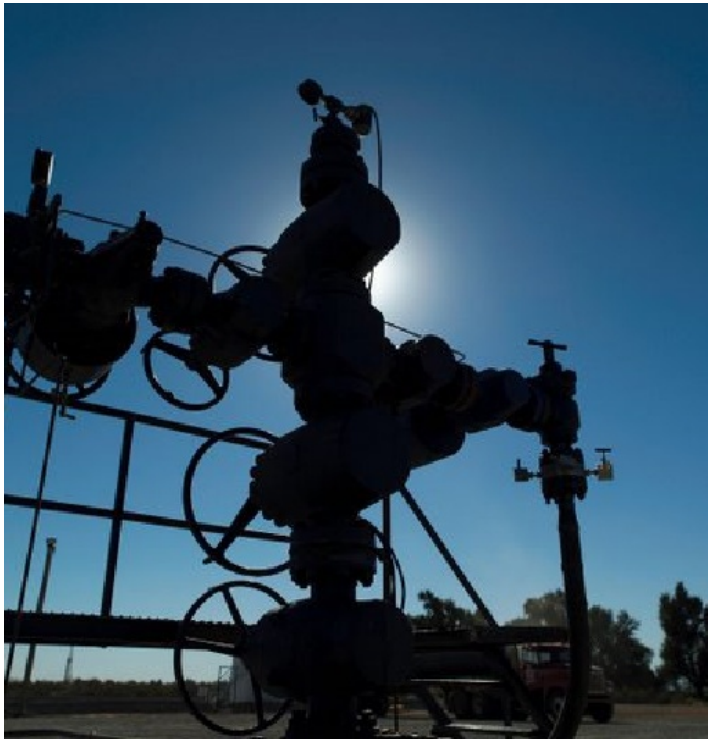


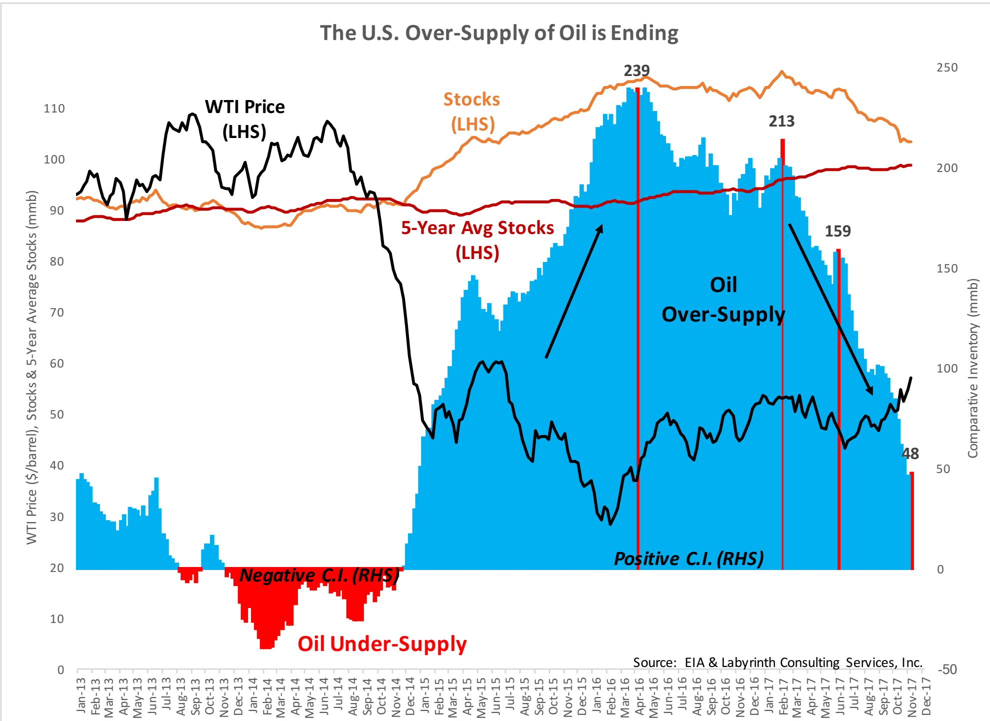
The U.S. Over-Supply of Oil is Ending

Pay-It-Forward Network

Art Berman
Labyrinth Consulting Services, Inc.

