

COVID-19 and Corona Beer

IS 590PR

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Description

The spread of COVID-19 is causing huge panic around the world. Due to the name of coronavirus, some people connect it with Corona Beer and refuse to buy any Corona Beer under this circumstances. This project aims to study how the spread of COVID-19 influence the stock price of Constellation Brand(owner of Corona Beer).

- Constellation vs. S&P 500
- Constellation vs. other beer companies
- stock price vs. COVID-19 cases

Hypothesis

1. The spread of COVID-19 will negatively influence the stock price of Constellation.
2. The influence of coronavirus on STZ stock price will gradually disappear as coronavirus continues.

Retrieving Stock Price

(<https://finance.yahoo.com/>)

getStock(abbr, write_csv, time):

- abbr: company abbreviation
- write_csv: save file to local
- time: before/after COVID-19
- returns date and stock price

```
abbr = abbr.upper()
output_filename = abbr+'.csv'
if time=='before':
    url = 'https://query1.finance.yahoo.com/v7/finance/download/' + abbr + \
        '?period1=1559260800&period2=1577750400&interval=1d&events=history'
else:
    url = 'https://query1.finance.yahoo.com/v7/finance/download/' + abbr + \
        '?period1=1579564800&period2=1588283265&interval=1d&events=history'
# read the url into dataframe
df = pd.read_csv(url)
# trim the year in Date column
df['Date'] = df['Date'].astype(str).str[5:]
output = df[['Date', 'Close']]
# rename columns for further steps
output.columns = ['date', abbr]
if write_csv:
    df.to_csv(output_filename, index=False)
return(output)
```

Retrieving COVID cases

(<https://github.com/nytimes/covid-19-data>)

getCOVID(area, write_csv):

- area: state/us data
- write_csv: save file to local
- returns date, case and new(calculated)

```
if area_name.lower() == 'us': # url for us data
    url = 'https://raw.githubusercontent.com/nytimes/covid-19-data/master/us.csv'
    area = pd.read_csv(url)
else: # url for state data
    url = 'https://raw.githubusercontent.com/nytimes/covid-19-data/master/us-states.csv'
    df = pd.read_csv(url)
    df['state'] = df['state'].str.lower()
    # extract the target state
    area = df[df['state'] == area_name]
    area = area.reset_index()

# trim date
area['date'] = area['date'].astype(str).str[5:]
# calculate new confirmed cases based on cumulative number
area['new'] = area.cases.diff()
# manually fill the first row of the data
area.loc[area.index[0], 'new'] = area.loc[area.index[0], 'cases']
area['new'] = area['new'].astype('int64')
if write_csv:
    output_filename = area_name.lower() + '_COVID.csv'
    area = area.drop(columns=['index', 'state', 'fips'], axis=1)
    area.to_csv(output_filename, index=False)
area_out = area[['date', 'cases', 'new']]
return area_out
```

Merge COVID Data and Stock Price

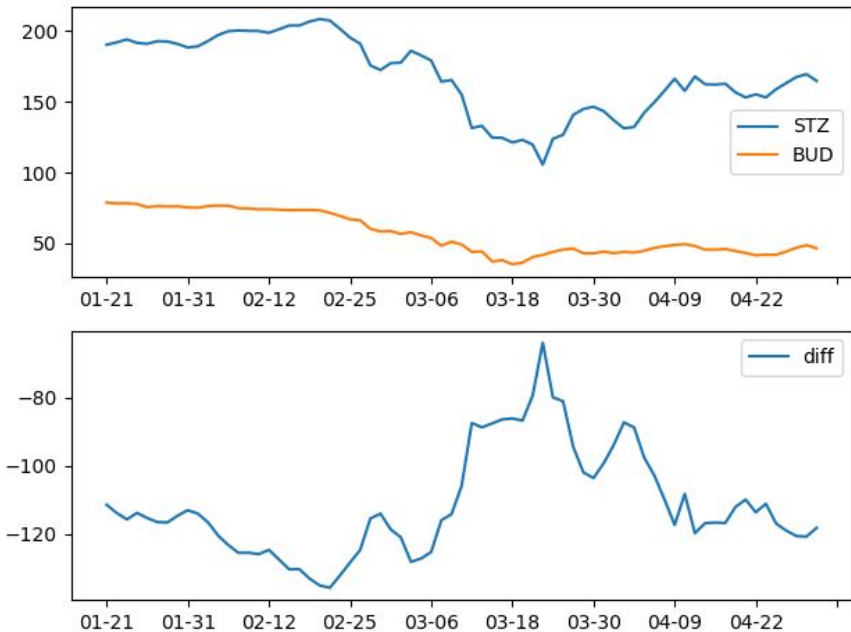
stock_covid(stz, compare, covid):

