     VWAP  \
count     4139.00  4139.00  4139.00  4139.00  4139.00  4139.00  4139.00
mean      1693.84  1695.59  1715.88  1673.59  1694.31  1694.37  1694.62
std        722.88   722.98   728.45   717.78   723.18   723.06   723.14
min        366.65   360.00   377.75   358.00   365.70   366.65   368.40
25%       1106.25  1105.53  1120.28  1088.58  1107.00  1106.50  1105.75
50%       1633.50  1625.00  1655.00  1610.00  1630.05  1636.35  1629.42
75%       2326.12  2321.80  2345.00  2301.30  2325.00  2326.85  2319.90
max       3603.70  3625.00  3674.80  3572.55  3610.75  3603.70  3633.11

            Volume      Turnover     Trades  Deliverable Volume  %Deliverble
count      4139.00  4.139000e+03    2456.00             4139.00      4139.00
mean    1676761.95  2.952102e+14   85502.71           895220.63         0.55
std     1607879.26  3.849370e+14   56031.49           863790.82         0.13
min       18345.00  1.370237e+12    1219.00             7765.00         0.12
25%      788477.50  1.050834e+14   46749.50           433474.00         0.46
50%     1227748.00  1.824973e+14   68901.00           705264.00         0.55
75%     2081119.50  3.455393e+14  110630.25          1136131.50         0.65
max    44033577.00  1.268362e+16  542541.00         31556256.00         0.96
```

The describe function will show you statistical data such as the Count of non-null values, Mean, Standard Deviation, etc of the data present in the dataset. The round(2) function rounds up the values up to two decimal places

1.1.6 Working on Data

Converting the "Date" column dtype from object to date

[22]:
```
tata_motors["Date"]=pd.to_datetime(tata_motors["Date"])
tata_steel["Date"]=pd.to_datetime(tata_steel["Date"])
tcs["Date"]=pd.to_datetime(tcs["Date"])
```

[23]:
```
tata_motors.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5306 entries, 0 to 5305
Data columns (total 15 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Date                5306 non-null   datetime64[ns]
 1   Symbol              5306 non-null   object
 2   Series              5306 non-null   object
 3   Prev Close          5306 non-null   float64
 4   Open                5306 non-null   float64
 5   High                5306 non-null   float64
 6   Low                 5306 non-null   float64
 7   Last                5306 non-null   float64
 8   Close               5306 non-null   float64
 9   VWAP                5306 non-null   float64
 10  Volume              5306 non-null   int64
 11  Turnover            5306 non-null   float64
 12  Trades              2456 non-null   float64
 13  Deliverable Volume  4792 non-null   float64
 14  %Deliverble         4792 non-null   float64
dtypes: datetime64[ns](1), float64(11), int64(1), object(2)
memory usage: 621.9+ KB
```

try executing the .info() function on any of the datasets, you will notice the datatype of the ‘Date’ column changed from ‘object’ to ‘datetime64[ns]’ for all 3 datasets.

1.2 Dropping columns Trades, Deliverable Volume, and %Deliverable

[24]:
```
tata_steel=tata_steel.drop(['Trades','Deliverable Volume','%Deliverble'],␣
 ↪axis=1)
tcs=tcs.drop(['Trades','Deliverable Volume','%Deliverble'], axis=1)
```

[25]:
```
tcs.head()
```

[25]:
```
        Date Symbol Series  Prev Close    Open    High     Low    Last  \
0 2004-08-25    TCS     EQ      850.00  1198.7  1198.7  979.00  985.00
1 2004-08-26    TCS     EQ      987.95   992.0   997.0  975.30  976.85
2 2004-08-27    TCS     EQ      979.00   982.4   982.4  958.55  961.20
3 2004-08-30    TCS     EQ      962.65   969.9   990.0  965.00  986.40
4 2004-08-31    TCS     EQ      986.75   986.5   990.0  976.00  987.80
```

```
     Close     VWAP    Volume      Turnover
0   987.95  1008.32  17116372  1.725876e+15
1   979.00   985.65   5055400  4.982865e+14
2   962.65   969.94   3830750  3.715586e+14
3   986.75   982.65   3058151  3.005106e+14
4   988.10   982.18   2649332  2.602133e+14
```

[26]:

```python
tata_steel.head()
```

[26]:

```
         Date Symbol Series  Prev Close    Open   High     Low    Last   Close  \
0 2000-01-03  TISCO     EQ      142.35  148.00  153.2  146.10  152.50  152.45
1 2000-01-04  TISCO     EQ      152.45  150.10  153.0  143.05  151.95  150.80
2 2000-01-05  TISCO     EQ      150.80  144.60  162.9  144.60  158.00  156.55
3 2000-01-06  TISCO     EQ      156.55  158.95  169.1  158.95  169.00  168.25
4 2000-01-07  TISCO     EQ      168.25  173.40  179.0  166.30  170.55  171.95

     VWAP   Volume      Turnover
0  150.92  2003185  3.023164e+13
1  151.03  1555136  2.348785e+13
2  156.85  3840284  6.023364e+13
3  167.61  2560449  4.291530e+13
4  173.89  3641691  6.332459e+13
```

try running the .head() or .tail() function on any of the datasets, you will notice all the 3 columns Trades, Deliverable Volume, and %Deliverable not present.

1.3 Adding 3 more new columns to each of the Dataset

[27]:

```python
tata_motors['Month']=tata_motors["Date"].dt.month

tata_motors['Year']=tata_motors["Date"].dt.year

tata_motors['Day']=tata_motors["Date"].dt.day


tata_steel['Month']=tata_steel["Date"].dt.month

tata_steel['Year']=tata_steel["Date"].dt.year

tata_steel['Day']=tata_steel["Date"].dt.day


tcs['Day']=tcs['Date'].dt.day

tcs['Year']=tcs['Date'].dt.year

tcs['Month']=tcs['Date'].dt.month
```

```
[28]: tcs.head()
```

```
[28]:          Date Symbol Series  Prev Close    Open    High     Low    Last  \
      0 2004-08-25    TCS     EQ      850.00  1198.7  1198.7  979.00  985.00
      1 2004-08-26    TCS     EQ      987.95   992.0   997.0  975.30  976.85
      2 2004-08-27    TCS     EQ      979.00   982.4   982.4  958.55  961.20
      3 2004-08-30    TCS     EQ      962.65   969.9   990.0  965.00  986.40
      4 2004-08-31    TCS     EQ      986.75   986.5   990.0  976.00  987.80

          Close     VWAP    Volume      Turnover  Day  Year  Month
      0  987.95  1008.32  17116372  1.725876e+15   25  2004      8
      1  979.00   985.65   5055400  4.982865e+14   26  2004      8
      2  962.65   969.94   3830750  3.715586e+14   27  2004      8
      3  986.75   982.65   3058151  3.005106e+14   30  2004      8
      4  988.10   982.18   2649332  2.602133e+14   31  2004      8
```

```
[29]: tata_motors.head()
```

```
[29]:          Date Symbol Series  Prev Close   Open    High    Low   Last   Close  \
      0 2000-01-03  TELCO     EQ      201.60  207.4  217.25  207.4  217.0  216.75
      1 2000-01-04  TELCO     EQ      216.75  217.0  219.00  206.0  211.9  208.20
      2 2000-01-05  TELCO     EQ      208.20  194.0  217.80  194.0  213.1  213.25
      3 2000-01-06  TELCO     EQ      213.25  215.0  229.90  215.0  222.0  222.10
      4 2000-01-07  TELCO     EQ      222.10  224.0  239.90  223.1  239.9  239.90

           VWAP   Volume      Turnover  Trades  Deliverable Volume  %Deliverble  \
      0  214.28   676126  1.448775e+13     NaN                 NaN          NaN
      1  209.50   679215  1.422962e+13     NaN                 NaN          NaN
      2  210.33  1120951  2.357684e+13     NaN                 NaN          NaN
      3  225.29  1968998  4.435932e+13     NaN                 NaN          NaN
      4  236.32  2199431  5.197636e+13     NaN                 NaN          NaN

