



### CHARTS OF THE MONTH

We estimate global oil demand for the July-August period averaged 98.2 MM b/d. The figure is close to our forecast. The rate puts global use a wee over 1.3 MM b/d above 3Q 2016's rate with the only footnote being that the figure is probably understated because of specific impacts on North America related to dislocations from Hurricane Harvey. Our model of the global oil balance is detailed on the last page of this report. Our forecast continues to see demand reaching a new all time high in 4Q which we expect will result in continued draws on global oil inventories. Consensus figures for demand remain too low, in large part because the IEA historical numbers reaching back to 2015 remain too low – a problem exacerbated by a goofy set of non-OECD revisions a month ago.

#### Apparent Demand "Math" for 3Q '17 Million barrels per day

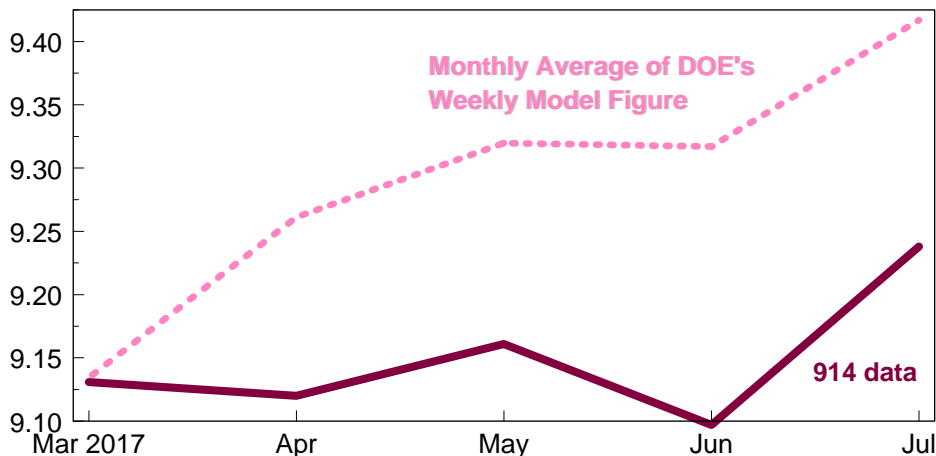
World supply	98.03
Commercial stock change	-0.11
Emergency stock change	-0.05
<b>Global Apparent Demand</b>	<b>98.19</b>

**Our 3Q 2016 demand forecast** 98.29

**Y/Y growth based on our analysis** 1.32  
**Y/Y growth of our forecast** 1.41

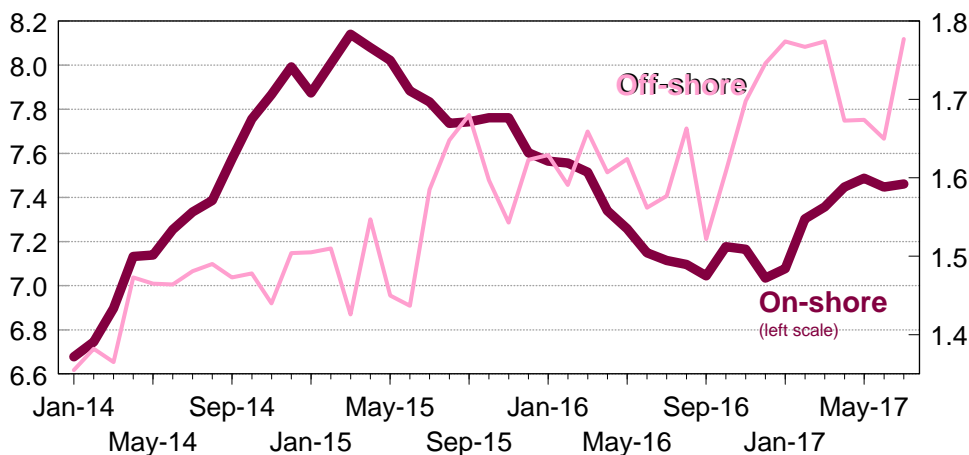
#### US Crude Oil Production

Million barrels/day



#### US On-shore Crude Oil Production

Million b/d

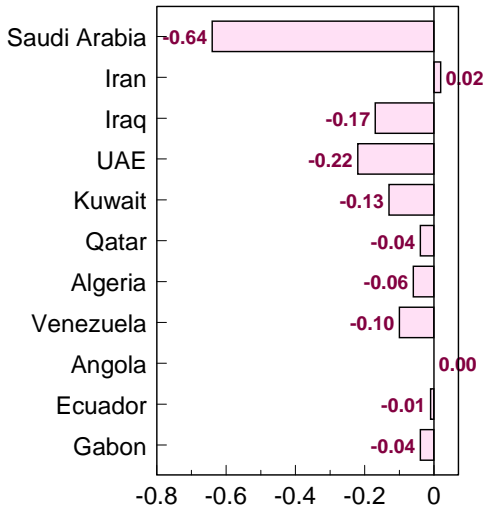


Most oil pundits and market watchers espouse fear about US shale oil output. In the immediate aftermath of OPEC's deal last November many, in fact, stated the cartel's production cuts would be self-defeating because of US production gains. In point of fact, since OPEC's meeting, US crude output rose just 362,000 b/d (November '16 versus July's 914 data). This is 500,000 b/d shy of what pundits asserted which was for minimum gains of 100,000 b/d per month. From our vantage point, we think September marked the start of a major bout of analyst capitulations regarding shale oil growth. IEA figures – which end up being the consensus' projection – appear unrealistically high for US supply next year. The IEA's 2018 'projection for the US broke with the DOE (very unusual) suggesting the Paris-based group remains politicized and intent on fostering bearish oil market sentiment.

