Name: Connor Davis
ID: 9601275154

DSCI 510 FINAL PROJECT

Topic:

Analysis of cryptocurrency: Bitcoin and Ethereum

Description:

For this final project I have utilized and constructed csv files based on various sources. The three datasets can be accessed via the submission folder on d2l. Using the three datasets I have analyzed a possible slight relationship Bitcoin could have on influencing price fluctuation with Ethereum in two different time intervals.

Motivation:

Due to the COVID-19 pandemic and subsequent inflation in the current US economy, an increasing number of individuals have begun to invest in various cryptocurrencies, increasing their market capitalizations and mean prices. Two of the more popular cryptocurrencies known as Bitcoin and Ethereum have exploded in recent years, netting investors high profit returns. That being said, with interest in the evolution of the cryptocurrency market I wish to conduct an analysis on the market of the top coins known as Ethereum and Bitcoin; the goal is to 1) Extract historical crypto market data from 2021 and 2) compare it to present 24hr market data from 2022 (Current Prices and Percentages) and 3) find possible relationship Bitcoin has on Ethereum.

Goal: Analyze the possible relationship between Bitcoin and Ethereum

Data Sources:

1. **https://www.coingecko.com/**

   Data on present 24 hour market cap of top 100 coins (including Bitcoin and Ethereum). Also includes other details such as the 24 hour high and low of each coin.

Using web scraping, I have accessed the tabular data from this URL and organized it into a CSV file titled 'CoinGecko_Dataset'. This dataset consists of 100 rows and 7 columns. The one hundred rows within the dataset display the names of the top 100 coins; the first 10 rows were used in this analysis highlighting main coins labeled as (***BTC***, ***ETH***, **USDT**, **USDC**, **BNB**, **XRP**, **ADA**, **BUSD**, **SOL**, **DOGE**). The seven columns within the dataset are labeled as **#** (Coin Rank), **Price** (How much a coin costs), **1h** (Coin decrease/increase in past hour), **24h** (Coin decrease/increase in past 24 hours), **7d** (Coin decrease/increase in past 7 days), **24h Volume** (Volume of coins traded), and **Mkt Cap** (Market Capitalization). I have used Coin Rank, Price, 1H, 24H, and 7D of the top 10 coins to plot the stability regarding increase/decrease of each of the selected coins; particularly Bitcoin and Ethereum. Here are the first 10 rows of coins analyzed below.

CoinGecko_Dataset

	#	Coin	Price	1h	24h	7d	24h Volume	Mkt Cap
0	1	BTC	$27,834.62	-3.4%	-11.1%	-29.9%	$69,867,374,047	$547,275,571,787
1	2	ETH	$1,936.27	-4.5%	-18.1%	-34.2%	$49,535,976,881	$260,823,781,969
2	3	USDT	$1.00	-0.3%	0.0%	0.1%	$156,569,102,749	$82,735,570,571
3	4	USDC	$1.00	-0.5%	0.0%	0.2%	$20,920,633,679	$48,788,970,804
4	5	BNB	$246.29	-5.0%	-21.8%	-38.8%	$4,651,053,512	$44,387,450,560
5	6	XRP	$0.370121	-5.3%	-28.9%	-42.9%	$5,825,666,624	$19,288,703,980
6	7	ADA	$44.93	-3.8%	-32.1%	-51.6%	$4,403,681,007	$17,176,181,424
7	8	BUSD	$1.00	-0.3%	0.3%	0.4%	$19,578,046,716	$17,016,593,229
8	9	SOL	$0.451428	-5.8%	-27.8%	-49.6%	$2,669,325,721	$16,663,499,930
9	10	DOGE	$0.077067447896	-5.8%	-29.3%	-43.3%	$2,471,001,389	$11,117,931,863

2. **https://www.coindesk.com/**

Web scraped API data that shows past 24 hour crypto prices from the dates of 7/1/21 to 7/2/21. I have accessed this API and scraped the data into a CSV file titled 'CoinDesk_Dataset', which highlights previous timestamps of 24 hour prices regarding