         Month  Year  Day
      0      1  2000    3
      1      1  2000    4
      2      1  2000    5
      3      1  2000    6
      4      1  2000    7
```

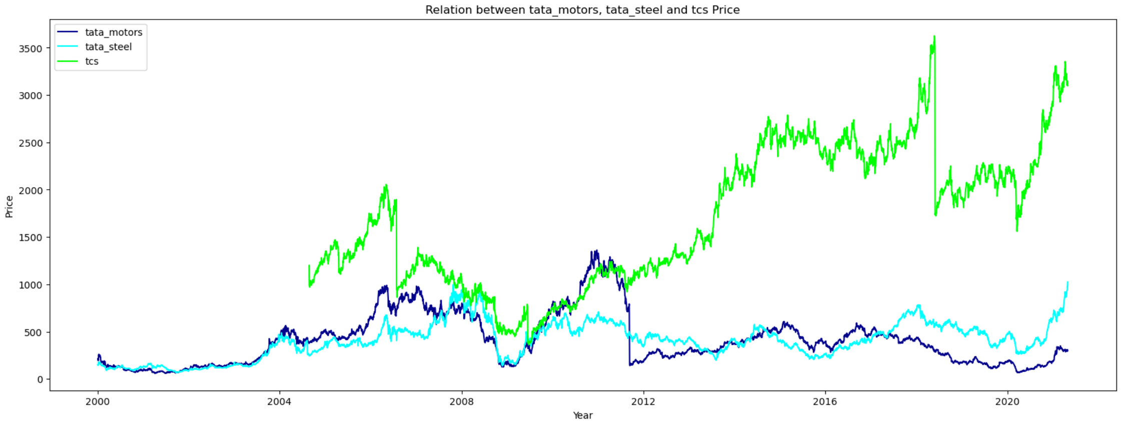
if you try running the .head() or .tail() function on any of the datasets, you will notice 3 new columns ‘Day’, ‘Month’ and ‘Year’ present. We will be using the ‘Day’ column for our analysis.

1.4 Comparing the Data

Price Comparision

```
[30]: plt.figure(figsize=(20,7))
```

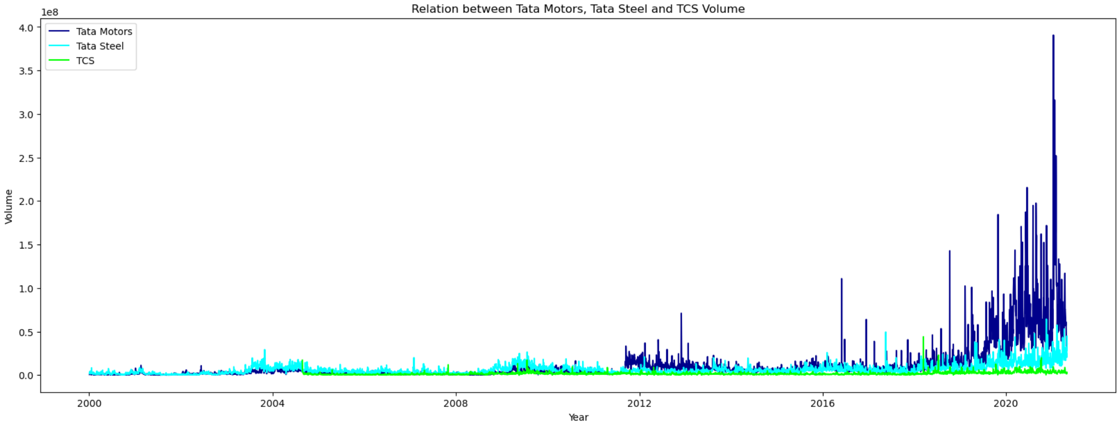
```
plt.
 ↪plot(tata_motors['Date'],tata_motors['Open'],color='darkblue',label='tata_motors')

plt.plot(tata_steel['Date'],tata_steel['Open'],color='aqua',label='tata_steel')

plt.plot(tcs['Date'],tcs['Open'],color='lime',label='tcs')


plt.title("Relation between tata_motors, tata_steel and tcs Price")

plt.xlabel("Year")

plt.ylabel("Price")

plt.legend(title="")

plt.show()
```



According to the graph above, the price of TCS has skyrocketed significantly higher than that of Tata Steel and Tata Motors. TCS's pricing trajectory has been generally upward from its beginning, whereas Tata Steel and Tata Motors have been more on a consolidation trend.

Volume Comparision

[31]:
```
plt.figure(figsize=(20,7))

plt.plot(tata_motors['Date'],tata_motors['Volume'],color='darkblue',label='Tata␣
 ↪Motors')

plt.plot(tata_steel['Date'],tata_steel['Volume'],color='aqua',label='Tata␣
 ↪Steel')

plt.plot(tcs['Date'],tcs['Volume'],color='lime',label='TCS')
plt.title("Relation between Tata Motors, Tata Steel and TCS Volume")

plt.xlabel("Year")

plt.ylabel("Volume")

plt.legend(title="")

plt.show()
```



Though the price of TCS has risen more significantly as compared to Tata Steel and Tata Motors, we can notice from the above graph that TCS has the least volume signifying that the python stock analysis has been traded comparatively less as compared to Tata Steel and Tata Motors and is lesser liquid

1.5 Return on Investment (ROI)

we will analyze the ROI of Tata Steel, Tata Motors, and TCS if we buy one share of each stock on the 30th of each month beginning from January 2000 for Tata Motors and Tata Steel and November 2004 for TCS.

Tata Motors ROI

[32]:
```
sumTM=0 #total amount invested in Tata Motors

