



# **Group Project 1:** ***Market Indicators & Political Influences Related to Stock Market Index***

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# Hypothesis, Assumptions & Objective



## Objective:

- To explore the accuracy of gold prices as a market indicator in comparison to other possible indicators. Further, we will experiment on combining these indicators with various weight to create a new and better indicator for stock market direction.

## Assumptions:

- From 1985 to early 2000, gold was used to hedge against market downturn.
- When investors were expecting a bear market, they sell shares in stock market and buy gold, causing decline in stock market indices and rise in gold prices.
- Therefore, gold price could be used as indicator of stock market direction.

## Hypothesis:

- The invention of paper gold and founding of commodities futures allowed investors to speculate on several types of commodities including gold. As a result, gold price loses some of its property to suggest market direction as it is driven by investor's speculation.

# Questions for Analysis

## Questions for Analysis:

- 1) Explore the relationship between S&P 500, Dow Jones, Nasdaq, Gold, Silver, Oil, Crypto, GDP, House Price Index, Interest and Inflation Rates
- 2) Find correlations from indices and commodities to compare which has the highest correlation to S&P 500
- 3) Combine data into portfolio to try to find a combination that leads to stronger indicator (higher correlation) for S&P 500
- 4) Does gold still have any utility in predicting market changes?
- 5) Does S&P 500 have correlation to GDP and Interest rate?
- 6) Does president have any influence on stock market & GDP?

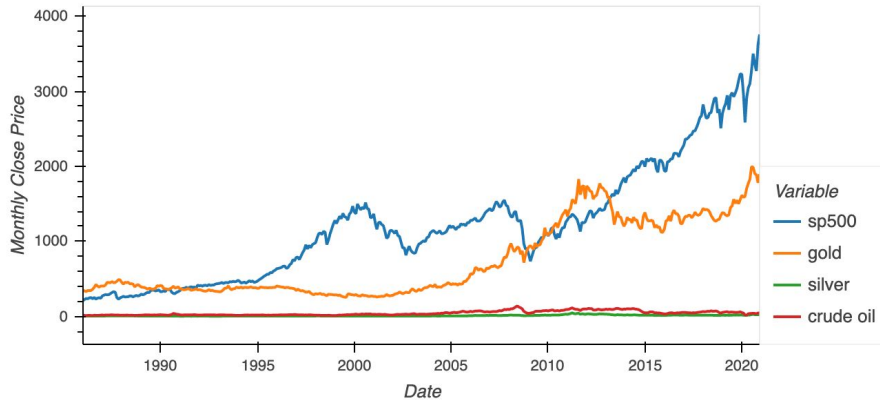


# Data Cleanup & Exploration



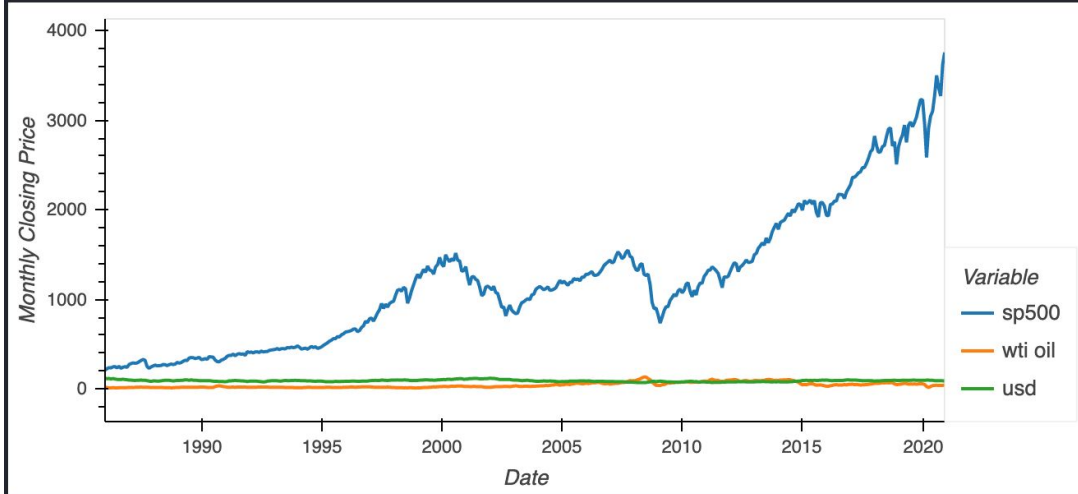
- Data cleaning was challenging due to mixed labels in different files
  - Resulted in team re-formatting .csv files for consistency
- Different datasets with same data have different formatting, so pulling S&P 500 data from multiple sources leads to consistency issues
  - **Postmortem:** create master file for variables or ensure team is only editing to most recent version of master file
- Interestingly, noticed that libraries and dependencies ordering is important, otherwise may result in an error message:
  - E.g. “WARNING:param.panel\_extension: A HoloViz **extension was loaded previously**. This means the extension is already initialized and the following Panel extensions could not be properly loaded: ['plotly']. If you are loading custom extensions with `pn.extension(...)` ensure that this is called before any other HoloViz extension such as `hvPlot` or `HoloViews`.”
- Multi-indexing is helpful to demonstrate changes when there is a significant different in variable values

