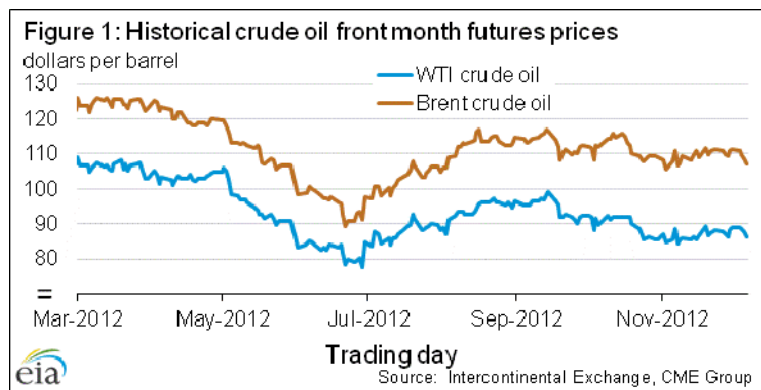


Short-Term Energy Outlook Market Prices and Uncertainty Report¹

Crude Oil

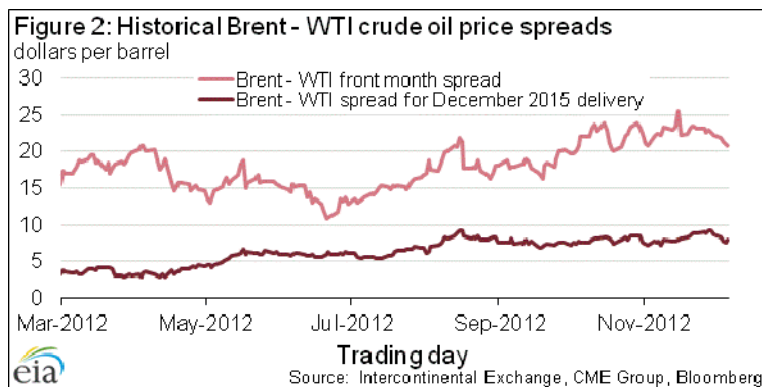
Prices: Crude oil prices have been relatively unchanged since the start of November (Figure 1). The ranges for both Brent and West Texas Intermediate (WTI) from November 1 to December 6 are the smallest over any five-week period since April of this year.



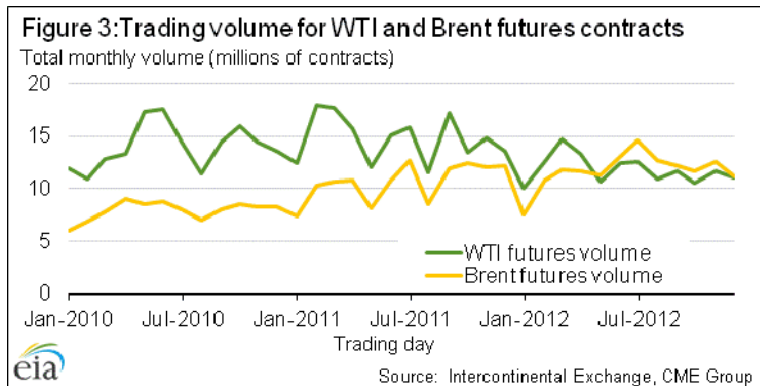
Relatively stable crude oil prices may reflect a balance of risk as markets wait for more news concerning potential supply disruptions and future economic growth. Specific events like the resolution of the “fiscal cliff” issues, new developments in the Eurozone situation or new supply disruptions arising from tensions in the Middle East may provide a catalyst to push crude oil prices away from their current levels, but the timing of such events and the direction they move prices remains uncertain.

