

The Critical Importance of Improving Oil Data



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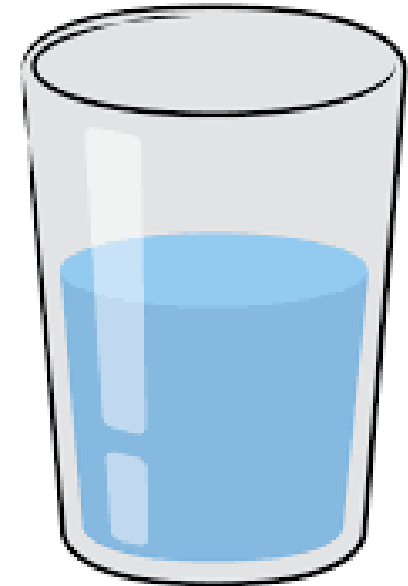
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Three Perspectives on Oil Data



- 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

The Glass

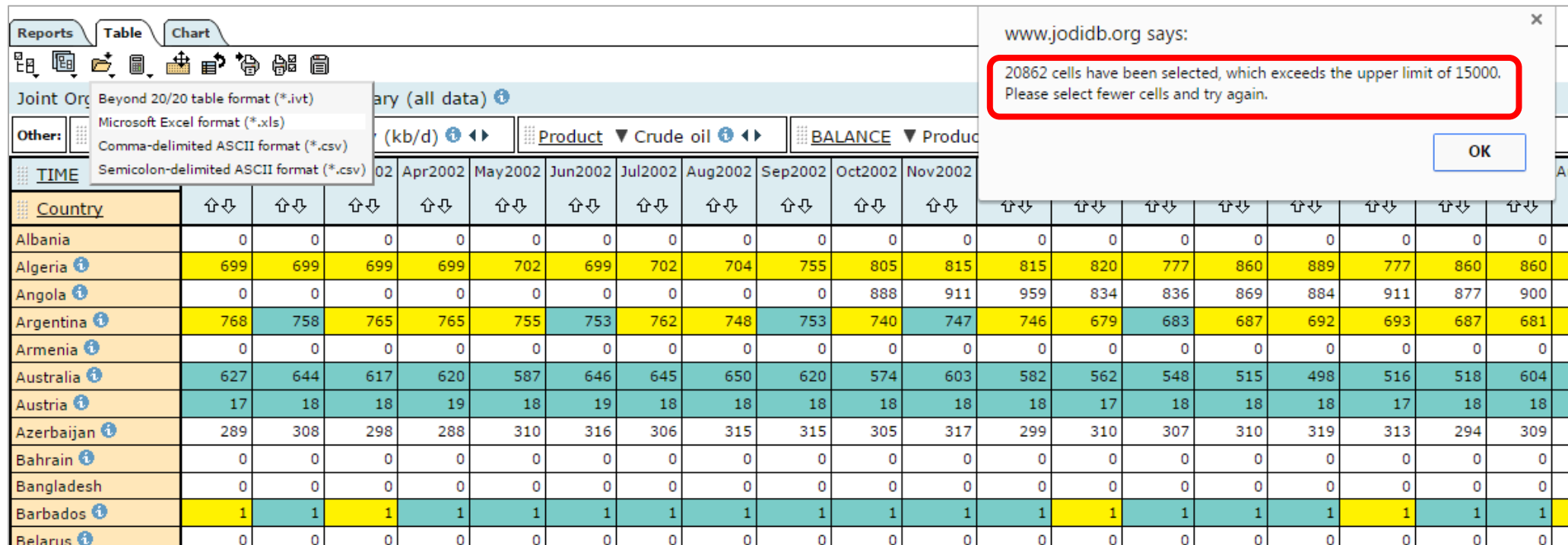


is

HALF FULL

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)



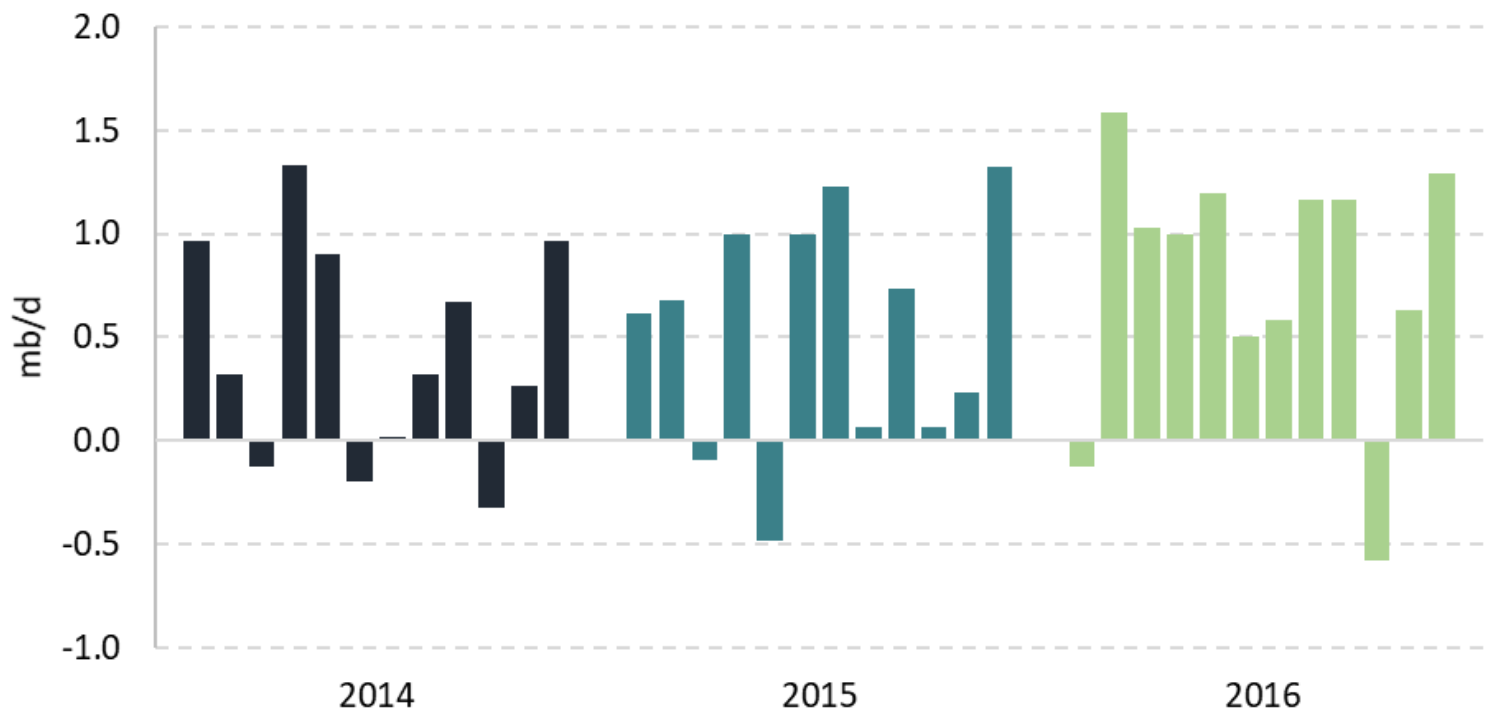
The screenshot shows the JODI web interface with a data table and an error message. The table displays production data for various countries from April 2002 to November 2002. The error message states: "20862 cells have been selected, which exceeds the upper limit of 15000. Please select fewer cells and try again."

