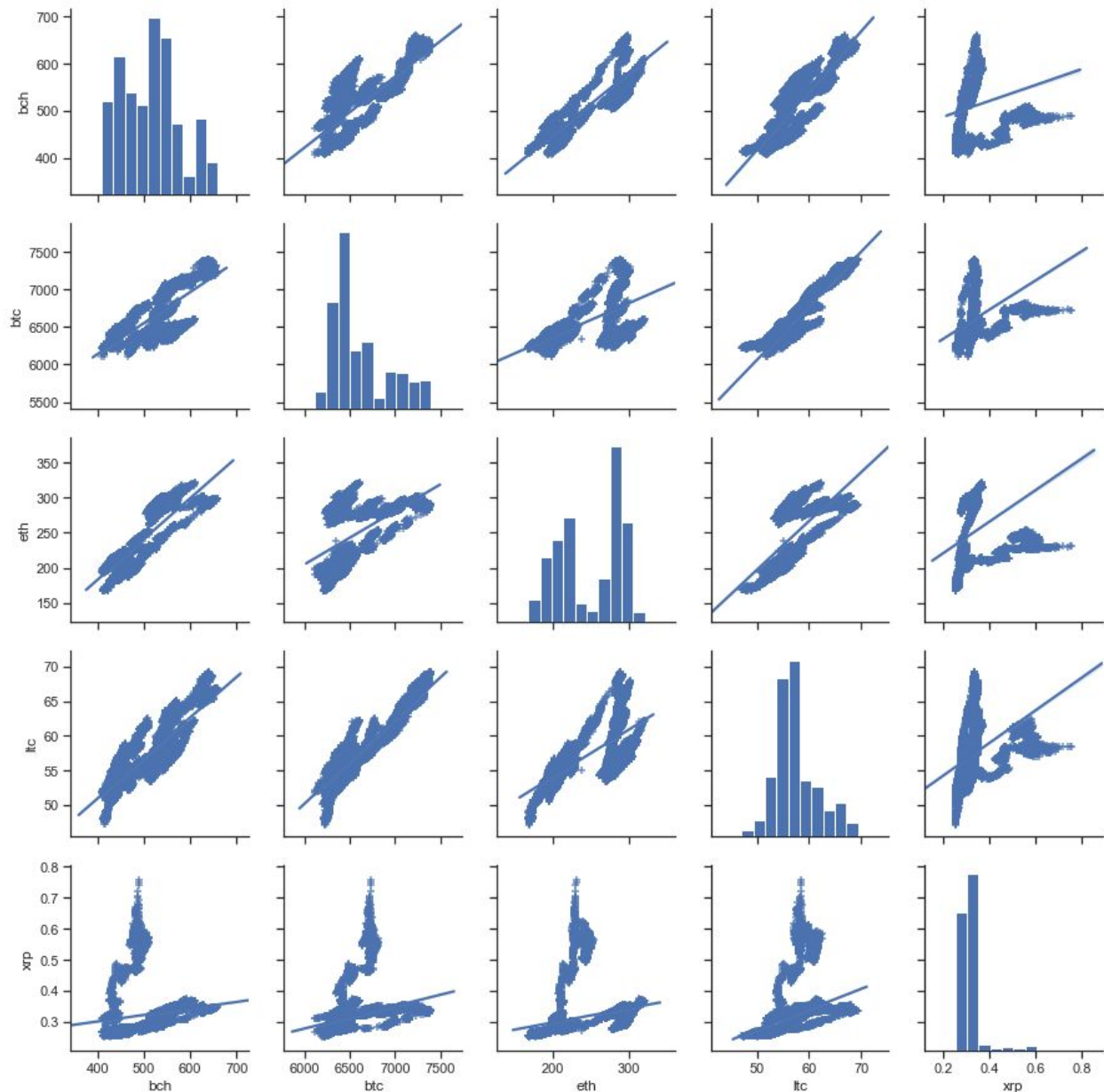


## Results from Multilinear Regression

Looking at the pairplot below, it appears there are correlations between many of the coins individually. One outlier is the XRP coin, which can be seen on the far right and far bottom plots. Some of the XRP regression lines are nearly flat. This coin seems to be moving differently compared to the other coins. On the other hand, LTC has very high correlation with both BTC and BCH.

BCH = Bitcoin Cash    BTC = Bitcoin    ETH = ETHereum    LTC = Litecoin    XRP = Ripple



Using OLS Least squares corroborates much of what had been predicted visually from the pairplot. In order to get a full grasp of how these coins relate to each other, MLN/OLS was performed on each coin. Here we are trying to predict the continuous value of one coin using the value of all other coins. We are looking for R2 close to 1.

BCH given [BTC,ETH,LTC, XRP] R-squared = .889

BTC given [BCH,ETH,LTC,XRP] R-squared = .877

ETH given [BTC,BCH,LTC,XRP] R-squared = .775

LTC given [BTC,BCH,ETH,XRP] R-squared = .927

XRP given [BTC,BCH,LTC,ETH] R-squared = .268

These results agree with the visual inspection of the data from the pairplot. What is surprising is that even though XRP shows a lower correlation when predicted using all other coins, removing XRP from the regressions above give lower R2 values. The LTC r2 value is exceptionally high in this dataset. Suggesting that given other coin data, we would be able to predict the LTC value with reasonable accuracy.

One question we pondered in our writeup was how much would a 1\$ increase in bitcoin effect other coins. Using the coefficient measure from the MLR summary helps us answer this question.

Given a 1\$ increase in bitcoin, on average the coins reacted as follows

BCH = - \$0.0162

ETH = - \$0.0182

LTC = + \$0.0082

XRP = - 2.394e-05

BCH, ETH, and XRP on average lose value when bitcoin goes up. Bitcoin cash (BCH) was created during a “split” from bitcoin. In this sense, the market cap is a zero sum game where loss in confidence in one coin can lead to a gain with the other.

Examining Litecoin(LTC) which has the highest correlation in our regression summaries. We see that a dollar increase in BTC, BCH, XRP all lead to increases with LTC. It seems that with the exception of ETH, increases in other coins are good for LTC.

BTC = + 0.082

BCH = + 0.0278

ETH = -.0048

XRP = + 5.4566

What does this tell us, and how can this be used?

High level, this model will attempt to tell us if the current market price of a coin is below what it is really worth in comparison to the other coins. Because of the fairly tight correlation of price movements, especially with LTC. If we assume what we have observed in the past is true for the future, we can trade based on this. \*If\* we are correct we will make a ton of money, but if we are incorrect we could amplify our losses.

Consider these fabricated trades as an example.

2018-08-15 18:55:02	BTC traded at 6519.39	LTC traded at 57.82
2018-08-15 18:55:03	BTC traded at 6519.60	
2018-08-15 18:55:05	BTC traded at 6520.39	

The price of BTC went up by a dollar in a short span of 4 seconds. The last LTC trade executed was at the first second of the minute at 57.82. According to our algorithm, the value of LTC at 18:55:05 given the rise in BTC is 57.8282. Our goal now is to buy as many LTC coins in the open market for under 57.8282 as possible. During the inverse event when the price is dropping, our algorithm will attempt to sell coins we it deems as overvalued. If our model turns out to be accurate, and we are fast enough. Over the long run, we will be able to keep these small differences between our predicted value of a coin and its market value as profit.