Oil Profitability Analysis

By
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AGENDA

Introduction

Assess the production value data

Build a predictive model

Share insights

Final tips & takeaways

Problem Statement

The Primary Goal:

- Analyze oil and gas production across different countries other than U.S.
- Determine which areas are the most profitable for future investment.
- The analysis will consider like production trends in those areas.

Raw Data Sample

	country_name	type	product	flow	year	value
0	Australia	Balance	Crude oil	Industrial Production	2021	18029.678
1	Austria	Balance	Crude oil	Industrial Production	2021	561.852
2	Belgium	Balance	Crude oil	Industrial Production	2021	0.000
3	Canada	Balance	Crude oil	Industrial Production	2021	266630.180
4	Chile	Balance	Crude oil	Industrial Production	2021	340.997

2376 Rows
6 Columns

Data Wrangling

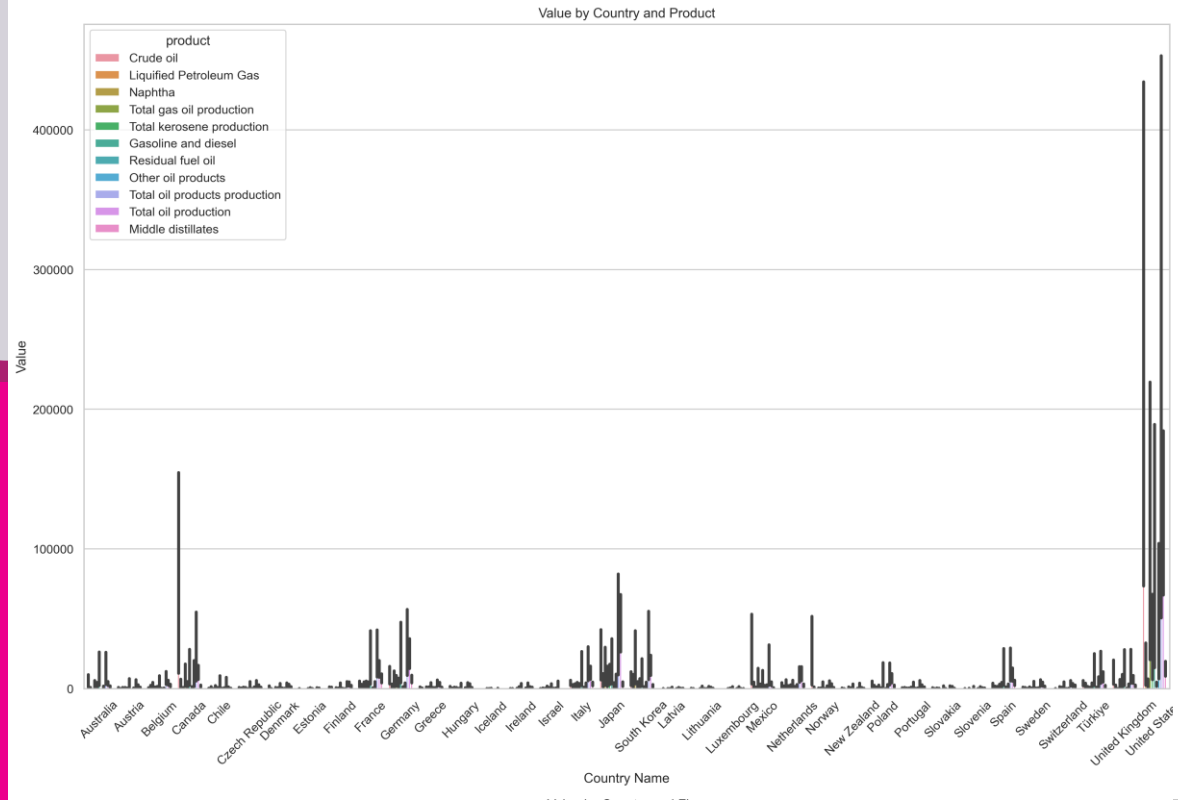
Original dataset had 2376 rows and Rows

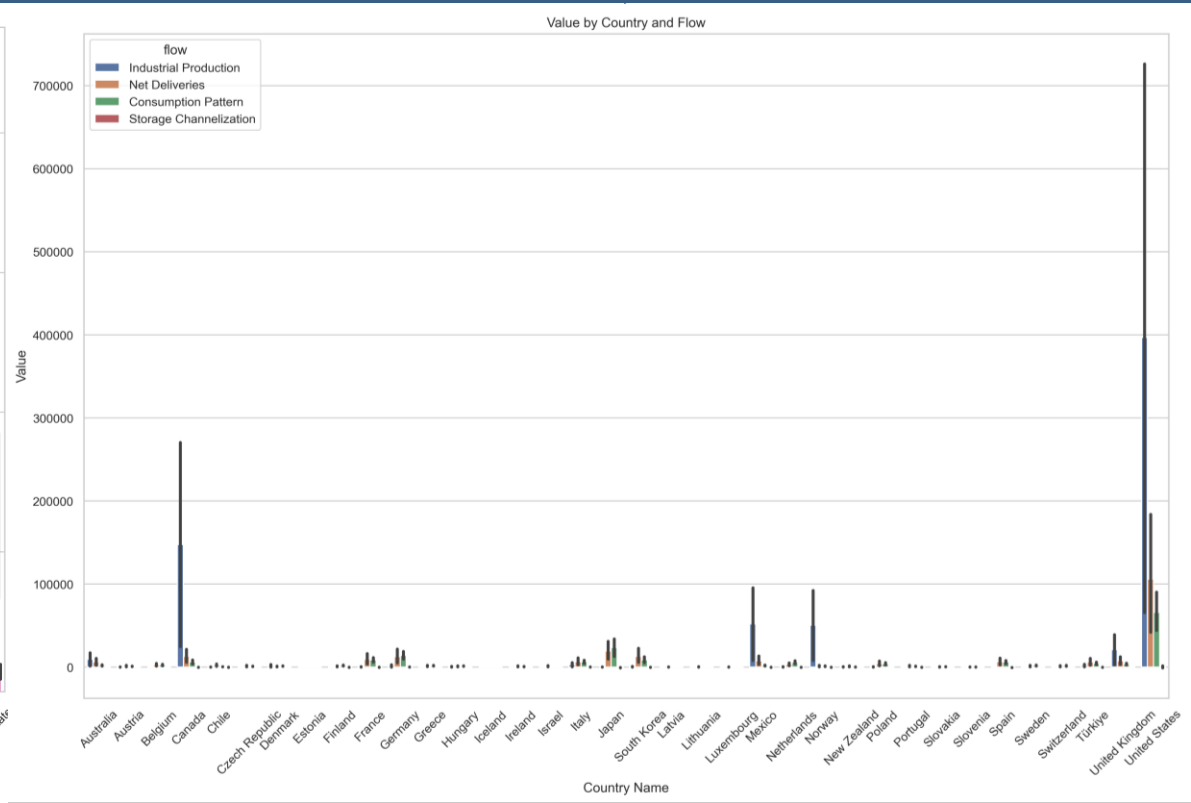
6 columns

- Drop unnecessary columns
- Assess the raw data
- Display data samples to understand its structure
- Data Cleaning: Identify and handle missing values
- Target Variable: Production value

