Oil Price Shocks & Conflict Escalation

Economic Impact of Oil Price Volatility

Ian, David, Jana, Artyom

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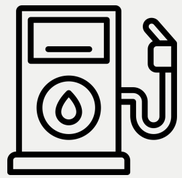
Introduction

Ian, David, Jana, Artyom

On a mission to explore

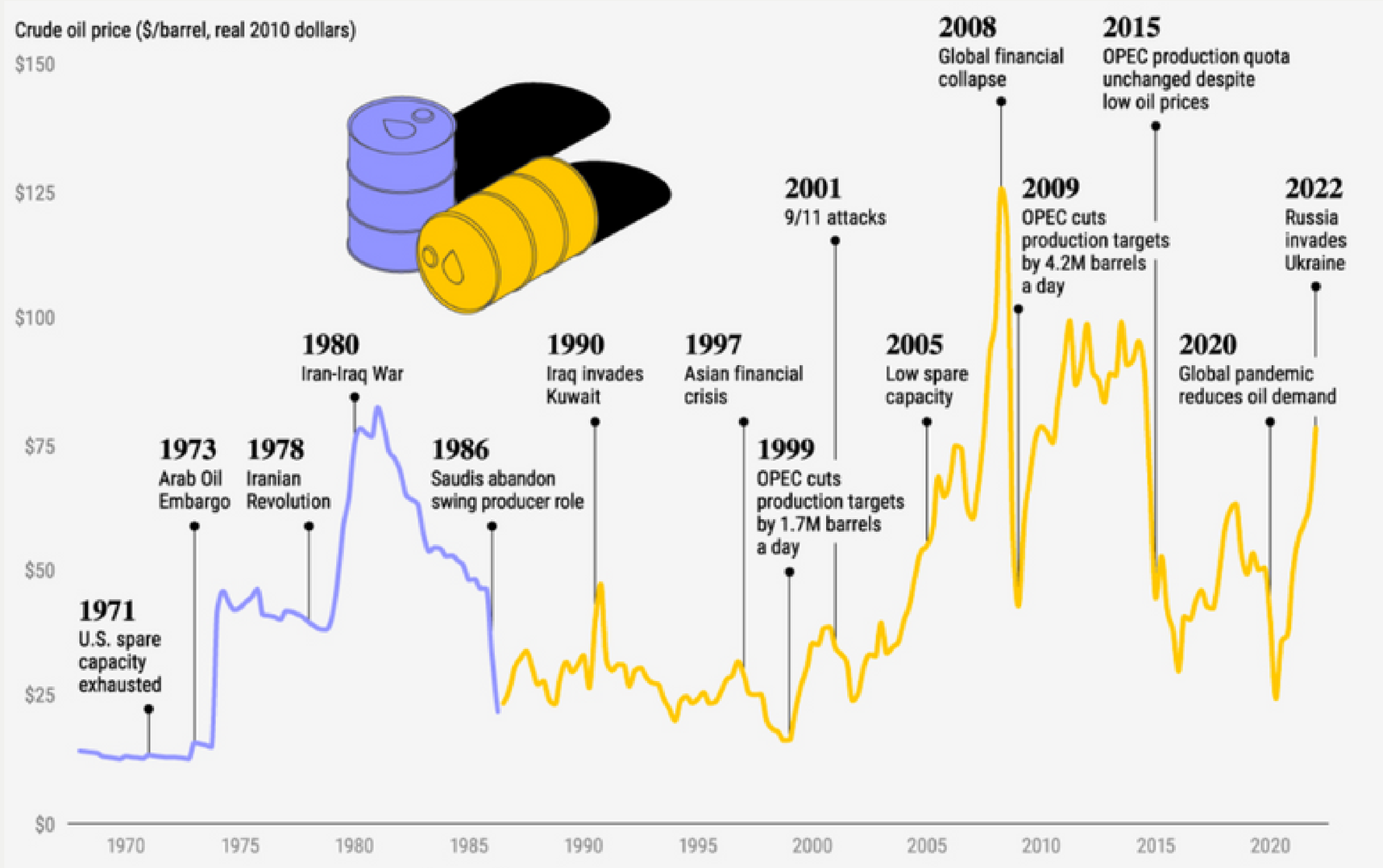


The relationship between crude oil prices, GDP, inflation and total export of G20 and OPEC countries.

