Mining for Gold or Crypto?

Presented to you by the Dream Team:

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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

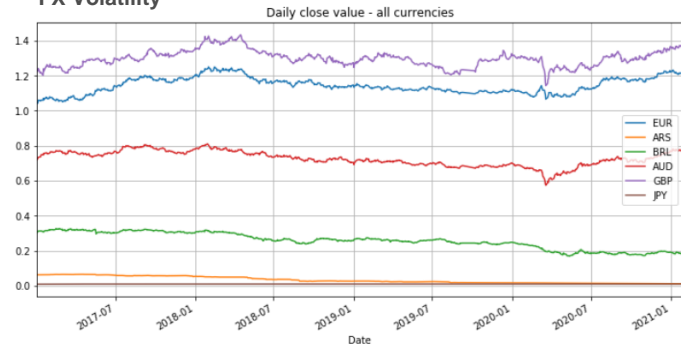# DATA EXPLORATION AND CLEANUP

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[1]/API

Data Exploration[2]:

Daily Returns Line Chart – Major Markets, Gold, Cryptocurrencies
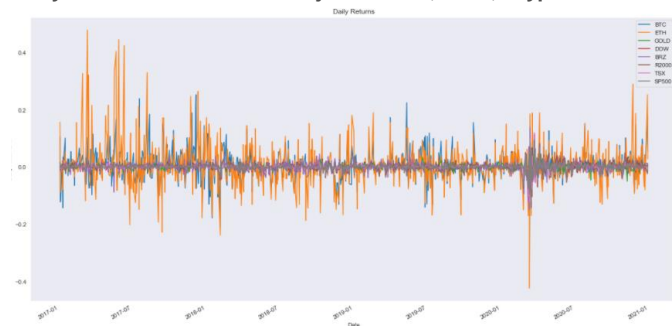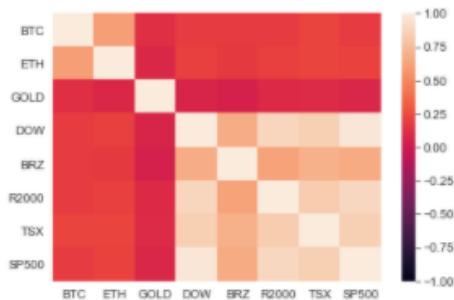

FX Volatility

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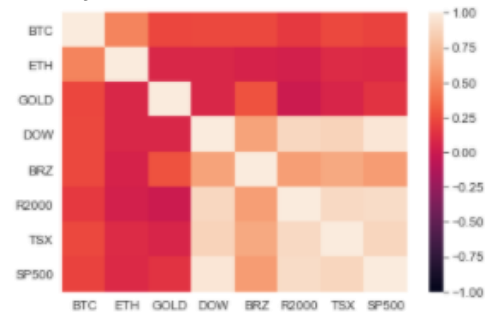(2) Don't forget to DropNa()

DATA EXPLORATION AND CLEANUP
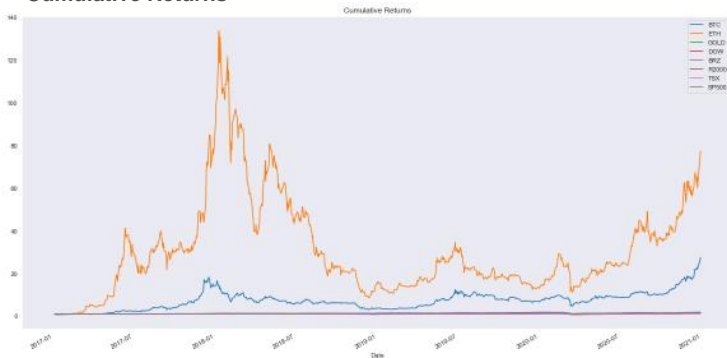
Data Exploration Continued:

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:

```python
#combined monthly returns

monthly_returns = combined_df.resample("M").ffill().pct_change().dropna()
```

New Graph Types:

```python
# 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()
```
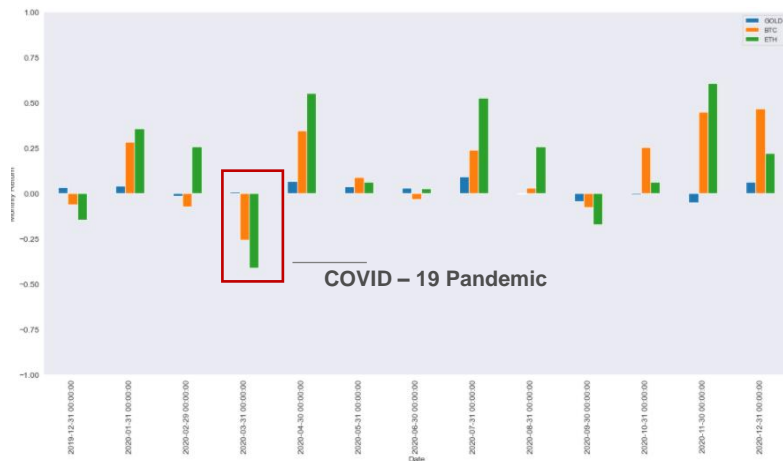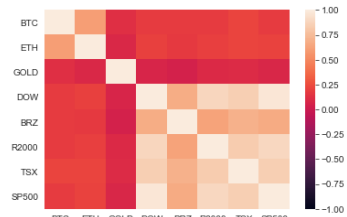

