



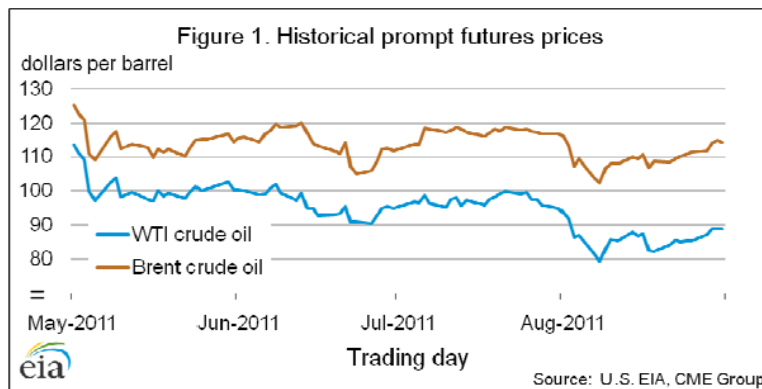
September 2011



Short-Term Energy Outlook Market Prices and Uncertainty Report¹

September 7, 2011 Release

Crude Oil Prices. After a fairly quiet July, oil prices experienced some significant downward movement (**Figure 1**) in the first week of August. From a prompt month price of \$94.89 on August 1, West Texas Intermediate (WTI) crude oil, fell over \$15 to settle at \$79.30 eight days later on August 9. This was the lowest settlement price for the prompt month contract since September of 2010. Brent, a crude oil produced in the North Sea, experienced similar price drops during the same period, falling to a recent low of \$102.57 on August 9, though still well above price levels at the beginning of 2011. These price declines came during a period of increased concerns about the world economy and disappointing economic data. After the first sovereign credit rating downgrade in U.S. history on August 5, further negative sentiment came from lowered consumer confidence and subdued manufacturing levels in the U.S. and questions surrounding a potential Greek bailout. Oil demand uncertainty appeared to permeate through a number of different markets, with the Standard & Poors equity index falling 9 percent during the same period.



After some price recovery through the following week, world crude oil prices fell again on August 18 in response to positive events in Libya, as the rebel army entered Tripoli, its capital. This advance increased expectations of a more rapid return of lost Libyan crude oil to the

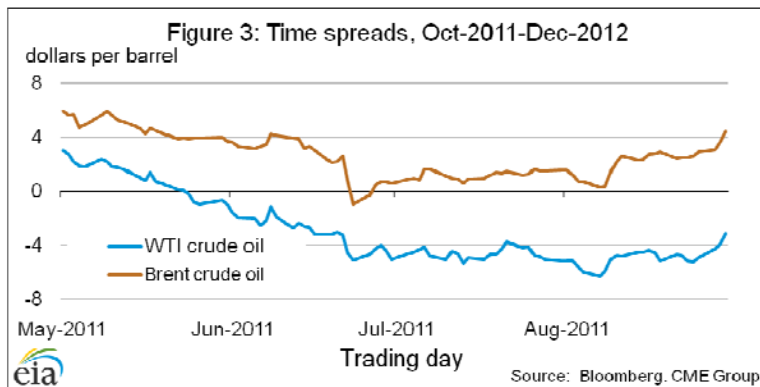
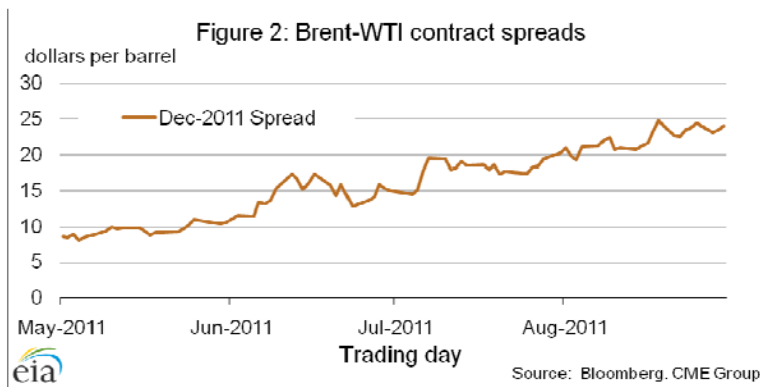
¹ This is a regular monthly companion to the EIA *Short-Term Energy Outlook*.

