

Project Description

The main motivation of this project is to show the impact that news articles can have on the stock prices of companies. In the initial stages of the project, it was first designed to analyze the increase in Johnson & Johnson's stock prices when their COVID-19 vaccine received an emergency use authorization (EUA) from the US Food & Drug Administration (FDA). The initial hypothesis was that their stock price would increase significantly when the FDA's announcement has been made.

However, as the COVID-19 situation continued to unfold in April 2021, I realized that a more unique situation had then become available. Vaccinations with Johnson & Johnson's vaccine was paused due to several cases of blood clots. This was a situation like none other, as it did not happen with the other two available COVID-19 vaccines created by Pfizer-BioNTech and Moderna. However, Johnson & Johnson's vaccine was soon cleared by the FDA once again, but not before the news articles have made its lasting impact on people's minds--including mine. Thus, I realized that said articles could have a lasting impact on the minds of investors as well. With that in mind, I quickly changed the direction of my project, now analyzing the news articles published and Johnson & Johnson's stock prices during that 2-week period, wherein the FDA abruptly paused then swiftly cleared their vaccine.

In this project, I used two data sources to conduct my analyses. The first data source is the News API. This API has access to all news articles that are published by various sources. I chose to use the LA Times and BBC News, as these represent different audiences--one based in the US and the other in the UK. With this data source, I collected the dates and links of articles that were written about Johnson & Johnson by these two publications and compiled this information into a CSV file. The second data source is Yahoo Finance. I scraped the website, specifically the Johnson & Johnson page where it contains the information about the company, including its historical stock prices. With this data source, I collected the dates and daily adjusted closing stock price value of Johnson & Johnson and compiled these into a CSV file.

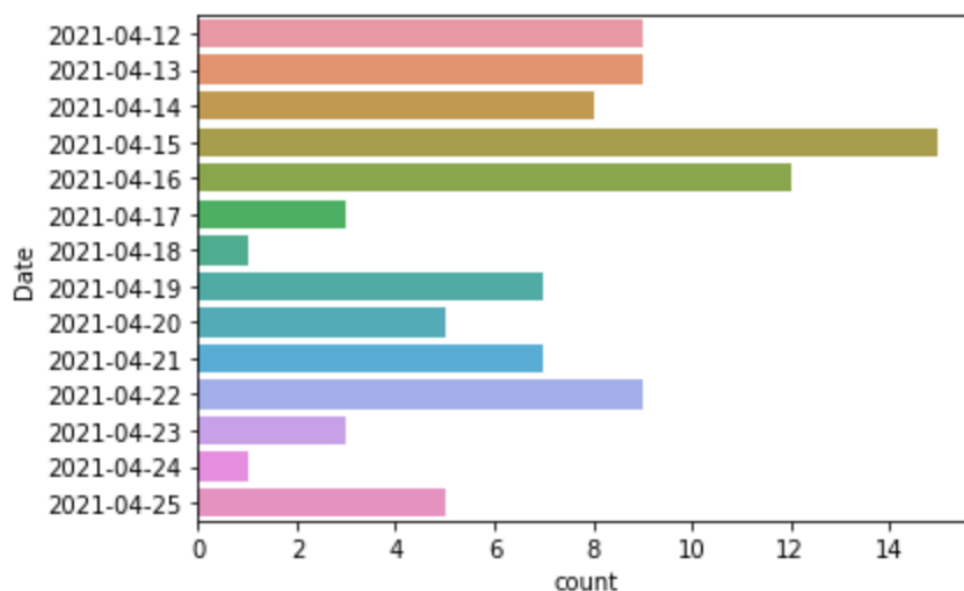


Figure 1: Number of articles published by the LA Times about Johnson & Johnson

Using the API module, I scraped for articles by said publications that were published between April 12, 2021 and April 25, 2021 and created bar graphs visualizing the count of daily articles written about Johnson & Johnson by each publication. During this timeframe, both the LA Times and BBC News were heavily covering Johnson & Johnson as the FDA announced its recommendation to pause the use of their vaccine on April 13. There were more than 6 news articles published about Johnson & Johnson by both publications each.