Exploratory Data Analysis

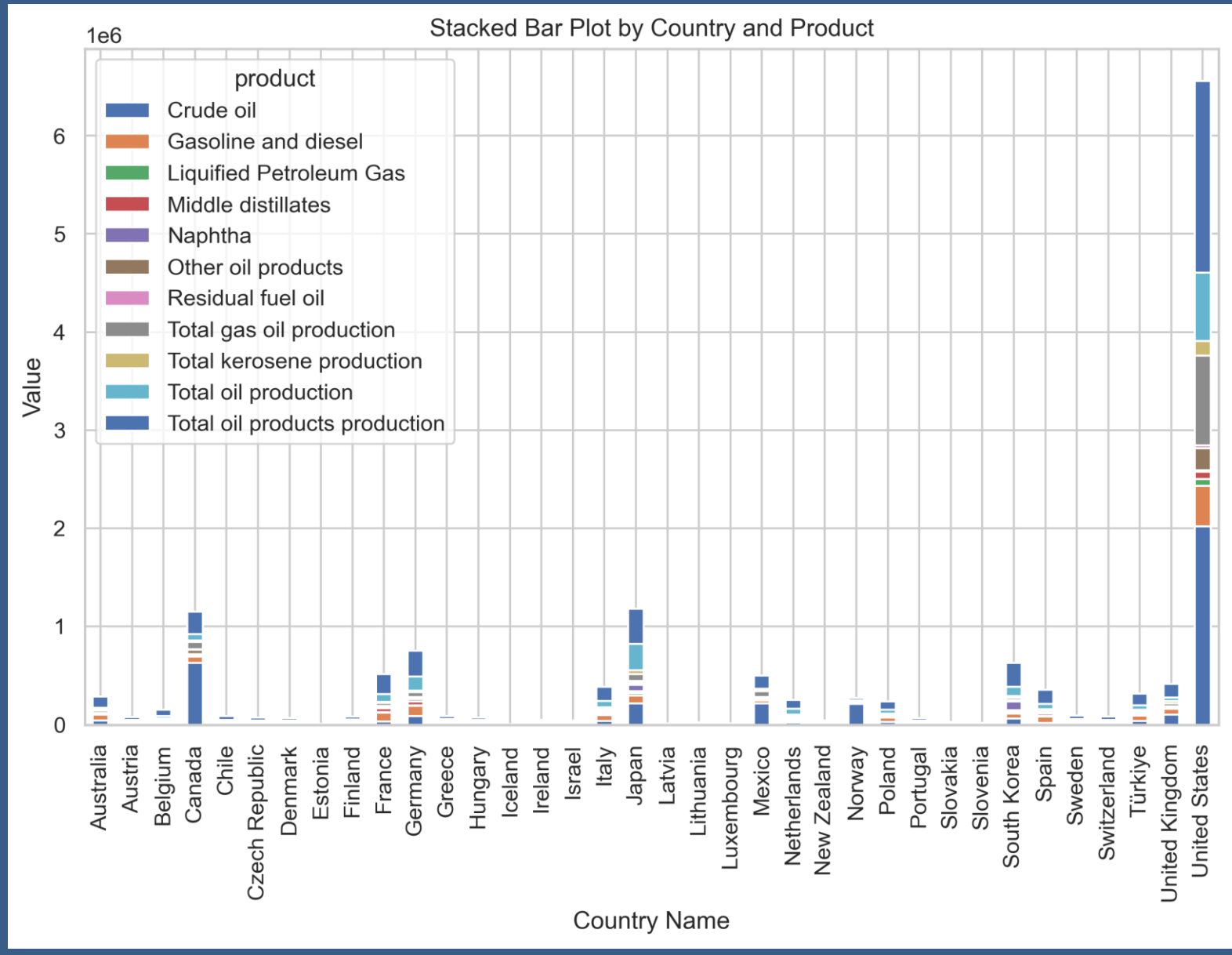
- Analyzing Feature (Independent Variables) Distributions