- stz: Corona Beer stock price
- compare: the company to be compared with
- covid: covid data of a certain area
- returns a left joined dataframe

```
output = stz.merge(compare, on='date', how='left')
output['diff'] = output[output.columns[2]] - output[output.columns[1]]
output = output.merge(covid, on='date', how='left')
print(output)
```

	date	STZ	BUD	diff	cases	new
0	01-21	190.229996	78.809998	-111.419998	1	1
1	01-22	191.940002	78.110001	-113.830001	1	0
2	01-23	193.970001	78.260002	-115.709999	1	0
3	01-24	191.559998	77.739998	-113.820000	2	1
4	01-27	190.899994	75.580002	-115.319992	5	0

Plot Stock Difference

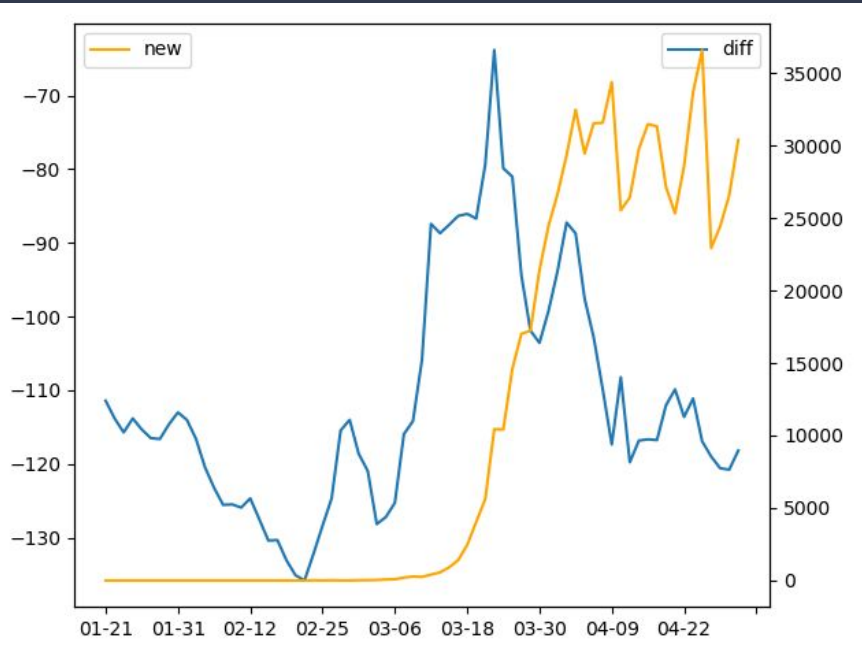


plot_stock(df):

- df: dataframe from previous step
- returns two line graph

```
fig, ax = plt.subplots(2)
stz, = ax[0].plot(df['date'], df[df.columns[1]])
stz.set_label(df.columns[1])
other, = ax[0].plot(df['date'], df[df.columns[2]])
other.set_label(df.columns[2])
ax[0].xaxis.set_major_locator(plt.MaxNLocator(10))
ax[0].legend()
diff, = ax[1].plot(df['date'], df['diff'])
diff.set_label('diff')
ax[1].xaxis.set_major_locator(plt.MaxNLocator(10))
ax[1].legend()
plt.show()
```

