Brian Shiau, CFA February 27, 2015

WTI Crude Oil - Bearish Recommendation - Current Price: $32.84

Thesis: Bullish forces for oil are not as strong as oil bulls think. Sell oil on rallies.

Summary

1. Data may indicate US production and demand rebalancing, but data is noisy and imports plentiful
2. E&P bankruptcies will decrease oil prices, not increase them
3. Capex cuts are slow to affect production and new production can come back quickly
4. OPEC-Russia deal is overhyped
5. Oil prices may be depressed even in the long-term due to secular forces

Intro

Oil has rallied 27% from recent lows. Several prominent investors, analysts, and industry insiders have called this the bottom in crude oil prices. There are predictions that crude oil can recover to as high as $65 by year-end. These predictions are driven by three forces:

- Low prices will eventually bankrupt some producers and decrease production
- Capex cuts in the US will result in lower future production
- Potential deal between OPEC and Russia to freeze or cut production

On July 30, 2015, I wrote a note presenting a 12-24 month bearish view on crude oil and a bullish view 2+ years out. At the time, I pointed to 1) strong US Dollar, 2) continuing supply growth, and 3) slowing demand growth. Today, the US Dollar remains strong, Iran is prepared to bring oil to global markets, and demand has increased slightly year-over-year.

The Data

Use my interactive crude oil chart to see how a) US refinery demand for crude oil and b) US oil production have changed over time. From EIA data:

Week ending:	February 20, 2015	January 1, 2016	February 19, 2016
US Refinery Demand	15,243k bpd	16,617k bpd	15,685k bpd
US Production	9,285k bpd	9,219k bpd	9,102k bpd
US Net Imports	6,801k bpd	7,010k bpd	7,403k bpd
US Surplus	843k bpd	- 388k bpd	820k bpd

Demand fluctuating. Production falling. Imports rising: Since the beginning of the year, **US refinery demand** is **down 932k bpd** and **US production** is **down 117k bpd**. However, refinery demand has seasonality. Year-over-year, **demand** is **up 442k bpd** and **production** is **down 183k bpd**. However, US oil is not a closed system. **Imports** are **up 602k bpd** yoy and **up 393 bpd** since the beginning of the year.

Demand is stuck. Stockpiles grow: Demand exhibits a lot of variability. Crude oil must be refined before it can be used. Refining capacity in the US has not grown at the pace of US oil production and refinery

utilization oscillates between 85% and 95% largely due to seasonality, facility maintenance, and equipment failure. Pumping more oil doesn't mean more gasoline and diesel production if the bottleneck of refining has not been widened. As a result, oil stockpiles build when refineries cannot accept more feedstock.

Imports replace production. Global cuts key: The very slight decreases in US production have been replaced by increased imports. Supply responses in the US can been fulfilled by production around the world, such as Iran's planned ramp up. Oil is a global supply problem, not merely a US supply problem.

Data is noisy: It is important to note the data is extrapolated from surveys and there is some margin of error to the measurements (for example, findings of EIA and API surveys can differ by millions of barrels in stockpile changes each week); therefore, we should not rush to conclude trends from smaller fluctuations that may be measurement variability.

Key Takeaways:

- US production drops have been marginal and data measurement is noisy, which discounts a conclusion of a downward trend.

- US production can be replaced by global imports that will be boosted by Iran's return to market.

Bullish Force 1: Bankruptcy

Bankruptcies have been slow because this time IS different: In past oil cycles, low-cost producers had strong balance sheets while high-cost producers had weak balance sheets. As oil prices fell, high-cost producers filed bankruptcy. This time it is the reverse. Strong balance sheet producers like Exxon Mobil, Chevron, and BP have high-cost offshore oil platforms. They can sustain losses with mountains of cash and are not in danger of missing debt repayments. Weak balance sheet producers have low-cost onshore wells. With cash operating costs of $30 per barrel, they can keep pumping until their debt payments are due.

Bankruptcy does not stop production: In the US, businesses do not cease operations upon bankruptcy. The bankruptcy process is intended to maximize the recovery value for creditors. In the case of oil E&P firms, creditors are much better off taking control of producing wells rather than barren fields.

