



**Bitcoin Data  
Analysis**

**Group-3**

# What are we going to learn in this presentation?

- Bitcoin adoption in the US through the lens of bitcoin ATM data
- Some of the key features and their relationship with Bitcoin

# Agenda

Intro and questions we tried to answer

Approach - Data sources, Financial Packages, Data Pre-processing

Solution and analysis findings:

- ☐ Bitcoin adoption through ATM data analysis
- ☐ Correlation analysis between:
  - Bitcoin and wallet addresses, hash rates and difficulties
  - Bitcoin and SP500
  - Bitcoin and options volume
  - Bitcoin and Forex data
  - Bitcoin and CPI

Key observations and next steps



# Setting the context - Questions we tried to answer

How is the bitcoin adoption in the US?

What are some of trends and signals?

Is Bitcoin a good choice for portfolio diversification?

What's the impact of China's ban on Bitcoin mining?

How does the Bitcoin price move relative to the S&P 500 and other factors?

Does Bitcoin future volume show any relation to Bitcoin price movement?

Is there a correlation between Bitcoin price and Forex prices & CPI?

# Our approach

## Data Sources

CoinATM radar | Census.gov for Bitcoin ATM data and US population data

nomics.com | [Yahoo Finance API](#) | [Coingecko API](#) | Quandl API for market data of Crypto and stocks

Quandl API for Bitcoin hashrate, difficulty and wallet addresses

[Deribit API](#) for Bitcoin derivative data

Billion prices project site for CPI data

## Important packages

Pandas

Panel | Plotly | hvplot | matplotlib | seaborn

Quandl | [MPL Finance](#)

[Concurrent Futures](#)

## Data pre-processing

Postgres SQL

Notebook

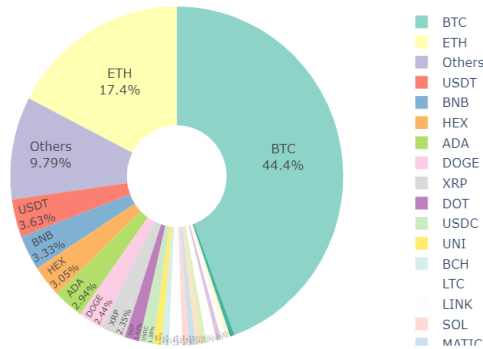


# Bitcoin Introduction

# Bitcoin Market Dominance and Recent Price Action

~45% crypto market share

Bitcoin Dominance (Total crypto market cap \$1.731 Trillion)




Meteoric rise in price since it's inception in 2009





How is the Bitcoin Adoption  
in the US?





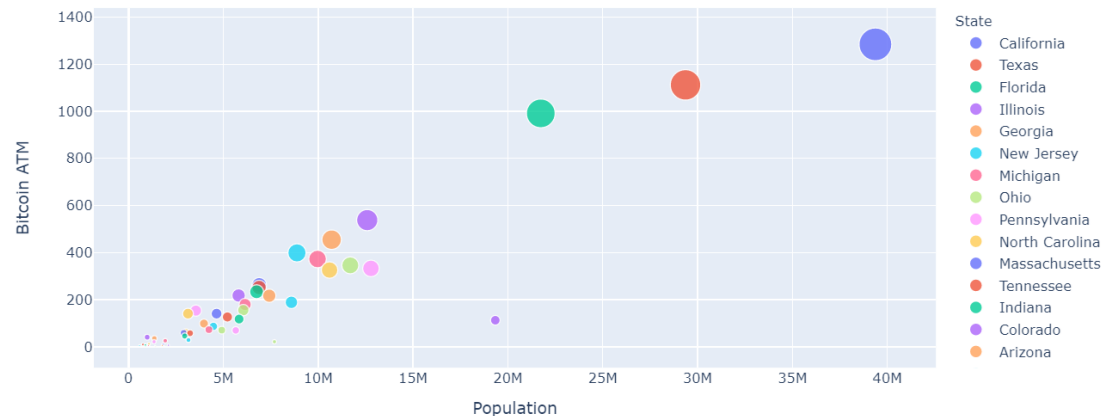
# Bitcoin adoption through ATM data analysis - Data Preparation in SQL

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ATM\_data\_prep\_script.sql

# Bitcoin adoption – Bitcoin ATM Data Analysis

New York 4th most populous state with low adoption, Florida ahead of the pack. Alaska, Vermont yet to get their ATMs



