Examining the Impact of Oil Prices on Commodity Prices

As the Department in charge of Planning and Economic Affairs, we seek to understand the effect of oil price fluctuations on the prices of key commodities exported and imported by our country, including tea, sugar, and coffee.

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Dataset Acquisition Process

1

Kaggle Download

Obtained the dataset from Kaggle.

2

Library Import

Imported required libraries like pandas, seaborn, and matplotlib.

3

Extraction

Extracted the downloaded dataset files.

The process of acquiring the dataset involved downloading it directly from Kaggle, a popular platform for data science and machine learning projects. After importing the necessary libraries, the dataset files were extracted and made ready for further analysis.
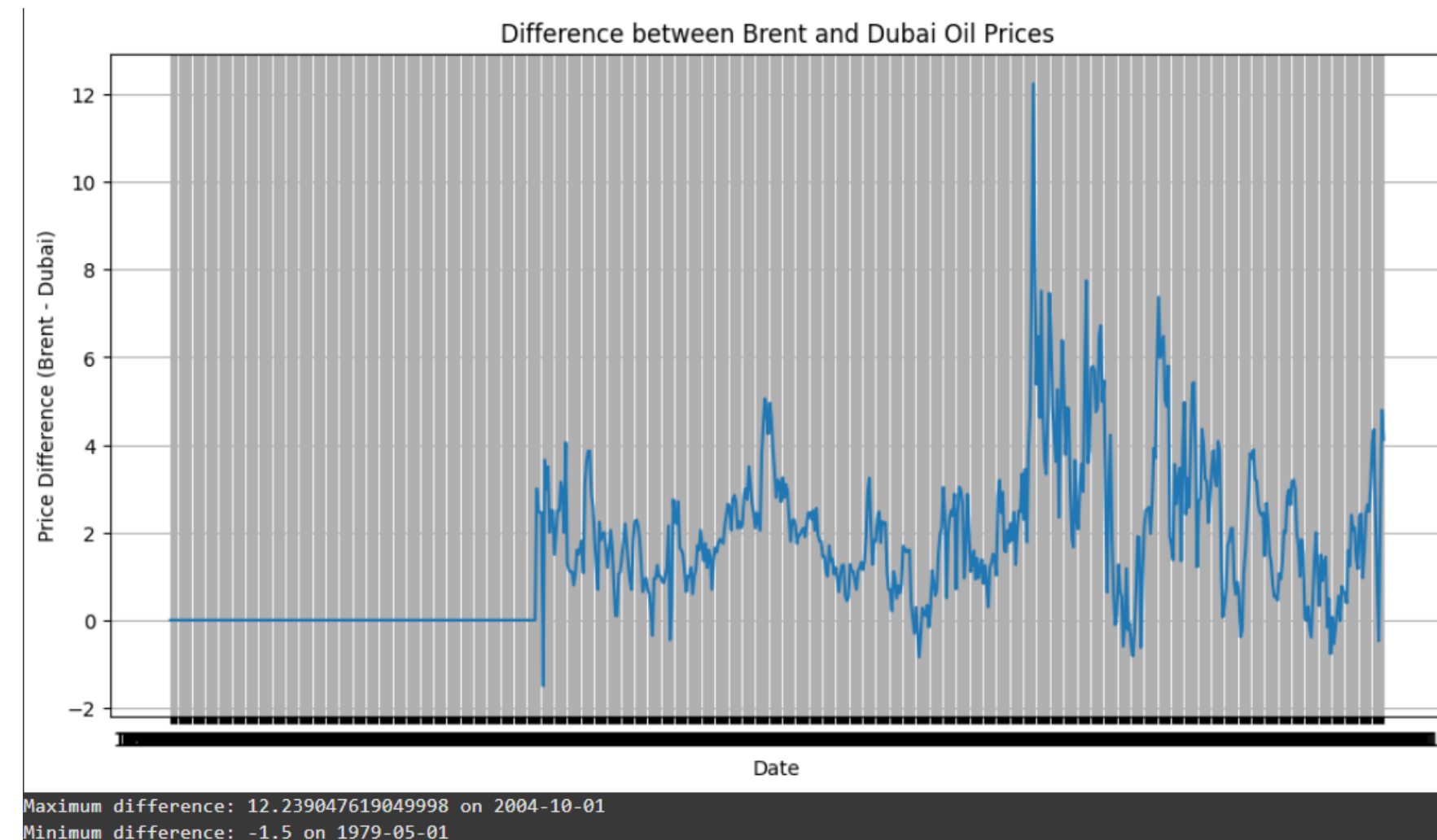
Commodity Prices