Bankruptcy actually lowers the total cost of production: The likely result of a bankruptcy will simply be senior creditors taking over the equity of the firm and the firm's debt burden getting lifted. The firm would then emerge from bankruptcy with an even lower cost of production. Investors must remember that fracking firms are losing money at these oil prices because of their debt service. Many are not losing money on a cash operating basis. Once these companies are free of debt service, they may be able to operate at $30 per barrel.

In other cases, oil assets will be sold to surviving firms, which will reduce overhead costs and decrease the cost of production. Either way, there will be more barrels at lower cost.

Key Takeaway: E&P bankruptcies may actually DECREASE oil prices as total firm costs decline when debt obligations are converted to equity or overhead costs are cut by eliminating inefficient firms.

Bullish Force 2: Capex cuts

If there is no new investment, global oil production is estimated to fall 4% each year as wells age. Capex around the world is definitely down—billions of dollars of new projects have been cancelled or delayed. For conventional drilling projects, this takes supply away from the years in the future when these projects should have come online. For unconventional drilling projects, this takes supply from the near-term. According to Baker Hughes data, oil rigs in North America have fallen from 1,609 rigs on October 10, 2014 to 413 rigs on February 19, 2016. But…

Horizontal wells still last for years: It is well known that shale wells do not last as long as traditional wells. Tight oil wells often produce 1,000 bpd at start and decline 6 - 10% per month to 100 - 400 bpd by end of year one. After the steep decline of the first year, these wells continue to produce oil at a more stable level for an average of 6 - 7 years (traditional wells can produce for decades). We are also learning that newer technology is extending the life of these fracking wells over previous estimates.

A 60 - 90% production decline in the first year may sounds troubling, but only a small portion of the 9.2 million bpd US production will still suffer this steep decline. Some estimate US production may decline by 1 million bpd in 12 months if no new wells are brought online, but after that the declines would be much less drastic.

Horizontal wells are drilled quickly at lower capex: The upward force capex cuts have on prices is not the same today. Fracking has a much shorter lead time than traditional oil drilling. US companies can drill horizontal wells in one to three weeks. If oil prices recover at all, US companies can ramp up new oil production within a month. Investors may be anchoring expectations to previous oil cycles in which offshore drilling could take a year to recover production drops. The cost of drilling has decreased from billions of dollars to single-digit millions with unconventional drilling. Furthermore, the plunge in oil prices has forced US firms to become even more efficient. The capex required has declined through increased pad drilling, longer-lateral wells, lower oilfield service costs, and high-grading. Overall, this means new supply can respond to rising prices much faster than in previous oil cycles.

DUCs are a big overhang: Drilled but UnCompleted (DUC) wells are a new phenomenon that pose a major obstacle to any price rise. This began as a consequence of the times. E&P firms had signed contracts to hire drilling rigs for a set time period. As oil prices fell and oil companies needed to conserve cash, they kept drilling with the rigs they already hired but did not hire crews to complete the wells. In other cases, firms needed to keep drilling as part of the conditions of their land lease. The well completion process involves pumping water, sand, and chemicals to hydraulic fracture shale rock to release oil and gas. Firms also became more efficient, drilling more wells per rig.

Drilling is 3/4 the cost of setting up a well, so much of the capex is already done. The cost of completing wells has dropped 40%. NY Times reported there are over 4,000 DUCs in the US ready to produce over 500,000 bpd once firms decide prices are high enough to release the oil. These figures place production at 125 bpd per well, which already accounts for the steep productivity decline curve (wells often produce 1,000 bpd at start). In the Eagleford, 40% of the 1,400 DUCs would be profitable at sub-$30 oil but firms are holding back in hopes for higher ROI if prices recover. Completing these wells will quickly make up for the capex cuts so far.

Anadarko, EOG Resources, and other major producers are now intentionally using this strategy to warehouse oil underground, ready to release to the market the moment oil prices rise. Executives at Anadarko report they are drilling more wells in 2016 than in 2014 with fewer rigs and more efficient well designs. This backlog of DUCs around the country is growing.

