

# Mining for Gold or Crypto?

Presented to you by the Dream Team:

Rena, Ayça and Hamza

# MOTIVATION

---

## Key Questions:

- In 2020, was the rise in Bitcoin driven by macroeconomic measures or speculation?
- How has Bitcoin/Ethereum performed against Gold and major market indices (i.e. NASDAQ, DOW JONES, TSX, etc)?
- How do cryptocurrencies relate to foreign exchange rates for emerging economies?
- How does Bitcoin compare to other cryptocurrencies (i.e. Altcoin's, Ethereum, Ripple, etc)?
- Are retail or institutional investors driving up cryptocurrency prices in 2020?
- Is Bitcoin the new digital gold?

## Our Hypotheses:

- Bitcoin and other cryptocurrencies are inversely related to economic growth
  - Countries with FX volatility are more likely to invest in cryptocurrencies
  - Institutional investors prefer Bitcoin to Gold as a natural hedge during economic uncertainty
  - Bitcoin and other cryptocurrencies have performed similarly
-

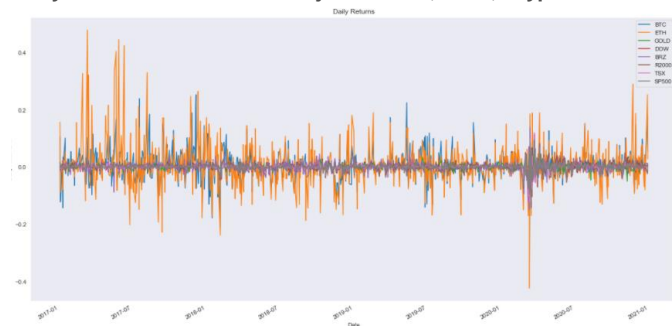
# DATA EXPLORATION AND CLEANUP

## Data Summary:

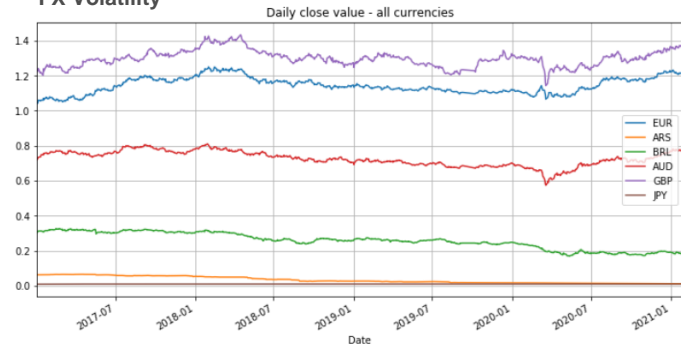
Category	Examples	Format	Source
Market Indexes	TSX, NASDAQ, DOW JONES, R2000	CSV	Yahoo Finance
Cryptocurrency Prices	BTC, ETH, XLM, XRP, Teth	CSV	CoinDesk
FX Data	USD:EURO, USD: JPY, USD:ARS, USD:BRL, USD:AUD, USD: GBP, USD:VES	JSON API	AlphaVantage Library <sup>1</sup> /API

## Data Exploration<sup>2</sup>:

Daily Returns Line Chart – Major Markets, Gold, Cryptocurrencies



FX Volatility

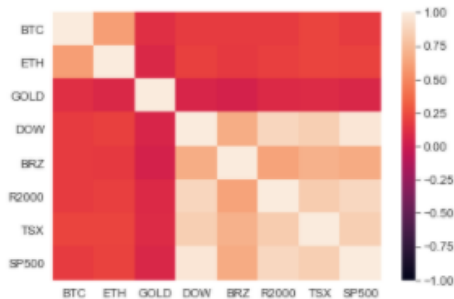


- (1) This satisfies our requirement to use a new financial library ☺
- (2) Don't forget to DropNa()