Ethereum and Bitcoin. There are 2880 rows and 6 columns. Rows 0 through 1439 show rising datetimes (from 00:00 - 23:59) regarding Bitcoin price. Rows 1440 through 2880 show rising datetimes (from 00:00 - 23:59) regarding Ethereum price. The columns read: **Datetime** (Date and Time beginning from 2021-07-01 00:00), **Coin** (BTC, ETH), **Open** (estimated close price), **High** (Highest price reached), **Low** (Lowest price reached), **Price** (Final Closing Price). The first 1440 rows were used to plot and analyze price frequency of BTC and the following 1440 rows were used to plot and analyze price frequency of ETH. The Columns used were Coin and Price to display and find any relation between 24 hour prices of BTC and ETH within each plotted point. The first 5 rows of BTC and ETH are shown below.

CoinDesk_Dataset

	Datetime	Coin	Open	High	Low	Price
0	2021-07-01 00:00:00	BTC	35049.045484	35056.817222	34991.326658	34993.994267
1	2021-07-01 00:01:00	BTC	34995.349202	35030.583041	34989.167695	34991.266464
2	2021-07-01 00:02:00	BTC	34991.950939	34994.431719	34929.671801	34952.450112
3	2021-07-01 00:03:00	BTC	34954.642324	34980.657519	34954.642324	34961.649826
4	2021-07-01 00:04:00	BTC	34960.350436	34996.245435	34960.350436	34976.586395
...	...	...	...	...	...	...
2875	2021-07-01 23:55:00	ETH	2115.487870	2116.022408	2115.060438	2115.626989
2876	2021-07-01 23:56:00	ETH	2115.634570	2115.634570	2110.692884	2110.885244
2877	2021-07-01 23:57:00	ETH	2111.087472	2111.089436	2108.026641	2109.508642
2878	2021-07-01 23:58:00	ETH	2109.780003	2113.666995	2109.780003	2113.329023
2879	2021-07-01 23:59:00	ETH	2113.209766	2113.209766	2108.454955	2108.454955

3. **https://t3index.com/indices/bit-vol/#**

This last source is a csv file showing both 2021 and 2022 volatility index ratings from Ethereum. Volatility can best be described as the unpredictable up and down movements in price value of cryptocurrencies. The volatility index regarding Ethereum is measured by calculating the average of current price movements and comparing it to the average of previous upward and downward trend movements. The csv file titled 'ethervol' displays dates from 2021 to present Ethereum's volatility. Within this dataset there are 746 rows and 2 columns showing the indices of various dates and volatility ratings. I have used this dataset to plot the volatility of Ethereum within a 10 day period (6/22/21-7/2/21) to show how the volatility changes leading prior to the 24 hour price frequency of ETH analyzed in the 'CoinDesk_Dataset'; along with the 10 day period of 4/28/2022-5/8/22 to show how volatility changes in comparison to the frequency of ETH in the 'CoinGecko_Dataset'. The data table below reads the first 5 lines of volatility in 2021 and the next 5 rows read volatility in 2022.

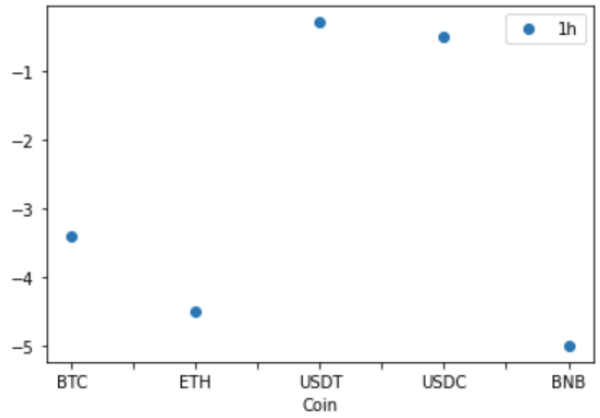
'ethervol'

