

Predictive Analysis of the USD

Team 2

Meet the Team

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Project Overview

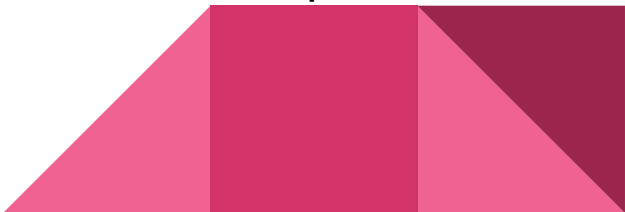
Description

- ❖ Project Aim: Identify trends and relevant factors affecting the USD value over the last 50 years

Objective

- ❖ Determine which variables correlate the most with USD
- ❖ Create hedging portfolio to max Sharpe Ratio

Scope

- ❖ Focus: USD index
 - ❖ Studied inputs:
 - Trade (% of GDP)
 - R&D (% of Federal Budget)
 - Debt-to-GDP ratio
 - US oil prices
- 

Scope Questions

- ❖ Where can the relevant data be sourced?
- ❖ Why the USD index?
- ❖ What data sequence (i.e. monthly or yearly) could be leveraged for this analysis?



Hypothesis: USD expected to DECREASE

Which variables affect the USD index?

Government Debt & Federal Investment in R&D

- ❖ Debt-ceiling: \$31.4 trillion
- ❖ Crowding-out-effect: hurts long-term economic growth

Oil

- ❖ Negative correlation
- ❖ Weak USD means it takes more \$ to buy the same amount of oil

Globalization (international trade)

- ❖ Trade activity is strong when USD is weak (and vice versa)
- ❖ Cause: global exporters borrow from international banks using USD

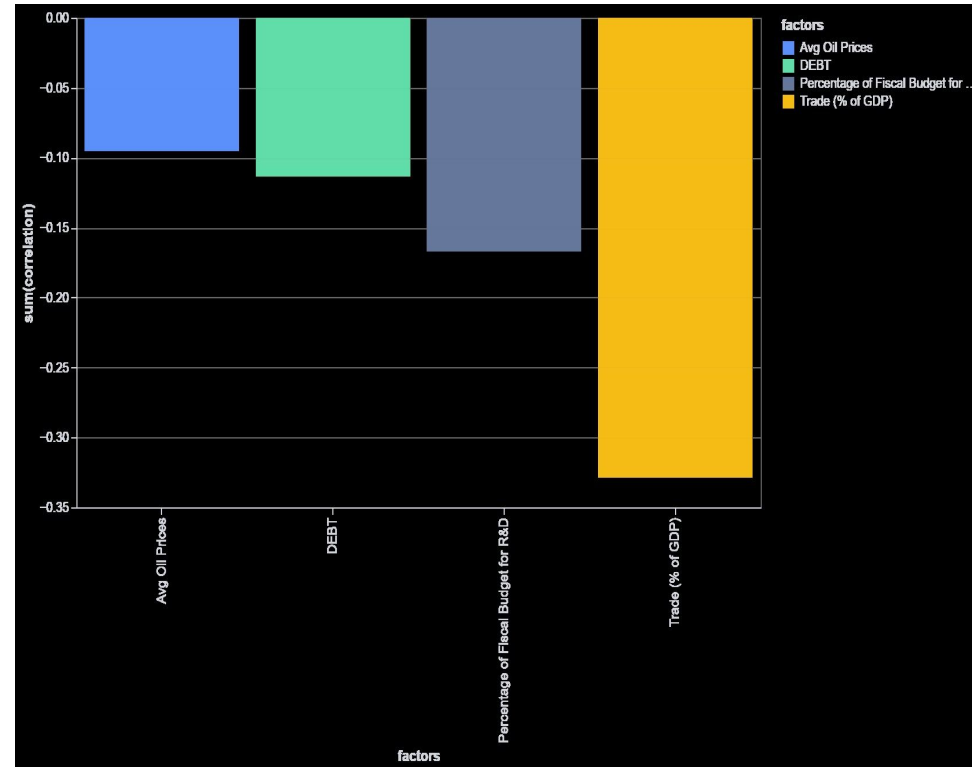
Correlation Analysis :

What library would best illustrate and visually represent the correlation between the variables?