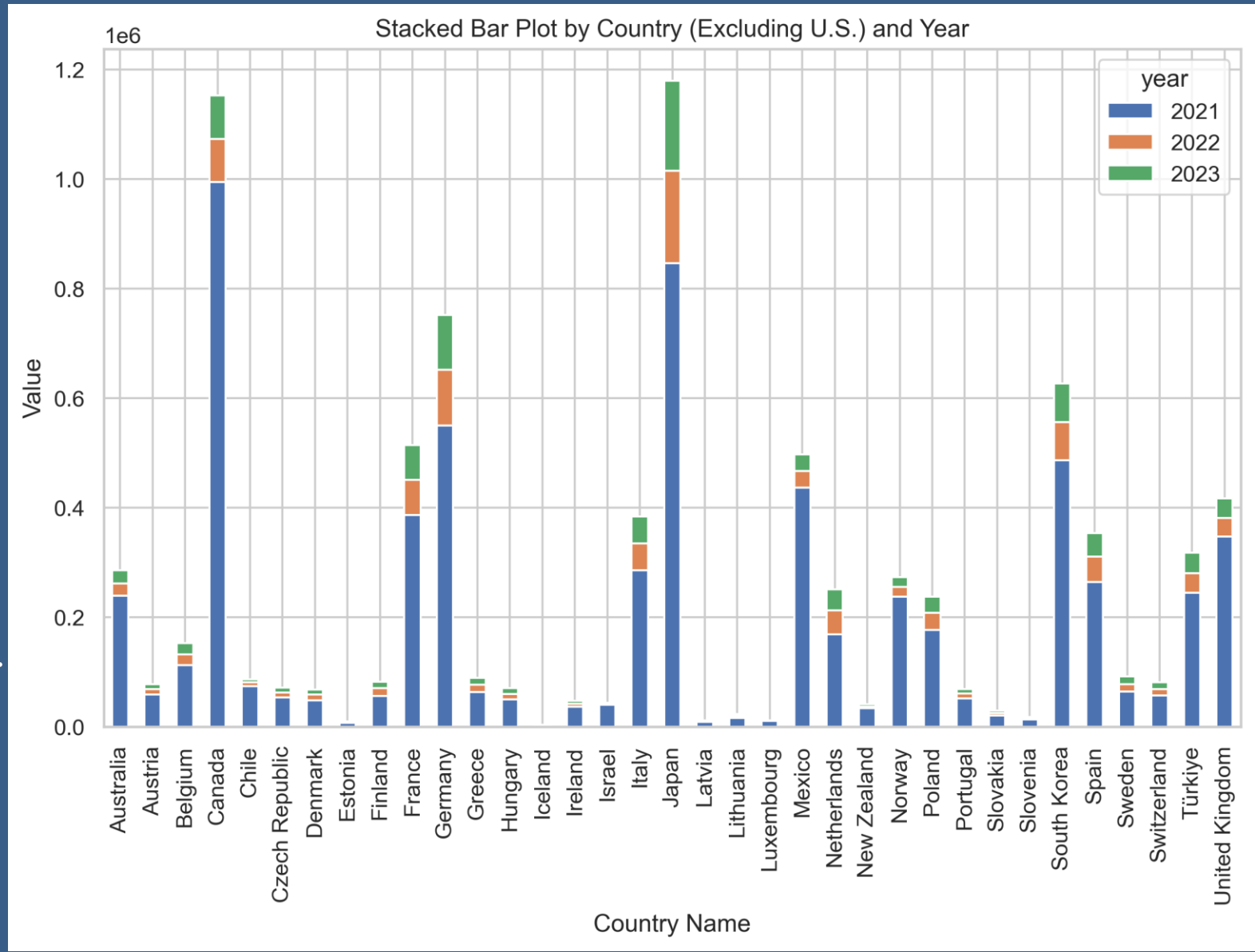
Exploratory Data Analysis

- Analyzing Feature (Independent Variables) Distributions



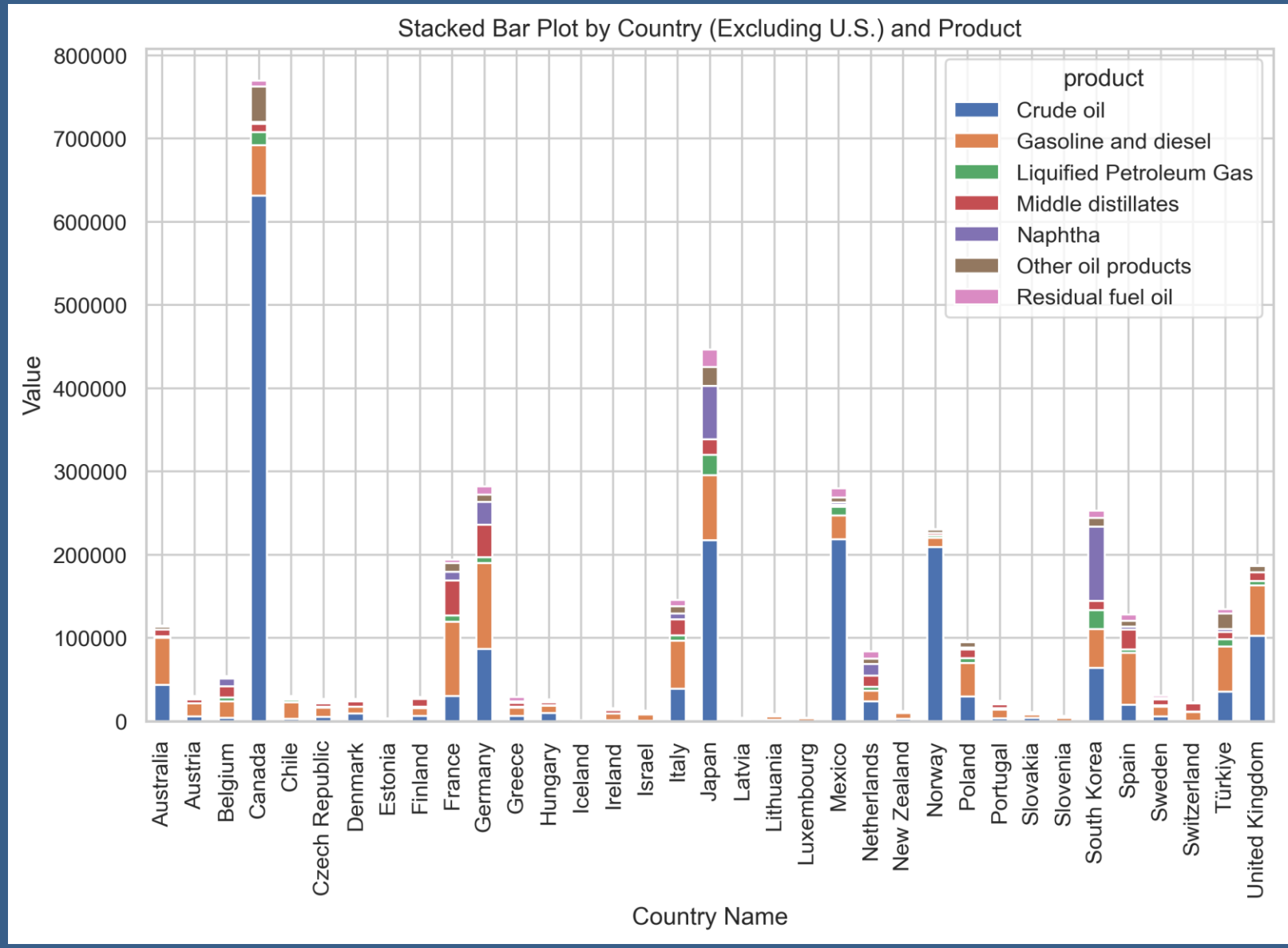
Exploratory Data Analysis

- Analyzing Feature (Independent Variables) Distributions outside of U.S.