☐ Positive correlation

☐ NY is exception

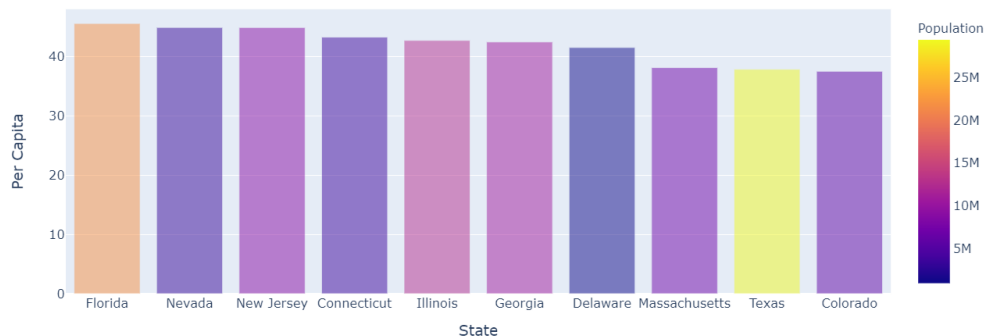
Total bitcoin ATMs in the USA => 9527

Average bitcoin ATMs per state => 198

Bitcoin ATM in NY => 113

Two states don't have Bitcoin ATM => ['Alaska', 'Vermont']

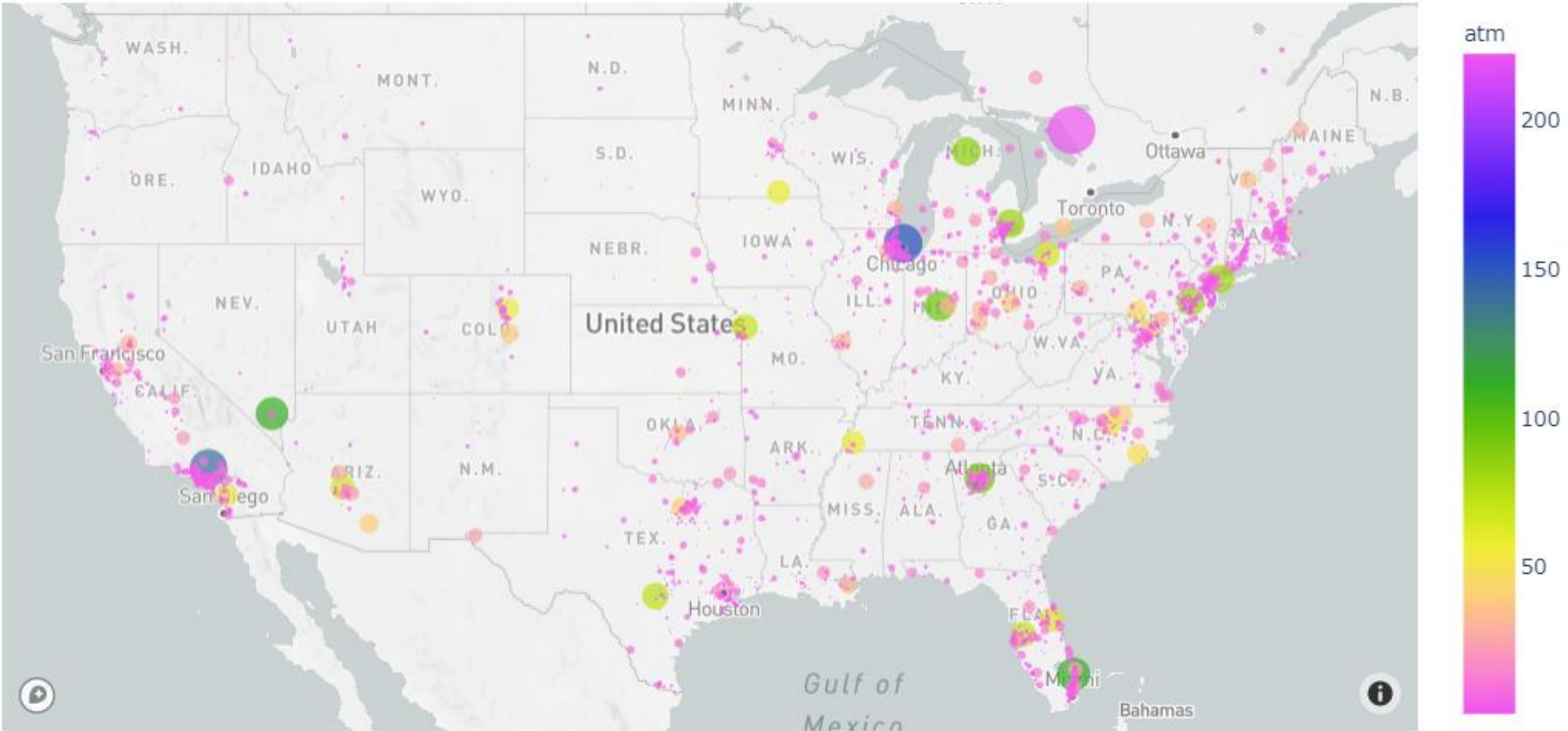
Top 10 US states (number of Bitcoin ATMs / million population)



☐ Florida “crypto currency capital”

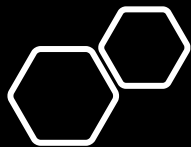
# Bitcoin ATM Distribution in the US states

West coast needs some work to catch-up with East Coast and Central





How Volatile is Bitcoin?