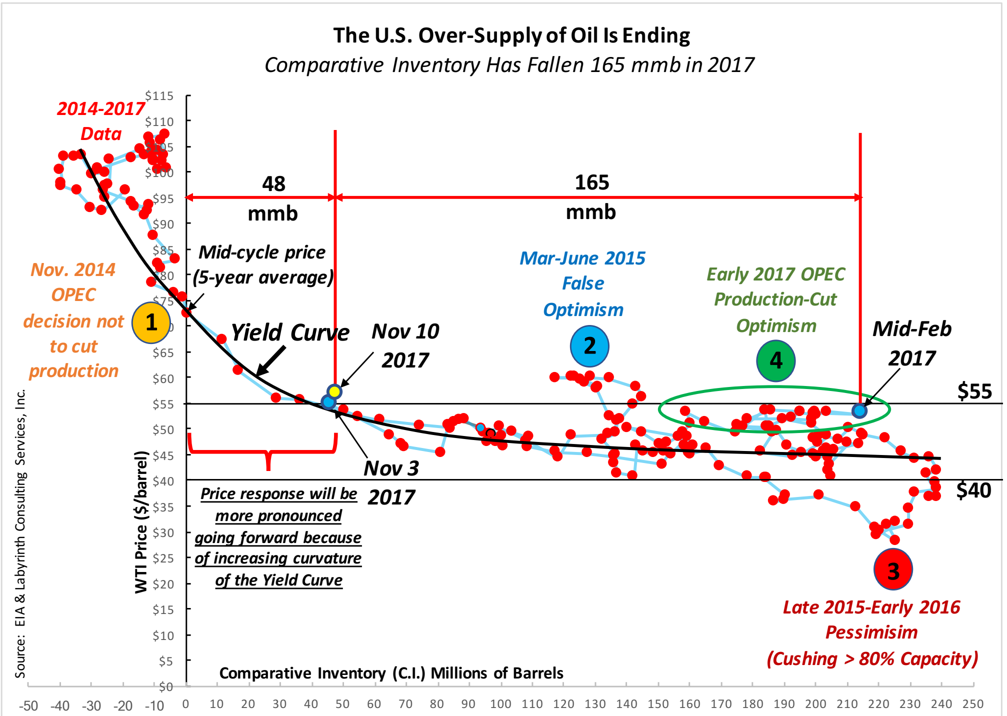
November 17, 2017

The U.S. Over-Supply of Oil is Ending



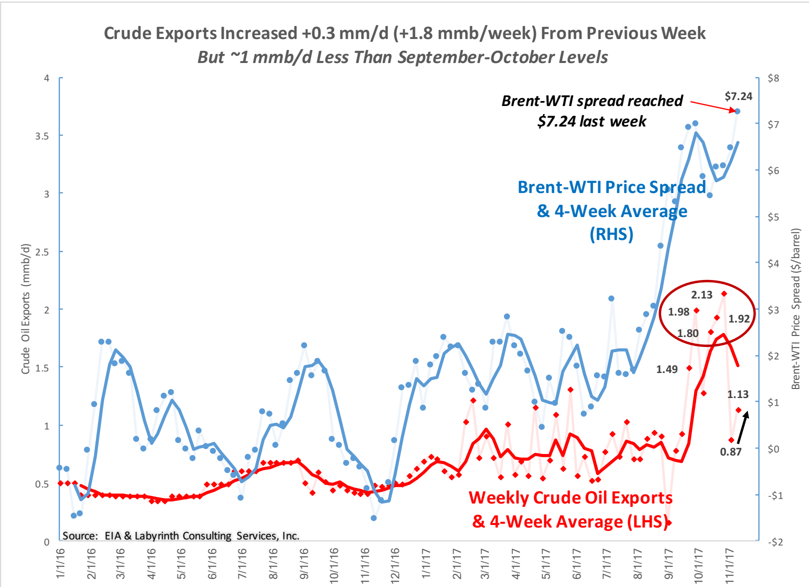
- Comparative inventory (C.I.) has been dramatically reduced in 2017.
- Levels have fallen 165 mmb since February and are now approaching the 5-year average for the first time in nearly 3 years.
- The causes of the U.S. inventory drawdown are clear: increased exports of crude oil and greater domestic consumption.