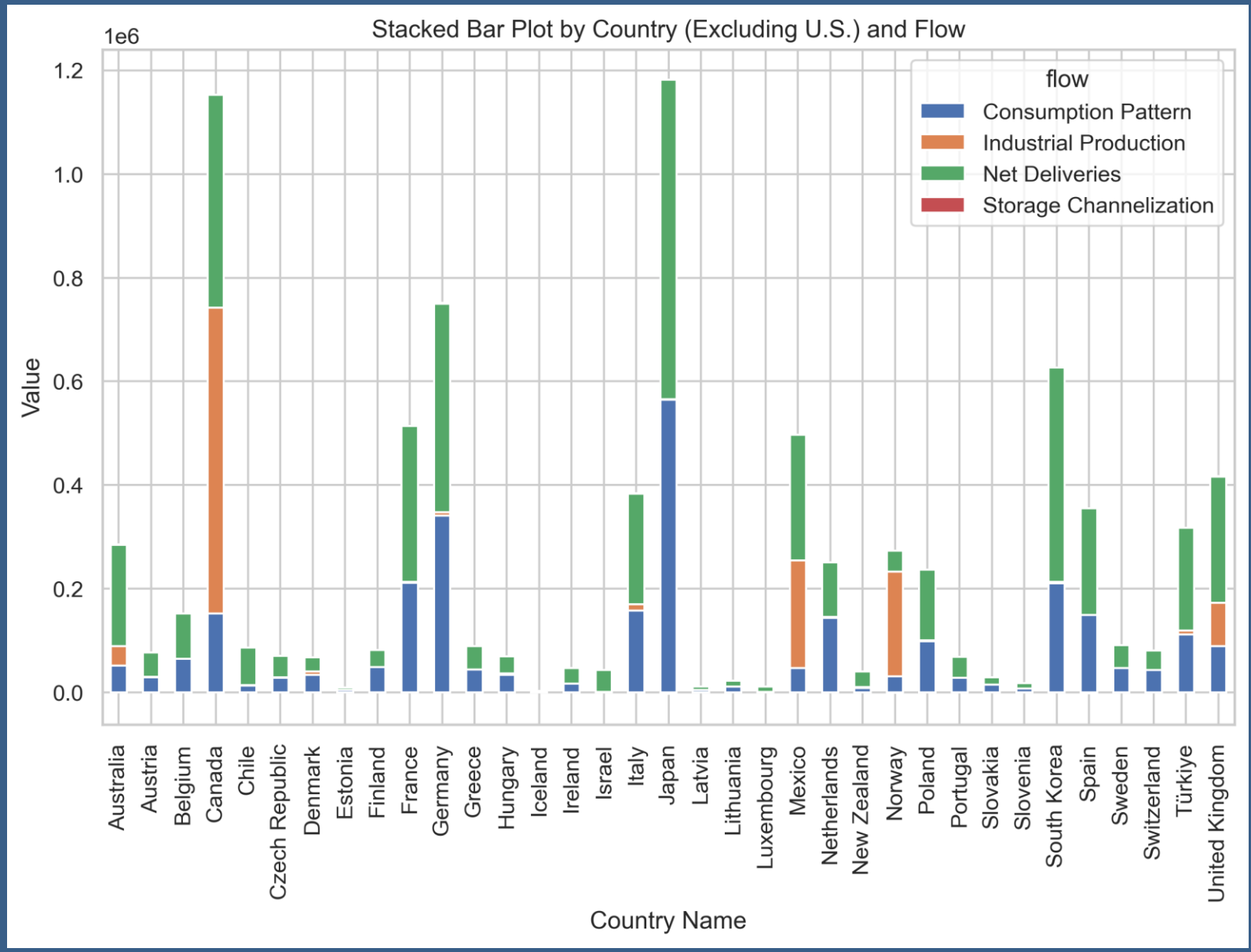
Exploratory Data Analysis

- Comparing values by product outside of U.S.



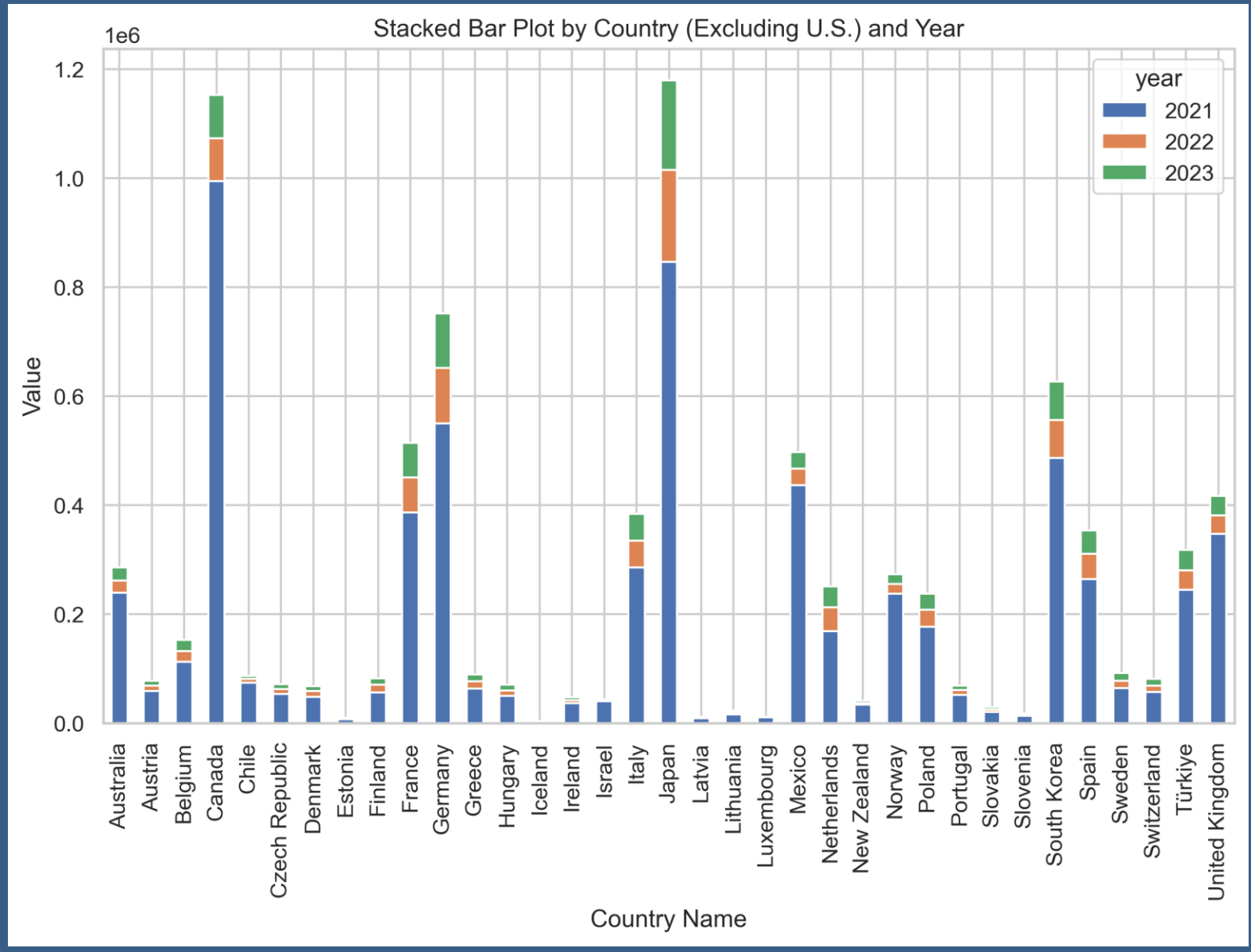
Exploratory Data Analysis

- Comparing values by Flow features outside of U.S.