Formulation for New Library[1]

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

DATA ANALYSIS: CRYPTOCURRENCIES VS GOLD
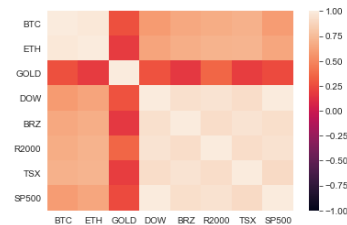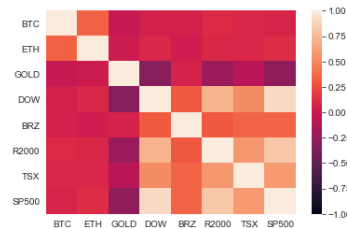
2020 Monthly Returns – Gold vs BTC vs ETH

COVID – 19 Pandemic

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[1] :**

- 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.

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(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

**Cumulative Returns of Bitcoin and Altcoins (Jan 2020 to Jan 2021)**
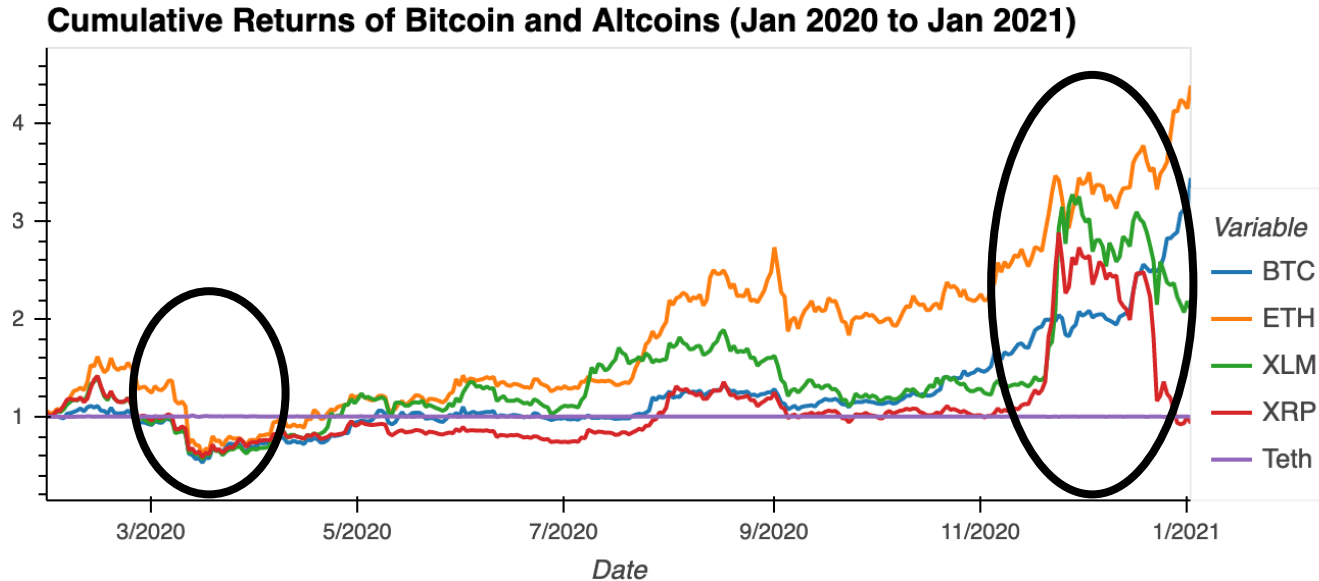
- Returns for Bitcoin (BTC) and most altcoins dropped in March 2020
- Tether (Teth) returns were unaffected and are consistently flat
- Ethereum (ETH) is clearly the frontrunner, outperforming Bitcoin
- ETH and BTC exhibit a similar growth pattern
- Stellar (XLM) and Ripple (XRP) exhibit a similar trend; returns are slightly greater for XLM