Country	Apr2002	May2002	Jun2002	Jul2002	Aug2002	Sep2002	Oct2002	Nov2002
Albania	0	0	0	0	0	0	0	0
Algeria	699	699	699	702	699	702	704	755
Angola	0	0	0	0	0	0	0	888
Argentina	768	758	765	765	755	753	748	753
Armenia	0	0	0	0	0	0	0	0
Australia	627	644	617	620	587	646	645	650
Austria	17	18	18	19	18	19	18	18
Azerbaijan	289	308	298	288	310	316	306	315
Bahrain	0	0	0	0	0	0	0	0
Bangladesh	0	0	0	0	0	0	0	0
Barbados	1	1	1	1	1	1	1	1
Belarus	0	0	0	0	0	0	0	0

- 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



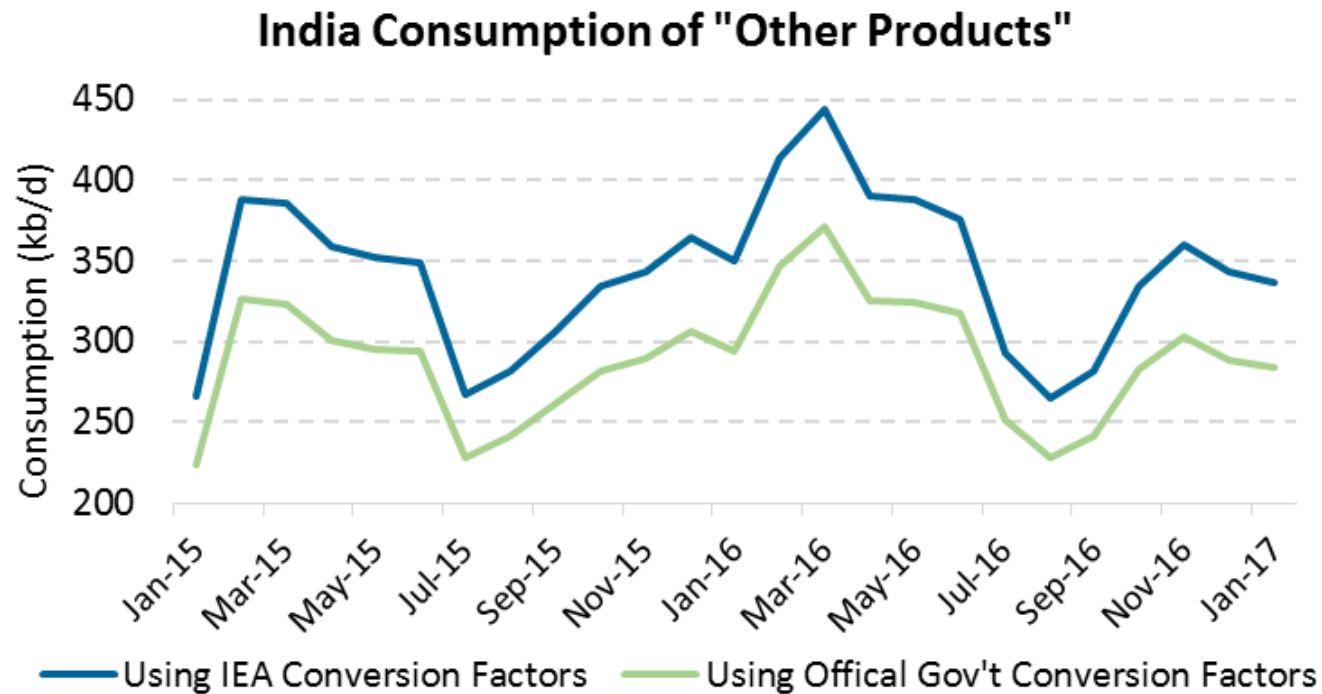
Implied Chinese Crude Inventory Change



Source: IEA, Rapidan Group

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**