To understand the impact of oil sector of the economy.

Why is it important?

Oil sector is cyclical - sensitive to economic cycles



Data Sources

West Texas Intermediate (WTI)

Widely recognized proxy for crude oil

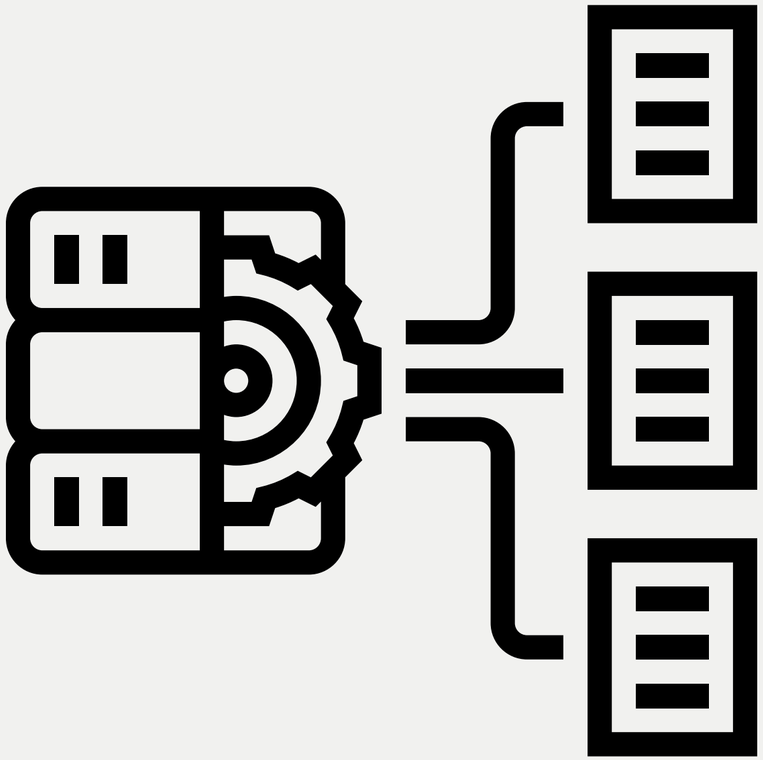
Source: Yahoo API

Economic Indicators (World Bank)

- Exports
- GDP
- Inflation

CO2 Emissions (World Bank)

- CO2 Emissions Value from liquid fuel
- CO2 emissions from Manufacturing
- Electricity Production from Coal
- Energy use



