

The economy has been stable for the past few years. This has kept society stable and functioning. This also kept the prices of goods low and allowed people to make some money from the stock market. In order to apply and better understand the concepts of correlation, a study was conducted to determine any relationship between gas prices at a speedway in North Olmsted and Apple stock prices that might exist.

The purpose of the study was to determine if there was a relationship between gas prices at Speedway in North Olmsted and Apple stock prices. The study was conducted over a 34 day period and the data was collected. The stock prices were obtained from Yahoo Finance(<https://finance.yahoo.com/>) and the gas prices were obtained from the gas station personally. The sample was the gas price and the stock price. The population of interest was the United States. The sample was obtained randomly once each day. At random times while passing by the gas station, the prices were recorded. In order to avoid biases, time of recording the price was randomly chosen. The stock prices were also checked on Yahoo Finance at random time to get the price over 34 days. After the data was collected, regression analysis and descriptive statistics were performed to better understand the data and the relationship that might exist.

When the regression analysis is calculated, based on the formula  $y = a + bx$ , we can see that the y-intercept is at 1.730 and slope of the regression line is 0.003591. The data doesn't seem to be linear and doesn't exhibit any pattern when graphed in a fitted line plot. The correlation coefficient (0.36) indicates that there is a moderate correlation between the two variables. There doesn't seem to be any influential points or outliers. When a residual plot is created, a slight pattern seems to be present. The pattern is like a curvature. In order to better understand the pattern, a quadratic regression is performed to verify if a pattern exists. When quadratic regression is performed, the correlation of determination is 0.30 indicating a correlation coefficient value of 0.55 which indicates a moderate correlation. The value of  $r^2$  shows the percentage of variation in gas prices that can be explained by an approximately linear relationship between stock prices and gas prices. Since the value of  $r^2$  is higher for quadratic regression, a quadratic relationship seems to be present.

The descriptive statistics show the value mean, median, min, max, Q1, and Q3 of each variable different from each other since the price values are very different for each variable.

In conclusion the analysis of the data can be used to conclude that there isn't a strong linear relationship, but due to higher  $r^2$  for quadratic regression, a quadratic relationship seems to be present.

S      R-sq   R-sq(adj)      R-sq(pred)  
 0.0925858    13.09%    10.37%      1.62%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	1.730	0.354	4.89	0.000	
Stock prices (\$)	0.00359	0.00164	2.20	0.036	1.00

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Stock Prices (\$)	34	0	216.07	1.69	9.85	190.14	210.11	219.08	221.91	231.47
Gas Prices (\$)	34	0	2.5059	0.0168	0.0978	2.3200	2.4700	2.5050	2.5525	2.7400

<b>Date</b>	<b>Apple stock prices (\$)</b>	<b>Gas prices speedway (\$)</b>
10/1/18	228.42	2.52
10/2/18	226.3	2.52
10/3/18	231.47	2.74
10/4/18	230.45	2.66
10/5/18	224.63	2.65
10/8/18	221.2	2.63
10/9/18	225.31	2.63
10/10/18	223.24	2.56
10/11/18	217.32	2.55
10/12/18	219.19	2.61
10/15/18	219.98	2.63
10/16/18	216.76	2.51
10/17/18	220.2	2.51
10/18/18	219.63	2.49
10/19/18	220.36	2.49
10/22/18	221.49	2.5
10/23/18	219.51	2.36
10/24/18	223.17	2.32
10/25/18	220.38	2.39
10/26/18	215.15	2.47
10/29/18	213.29	2.49
10/30/18	215.1	2.35
10/31/18	217.65	2.35
11/1/18	218.98	2.52
11/2/18	213.96	2.54
11/5/18	210.32	2.48
11/6/18	207.82	2.48
11/7/18	206.52	2.39
11/8/18	209.47	2.47
11/9/18	206.31	2.39
11/12/18	200.25	2.51
11/13/18	197.87	2.54
11/14/18	194.37	2.47
11/15/18	190.14	2.48