Source: India PPAC, IEA, The Rapidan Group

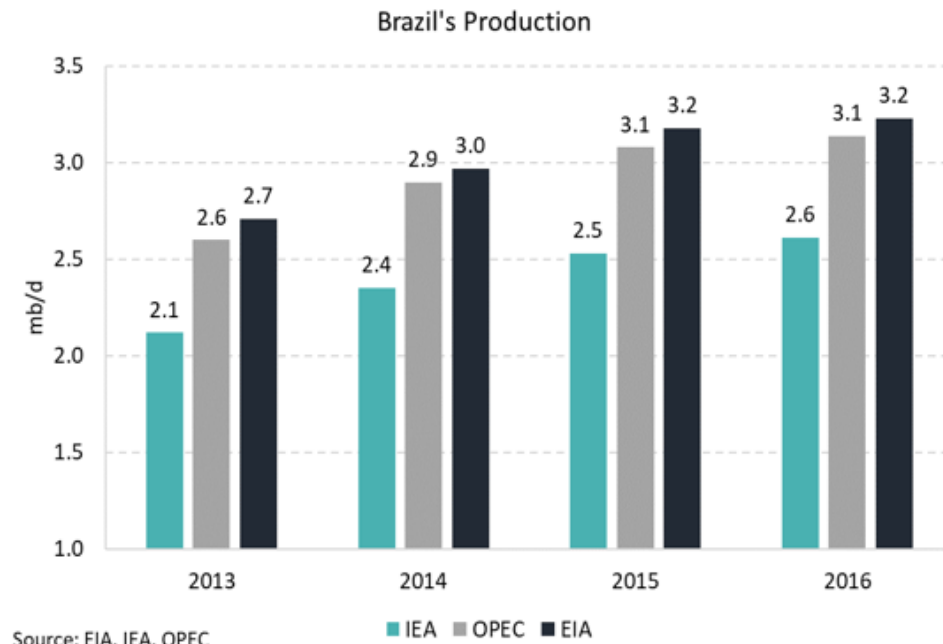
- Relevant for crude oil (API gravity), as well as for petroleum product (LPG, diesel, etc.)
- Volume (in metric tons) as reported by major countries like China and India is different in barrel/day terms (the standard used by global oil markets) depending on even a slight difference in the conversion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

Country-Level Supply Figures		
	Biofuels	Processing Gains
	✓	✓
	X*	X*
	✓	X*

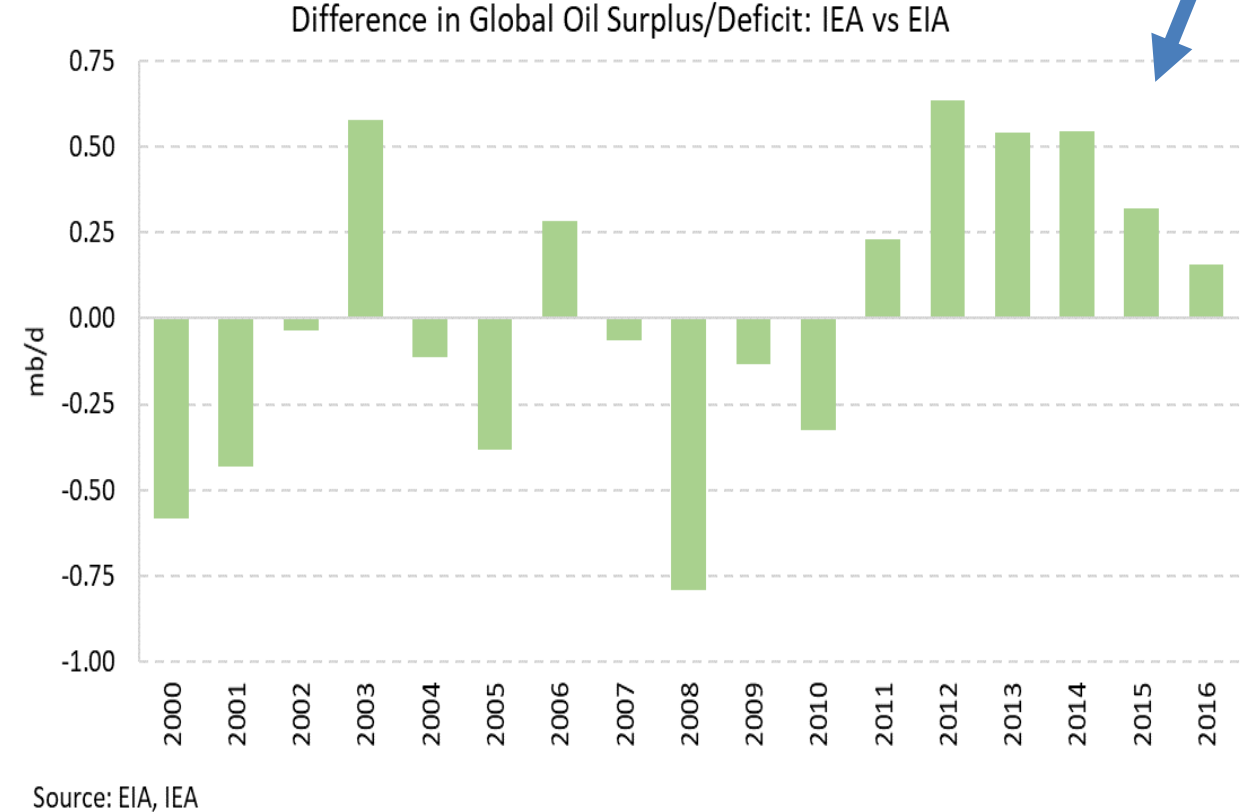
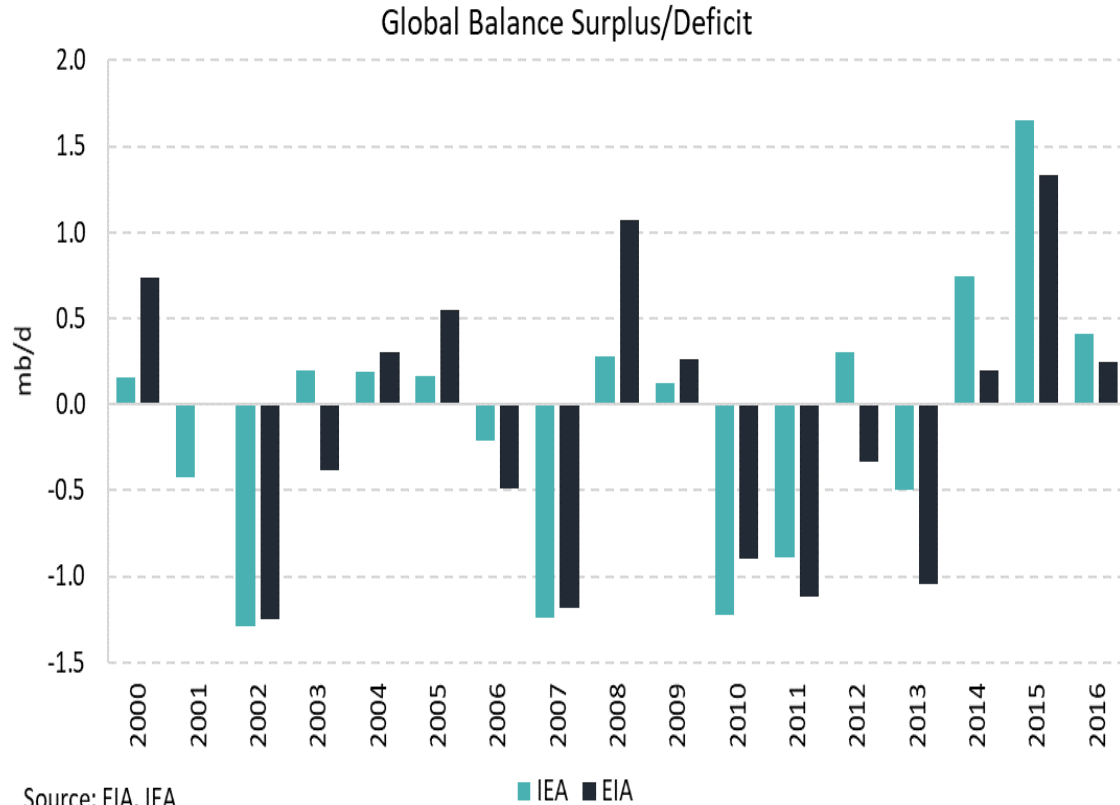
* Aggregated and reported as a global figure