As a matter of discussion, last week's 914 data for July showed output up 145,000 b/d in July but, importantly, almost all of it was from Federal offshore. July's production figure is also lower than the weekly DOE average by 179,000 b/d. As per a series of analyses last month, we think the DOE under-stated production outages post Harvey.

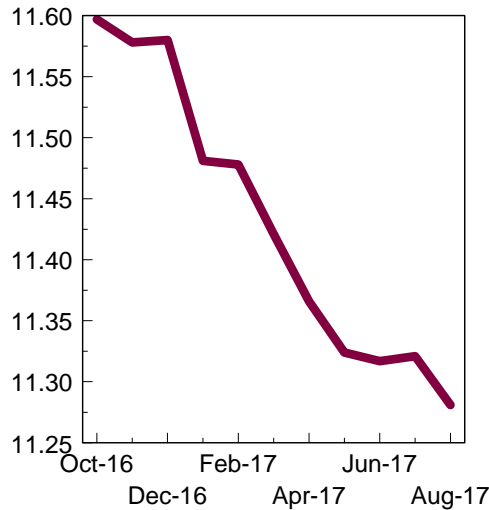
**OPEC Production Changes**

August '17 versus November '16, MM b/d



**Russia's Crude Oil Production**

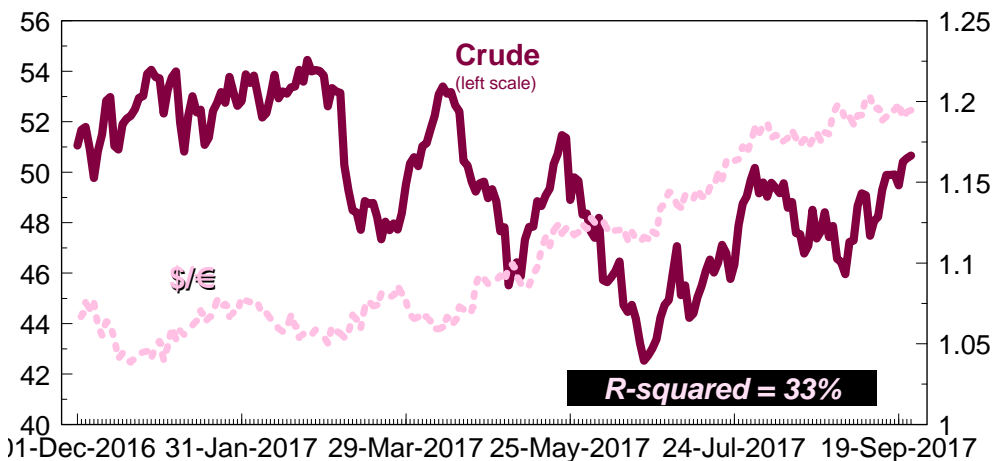
Monthly



On the heels of November's OPEC meeting, there was an immediate pooh-poohing of the deal by pundits consisting of four central assertions: (1) OPEC will cheat (2) Russia wouldn't honor its commitment (3) US Dollar strengthening would "wreck" oil prices, (4) US shale production would explode higher making OPEC cutbacks self defeating. On P1 we discussed the "miss" on shale, but how have the other assertions fared? Contrary to expectations of most, OPEC's quota compliance has been strong and, from a historical perspective, much better than what we witnessed for several years when country ceilings were first introduced in March 1983. Pundits that asserted the \$/€ trade would counter OPEC's deal also missed the mark with that correlation looking poor since the November deal was announced. Lastly, 11 non-OPEC countries pledged 558,000 b/d of cuts. The largest volume was offered from Russia (300,000 b/d), and most all market watchers stated that it wouldn't materialize. This amounted to a swing-and-a-miss.