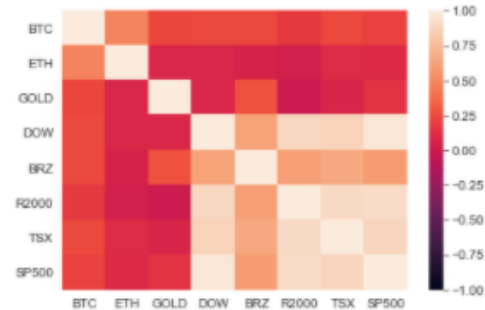
# DATA EXPLORATION AND CLEANUP

## Data Exploration Continued:

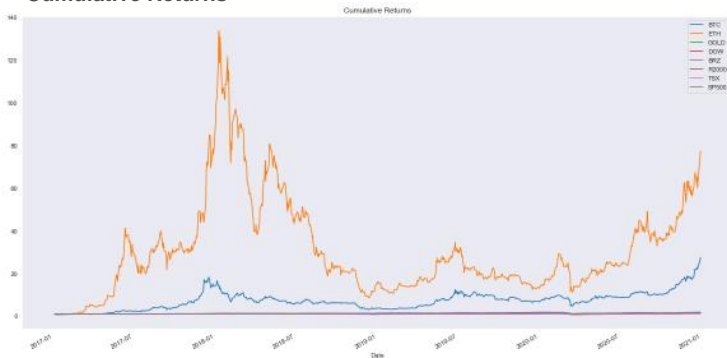
Daily Returns Correlation Matrix



Monthly Returns Correlation Matrix



Cumulative Returns



USD: AUD Exchange Rate (2011- 2021)



# SOLVING FOR DATA CHALLENGES

---

## Data Cleanup:

Calculating Monthly Returns from Daily Returns Data:

```
#combined monthly returns  
  
monthly_returns = combined_df.resample("M").ffill().pct_change().dropna()
```

## New Graph Types:

```
# ARS vs. BTC  
  
x = all_df.index  
y1 = all_df['ARS']  
y2 = all_df['BTC']  
  
fig, ax1 = plt.subplots(figsize=(20,5))  
  
ax2 = ax1.twinx()  
ax1.plot(x, y1, 'g-', linewidth=2)  
ax2.plot(x, y2, 'b-', linewidth=2)  
  
ax1.set_xlabel('Date')  
ax1.set_ylabel('ARGENTINE PESOS', color='g')  
ax2.set_ylabel('BITCOIN', color='b')  
  
plt.show()
```



## Formulation for New Library<sup>1</sup>

```
#ARS-USD DATA  
data, meta_data = fx.get_currency_exchange_daily(from_symbol='ARS', to_symbol='USD', outputsize='full')
```

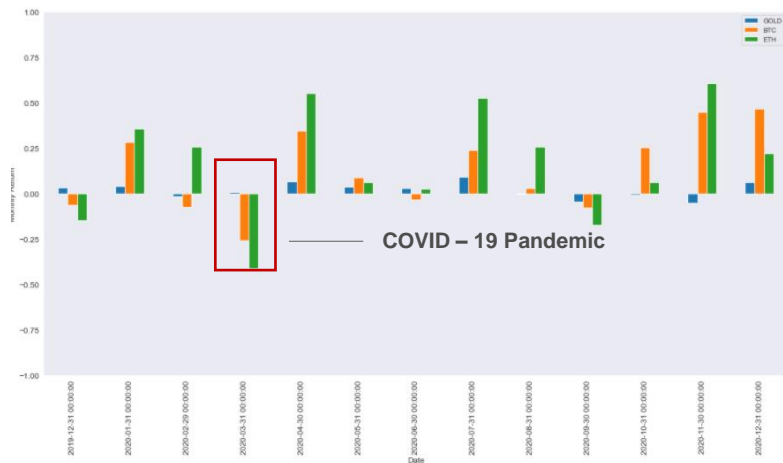
# DATA ANALYSIS: CRYPTOCURRENCES VS GOLD

---

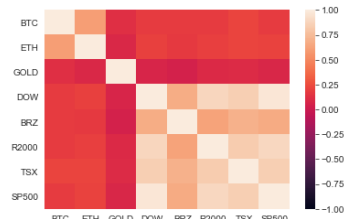
 <b>BITCOIN</b>	 <b>GOLD</b>
 21 Million Coins	 Supply unknown
 Easy To Verify	 Hard To Verify
 Can Be Sent Cheaply Over The Internet	 Third Parties For Large Quantities
 CoinsCapture	

# DATA ANALYSIS: CRYPTOCURRENCES VS GOLD

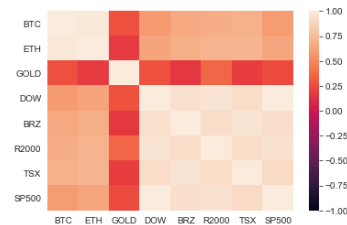
## 2020 Monthly Returns – Gold vs BTC vs ETH