Source: EIA, IEA, OPEC

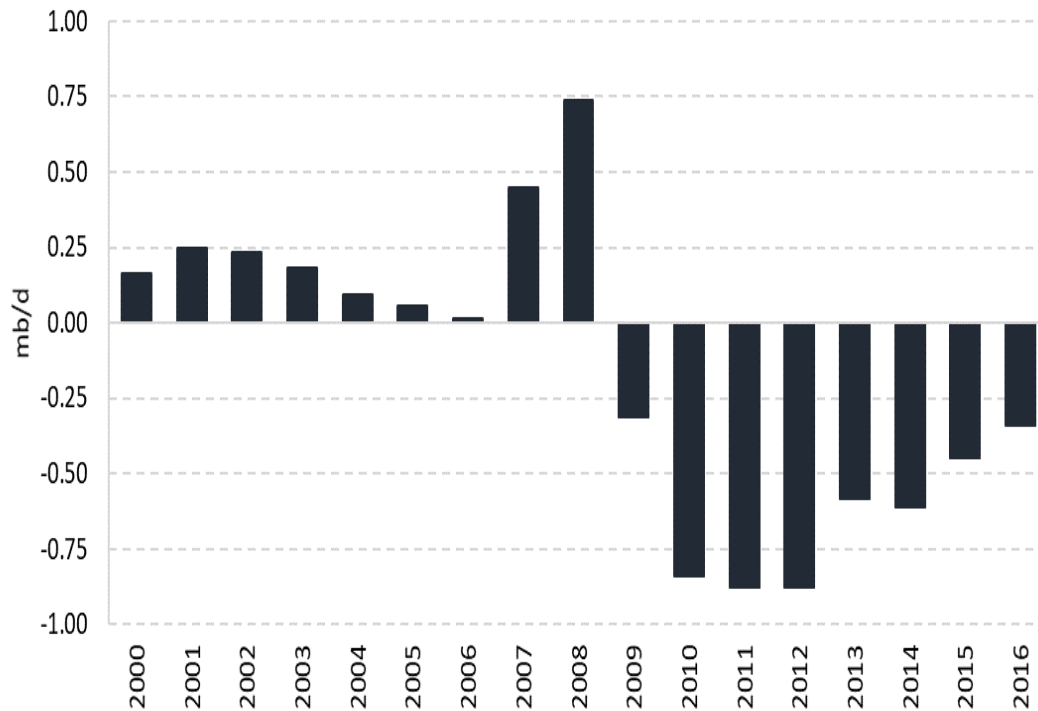
Large Differences Between Agencies

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



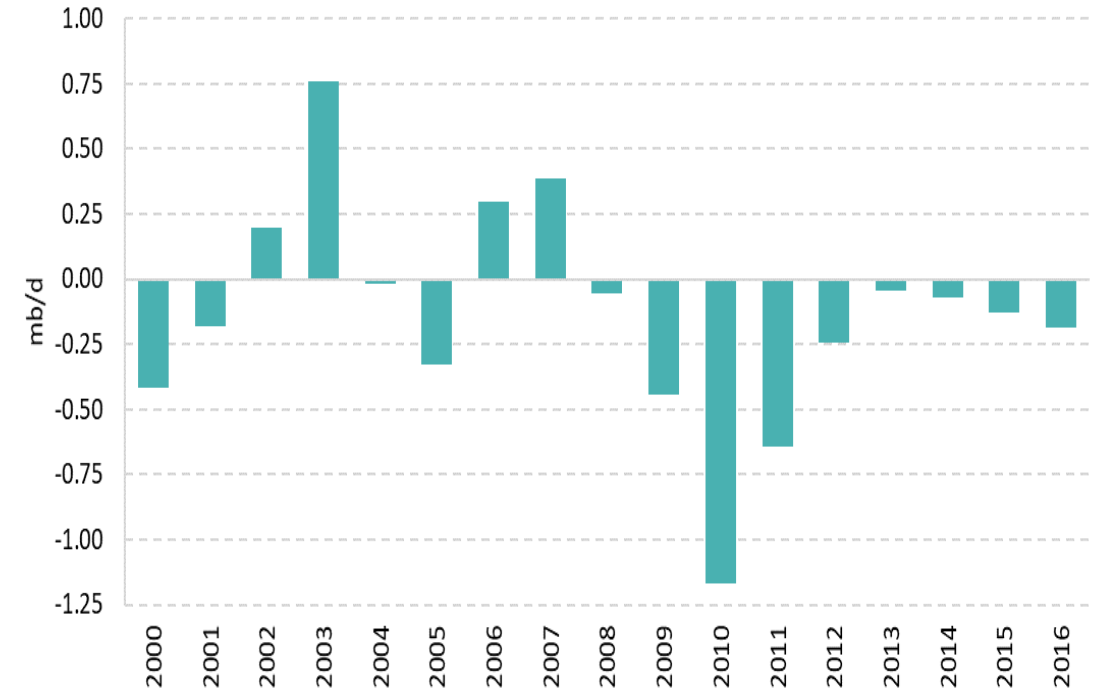
Erratic Historical Divergences in Direction and Magnitude