Brent oil

Dubai oil

Teta

Robatca
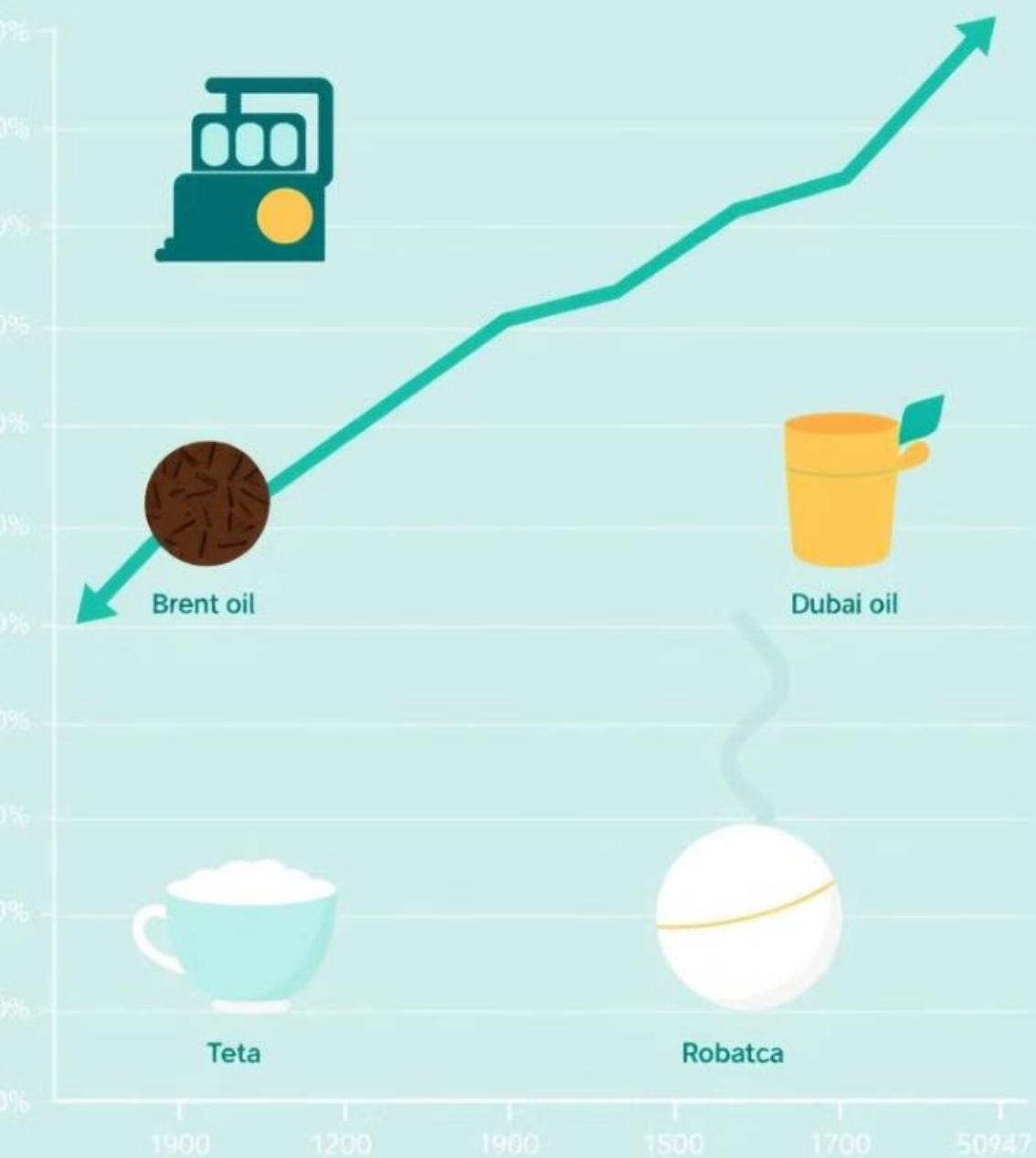
Serten/oil, duaber tites.coms

Oil Price Differences

The data shows that the prices for Brent and Dubai crude oil are marginally different across the time period provided.

