

Vaccine Stock Analysis during the COVID-19 Pandemic

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```
[40]: import numpy as np
import pandas as pd

from functools import reduce
```

Covid Dataset

```
[41]: df = pd.read_csv("epidemiology.csv")
# TODO: covid data set manipulations.
```

Stock Datasets

```
[42]: df2 = pd.read_csv("moderna.csv")
moderna_df = df2[['date', 'close', 'volume', 'rsi']]

df3 = pd.read_csv("jnj.csv")
jnj_df = df3[['date', 'close', 'volume', 'rsi']]

df4 = pd.read_csv("astra-zeneca.csv")
astra_zeneca_df = df4[['date', 'close', 'volume', 'rsi']]

df5 = pd.read_csv("biontech.csv")
biontech_df = df5[['date', 'close', 'volume', 'rsi']]

df6 = pd.read_csv("novavax.csv")
novavax_df = df6[['date', 'close', 'volume', 'rsi']]

df7 = pd.read_csv("pfizer.csv")
pfizer_df = df7[['date', 'close', 'volume', 'rsi']]
```

Merge Datasets

```
[43]: # TODO: add covid dataset in data_frames list

data_frames = [moderna_df, jnj_df, astra_zeneca_df, biontech_df, novavax_df,
               pfizer_df]

df_merged = reduce(lambda left, right: pd.merge(left, right, on=['date'],
               how='outer'), data_frames)
```

```
#TODO: rename dataframe columns after merging covid dataset.
df_merged.columns = ['date', 'moderna_closing_price', 'moderna_volume',
    → 'moderna_rsi', 'jnj_closing_price', 'jnj_volume', 'jnj_rsi',
    → 'astra_zeneca_closing_price', 'astra_zeneca_volume', 'astra_zeneca_rsi',
    → 'biontech_closing_price', 'biontech_volume', 'biontech_rsi',
    → 'novavax_closing_price', 'novavax_volume', 'novavax_rsi',
    → 'pfizer_closing_price', 'pfizer_volume', 'pfizer_rsi']

df_merged.dtypes
```

```
[43]: date                object
      moderna_closing_price  float64
      moderna_volume        float64
      moderna_rsi           float64
      jnj_closing_price      float64
      jnj_volume            float64
      jnj_rsi               float64
      astra_zeneca_closing_price float64
      astra_zeneca_volume    float64
      astra_zeneca_rsi       float64
      biontech_closing_price  float64
      biontech_volume        float64
      biontech_rsi           float64
      novavax_closing_price   float64
      novavax_volume         float64
      novavax_rsi            float64
      pfizer_closing_price    float64
      pfizer_volume          float64
      pfizer_rsi             float64
      dtype: object
```

Data Analysis

Q1: How did each pharmaceutical stock perform during the pandemic, and is there a trend between performance and COVID-19 cases?

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Q2: Is there a positive or negative relationship between COVID-19 cases and pharmaceutical stock prices of the aforementioned companies? Could a rise in COVID-19 cases be used as a factor to predict a rise in pharmaceutical stock prices?

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Q3: Assuming there is a pattern/relationship, what are the nuances that explain any breaks from the pattern between COVID-19 cases and stock prices?

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