Difference in Global Demand Levels: IEA vs EIA



Source: EIA, IEA

Difference in Global Supply Levels: IEA vs EIA

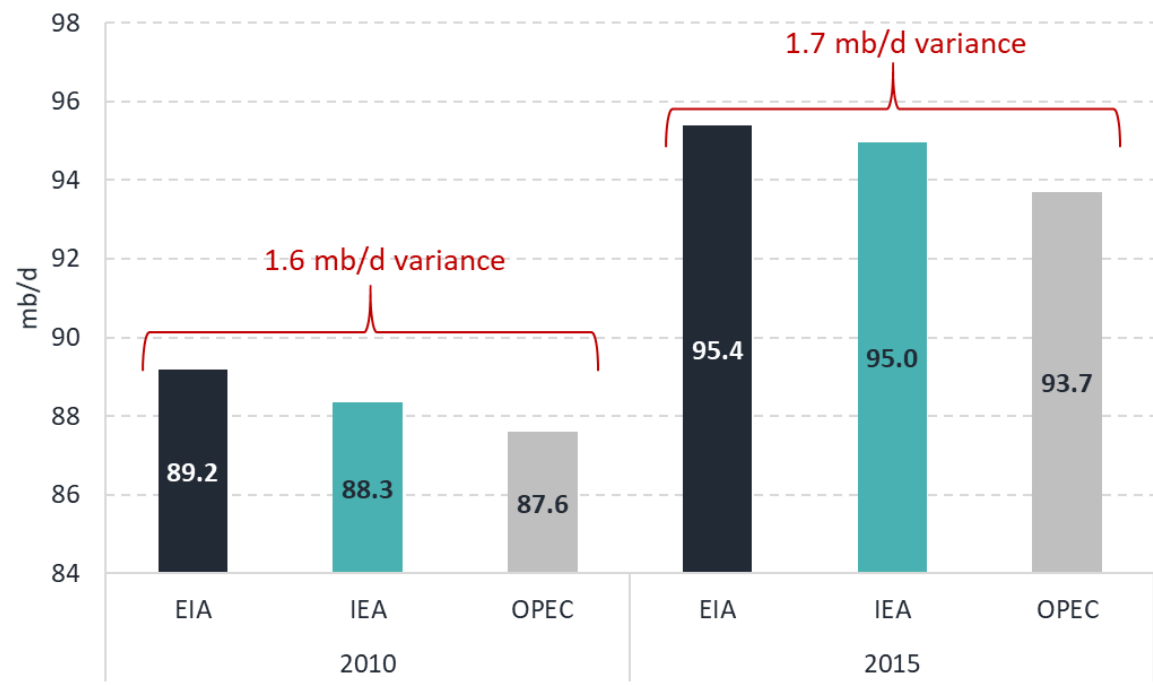


Source: EIA, IEA

Erratic Historical Divergences in Direction and Magnitude

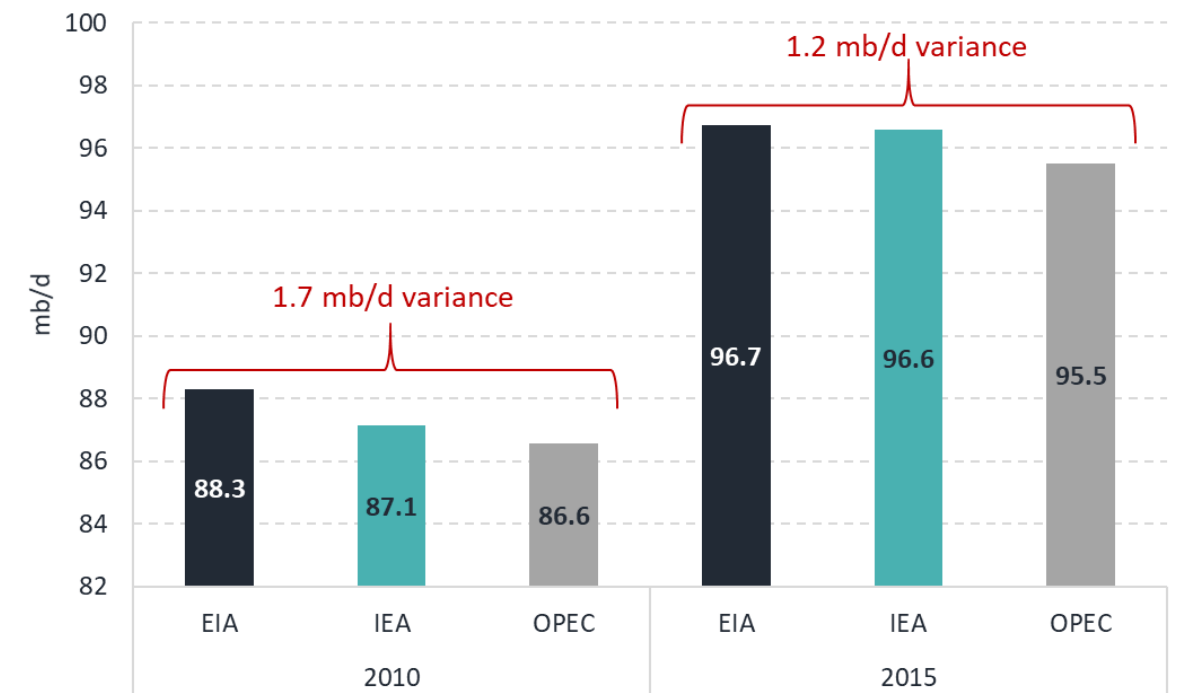
- Historical global supply and demand annual averages *and* y/y growths vary between agencies and are not resolved after time
- Even if agencies agree on y/y growth, having a different baseline can lead to very different global surplus/deficit outlook