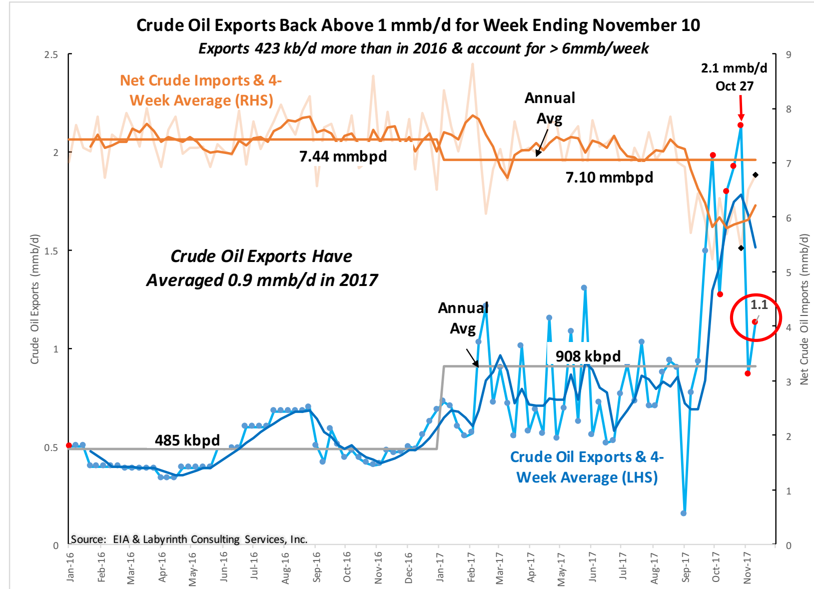
Comparative Inventory Yield Curve Predicts $67+ WTI Prices By January 2018



- An interpreted yield curve that correlates C.I. and WTI price is developed by cross plotting the same data without the time dimension.
- The yield curve may provide price solutions to inventory reduction assumptions in the near term.
- If C.I. continues to fall at the 9-month average of 4 mmb/week, oil prices may be approximately $67 per barrel by the end of December.
- If C.I. falls at the 8 mmb/week average since late September, WTI could approach levels not seen since before the price collapse in late 2014.

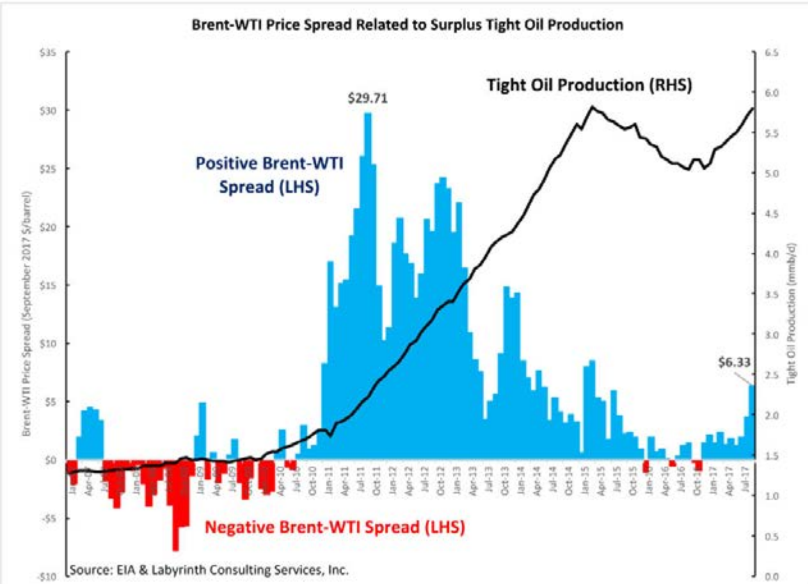
Crude Oil Exports and the Brent-WTI Spread