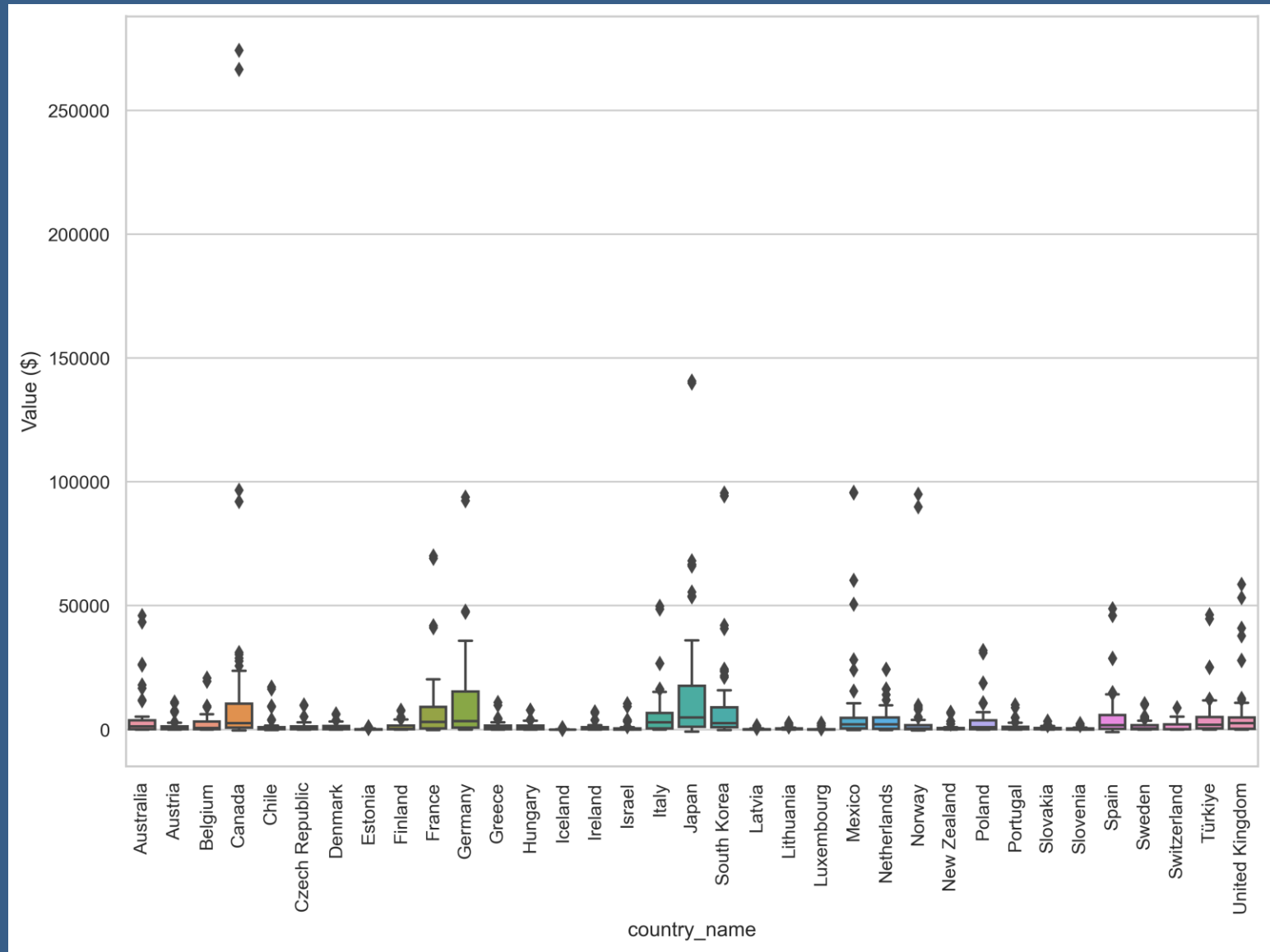
Exploratory Data Analysis

- Yearly distributions of production values outside of U.S.



Exploratory Data Analysis

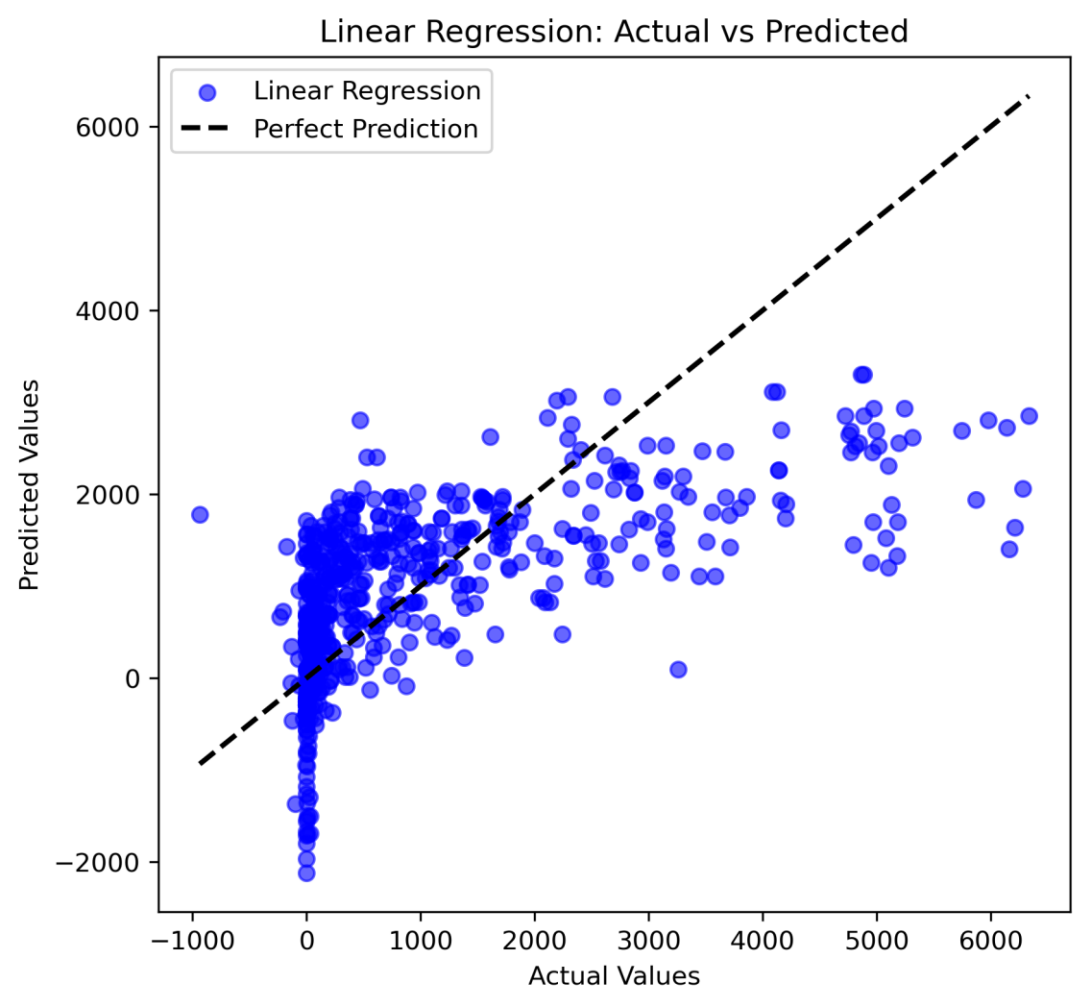
- Analyzing features for outliers
  - Canada has exaggerated outlier compared to other countries

