Financial markets data and Recession Predictors

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Agenda

- Theory of market cycles and recession

- Data exploration
  - Dataset
  - Data Validation and Preparation
  - Exploratory Questions

- Section 1: Macroeconomic data
- Section 2: Credit and Recession Data
- Section 3: Stock Market and Recession
- Section 4: Commodity Prices and Recession

Theory of market cycles and recession

Theory of recessions and credit cycles:

Since the beginning of capitalism, markets follow a sequence of ups and downs:

- from the Tulip mania of the 17th century
- to the Great Financial Crisis (GFC) of the 21st century

Periods of growth have always been followed by times of recession. The “cyclical” behavior of the capitalist economy shows periods (roughly 5-7 years) of economic growth followed by times of recession.

Exploring recessions:

For the purpose of this project, we will focus our attention on a few specific recessionary period to better understand the behaviour of financial market data and see how different variables can be used to predict financial recessions. Specifically we will focus our attention on 3 recessionary periods in US history:

1. 1980–1982 recession - Jan 1980 - Nov 1982
2. Early 2000s recession - Mar 2001 - Nov 2001
3. Great Recession - Dec 2007 - Jun 2009

Data exploration

- Dataset
- Data Validation
- Data cleaning
- Exploratory Questions

Dataset

4 distinct set of financial data

1. Macroeconomic Data
2. Global Stocks Data
3. Commodity price and Index Data
4. Credit and Sentiment Data

Steps in the data transformation process:

1. Read & clean the data
2. Rename the column (to have more pythonic titles) and organize the data
3. Creating bins for the date variables and ordering them (enable merging the data between different dataframes)
4. Visualizing the data to understand economic trends
5. Create a new column to define a period of recession vs no recession (apply groupby on the data)

Section 1: Macroeconomic data

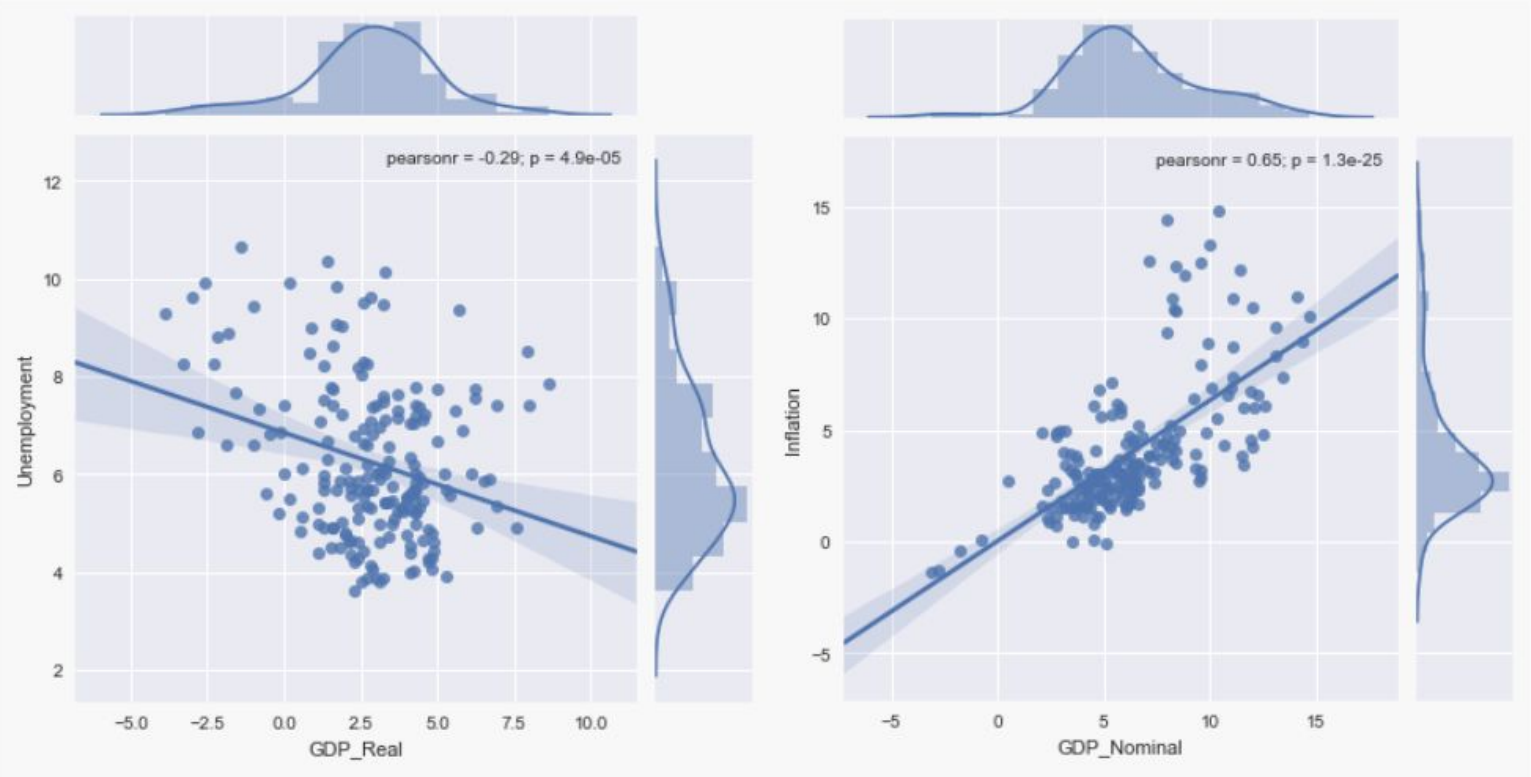
Macroeconomics is the study of the behavior of the economy as a whole and macroeconomic indicators that tell us about the overall health of the economy.