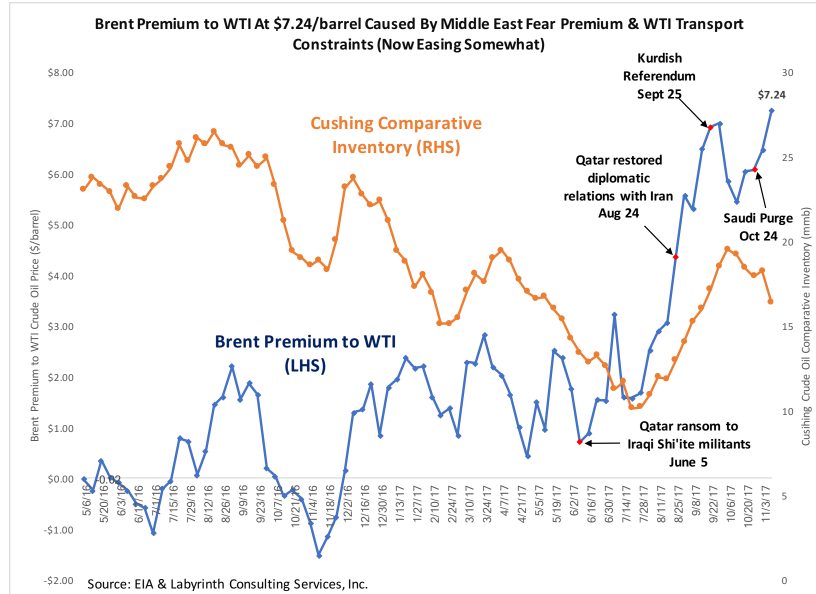




- Crude oil exports for the first half of 2017 averaged 0.8 mmb/d but rose to 1.8 mmb/d in September and October.
- Increased exports now average 7-12 mmb/week and contribute substantially to reduced inventory levels.
- Higher export levels correlate with the increased spread between Brent and WTI prices that began in late July.
- Traders can sell U.S. crude oil overseas at less than international prices but at levels higher than domestic pricing allows. Record exports of 2.13 mmb/d occurred during the week ending October 27.
- Exports have averaged ~1 mmb/d in 2017—almost double levels in 2016.

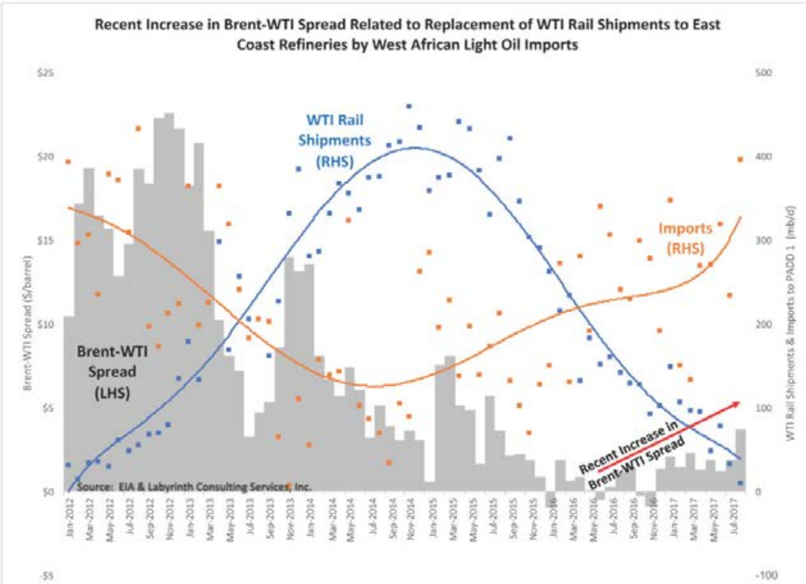
Crude Oil Exports and the Brent-WTI Spread





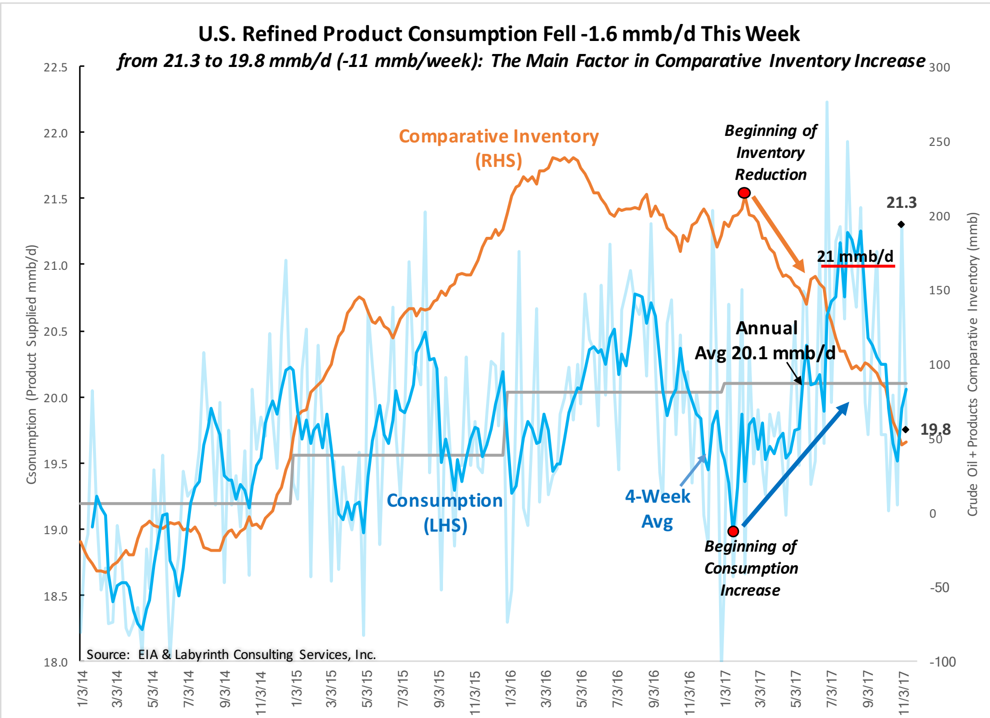
- Tight oil production levels, crude oil quality and U.S. refinery blending needs are behind the WTI discount to Brent price.
- Most U.S. refineries are designed for international grades of oil like Brent which is heavier and contains more sulfur than WTI.
- The U.S. has had a surplus of light sweet oil since the tight oil boom began, and the Brent-WTI spread reached almost $30/barrel in September 2011 as a result.
- Middle East fear premium has been an important factor since June 2017.