s1=0 #number of shares owned by Tata Motors

#calcuating total amount invested and number of shares owned in Tata Motors

for i in range(len(tata_motors)):
```

```python
    if tata_motors.loc[i,'Day']==30:

        sumTM+=tata_motors.loc[i,'Open']

        s1+=1

#displaying basic results

print("Total Invested in Tata Motors = Rs",round(sumTM,2))

print("Shares Owned of Tata Motors =",s1)

print("Average Investmentment of 1 share = Rs",round((sumTM/s1),2))

tm_end=298.2 #last open price of Tata Motors on 2021-04-30

#obtained by looking at the data or can be seen after executing tata_motors.tail()

#calculating investment results

result1=round((tm_end*s1)-sumTM,2)

roiTM=round((result1/sumTM)*100,2)

#displaying investment results

print("nInvestment Result:")

if result1<0:

    print("Net Unrealised Loss = Rs",result1)

else:

    print("Net Unrealised Profit = Rs",result1)

print("Tata Motors ROI from 2000-1-3 to 2021-04-30 =",roiTM,"%")
```

```
Total Invested in Tata Motors = Rs 65977.3
Shares Owned of Tata Motors = 162
Average Investmentment of 1 share = Rs 407.27
nInvestment Result:
Net Unrealised Loss = Rs -17668.9
Tata Motors ROI from 2000-1-3 to 2021-04-30 = -26.78 %
```

Tata Steel ROI

[33]:

```
sumTS=0 #total amount invested in Tata Steel

s2=0 #number of shares owned by Tata Steel

#calcuating total amount invested and number of shares owned in Tata Steel

for i in range(len(tata_steel)):

    if tata_steel.loc[i,'Day']==30:

        sumTS+=tata_steel.loc[i,'Open']

        s2+=1

#displaying basic results

print("Total Invested in Tata Steel = Rs",round(sumTS,2))

print("Shares Own of Tata Steel =",s2)

print("Average Investmentment of 1 share = Rs",round((sumTS/s2),2))

ts_end=1024 #last open price of Tata Steel on 2021-04-30

#obtained by looking at the data or can be seen after executed tata_steel.tail()
#calculating investment results

result2=round((ts_end*s2)-sumTS,2)

roiTS=round((result2/sumTS)*100,2)

#displaying investment results

print("nInvestment Result:")

if result2<0:

    print("Net Unrealised Loss = Rs",result2)
else:
    print("Net Unrealised Profit = Rs",result2)

print("Tata Steel ROI from 2000-1-3 to 2021-04-30 =",roiTS,"%")
```

```
Total Invested in Tata Steel = Rs 65825.9
Shares Own of Tata Steel = 162
Average Investmentment of 1 share = Rs 406.33
```

```
nInvestment Result:
Net Unrealised Profit = Rs 100062.1
Tata Steel ROI from 2000-1-3 to 2021-04-30 = 152.01 %
```

TCS ROI

[34]:

```
sumTCS=0 #total amount invested in TCS

s3=0 #number shares owned of TCS

#calcuating total amount invested and number of shares owned in TCS

for i in range(len(tcs)):

    if tcs.loc[i,'Day']==30:

        sumTCS+=tcs.loc[i,'Open']

        s3+=1

#displaying basic results

print("Total Invested in TCS = Rs",round(sumTCS,2))

print("Shares Owned of TCS =",s3)

print("Average Investmentment of 1 share = Rs",round((sumTCS/s3),2))

tcs_end=3099 #last open price of TCS on 2021-04-30

#obtained by looking at the data or can be seen after executed tcs.tail()
#calculating investment results

result3=round((tcs_end*s3)-sumTCS,2)

roiTCS=round((result3/sumTCS)*100,2)

