Don’t Hold Your Breath For $70 Oil and The Demise of the Bakken

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Oil Markets In Early Recovery From The Second of Two Major Production Bubbles

- The 1st Bubble 1974-1980: oil shocks and price increase from $23 to $117/barrel led to massive E&P investments, over-production, demand destruction & oil-price deflation until 1998.
- After the 2008 Financial Collapse, OPEC cut production then, declining OPEC spare capacity, falling OECD inventories, & near-zero interest rates led to the longest period of high oil prices in history from 2011-2014.
- Over-investment resulted in a massive over-supply.
- The bubble burst in 2014 and prices collapsed.
The 2016 OPEC Cut

- First mention of a production “freeze” in February 2016 when oil prices were $26/barrel.
- Expectation of OPEC action & improving fundamentals lifted prices to $43 average for 2016.
- Prices dropped when a freeze agreement failed in August; failure to act in November would have sent prices into the mid-$30 range.
- The cut was more about setting a price floor than about raising prices.
- OPEC agreed to cut production in November partly because it was incapable of sustaining output at 2016 levels.
- By July 2016, surplus production capacity was 0.92 mmb/d—the all-time low was 0.71 mmb/d in late 2004.
- Announcing a cut is a good way to cover the reality that commercial reserve limits have been reached.
- Low OPEC spare capacity has usually led to a major oil-price increase (e.g., 2004 & 2007).
There Never Was An OPEC Strategy or Price War

- Analysts created a narrative that OPEC’s strategy was to hurt U.S. tight oil producers.
- This story line is unfounded but widely accepted because of American hubris.
- Cartel’s inaction since the 2014 price collapse reflected unwillingness to repeat the mistake of 1979-85 when OPEC cut 14 mmb/d with no effect on over-supply, demand or oil prices.
- Cuts lowered OPEC market share and greatly reduced revenue.
- “We met with non-OPEC producers, we asked ‘what are you going to do?’ They said nothing. We said the meeting is over.” —Ali Al-Naimi, February 2016.
- The 2016 OPEC cut happened because Russia participated along with rest of OPEC.
Tight Oil Is Not A Threat To OPEC

- Tight oil has never been a long-term threat to OPEC because the reserves are relatively small.
- EIA year-end 2015 data indicates that U.S. tight oil proven reserves are less than 12 billion barrels.
- Deep water reserves are more substantial than tight oil but are still small compared with OPEC reserves.
- Canada’s and Venezuela’s combined oil sands reserves exceed 350 billion barrels.
- Oil sands are Saudi Arabia’s and OPEC’s chief reserve competition, not U.S. tight oil.
Supply and demand fundamentals improved in 2016 but progress has been uneven.

The global production surplus is ~0.75 mmb/d, the average for 2016, but excursions have included +2 to -1.5 mmb/d.

Consumption growth was 1.3 mmb/d, less than average since the Financial Collapse but slightly better than forecasts.

2016 was the lowest average oil price ($2016) since 2003 and 12% less than 2015 and yet, demand growth was mediocre.

The weak global economy is an important consideration for supporting higher oil prices.

Most of 2016 was without bad economic news to depress markets.
The OPEC Production Cut Will Not Bring The Market Into Balance Quickly

- Production is not supply and consumption is not demand.
- Inventory is part of supply and is also a component of demand.
- IEA forecasts a supply deficit by Q1 2017 yet OECD inventories > 400 mmb above 5-yr average.
- Stocks would have to be drastically reduced over the next 5 weeks for that to occur.
- What IEA is showing as “demand/supply balance” is really demand-production balance.
- If OPEC cuts as announced, consumption may exceed production in Q1 & Q2 2017 & withdrawals from storage will occur—legitimate demand increase.
- But, the billions of barrels of working capacity in inventory are not considered part of supply!
- Inventory is like a savings account—separate from checking but certainly part of available money.
Comparative inventories index current storage levels against a moving average of values for the same calendar date over the previous 5 years.

OECD comparative inventories (C.I.) are at an all-time high level of more than 300 million barrels (absolute inventories > 3.1 billion barrels).

C.I. ~ zero corresponds to periods of high oil prices (> $80 per barrel) over the past decade.

Cross-plot of C.I. vs Brent price suggests current ~ $56/barrel is at least $10 over-valued.

C.I. must fall >200 mmb to support $70 prices.

OPEC cuts will accelerate movement toward market balance but massive stock reductions will occur over a year or more.

