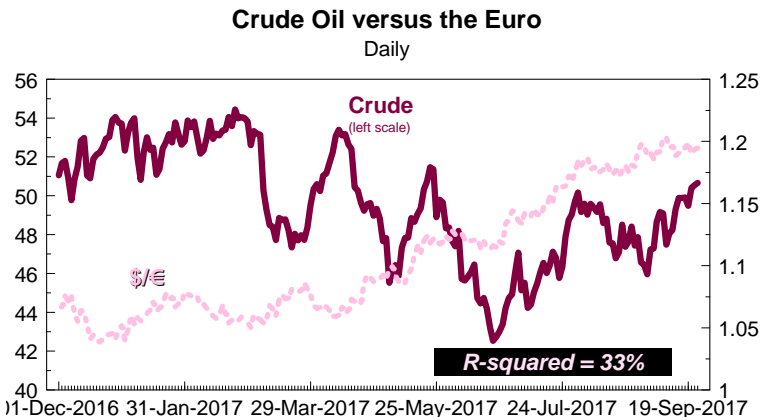
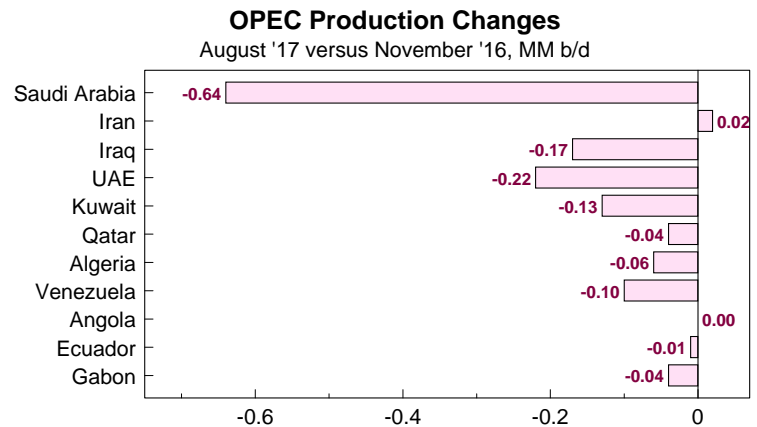




THE HARD SELL VERSUS THE HARD TRUTH

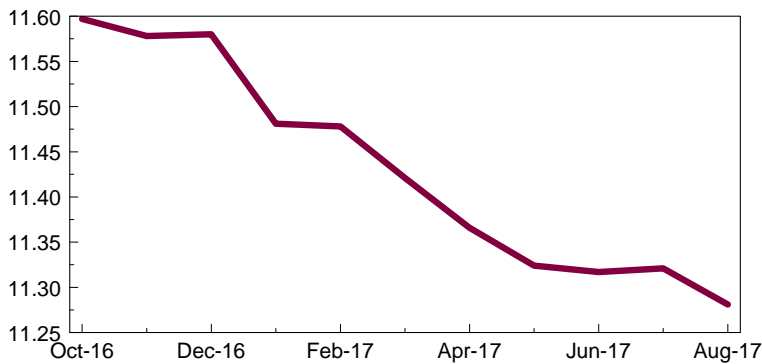
On the heels of last November's OPEC meeting, there was an immediate pooh-poohing of the deal by pundits consisting of four central assertions: (1) OPEC will cheat (2) Russia wouldn't honor its commitment (3) US Dollar strengthening would "wreck" oil prices, (4) US shale production would explode higher making OPEC cutbacks self defeating. The casual press and "talking heads" in financial media bought into the negativity and for energy equities, we witnessed something of a historic disconnect with crude prices. So, how have matters actually progressed, and where do we go from here?

Contrary to the above expectation, 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. Admittedly, the ability of OPEC to violate a quota agreement has diminished by the growth (over time) in the demand for its oil. This point – which relates to the cartel's limited spare output capacity – was actually one of the considerations we highlighted last year when the cuts were announced. In short, the "OPEC will cheat" assertion amounts to a *swing-and-a-miss* in baseball parlance.



Between 1983 and 2006, changes in the US Dollar and changes in oil prices were not correlated – the R^2 of the regression was 0.4%. During 2007 as the subprime loan market became toxic, we began to see traders use crude oil to hedge Dollar risk -- the R^2 of the regression climbed to 93%. This eventually gave birth to the advent of macro trades as evidenced by periods where crude oil moved in a highly correlated manner with not just the Dollar, but gold, the S&P, copper, the 30 year US treasury and even the Hang Seng. An observance of these macro trade behaviors showed them to have an on-again/off-again relationship which was a finding many did not want to actually believe. After OPEC's deal was announced last November, pundits asserted that a weakening Dollar would counter OPEC's cuts and cause oil prices to actually fall dramatically. As seen in our analysis of the two variables since that time, this also amounted to a *swing-and-a-miss*.