# Data Analysis: *Indices*



- The correlation started to change to positive due to creation of paper gold and commodities market in 1970's.
  - However, it took some time for the paper gold and commodities futures market to be popularized and accessible to retail investors; therefore, the transition was not apparent until mid 2000's.
- Commodities market allows traders and investors to speculate on future commodities prices.
  - As a result, the gold price correlation began to shift to positive territory
- Since 2007, Crude Oil > Gold correlation to S&P 500
- Cryptocurrencies have weak correlation to S&P 500

# Data Analysis: *Commodities*



- US Dollar index has very little correlation with the S&P 500 index throughout time
  - likely a result of the money market being used as a very liquid, non-risky area of investment especially being in the form of a strong world currency such as the USD
- The West Texas Intermediate (WTI) is more correlated to the S&P 500 index and the WTI stock has become more so in the more recent years
  - likely due to investor speculation on these kinds of commodities in more recent years as the future of the oil industry is unknown, combined with various political influences affecting supply

- Interest rate and S&P 500 index has a very little to no correlation between them
- GDP seems similar to S&P 500, line trends positively for both and heat map shows some correlation between them as well



# Data Analysis:

## *Economic indicators (cont'd)*

Does Presidency have any influence on stock market & GDP?

- Little impact on growth and changes in stock market
  - Observe the S&P 500 growing positively through all year regardless of the president
- GDP trends positively regardless of president.
  - fluctuation in the market are mostly likely due to external factors (COVID, 9/11, Recession of 2008) likely unrelated to presidential policies.
- According to indicators analysed in this research shows that president has little to no influence on the stock market





# Data Analysis

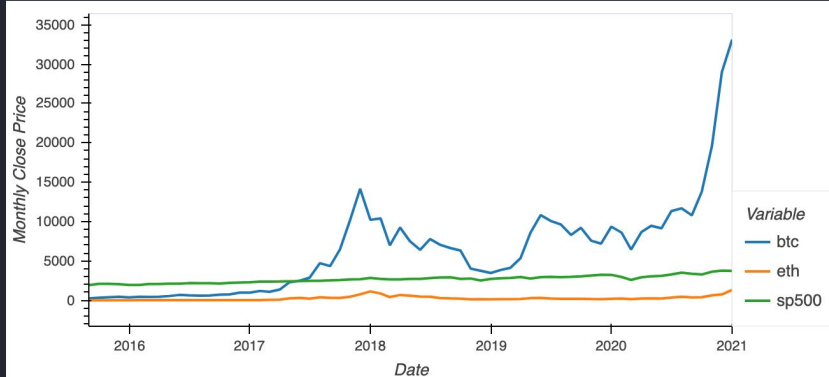


- Highest correlation to stock market index: Crude Oil (0.14)
- Second highest correlation: Silver (0.1)
- Tested various combinations and determined that an equal weight between crude oil and silver will provide highest correlation (0.16)
- When silver & crude oil portfolio returns are graphed, we can see the trend moves in the same direction as S&P500 in the last 5 years.
  - likely due to up to 2015, US and Saudi Arabia have been manipulating oil prices in oil price war.
  - also, gold and silver have been used as hedging commodities
- Oil and silver have slightly higher correlation to S&P 500 in the past 5 years
- When looking at beta graphs, I noticed that crude oil and silver have lower beta than other commodities indicating lower volatility to S&P 500

