USD-JPY Time-series Forecast Analysis:

Executive Summary

US dollar-Japanese Yen exchange rate has been in a skyrocketing trend over the past two years due to global hyperinflation. With more economic data suggesting that inflation is near the peak, a question arises: "Will the USD-JPY exchange rate come down toward the year-end?"

Of course, no one can predict the exchange rate in a precise way, here are just my humble ways to make a guess.

Our AI deep learning models(TFT, Nbeats) suggest the current exchange rate is overly-bought(USD too high) but will gradually catch up to the current level and stay in an up-ward trend toward year-end due to below two reasons:

1, Employment and consumer confidence are expected to worsen further(overly bought reason).

2, Commodity prices such as oil and copper will likely remain high(still going up reason).

Our model use WTI(oil price), gold price, copper price, 10 years US treasury, 10 years JGB, US-consumer confidence index, US-non-manufacturing PMI, US-non-farm employment, and US-jobless data as predictors.

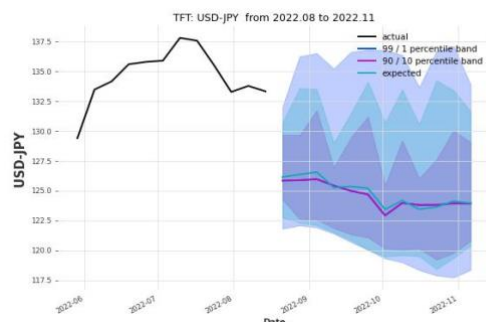## TFT model result

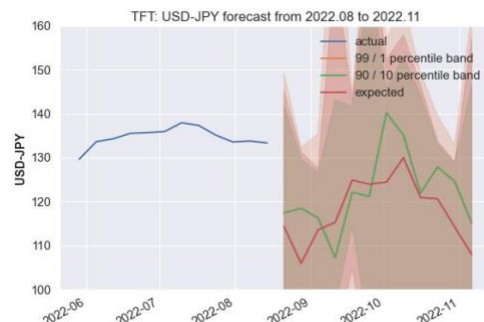Prediction without concerning predictors
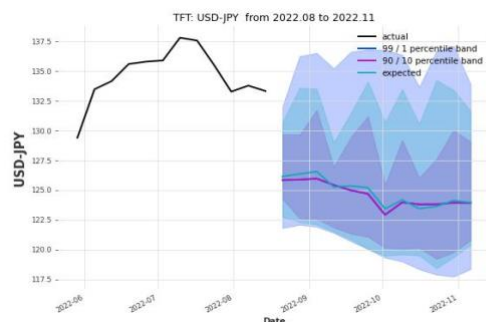
Prediction with concerning predictors
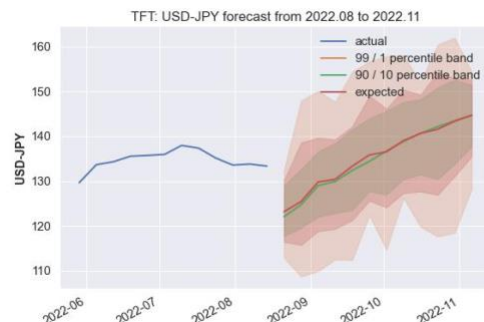
N-Beats model result

Prediction without concerning predictors

Prediction with concerning predictors

USD-JPY Analysis

Trend and seasonality

USD-JPY alone has a seasonality of around nine years. If we take the recent bottom in 2021, then the soaring price in 2022 maybe just a beginning of a new upward cycle.