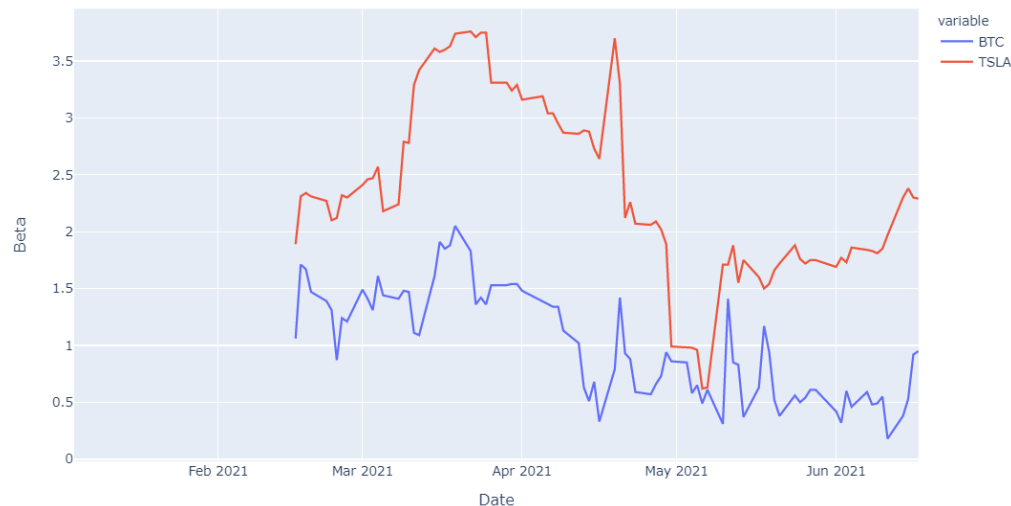


- Bitcoin beta : 1.12
- Tesla beta : 2.46
- Tesla 119% more volatile than Bitcoin

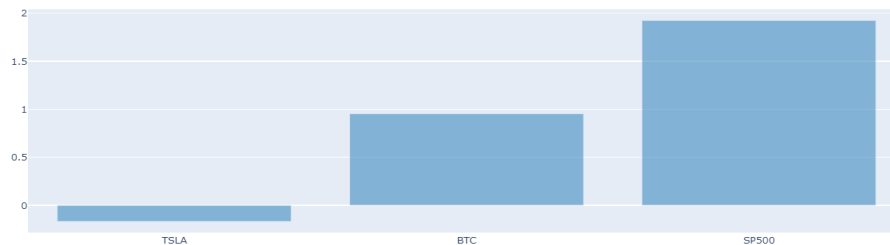
# Bitcoin Volatility (Beta)

Bitcoin is volatile but Tesla is 119% more volatile than Bitcoin

30-day Rolling Beta for Bitcoin and Tesla



Sharpe Ratio





Can Bitcoin can be considered as a portfolio diversification vehicle?

# Bitcoin correlation with SP500

Bitcoin correlation with S&P500 is in downward trend – an emerging asset class for portfolio diversification

SP500-BTC 30-day rolling correlation in last 6 months



Bitcoin correlation with SP500 has been dipping in the past 6 months

\*\*\*\*\* LONGTERM CORRELATION \*\*\*\*\*

	BTC	SP500
BTC	1.000000	0.884074
SP500	0.884074	1.000000

\*\*\*\*\* SHORTTERM CORRELATION \*\*\*\*\*

	BTC	SP500
BTC	1.000000	0.258544
SP500	0.258544	1.000000



Why is the current bearish trend in Bitcoin price action when:

- Adoption is increasing
- Not the most volatile asset
- Becoming less correlated with other asset classes