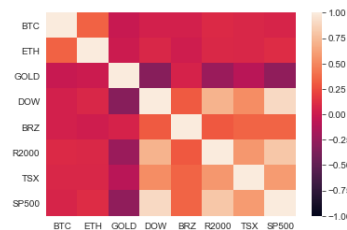
## Correlation Matrix – 2017 to 2021



## Correlation Matrix – March 2020



## Correlation Matrix – 2017

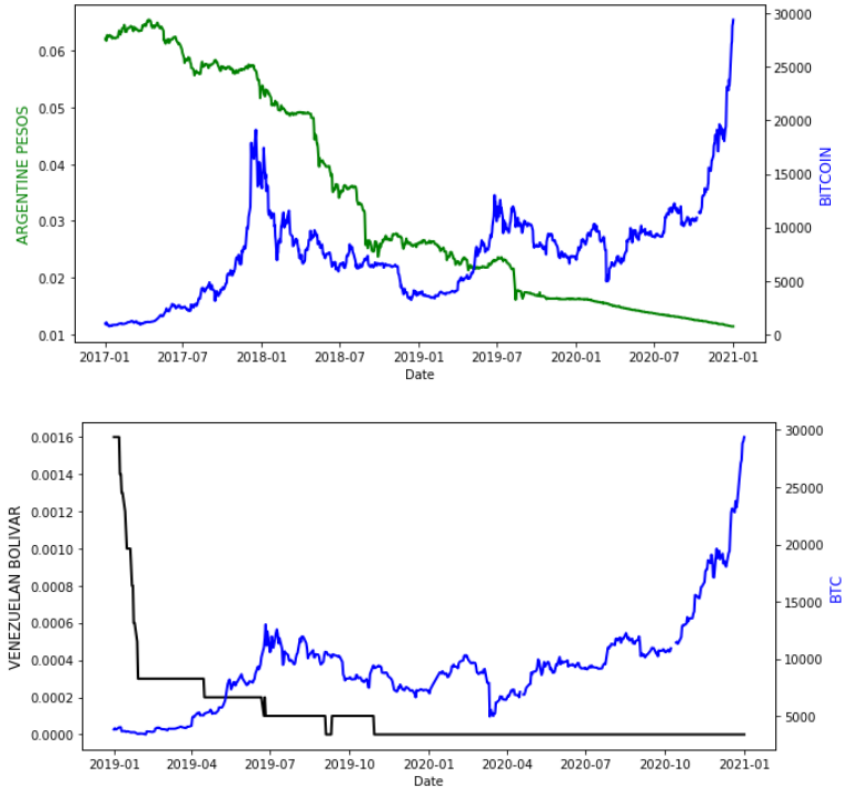


Investors using Gold rather than BTC/ETH for natural hedge

# DATA ANALYSIS: CRYPTOCURRENCY VS FX FLUCTUATION

**Bitcoin vs. Argentine Pesos,  
Brazilian Real,  
Venezuelan Bolivar<sup>1</sup> :**

- In latest Cryptocurrency Adoption Index,
  - Venezuela ranked 3,
  - Brazil ranked 13,
  - Argentina ranked 28 out of 154 countries.
- In 2020, Argentina had highest increase in trading volume due to political/ economical uncertainty and also due to limitation on US dollar purchases.
- Countries with emerging economies like Brazil, Venezuela and Argentina are seeking alternative way to invest due to devaluation of the currency against USD.
- Cryptocurrencies' increase trend, especially Bitcoin's upward trend, led people to drawn to invest.



(1) After hyperinflation, Venezuela official currency changed to VES. It is effective as of the date of August 2018,



