# Product Announcements and Stock Prices

## Final Project Report

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## I. Objective

Our objective for this project is to learn more about how new product announcements impact stock prices of different tech companies.

## II. Motivation

We are motivated to research the effect product release announcements have on the stock price because we're all interested in business and finance. We are investigating the factors that influence the stock market in hopes of better understanding why a stock has a certain price at a given time. Due to well-known events, such as Elon Musk's tweets causing a change in stock price, made us interested in how product announcements, and by extension, customer expectations, impact a stock's price.

## III. Data to be Used

Overall, our project is relatively simple in terms of the data it requires. We really only need two types of data: product announcement dates and stock prices. We will look at a few products from each tech company (the amount of products we look for can be altered as needed for project scope). The product announcement dates will be used as a set of important dates to check the stock price ranges of. We will scrape the product release dates off of the product release pages of three major tech companies (Apple, Google, and Tesla) and then scrape each company's stock data in the days before and after the product announcements. We haven't decided on a specific website to scrape stock data from, but Yahoo Finance, marketwatch.com, and CNN all have good stock market data that we could use.

## IV. Methodology

In order to allow all group members to experience all steps of our project, we each chose a tech company to research. We then individually collected the data through various means—by hand (finding stock data online) and automatically (by scraping data using the Yahoo Finance API). Once we all had our data, we established how exactly we would process it.

Using the closing stock price from one, three, and seven days after the product announcement. We compared that to the closing price on the product announcement data and used these to calculate the relative change and price for the three different intervals we cared about. These percentage changes were then graphed to help see if there was a correlation between the product announcement and the stock's price in the following days.

## V. Responsibilities & Timeline

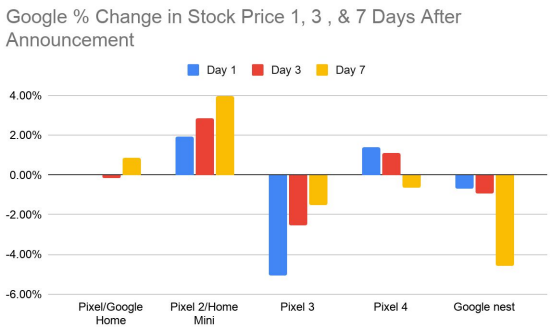
We will have a team leader whose primary role will be to keep the group on track of milestones as well as making sure the project is in steady progress. The other two members will have similar tasks as they will need to steadily monitor stock price patterns and times. We plan to have weekly meetings for discussion on progress and new data. Members will come together for discussion on analyzing data and forming conclusions. It will be the responsibility of all members to find product announcement dates and stock prices. One of the first milestones will

be researching different products and choosing a few to focus on. After we have our set, our next milestone will be gathering and organizing information with dates and corresponding stock prices.

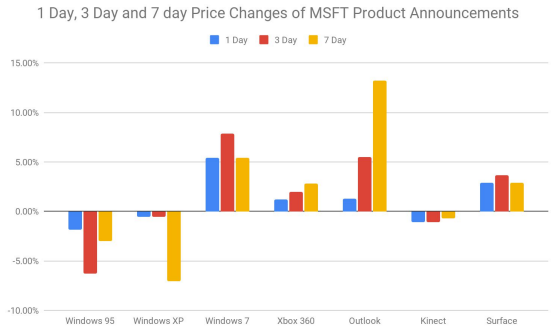
## VI. Expected Outcome

After analyzing stock market trends in relation to specific product announcements, we expect to see jumps in the stock price in the days after a new announcement. Since so many people nowadays want to have the newest technology, it makes sense that the stock prices will increase, since they are an indicator of consumer interest. As most product announcements are met with excitement from the consumer base, we expect that product releases will lead to increased stock prices, and if a product release isn't met with increased stock prices, we expect there to be extenuating circumstances behind the anomaly. At the end of this project, we hope to have a clear view on how product announcements impact stock prices.