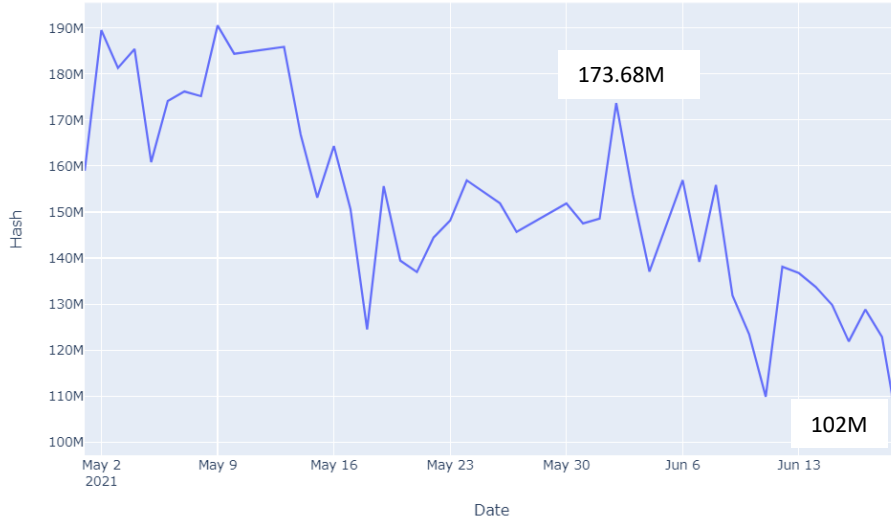
Death-cross



# Environmental, Social, and Governance (ESG) Concerns

Bitcoin mining ban in one of the countries would propel Bitcoin mining to clean energy, would drastically reduce carbon footprint

Bitcoin Hashrates (May-June'2021) - in exahashes per second - 18 zeros after the number



- ~35-40% of world's mining capacity is expected to move to greener energy – paving the way to solve ESG concerns in next few months
- More institutional adoption



What are some of the features that can signal potential price movement?

- a) Hash-rate, Difficulties **and** Wallet Addresses
- b) Call/put volume
- c) S&P500
- d) Fiat
- e) CPI

# Correlation of Bitcoin price with Hash-rate, Difficulties and Wallet Addresses

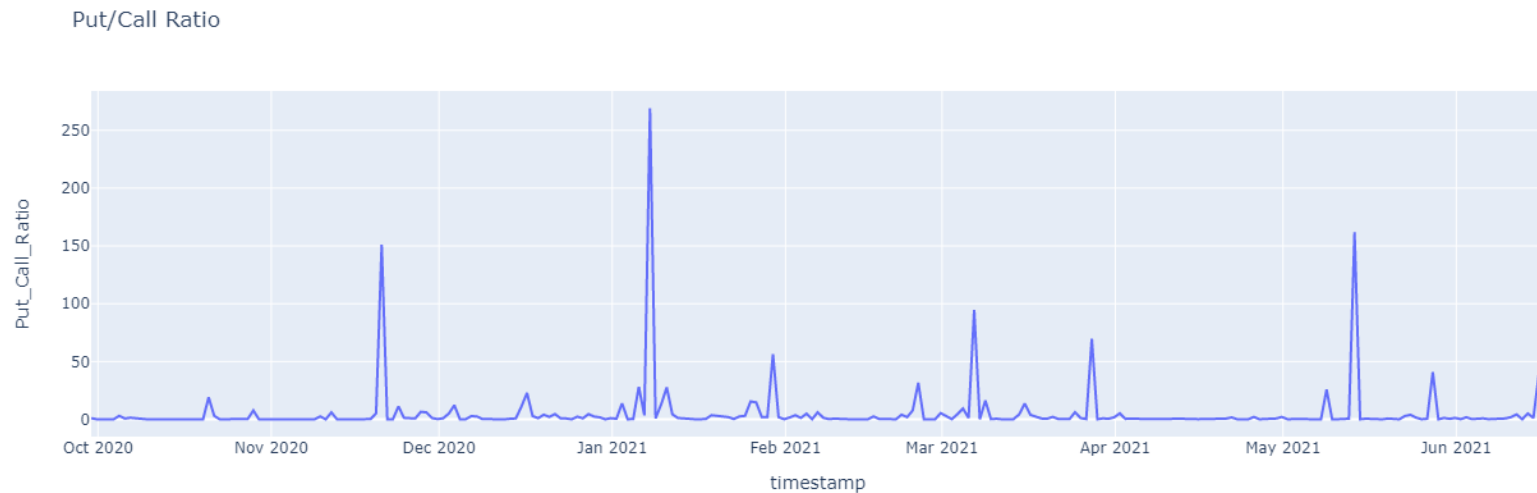
All three features are strongly correlated with Bitcoin price movement

Bitcoin Hashrates and Difficulties



	BTC	Wallet	Difficulty	Hash Rate
BTC	1.000000	0.764862	0.744317	0.739481
Wallet	0.764862	1.000000	0.968035	0.961593
Difficulty	0.744317	0.968035	1.000000	0.991597
Hash Rate	0.739481	0.961593	0.991597	1.000000