- **Gross Domestic Product (GDP)** is the most important concept of macroeconomics, it refers to the total amount of goods and services a country produces, commonly known as the GDP. This figure is like a snapshot of the economy at a certain point in time.

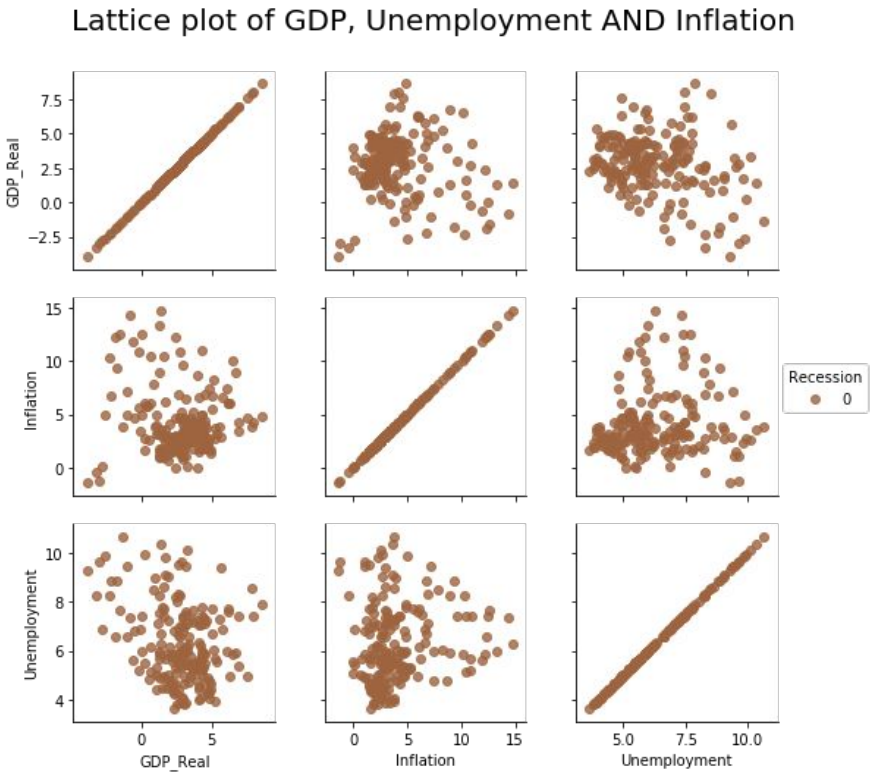
- **The Unemployment Rate** tells us about the health of the labor force and individuals' ability to find work. When the economy witnesses high growth, unemployment levels tend to be low. This is because with rising (real) GDP levels, output is higher and, hence, more laborers are needed to keep up with the greater levels of production.