Russia's Crude Oil Production
Monthly



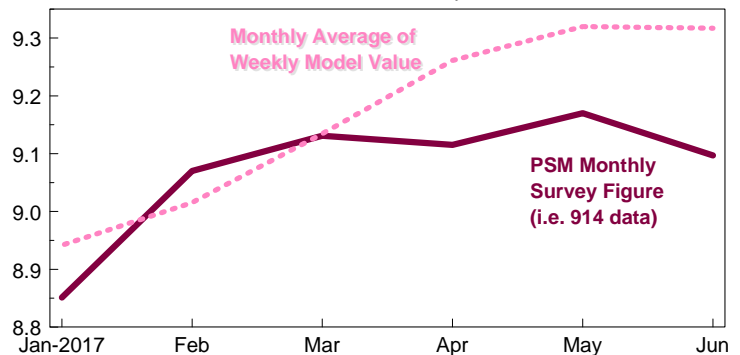
Part of what made the OPEC quota deal interesting from a market perspective was the inclusion of 11 non-OPEC countries pledging a total of 558,000 b/d of cuts. The largest volume (accounting for 54% of the total) came from Russia. In most cases, the pledged cut amounted to what was an in-place erosion of output (Mexico is the easiest example to point to. This was not the case for Russia and most market watchers posited that its cut wouldn't materialize which amounted to

yet another *swing-and-a-miss*.

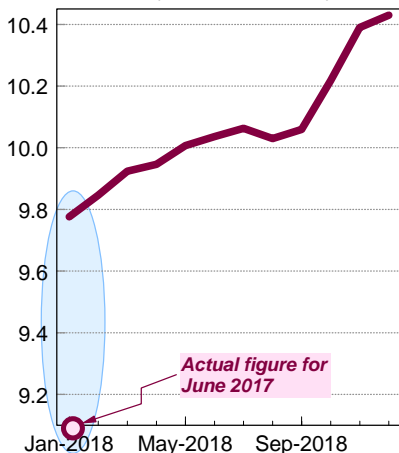
The biggest bear concerns about OPEC's November production deal was actually tied to a view that we'd see material output growth from US shale. Many were so convinced about this prospect that we saw energy share prices (relative to the S&P 500) weaken disproportionately to the point where the sector literally decoupled from its normal correlated pattern with oil prices. As the months wore on after the OPEC deal, questions about shale countering the OPEC cut accounted

for more than 9-out-of-10 questions that came in from money managers. Pundits pointed to the DOE weekly report and asserted that crude production was growing by almost 30,000 b/d *per week*, and the analyst community extrapolated that US production growth would actually accelerate with 2018 seeing as much as a 1.4 million b/d gain in output – that's full year '18 versus full year '17. Holy cow! Well, the data has not borne out such a story.

US Crude Oil Production
Million barrels/day



US Crude Output versus IEA Forecast
Monthly, Million barrels/day



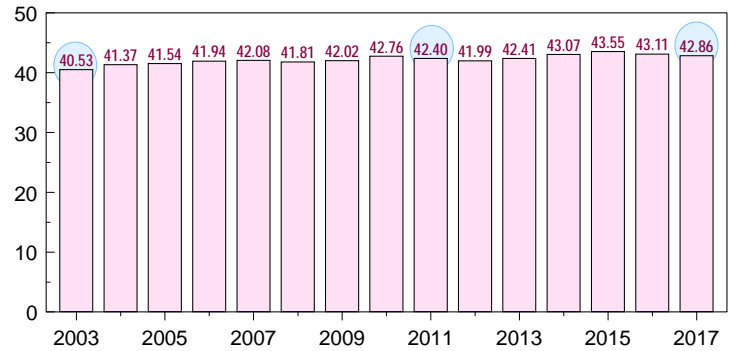
In point of fact, since OPEC's meeting, US crude output rose just 225,000 b/d (November '16 versus June's 914 data). This is 500,000 b/d shy of what pundits asserted which was for minimum gains of 100,000 b/d per month. From our vantage point, we think we're at the start of a major bout of analyst capitulations regarding shale oil growth. IEA figures – which end up being the consensus' projection – appear unrealistically high for US supply next year. At face value, US production would have to rise 800,000 between end-June and January as per our analysis. The IEA's '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.



In all of this, what's been 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. Critically, if we examine demand since the oil industry's CAPEX cycle inflected back in 2002 and compare it with the total gain in non-OPEC supply (all liquids), we see why virtually all of OPEC's spare production capacity was exhausted. This is a very stark contrast to what we witnessed after the 1973-1980 bull cycle.