Key Takeaway: Do not expect US production to plunge from lower capex any time soon. Any rally in oil prices will attract new production. The drilling is already done with oil nearly ready to sell.

Bullish Force 3: OPEC-Russia Deal

The main driver of the recent 27% rally in oil prices has been speculation that OPEC and Russia will freeze production at January 2016 levels. Mohammed bin Saleh al-Sada, current OPEC President and Qatar's Minister of Energy, believes the freeze could increase oil prices to $50 in a year. It is important to clarify that discussions are to freeze production, not cut production.

Freeze plan unlikely to pass: So far, five of OPEC's thirteen members (Saudi Arabia, Kuwait, United Arab Emirates, Qatar, and Venezuela) and Russia are reportedly interested in the freeze plan. However, Iran has called the proposal a "joke." There is some talk that Saudi Arabia, Russia, and a few other OPEC members may meet to discuss this freeze in March.

However, the next OPEC meeting is not until June 2, 2016 and any decision to change the quota requires unanimous approval by all thirteen members. It is possible that OPEC allows an exception for Iran, but that still means Iran will add 300k bpd in 2016 and another 500k bpd in 2017 according to EIA forecasts. This is more than adequate to make up for US production decreases.

Iraq rising: Furthermore, Iraq has not agreed to the freeze. Iraq increased production to 3.297 million bpd in December despite ISIS clashes. Investors should expect this to continue as the country recovers, especially if any progress is made against ISIS.

Cartels fail due to cheating: Throughout history, past efforts to raise prices through collusion were mitigated by rampant cheating. Saudi Arabia bears the brunt of the production cuts while smaller countries that require the revenue continue to ramp production. Today, Saudi Arabia cannot bear this alone as the kingdom desperately tries to meet budget expenditures by planning an IPO of crown jewel Saudi Aramco. Russia and other OPEC members are in similarly dire situations in which the incentive to cheat is too high.

Key Takeaway: The freeze is unlikely and will not decrease production even if it passes.

Long-term recovery?

On the bear side, there are those who believe oil will never reach $45… ever again.

- Oil production ramp-ups can respond to price within weeks so that shortages become unlikely in the future. Any recovery to $40 will be met with rigs returning to the fields.

- Vehicles around the world are becoming more fuel efficient. This trend extends beyond cars and trucks to include aircraft and ships.

- Adoption of electric vehicles is happening much faster than most expected. For example, in 2015, Tesla Model S outsold its luxury peers and, in some classifications, commanded 25% of the US $75,000 - $150,000 luxury sedan market (25,202 vehicles of 99,198 sold). Granted, this segment is a negligible portion of the 18 million-vehicle US automobile market, but it indicates a secular trend

that continues even with low gasoline prices.

- Electric cars are becoming more affordable and outperform combustion vehicles. Every day more people around the world will never buy another gallon of gasoline despite its falling cost. Continued governmental and social pressure for environmental considerations will drive electric car adoption.

- Oil consumption won't fall to zero anytime soon, but that's not the point. Investors must remember that commodities in surplus are not worth very much. Supply only needs to exceed demand by a single barrel each day for that last barrel to have little value to consumers.

- Companies like Uber and Lyft are working with automakers to deploy fleets of autonomous-driving electric cars. Millennial preferences may create a future of on-demand transportation in which electric cars drive themselves to charging stations between rides, overcoming the one flaw of electric cars: range anxiety. This is a long time away, but it does have implications for now…

- In the very long-term, crude oil is headed to obsolesce. It is inevitable that crude oil will one day have the industrial value of whale oil, the question is when. This means oil producing countries and companies should keep producing now because one day their sole product will not have significant value. **There is a race to cash in on all the natural resource wealth in the ground while it is still valuable.**

- This is evident by Norway's plan to use oil wealth to diversify the nation's income before oil's eventual demise.

Key Takeaway:

- The era of $100 oil was likely unique. In the scope of "the rest of time," $45 is probably a low ceiling. I reiterate that oil prices will probably be higher in 18 months than they are today. Capex cuts will take their toll, but not right now.

- However, investors should be aware that oil's future obsolesce impels oil producers to try to sell all the reserves they have in the ground before prices eventually fall permanently.