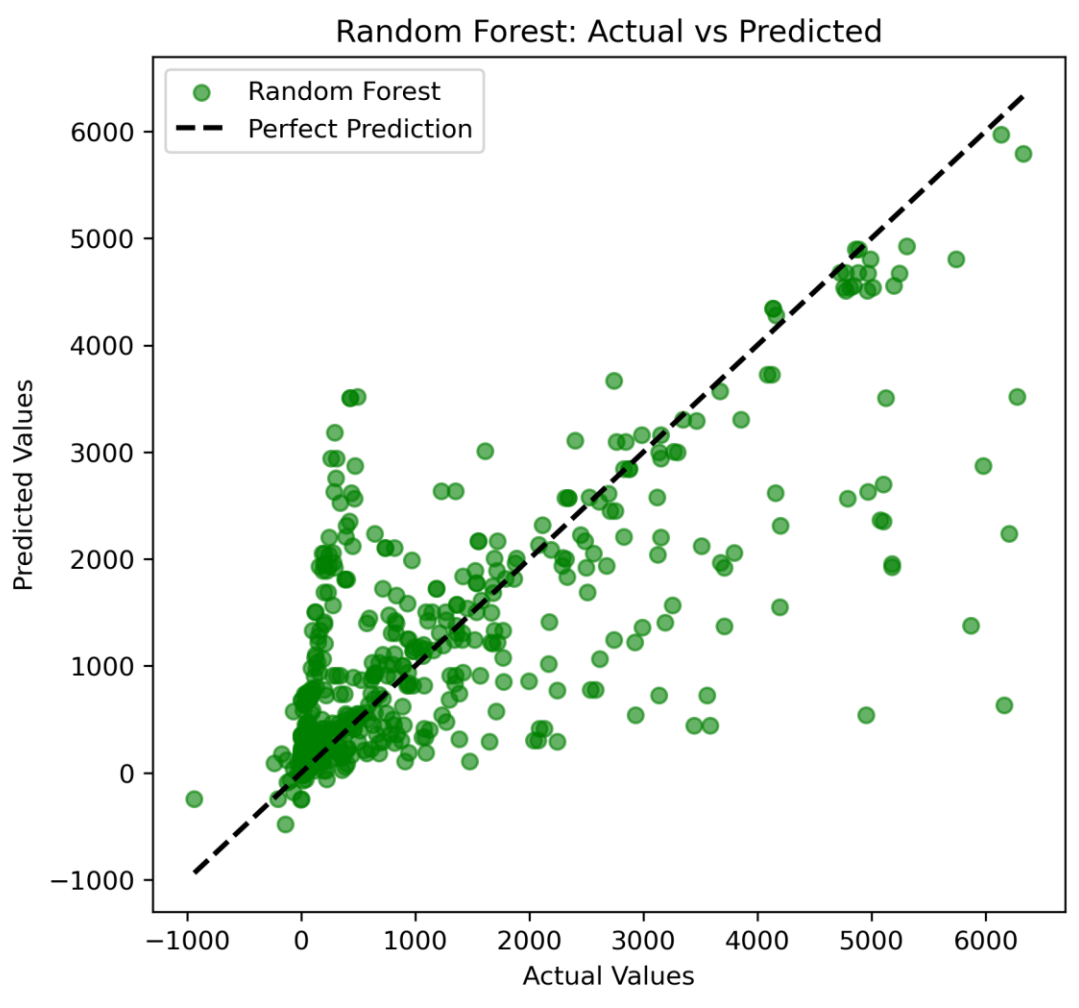


Modeling Evaluation

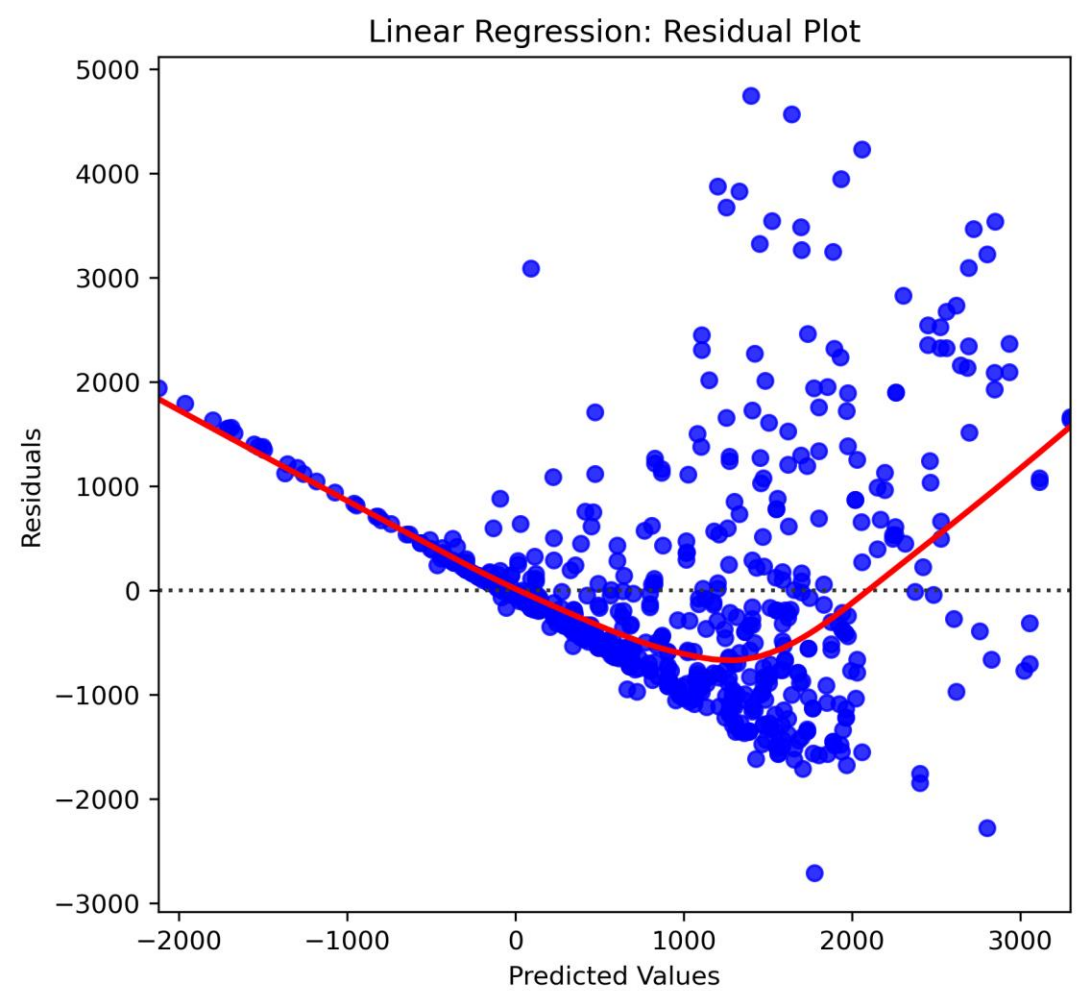
- **Compared models:**
- **Linear Regression**
  - **Evaluation:**
    - Mean Absolute Error: 803.25
    - Mean Squared Error: 1213187.81
