JODI Data in OPEC Research

Presented by:

Dr. Hossein HASSANI
Statistical Systems Coordinator
Data Services Department, OPEC
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Outline

• Increasing need for statistical data
• Advantages of JODI data
• The role of other commodities in the overall energy mix
• JODI data in OPEC data base and Research
  – Database: supply, demand, stock
  – Research and analysis: Oil and gas demand, refinery, trade and many more
• Conclusion
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Increasing need for more granular energy data

Energy markets/studies require more detailed energy data

- Recent developments in oil, gas and energy markets have placed energy on the top of the international agenda.
- More reliable and timely data on main petroleum flows would be needed, for example
  - Trade
  - Stocks
Advantages of JODI data

- Provide timely and reliable data on major oil and gas flows, which are relevant to the market
  - Production
  - Consumption
  - Trade
  - Storage
  - Refinery
- For more than 90 countries and with strong overall coverage
- JODI data – official and direct information with comprehensive metadata country notes
- Monthly data with just 2 months time lag
- Freely accessible
- JODI contains unique information that cannot be accessed elsewhere
Advantages of JODI oil data

- **Crude oil production**: Large coverage, about 92% of total crude oil production is covered in JODI database
- **Demand**: Around 83% of total demand is covered in JODI database, including some of the new consuming countries
- **Inventories**: In addition to the OECD, a few non-OECD countries are also covered
- **Refinery**: Around 86% of total refinery intake and output are covered in JODI database
- **Trade**: Large coverage, about 88% of total oil exports and imports are covered in JODI database
An example of granular oil data: OPEC Member Countries oil flows

OPEC flows of crude and refined oil (1,000 b/d), 2014

Source: OPEC ASB2015
The role of other commodities in the overall energy mix

Total world primary energy consumption by main commodity in 2014

- Oil: 33%
- Natural gas: 24%
- Coal: 30%
- Nuclear energy: 4%
- Renewables: 9%

OECD
- Oil: 37%
- Natural gas: 19%
- Coal: 26%
- Nuclear energy: 10%
- Renewables: 8%

Non-OECD
- Oil: 29%
- Natural gas: 38%
- Coal: 22%
- Nuclear energy: 2%
- Renewables: 9%

Source: BP Statistical Review of World Energy 2015
JODI data in OPEC energy database and research

Examples in OPEC energy database
• Supply
• Demand
• Stock

Examples in research and analysis
• Oil demand
• Refinery
• Trade
JODI data in OPEC’s oil supply database

- JODI database is an important source and utilized for updating oil supply information for a number of producing countries.
- JODI data are widely used for the following reasons:
  - For some countries, JODI data are more timely than national information, and are hence used as the first estimate.
  - Data for smaller producing countries are taken from JODI, after having been reviewed and compared with national information, to ease and speed up the update.
  - For some producing countries no other genuine information than JODI is available at reasonable costs.
JODI data in OPEC’s oil demand database

Data for main petroleum categories in JODI essential in understanding oil market, e.g. Thailand
JODI data in OPEC’s oil stocks database

- Availability of key Non-OECD data in JODI directly relevant to oil market developments

Bar chart showing JODI data in OPEC’s oil stocks database for 1Q08 and 3Q15.

- MB of oil stocks
- 1Q08: Non-OECD = 4113 MB, OECD = 1414 MB
- 3Q15: Non-OECD = 4558 MB, OECD = 2124 MB

Pie chart showing non-OECD oil stocks by region:
- 3Q15:
  - Non-OECD Europe: 673 MB
  - Asia: 477 MB
  - Latin America: 230 MB
  - China: 263 MB
  - FSU: 137 MB
  - Africa: 305 MB
  - Middle East: 39 MB

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JODI data in OPEC research: Emergence of Non-OECD countries

Non-OECD oil demand already at the level of OECD oil demand

Non-OECD gas demand already surpassed OECD gas demand

% shift in oil demand

1970: 24% OECD, 76% Non-OECD
2014: 50% OECD, 50% Non-OECD

% shift in gas demand

1970: 25% OECD, 75% Non-OECD
2014: 53% OECD, 47% Non-OECD
Increase in Non-OECD refinery capacity

World refinery capacity

% shift in refinery capacity

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Global oil trade

OPEC’s importance meeting global oil demand, 1980-2014

\[ y = 4.07x - 0.04 \]

OPEC export growth vs. global demand growth

OPEC’s importance meeting global gas demand, 1990-2014

\[ y = 3.20x - 0.01 \]

OPEC export growth vs. global demand growth
Major US crude oil importers according to DOE

Multiple regression

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 127</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>123067549</td>
<td>3</td>
<td>41022516.4</td>
<td>F( 3, 123) = 237.95</td>
</tr>
<tr>
<td>Residual</td>
<td>21205038.3</td>
<td>123</td>
<td>172398.685</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
</tbody>
</table>

R-squared = 0.8530
Adj R-squared = 0.8494

| US_Imports | Coef. | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|------------|-------|-----------|-------|------|----------------------|
| Canada_Exports | -1.002582 | .1475106 | -6.80 | 0.000 | -1.29457 | - .7105934 |
| Mexico_Exports | 1.822575 | .2291383 | 7.95  | 0.000 | 1.369009 | 2.27614 |
| Saudi_Exports | .572875 | .2212934 | 3.23  | 0.002 | .2212934 | .9244567 |
| _cons      | 8356.087 | 579.6617 | 14.42 | 0.000 | 7208.683 | 9503.492 |

Root MSE = 415.21
F( 3, 123) = 237.95
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Crude oil trade according to JODI

Multiple regression

Source | SS    | df | MS    | Number of obs = 127
-------|-------|----|-------|------------------
Model  | 113989816 | 3  | 37996605.2 | F(3, 123) = 154.33
Residual | 30282771.8 | 123 | 246201.396 | R-squared = 0.7901
Total  | 144272587 | 126 | 1145020.53 | Root MSE = 496.19

USImports | Coef. | Std. Err. | t  | P>|t| | [95% Conf. Interval]|
-----------|-------|-----------|----|-------|-------------------|
CanadaExports | -1.949506 | 0.199812 | -9.76 | 0.000 | -2.345022 to -1.553991|
MexicoExports | 1.414089 | 0.2372712 | 5.96 | 0.000 | 0.9444253 to 1.883753|
SaudiArabiaExports | -0.0041264 | 0.0812134 | -0.05 | 0.960 | -0.1648834 to 0.1566305|
_cons     | 10179.09 | 588.4237 | 17.30 | 0.000 | 9014.338 to 11343.84|
Conclusion

- JODI Oil & gas databases contain official country data and valuable information, which cannot be found easily elsewhere
- Extensive usage of JODI data in OPEC Secretariat’s research
  - Update of databases
  - As input for studies
- Granularity of data can always be improved
  - Existing databases (time lag, coverage, reliability,…)
  - Coverage of other energy commodities a necessity as result of increasing interaction
Thank You.