Plot Stock vs. COVID



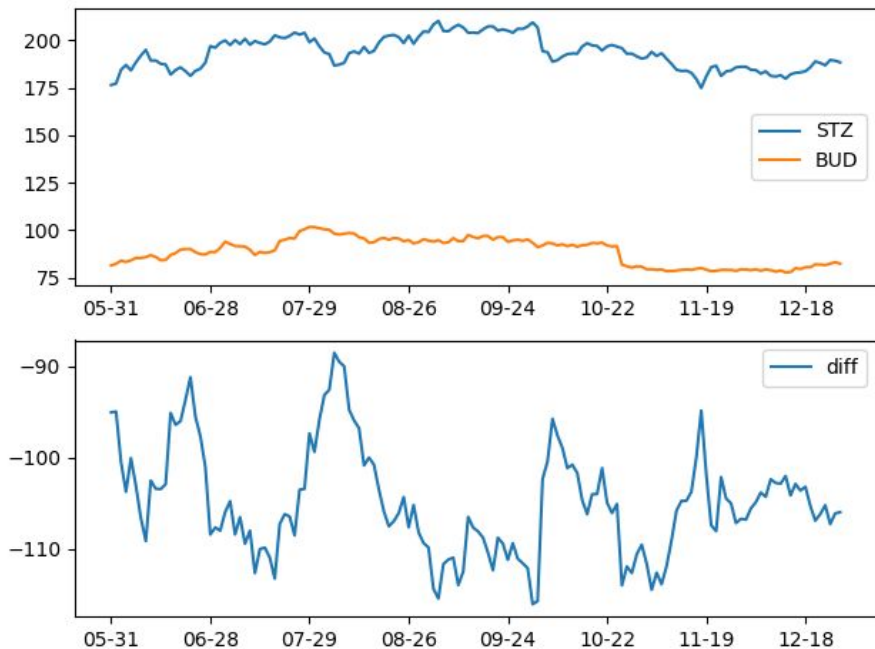
`plot_covid(df, how):`

- `df`: dataframe from previous step
- `how`: cumulative cases or new cases
- returns one line graph

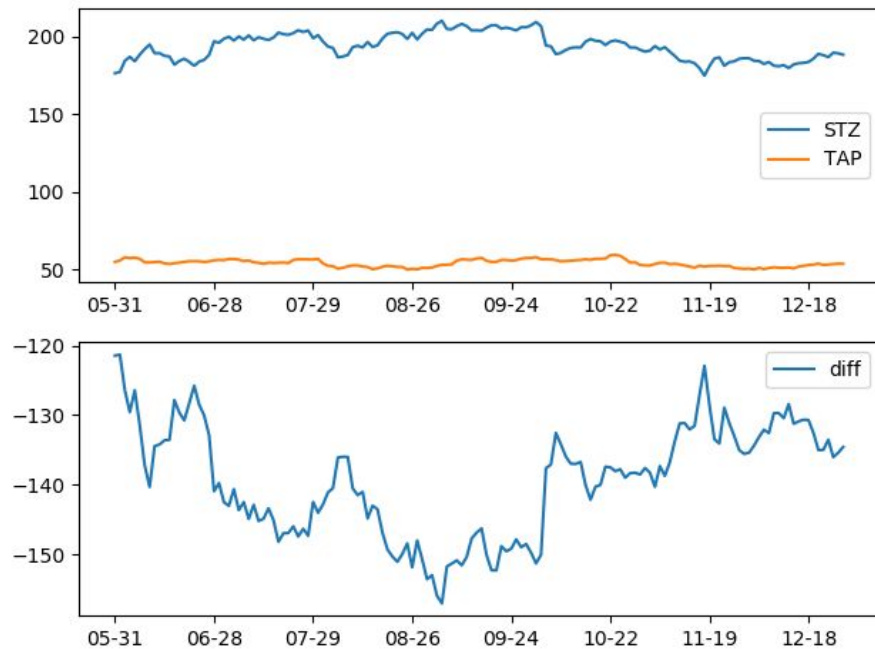
```
fig, ax = plt.subplots()
stock, = ax.plot(df['date'], df['diff'])
stock.set_label('diff')
ax2 = ax.twinx()
cases, = ax2.plot(df['date'], df[how], color='orange')
cases.set_label(how)
ax.xaxis.set_major_locator(plt.MaxNLocator(10))
ax.legend()
ax2.legend()
plt.show()
```