- **Inflation** is the third main factor macroeconomists look at which represents the rate at which prices rise. If nominal GDP is higher than real GDP, we can assume the prices of goods and services has been rising. The data shows the strong correlation between nominal GDP and Inflation with a strong positive relationship.

Regression: GDP, Unemployment & Inflation



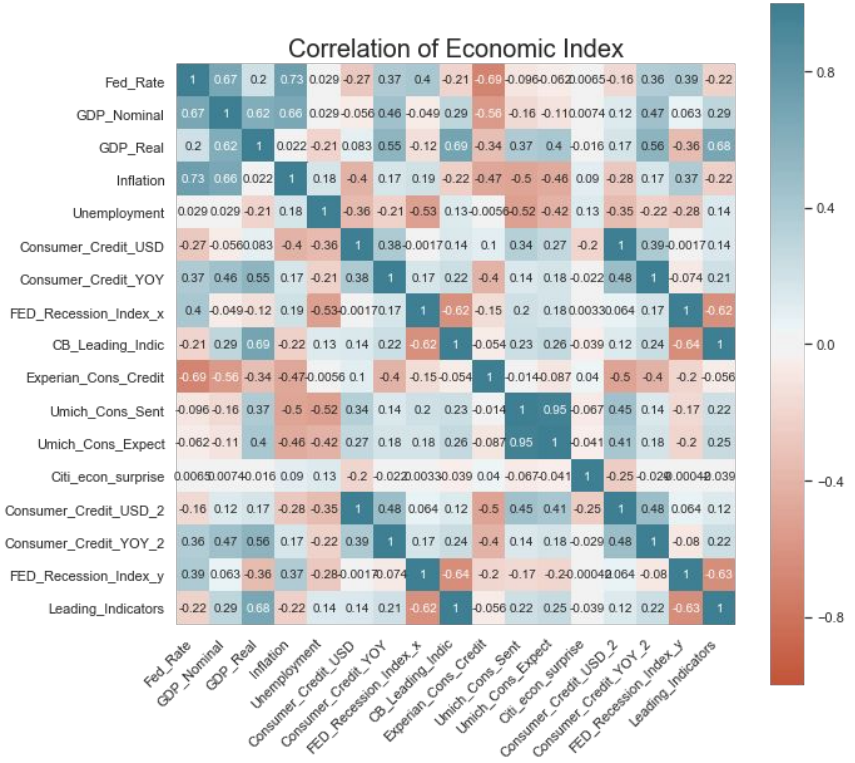
Lattice plots: GDP, Unemployment & Inflation



Section 2: Credit and Recession Data

- In our data, we looked at our dataset to see which credit metrics have the highest correlation to gdp growth