2010 and 2015 Global Demand Estimates By Agency



Source: EIA, IEA, OPEC

2010 and 2015 Global Supply Estimates By Agency

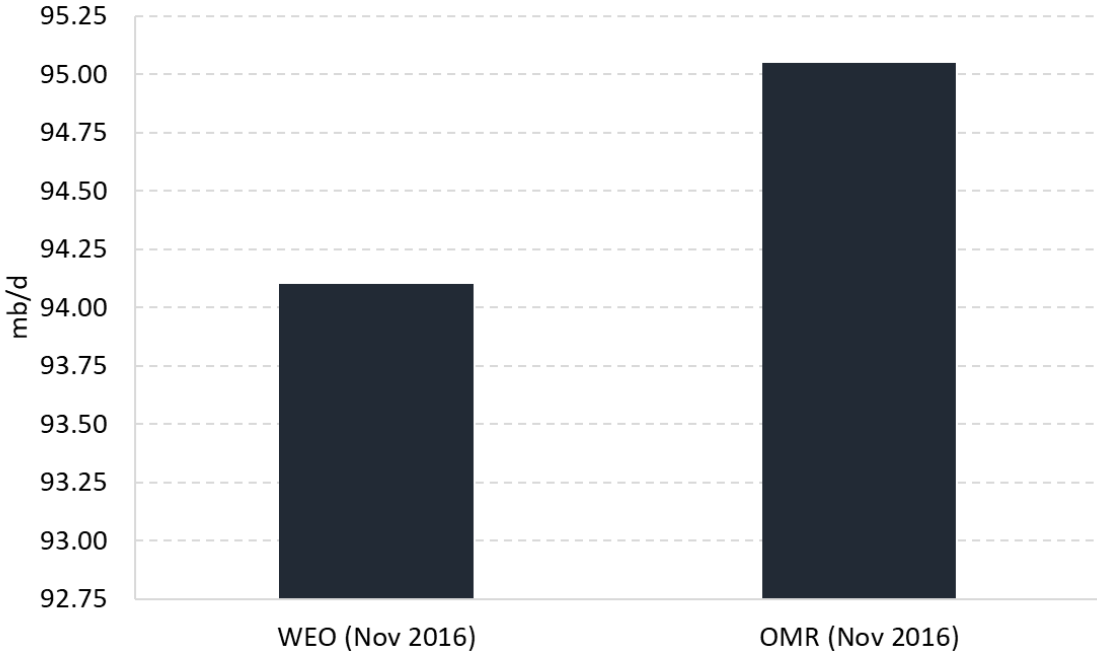


Source: EIA, IEA, OPEC

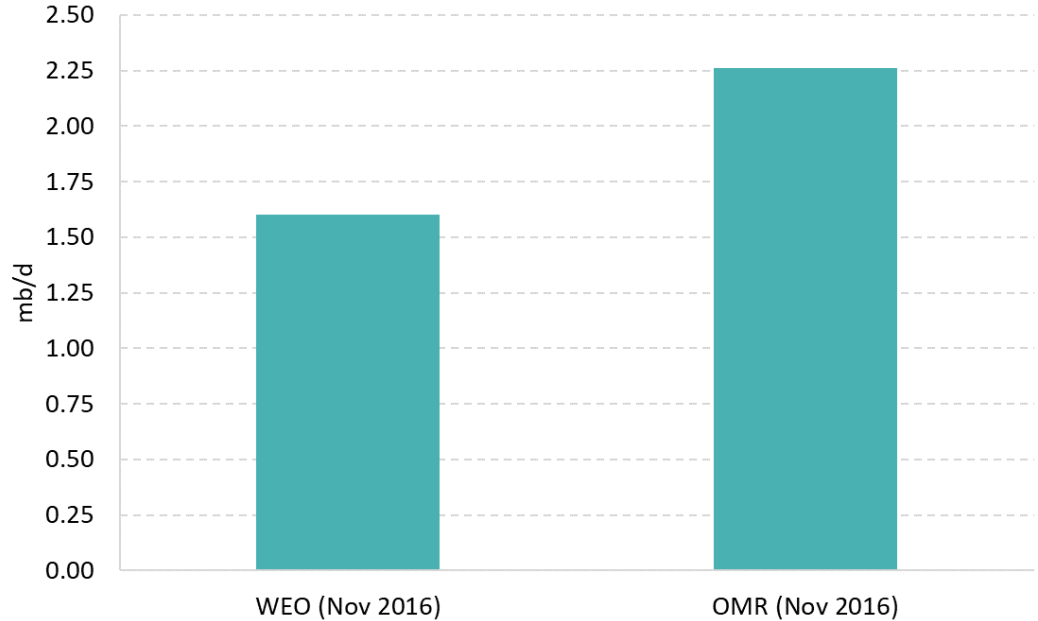
Inconsistent Definitions Across Reports Within the Same Agency (!)