Our ACF model shows that once a new trend is formed, the same trend will continue for 50 weeks with 60% probability and 100 weeks with 40% probability. Currently, Yen is in its 70th week of the upward cycle, and I think it is approaching its peak. However, our short-term model using TFT and N-beats suggest it still has a couple of months to run.
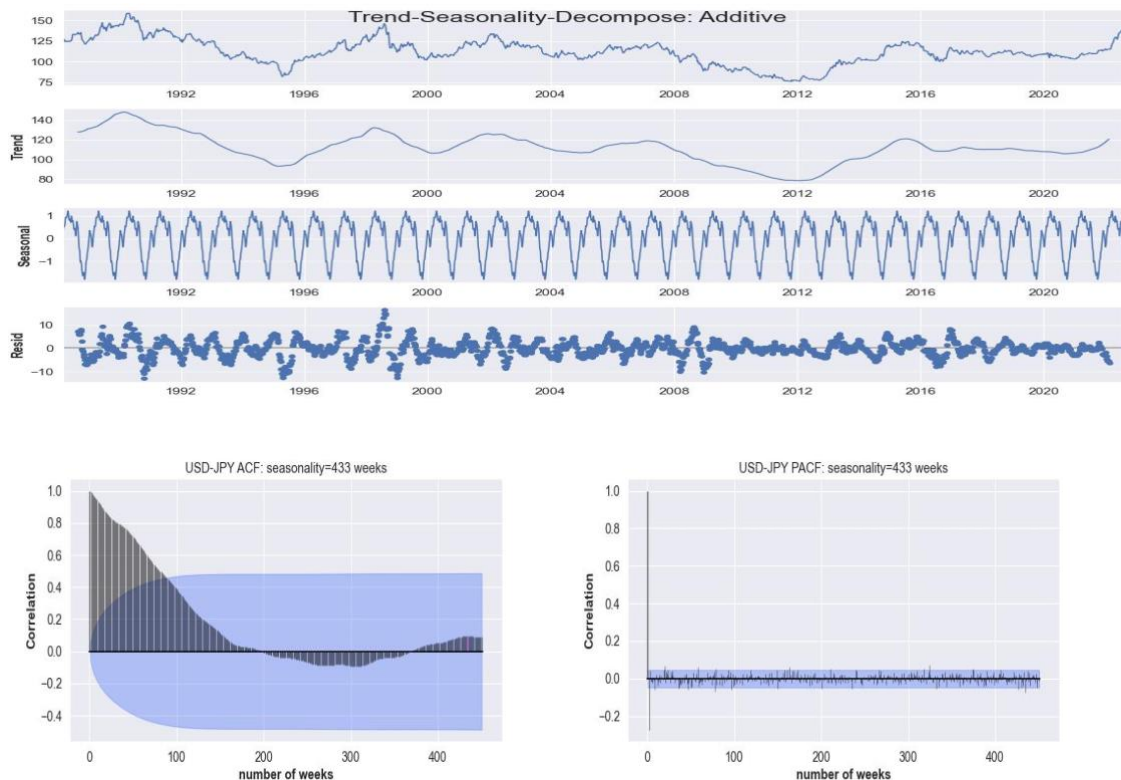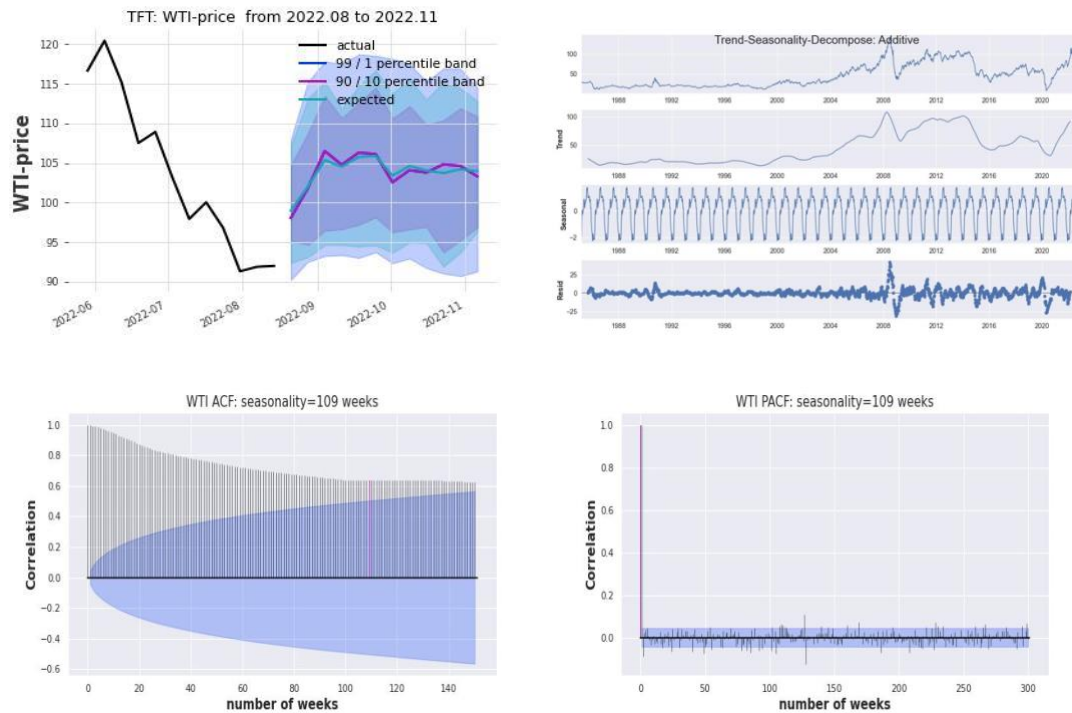