**Crude Oil versus the Euro**

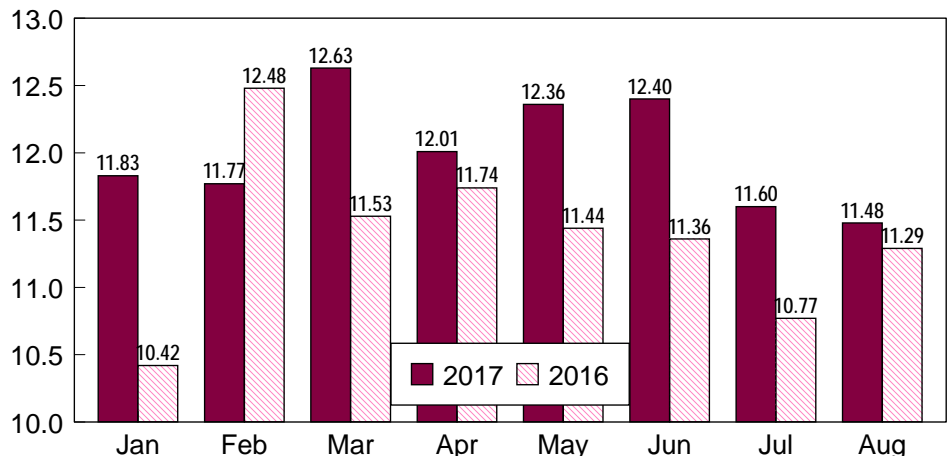
Daily



**China's Apparent Oil Demand**

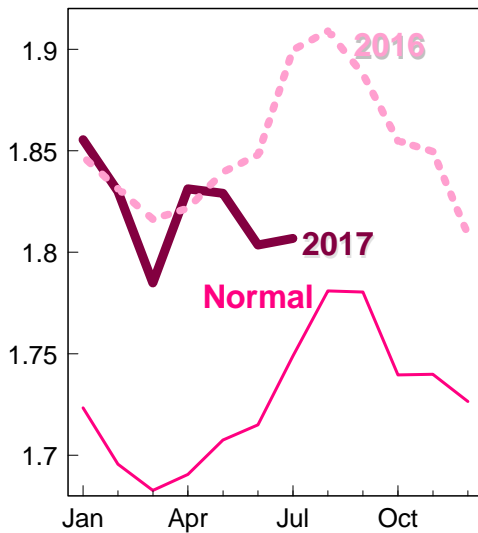
Monthly average, Million b/d

The preliminary trade data we crunched for China suggests its oil demand saw slower growth in August bringing quarter-to-date growth to 4.6%. Before you think, "oh my," that left the year/year demand gain about 50% above the forecast (which seems to have been the pattern all through 2017). The apparent demand math we generate for China has proven to be a good proxy for the official data which does lag – a point that is obvious if one follows the IEA's almost constant upward revisions for China consumption.



**Total OECD Product Stocks**

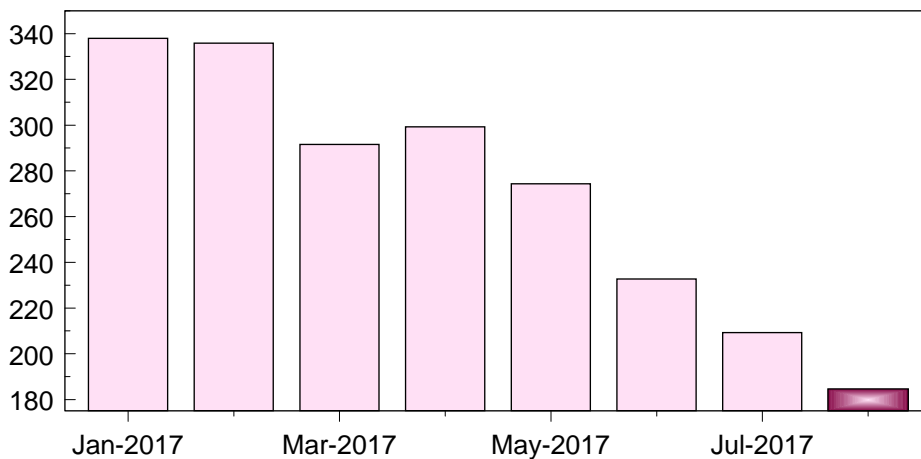
Monthly, Billion barrels



In almost all our oil balance work, we focus on changes (and the absolute level of) total petroleum stocks. But it's worth noting that, on average, pet-chems and refined product inventories account for 70% of global oil stores. In that regard, prior to impacts from Hurricane Harvey, we were already witnessing total global inventories drawing with a significant contra-seasonal pull on refined products and pet-chems. In point of fact, at end-July the non-crude portion of global inventories stood within 60 million barrels of normal. We have not run the math, but the pull seen in the US over the past couple months may have taken global pet-chems and refined product inventories to a below normal level.