	Date	Ethereum Volatility Index
431	2021-07-01 00:00:00	116.93
432	2021-07-02 00:00:00	108.97
433	2021-07-03 00:00:00	107.09
434	2021-07-04 00:00:00	103.48
435	2021-07-05 00:00:00	102.80
..	...	...
740	2022-05-06 00:00:00	69.80
741	2022-05-07 00:00:00	67.93
742	2022-05-08 00:00:00	73.01
743	2022-05-09 00:00:00	82.85
744	2022-05-10 00:00:00	81.75

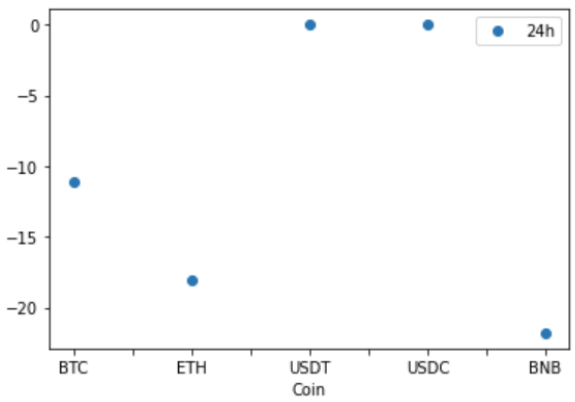
Analysis Performed:

Utilizing the first dataset titled 'CoinGecko_Dataset', I have conducted an analysis on the top 5 coins (particularly ETH and BTC); using the 3 columns titled : 1H, 24H, 7D, I have plotted the percentages of increase and decrease over set ranges of time over 3 different graphs. The X-axis of the graphs show the name of the coins; the coins titled USDT, USDC & BNB are all graphed to show how the increases of Bitcoin and Ethereum correlate compared to other top coins on the market. The Y-axis displays the percentage negated as a whole negative number. The graphs below show the displayed information discussed above from the jupyter notebook analysis.