Also assumes that non-OPEC production falls or remains static.
U.S. Production Will Not Remain Static

- Output fell 1 mmb/d from April 2015-September 2016 but is now increasing.
- EIA forecast is for 9.8 mmb/d by December 2018.
- WTI does not reach $60/barrel and falls below $50 in February for half of 2017.
- The tight oil horizontal rig count has increased by 138 (55%) since the OPEC production cut was first announced in September 2016.
- 67% of the increase has been in the Permian basin where the rig count has increased 95.
- Eagle Ford has made a come-back in recent weeks.
- This suggests that U.S. production will increase.
- Increased production from Nigeria and Libya plus U.S. tight oil may cancel OPEC/NOPEC production cuts.
- Lack of frack crews & poor condition of frack equipment are a concern for near-term production growth.
• U.S. crude oil inventories are at all-time high levels: 519 million barrels.
• That is 46 million barrels above 2016 and 144 million barrels above the 5-year average.
• The 14 million barrel addition the week ending February 3 was the 2\(^{nd}\) highest in history—the highest was in October 2016 when WTI was $5/barrel lower.
• Comparative inventories are also at record high levels.
• When C.I. was closest, WTI was less than $50 per barrel.
• The trend line shows that oil prices are at least $6 to $7 per barrel over-valued.
Record U.S. Crude Oil Inventories Reflect Over-Valued Oil Prices

- Both WTI and Brent have record number of long positions on futures prices.
- Long positions historically precede falling oil prices.
- Prices remain range-bound between $43 and $54 per barrel and are at the upper limit of that range today.
- Prices have gotten to these levels based on expectation of market balance from the OPEC cuts.
- Fundamentals indicate that there is as much likelihood that prices may fall as that they may rise.
- Realistically, the OPEC cuts have put a floor under oil prices and volatility should continue to characterize oil markets.
- Prices will probably fall below $50 until the effects of the OPEC cuts are seen in inventory levels.
Demise of The Bakken: Production Has Declined 285 kbpd since December 2014

- Bakken production fell 92,000 bopd in December—a 9% drop in one month.
- Some of the decline is probably weather-related but also because of a sizeable decrease in the number of producing wells—why?
- Current wellhead price is $42.50 per barrel.
A detailed reserve analysis of the 8 top operators indicates that a 1.2 million acre area is commercial at $50/barrel wellhead prices. There are currently 5,500 producing wells in that area yielding an average well density of 215 acres per well. Operators suggest 40-120 acre infill spacing for tight oil plays, favoring the lower end of that range. 215 acre spacing suggests considerable down-spacing and potential for several years of production growth at higher oil prices.
EUR, Gas-Oil Ratios & Water Cut Trends Suggest Declining Output More Likely

- EUR has decreased over time except for Continental Resources.
- Gas-oil ratios have increased for all operators.
- Water cuts are consistently higher over time and average almost 50% of total liquids.
- These trends suggest depletion and that the play has been over-drilled—not conclusive without pressure data.
2015-2016 drilling has collapsed to the commercial core area so declining EUR suggests well interference.
Most of the core area has been drilled with 8,000-10,000 ft laterals.
It is reasonable that 215 acre/well exceeds optimum infill spacing.
Shorter laterals probably reflect earlier Parshall-Sanish development.
Only 3 Companies Can Break Even Near Current Wellhead Prices ($42.50) Based On Average Well EUR

- Only EOG is breaking even at current wellhead prices.
- ConocoPhillips and Marathon break even at slightly higher prices.
- Despite large $50 commercial area, companies’ project average includes poorer performing wells outside of core.
- This is typical of the resource plays because lease positions are taken before the core is well defined.
- The premature demise of the Bakken is a signal that the other plays may meet a similar end.
- That scenario is confirmed in the shale gas plays.
Bakken & Other Tight Oil Have Added 6.2 Billion Barrels of Ultra-Light Oil Since 2010

- Unconventional oil plays have added more than 6 billion barrels of oil greater than 40 API gravity since January 2010.
- 31 API gravity is the average input to U.S. refineries.
- There is limited capacity to refine ultra-light oil.
- It must be blended with heavier, mostly imported oil to be refined.
- There is a surplus that can neither be refined nor exported—the world refining capacity is similar to the U.S.
- The only way to find export markets for U.S. light oil is by deep discounting.
- U.S. exports have not increased since the oil export ban was lifted in late 2015.
- Some significant amount of light oil goes into storage.
- The OPEC production cut will reduce foreign inventories but not U.S. inventories as much.
Don’t Hold Your Breath For $70 Oil Prices

- Oil markets look for every excuse to increase prices because we are conditioned by 4 years of prices >$90 as normal.
- Expectations for a return to $70 prices are premature given the magnitude of the bubble.
- Over-supply was the price-collapse trigger but was not the sole cause.
- A global economy exhausted by debt, weak demand growth and the high price of energy even at today’s prices are of at least equal weight.
- Over-supply can be fixed but the other factors are more problematic.
- Inventories are the key—when inventories fall systematically, prices will increase.
- Under-investment in E&P will result in tight supply over the next several years and prices will increase to abnormal levels.
- Even with considerable improvement in the global economy, this may be a disaster.