# Bitcoin Options: Put/Call Ratio over time

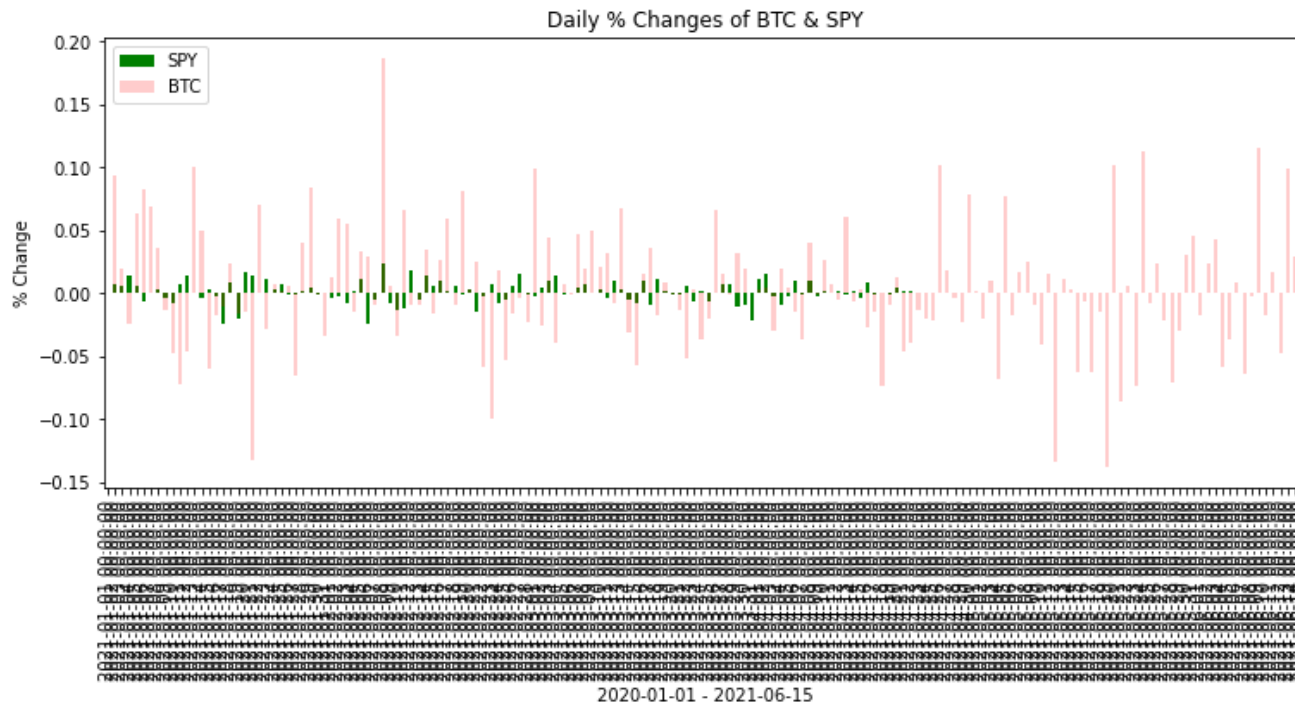


# Bitcoin Options: Instrument Volume vs Price

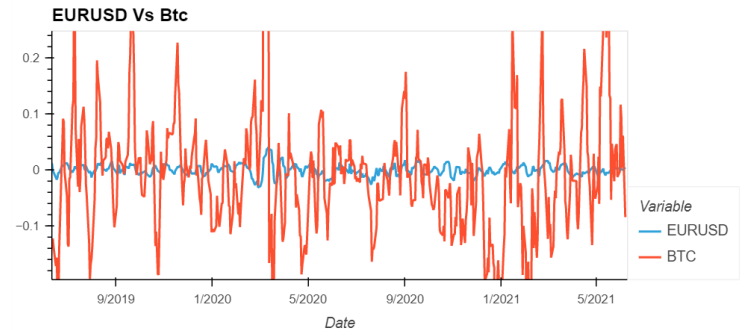
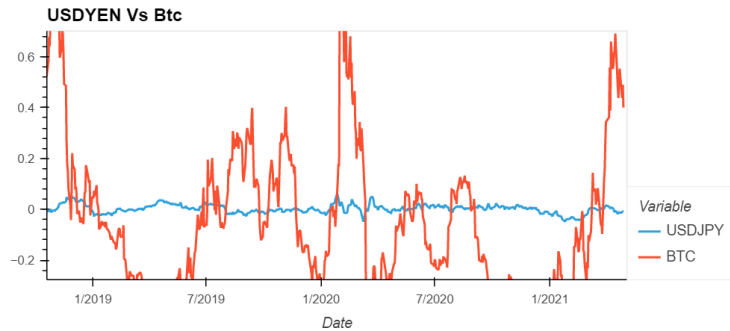
Big volume (>10k) days observed changes in lower time frame trends shortly after



