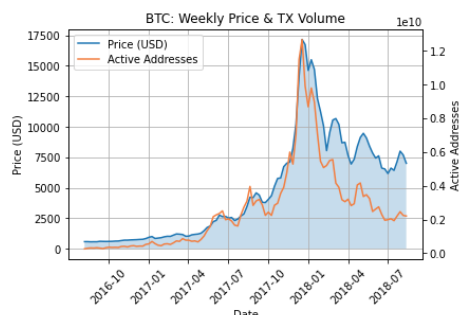


Analysis of Cryptocurrencies

In 2009 bitcoin was created, using peer-to-peer blockchain technology to create a decentralised cryptocurrency not only being able to verify transactions but also contracts. As time goes on, technology progresses and Vitalik Buterin established a new cryptocurrency called “Ethereum”. Both of these cryptocurrencies have had an unprecedented explosion in their prices.

Bitcoin

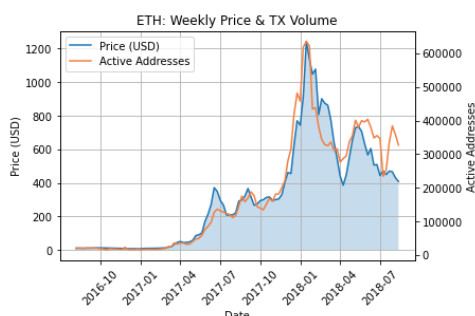
Over the past few years bitcoin has had an astonishingly interesting case regarding its price. Although, it is just as important to look at other factors as well.



Displayed above, is the chart of bitcoin’s weekly price and adjusted transaction volume ranging from 7/8/2016 to 7/8/2018. First glance at the graph and you instantly notice the peak around December 2017 of \$17,152.74 compared to the price being less than \$5,000 in October earlier that year. Furthermore, we can see that the transaction volume and price follow one another very closely. Running a Spearman Rank Coefficient test we can see that they do in fact have a strong positive correlation with the correlation value being at 0.9481 which is incredibly close to one, meaning a perfect correlation. Moreover, strengthening the link between adjusted transaction count and the price of bitcoin, we also get a p-value of 1.42×10^{-53} which means we have sufficient evidence to reject our null hypothesis, which is, there is no correlation between the two factors.

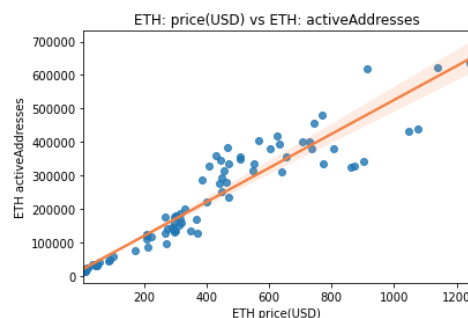
Ethereum

Similarly, Ethereum also followed the same price pattern as Bitcoin with a peak shortly after the beginning of 2018. This time, we’re taking a look



At the number of active addresses plotted alongside the price of Ethereum. Once again, we see the two features roughly follow one another up until around the end of the peak at the beginning of 2018. Applying the

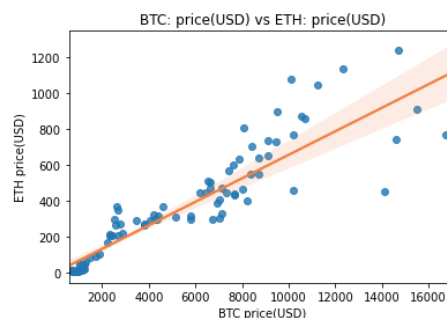
Spearman Rank Coefficient again we get a correlation of 0.9685, paired with a p-value of 1.33×10^{-64} which leads us to the same conclusion as we did with bitcoin... There is a strong correlation and sufficient evidence to support our alternative hypothesis. We can further analyse this relationship with a regression plot.



This clearly demonstrates a positive correlation between the price and the number of active addresses on the Ethereum network, meaning as the network becomes more popular (i.e. demand increases) the price increases. We can back this up with a KS test which gives us a p-value of 5.55×10^{-63} once again showing we accept H_1 which is that there is a strong correlation

Bitcoin and Ethereum

It is also a common belief that as the price of bitcoin rises as do other cryptocurrencies such as Ethereum to if this correlation is true, we can plot a regression plot (using the seaborn module). Instantly, we see a positive



correlation between the two prices of each currency. Validating the idea that the prices are positively correlated we use both Spearman R coefficient and KS2 test. The spearman test produced a correlation of 0.9449 paired with a p-value of 2.98×10^{-52} . Also applying a KS 2 Sample test, we get a p-value of 3.04×10^{-35} This shows astonishingly strong evidence that we should reject the null hypothesis which therefore implies we have a strong correlation between the price of Ethereum and Bitcoin.