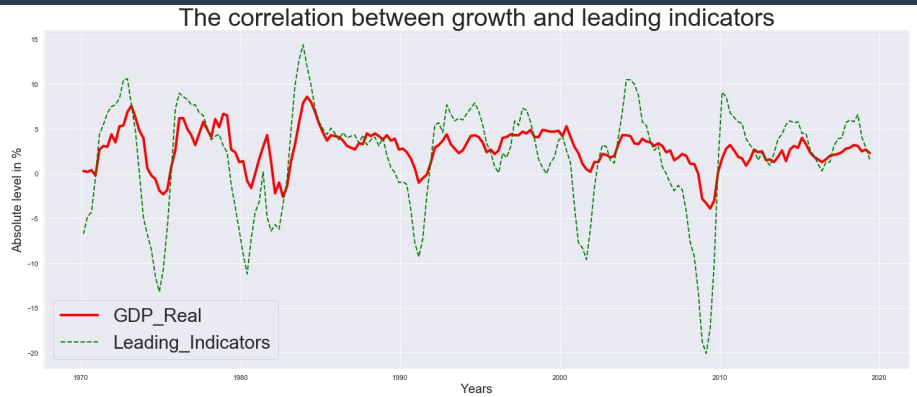
- As apparent from the above heat map, GDP real has the highest correlation to leading indicators, and Consumer Credit YoY.

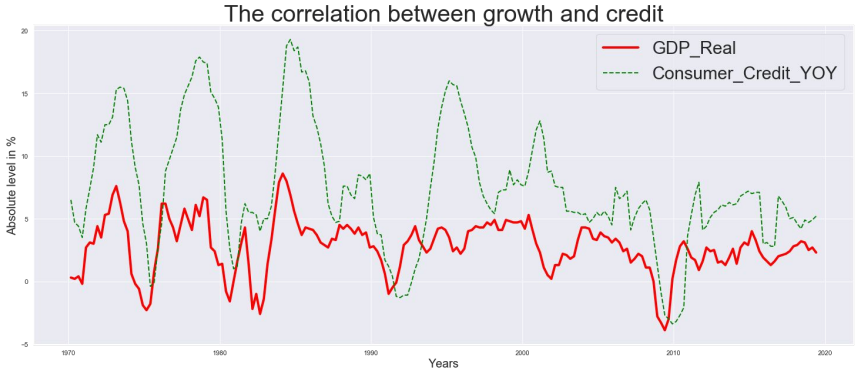


Section 2: Credit and Recession Data (Cont'd)

- The conference board leading indicators (composite index of 10 leading econ indicators) had the highest correlation to GDP over a long period

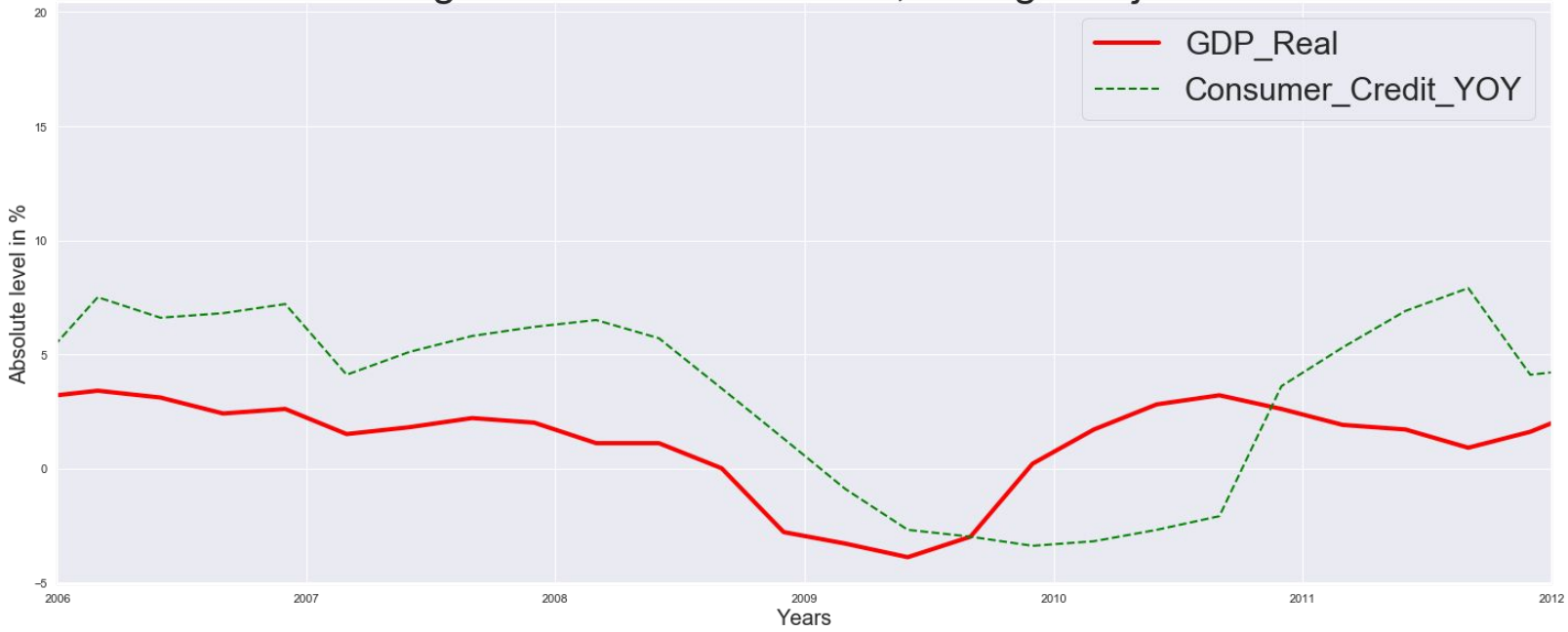
- Consumer credit data also has a very strong relationship to GDP over a long period. However, credit to only be predictive of certain recessionary periods (1980s and 08-09 financial crisis)





