The Critical Importance of Improving Oil Data

Robert McNally
June 27, 2017
Three Perspectives on Oil Data
The Glass is Half Full....

- Breadth and depth of data are improving
  - JODI (and other IEF efforts)
  - Tanker tracking
  - Stocks at sea estimates
  - China stock changes
- G20 paying more attention
- EIA’s Drilling Productivity Report
- Outstanding EIA web site
- OPEC Secretariat coverage of macro and broader commodity flows
JODI – Great step forward, but many more steps needed

- JODI has limited analytical value with no internal function for analysis, and limits on downloading to another program (i.e. Excel)
  - Strict download limitations on number of cells does not allow for downloading even one product (i.e. crude oil) for one flow (i.e. production) for all available countries over the time series available
  - Incomplete datasets for individual countries (i.e. missing values) and between countries (some countries have no data whatsoever)
Opaque Non-OECD Demand and Inventory Estimates

- Many non-OECD countries do not measure commercial and/or government inventories for security reasons (i.e. China and Russia)
- With new waves of SPR filling in China, India, and Malaysia, differentiating between flows being consumed or stored is becoming increasingly vital (even if the flows going into storage will never be “properly” consumed)
- If SPR or other commercial inventory (i.e. teapot refinery) fill is built into base year consumption estimates, future demand rates built on the base will be overstated when the SPR surge slows
Inconsistent Conversion Factors

- Conversion factors between different units reported by different countries are not standardized.
  - Some countries report in tonnes, others in barrels/day
  - Example: For “other products”, a loose category of odds and ends from the refining process including petroleum coke, asphalt, bitumen, etc., the IEA uses a conversion factor of 8.00 while the Indian government official conversion factor is 7.01. **The difference in b/d terms can be almost 100 kb/d**

- Relevant for crude oil (API gravity), as well as for petroleum product (LPG, diesel, etc.)
- Volume (in metric tons) as reported by major countries like China and India is different in barrel/day terms (the standard used by global oil markets) depending on even a slight difference in the conversion factor
Inconsistent Definitions Among Agencies

- Agencies treat biofuels and processing gains differently in country-level supply figures making it difficult to compare individual country output levels and growth across agencies
- IEA and OPEC aggregate biofuels and/or processing gains and report them as a separate global line item
- This alone can create +0.6 mb/d difference in supply estimates (see Brazil below)

<table>
<thead>
<tr>
<th>Country-Level Supply Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>EIA</td>
</tr>
<tr>
<td>IEA</td>
</tr>
<tr>
<td>OPEC</td>
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</tbody>
</table>

* Aggregated and reported as a global figure

Brazil's Production

<table>
<thead>
<tr>
<th>Year</th>
<th>IEA</th>
<th>OPEC</th>
<th>EIA</th>
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<tbody>
<tr>
<td>2013</td>
<td>2.1</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>2014</td>
<td>2.4</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>2015</td>
<td>2.5</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td>2016</td>
<td>2.6</td>
<td>3.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Source: EIA, IEA, OPEC
Large Differences Between Agencies

- IEA and EIA Global Surplus’ Differ by >0.5 mb/d for 3 of Past 5 Years

Source: EIA, IEA

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Source: EIA, IEA
Erratic Historical Divergences in Direction and Magnitude

Difference in Global Demand Levels: IEA vs EIA

Source: EIA, IEA

Difference in Global Supply Levels: IEA vs EIA

Source: EIA, IEA
Erratic Historical Divergences in Direction and Magnitude

- Historical global supply and demand annual averages and y/y growths vary between agencies and are not resolved after time.
- Even if agencies agree on y/y growth, having a different baseline can lead to very different global surplus/deficit outlook.

### 2010 and 2015 Global Demand Estimates By Agency

<table>
<thead>
<tr>
<th>Year</th>
<th>EIA</th>
<th>IEA</th>
<th>OPEC</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
<td>89.2</td>
<td>88.3</td>
<td>87.6</td>
</tr>
<tr>
<td>2015</td>
<td>95.0</td>
<td>95.0</td>
<td>93.7</td>
</tr>
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1.6 mb/d variance

### 2010 and 2015 Global Supply Estimates By Agency

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<td>96.6</td>
<td>95.5</td>
</tr>
</tbody>
</table>

1.7 mb/d variance

Source: EIA, IEA, OPEC
Inconsistent Definitions Across Reports Within the Same Agency (!)

• Biofuel demand is measured differently in IEA’s OMR vs WEO
• IEA’s OMR estimates measure biofuel by their physical volume, but the agency’s WEO uses the gasoline and diesel equivalent volume for biofuels
• The OMR published in November 2016 shows 2.3 mb/d of biofuels in 2015 while the WEO, also published in November 2016, only estimates 1.6 mb/d
Return of Boom Bust Oil Prices Makes Better Data Imperative

Saudi Arabia and OPEC unable to put a ceiling over prices

Saudi Arabia and OPEC unwilling to put a floor under prices

Old Range: OPEC’s Desired Band

Source: EIA, The Rapidan Group analysis
Unbalanced Market + No Swing Producer =
Boom and Bust Price Cycles

- Standard Oil, Texas Railroad Commission, Seven Sisters & OPEC regulated wellhead
  supply to stabilize prices

FINANCIAL TIMES
WEDNESDAY 1 FEBRUARY 2017
MARKETS INSIGHT

Opec

Boom and bust returns as oil market
loses its swing

For the first time in years, the global oil market is lacking a swing producer

THE WALL STREET JOURNAL.
BOOKSHELF

Wanted: Swing Producer

Volatility in the price of the world’s most essential commodity—oil—is perilous. Buckle up
for our new boom and bust era. R. Tyler Priest reviews “Crude Volatility” by Robert McNally.

By R. TYLER PRIEST
Updated Jan. 27, 2017 5:20 p.m. ET

FIGURE 4.2

Martial law. Militia are deployed to shut wells in East Texas oil fields. The postcard
reads “HOOF BEATS DROWN DRILLING DUN AS CAVALRY MEN PATROL EAST TEXAS
OIL FIELDS.”

Source: From the postcard collection of Jeff Spencer; original postcard photo by Jack Nolan.
History’s Third Boom-Bust Era Features Unusual Price Swings
Longer Term Uncertainty Abounds Too

Oil demand and supply from existing fields

Million barrels per day

Source: Statoil Energy Perspectives 2017
Conclusion

• It’s getting weird out there.
• The stakes are still high.
• Industry and governments should keep up and speed up the good work.
• Please improve oil data!

Thank you.

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