Structural Problems Getting WTI to East Coast Refineries



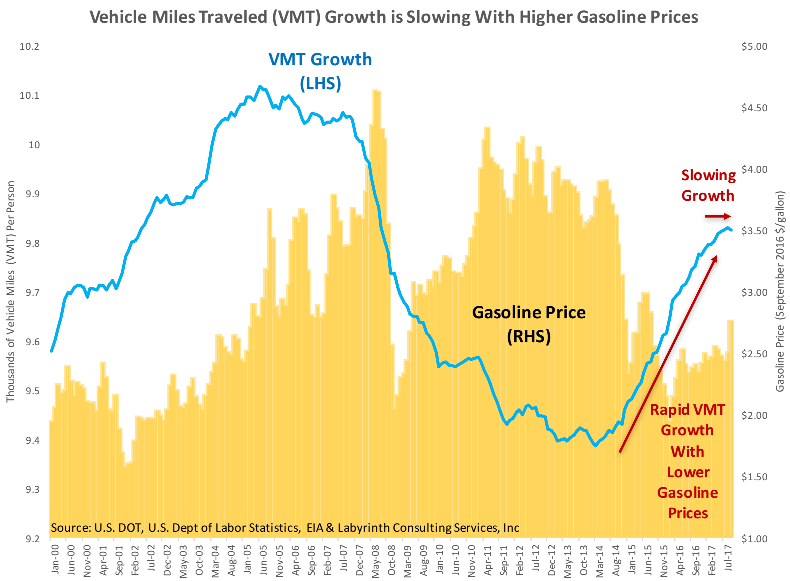
- The spread decreased to about $2.25 with the advent of rail shipments of WTI to East Coast refineries, and associated reduced light oil imports.
- The transport cost was reasonable when oil prices were $100 per barrel but lower oil prices after 2014 resulted in a progressive decline in rail shipments.
- East Coast refiners increasingly relied again on imported light oil mostly from West Africa to blend with heavier grades of oil.
- A surplus of tight oil returned as production recovered as a result higher oil prices in 2016 and 2017. Surplus supply caused discounted WTI prices, and the recent increase in the Brent-WTI spread.
- Some of excess oil has been exported in recent weeks but the price spread persists because import levels are so far unaffected.

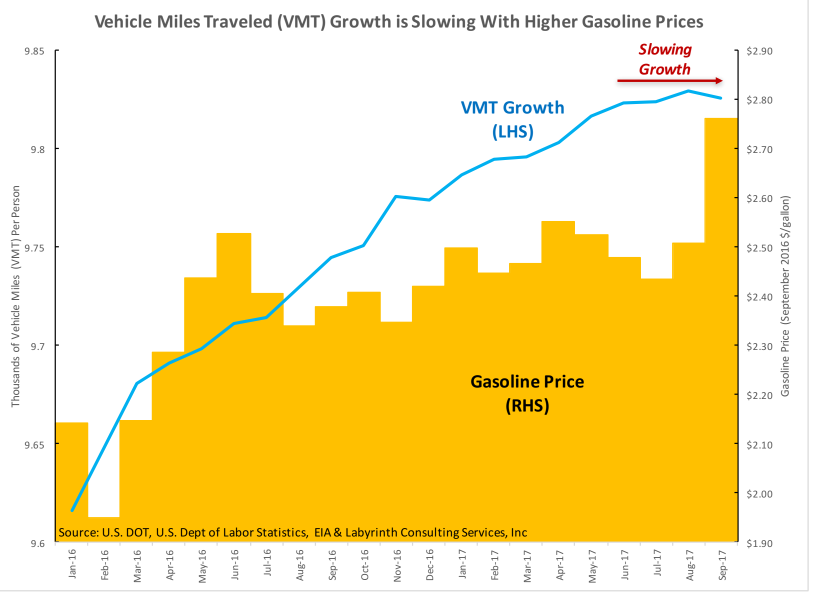
Increased Domestic Consumption is 2nd Cause of Inventory Drawdowns