¹ This is a regular monthly companion to the EIA Short-Term Energy Outlook (<http://www.eia.gov/forecasts/steo/>)
 Contact: James Preciado (james.preciado@eia.gov)

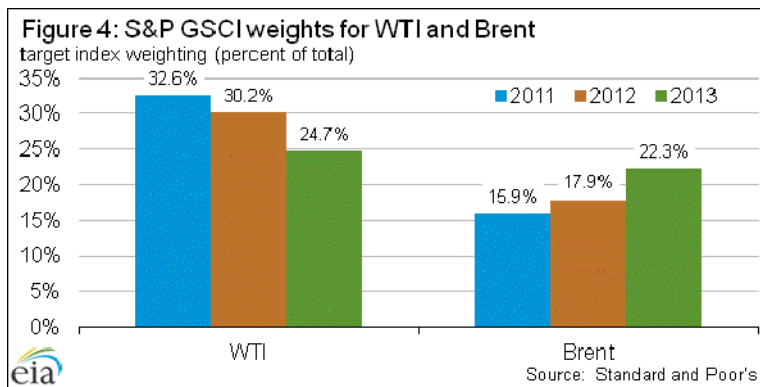
The price spread between Brent and WTI futures prices remained high, rising in the middle of November before falling in the first week of December. The front month spread settled at \$20.77 per barrel on December 6, after reaching \$25.53 on November 15, the largest settlement for that spread in over a year. Similarly, the spread between the December 2015 Brent and WTI futures contracts also widened to \$9.19 per barrel on November 28, just slightly below the all-time high for that spread set in August of this year (**Figure 2**). The Brent – WTI spread represents the value of moving an additional barrel of crude oil from the mid-continent (PADD 2) to the refining centers located on the U.S. Gulf Coast. With [U.S. crude oil production hitting a nearly fifteen year high](#), increases in projections for U.S. crude oil production in 2013, and the start-up of the southern portion of the Keystone XL pipeline pushed back to the end of the fourth quarter of 2013, the market is clearly pricing in that crude oil produced in the U.S. mid-continent faces continued transportation bottlenecks.



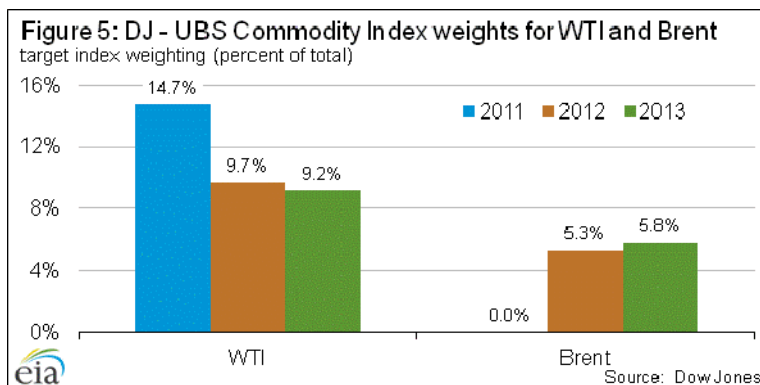
Volume: For the 8th straight month, more Brent crude oil futures traded than WTI futures contracts. The transportation constraints affecting WTI mean that those prices no longer reflect the world waterborne price and is most likely one of the main causes for more trading in Brent contracts on the Intercontinental Exchange (ICE). In November 2012, 11.2 million Brent contracts were traded while WTI saw 11.1 million contracts change hands (**Figure 3**).



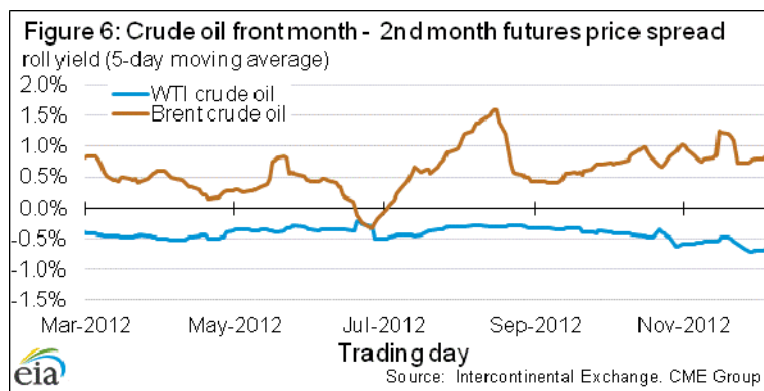
Index Investing: The S&P Goldman Sachs Commodity Index (GSCI) has increased its target weighting of Brent from 15.9 percent in 2011 to 22.3 percent in 2013, while dropping WTI from 32.6 to 24.7 percent (**Figure 4**).



