Dataset for OPEC Crude Oil Trade Network

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Abstract—Quantification and analysis of global oil trade networks reveals deep insights into a nation's development and influence at a global scale. Further, it allows us to predict future trends and changes to adapt state policy as the crude oil market influences the balance of power among the developed and emerging economies alike as it is central for energy needs as well for industrial progress. This document is a dataset descriptor for the dataset of crude oil exports from OPEC nations to importing nations/regions from a period of (2016-2022) structured for easy formation of nodes and edges sourced from various sources referenced below also it contains the average closing price per barrel and the global demand of crude oil during a fiscal year to note and understand complex relations between the global oil trade.

The data-set is available at https://dx.doi.org/10.21227/m8ds-nd06 [5].

Index Terms—OPEC, Crude Oil, Complex Networks

I. INTRODUCTION

Using the dataset one can insight into the ever important trade networks of crude oil (Black gold), to create such a trade complex network the data was sourced from OPEC official website [1] which is allowed to be repurposed for academic purposes. The dataset selected there is the OPEC Member's crude oil exports by destination in 1,000 barrels per day (b/d) from 2016 to 2022. Further, the average crude oil prices adjusted for inflation is collected from Macrotrends website [2]. Finally, the global demand of oil in million barrels per day (mb/d) sourced from statista [3] for the fiscal year.

II. CRUDE OIL TRADE NETWORK

The dataset here has contains information of the crude oil trade volumes from 11 OPEC exporting nations of Algeria, Angola, Congo,Equatorial Guinea, Gabon, IR Iran, Iraq, Kuwait, Libya, Nigeria, United Arab Emirates, Venezuela, Saudi Arabia to the 13 importing nations/regions The Organization for Economic Co-operation and Development (OECD) Americas, OECD Europe, OECD Asia Pacific, China, India, Other Asia, Latin America, Middle East, Africa, Russia, Other Eurasia, Other Europe from a period of (2016-2022) for every year we have the corresponding average closing price of per barrel and the demand in (mb/d) . These information together offers deeper insights on how individual nations trade and manage their resources and wealth.

III. DATASET DESCRIPTION

Dataset consists of 4 .csv files also the same files are available in .ods format. The Nodes file contain Exporting and importing/regions, Edges file has the Nodes and their corresponding trade volume, Global demand for crude oil has it's file and finally price of crude oil in it's separate file.

A. Nodes dataset

The Nodes dataset contains the exporting nations and the importing nations/regions.

Fig. 1. Nodes data file snapshot.

- ID: The column consists of corresponding ID of the exporting nations as well as importing nations/regions which are given unique identifiers to be used in creation of graphs.
- Country: The column has the names of the exporting nations as well as the importing nations/region.
- Main: This a boolean value 1 for a exporting nation and 0 for a importing nation/region.

B. Edges dataset

The edge dataset contains the volume of trade between the exporting and importing nations/regions from year 2016 to 2022.

Fig. 2. Edges data file snapshot.

- Source: The exporting OPEC nation's ID from the nodes dataset.

- Target: The importing nation/region's ID from the nodes dataset.
- 2016: The trade volume between Source and Target in that fiscal year, The further columns are used for the subsequent years 2017, 2018, 2019, 2020, 2021 and 2022 following the same structure.

C. Global demand for crude oil dataset

This dataset has Global demand of crude oil congaing the fiscal year and it's corresponding demand of oil in (mb/d)

Year	Demand
2005	83.65
2006	84.58
2007	86.50
2008	85.90
2009	84.60

Fig. 3. Global demand for crude oil dataset data file snapshot.

- Year: The fiscal year for demand.
- Demand: The demand of crude oil in (mb/d) during the fiscal year.

D. Average closing price of crude oil dataset

This dataset contains the average closing price of crude after the trading day against the fiscal year.

Year	Average Closing Price
2022	$94.53
2021	$68.17
2020	$39.68
2019	$56.99
2018	$65.23

Fig. 4. Average closing price of crude oil dataset data file snapshot.

- Year: The fiscal year for demand.
- Average closing Price: The average closing price of crude oil after trade hours in (USD $) during the fiscal year.

IV. CONCLUSIONS

The dataset contains export quantity of crude oil from OPEC nations to the various nations/regions of the world from 2016 - 2022 sourced directly fro OPEC website [1] and further supplemented by average crude oil prices [2] and the global demand for crude oil [3] to formulate meaningful relations and networks to understand such a complex global trade commodity and predict future spikes and overproduction issues.

The dataset is designed to work with Gephi [4] software for plotting and analysis of complex networks.

REFERENCES

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