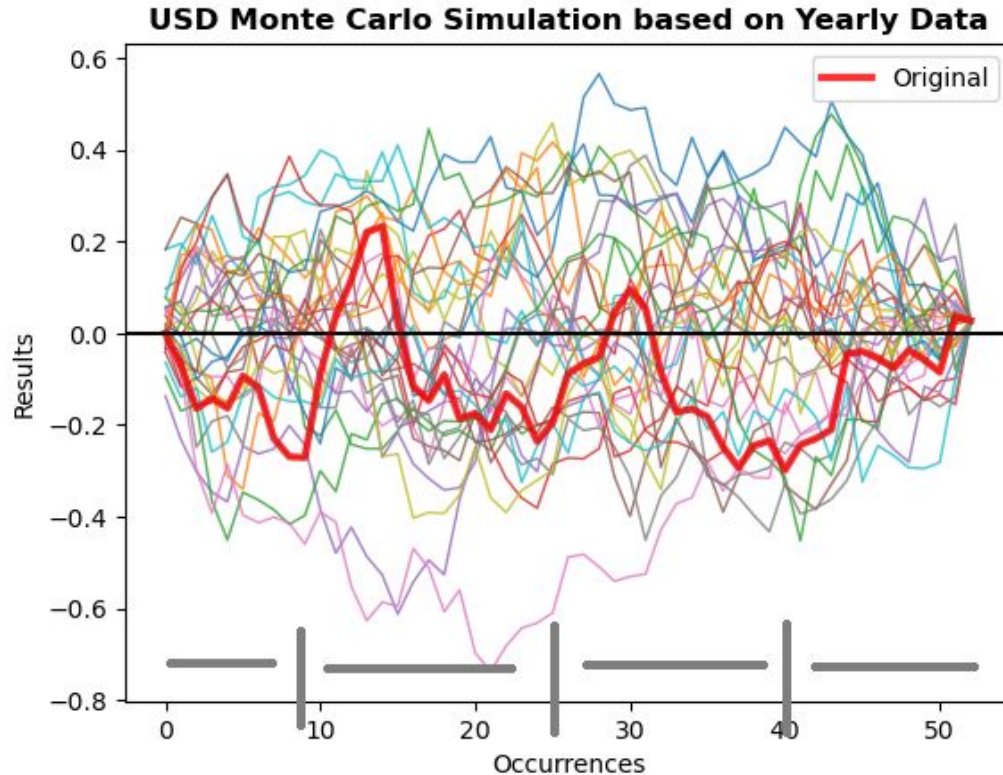
❖ Pygwalker

Which variables are significantly correlated to the USD index?