- Consumption reached a 10-year record of 21 mmb/d during the summer of 2017.
- August 2017 consumption was 300 kb/d more than in August 2016 and that difference accounts for more than 2 mmb/week of incremental inventory reduction.
- In fact, the increase in consumption that began in January coincided with the beginning of comparative inventory reduction that in February.

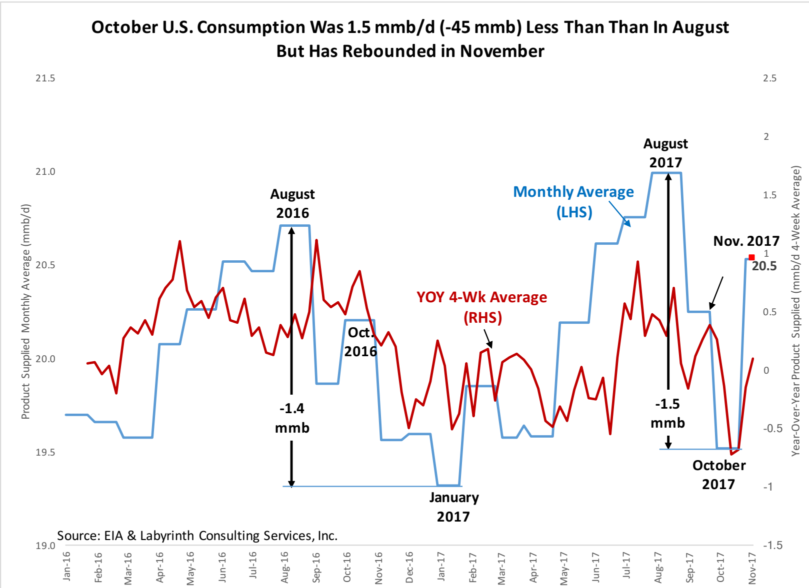
Greatest Portion of Consumption is From Transportation





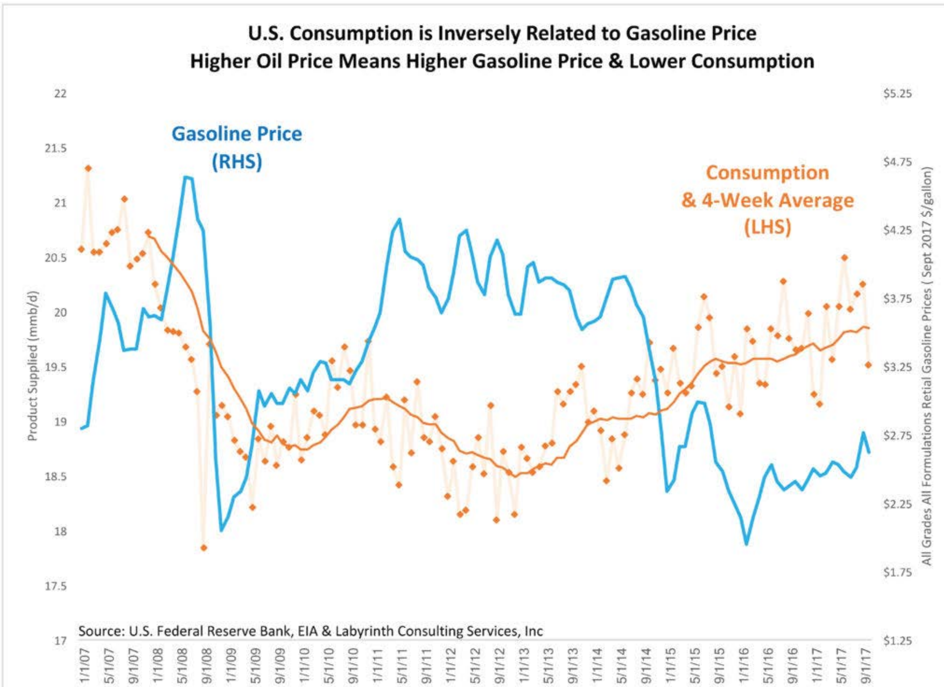
- U.S. travel data seems to contradict consumption data.
- VMT growth has slowed since mid-2017.
- Declining Vehicle Miles Traveled (VMT) mid-2005 through mid-2014.
- High gasoline prices and 2007-2008 Financial Collapse most probable causes.
- Strong VMT recovery with lower gasoline prices with oil-price collapse.
- Recent decline in VMT probably because of higher gasoline prices.
- Or, are consumption and travel data explained by late summer hurricanes?

