STOCK_MARKET_ANALYSIS

May 14, 2024

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:
```
import glob
```

[8]:
```
data = (glob.glob(r"/Users/abhishekbhadani/Desktop/untitled folder 2/
↪S&P_resources (1)/individual_stocks_5yr/*csv"))
data
```

[8]:
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```

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```

```
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(1)/individual_stocks_5yr/COG_data.csv',
 '/Users/abhishekbhadani/Desktop/untitled folder 2/S&P_resources
(1)/individual_stocks_5yr/F_data.csv']
```

[5]:

```
all_data = pd.DataFrame()
```

[9]:
```
company_list = [r'/Users/abhishekbhadani/Desktop/untitled folder 2/
↪S&P_resources (1)/individual_stocks_5yr/GOOG_data.csv',
                r'/Users/abhishekbhadani/Desktop/untitled folder 2/
↪S&P_resources (1)/individual_stocks_5yr/MSFT_data.csv',
                r'/Users/abhishekbhadani/Desktop/untitled folder 2/
↪S&P_resources (1)/individual_stocks_5yr/AAPL_data.csv',
                r'/Users/abhishekbhadani/Desktop/untitled folder 2/
↪S&P_resources (1)/individual_stocks_5yr/AMGN_data.csv']
```

[10]:
```
for file in company_list:
    current_df = pd.read_csv(file)
    all_data = current_df.append(all_data,ignore_index = True)
```

```
/var/folders/qm/_mqp4sjj7fsb8_kk_zvcs1d80000gn/T/ipykernel_5428/2137937602.py:3:
FutureWarning: The frame.append method is deprecated and will be removed from
pandas in a future version. Use pandas.concat instead.
  all_data = current_df.append(all_data,ignore_index = True)
/var/folders/qm/_mqp4sjj7fsb8_kk_zvcs1d80000gn/T/ipykernel_5428/2137937602.py:3:
FutureWarning: The frame.append method is deprecated and will be removed from
pandas in a future version. Use pandas.concat instead.
  all_data = current_df.append(all_data,ignore_index = True)
/var/folders/qm/_mqp4sjj7fsb8_kk_zvcs1d80000gn/T/ipykernel_5428/2137937602.py:3:
FutureWarning: The frame.append method is deprecated and will be removed from
pandas in a future version. Use pandas.concat instead.
  all_data = current_df.append(all_data,ignore_index = True)
/var/folders/qm/_mqp4sjj7fsb8_kk_zvcs1d80000gn/T/ipykernel_5428/2137937602.py:3:
FutureWarning: The frame.append method is deprecated and will be removed from
pandas in a future version. Use pandas.concat instead.
  all_data = current_df.append(all_data,ignore_index = True)
```

[11]:
```
all_data
```

[11]:

	date	open	high	low	close	volume	Name
0	2013-02-08	85.61	87.165	85.390	86.77	7888920	AMGN
1	2013-02-11	85.48	85.980	84.590	84.92	7538344	AMGN
2	2013-02-12	85.00	85.230	84.280	84.54	4655977	AMGN
3	2013-02-13	84.96	85.130	84.450	84.94	7943132	AMGN
4	2013-02-14	86.00	86.398	84.609	84.72	6189005	AMGN
…	…	…	…	…	…	…	…
4747	2018-02-01	1162.61	1174.000	1157.520	1167.70	2412114	GOOG
4748	2018-02-02	1122.00	1123.070	1107.280	1111.90	4857943	GOOG
4749	2018-02-05	1090.60	1110.000	1052.030	1055.80	3798301	GOOG
4750	2018-02-06	1027.18	1081.710	1023.140	1080.60	3447956	GOOG
4751	2018-02-07	1081.54	1081.780	1048.260	1048.58	2369232	GOOG

[4752 rows x 7 columns]

[12]:
```
all_data['Name'].unique()
```

[12]: array(['AMGN', 'AAPL', 'MSFT', 'GOOG'], dtype=object)