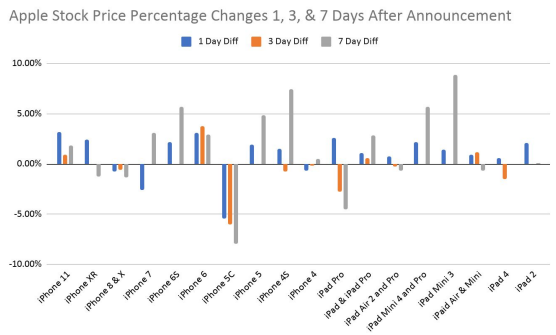
## V1II. Results and Analysis




With the announcement of many of the big mobile devices especially smartphones, we expected to see a more consistent, increasing trend. With Google data especially, it was harder to recognize a pattern or trend. However, Google announced two products on some days and according to the data, there was an increasing trend on those announcement days. Many of the products do have an increasing trend even if it is negative. The Pixel 4 announcement could also be an anomaly since it was announced in October of 2020 which is during the COVID-19 pandemic, so that is most likely a big factor in its percentage change. However, it is still not concrete enough to assume that the stock price went up because of the products' announcement.




Microsoft product announcements seemed to have a delayed effect on stock price. There was no correlation in percentage change or direction between the products, however the most extreme changes seemed to occur in the 7 day outlook. This implies that the product announcement news took some time to reach investors and have an impact on Microsoft's stock price.




When it comes to Apple product announcements (of which there are many), the effects of a product release tend to vary across different instances. The largest price increase change can sometimes be seen on the first day, while other times it peaks on the seventh day after the product announcement; sometimes the stock even falls in price after a product announcement. Although there is a good amount of variance, it appears that if a product announcement is going to positively affect the stock price, the most significant effects will be seen at either the beginning or end of the following week (1 and 7 day intervals). The significant amount of variance displayed by the graph above shows the unpredictability of the stock market.

Although individually there are a significant number of occurrences where an increase in stock price followed a product announcement, the amount of variance in the data prevents us from claiming there is a guaranteed correlation. However, the fact that the price did often rise and that multiple products being released on the same day tended to increase the percentage change significantly does provide some support to the idea that these announcements impact the stock price. The variance seen in the data could possibly be explained by external factors that weren't realized when analyzing the change in stock price—a bad PR move that leads to lower consumer support by one of the companies as an example. Additionally, since the trends between our three companies differed significantly, this might imply that different companies' customer loyalty levels might cause their stocks to change differently. For example, Apple has high customer loyalty, people are always lined up to buy the new iPhone, so they are more likely to be excited about new product announcements, and therefore impact the stock prices. Google, on the other hand, has been releasing readily-upgradable tech products for a much smaller time frame, which could mean that there are less consumers eagerly awaiting their new releases. Overall, our data presents some interesting occurrences that could indicate a correlation, but due to the variance we found it isn't guaranteed.

## VIII. Primary Project Issues

When it came to data collection, we experienced slight issues that delayed the collection of our data. A common issue was missing data points, since the stock market is closed on weekends, there are two days out of every week where no stock data was available. If one of the intervals we were getting data for happened to fall on a weekend, we were unable to calculate the percentage change for that interval, this led to small gaps in our data that we couldn't fill.

Due to the volatility and unpredictable nature of the stock market, we encountered significant issues throughout the completion of our project. The main issue we encountered was the difficulty of

isolating the impactful factors of the stock market. There are so many things that can impact a stock's price, and trying to verify that nothing else impactful happened during a product announcement to impact the stock price was like searching for a needle in a haystack. It was impossible for us to isolate a stock's price with one factor (product announcements), which makes it hard to find a strong correlation, since any correlation we do find could have been impacted by factors we didn't consider, such as bad PR that could have occurred within the same time frame.

## IX. Future Work

As mentioned previously, the unpredictability and easily-malleable nature of the stock market makes it difficult to isolate the cause of a stock's change in price. Further studies that could help us further isolate the events impacting a stock's price would allow us to ensure the correlation that we do see is actually caused by the product announcement, and not some external factor we didn't consider or didn't have knowledge of. For example, a study that keeps track of major negative positive events in a company's existence would be useful in granting context to our data.

Another portion of our project that would benefit from more work/resources is the 1, 3, 7-day interval system we used for determining what days we should use for comparison to the stock product announcement day price. We assumed that the most noticeable changes would occur soon after the product announcement, and thus chose to check one and three days after the announcement (as well as 7 to see the longer-term impact). The problem with this is that we don't know how fast consumers learn about product announcements. It might be the case that most people don't learn about new products through official product announcements, some (or potentially many) people might learn about these through word of mouth. This might mean that the effects of consumer opinion might not be best reflected in the day following the announcement, since consumers aren't guaranteed to learn about them quickly. A study that explores how consumers learn about new products being announced would be a very useful supplementary resource to ensure that the timeframe we chose is accurate to the timeframe in which people learn about new products.