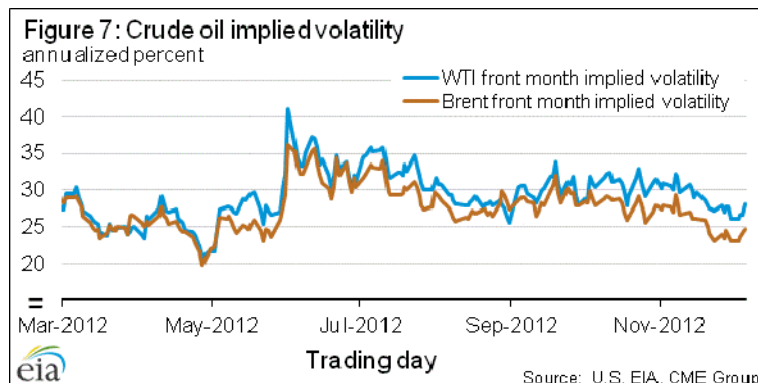
The Dow Jones – UBS Commodity Index included Brent for the first time in 2012, with a 5.3 percent weighting. For 2013, the target weight was increased to 5.8 percent. Note that the crude oil weightings in the Dow Jones – UBS Commodity Index are less than the GSCI because the DJUBS restricts the total exposure to any one sector at 33.3 percent of the total index (**Figure 5**).



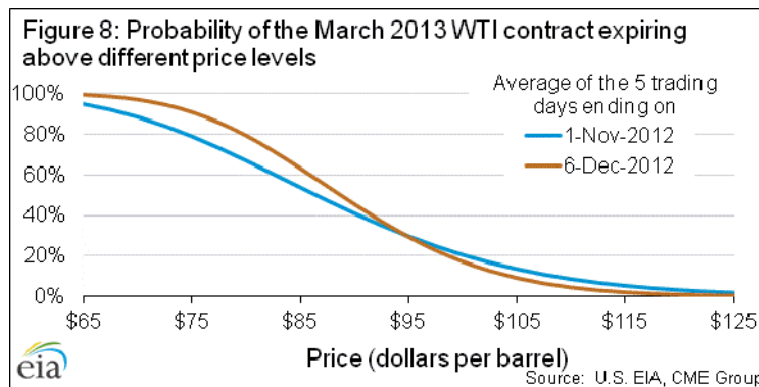
Trading volume is one of the major factors in determining how a commodity is weighted in the overall basket (the higher the futures volume, the higher the weighting). Another difference between the Brent and WTI markets that has affected the weighting and inclusion of both crude oil benchmarks in commodity indices is the difference in their roll yields – the value (either positive or negative) of maintaining the portfolio positions from one month to the next. Crude oil futures are for delivery in a given month; to maintain constant exposure over time, index funds need to sell the front month contract and buy the second month contract before the front month contract expires. A commodity in backwardation (when the front month price is greater than the second month price) lets the index fund realize a small gain when it purchases the second month futures contract for less than the price at which it sells the front month contract. The opposite is true when the commodity is in contango (when the front month price is lower than the second month price) and the fund loses a small percentage. Since the spring, WTI has consistently had a negative roll yield of about -0.5 percent while Brent, with the exception of two weeks in June 2012, has had a positive roll yield ranging from 0.5 to 1.5 percent (**Figure 6**).



Volatility: Implied volatility for both the front month Brent and WTI futures contracts decreased in November and the first week of December (**Figure 7**). Brent implied volatility settled at 24.7 percent on December 6, a 2.7 percentage point decrease from November 1. WTI implied volatility settled at 28.0 percent on December 6, a 2.3 percentage point decrease since November 1.