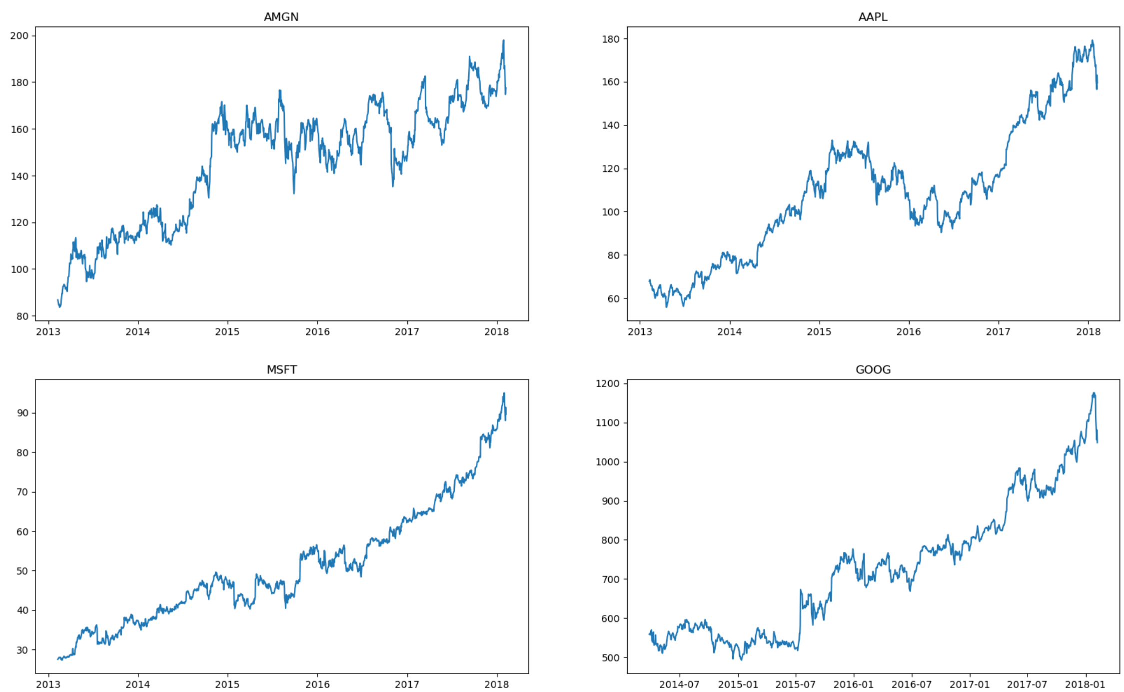
[14]:
```python
all_data.isnull().sum()
```

[14]:
```
date      0
open      0
high      0
low       0
close     0
volume    0
Name      0
dtype: int64
```

[16]:
```python
all_data['date'] = pd.to_datetime(all_data['date'])
```

[17]:
```python
tech_list = all_data['Name'].unique()
```

[21]:
```python
plt.figure(figsize = (20,12))
for index , company in enumerate(tech_list,1):
    plt.subplot(2,2,index)
    filter1 = all_data['Name'] == company
    df = all_data[filter1]
    plt.plot(df['date'],df['close'])
    plt.title(company)
```



[23]:
```
all_data.head(15)
```

[23]:

	date	open	high	low	close	volume	Name
0	2013-02-08	85.61	87.1650	85.390	86.770	7888920	AMGN
1	2013-02-11	85.48	85.9800	84.590	84.920	7538344	AMGN
2	2013-02-12	85.00	85.2300	84.280	84.540	4655977	AMGN
3	2013-02-13	84.96	85.1300	84.450	84.940	7943132	AMGN
4	2013-02-14	86.00	86.3980	84.609	84.720	6189005	AMGN
5	2013-02-15	84.24	84.7199	83.320	83.610	5622197	AMGN
6	2013-02-19	83.51	84.2700	82.920	84.131	5944265	AMGN
7	2013-02-20	84.37	85.3400	84.240	84.650	6388286	AMGN
8	2013-02-21	84.59	85.3200	84.150	85.130	4094108	AMGN
9	2013-02-22	85.07	86.8800	85.070	86.820	4920383	AMGN
10	2013-02-25	89.30	91.2500	89.300	89.550	11421682	AMGN
11	2013-02-26	89.63	90.2100	88.660	89.470	4805195	AMGN
12	2013-02-27	89.15	91.3000	89.060	91.030	3549796	AMGN
13	2013-02-28	91.00	93.4200	90.870	91.550	6528557	AMGN
14	2013-03-01	91.16	92.7600	90.510	92.580	4317624	AMGN

[26]:
```
# What is the moving average of the various stock
all_data['close'].rolling(window = 10).mean().head(14)
```

[26]:
```
0         NaN
1         NaN
2         NaN
3         NaN
4         NaN
5         NaN
6         NaN
7         NaN
8         NaN
9     85.0231
10    85.3011
11    85.7561
12    86.4051
13    87.0661
Name: close, dtype: float64
```