    - R^2 Score: 0.39
- **Random Forest Regressor**
  - **Evaluation:**
    - Mean Absolute Error: 515.6194
    - Mean Squared Error: 828804.4951
    - R^2 Score: 0.59

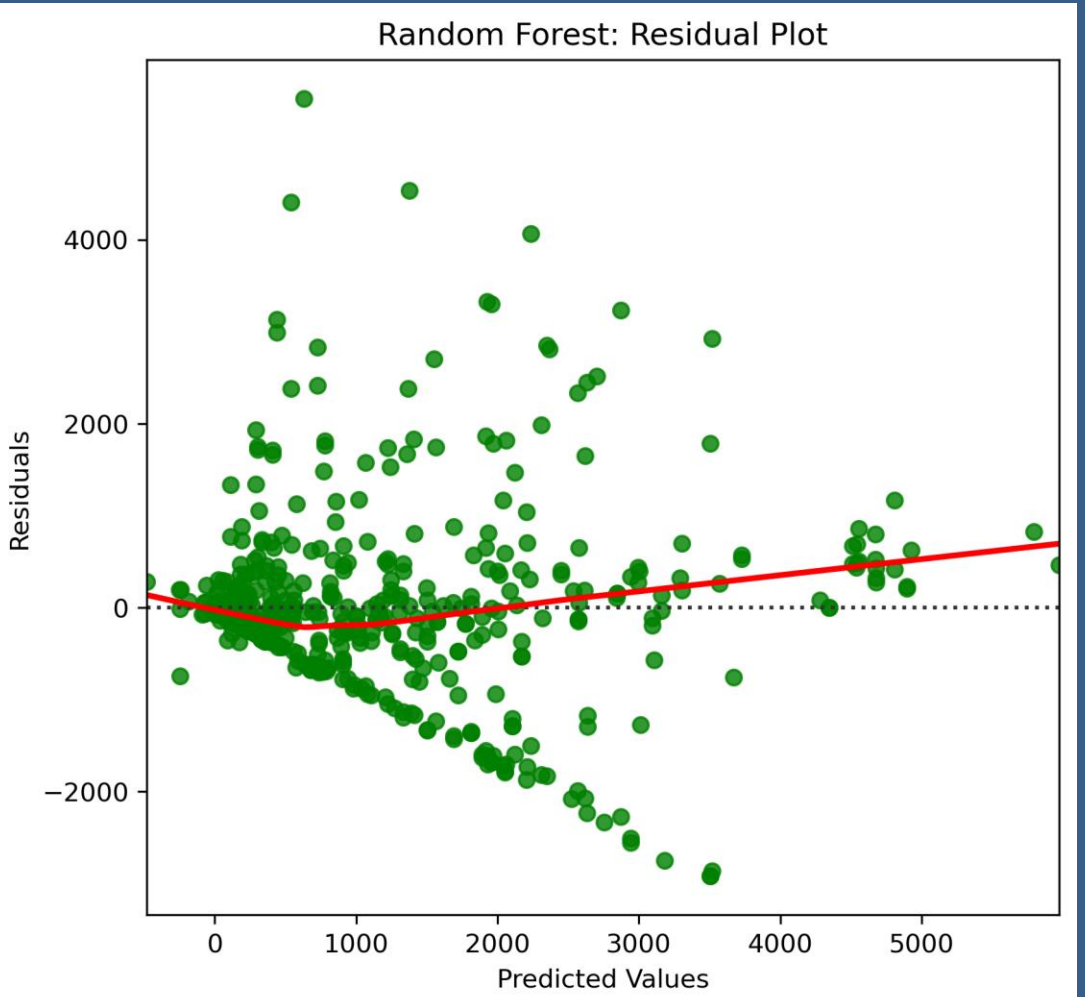
Predictions vs. Actual Values Evaluation