Stock Difference before COVID(5/31-12/31)

Bud Light

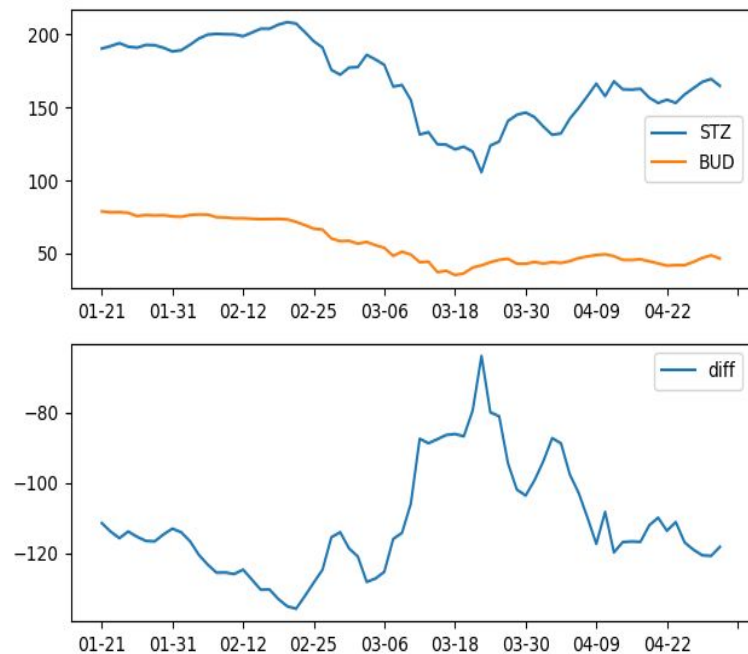


Coors Light

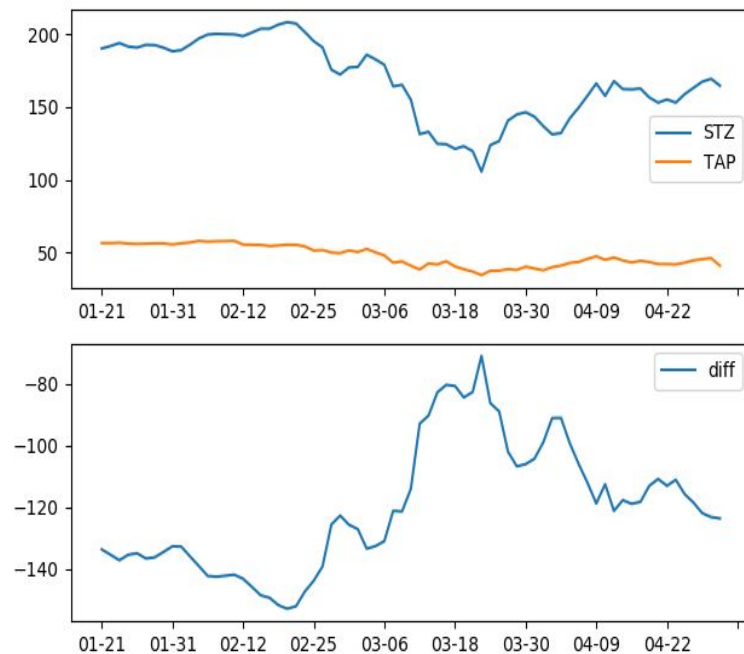


Stock Difference after COVID(1/21)