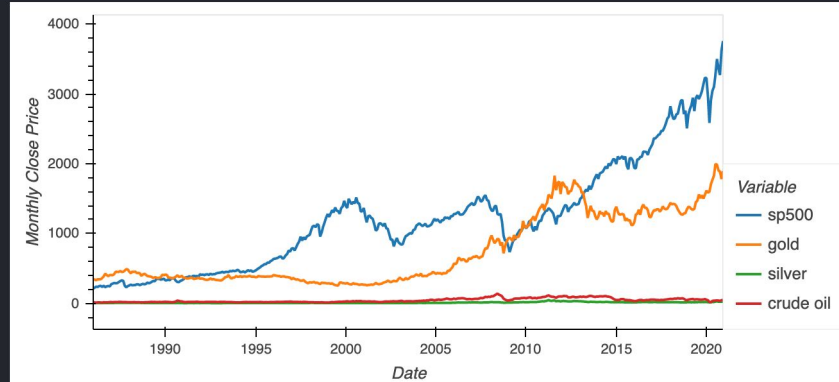
# Summary

- Crude Oil has become more correlated to S&P 500

## S&P 500 and Cryptocurrencies Summary



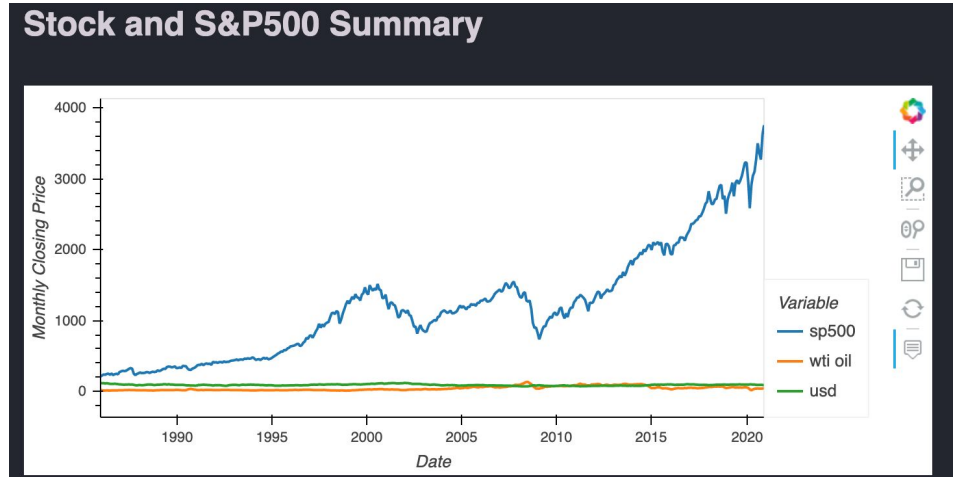
## S&P 500 and Commodities Summary

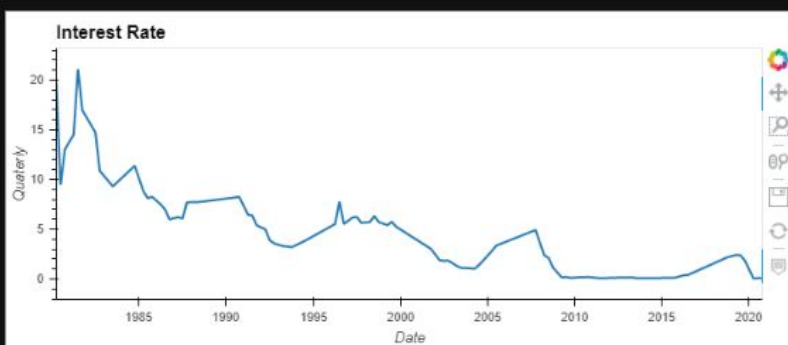
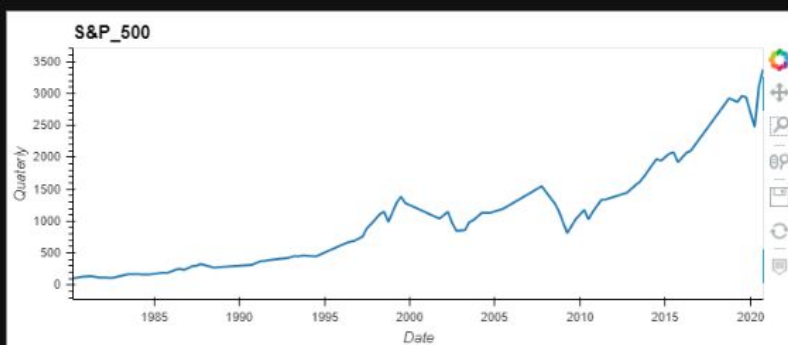
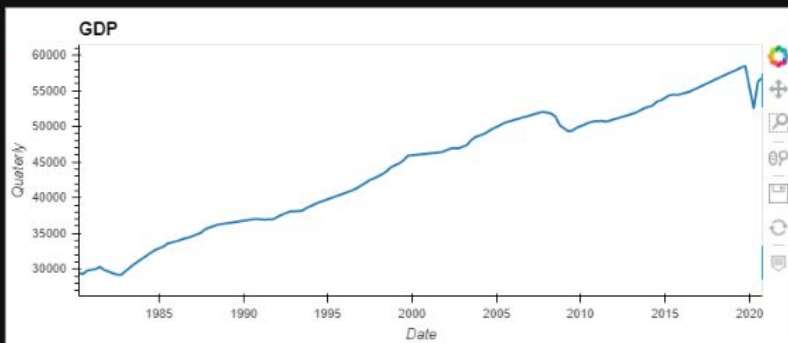
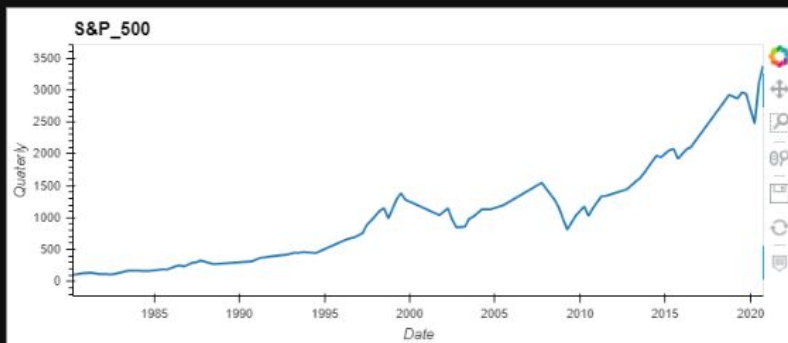