DATA ANALYSIS: BTC VS ALTCOINS

Volatility of Cryptocurrencies (Jan 2020 to Jan 2021)
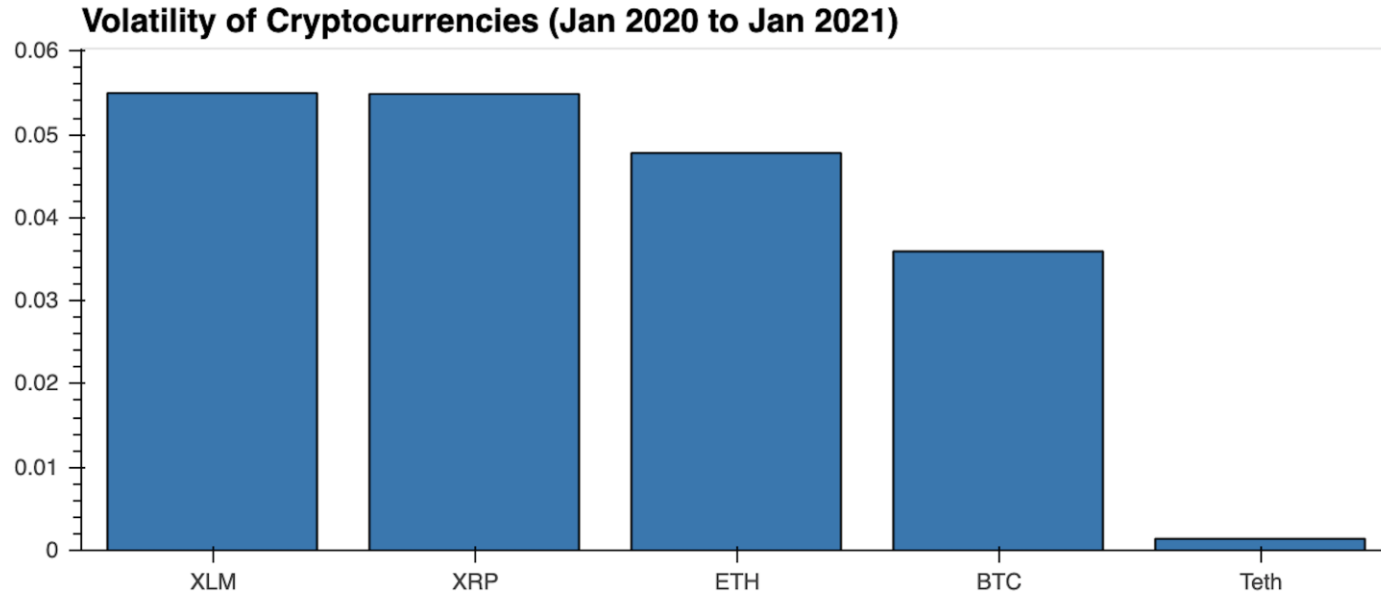
- Stellar and Ripple show larger volatility vs Ethereum and Bitcoin
- Tether is quite stable

DATA ANALYSIS: BTC VS ALTCOINS
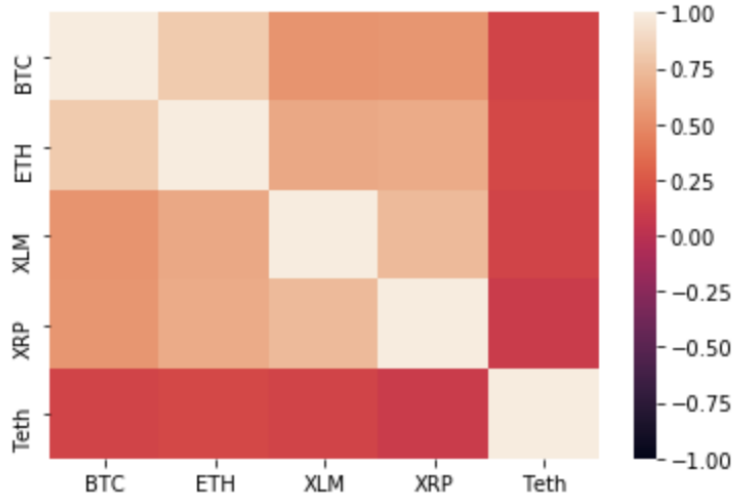
- BTC and ETH are closely correlated (~0.8)
- XRP and XLM are closely correlated (~0.75)
- XRP and XLM offer similar blockchain-based solutions for cross border remittances, which may explain their correlation
- Tether has little correlation to any of the coins
- Tether is a 'stablecoin' that is pegged 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[1]
- Bitcoin and Ethereum are more volatile than Gold
- Bitcoin and Ethereum had disproportionately larger returns than Gold for the remainder of 2020

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

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

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