**Final Project R Essay**

Brandon Kane

Tabor School of Business, Millikin University

IS 470: Business Intelligence and Big Data

Professor RJ Podeschi

December 15, 2020

**Domain Background**

After researching information about how companies’ stock is analyzed, we’ve learned that there are several different factors that are used to determine whether a stock is undervalued or overvalued. First, it’s important to understand that a stock price is “the amount it would cost to buy one share in a company” and that the stock price fluctuates based on different market conditions (IG.com). For instance, if investors perceive that a company is doing well, then the stock price will most likely increase, and if the company isn’t meeting its earnings expectations, then the stock price will fall (IG.com). Also, we’ve learned that it’s also important to look at other aspects of a company to measure its value, such as its market capitalization and its number of shares (Pinsent, Investopedia.com). It is clear that we’ve learned that there are several different factors that are used to determine whether a stock is undervalued or overvalued.

**Proposal**

Next, we’re going to use what we’ve learned to solve the following problems, “Has the percentage increase in Apple’s closing stock price from July to October 2020 been larger or smaller than July to October 2019?” Also, “Has the percentage increase or decrease in iPhone net sales from June to September 2020 been larger or smaller than June to September 2019?” Thirdly, “How much did the stock price increase 1 month before Apple’s iPhone release in 2020 compared to 2019?” Our goal is to report these increases or decreases and to see if there is a relationship between Apple’s stock prices per month and their increase or decrease in iPhone sales for Q4 of 2019 and 2020. Next, we will solve this problem by using the programming language R to aggregate data. Also, our data sources will include Yahoo Finance and Apple’s consolidated financial statements for Q4 of 2019 and Q4 of 2020. It is clear that we’ve determined the problems that we will solve for the data research project.

**Methodology**

In this project, there are several variables we must take into consideration to determine if there’s a relationship between Apple’s stock prices per month and their increase or decrease in iPhone sales for Q4 of 2019 and 2020. Also, we will include different data visualizations to support this project’s results. Some of the variable that we will compare are NASDAQ and the S&P 500’s closing stock prices from July to October 2020 and 2019 to note their increases and decreases. Another variable that has an impact on 2020’s stock prices and net iPhone sales is the COVID-19 pandemic. We acknowledge that this variable has influence on this project’s results, but didn’t use COVID-19 data due to the time constraints of this project. Lastly, we will calculate and analyze the percent increases and decreases in Apple’s stock prices and net iPhone sales to answer this project’s questions and achieve its goal. Also, we will include and analyze different data visualizations such as, bar plots, line plots, and bar and line plot combination charts to support this project’s results. It is clear that there are several variables to take into consideration to determine if there’s a relationship between Apple’s stock prices per month and their increase or decrease in iPhone sales for Q4 of 2019 and 2020.

**Results**

After completing this project, we have determined the answer’s to its questions and achieved its goal. First, we’ve learned that there was a 28.01 percent change in Apple’s stock for July to October 2019 and a -7.74 percent change for July to October 2020. Therefore, the precent increase in Apple’s stock was smaller in 2020 than in 2019 during these months. Next, we’ve learned that the percent change in net iPhone sales for June to September 2019 compared to June to September 2018 was -9.23 percent, which was less of a decrease in net iPhone sales compared to June to September 2020. Also, the percent change in net iPhone sales for June to September 2020 compared to June to September 2019 was -20.74 percent. Thirdly, we learned that Apple’s stock percent change was -10.25 percent one month before the 2020 iPhone release in September and -2.01 percent one month before the 2019 iPhone release in October. Overall, there is a relationship between Apple’s stock prices for the months July to October before during their yearly iPhone release and their increase or decrease in iPhone sales for Q4 of 2019 and 2020. This is apparent because there was a 28.01 percent change in Apple’s stock in 2019 and their net iPhone sales only decreased by 9.23 percent compared to 2018. Also, there was a -7.74 percent change for July to October 2020 and their net iPhone sales decreased by 20.74 percent compared to 2019. Lastly, the code that we used to determine these results can be found in our GitHub repository at <https://github.com/bwkane2021/rfinalproject-brandonkane>.

**Appendix**

*1. Apple Closing Stock Prices July to October 2020 and 2019*

Chart, bar chart

Description automatically generated

Percent

Months and Year

Months and Year

*2. Percentage Decrease iPhone Net Sales June to September 2019 and 2020*

*Chart

Description automatically generated*

Months and Year

Months and Year

Percent

*3. Apple Stock Decrease 1 Month Before iPhone Release 2020 and 2019*

*Chart

Description automatically generated*

Percent

Months and Year

Months and Year

*4. Apple Closing Stock Prices June to October 2020 and 2019*

*Chart, line chart

Description automatically generated*

iPhone Release 2020

iPhone Release 2019

*5. NASDAQ Closing Stock Prices June to October 2020 and 2019*

*Chart, line chart

Description automatically generated*

*6. S&P 500 Closing Prices June to October 2020 and 2019*

*Chart, line chart

Description automatically generated*

*7. Apple Closing Stock Prices and Net iPhone Sales June to October 2019*

*Chart

Description automatically generated*

Month

Net iPhone Sales

Closing Price

*8. Apple Closing Stock Prices and Net iPhone Sales June to October 2020*

*Chart, line chart

Description automatically generated*

Closing Price

Net iPhone Sales

Month

Bibliography

Harper, D. R. (2020, August 28). What Drives the Stock Market?

https://www.investopedia.com/articles/basics/04/100804.asp.

IG. Share price definition. IG.

https://www.ig.com/uk/glossary-trading-terms/share-price-

definition.

Pinsent, W. (2020, August 28). Understanding Stock Prices and Values. Investopedia.

https://www.investopedia.com/articles/stocks/08/stock-prices-fool.asp.

Zucchi, K. (2020, October 25). What Moves Apple's Stock Price? Investopedia.

https://www.investopedia.com/stock-analysis/061115/what-moves-apples-stock-price-aapl.aspx.