Predicting Electric Vehicle Stock Prices

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Hypothesis

Our hypothesis is threefold. First, we believe that the volatility of the closing stock price of companies directly involved with electric vehicle manufacturing included within the DRIV ETF are generally equivalent to the volatility of prices of traditional electronic tech companies. Second, we believe that changes in EV stock prices over time are more affected by changes in lithium prices over time than by changes in oil prices over time. Finally, we believe that the price of oil and gold are not highly correlated and do not jointly affect EV stock prices.

Data

Our crude oil data was collected from an excel sheet that can be downloaded from the US Energy Information Agency's website. It measure's daily crude oil prices measured according to the standard WTI spot price in dollars per barrel of crude oil. Lithium data was collected from a CSV file that was download from investing.com, measured in dollars per metric ton. Gold price data was collected from a spreadsheet (XLS file) containing daily records of gold prices from the World Gold Council, with prices measure in US dollars per ounce. EV stock data was collected from the IEX cloud API, with daily stock prices for 20 EV companies measured in US Dollars. All of the data was of similar quality and included a few missing rows for some days and differences in floating point precision and date format. Overall, all the data collected was of acceptable quality.

Findings

Claim #1: Volatility of EV stocks in the DRIV ETF are NOT generally equivalent to the volatility of traditional technology stocks
Support for Claim #1: The test yielded the following results: P = 0.11 Test Statistic = 2.52 This test statistic is greater than the critical value, indicating that there is a significant difference between the variances of the two sample populations. With reasonable confidence, we reject the null hypothesis and conclude the alternate hypothesis (Claim #1).

Claim #2: Changes in lithium prices affect EV stock prices more than changes in oil prices.
Support for Claim #2: When comparing oil prices to EV stock prices, the mean squared error (MSE) was 1933.6. When comparing lithium prices to EV stock prices, the MSE was 397.8. This means that lithium prices account for a higher proportion of the variance for EV stock prices than does oil prices. In other words, changes in lithium prices affect EV stock prices more than changes in oil prices.

Variables	**MSE**
Oil AND Lithium to EV Stocks	381.2
Lithium to EV Stocks	397.8

Oil to EV Stocks	1933.6

Figure 1: Mean Squared Errors Between Oil, Lithium and EV Stocks

Claim #3: Oil and gold are NOT highly correlated and do not jointly affect EV stock prices
Support for Claim #3: Given a Spearman's correlation coefficient of 0.032 along with p-value 0.4803, we feel confident in assuming that gold and oil are not correlated, thus failing to reject the null hypothesis that the price of Oil and Gold are not highly correlated and do not jointly affect EV stock prices.