[27]:
```
new_data = all_data.copy()
```

[31]:
```
ma_day = [10,20,50]
```

[33]:
```
for ma in ma_day:
    new_data['close_'+str(ma)] = new_data['close'].rolling(ma).mean()
```

[35]:
```
new_data.tail(10)
```

[35]:
```
            date     open     high      low    close   volume  Name  close_10  \
4742  2018-01-25  1172.53  1175.94  1162.76  1170.37  1480540  GOOG  1140.921
4743  2018-01-26  1175.08  1175.84  1158.11  1175.84  2018755  GOOG  1147.953
4744  2018-01-29  1176.48  1186.89  1171.98  1175.58  1378913  GOOG  1153.285
4745  2018-01-30  1167.83  1176.52  1163.52  1163.69  1556346  GOOG  1157.478
4746  2018-01-31  1170.57  1173.00  1159.13  1169.94  1538688  GOOG  1161.274
4747  2018-02-01  1162.61  1174.00  1157.52  1167.70  2412114  GOOG  1165.065
4748  2018-02-02  1122.00  1123.07  1107.28  1111.90  4857943  GOOG  1162.504
4749  2018-02-05  1090.60  1110.00  1052.03  1055.80  3798301  GOOG  1152.503
4750  2018-02-06  1027.18  1081.71  1023.14  1080.60  3447956  GOOG  1143.566
4751  2018-02-07  1081.54  1081.78  1048.26  1048.58  2369232  GOOG  1132.000

       close_20   close_50
4742  1110.2520  1066.6514
4743  1116.5755  1069.6532
4744  1122.9475  1072.6448
4745  1128.8120  1075.5004
4746  1134.0590  1078.2492
4747  1138.3200  1081.2214
4748  1139.5950  1083.0918
4749  1137.2735  1083.5180
4750  1135.9565  1084.4108
4751  1133.0725  1084.5702
```

[36]:
```
new_data.set_index('date', inplace = True)
```

[37]:
```
new_data
```

[37]:
```
                open      high       low    close   volume  Name  close_10  \
date
2013-02-08     85.61    87.165    85.390    86.77  7888920  AMGN       NaN
2013-02-11     85.48    85.980    84.590    84.92  7538344  AMGN       NaN
2013-02-12     85.00    85.230    84.280    84.54  4655977  AMGN       NaN
2013-02-13     84.96    85.130    84.450    84.94  7943132  AMGN       NaN
2013-02-14     86.00    86.398    84.609    84.72  6189005  AMGN       NaN
…                …        …         …        …       …    …         …
2018-02-01   1162.61  1174.000  1157.520  1167.70  2412114  GOOG  1165.065
2018-02-02   1122.00  1123.070  1107.280  1111.90  4857943  GOOG  1162.504
2018-02-05   1090.60  1110.000  1052.030  1055.80  3798301  GOOG  1152.503
2018-02-06   1027.18  1081.710  1023.140  1080.60  3447956  GOOG  1143.566
2018-02-07   1081.54  1081.780  1048.260  1048.58  2369232  GOOG  1132.000

             close_20   close_50
date
2013-02-08        NaN        NaN
2013-02-11        NaN        NaN
2013-02-12        NaN        NaN
```

```
2013-02-13        NaN        NaN
2013-02-14        NaN        NaN
…                 …          …
2018-02-01  1138.3200  1081.2214
2018-02-02  1139.5950  1083.0918
2018-02-05  1137.2735  1083.5180
2018-02-06  1135.9565  1084.4108
2018-02-07  1133.0725  1084.5702

[4752 rows x 9 columns]
```

[39]:
```python
plt.figure(figsize = (20,12))

for index , company in enumerate(tech_list , 1):
    plt.subplot(2,2,index)
    filter1 = new_data['Name'] == company
    df = new_data[filter1]
    df[['close_10','close_20','close_50']].plot(ax = plt.gca())
    plt.title(company)
```