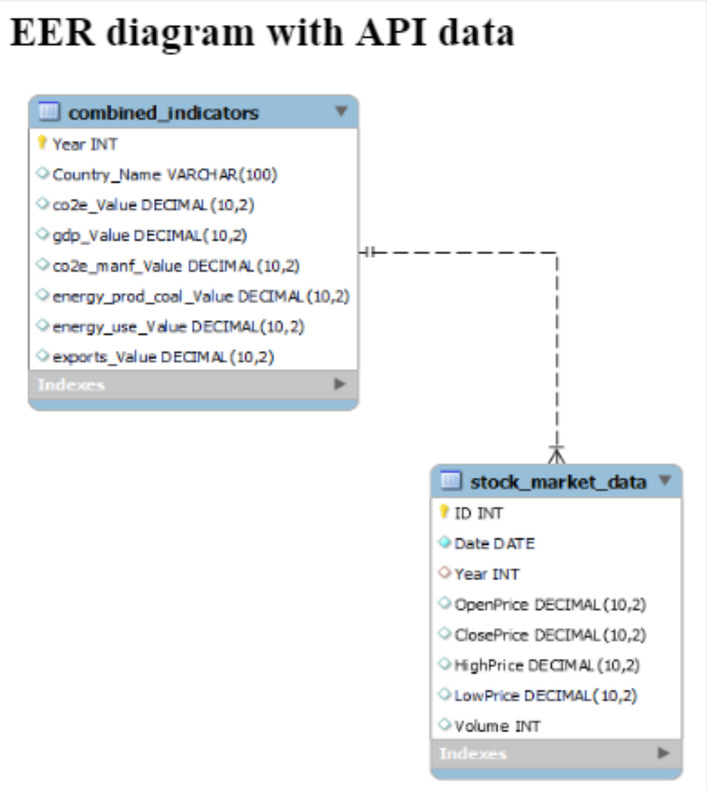
Setup

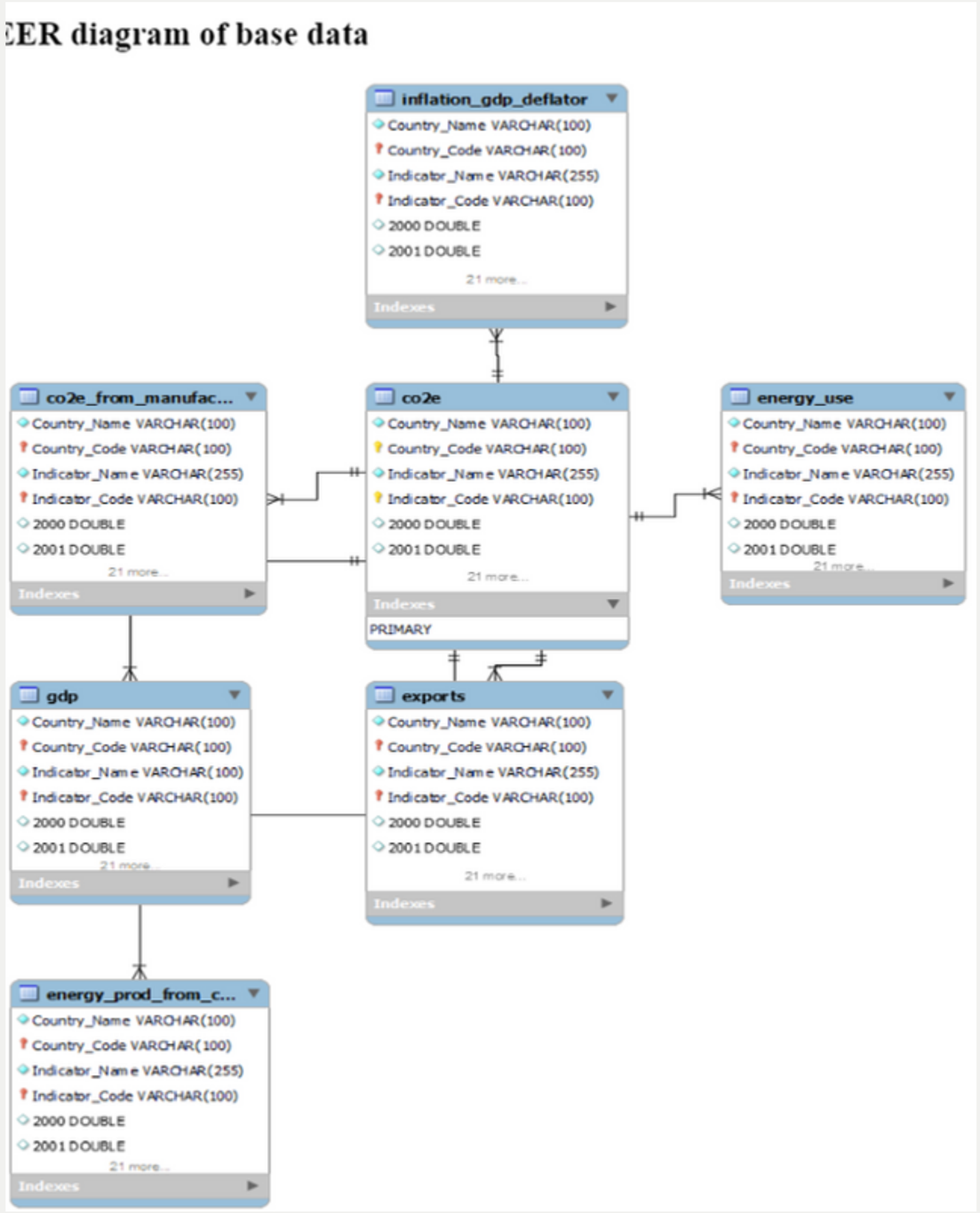
1. Upload the data in MySQL using Data_Dump_2.sql
2. Run the code from Data_Pipeline.sql
3. Download Knime pipeline
4. Setup your SQL connection using your credentials
5. Run the pipeline
6. Check the resulting correlation matrices.
7. Check the visualizations