The Possible Downside of Consumption



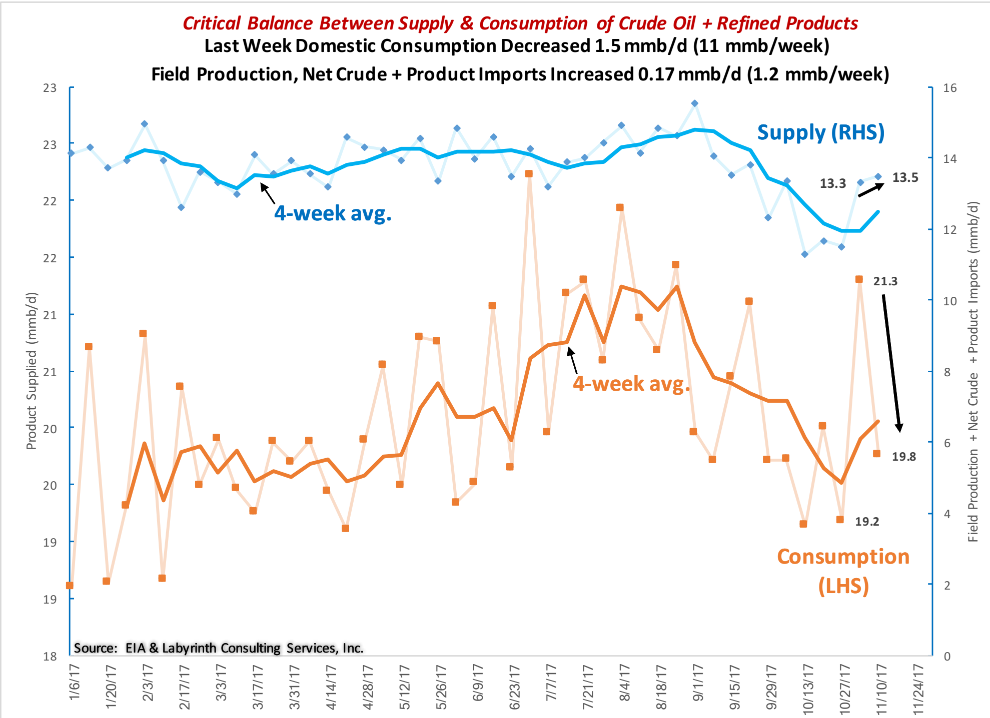
- Continued high U.S. consumption is the only area of concern for sustained higher oil prices.
- September and October consumption were considerably lower than in August.
- It is normal for consumption to decline after the summer driving season but the magnitude of the decline is disturbing.
- October consumption was 1.5 mmb/d (45 mmb/month) less than in August.
- That is more than the total August-to-January seasonal decline during the previous year (1.4 mmb/d, 42 mmb/month).
- So far in November, consumption has rebounded.