Correlation with predictors
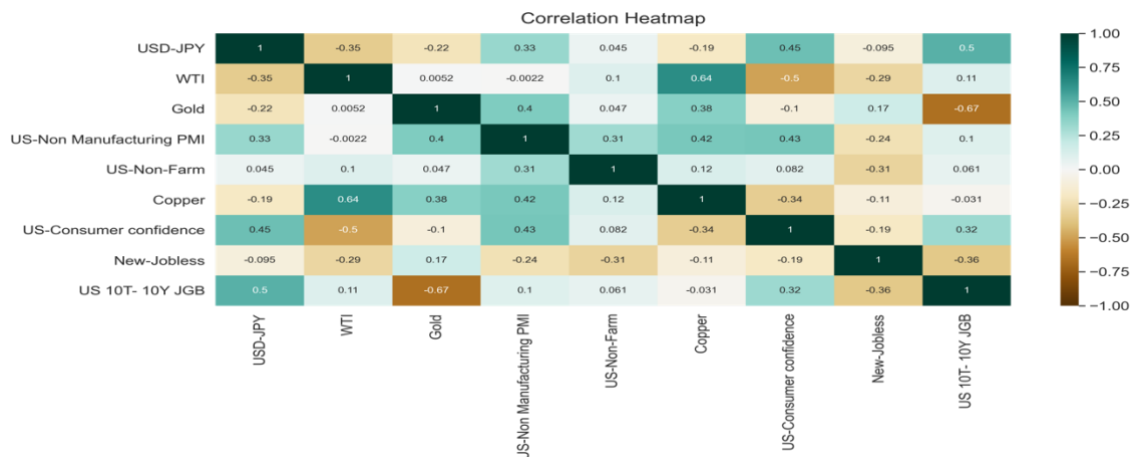
Inflation contributors: Commodity are likely to stay high

Our time-series model suggests WTI and copper are in an over-sold position and are likely to increase in a 3 months horizon.
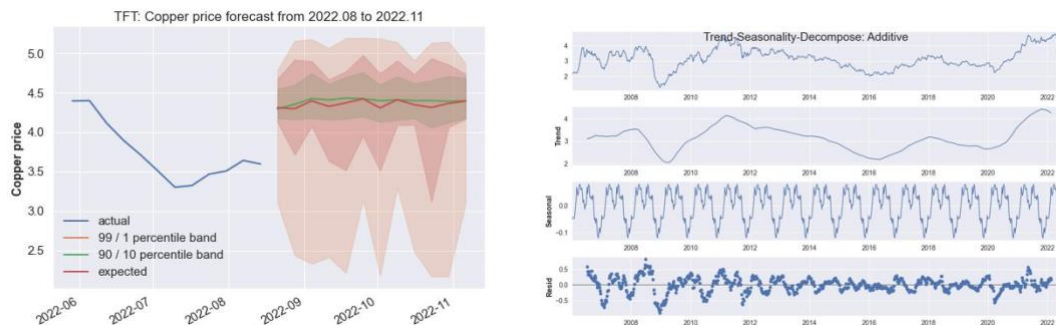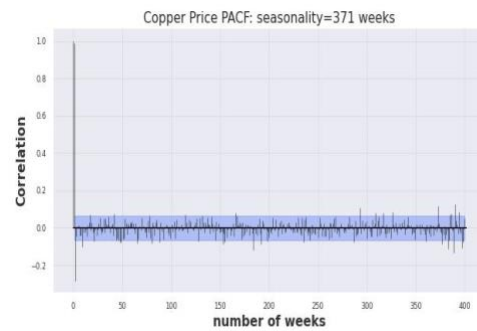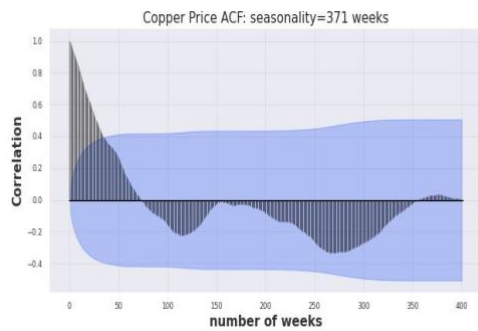
Oil Price -WTI

Oil price with roughly 2.5 years of seasonality is expected to stay in the upward trend.