**OECD Stocks Relative to Normal**

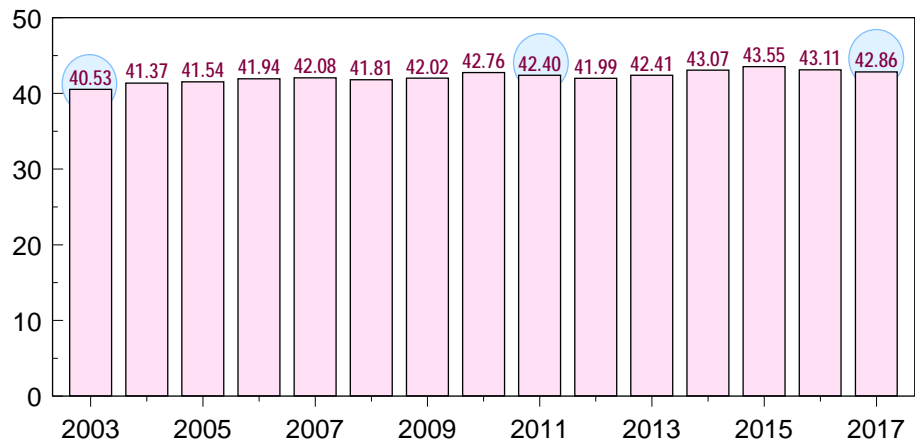
Million barrels



**Non-OPEC Supply Excluding the USA**

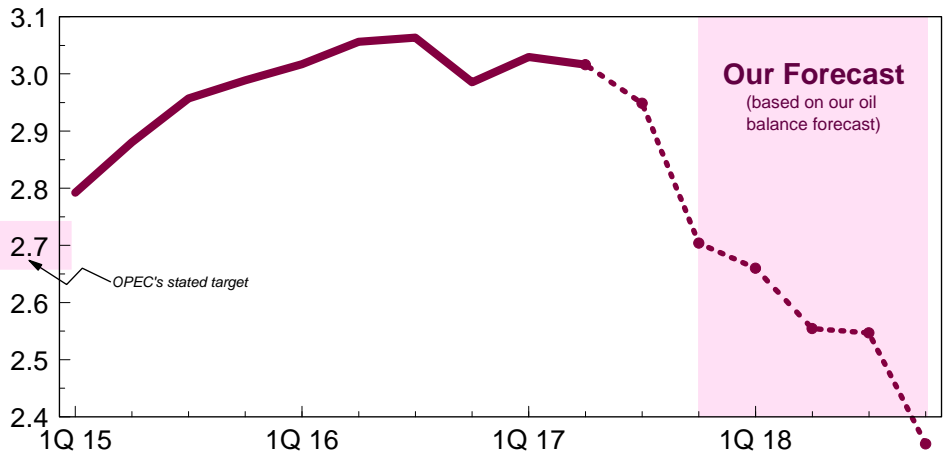
Annual average, Million barrels/day

Lost on market watchers is the fact that aggregate non-OPEC supply excluding the US saw very little in the way of growth despite what's been a step-change in oil prices from the '80s and '90s. The reductions in CAPEX following OPEC's "scorched earth" policy in 2014 will, we think, reinforce that trend over the medium term. Importantly, lackluster non-OPEC supply growth looks to occur in the face of continued robust global oil demand gains.



**Total OECD Petroleum Inventories**

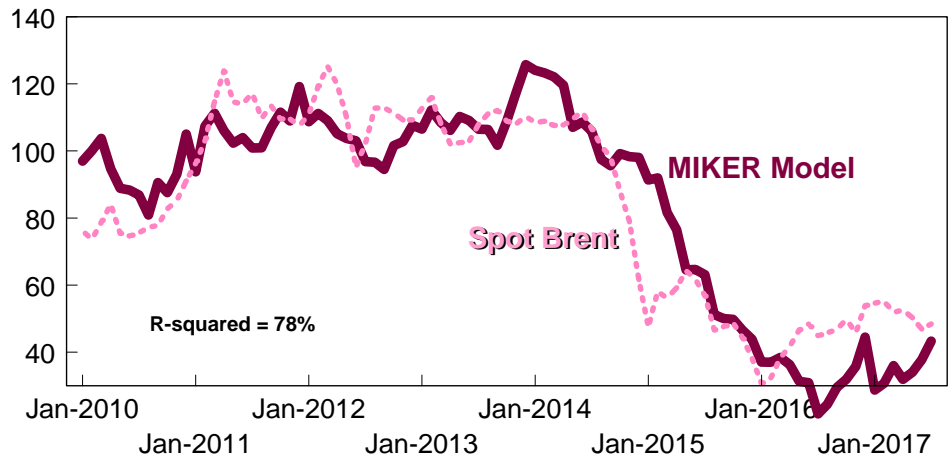
End of quarter level, Billion barrels



OPEC's production cuts have, in fact, whittled down the global inventory overhang, and we think storage draws will accelerate in the coming months. 2018 is forecast to be another year where world demand growth outpaces non-OPEC supply gains. By our reckoning, OPEC will need to unwind its cut sometime after 1Q 2018. Our inventory forecast shown here actually accounts for an unwinding of OPEC's November deal, but even that does not look to prevent further draws on global oil stocks. Much of the oil balance work we publish is meant to drill down to an effect on inventories because of a strong inverse relationship with crude prices. The MIKER model is a formalized analysis of that relationship (it has an R<sup>2</sup> of about 80% which is amazingly high given just how complex the global oil markets are). When we look at where global inventories are forecast to fall to, MIKER kicks out an oil price that makes our \$85/barrel price target look conservative. This is also the case when we run a sensitivity analysis with demand stress-tested using a growth rate of just 50% of the base case forecast.