[40]:
```python
apple = all_data[all_data['Name'] == 'AAPL']
```

[41]:
```python
apple
```

[41]:
```
            date     open     high      low    close     volume  Name
1259  2013-02-08  67.7142  68.4014  66.8928  67.8542  158168416  AAPL
```

```
1260 2013-02-11   68.0714   69.2771   67.6071   68.5614  129029425  AAPL
1261 2013-02-12   68.5014   68.9114   66.8205   66.8428  151829363  AAPL
1262 2013-02-13   66.7442   67.6628   66.1742   66.7156  118721995  AAPL
1263 2013-02-14   66.3599   67.3771   66.2885   66.6556   88809154  AAPL
…          …        …        …        …        …          …   …
2513 2018-02-01  167.1650  168.6200  166.7600  167.7800   47230787  AAPL
2514 2018-02-02  166.0000  166.8000  160.1000  160.5000   86593825  AAPL
2515 2018-02-05  159.1000  163.8800  156.0000  156.4900   72738522  AAPL
2516 2018-02-06  154.8300  163.7200  154.0000  163.0300   68243838  AAPL
2517 2018-02-07  163.0850  163.4000  159.0685  159.5400   51608580  AAPL

[1259 rows x 7 columns]
```

[42]:
```python
apple['close']
```

[42]:
```
1259     67.8542
1260     68.5614
1261     66.8428
1262     66.7156
1263     66.6556
          …
2513    167.7800
2514    160.5000
2515    156.4900
2516    163.0300
2517    159.5400
Name: close, Length: 1259, dtype: float64
```

[44]:
```python
apple['Daily_return(in %)'] = apple['close'].pct_change()*100
```

```
/var/folders/qm/_mqp4sjj7fsb8_kk_zvcs1d80000gn/T/ipykernel_5428/3542914216.py:1:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  apple['Daily_return(in %)'] = apple['close'].pct_change()*100
```

[45]:
```python
import plotly.express as px
```

[46]:
```python
px.line(apple, x='date',y = 'Daily_return(in %)')
```

[48]:
```python
# performing resampling analysis of closing price
apple.dtypes
```

[48]:
```
date                  datetime64[ns]
open                         float64
```

```
high                          float64
low                           float64
close                         float64
volume                          int64
Name                           object
Daily_return(in %)            float64
dtype: object
```

[49]:
```
apple.set_index('date',inplace = True)
```

[50]:
```
apple.head()
```

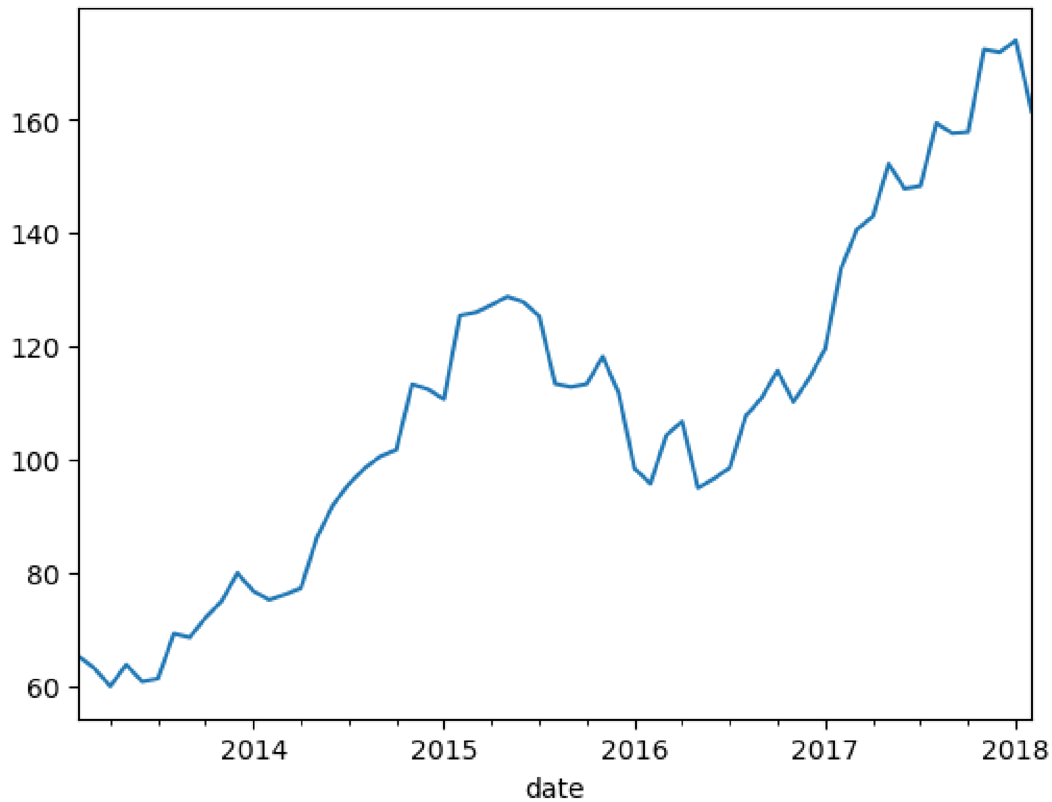
[50]:
```
               open     high      low    close     volume  Name  \
date
2013-02-08  67.7142  68.4014  66.8928  67.8542  158168416  AAPL
2013-02-11  68.0714  69.2771  67.6071  68.5614  129029425  AAPL
2013-02-12  68.5014  68.9114  66.8205  66.8428  151829363  AAPL
2013-02-13  66.7442  67.6628  66.1742  66.7156  118721995  AAPL
2013-02-14  66.3599  67.3771  66.2885  66.6556   88809154  AAPL

            Daily_return(in %)
date
2013-02-08                 NaN
2013-02-11            1.042235
2013-02-12           -2.506658
2013-02-13           -0.190297
2013-02-14           -0.089934
```