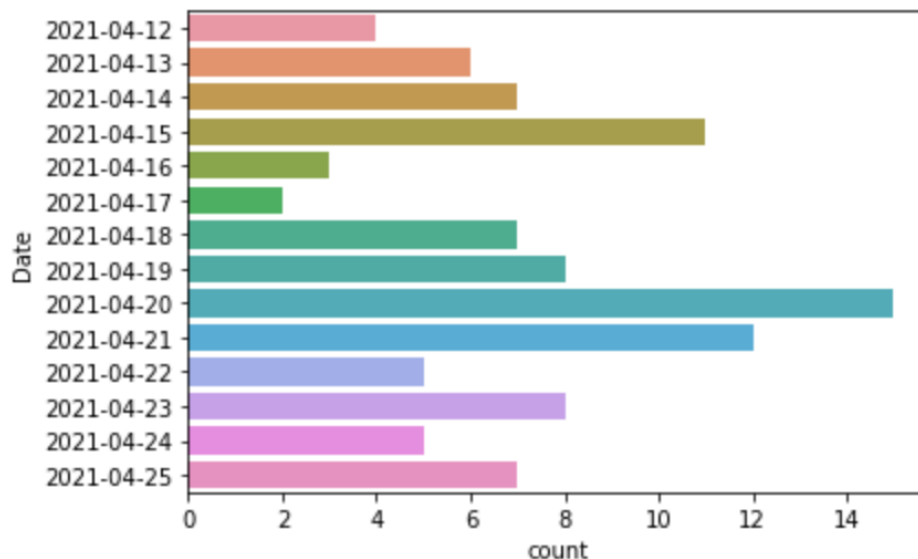


Figure 2: Number of articles published by BBC News about Johnson & Johnson

For the LA Times, its peak was on April 15, two days after the announcement was made. The BBC News also heavily covered Johnson & Johnson on April 15, publishing 11 articles about it. For both publications, there were noticeable declines in the Johnson & Johnson coverage on April 17. However, the peak for BBC News was on April 20, publishing 15 articles about Johnson & Johnson. This was only three days before the FDA made a follow-up announcement stating that they now have confidence in the vaccine's safety and effectiveness. This shows that there was a significant dialogue continuing to happen in the 10 days between the announcements that the FDA made.

By conducting web scraping of the Yahoo Finance website, I was able to gain information about Johnson & Johnson's stock price trend between the timeframe, wherein the FDA paused and then cleared their COVID-19 vaccine. The lowest point was on April 13, in which the adjusted closing stock price was \$159.48. This was also the day that the FDA recommended pausing the use of the vaccine. The highest point was on April 21, in which the adjusted closing stock price was \$166.59. This was a day after the FDA lifted the recommendation of the pause. With that being said, the most significance rise was between April 19 and April 20.

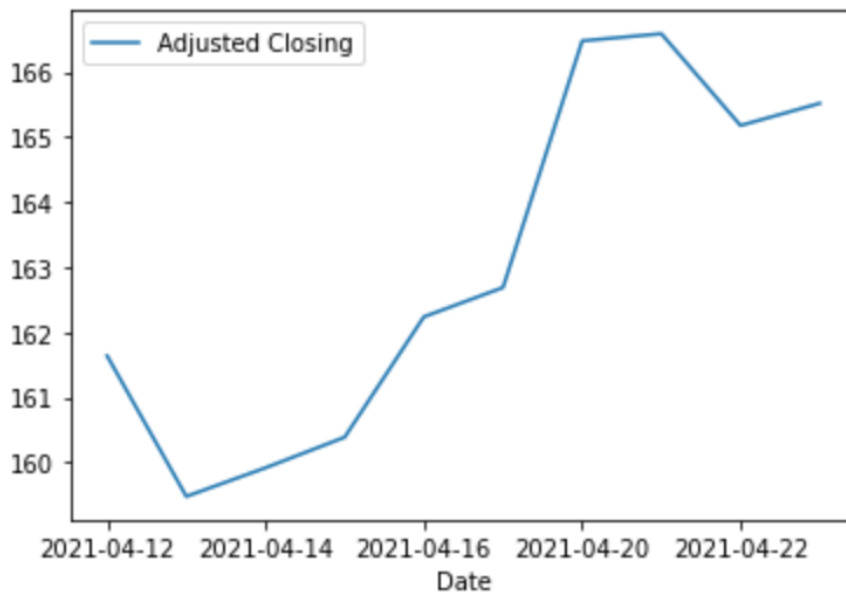


Figure 3: Johnson & Johnson's daily adjusted closing stock prices

It appears that there is somewhat of a correlation between the news articles published by the LA Times and BBC News and the stock prices of Johnson & Johnson. As the company was heavily covered on April 13, their stock price decreased significantly by almost 2 points from the previous day. As the company was again heavily covered on April 20, its stock price increased significantly by almost 4 points from the previous day. However, as the number of news articles published about Johnson & Johnson began to decrease between the two dates, their stock price slowly began to recover from its lowest point. There are three conclusions that can be made about the correlation of these datasets:

1. When negative news was released about the company, their stock price significantly decreased.
2. As coverage of the company began to subside, their stock price started to recover.
3. When positive news was released about the company, their stock price significantly increased.

The stock market is very convoluted, as many different factors can impact it. While there is somewhat of a correlation between the articles published about Johnson & Johnson by the LA Times and BBC News and the company's stock price, there are also other factors that must be taken into consideration—including the FDA's role.

Further research can potentially be conducted with natural language processing (NLP) analysis to determine the tones of the articles published about companies and their effect on companies' stock prices. This additional layer of possible future research can add a layer of depth to the analysis.