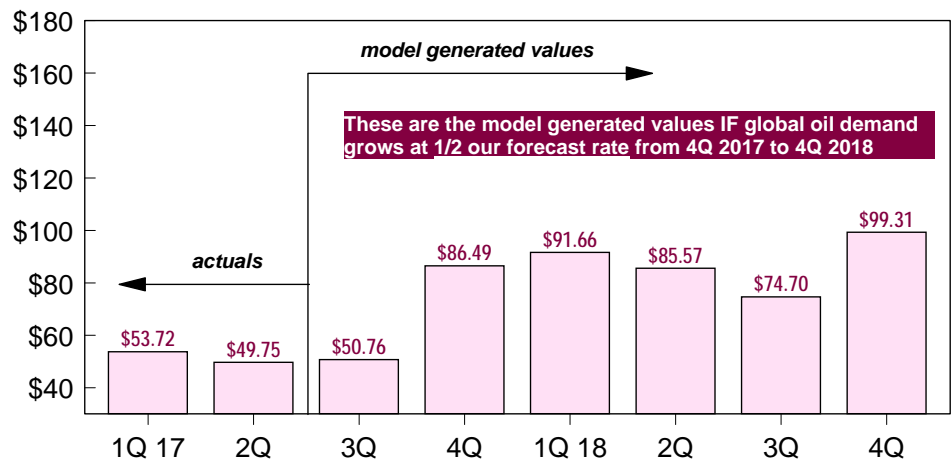
**The MIKER Model for Brent Crude**

Compared against actual monthly average of Brent, \$/barrel



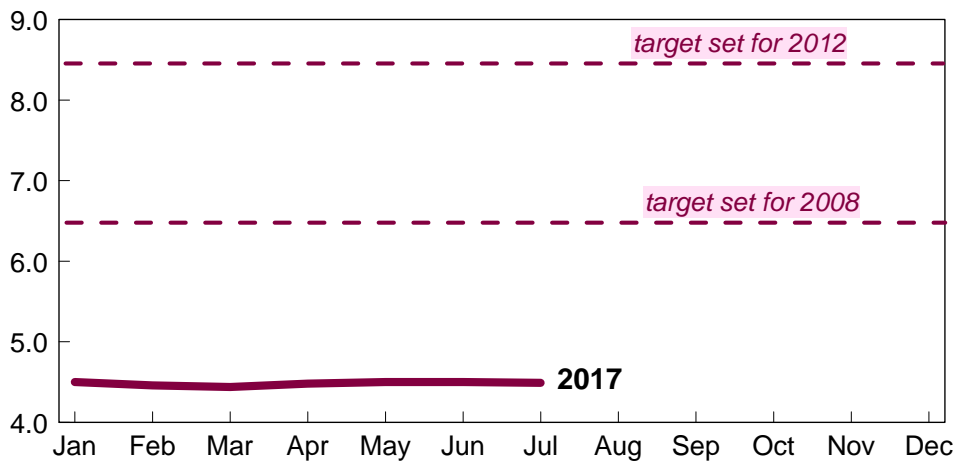
**MIKER Model Values Based on a "Weak Demand" Scenario**

Actual and model generated figures for Brent crude, \$/barrel



### Iraq's Monthly Crude Oil Production

Million barrels/day



Iraq's civil war is actually treated as something of a non-event in the oil market. This apathy exists despite the fact that a loss of its output would be tantamount to a "black swan" for the global oil market given OPEC's spare capacity is limited to the cutbacks since last November. Moreover, it has been conveniently forgotten that a number of market watchers took a stand last year that Iraq's oil production was "well on the way" to the 5.5 million b/d mark. Indications last month about increased unrest in Iraq's south should be a cause for concern in the oil market, especially given the "zero" risk premium in crude prices. The Kurd independence vote might help foster market angst about Iraq's sectarian war.

There're two separate but related situations in Saudi Arabia of late that appear to be off the radar screen of most oil market watchers. The first started several weeks back and centered on rumors that King Salman was going to abdicate the throne to Mohamad bin Salman (MbS). The supposed view was that it would secure MbS's position given the growing disquiet in the wake of Prince Nayef's removal from the succession line. We're not sure how to handicap the odds for a plot that prevents MbS' succession, but Saudi Arabia's leaders clearly believe them to be significantly higher than "zero." We say this because the other situation of late relates to a string of arrests of clerics, prominent scholars, political commentators and journalists all of whom were accused of espousing anti-Saudi comments. This suggests to us that the country's helm may have become fearful of circumstances morphing into unrest a'la Tunisia and Egypt. The paranoia seems high enough to have warranted an edict last month that anti-Saudi comments on social media are now punishable – a Stalin-esque move given indications that citizens are encouraged to "rat out" neighbors and friends that might harbor such anti-government views. This edict is also noteworthy because up to this point the country's leaders ignored dissent on social media, viewing it as a benign outlet to vent frustration with government policy. Some anxiety Saudi leaders currently feel likely relates to the Trump administration's now evident lack of support for its position on Qatar. Saudi Arabia is the world's 2nd largest oil producer (the US ranks first in terms of total liquids), and its oil exports account for nearly all of its revenue. For this reason, pressure on Riyadh continues to stem from what's been a nearly 36 month long bleed out of its financial resources as per the analysis below.