- 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

2015 Global Oil Demand



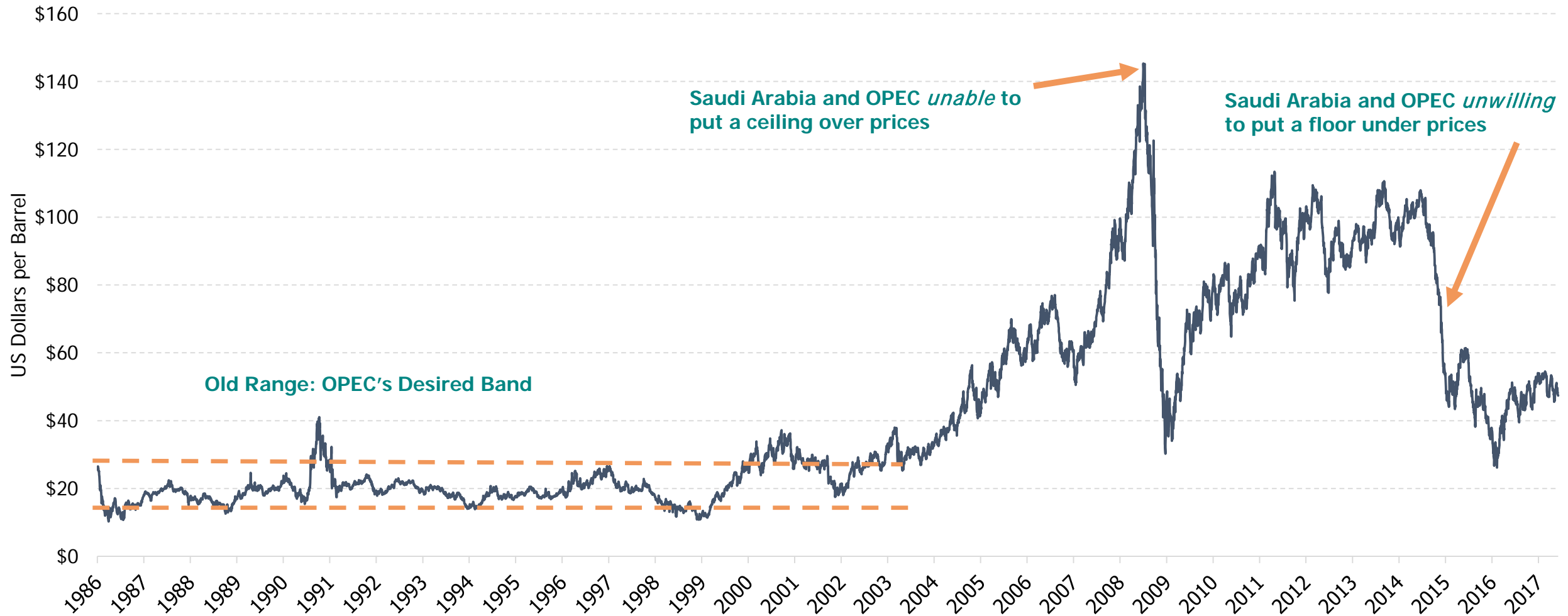
2015 Global Biofuel Demand



Source: IEA

Source: IEA

Daily WTI Spot Price



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

CRUDE

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.

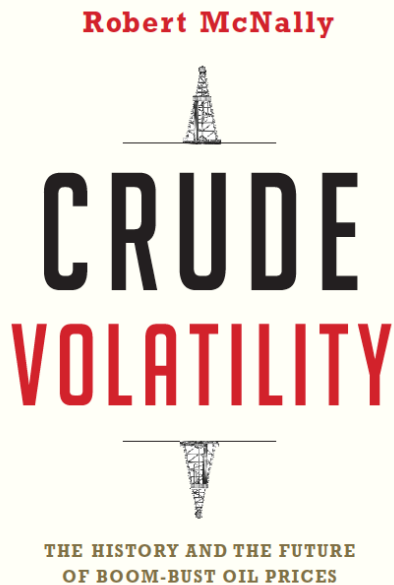
By **R. TYLER PRIEST**
 Updated Jan. 27, 2017 5:20 p.m. ET