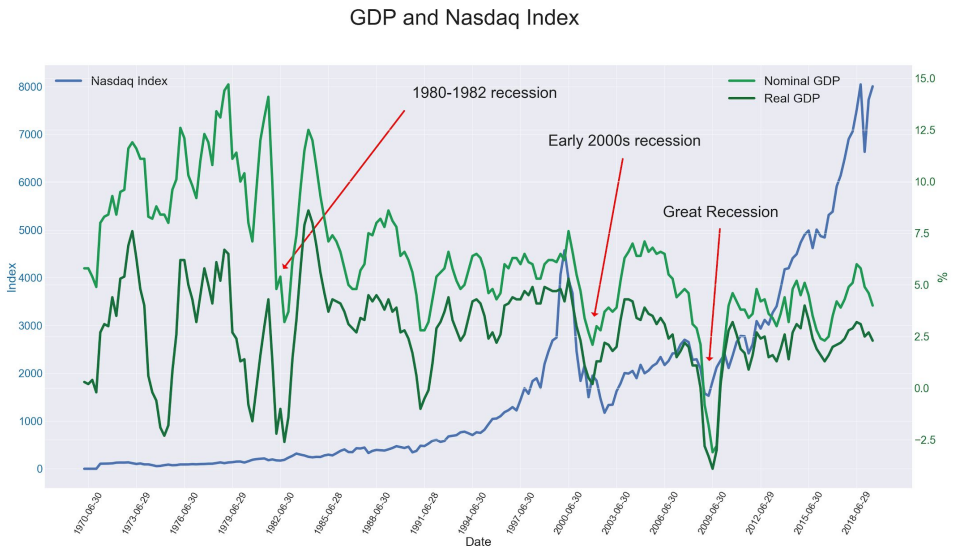
Section 2: Great Financial Crisis

The correlation between growth and credit before, during and just after the financial crisis