- Cryptocurrencies have weak correlation to S&P 500.

## Summary cont'd

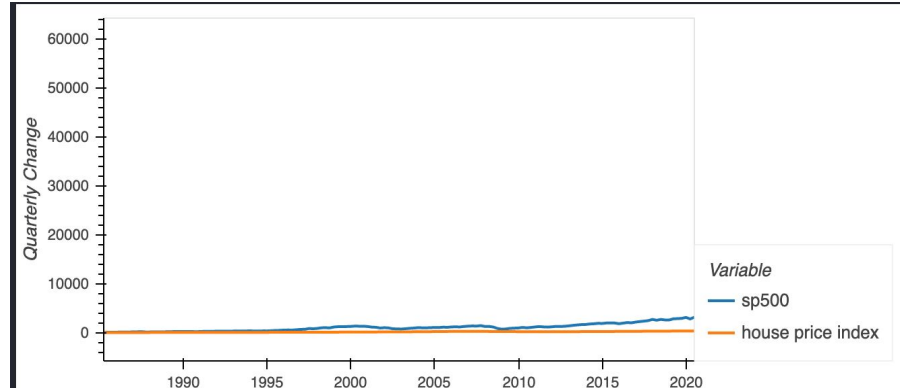
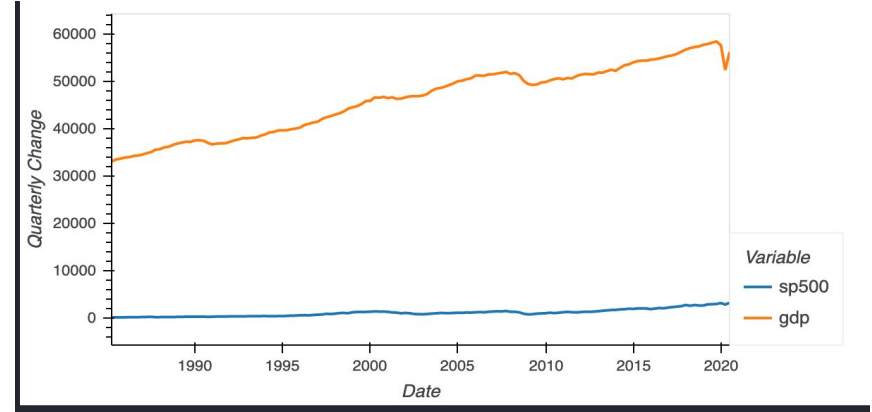
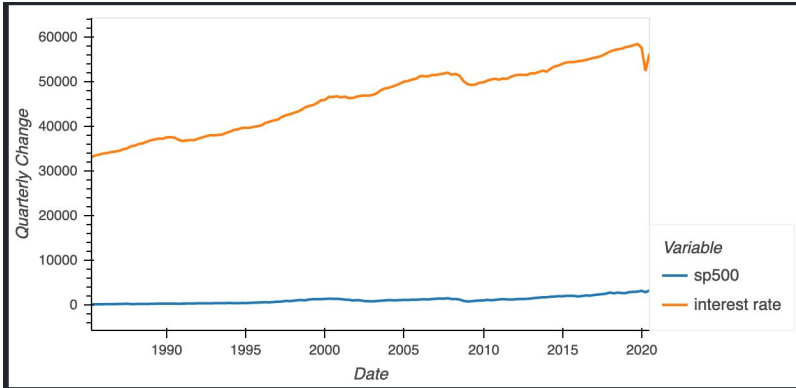
- USD, GDP and interest rate have very little correlation to the S&P 500!





## Summary cont'd

No correlation with presidency and market indicators.  
No correlation with housing price index





# Discussion

Open for questions