1 HR GRAPH

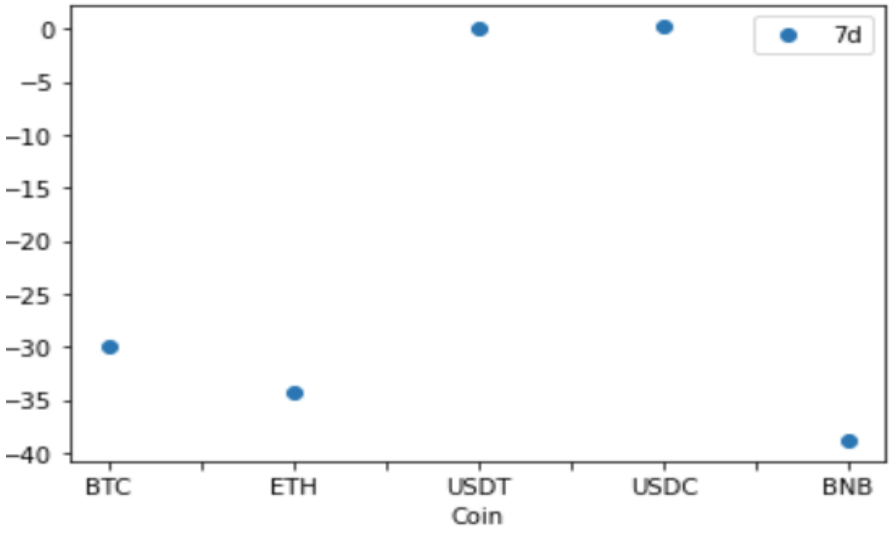


24 HR GRAPH



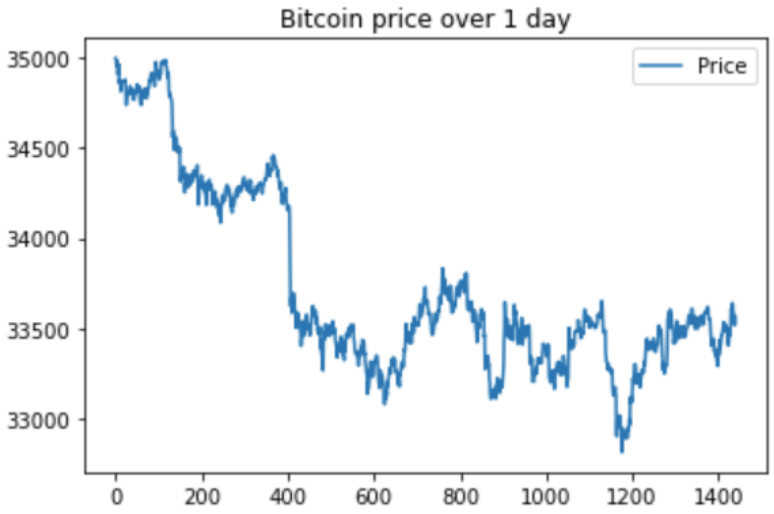
In analyzing the change in time between Bitcoin and Ethereum between the 1 hour graph and the 24 hour graph there is a 13.6% decline in Ethereum price alongside a 7.7% decrease in Bitcoin's price. USDT & USDC coins held small increases of .2% and .5%. And BNB negated the lowest among the 5 with a 16.8% decrease.

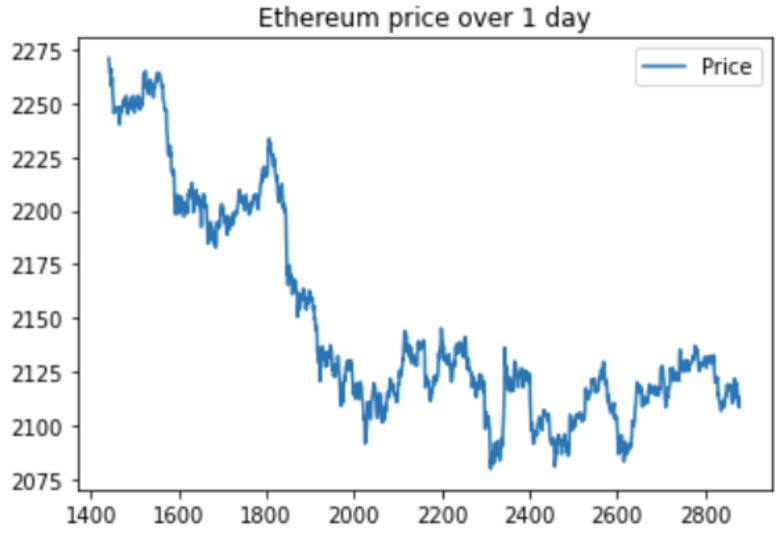
7 DAY GRAPH



Analyzing the relation of price percentage between Ethereum and Bitcoin on a 7 Day price difference, ETH dropped another 16.1% with a closing price of $1936.27 alongside Bitcoin dropping another 18.8% with a closing price of $27,834.62. Whereas the USDT and USDC coins began to increase and even out and BNB coin plummeted even further. The 7 day difference between the two was 2.8%. This data suggests that with a drop in Bitcoin, Etheruem also holds potential to follow suit with a similar decline. However, in further analysis we must highlight if the two have a history of increasing in price alongside one another in correlation to declining together.

Transitioning to the second dataset titled ‘CoinDesk_Dataset’, we can relate the 24 hour 2021 data to the present analysis of the 2022 by showing how both the Ethereum price and Bitcoin price change in fluctuation when referring to the graphs below.





Utilizing the data from these visualizations it is made evident that although differing in closing prices (on the Y-axis), with the 1400 rows of data (located on the X-axis) on each graph there is a similar pattern in decrease and increase. Both graphs hold a right skewed distribution following similar patterns in gains and losses. Between rows 0-200 and 1400-1600 Bitcoin and Ethereum both hit a 24 hour high of over $35056.81 and $2275.01; then both proceeded to drop to lows between rows 800-1200 and 2200-2600 before slightly increasing toward the end of the day. Some more stats on the data regarding high, open, low, and close prices are below.