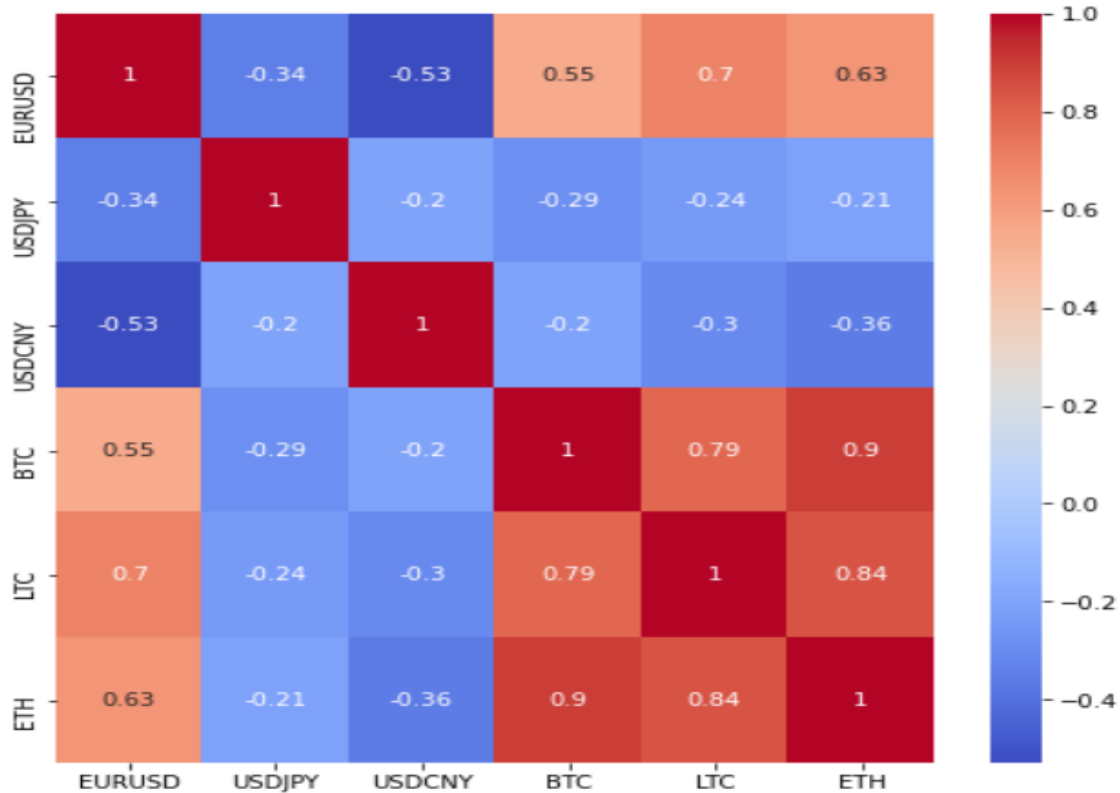
# How does the Bitcoin Price move relative to the S&P 500?