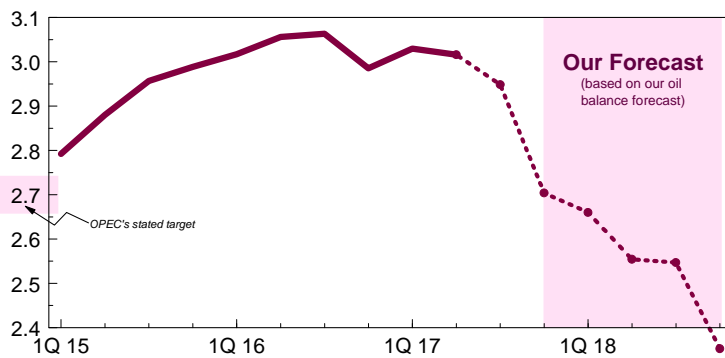
Non-OPEC Supply Excluding the USA

Annual average, Million barrels/day



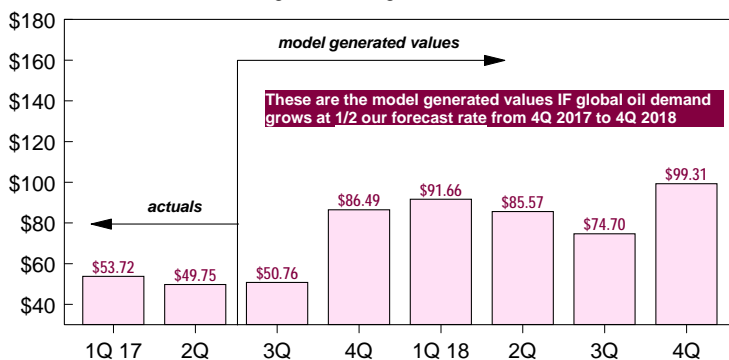
Total OECD Petroleum Inventories

End of quarter level, Billion barrels



MIKER Model Values Based on a "Weak Demand" Scenario

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



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.



We do we go from here? Well, OPEC's production cuts have, in fact, whittled down the global inventory overhang, and we think storage draws will actually 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 left) 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 R² of about 80% which is amazingly high given just how complex the global oil markets are). When we

PERHAPS A BIG DAY FOR THE CHART GUYS

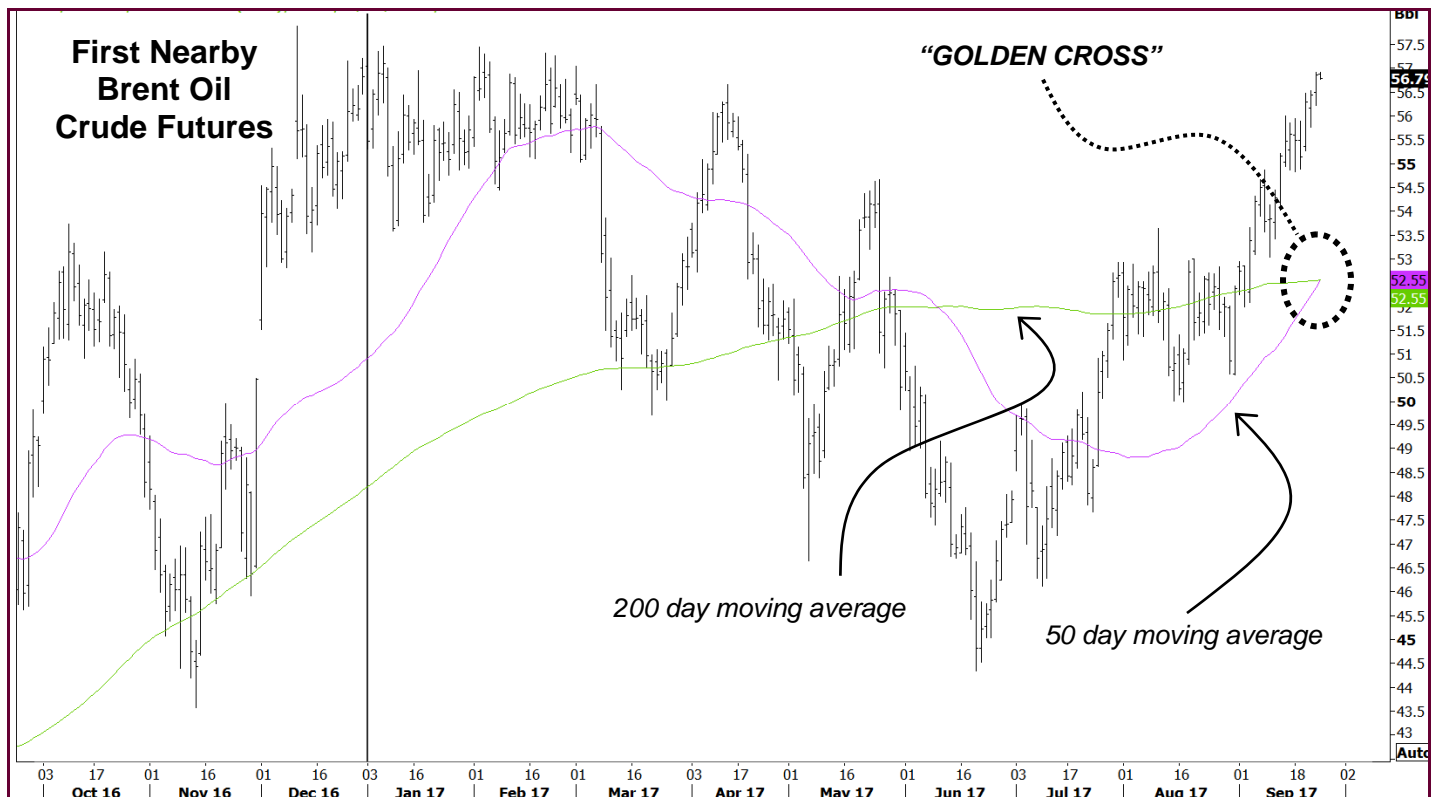
There's little question that technical and momentum activity play a role in the oil market, and at times the paper flow related to these considerations feels almost overwhelming.