❖ Trade(% of GDP): corr = -0.33



Prediction Analysis: Monte Carlo

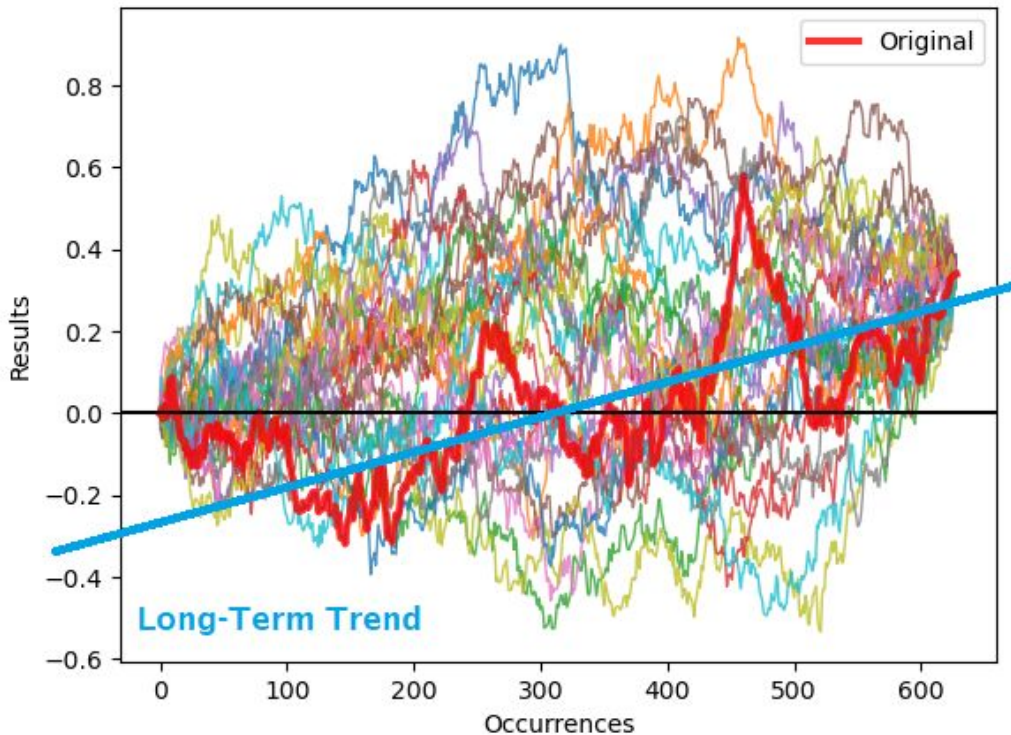


What model is suited to identify trends and make predictions?

- ❖ **Short-term trend: 15y cycles**
(expansion, peak, contraction..)
- ❖ Currently: reaching the peak
10y into the cycle, **expected to enter contraction phase**

Prediction Analysis: Monte Carlo

USD Monte Carlo Simulation based on Monthly Data



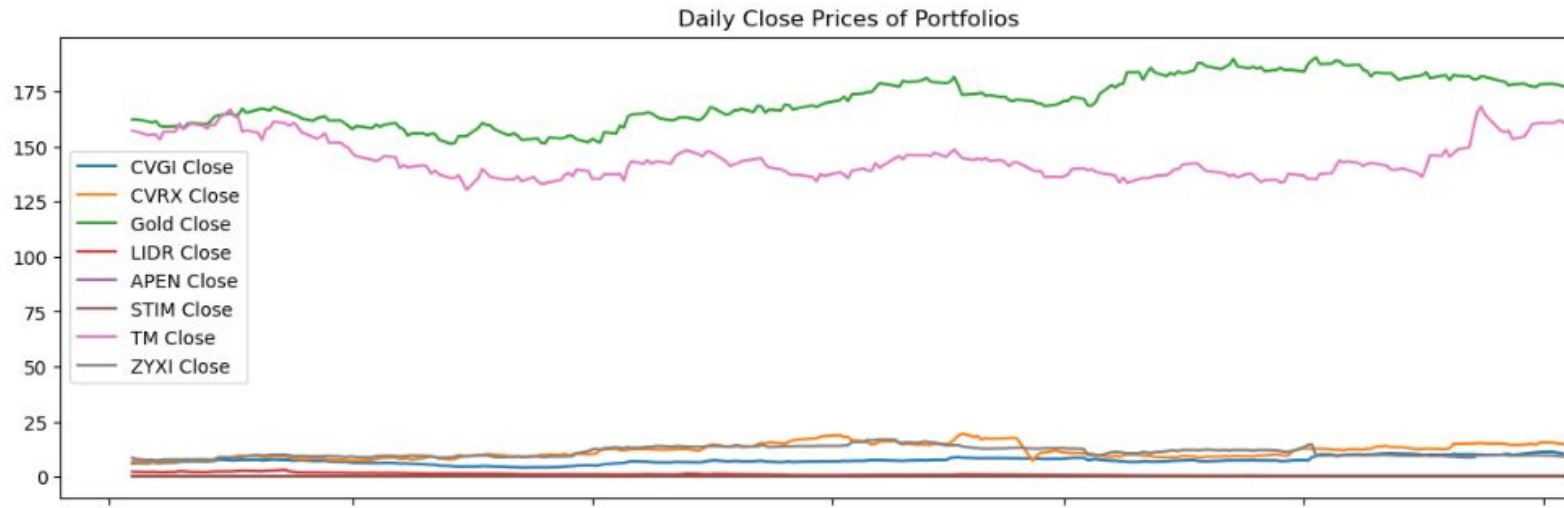
- ❖ **Long-term trend:** USD increasing over the last 50y (600m)