# Fiat Vs Bitcoin

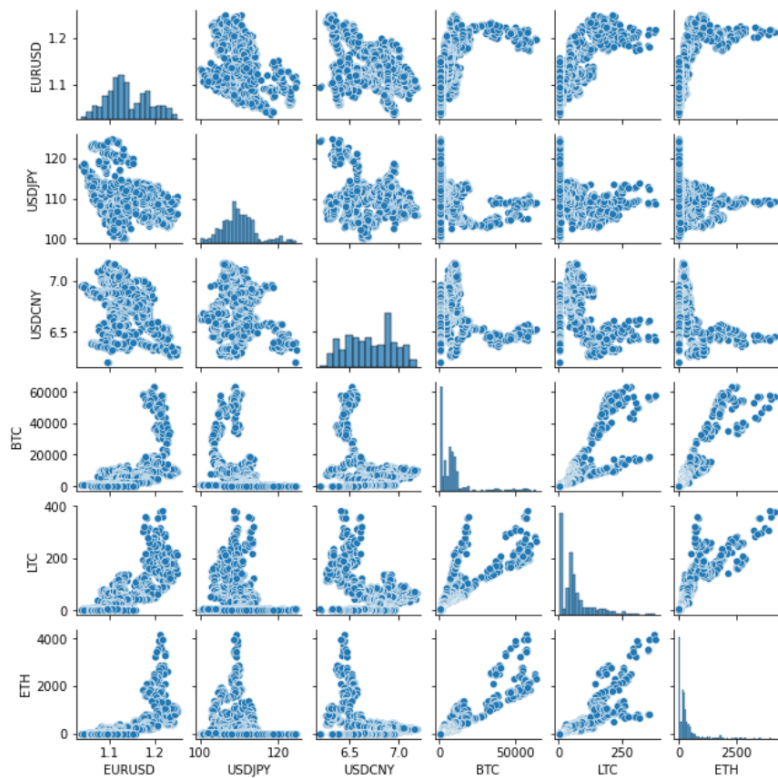


# Top Fiat Currency Pairs and Crypto Correlations Heatmap

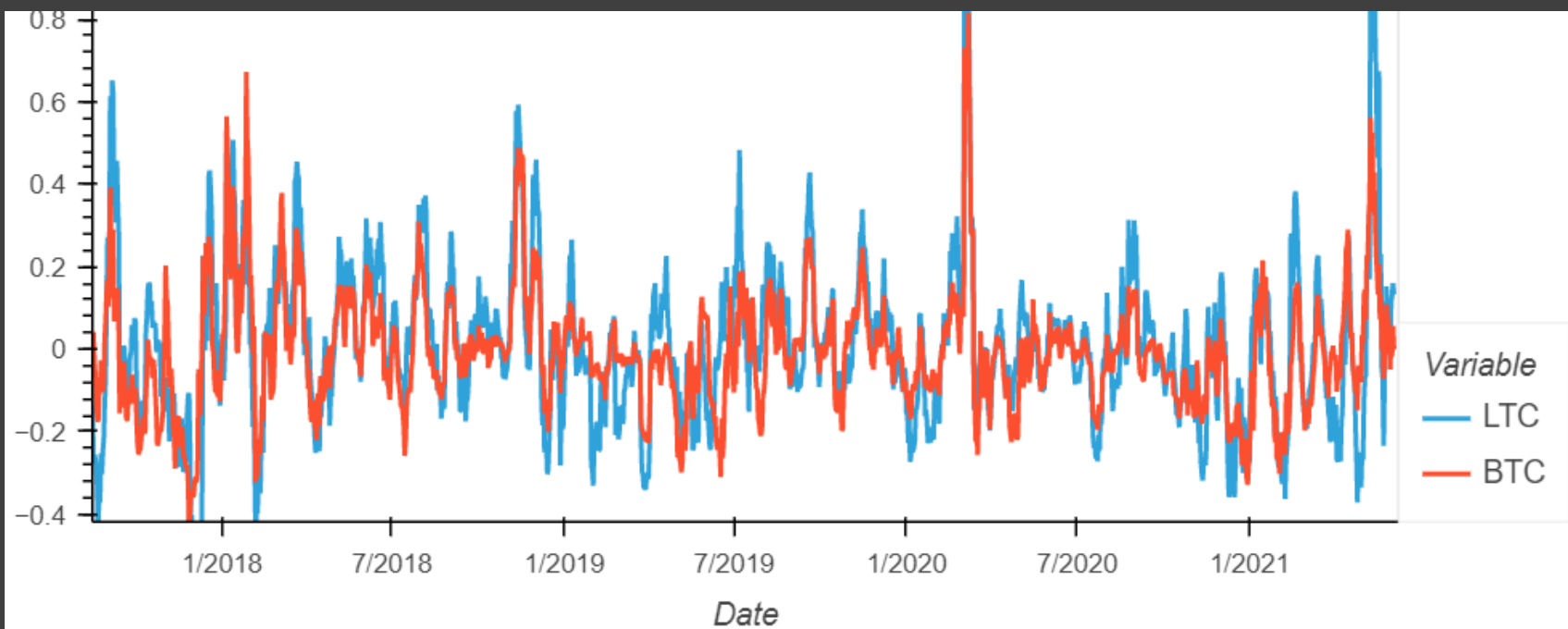




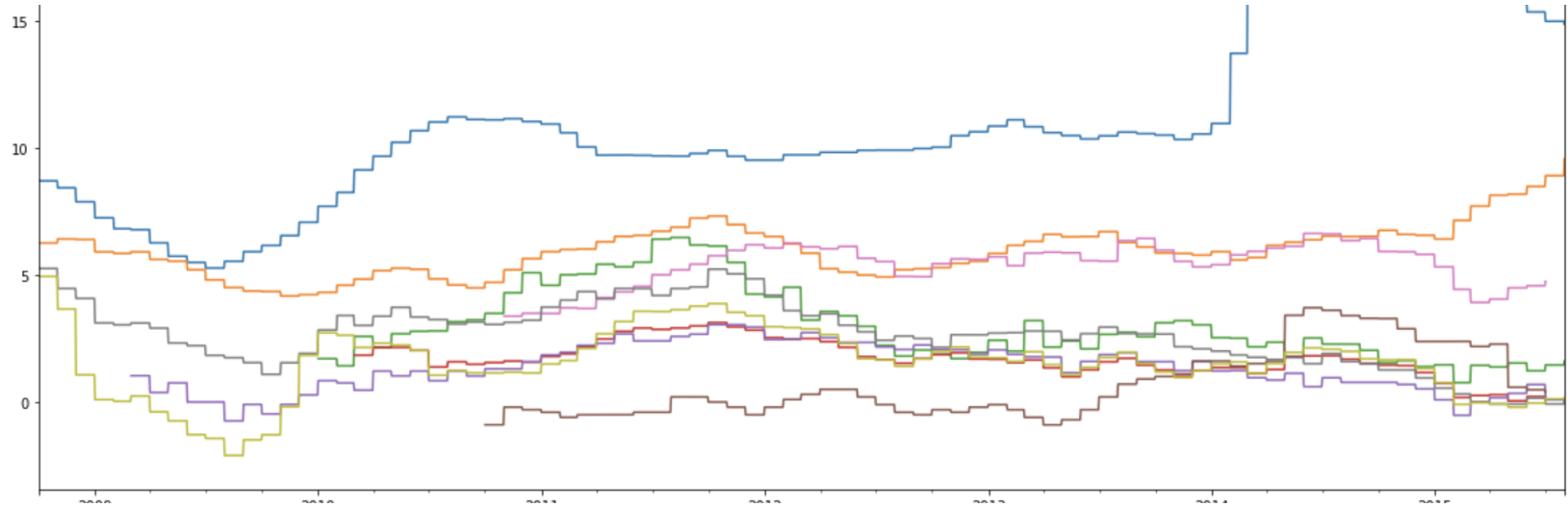
# Correlation snapshot



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# Consumer Price Index (9 Countries)



# Consumer Price Index and Bitcoin Correlation

	ARGENTINA	BRAZIL	CHINA_S	DM	GERMANY	JAPAN	SOUTHAFRICA	UK	USA	BTC
ARGENTINA	1.000000	-0.952549	0.004972	0.849795	0.239325	0.831630	0.798996	0.876902	0.833428	0.573563
BRAZIL	-0.952549	1.000000	0.105755	-0.768774	-0.195675	-0.840898	-0.701381	-0.747911	-0.690329	-0.471022
CHINA_S	0.004972	0.105755	1.000000	0.453770	0.579874	0.058001	0.401822	0.217372	0.407343	0.229343
DM	0.849795	-0.768774	0.453770	1.000000	0.610345	0.724643	0.917495	0.968106	0.994774	0.819672
GERMANY	0.239325	-0.195675	0.579874	0.610345	1.000000	0.061546	0.604285	0.554085	0.616754	0.618451
JAPAN	0.831630	-0.840898	0.058001	0.724643	0.061546	1.000000	0.479235	0.722452	0.673275	0.423551
SOUTHAFRICA	0.798996	-0.701381	0.401822	0.917495	0.604285	0.479235	1.000000	0.924549	0.947582	0.768250
UK	0.876902	-0.747911	0.217372	0.968106	0.554085	0.722452	0.924549	1.000000	0.966547	0.812658
USA	0.833428	-0.690329	0.407343	0.994774	0.616754	0.673275	0.947582	0.966547	1.000000	0.822194