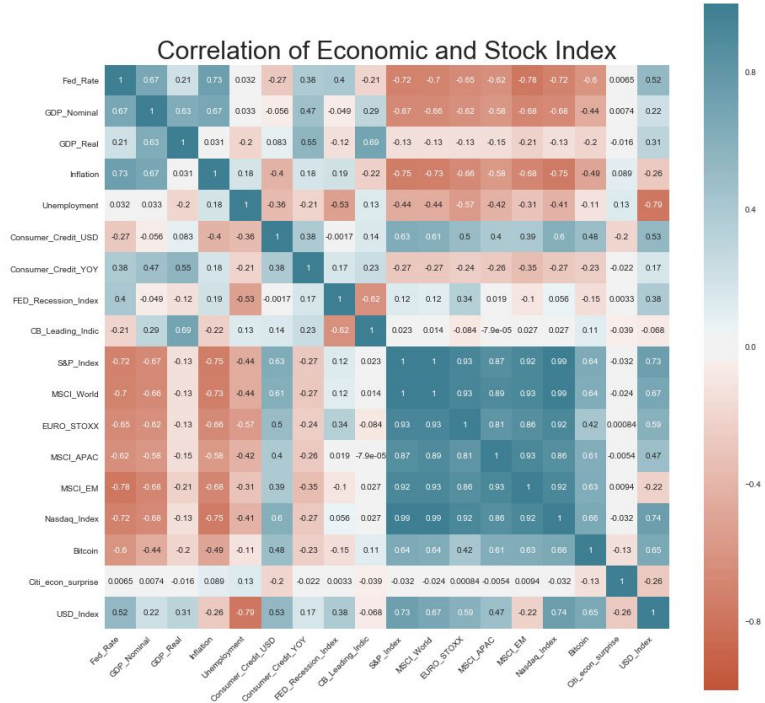


Section 3: Stock Market and Recession

GDP and Nasdaq are less related

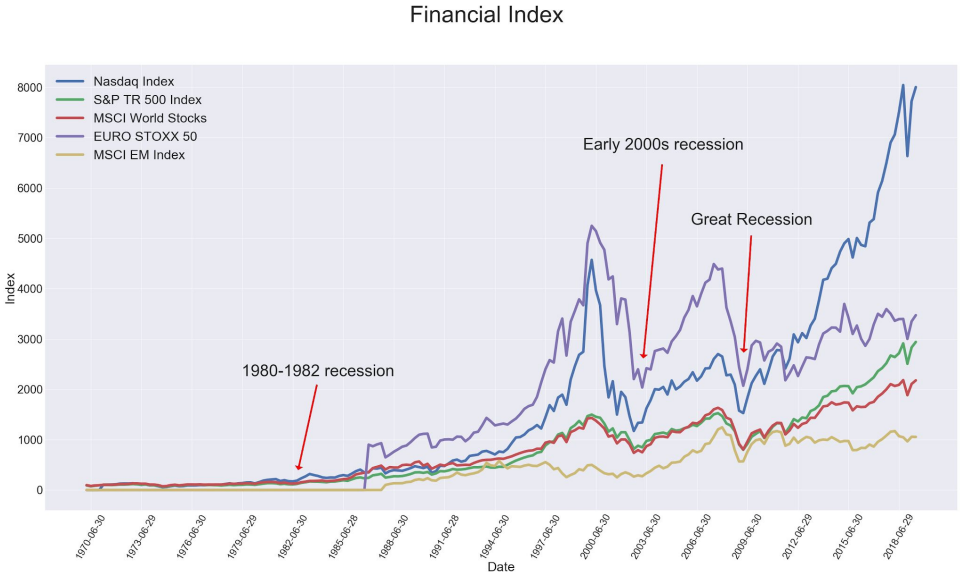


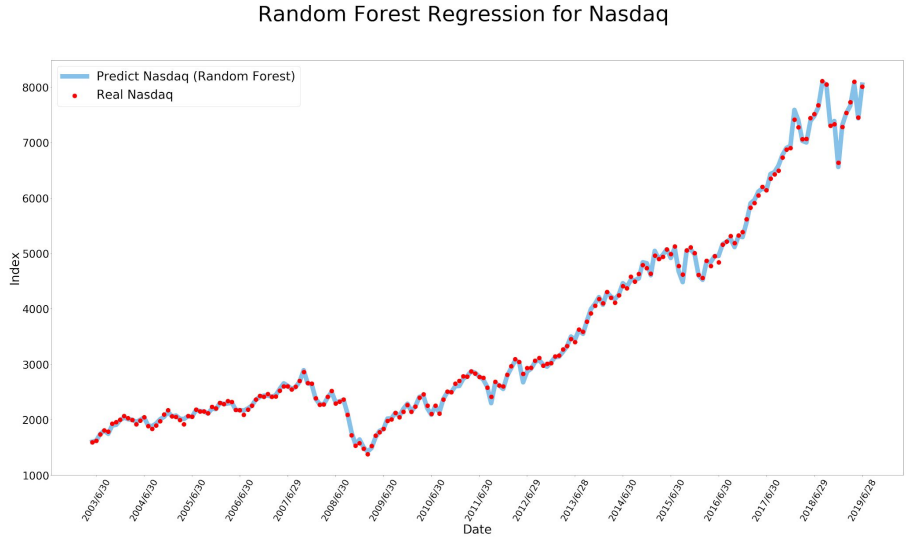
Correlation between macro econ indicator vs.Stock