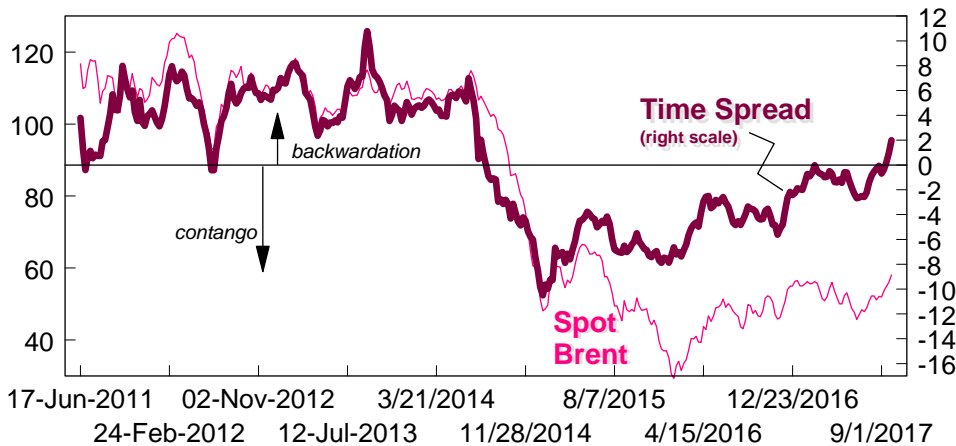
### Saudi Arabia's Foreign Reserves

Quarterly delta, Billion US Dollars



**Spot Brent vs. the Brent Time Spread**

Weekly

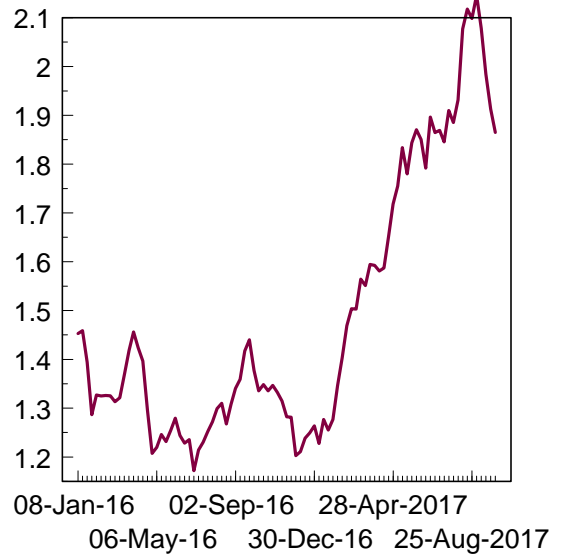


Brent crude is the global price benchmark, and the time spread (the differential between the 1st and 12th nearby contracts) became backwardated last month for the first time since August '14. We expect backwardation will become wider as we move forward in the coming quarters. At OPEC's November '16 meeting we forecast backwardation would return to the oil market during 2017 as stocks were worked down. Crude prices in a premium bid structure helps induce long positioning because the month/month contract roll effectively pays the holder. We would not be surprised to eventually see financial institutions encourage money managers to have oil as an asset class for this reason.

Shares of energy equities relative to the S&P 500 recently turned higher coinciding with what looks like a mirrored rotation out of tech stocks as we detail here. The momentum trade that placed these sectors on the opposite sides of each other was, we feel, a key ingredient to a coincident decoupling evidenced between crude prices and the relative share performance of the S&P energy names. Even with the recent turn, energy share prices are trading as if crude prices were down at \$30/bbl – actually they're still trading lower than when oil bottomed out in 1Q 2016. Because of the relative performance of energy names in the first half of the year, we almost sense that investors dread the idea of owning the space ("catch a falling chainsaw" syndrome) despite what appears to be a very compelling risk/reward ratio.