Difference between Brent and Dubai Oil Prices

Maximum difference: 12.239047619049998 on 2004-10-01
Minimum difference: -1.5 on 1979-05-01

Choosing Between Brent and Dubai

Correlation Analysis

The analysis shows a strong positive correlation between Brent and Dubai oil prices, with a correlation coefficient of around **0.99.** This indicates that the two prices tend to move in a similar direction and magnitude.

Scatter Plot Visualization

The scatter plot provides a visual representation of the correlation, with the data points clustering along a linear trend line. This further confirms the close relationship between the Brent and Dubai oil price movements.

Implications for Analysis

Given the high correlation, either Brent or Dubai oil prices can be used for the subsequent analysis, as they are likely to provide similar insights. The choice may depend on factors such as data availability or market relevance for the specific application.

Correlation between Brent and Dubai oil prices: 0.9990503314013095

Correlation between Brent and Dubai Oil Prices
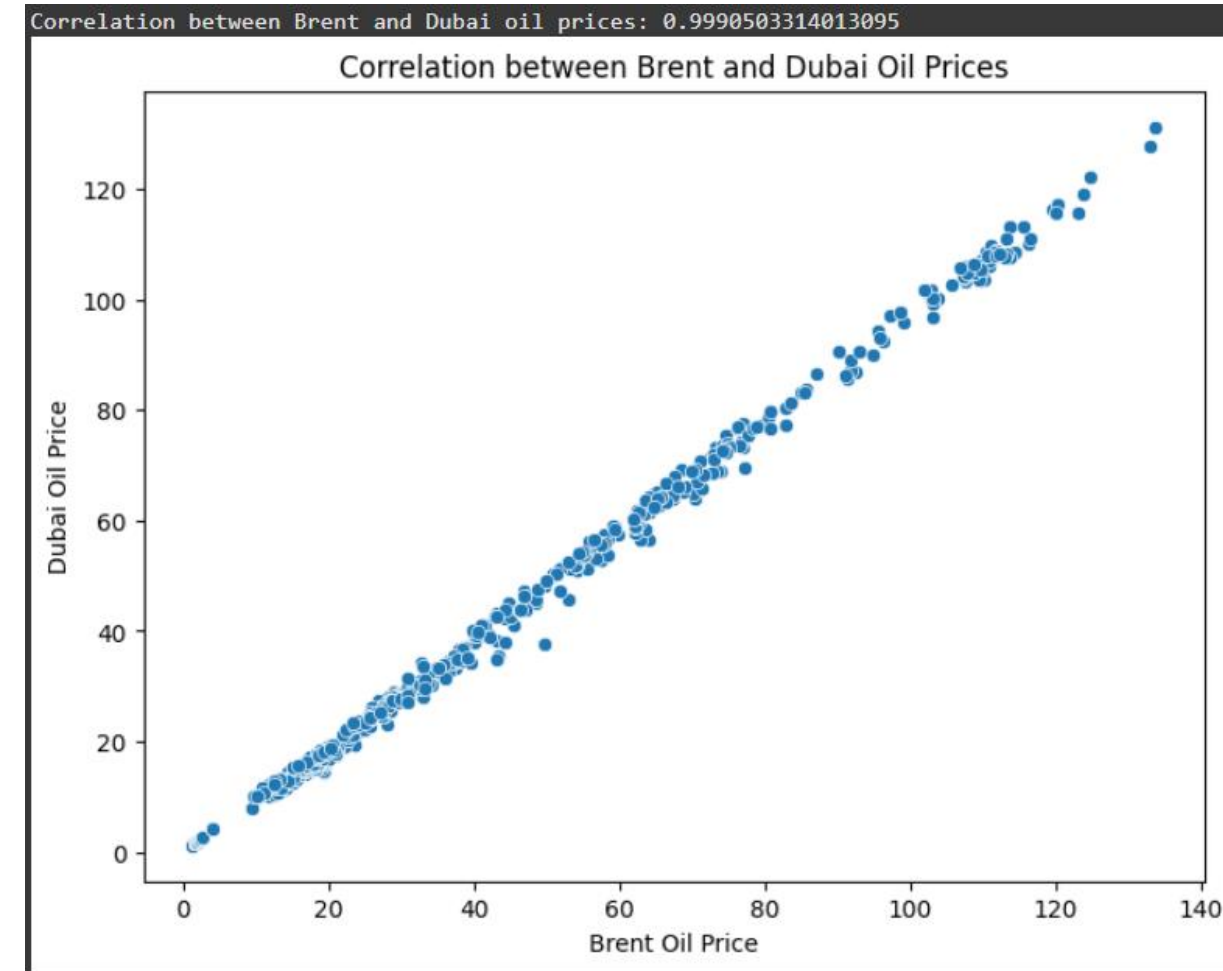
Choosing Between Brent and Dubai

