

1. Research Question

What are the most influential factors determining crude oil price?

2. Dataset

Response: West Texas Intermediate (WTI)

Predictors: 27 predictors in 6 factor groups – Supply factor, Demand factor , Financial Market factor, Commodity Market factor, Speculative factor and Geopolitical factor

3. Methodology

Multiple Linear Regression (MLR) Modeling

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_p X_p + \varepsilon$$

Model Selection

- Pairwise Collinearity
- Criterion-Based Selection: AIC (14 predictors) , **BIC (10 predictors)**, and Adjusted R-Squared (15 predictors).



4. Result & Conclusion

The most influential factors (Descending Order ↓)

- Europe GDP growth (-)
- US GDP growth (+)
- U.S. based federal funds rate (-)
- OPEC surplus crude oil production capacity (-)
- Capacity utilization rate (-)
- ISM manufacturing index (+)
- Terror (+)
- S&P GSCI non-energy index (+)
- U.S. steel production (+)
- global crude oil closing stock (-)

Diagnostics

- Linear Regression Assumptions: Linearity, Homoscedasticity, Normality, Independence
- Multicollinearity: Variance Inflation Factor(VIF)

Limitations

- Potential errors in the dataset, biased data collection, omission of other influential data, etc.

Future work

- Time series analysis, etc.

