



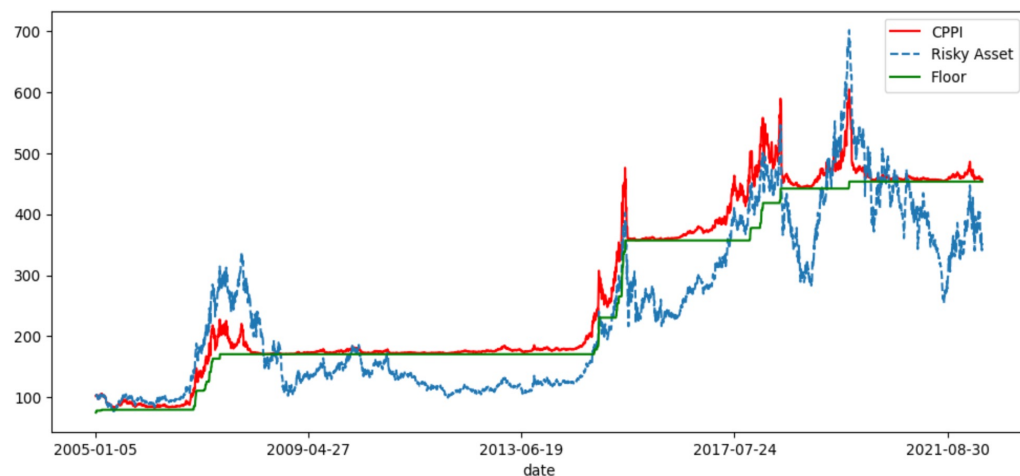
CMF Project “Algo-Hedge Fund”