Bud Light

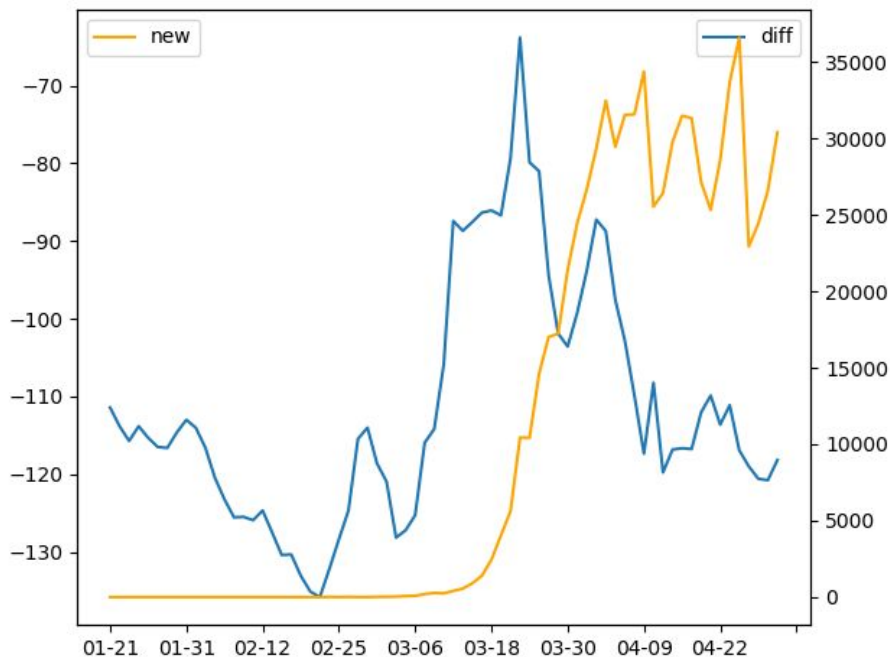


Coors Light

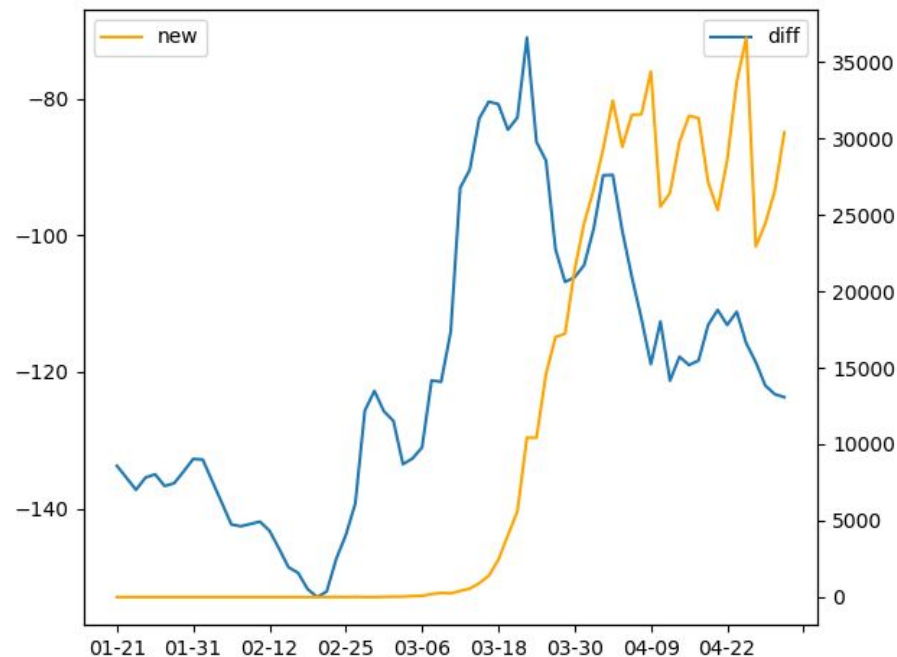


Stock Difference and COVID in US

Bud Light

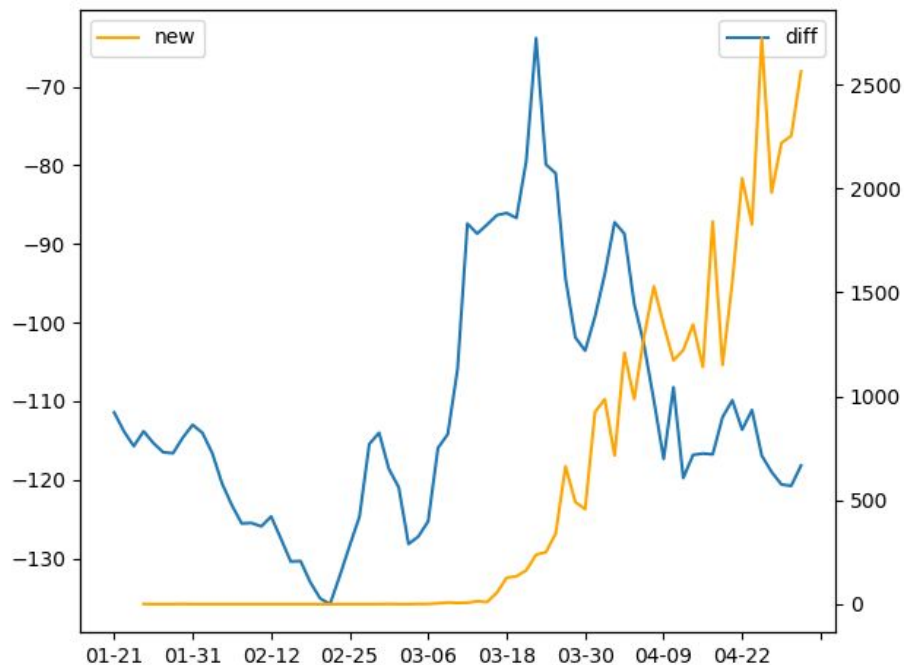


Coors Light

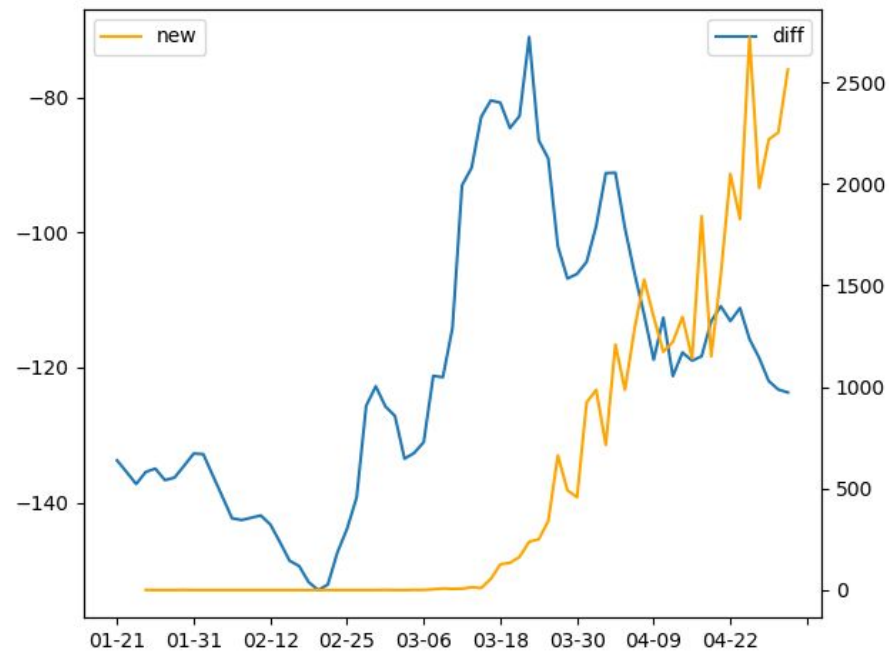


Stock Difference and COVID in IL