BTC	0.573563	-0.471022	0.229343	0.819672	0.618451	0.423551	0.768250	0.812658	0.822194	1.000000



# Key-observations

Fast adoption by both  
Retail and Institutions

High risk – risk will be  
reduced as adoption  
grows

Growing interest as an  
emerging asset class

Bitcoin price action is  
strongly correlated with  
Hash-rate, difficulties and  
wallet addresses

Big options volume  
(>10K) days observed  
changes in lower time  
frame trends shortly  
after.

Correlation between  
Bitcoin price and Forex  
prices & CPI

# Next Steps

## Sentiment Analysis

Emotions in textual communication through NLP

Data from Tweeter, Reddit, Bitcoin Talk

Identify market sentiment

Can be a leading market indicator

## On-chain Analysis

Track big trade size on Blockchain

Use market depth to gauge the impact

Look at strongly correlated assets

Create trigger

## Descriptive to Predictive

Price movement forecasting based on time series data

Refine the features used in project

Build and test models

Evaluate opportunities for portfolio optimization reco



# Sources

- <https://www.codearmy.com/python-tutorial/crypto-algo-trading-historical-data2>
- <https://medium.com/cassandra-cryptoassets/introducing-python-websockets-and-asyncio-with-a-worked-example-37ff43f62935>
- [https://github.com/schepal/deribit\\_data\\_collector](https://github.com/schepal/deribit_data_collector)

Thank You