[52]:
```
apple['close'].resample('M').mean()
```

[52]:
```
date
2013-02-28     65.306264
2013-03-31     63.120110
2013-04-30     59.966432
2013-05-31     63.778927
2013-06-30     60.791120
                 …
2017-10-31    157.817273
2017-11-30    172.406190
2017-12-31    171.891500
2018-01-31    174.005238
2018-02-28    161.468000
Freq: M, Name: close, Length: 61, dtype: float64
```

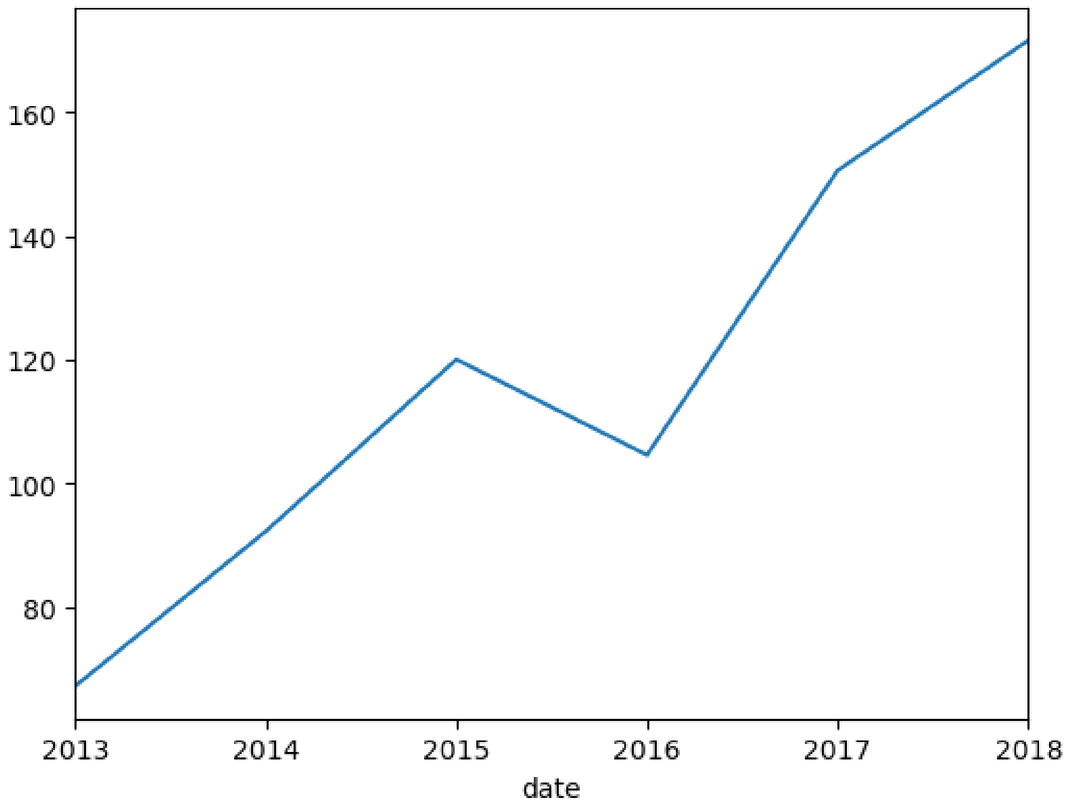
[53]:
```
apple['close'].resample('M').mean().plot()
```