Section 3: Stock Market and Recession

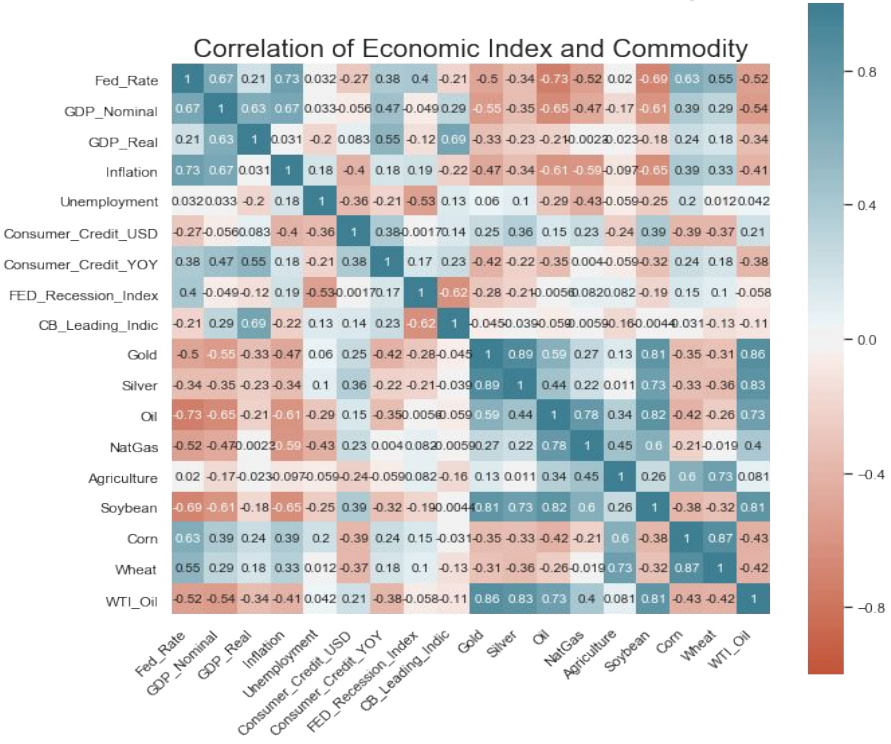
- The trend of Nasdaq is highly related with S&P, MSCI World Stock, EURO STOXX 50 and MSCI EM
- These index could predict the trend of Nasdaq by applying random forest regression