Copper Price

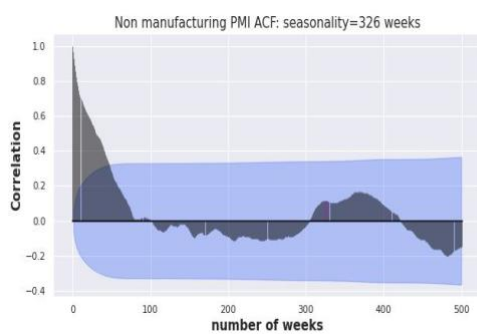Copper price with roughly 8 years of seasonality is expected to stay in the upward trend.

Copper Price ACF: seasonality=371 weeks

Copper Price PACF: seasonality=371 weeks

US Non-manufacturing PMI

This index, with roughly 6 years of seasonality, is expected to stay in the upward trend with the commodity price.

TFT: US-Non-Manufacturing PMI from 2022.08 to 2022.10

Trend-Seasonality-Decompose: Additive

Non manufacturing PMI PACF: seasonality=326 weeks



Non manufacturing PMI ACF: seasonality=326 weeks
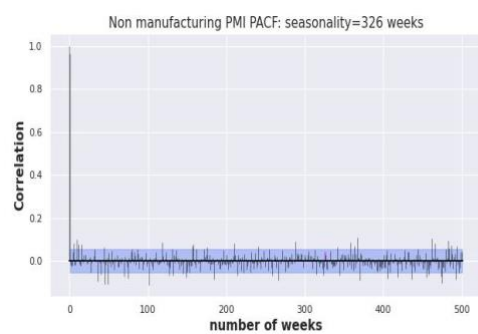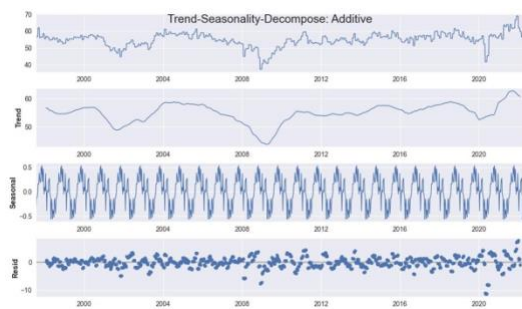
Deflation contributors: Demand side weak ahead

Our time-series model suggests the consumer confidence index and the employment will show some weakness in the 3-month horizon.

US Consumer confidence index

Although we see some discrepancy between the expected and actual levels, the model shows a declining trend three months ahead.
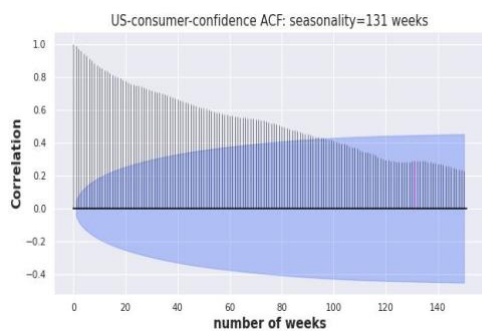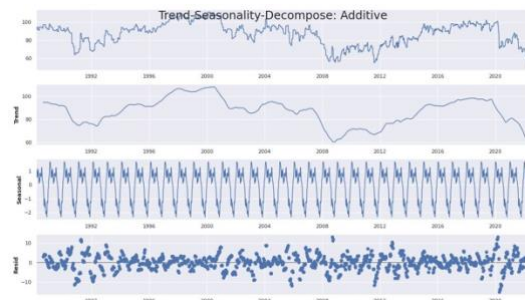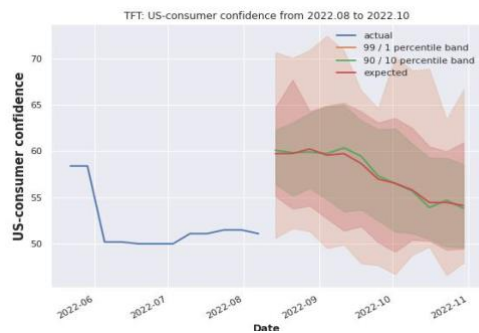
Non-Farm payroll and New Job-less

With 9 month seasonality our prediction for the employment data shows a gradual worsening future ahead.

TFT: US-newjobless from 2022.08 to 2022.10

Trend-Seasonality-Decompose: Additive

US-New-Jobless ACF: seasonality=36 weeks

US-New-Jobless PACF: seasonality=36 weeks