[53]:
```
<AxesSubplot:xlabel='date'>
```



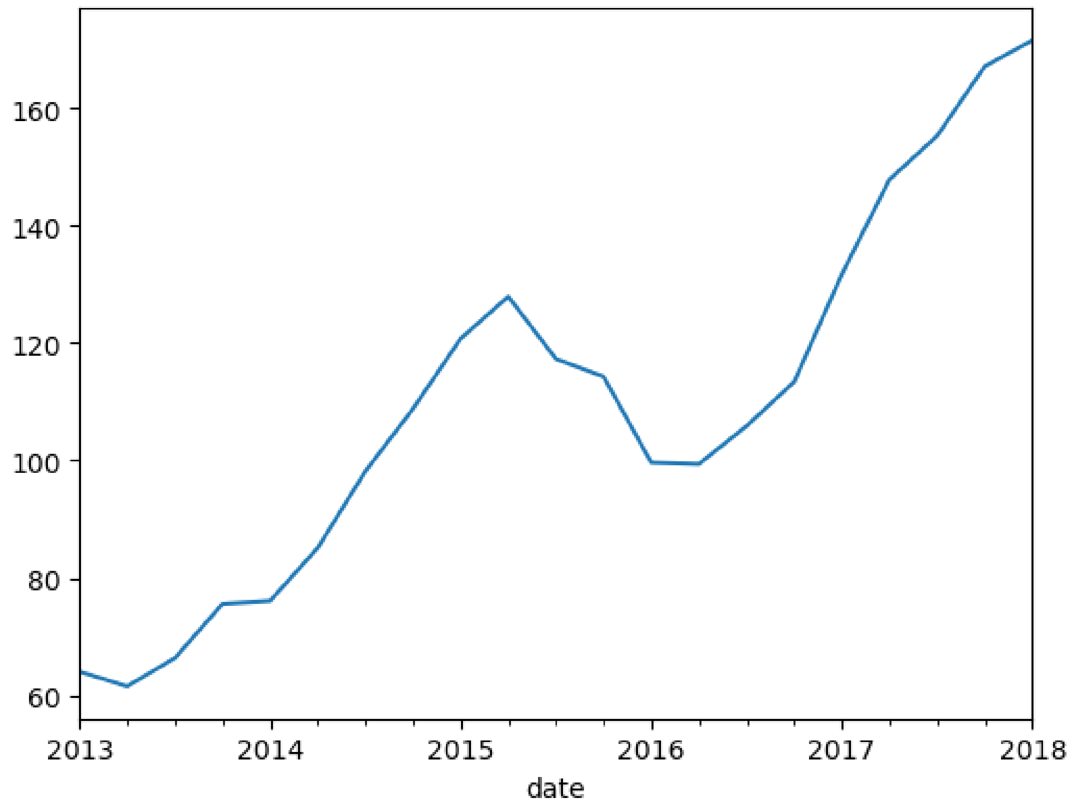
[54]:
```
apple['close'].resample('Y').mean().plot()
```

[54]: <AxesSubplot:xlabel='date'>




```
[55]: apple['close'].resample('Q').mean().plot()
```

```
[55]: <AxesSubplot:xlabel='date'>
```



[56]:
```
'''Checking if the closing prices of these
   tech companies (Amazon,Apple,Google,Microsoft)
   are correlated or not !!'''
company_list
```

[56]:
```
['/Users/abhishekbhadani/Desktop/untitled folder 2/S&P_resources
(1)/individual_stocks_5yr/GOOG_data.csv',
 '/Users/abhishekbhadani/Desktop/untitled folder 2/S&P_resources
(1)/individual_stocks_5yr/MSFT_data.csv',
 '/Users/abhishekbhadani/Desktop/untitled folder 2/S&P_resources
(1)/individual_stocks_5yr/AAPL_data.csv',
 '/Users/abhishekbhadani/Desktop/untitled folder 2/S&P_resources
(1)/individual_stocks_5yr/AMGN_data.csv']
```

[58]:
```
com = [pd.read_csv(a) for a in company_list]
```

[61]:
```
closing_price = pd.DataFrame()
for name in com:
    closing_price['closing_price_'+name['Name'][0]] = name['close']
```

[63]:
```
closing_price
```

[63]:

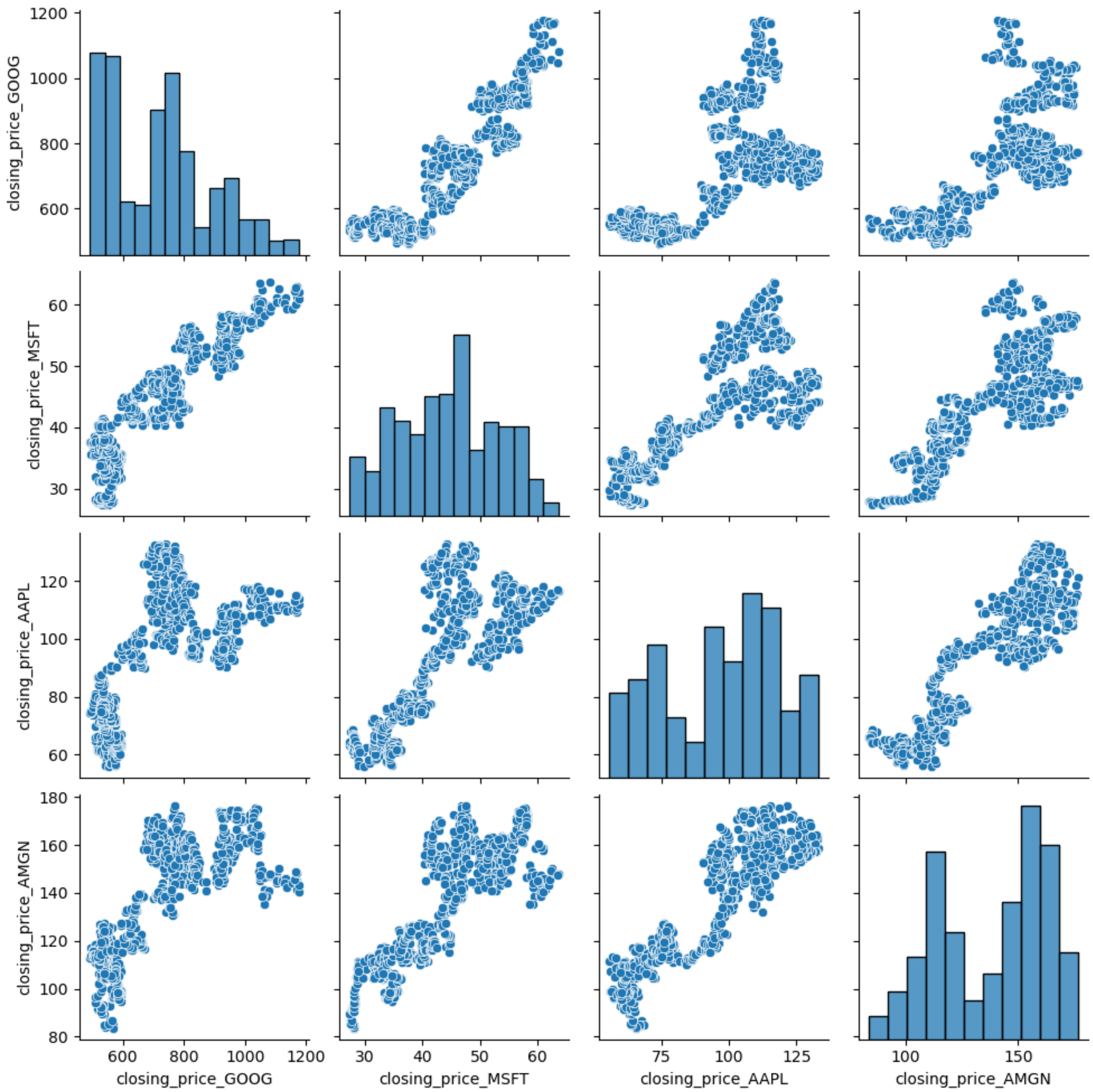
```
     closing_price_GOOG  closing_price_MSFT  closing_price_AAPL  \
0                558.46               27.55             67.8542
1                559.99               27.86             68.5614
2                556.97               27.88             66.8428
3                567.16               28.03             66.7156
4                567.00               28.04             66.6556
..                  …                   …                   …
970             1167.70               62.68            115.1900
971             1111.90               62.58            115.8200
972             1055.80               62.30            115.9700
973             1080.60               63.62            116.6400
974             1048.58               63.54            116.9500

     closing_price_AMGN
0                 86.77
1                 84.92
2                 84.54
3                 84.94
4                 84.72
..                  …
970              148.69
971              150.39
972              149.37
973              147.74
974              147.22

[975 rows x 4 columns]
```