Price Difference

The analysis reveals a notable price difference between Brent and Dubai oil over time. This variation highlights the need to choose the oil price that is most relevant for your specific geographic region or industry.

High Correlation

The two oil prices are highly correlated, indicating they tend to move in similar directions. If your analysis focuses on general oil price trends, either Brent or Dubai could be acceptable.

Geographic Considerations

Brent is primarily used as a global benchmark, especially in Europe, while Dubai is more relevant for the Middle East and Asia; Our export market.

Commodity Correlation with Oil Dubai

After removing the unnecessary columns from the original dataset, we can now focus on analyzing the correlation between oil Dubai and other commodities. This analysis will help us understand the relationships and interdependencies between different markets.

1.63
Oil Dubai
The average price of oil Dubai in the dataset.

0.93
Coffee Arabica
The average price of coffee arabica in the dataset.
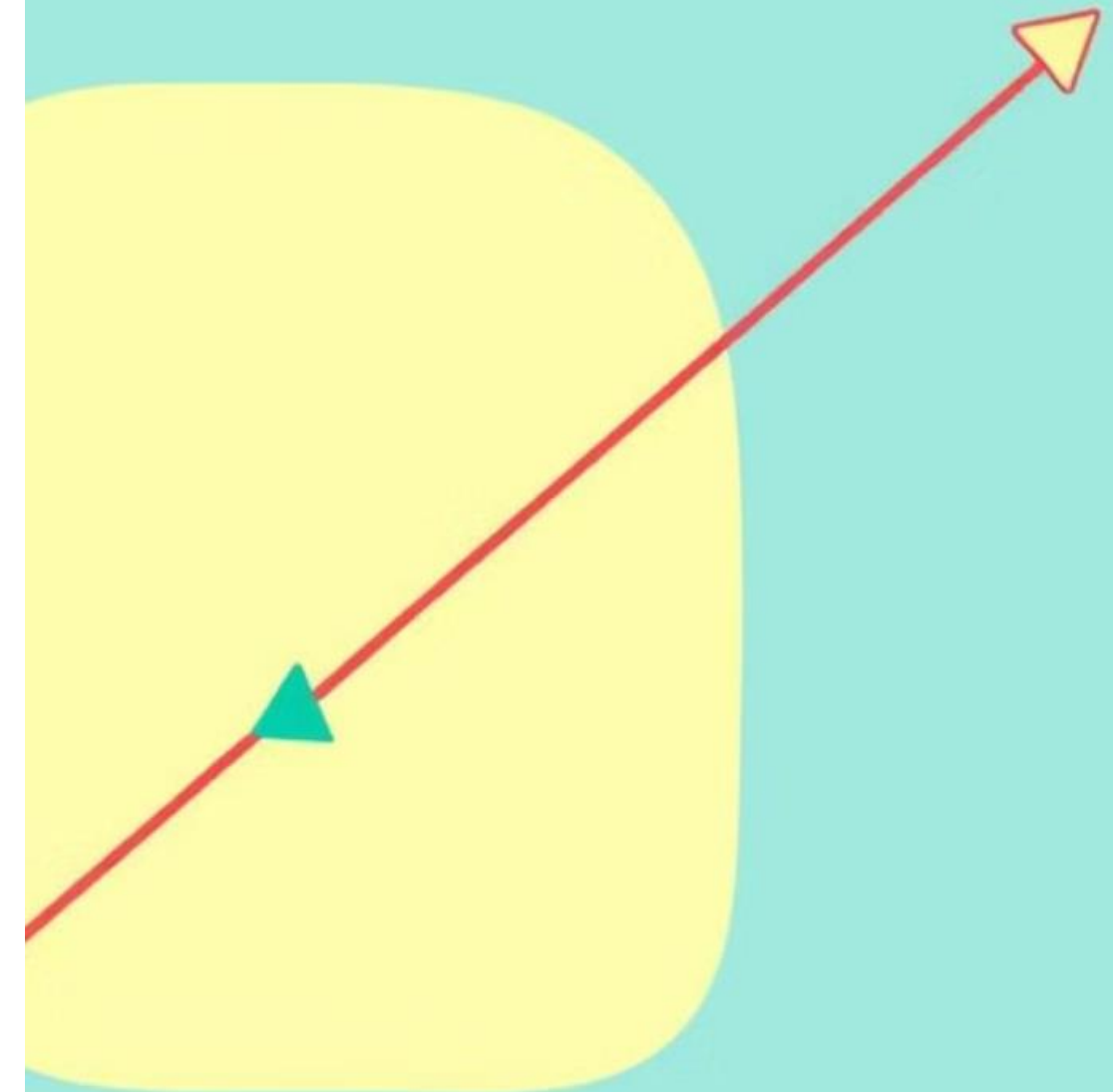
1.12
Tea Kolkata
The average price of tea from Kolkata in the dataset.