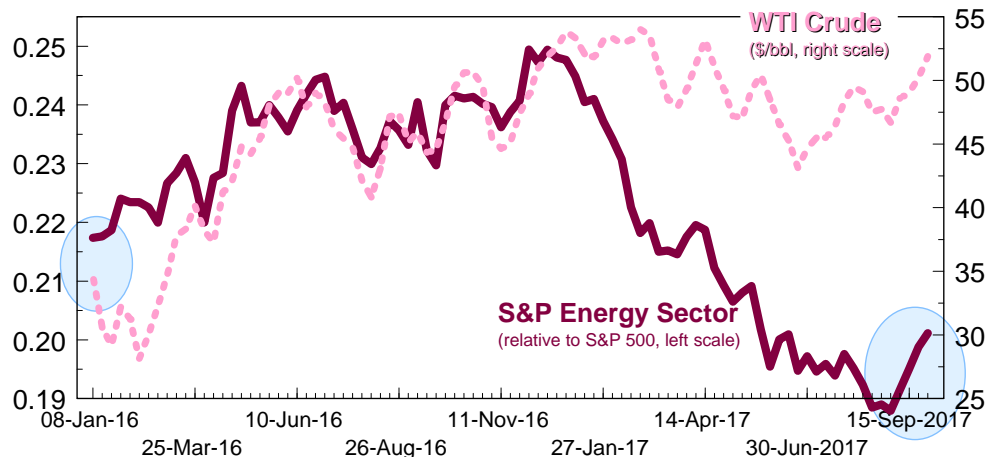
**S&P Technology Sector**

**Versus S&P Energy Sector, Weekly**



**Performance of the S&P Energy Sector**

Relative to the S&P 500, Weekly



## Our Model of the Global Oil Balance, Quarterly 2016-2018 Forecast, Figures in Million barrels/day

	1Q	2Q	3Q	4Q	2016	1Q	2Q	3Q	4Q	17-F	1Q	2Q	3Q	4Q	18-F
<b>DEMAND</b>															
US	19.5	19.4	19.9	19.8	19.6	19.5	20.0	20.1	19.9	19.9	19.6	20.1	20.2	20.1	20.0
Europe	13.6	13.9	14.4	14.2	14.0	13.9	14.3	14.4	14.1	14.2	13.9	14.3	14.5	14.2	14.2
Other OECD	13.6	12.7	13.0	13.5	13.2	13.5	12.7	13.0	13.5	13.2	13.6	12.8	13.0	13.5	13.2
<b>Total OECD</b>	<b>46.7</b>	<b>46.0</b>	<b>47.3</b>	<b>47.4</b>	<b>46.9</b>	<b>46.9</b>	<b>47.0</b>	<b>47.4</b>	<b>47.5</b>	<b>47.2</b>	<b>47.1</b>	<b>47.2</b>	<b>47.7</b>	<b>47.8</b>	<b>47.5</b>
FSU	4.6	4.6	4.9	4.9	4.8	4.6	4.8	4.9	5.0	4.8	4.6	4.8	5.0	5.0	4.8
China	11.8	12.1	11.6	11.9	11.9	12.5	12.7	12.0	12.3	12.4	12.9	13.1	12.4	12.7	12.8
Other Non-OECD	32.4	32.3	32.3	34.1	32.8	31.5	33.1	33.2	34.8	33.2	32.5	34.0	33.9	35.6	34.0
<b>Total Non-OECD</b>	<b>49.5</b>	<b>49.7</b>	<b>49.6</b>	<b>51.7</b>	<b>50.1</b>	<b>49.3</b>	<b>51.2</b>	<b>50.9</b>	<b>52.8</b>	<b>51.1</b>	<b>50.7</b>	<b>52.6</b>	<b>52.0</b>	<b>54.0</b>	<b>52.3</b>
<b>Total World</b>	<b>96.2</b>	<b>95.7</b>	<b>96.9</b>	<b>99.1</b>	<b>97.0</b>	<b>96.2</b>	<b>97.3</b>	<b>98.3</b>	<b>100.4</b>	<b>98.3</b>	<b>97.9</b>	<b>99.7</b>	<b>99.7</b>	<b>101.8</b>	<b>99.8</b>
<b>SUPPLY</b>															
US	12.7	12.6	12.3	12.5	12.5	12.7	13.0	13.1	13.3	13.0	13.5	13.6	13.8	14.0	13.7
Canada	4.6	3.9	4.6	4.8	4.5	4.9	4.5	4.7	4.6	4.7	4.7	4.5	4.9	5.0	4.8
UK	1.1	1.1	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.1
Norway	2.0	1.9	1.9	2.1	2.0	2.1	2.0	1.8	2.0	2.0	2.0	1.9	1.9	1.9	1.9
Mexico	2.5	2.5	2.5	2.4	2.5	2.3	2.3	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1
FSU	14.3	14.1	14.0	14.5	14.2	14.4	14.3	14.3	14.5	14.4	14.3	14.3	14.3	14.4	14.3
China	4.2	4.1	4.0	3.9	4.0	4.0	4.0	3.8	3.7	3.9	3.8	3.8	3.6	3.6	3.7
Indonesia	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
Other	13.1	13.5	13.9	13.6	13.5	13.2	13.5	14.2	13.8	13.7	13.5	13.8	14.5	14.2	14.0
Refinery Gain	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
<b>Total Non-OPEC</b>	<b>57.7</b>	<b>56.8</b>	<b>57.2</b>	<b>58.0</b>	<b>57.4</b>	<b>57.8</b>	<b>57.8</b>	<b>58.3</b>	<b>58.4</b>	<b>58.1</b>	<b>58.1</b>	<b>58.3</b>	<b>59.3</b>	<b>59.4</b>	<b>58.8</b>
Saudi Arabia (incl NZ)	10.2	10.3	10.6	10.5	10.4	9.9	10.0								
Iran	3.1	3.6	3.7	3.8	3.6	3.8	3.8								
Iraq	4.3	4.3	4.4	4.6	4.4	4.5	4.5								
Kuwait (incl NZ)	2.9	2.9	2.9	2.9	2.9	2.7	2.7								
UAE	2.9	3.0	3.1	3.2	3.0	3.0	2.9								
Qatar	0.7	0.7	0.6	0.6	0.7	0.6	0.6								
Venezuela	2.4	2.3	2.2	2.1	2.2	2.1	2.1								
Nigeria	1.7	1.5	1.3	1.5	1.5	1.4	1.5								
Libya	0.4	0.3	0.3	0.6	0.4	0.7	0.7								
Ecuador	0.5	0.6	0.6	0.5	0.4	0.5	0.5								
Algeria	1.1	1.1	1.1	1.1	1.1	1.1	1.1								