#displaying investment results

print("nInvestment Result:")

if result3<0:

    print("Net Unrealised Loss = Rs",result3)

else:

    print("Net Unrealised Proift = Rs",result3)
print("Tata Steel ROI from 2004-08-25 to 2021-04-30 =",roiTCS,"%")
```

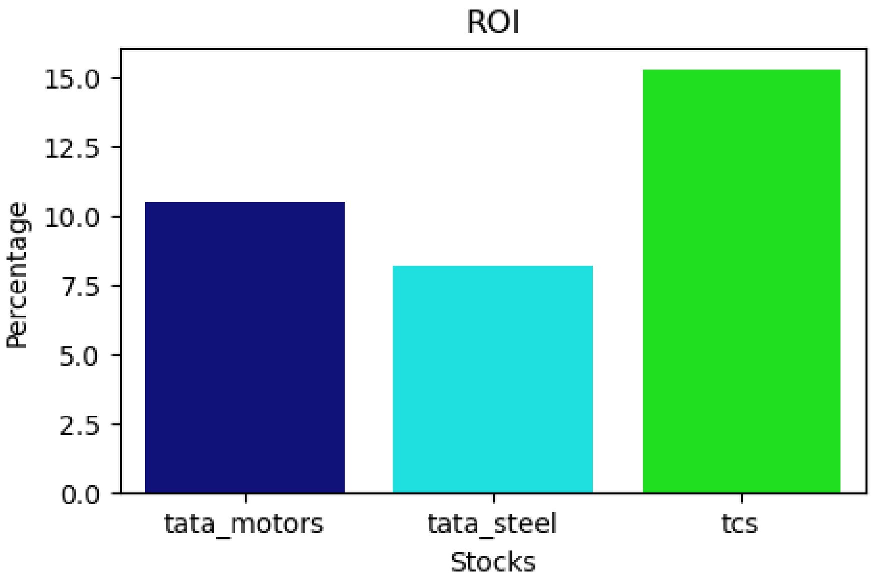
```
Total Invested in TCS = Rs 220762.0
Shares Owned of TCS = 128
Average Investmentment of 1 share = Rs 1724.7
nInvestment Result:
Net Unrealised Proift = Rs 175910.0
Tata Steel ROI from 2004-08-25 to 2021-04-30 = 79.68 %
```

From the above results, we can conclude that Tata Steel's ROI is significantly larger than that of Tata Motors and TCS. TCS on the other hand, has made the greatest profit.

Investment Results (Graphically) Plotting ROI on Bar Graph

[35]:

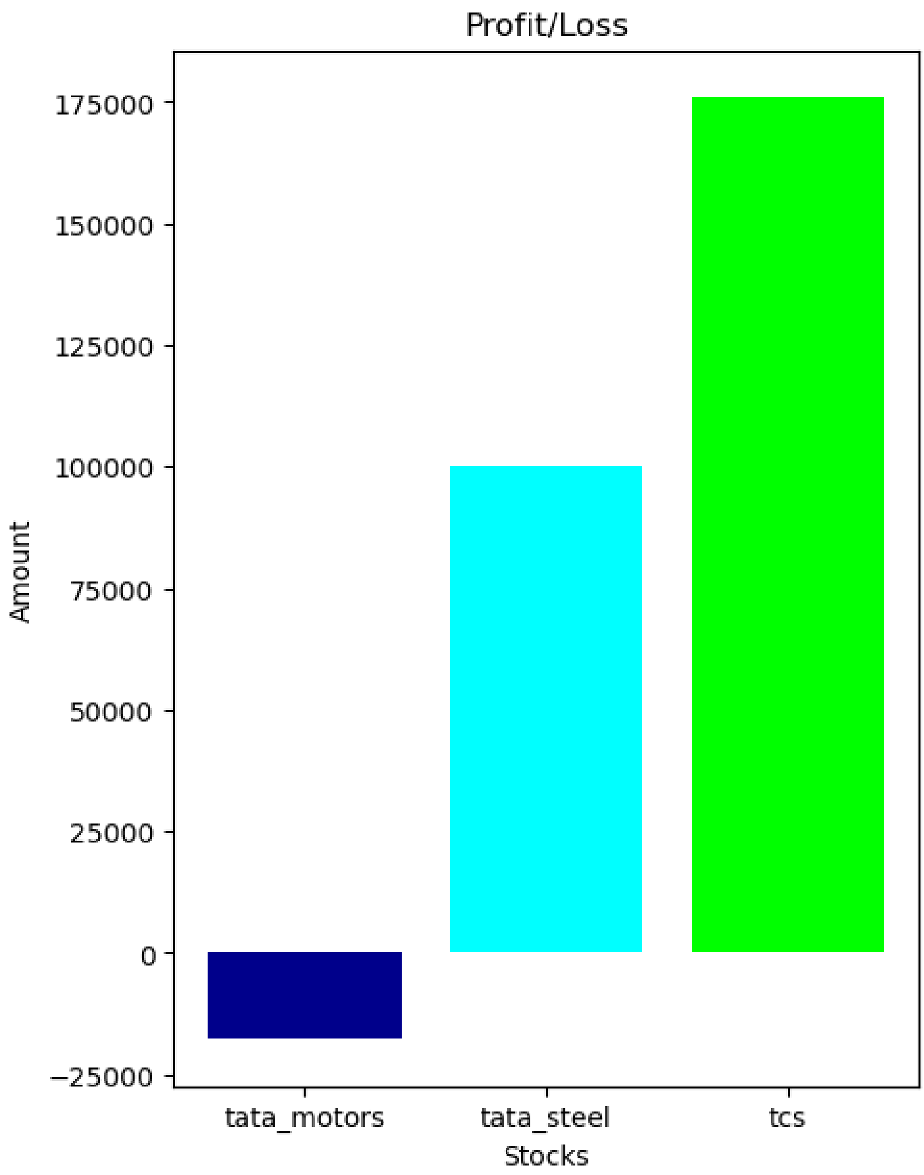
```
# Assuming you have the values of ROI for each stock
roiTM = 10.5
roiTS = 8.2
roiTCS = 15.3