0.12
Tea Mombasa
The average price of tea from Mombasa in the dataset.
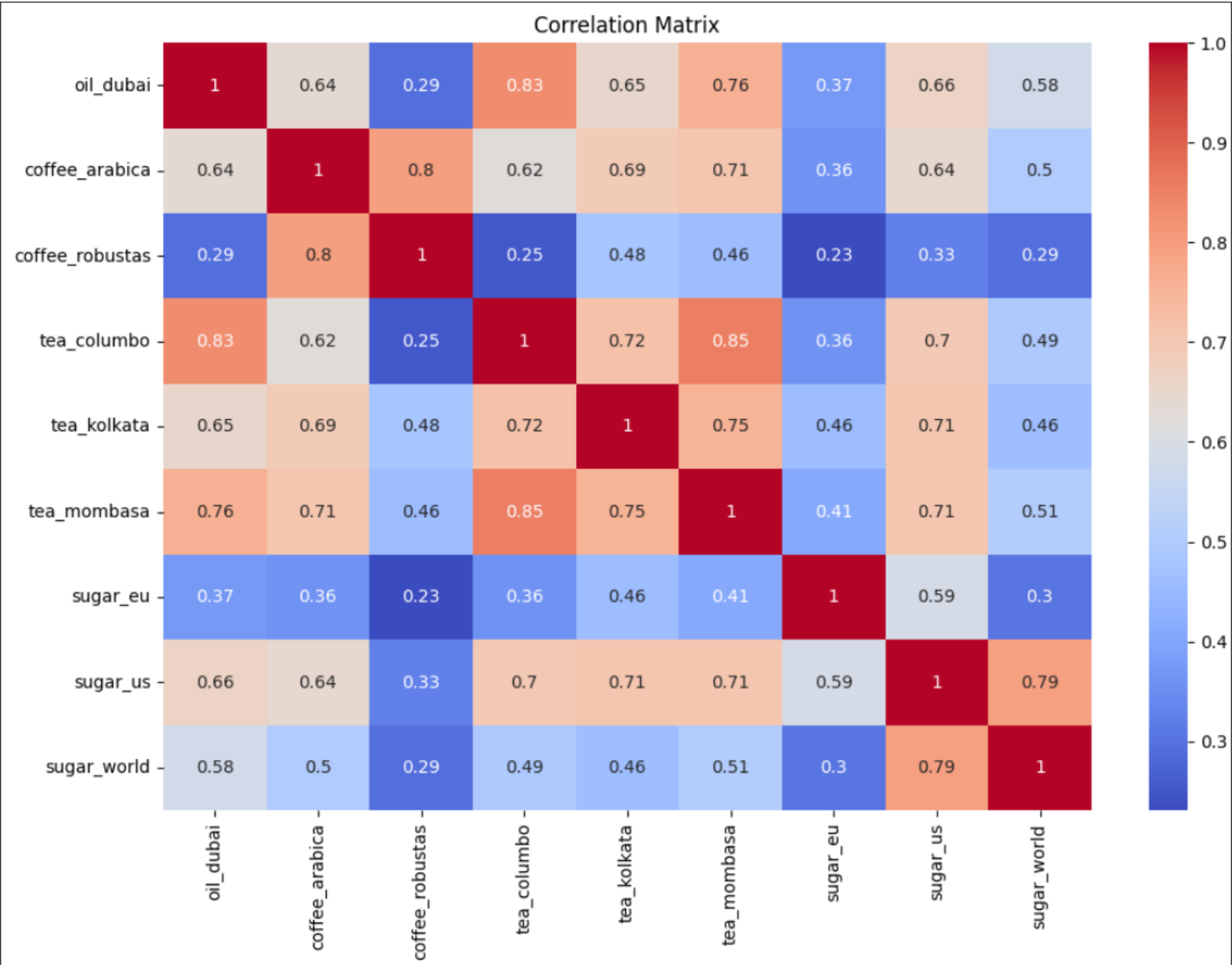
correlation matrix