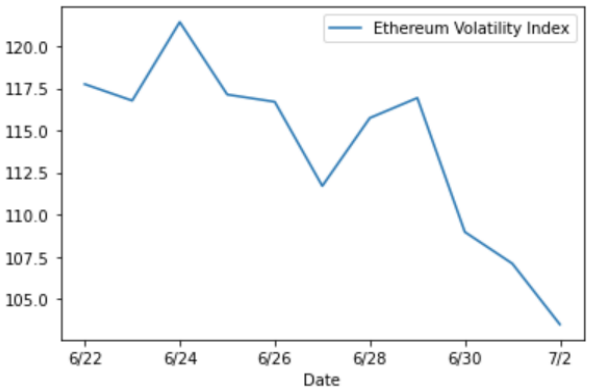
Datetime	2021-07-01 00:00:00	Datetime	2021-07-01 23:59:00
Coin	BTC	Coin	BTC
Open	35049.045484	Open	33566.759399
High	35056.817222	High	33566.759399
Low	34991.326658	Low	33516.926378
Price	34993.994267	Price	33528.566795

Datetime	2021-07-01 00:00:00	Datetime	2021-07-01 23:59:00
Coin	ETH	Coin	ETH
Open	2275.689004	Open	2113.209766
High	2276.012712	High	2113.209766
Low	2270.817381	Low	2108.454955
Price	2271.03933	Price	2108.454955

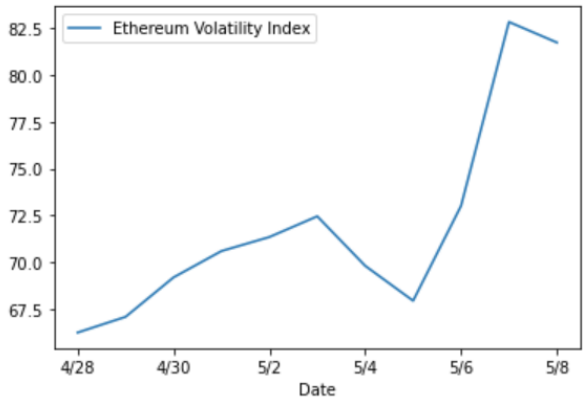
In total closing within the 24 hour period Bitcoin dropped by $1465.42 (-4.19%) and Ethereum dropped by $162 (-7.16%). With similar fluctuation of price distribution between Bitcoin and Ethereum, volatility becomes a variable that should be assessed alongside the increase/decrease of Ethereum.

To further assess the role Bitcoin could have, we should now refer to the ‘ethervol’ dataset to show the 10 day volatility index leading to the merge with ‘CoinDesk_Dataset’ 24 hour analysis on 7/2/21; and the 10 day volatility index leading to the merge with ‘CoinGecko_Dataset’ 24 hour analysis on 5/8/2022 (present day).

2021 Index



2022 Index



The 10 day volatility in 2021 fluctuated from a high of over 120% on 6/24/21, but then began to decrease over the next 7 days until reaching the target date of 7/2/21 where the index dropped below 105%. Merging the information analyzed above showing the decline in Bitcoin and Ethereum should begin to trigger higher volatility (when prices drop, investors tend to buy in). Therefore, there is little to no correlation in Bitcoin influencing the volatility of Ethereum in a 10 day period of 2021. However, in 2022 merging the 24 hour information from web scraping CoinGecko.com, Euthereum and Bitcoin began to reveal a steep drop over the last 7 days. That being said, volatility began to rise to a high of 82.5%, showing a slight possible correlation of Bitcoins price drop and Ethereum's increase in volatility.

Conclusion:

In summary of the analyzed data above, utilizing a correlation test to find if Ethereum holds dependence on Bitcoin, the coins may have a slight relationship; according to the analysis of the 'CoinDesk_Dataset', ETH and BTC have a moderate correlation between their prices. **The correlation coefficient of their 24 Hour prices is 0.5272945341411631.** That being said, the past analysis indicates moderate influence Bitcoin has on Ethereum both in past and present data within this analysis.