Presented by Artem Ilin

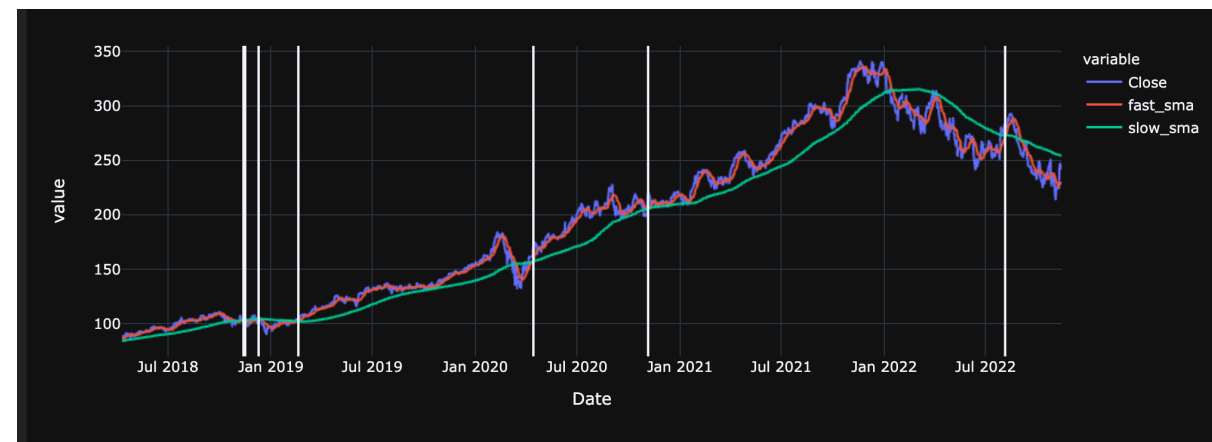
Feb 2023

Part 1: Strategies and ML

- CPPI



- Moving Average

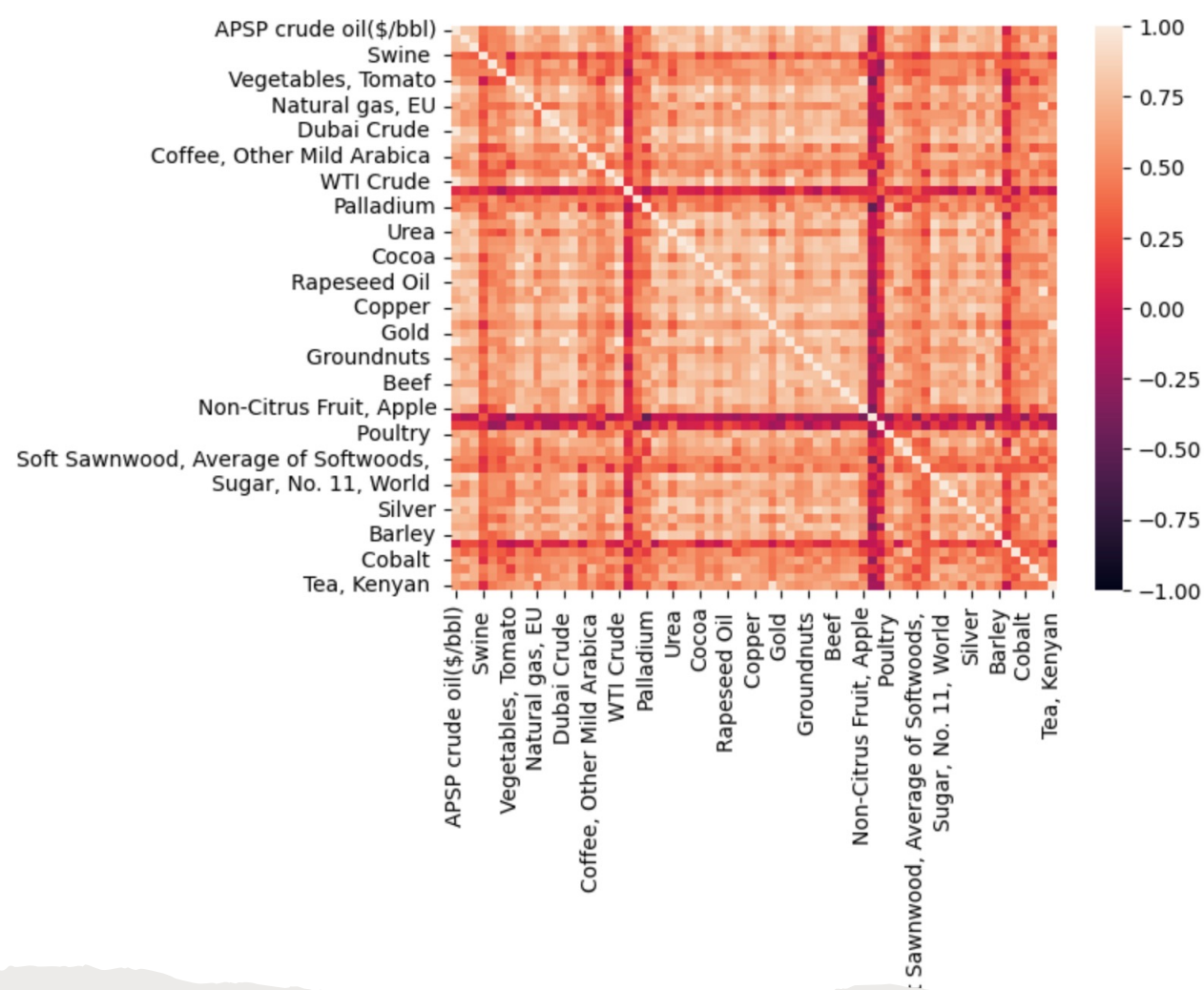


Macro

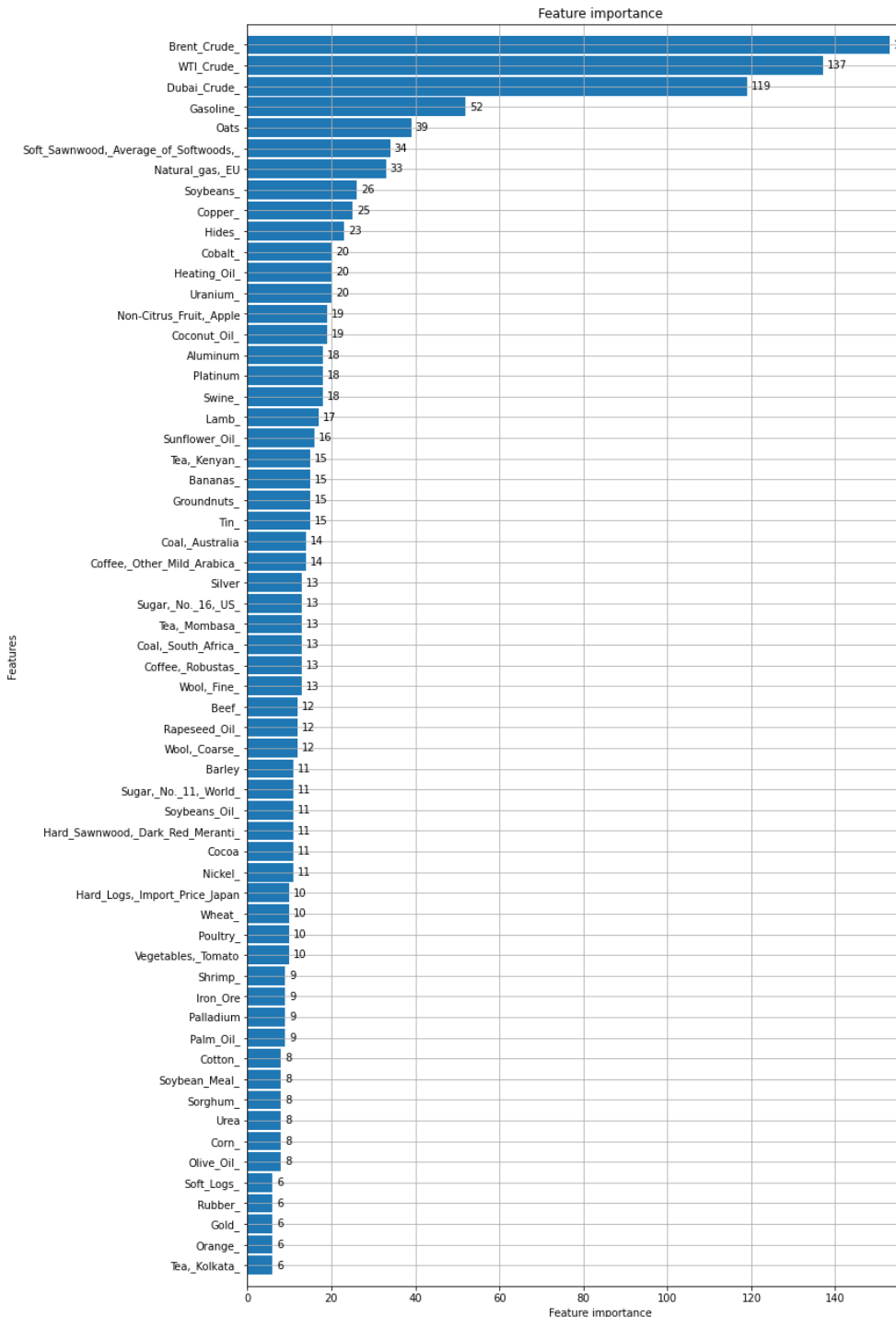
IMF Commodities Data 1990-2022

`'APSP crude oil($/bbl)'`





Correlation Matrix and Lasso



Running lightgbm to determine features importance

- Oats
- Softwood
- Soybeans
- Copper
- Hides
- Cobalt
- Heating Oil
- Uranium
- Apples
- Coconut Oil

Tests

- F-test
- T-test
- VIF Score

```
from statsmodels.stats.outliers_influence import variance_inflation_factor

def run_vif(df):
    vif = pd.DataFrame()
    vif['features'] = df.columns

    vif['vif'] = [variance_inflation_factor(df.values, i) for i in range(df.shape[1])]

    return(vif)
```

	features	vif
1	Uranium	4.003692
5	Poultry	12.019783
4	Coffee, Robustas	13.976314
3	Lamb	17.993315
2	Swine	20.740740
0	Hides	22.985027

	features	vif
0	Uranium	3.602549
1	Swine	15.335815
2	Lamb	13.090992
3	Coffee, Robustas	9.895261
4	Poultry	10.329726

	features	vif
0	Uranium	3.526962
1	Lamb	8.060172
2	Coffee, Robustas	9.223281
3	Poultry	9.219645