These trading features are not unique to the crude market, a finding discussed by us at times regarding the tech/energy sector trade this year.

The analysis below of the 1st nearby Brent crude futures price examines two closely watched moving averages: the 50 day and the 200 day.

Today's trading session looks to mark an intersection of the two which is referred to by chartists as a "golden cross."

We'll note that the below analysis takes a back seat to the fundamental work detailed in this report, but given few money managers watch to catch a proverbial falling knife and would instead prefer to *buy strength*, the crossover may help bring out buyers that have stayed sidelined who have been waiting for bullish momentum signals.



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
DEMAND															
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
Total OECD	46.7	46.0	47.3	47.4	46.9	46.9	47.0	47.4	47.5	47.2	47.1	47.2	47.7	47.8	47.5
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
Total Non-OECD	49.5	49.7	49.6	51.7	50.1	49.3	51.2	50.9	52.8	51.1	50.7	52.6	52.0	54.0	52.3
Total World	96.2	95.7	96.9	99.1	97.0	96.2	97.3	98.3	100.4	98.3	97.9	99.7	99.7	101.8	99.8
SUPPLY															
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
Total Non-OPEC	57.7	56.8	57.2	58.0	57.4	57.8	57.8	58.3	58.4	58.1	58.1	58.3	59.3	59.4	58.8
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								
Total OPEC Crude	32.3	32.5	32.9	33.4	32.5	32.1	32.3	32.4	32.4	32.3	32.4	33.4	33.4	33.4	33.2
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
Total OPEC Supply	39.0	39.3	39.8	40.3	39.3	38.9	39.2	39.3	39.3	39.2	39.3	40.3	40.3	40.3	40.1
Total World	96.7	96.1	97.0	98.3	96.7	96.7	97.0	97.5	97.7	97.2	97.4	98.6	99.6	99.7	98.8
Inventory Change	0.5	0.4	0.1	-0.8	-0.2	0.5	-0.3	-0.7	-2.7	-1.0	-0.5	-1.1	-0.1	-2.1	-1.0
% Change in Demand															
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%
Total OECD	0.2%	0.8%	0.7%	1.9%	0.9%	0.5%	2.1%	0.3%	0.3%	0.8%	0.5%	0.4%	0.6%	0.6%	0.5%
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%
Total Non-OECD	3.7%	-0.4%	0.0%	2.4%	1.4%	-0.4%	3.2%	2.6%	2.2%	1.9%	2.9%	2.6%	2.2%	2.2%	2.5%
Total World	2.0%	0.2%	0.4%	2.2%	1.2%	0.0%	1.7%	1.5%	1.3%	1.4%	1.7%	2.5%	1.4%	1.4%	1.5%

This is our the balance model we published recently but today we're drawing attention to the OPEC crude supply figure for 2018. Specifically, we're highlighting the "un-wind" of the November 2016 quota cuts after next year's 1st quarter. Even with that unwind, 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/hopeful partly because of a lower than consensus figure for US crude supply gains.