Data Analysis Overview

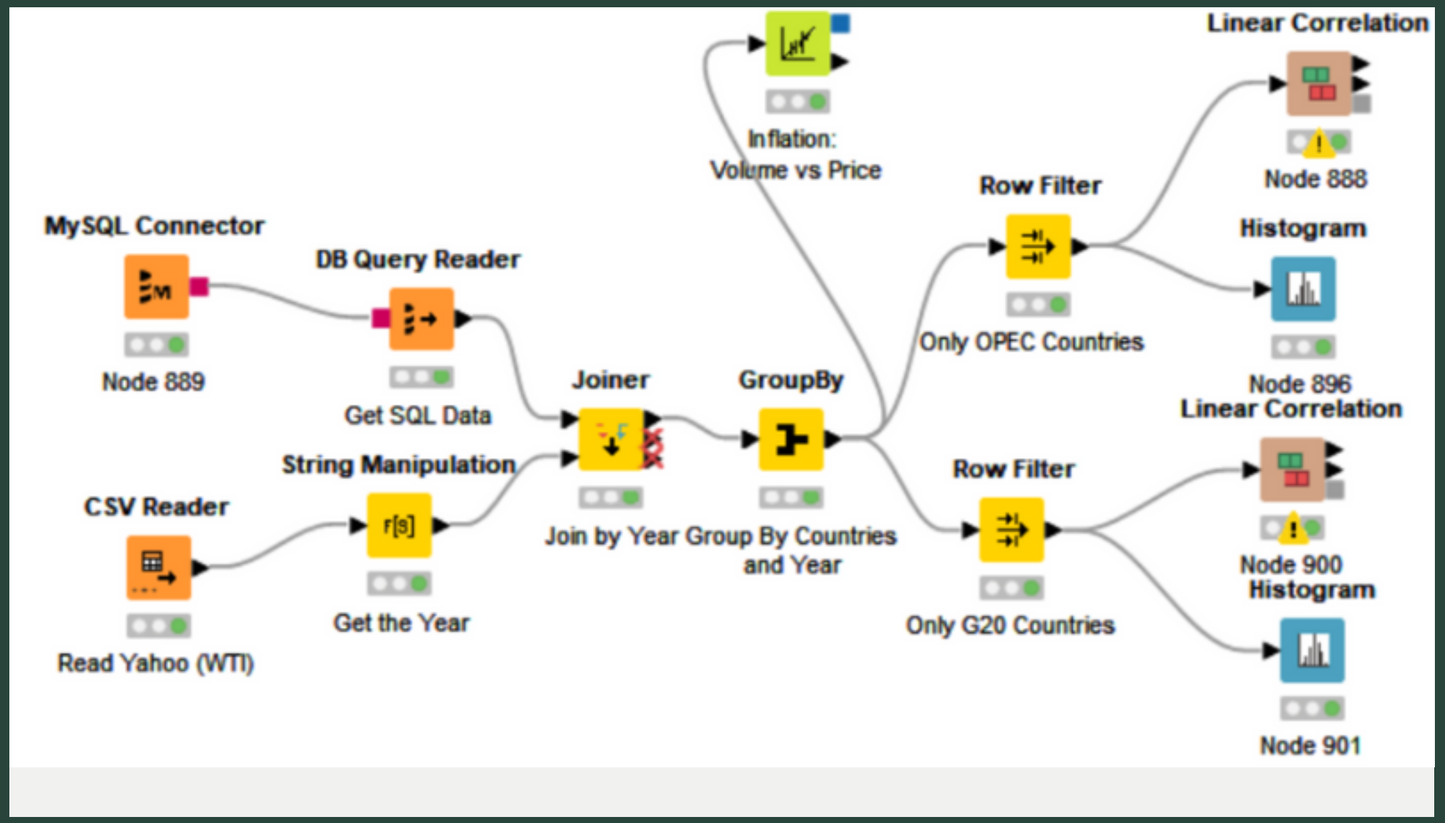
- Annual Data Collection: Sourced exclusively from the World Bank.
- Granularity Limitations: Monthly assessments not possible due to data availability
- Enhanced Classification:
  - G20 membership indicated for relevant countries.
  - OPEC status flagged to enable group analysis.
- Analytical Approach:
  - Developed visualizations and correlation matrices for G20 [illegible].
  - Focused on inflation, exports, and WTI prices due to data completeness.
  - Other indicators omitted due to significant data gaps.