Bud Light

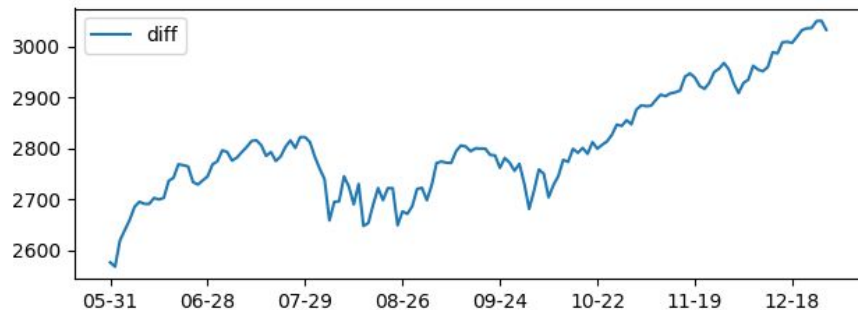
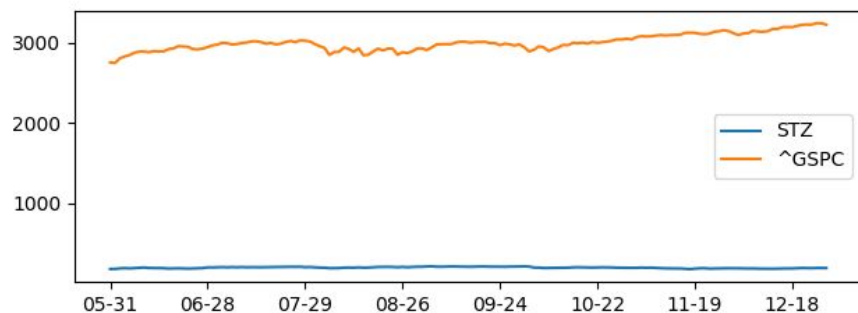


Coors Light

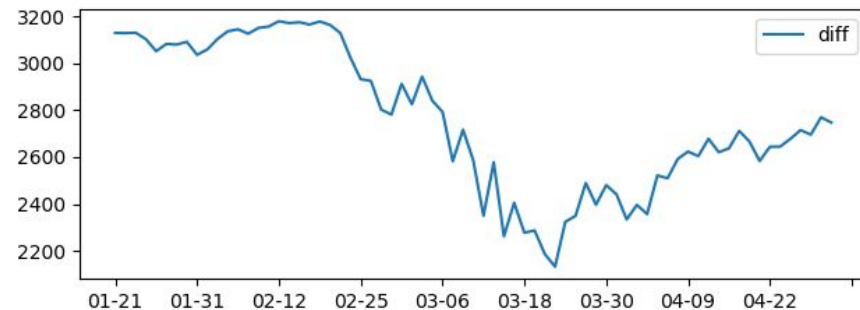
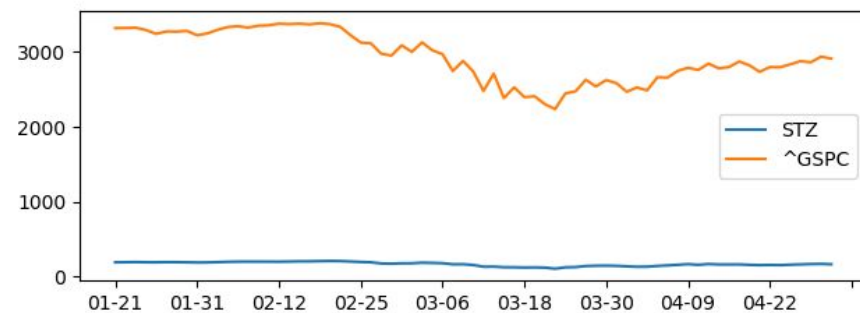


Constellation and S&P 500

Before



After



Conclusion

- The spread of COVID-19 did negatively impacted the stock price of Corona Beer compared with other beer companies, especially from 3/06 to 3/18.
- The effect of COVID-19 is decreasing after 3/18.
- There might be a positive relationship between COVID-19 and the stock price of Corona Beer compared with S&P 500 number.