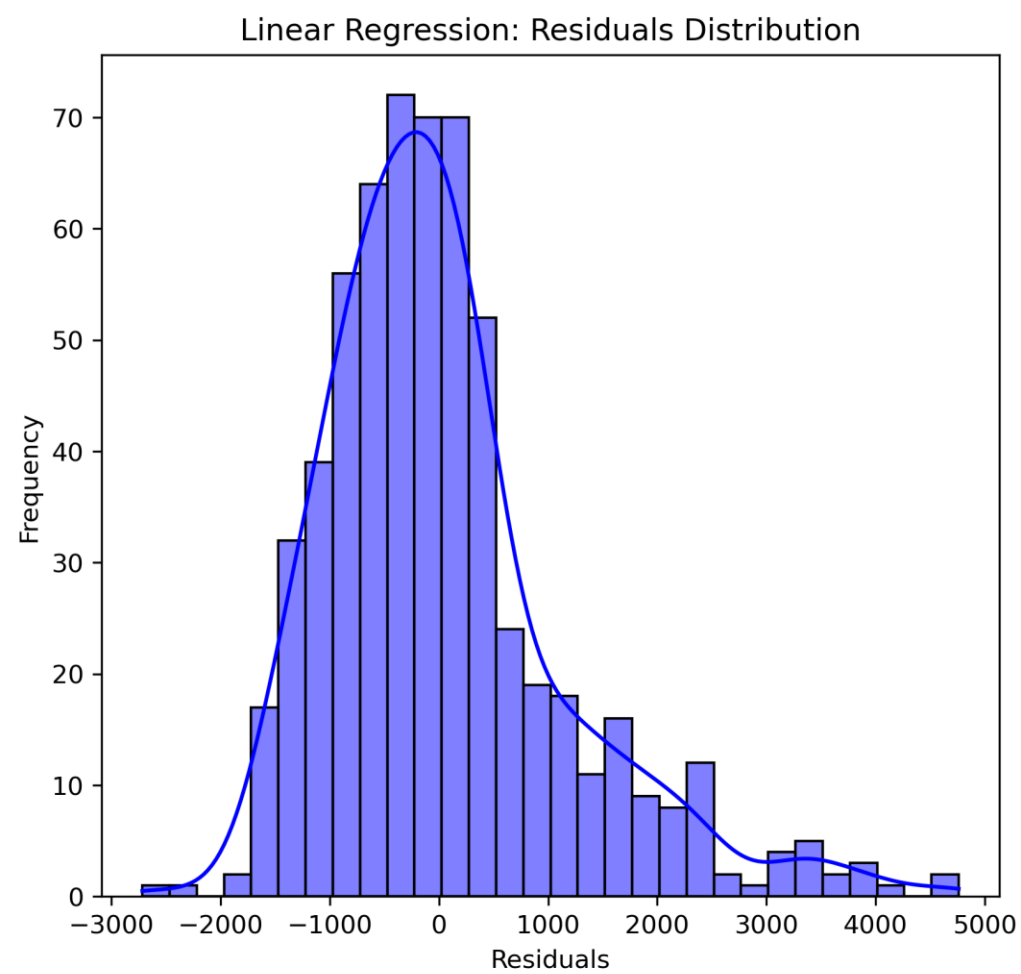


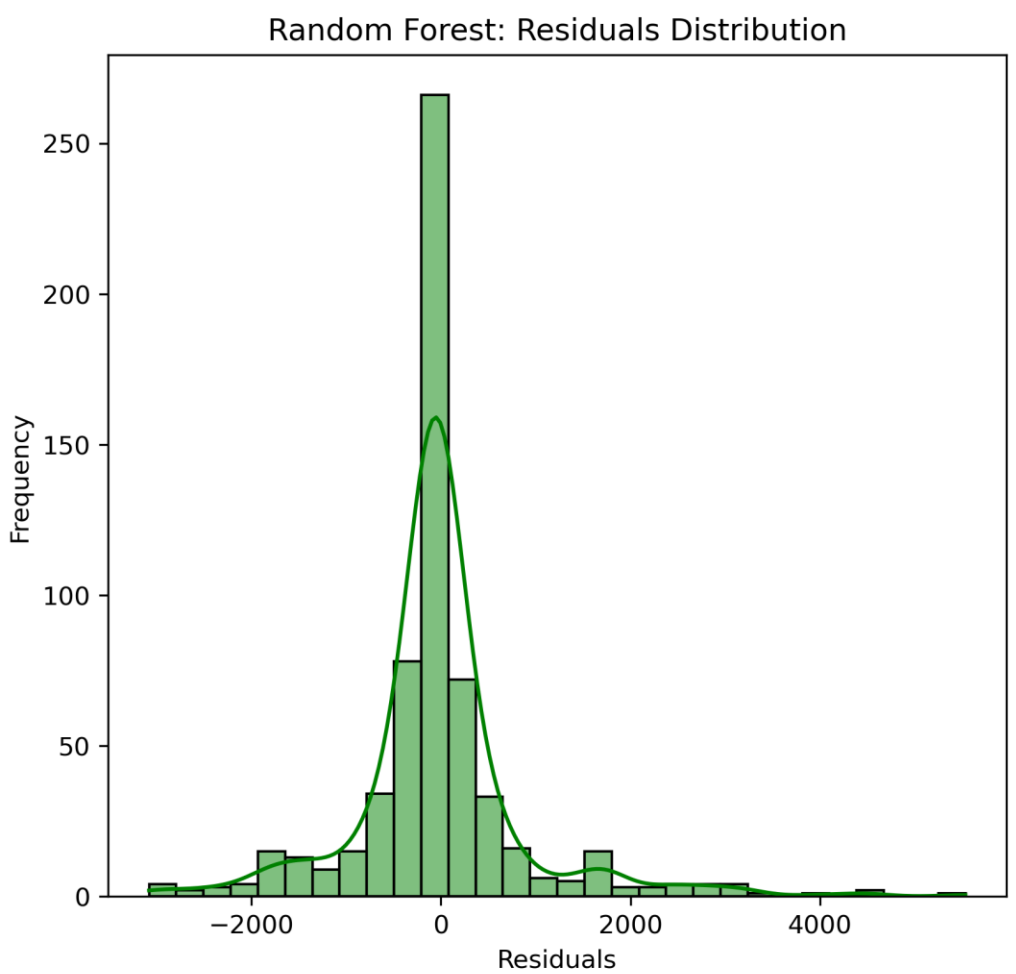
Model Residuals Plot Evaluation





Model Residuals Distribution Evaluation





Takeaways & Final Tips:
• Model Performance

- The Random Forest Regressor outperformed the Linear Regression model in terms of both R^2 score (0.59 vs. 0.39) and error metrics. The Random Forest model captured non-linear relationships and interactions between features better than the simpler linear model, making it more suitable for this type of analysis.

- The Linear Regression model provided a baseline but had a relatively low R^2 score, suggesting that linear assumptions might not be sufficient to model the complexities of the oil production data.

Takeaways & Final Tips:
• Investment Insights

- Countries with stable or growing production, such as Canada, Saudi Arabia, and Russia, are likely to be attractive investment targets.
- However, production declines in other countries could point to regions where there is potential for future growth if investment is directed toward improving infrastructure and technological innovation.

THANK YOU

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