Predictive Models

Linear Regression

- R2: 0.16424671451356254
- MAPE: 0.27659548231379666

Gradient Boosting

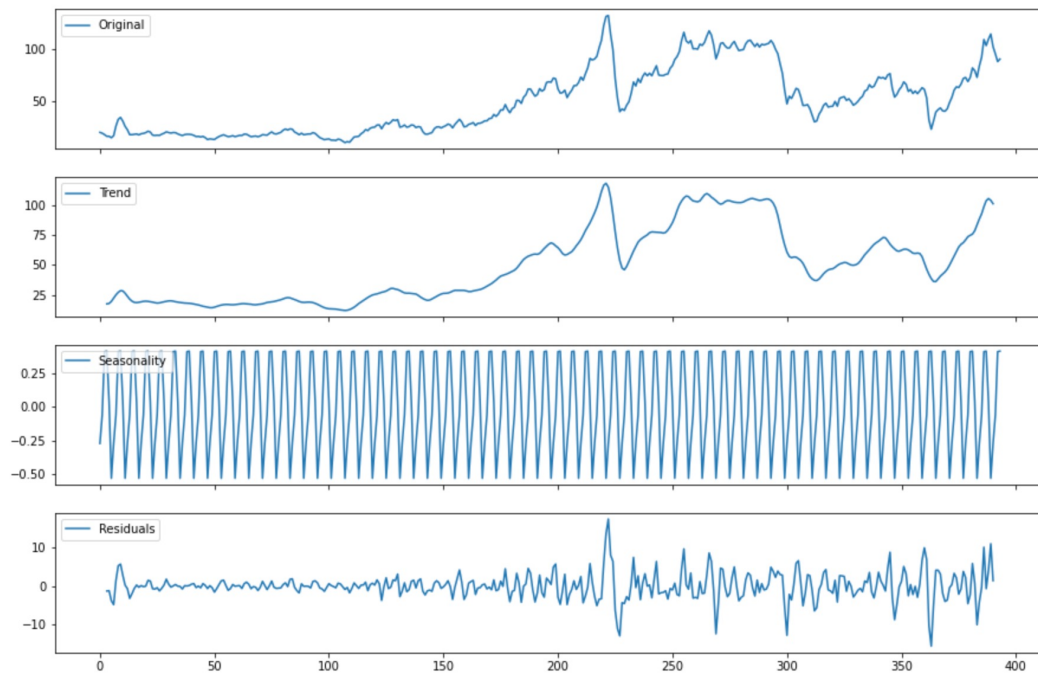
- R2: -0.40962697675375837
- MAPE: 0.40345644928973884

```
df_chosen2 = df[['Uranium ', 'Lamb ', 'Coffee, Robustas ', 'Poultry ']]
```

```
X, y = df[['Uranium ', 'Lamb ', 'Coffee, Robustas ', 'Poultry ']], df['APSP crude oil($/bbl)']  
X_train, X_test, y_train, y_test = X[X.index < norwgd], X[X.index >= norwgd], y[y.index < norwgd], y[y.index >= norwgd]
```


Future developments

Seasonality



Macroeconomics Footprint

- ESG
- Covid's impact

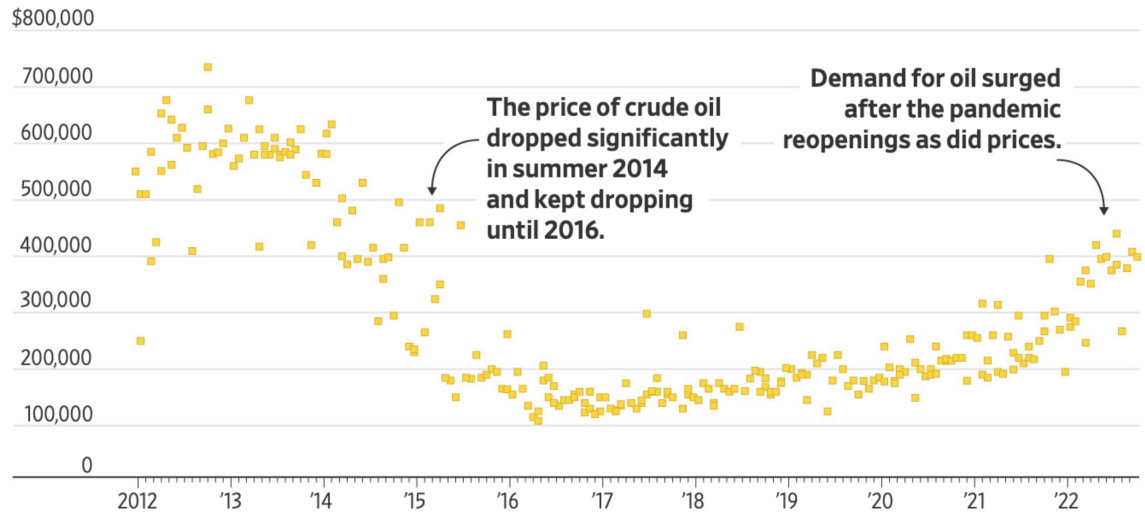


Why ESG?

Affects drilling

Drillship day rates

Drillship lease price per day, computed from signed contracts



Source: Westwood Global Energy Group
Camille Bressange/The Wall Street Journal

Affects prices and business



Carbon Credits



ESG ETFs/Portfolios



Adds restrictions



Debates: Green-Washing and Data credibility

Covid's Impact

China's zero covid
policies and
Crude's price
explosions

Deaths and
Government
spendings

Healthcare Trends

To be continued