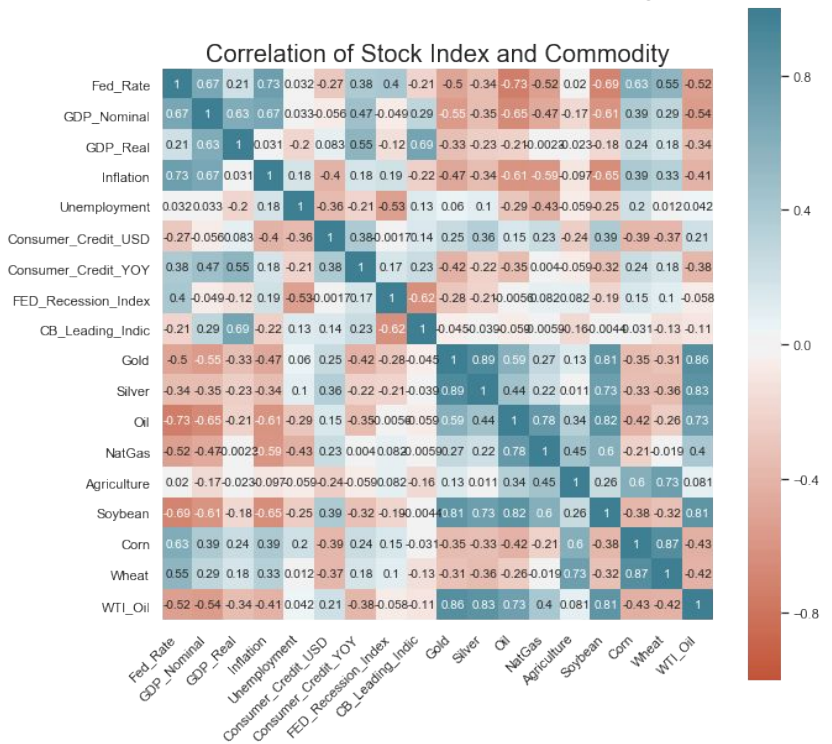


Section 4: Commodity and Recession

- Correlation between econ index vs. gold and oil

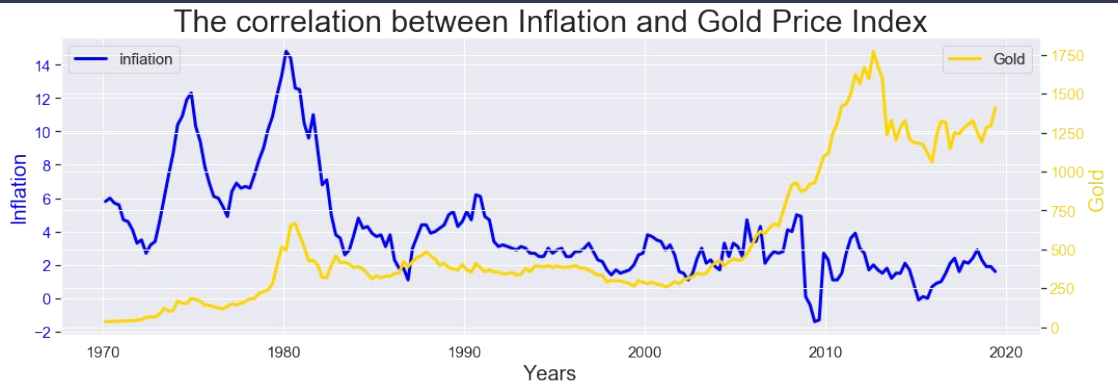


- Correlation between stock index vs. gold and oil



Section 4: Commodity and Recession

- In 1980, the oil crisis, inflation moves up, gold and oil prices move up
- In 2008, financial crisis, a spike of oil price, inflation increase a bit, gold price moves up in following years.
- Generally, gold and oil price increase in the recessions, though patterns are slightly different.



Conclusion

- Holistic analysis of financial markets
- Comparing economic data with financial data
- The visualization of data provided useful insights
- Python is a powerful tool for analyzing large financial data timesets.

Thank you for listening