[64]:

```
sns.pairplot(closing_price)
```

[64]:

```
<seaborn.axisgrid.PairGrid at 0x7ff48701f040>
```

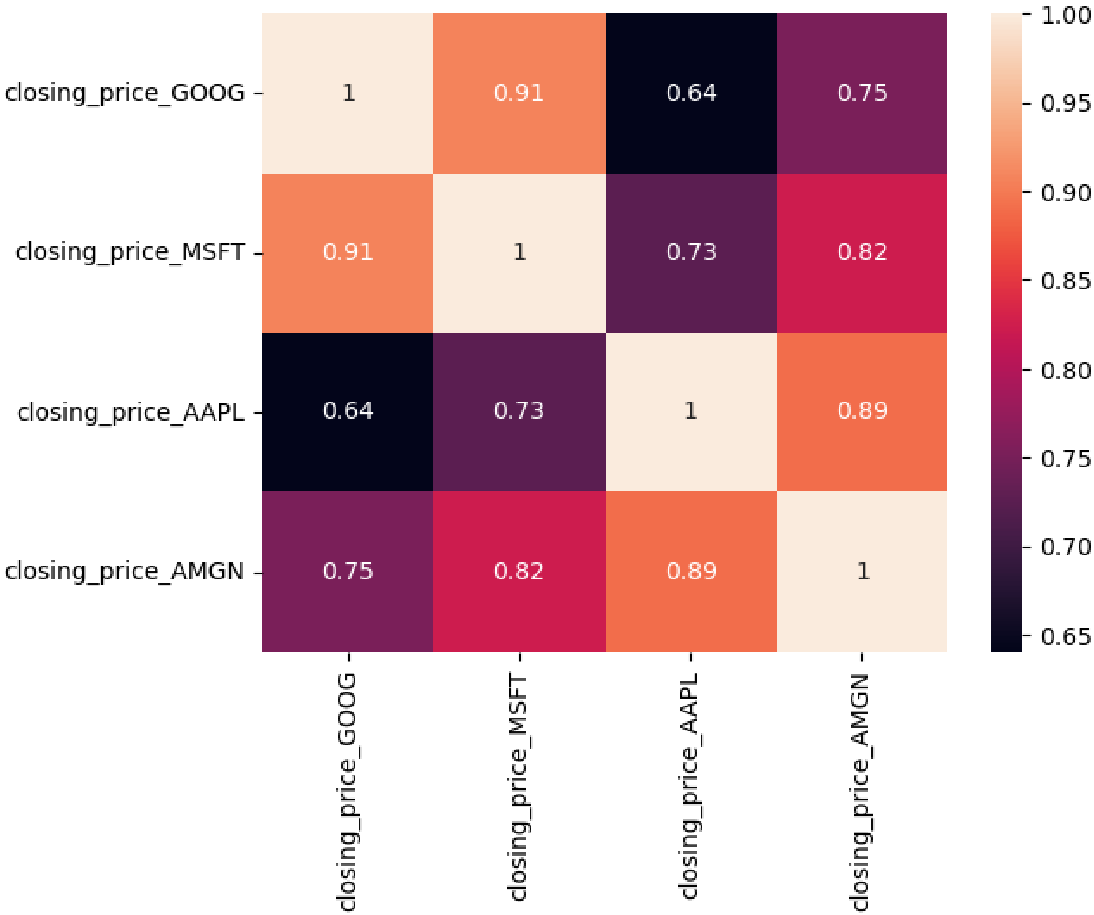


[65]:
```
closing_price.corr()
```

[65]:
```
                    closing_price_GOOG  closing_price_MSFT  \
closing_price_GOOG            1.000000            0.907011
closing_price_MSFT            0.907011            1.000000
closing_price_AAPL            0.640522            0.725608
closing_price_AMGN            0.751805            0.822473

                    closing_price_AAPL  closing_price_AMGN
closing_price_GOOG            0.640522            0.751805
closing_price_MSFT            0.725608            0.822473
closing_price_AAPL            1.000000            0.890040
closing_price_AMGN            0.890040            1.000000
```

[66]:
```
sns.heatmap(closing_price.corr(),annot = True)
```

[66]: <AxesSubplot:>



[68]:
```
# Whether daily change in the price of the stocks are correlated or not
a = closing_price['closing_price_AAPL']
```

[69]:
```
b = closing_price['closing_price_AAPL'].shift(1)
```

[70]:
```
a-b/a.shift(1)*100
```

[70]:
```
0          NaN
1     -31.4386
2     -33.1572
3     -33.2844
4     -33.3444
         …
970    15.1900
```

```
971    15.8200
972    15.9700
973    16.6400
974    16.9500
Name: closing_price_AAPL, Length: 975, dtype: float64
```

```
[ ]:
```