EER Diagram


EER diagram with API data
combined_indicators
Year INT
Country_Name VARCHAR(100)
co2e_Value DECIMAL(10,2)
gdp_Value DECIMAL(10,2)
co2e_manf_Value DECIMAL(10,2)
energy_prod_coal_Value DECIMAL(10,2)
energy_use_Value DECIMAL(10,2)
exports_Value DECIMAL(10,2)
Indexes
stock_market_data
ID INT
Date DATE
Year INT
OpenPrice DECIMAL(10,2)
ClosePrice DECIMAL(10,2)
HighPrice DECIMAL(10,2)
LowPrice DECIMAL(10,2)
Volume INT
Indexes


ER diagram of base data
inflation_gdp_deflator
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(255)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes
co2e_from_manufac...
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(255)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes
co2e
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(255)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes
PRIMARY
energy_use
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(255)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes
gdp
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(100)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes
exports
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(255)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes
energy_prod_from_c...
Country_Name VARCHAR(100)
Country_Code VARCHAR(100)
Indicator_Name VARCHAR(255)
Indicator_Code VARCHAR(100)
2000 DOUBLE
2001 DOUBLE
21 more...
Indexes

Knime Pipeline



Process

1. Get the transformed analytical table using DB Query Reader.
2. Obtain WTI data using the Yahoo Finance API.
3. Add the year as a column using string manipulation node.
4. Join these two datasets using the year column from both tables.
5. Group the joined dataset by year and country to get one observation per country and year. Note that we used average values to aggregate WTI.
6. Using a row filter based on columns is_G20 and is_OPEC, we created two scenarios.
7. For each scenario, we built a correlation matrix and histogram visualization.

Analytics and Vizualization

Correlation Findings for OPEC Countries

Exports & WTI Prices:

Positive, moderate correlation observed
p-value > 0.1

Inflation & WTI Prices:

Also a positive, moderate correlation
p-value > 0.1

GDP & Exports:

Strong positive correlation detected
p-value > 0.1

Correlation Findings for G20 Countries

Exports & Inflation

Negative moderate correlation(-0.14)
$p<0.05$

GDP & Average WTI:

Negative correlation coefficient (-0.19)
p-value < 0.01

Any Questions?

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Thank you!

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