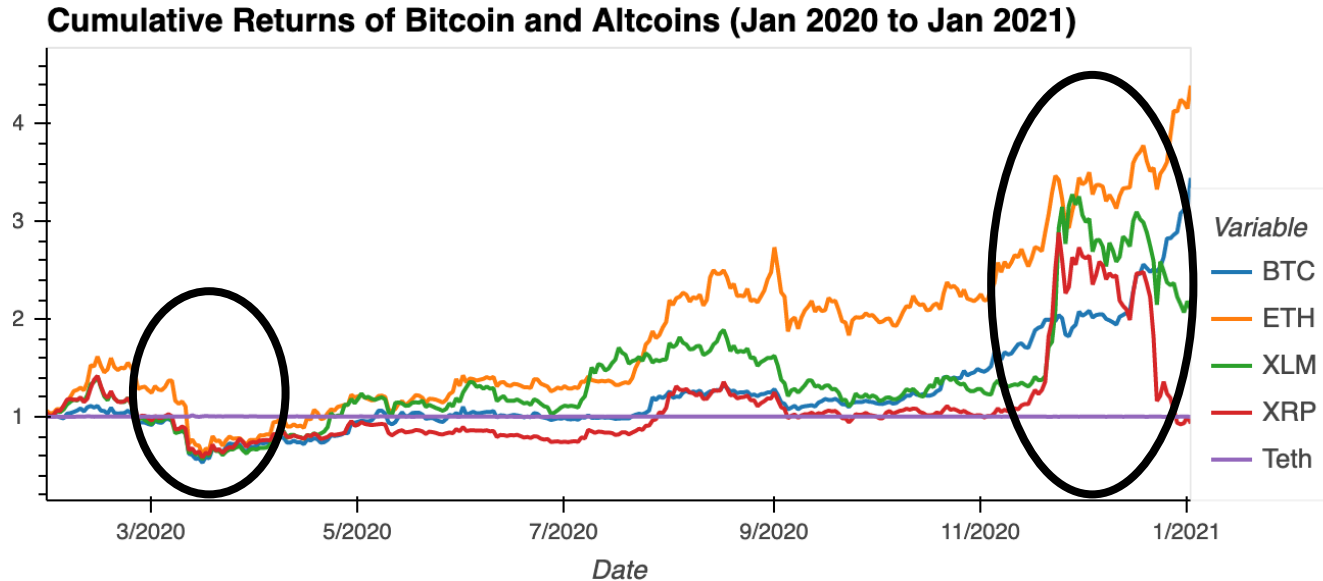
# DATA ANALYSIS: BTC VS ALTCOINS

---

- Do altcoins exhibit the same performance as Bitcoin?
- **Altcoins:** refers to all cryptocurrencies, other than Bitcoin
- In general, altcoins are created with the aim to offer efficient and inexpensive ways to carry out transactions over the internet
- **Assumption:** altcoin performance is positively correlated to Bitcoin's performance
- As of January 2021, there are 4000+ cryptocurrencies