Consumption Will Decrease If Gasoline Prices Increase With Higher Oil Prices



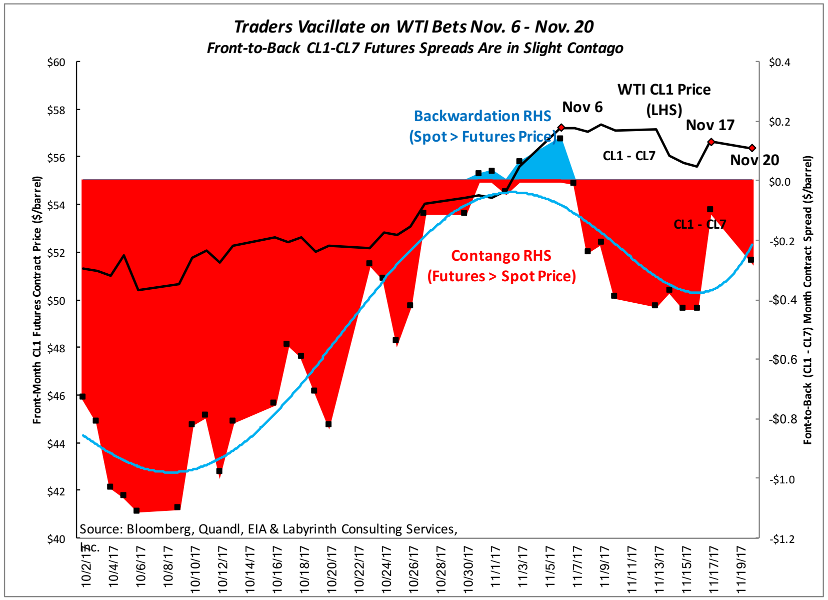
- Consumption becomes a greater concern if oil prices increase as much as I expect because gasoline prices will increase accordingly–consumption and gasoline price are negatively related.
- Higher oil price means higher gasoline price and lower consumption.
- $70 WTI will result in almost a $1/gallon price increase above the current average retail price of $2.53 and that may depress consumption.

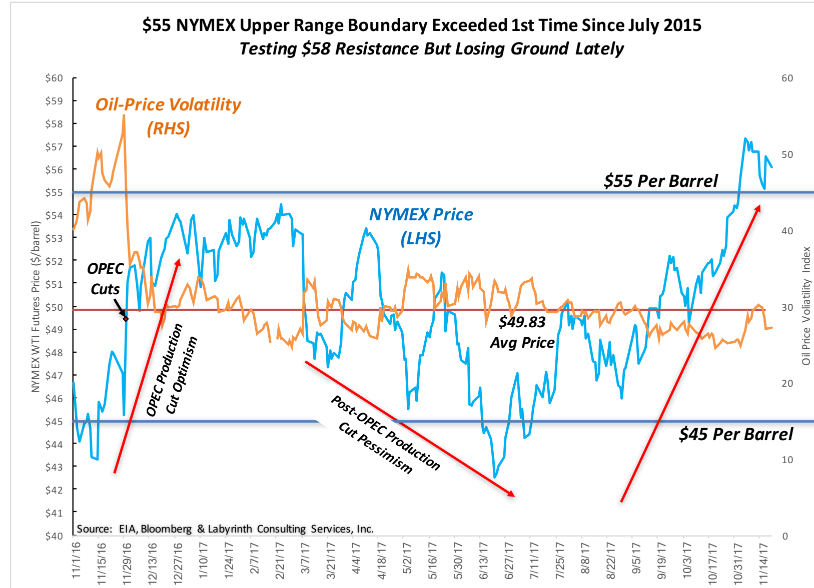
Critical Balance Between Supply & Consumption of Crude + Refined Products



- Although the large decrease in domestic consumption appears to be rebounding, this must be carefully watched since it has been the main driver of inventory reduction.
- Net crude + product imports are also important as refinery intakes increase following hurricane disruption.
- The Brent-WTI spread will largely determine crude export levels that have given a major boost to inventory reduction since the spread widened in late June.
- The upcoming OPEC meeting on extending production cuts will be a critical driver of momentum for in coming weeks.

I am cautiously bullish on oil prices despite the recent price pullback





- NYMEX prices exceeded $55 for 1st time since July 2015, fell back to $55 & are now vacillating.
- Traders recently unwound some long positions then reversed last Friday and reversed again Monday, and reversed again today. Sideways movement based on sentiment-based non-substantive "news."
- I am cautiously bullish on prices because the Brent-WTI spread has increased and favors higher U.S. exports.
- Domestic consumption is the key driver for inventory reduction and despite uncertainty, looks strong…for now.
- OPEC's cuts have taken substantial oil off the market & Saudi Arabia will keep some level of cuts in force regardless of disunity in OPEC.
- Expectation for U.S. production growth is exaggerated.
- For the near term, I anticipate prices rising perhaps more slowly than I did a few weeks ago.
- Peak demand is a fad concern for the medium term.
- Biggest concern is whether higher oil prices will dampen economic growth.