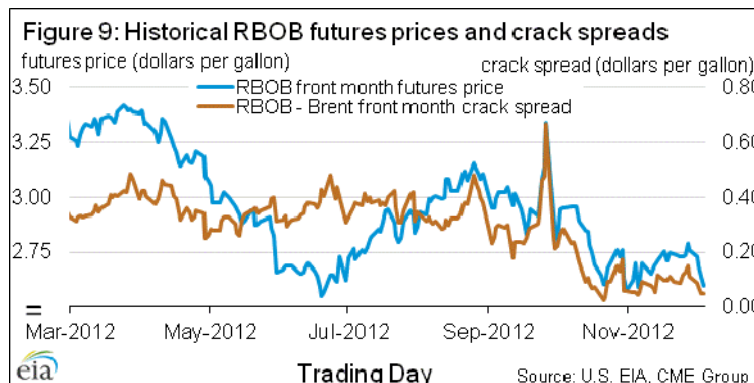


Market Derived Probabilities: The probability of the March 2013 WTI futures contract expiring above \$105 per barrel is now 9 percent, a 5 percentage point decrease from the five-day period ending November 1 (**Figure 8**). While prices for the March 2013 WTI futures contract increased slightly, lower implied volatility and shorter time to expiration led to a lower probability of exceeding higher price levels compared to November 1. Given the higher level of Brent prices relative to WTI prices, the probabilities that the March Brent contract will exceed specified dollar thresholds are higher.

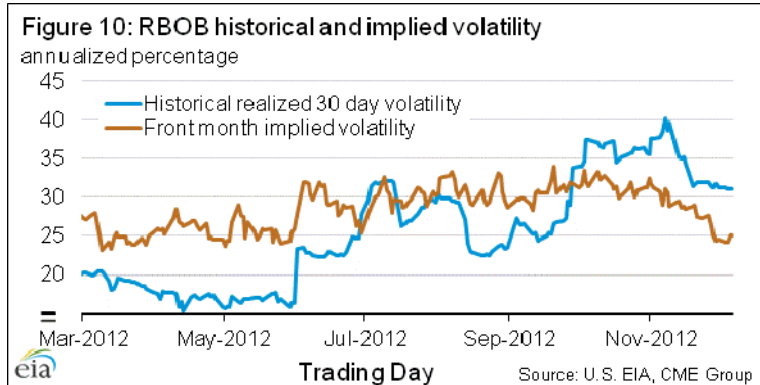


Gasoline

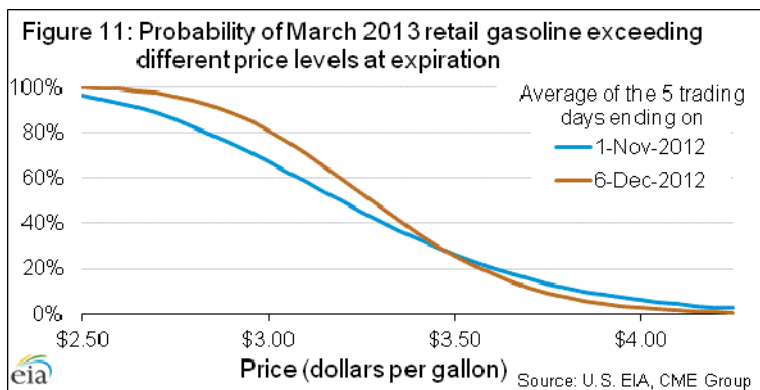
Prices: Front month futures prices for Reformulated Blendstock for Oxygenate Blending (RBOB) gasoline for delivery in New York Harbor settled at \$2.60 per gallon on December 6, a decrease of about \$0.04 per gallon from November 1 (**Figure 9**). The price increase in the RBOB contract during the middle of November was mostly attributable to increases in the RBOB – Brent crack spread, indicating tightness in the gasoline market compared to the beginning of the month. However, U.S. inventories of gasoline have increased over the last few weeks and now are 6.1 million barrels above their five year average. The higher gasoline inventories were largely responsible for the price decreases in gasoline over the last two weeks as well as a reduction in the front month crack spread.



Volatility: Implied volatility for the front month RBOB futures contract declined since November 1. It settled at 25.0 percent on December 6, a decline of 6.7 percentage points since November 1 (**Figure 10**). With the effects of Hurricane Sandy subsiding in the northeast and gasoline markets in the New York Harbor area returning to normal, the price volatility in gasoline futures has also subsided.