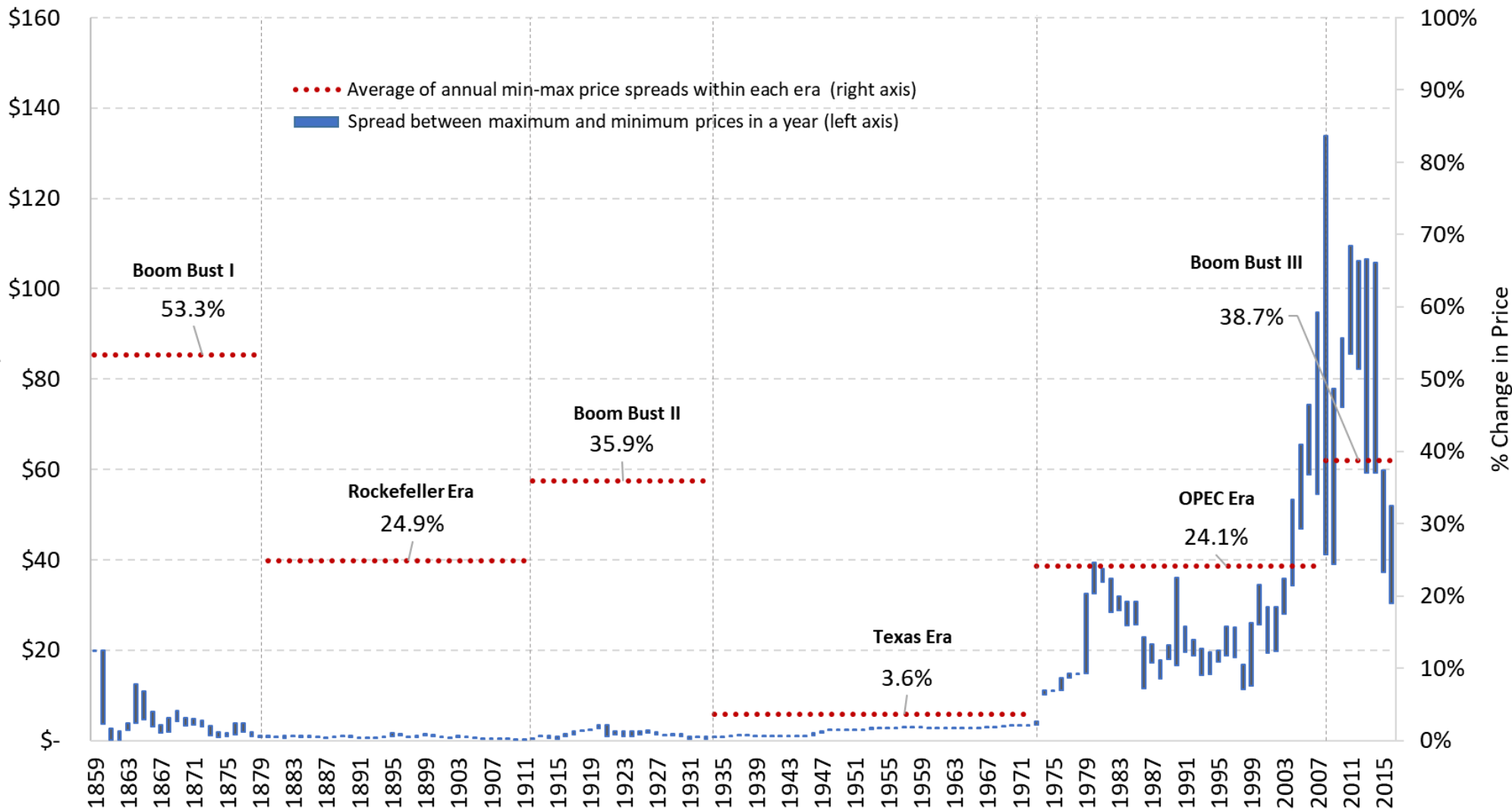
FIGURE 4.2

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

Source: From the postcard collection of Jeff Spencer; original postcard photo by Jack Nolan.

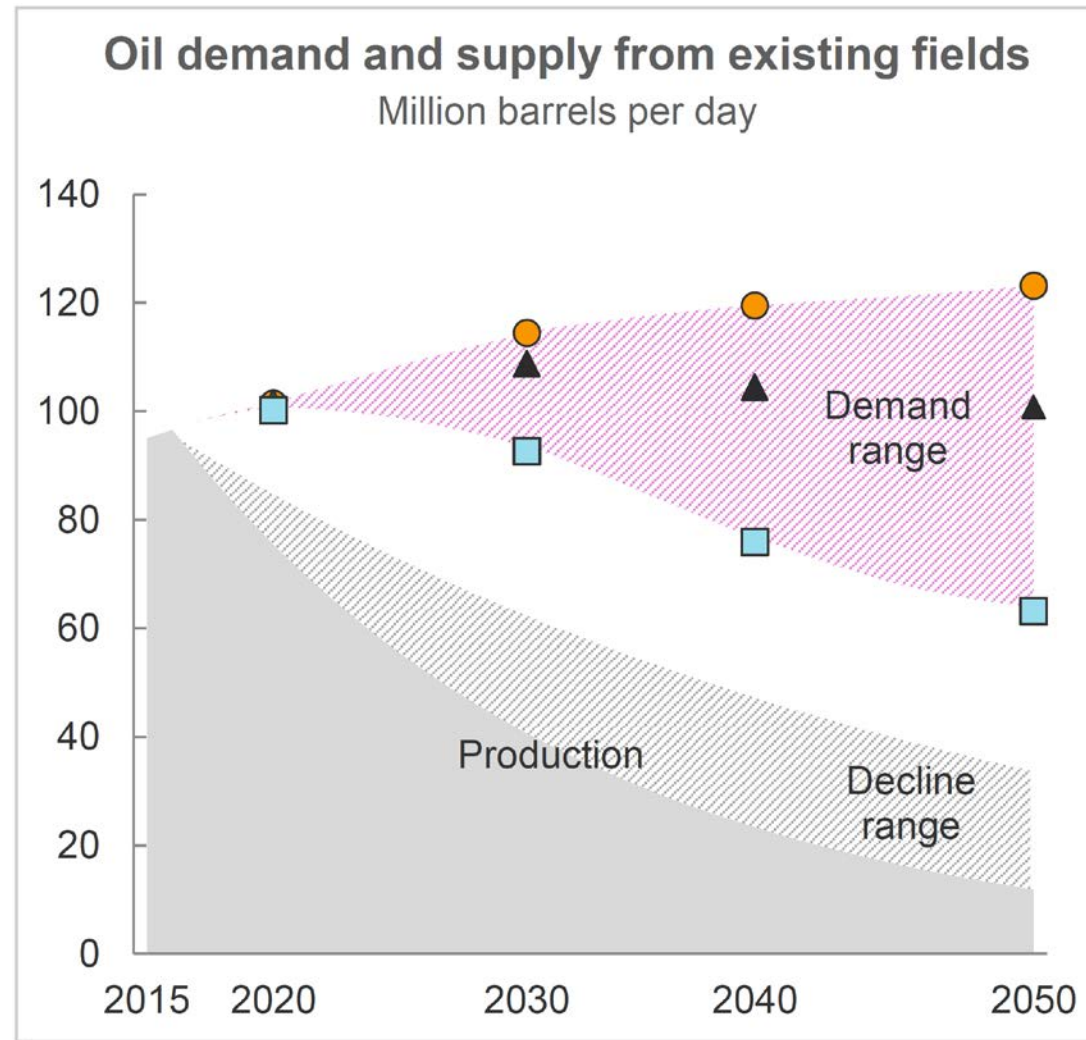


Annual Ranges of Monthly US Crude Oil Prices, 1859-2016



Data Sources: The Rapidan Group, based on The Derrick, API, St. Louis Fed, EIA, and Bloomberg

Longer Term Uncertainty Abounds Too



Source: Statoil [Energy Perspectives 2017](#)

- 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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