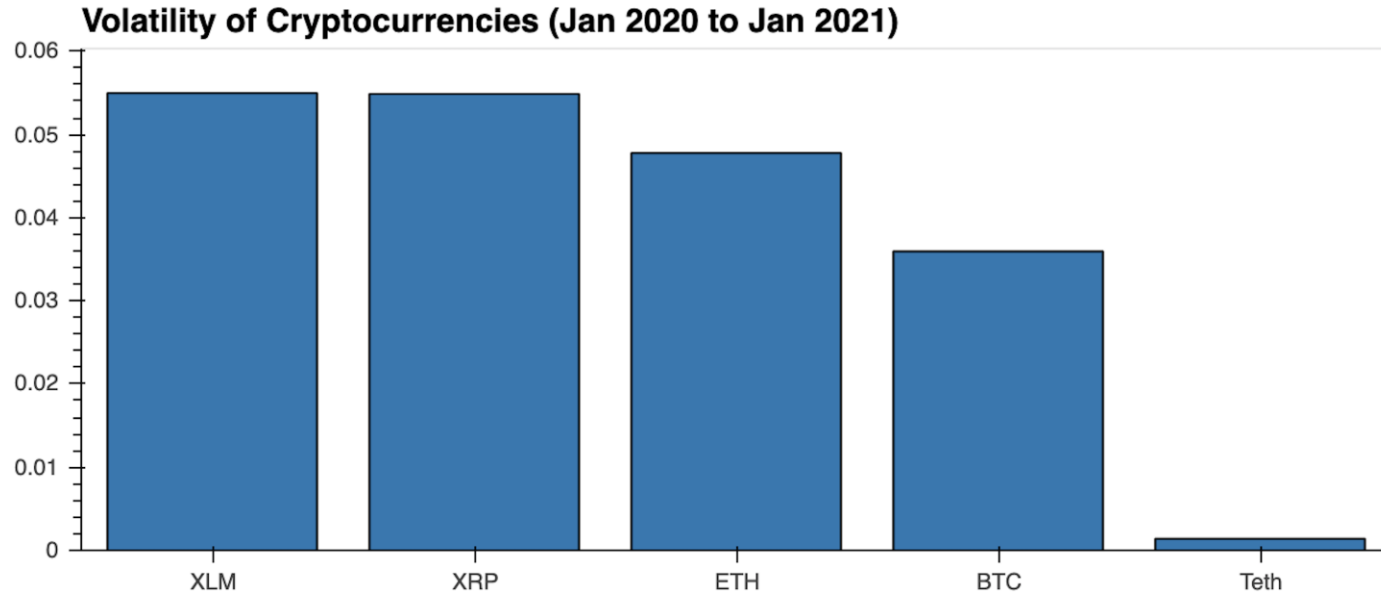
# DATA ANALYSIS: BTC VS ALTCOINS



- Returns for Bitcoin (BTC) and most altcoins dropped in March 2020
- Tether (Teth) returns were unaffected and are consistently flat
- Ethereum (ETH) is clearly the frontrunner, outperforming Bitcoin
- ETH and BTC exhibit a similar growth pattern
- Stellar (XLM) and Ripple (XRP) exhibit a similar trend; returns are slightly greater for XLM

# DATA ANALYSIS: BTC VS ALTCOINS

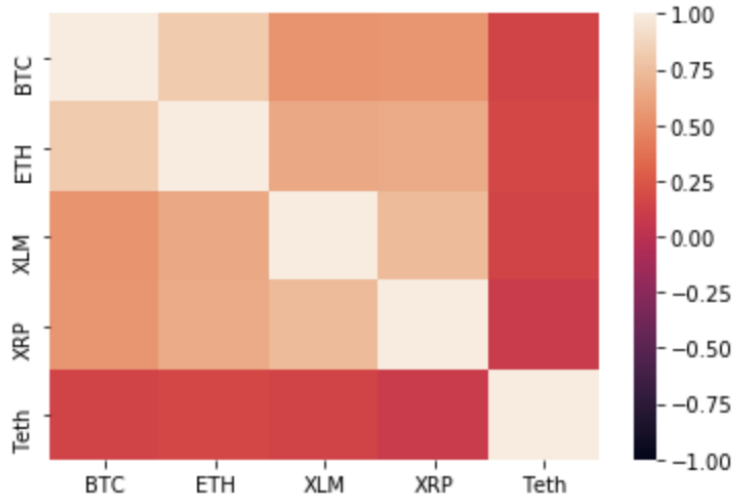
---



- Stellar and Ripple show larger volatility vs Ethereum and Bitcoin
  - Tether is quite stable
-

# DATA ANALYSIS: BTC VS ALTCOINS

---



- BTC and ETH are closely correlated (~0.8)
- XRP and XLM are closely correlated (~0.75)
- XRP and XLM offer similar blockchain-based solutions for cross border remittances, which may explain their correlation
- Tether has little correlation to any of the coins
- Tether is a 'stablecoin' that is pegged to the US dollar, thus keeping its value stable relative to the other coins

# FINDINGS

---

## BITCOIN VS GOLD:

- Investors resorted to Gold rather than Bitcoin during March 2020<sup>1</sup>
- Bitcoin and Ethereum are more volatile than Gold
- Bitcoin and Ethereum had disproportionately larger returns than Gold for the remainder of 2020

## BITCOIN VS FX FLUCTUATION:

- As seen in Venezuela, Argentina and Brazil, countries with devalued currencies against the USD want to invest in cryptocurrencies
- Correlation vs Causation: cannot 100% determine country investment in cryptocurrency effect BTC price increase

Country	Rank
Venezuela	3
Brazil	13
United Kingdom	14
Australia	20
Argentina	28
Japan	71

## BITCOIN VS ALT COINS:

- BTC and ETH show similar growth trends, ETH more volatile
- Stellar (XLM) and Ripple (XRP) show similar growth patterns and volatility based on cumulative returns and standard deviation while Tether is stable
- There has been a general increase in cryptocurrency investment since July 2020. The larger returns in Ethereum are likely due to the increasing trends in blockchain/smart contract technology and DeFi projects using the Ethereum blockchain

---

(1) COVID – 19 was declared a global health pandemic on March 18, 2020 (source: World Health Organization)

# DREAM TEAM RETURNS?

---

## Challenges with Analysis:

- Time Constraints: 3 “shallow” analyses vs 1 “deep” analysis
- Data Limitations: Altcoins recent development, not enough historical data

## Analysis 2.0:

- Compare cryptocurrency versus volatility indexes (^VIX, ^UVXY)
  - Compare returns on cryptocurrencies vs other commodities/ precious metals (silver, etc)
  - Add more depth to data points (cryptocurrency transactions per currency/country)
  - Forecast portfolio of precious metals vs market indices vs cryptocurrencies
-