Correlation Matrix Visualization

The correlation matrix provides a comprehensive view of the relationships between oil Dubai and various commodities. The matrix shows strong positive correlations between oil Dubai and tea Columbo (0.83), sugar US (0.66), and coffee Arabica (0.64), indicating these commodities tend to move in a similar direction with oil Dubai prices.

Weaker correlations are observed with commodities like coffee Robustas (0.29) and sugar EU (0.37), suggesting more independent price movements.

```
oil_dubai         1.000000
coffee_arabica    0.637200
coffee_robustas   0.292352
tea_columbo       0.829778
tea_kolkata       0.648664
tea_mombasa       0.760027
sugar_eu          0.372103
sugar_us          0.664593
sugar_world       0.579741
```


Correlation Matrix

	oil_dubai	coffee_arabica	coffee_robustas	tea_columbo	tea_kolkata	tea_mombasa	sugar_eu	sugar_us	sugar_world
oil_dubai	1	0.64	0.29	0.83	0.65	0.76	0.37	0.66	0.58
coffee_arabica	0.64	1	0.8	0.62	0.69	0.71	0.36	0.64	0.5
coffee_robustas	0.29	0.8	1	0.25	0.48	0.46	0.23	0.33	0.29
tea_columbo	0.83	0.62	0.25	1	0.72	0.85	0.36	0.7	0.49
tea_kolkata	0.65	0.69	0.48	0.72	1	0.75	0.46	0.71	0.46
tea_mombasa	0.76	0.71	0.46	0.85	0.75	1	0.41	0.71	0.51
sugar_eu	0.37	0.36	0.23	0.36	0.46	0.41	1	0.59	0.3
sugar_us	0.66	0.64	0.33	0.7	0.71	0.71	0.59	1	0.79
sugar_world	0.58	0.5	0.29	0.49	0.46	0.51	0.3	0.79	1

Linear Regression Analysis

```
Linear Regression: coffee_arabica vs. oil_dubai
                OLS Regression Results
================================================================
Dep. Variable:        coffee_arabica   R-squared:           0.406
```

Coffee Arabica vs. Oil Dubai

1

The linear regression analysis reveals a strong correlation between coffee arabica and oil Dubai prices. The R-squared value of 0.406 indicates that 40.6% of the variation in coffee arabica prices can be explained by changes in oil Dubai prices.

```
Linear Regression: tea_columbo vs. oil_dubai
                OLS Regression Results
================================================================
Dep. Variable:        tea_columbo   R-squared:           0.689
```

Tea Columbo vs. Oil Dubai

2

Similarly, the linear regression for tea columbo shows a significant relationship with oil Dubai prices. The model summary provides insights into the strength and statistical significance of this correlation.

Sugar US vs. Oil Dubai

3

The analysis also explores the impact of oil Dubai prices on sugar US, another commodity with a high correlation. The linear regression results shed light on the nature and magnitude of this relationship.

```
Linear Regression: sugar_us vs. oil_dubai
                OLS Regression Results
================================================================
Dep. Variable:        sugar_us   R-squared:           0.442
```

Final Decision by the Department

We have successfully levered AI for economic insights. As a department of Planning and Economic Affairs, keeping supply and demand dynamics, global economic growth, geopolitical events and other factors constant, we should perhaps invest more in the export of tea columbo as we stand to gain more foreign income from it (the higher the oil prices, the higher the tea prices).