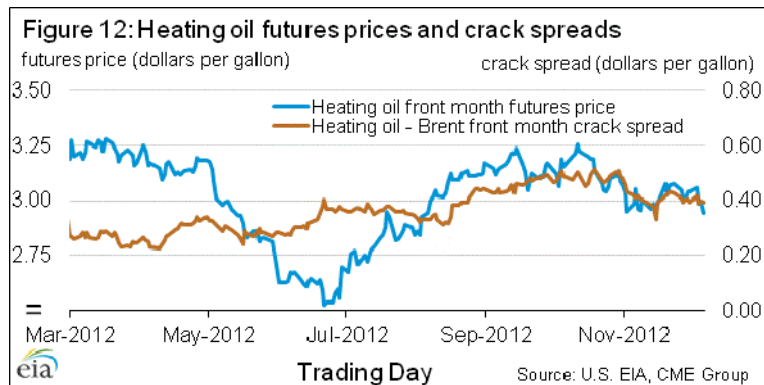
Market Derived Probabilities: The March 2013 RBOB futures contract averaged \$2.70 for the five trading days ending December 6 and has a probability of exceeding \$3.15 per gallon (typically leading to a retail price of \$3.75) at expiration of approximately 9 percent. The same contract as of the five trading days ending November 1 had a probability of exceeding \$3.15 of 13 percent. Lower implied volatility as well as the decrease in time to expiration were responsible for the decrease in exceeding higher prices by expiration of the March futures contract (**Figure 11**).



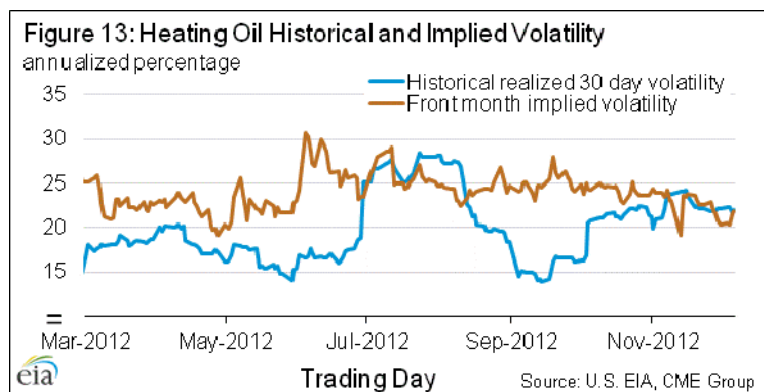
Heating oil

Prices: The front month NYMEX futures contract for heating oil moved lower since November 1. The price for the front month contract settled at \$2.94 per gallon on December 6, a decrease of \$0.09 per gallon since November 1 (**Figure 12**) largely reflecting a decrease in the heating oil – Brent front month crack spread.

Heating oil prices and crack spreads fell despite the fact that heating oil inventories in the northeast are currently below their five year ranges. Historically, lower heating oil inventories have been associated with higher heating oil prices and elevated front month heating oil crack spreads. The reason for the apparent disconnect may be because the U.S. is exporting more distillate, with some of those exports coming out of PADD 1. In the event of a shortage of heating oil domestically, those exports can be kept in the U.S. to provide additional supplies. Thus, with those additional exports serving as a buffer that most likely would have showed up in inventories in the past, the historical relationship between heating oil prices and inventory levels may have shifted.

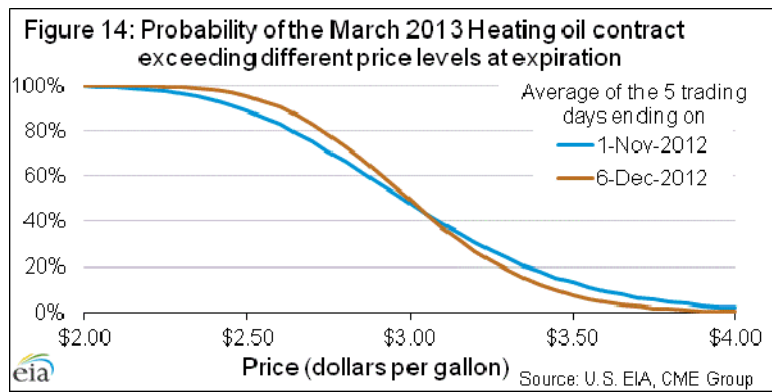


Volatility: Heating oil implied volatility decreased from November 1 to December 6 while historical volatility for the front month contract increased slightly (**Figure 13**). Implied volatility settled at 21.8 percent on December 6, a decline of 2.6 percentage points since November 1, while historical volatility settled at 22.0 percent on December 6, a rise of 2.0 percentage points from November 1.