Angola	1.8	1.7	1.7	1.6	1.7	1.6	1.6								
Gabon	0.2	0.2	0.2	0.2	0.2	0.2	0.2								
Equatorial Guinea	0.2	0.1	0.1	0.1	0.1	0.1	0.1								
<b>Total OPEC Crude</b>	<b>32.3</b>	<b>32.5</b>	<b>32.9</b>	<b>33.4</b>	<b>32.5</b>	<b>32.1</b>	<b>32.3</b>	<b>32.4</b>	<b>32.4</b>	<b>32.3</b>	<b>32.4</b>	<b>33.4</b>	<b>33.4</b>	<b>33.4</b>	<b>33.2</b>
Condensates & NGLs	6.7	6.8	6.9	6.9	6.8	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
<b>Total OPEC Supply</b>	<b>39.0</b>	<b>39.3</b>	<b>39.8</b>	<b>40.3</b>	<b>39.3</b>	<b>38.9</b>	<b>39.2</b>	<b>39.3</b>	<b>39.3</b>	<b>39.2</b>	<b>39.3</b>	<b>40.3</b>	<b>40.3</b>	<b>40.3</b>	<b>40.1</b>
<b>Total World</b>	<b>96.7</b>	<b>96.1</b>	<b>97.0</b>	<b>98.3</b>	<b>96.7</b>	<b>96.7</b>	<b>97.0</b>	<b>97.5</b>	<b>97.7</b>	<b>97.2</b>	<b>97.4</b>	<b>98.6</b>	<b>99.6</b>	<b>99.7</b>	<b>98.8</b>
<b>Inventory Change</b>	<b>0.5</b>	<b>0.4</b>	<b>0.1</b>	<b>-0.8</b>	<b>-0.2</b>	<b>0.5</b>	<b>-0.3</b>	<b>-0.7</b>	<b>-2.7</b>	<b>-1.0</b>	<b>-0.5</b>	<b>-1.1</b>	<b>-0.1</b>	<b>-2.1</b>	<b>-1.0</b>
<b>%Change in Demand</b>															
US	0.2%	-0.2%	0.4%	1.7%	0.5%	0.2%	3.0%	0.9%	0.9%	1.2%	0.8%	0.5%	0.8%	0.8%	0.7%
Europe	0.7%	1.9%	1.1%	2.6%	1.6%	2.0%	2.3%	-0.5%	-0.5%	0.8%	0.3%	0.3%	0.7%	0.7%	0.5%
Other OECD	-0.4%	1.3%	0.8%	1.4%	0.8%	-0.6%	0.5%	0.1%	0.1%	0.0%	0.2%	0.2%	0.2%	0.2%	0.2%
<b>Total OECD</b>	<b>0.2%</b>	<b>0.8%</b>	<b>0.7%</b>	<b>1.9%</b>	<b>0.9%</b>	<b>0.5%</b>	<b>2.1%</b>	<b>0.3%</b>	<b>0.3%</b>	<b>0.8%</b>	<b>0.5%</b>	<b>0.4%</b>	<b>0.6%</b>	<b>0.6%</b>	<b>0.5%</b>
FSU	5.3%	-1.7%	2.5%	4.0%	2.5%	-0.2%	4.6%	0.5%	0.5%	1.3%	0.5%	0.5%	0.5%	0.5%	0.5%
China	4.2%	4.2%	0.3%	2.3%	2.8%	5.9%	4.8%	3.1%	3.1%	4.2%	3.3%	3.3%	3.3%	3.3%	3.3%
E. Europe	6.2%	7.5%	4.3%	2.9%	5.2%	1.4%	2.8%	0.1%	0.1%	1.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Other Non-OECD	3.3%	-2.0%	-0.6%	2.2%	0.7%	-2.8%	2.4%	2.8%	2.2%	1.2%	3.1%	2.7%	2.1%	2.1%	2.5%
<b>Total Non-OECD</b>	<b>3.7%</b>	<b>-0.4%</b>	<b>0.0%</b>	<b>2.4%</b>	<b>1.4%</b>	<b>-0.4%</b>	<b>3.2%</b>	<b>2.6%</b>	<b>2.2%</b>	<b>1.9%</b>	<b>2.9%</b>	<b>2.6%</b>	<b>2.2%</b>	<b>2.2%</b>	<b>2.5%</b>
<b>Total World</b>	<b>2.0%</b>	<b>0.2%</b>	<b>0.4%</b>	<b>2.2%</b>	<b>1.2%</b>	<b>0.0%</b>	<b>1.7%</b>	<b>1.5%</b>	<b>1.3%</b>	<b>1.4%</b>	<b>1.7%</b>	<b>2.5%</b>	<b>1.4%</b>	<b>1.4%</b>	<b>1.5%</b>

This is our the balance model and we'd draw your attention to the OPEC crude supply figure for 2018. Specifically, we are highlighting the "un-wind" of the November 2016 quota cuts after next year's 1st quarter. Even with that unwind, global oil inventories are forecast by us to draw resulting in an additional tightening of global supply/demand. There are two key differences between our model and the consensus': (1) our global demand figures are higher because of the on-going "missing barrel" issue, (2) our forecast for non- OPEC supply is less robust partly because of a lower than consensus figure for US crude supply gains.

