**Statistical Analysis of $TSLA**

**(From IPO to 2/3/2020)**

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Introduction

Since the initial public offering (IPO) of Tesla, Inc. on the NASDAQ on June 29th 2010, $TSLA has not only been a controversial stock but also a major competitor for the legacy automakers in the United States. The opening price of the stock was $19 and as of the final adjusted closing price in the data set used for this analysis, Tesla’s stock price was $780 by the end of the trading day on February 3rd, 2020. For any investor that bought on the that first day and never sold, their investment would have accrued an unrealized gain of 4005% (. In the wake of Tesla’s historic rise, this statistical analysis was performed in an attempt to gain some insight on the viability and risk of $TSLA.

Research Questions and Solutions

**Question 1:**

What is the expected value, standard deviation, and variance of Tesla’s adjusted closing price from the IPO on June 29th, 2010 to February 3rd, 2020?

* Note: Calculations were completed through Excel since there were over 2400 data points

**Question 2:**

Find the probability that Tesla’s adjusted closing price finishes positive, negative, unchanged, as well as negative or unchanged.

**Question 3**:

Assuming that Tesla’s adjusted closing price finishes either positive or not positive (negative or unchanged), list the discrete sample space for any three trading days.

* Since the possible outcomes for one day is either positive or not positive and there are three trading days, the *mn* rule states there are,
* Let p = positive and n = negative/unchanged

**Question 4**:

Using the discrete sample space for three trading days, find the probability that the adjusted closing price will finished positive at least once out of the three trading days.

* As found earlier,
* Let

**Question 5**:

From the IPO on June 29th, 2010 to February 3rd, 2020, what is the probability that Tesla’s adjusted closing price will finish positive given that the trading day is in December?

* Let
* As found earlier,

**Question 6**:

Are the probabilities of Tesla’s adjusted closing price finishing positive and a trading day being in December independent?

* If , then A and B are independent
* As found earlier,

**Question 7**:

Prove the answer to Question 5 using Bayes’ Rule.

* Bayes’ Rule states that,
* As found earlier,