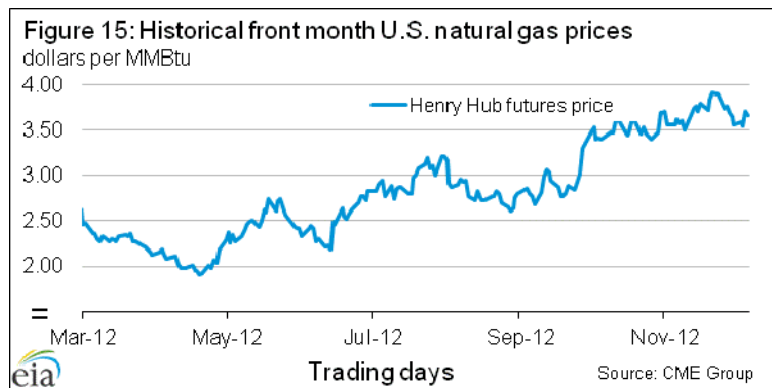
Market Derived Probabilities: The heating oil futures contract for March 2013 delivery averaged \$3.01 per gallon for the five days ending December 6, relatively unchanged from November 1. It has a probability of exceeding \$3.50 per gallon at expiration of approximately 7 percent. The same contract as of the five trading days ending November 1 had a probability of exceeding \$3.50 of 13 percent. Decreased implied

volatility and shorter time to expiration both contributed to the decrease in probability of the March contract exceeding \$3.50 per gallon (**Figure 14**).



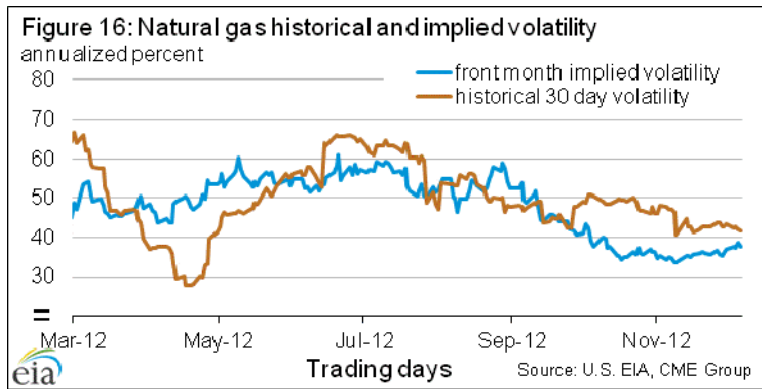
Natural Gas

Prices: The front month futures price for delivery of natural gas to Henry Hub Louisiana moved higher during the middle of November but has since fallen. The contract settled at \$3.67 per MMBtu on December 6, a slight decrease of \$0.03 per MMBtu from November 1 (**Figure 15**). The peak occurred on November 21, when the front month contract settled at \$3.90 per MMBtu, the highest price for natural gas in a year. The drop off in prices from the middle of the month can be attributed to some bearish inventory reports, particularly for the week ending November 23 when U.S. working natural gas inventories showed a build when the market was expecting a decline. The price of natural gas through the winter will largely depend on the number (and timing) of heating degree days. Prices for the next year are likely to be significantly influenced by the resulting inventory levels when the heating season ends.



Volatility: Implied volatility for the front month futures contract rose slightly in November, settling at 37.5 percent on December 6. Historical volatility decreased during

the month of November, settling at 41.8 percent on December 6, 4 percentage points lower than at the beginning of November (Figure 16).



Market Derived Probabilities: The probability that the March 2013 contract will settle higher than \$4.00 per MMBtu declined by 12 percentage points from 37 percent to 25 percent when compared to market conditions on the five trading days ending November 1 (Figure 17). Lower prices were the main cause for the drop in the probability of exceeding higher price levels by the expiration of the March 2013 futures contract.