stock = ['tata_motors', 'tata_steel', 'tcs']
ROI = [roiTM, roiTS, roiTCS]
col = ['darkblue','aqua','lime']

plt.figure(figsize=(5, 3))
# Create a Seaborn bar plot
sns.barplot(x=stock, y=ROI, palette=col)

plt.title("ROI")
plt.xlabel("Stocks")
plt.ylabel("Percentage")
plt.show()
```



Plotting Profit/Loss Amount on Bar Graph

[36]:
```
plt.figure(figsize=(5,7))

stock=['tata_motors', 'tata_steel', 'tcs']

amt=[result1,result2,result3]

col=['darkblue','aqua','lime']

plt.bar(stock,amt,color=col)

plt.title("Profit/Loss")

plt.xlabel("Stocks")

plt.ylabel("Amount")
```

[36]:
```
Text(0, 0.5, 'Amount')
```

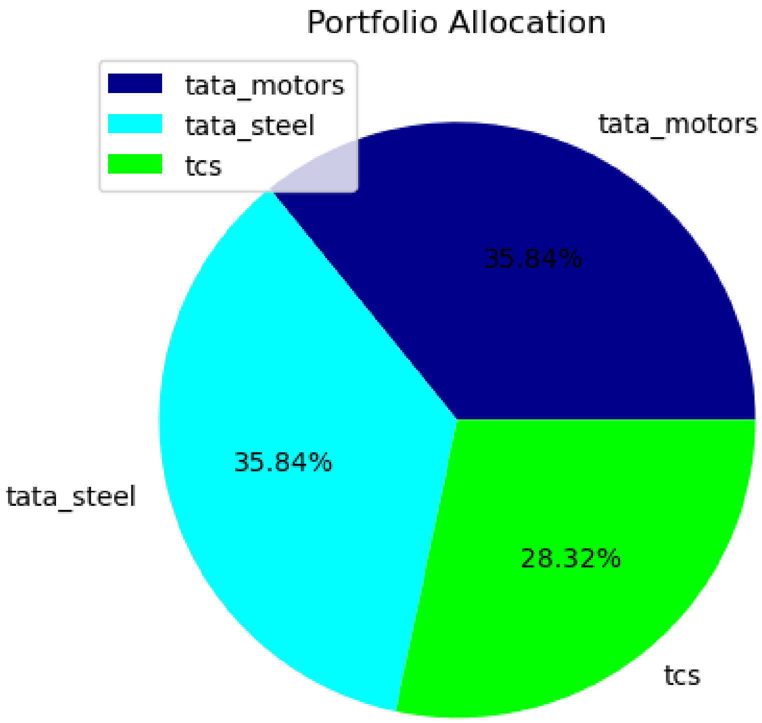


Portfolio Allocation

[37]:
```
plt.figure(figsize=(5,7))

stock=['tata_motors', 'tata_steel', 'tcs']

shares=[s1,s2,s3]

col=['darkblue','aqua','lime']
```

```
plt.pie(shares,labels=stock,autopct="%1.2f%%",colors=col)

plt.legend(title="",loc="upper left")

plt.title("Portfolio Allocation")
```

```
[37]: Text(0.5, 1.0, 'Portfolio Allocation')
```



2 Conclusion

- All work done in this project is for educational purposes only.
- This analysis depicts a stock's long-term performance and shows the potential of SIP in the long run.