Portfolio Optimization: Hedging Portfolio

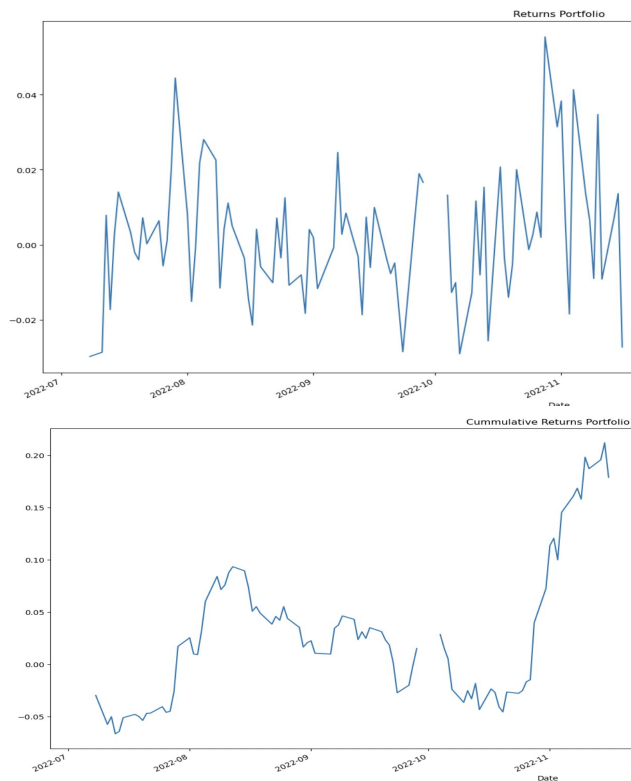
Which stocks were included and why?

Hedging against “slowbalization” and an expected decrease in USD

- ❖ Top NASDAQ Medical devices stock (HQ US): Zynex, Neuronetics, Apollo Endosurgery, CVRx
- ❖ Top Auto parts stock (HQ US): Aeye (Lidr), Commercial Vehicle Group
- ❖ Gold ETF (corr = -1 with USD)



Cumulative Returns



Portfolio Returns

- ❖ Overall, an upward growth trend in the portfolio's returns over the past year
- ❖ Portfolio allows investors to gain more consistent returns when compared to the fluctuations of the US \$

```
Date
2022-07-08    -0.029795
2022-07-11    -0.057607
2022-07-12    -0.050202
2022-07-13    -0.066625
2022-07-14    -0.064352
...
2023-02-17         NaN
2023-02-21     0.119943
2023-02-22     0.113817
2023-02-23     0.116923
2023-02-24     0.095261
Length: 99, dtype: float64
```

Sharpe Ratio

Sharpe Ratio: 1.02

- ❖ A Sharpe ratio of 1.02 indicates that the investment is generating 1.02 units of excess return for each unit of risk taken, relative to the risk-free rate
- ❖ Higher Sharpe Ratio = More attractive returns
- ❖ Sharpe Ratio 1-2 considered good

```
# sharpe ratios calculated without risk-free data
sharpe_ratio = (portfolio_return.mean() * 252) / (portfolio_return.std() * np.sqrt(252))
sharpe_ratio
```

1.0199734353104548