(<http://www.eia.doe.gov/emeu/steo/pub/contents.html>)

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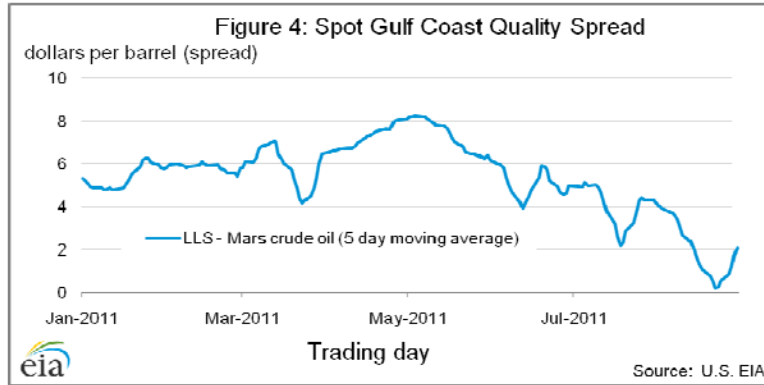
market. Prices rose modestly towards the end of August, with WTI prompt month settling at \$88.81 and Brent at \$114.85 on the final trading day of the month. Some recent economic barometers, like consumer spending and retail sales, have been reported higher than expectation levels, perhaps providing a boost to commodity prices.

Though Brent and WTI prices experienced similar price movements through the month, the price difference between prompt month Brent and prompt month WTI reached a record of \$26.36, a full one third of the WTI price, on August 19 (**Figure 2**). This compares with a Brent premium of only \$0.87 at the same point last year. Oversupply issues at the WTI delivery point of Cushing, Oklahoma, putting downward pressure on the benchmark price, and supply constraints in the Brent market, have contributed to the record price spread but may not be the only factors explaining this divergence. Changes in time spreads, the difference between futures contracts expiring in the short term and those expiring at more distant dates, are pointing to a looser supply situation in the medium term (**Figure 3**). Currently, one can purchase Brent crude oil, to be delivered in December 2012, at a price more than \$4 less than for oil to be delivered next month. Increased concerns about future economic growth, along with higher expectations of improved Libyan production in 2012, may account for this relative cheapness of crude oil for deferred delivery dates.

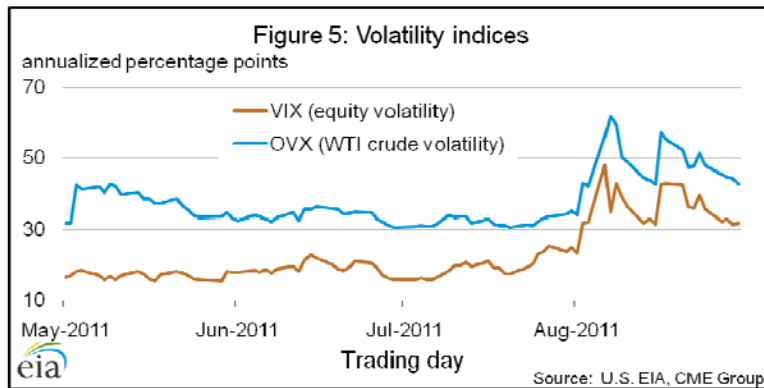


Another crude oil spread which has had some unusual behavior during the month of August is that between Light Louisiana Sweet (LLS) and Mars (**Figure 4**). Both crude oils have delivery points in the Gulf Coast of the U.S., with the first a sweeter, lighter crude and the second a

harder to refine heavy sour stream. Given the more desirable features of LLS, it traditionally trades at a price premium to Mars that averaged \$4.77 in 2010. On August 24 this price relationship switched to a \$0.74 discount for LLS (the figure shows the five day moving average nearing \$0.00); this weakness in light sweet crude oils in the Gulf Coast may reflect the recent sale of 30 million barrels of sweet crude oil that are a close substitute for LLS from the Strategic Petroleum Reserve.

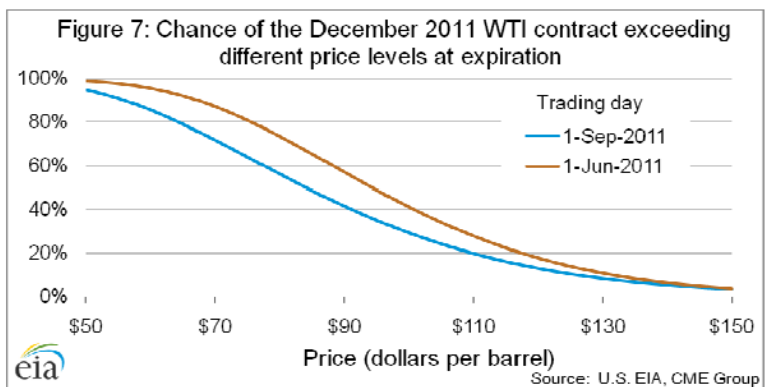
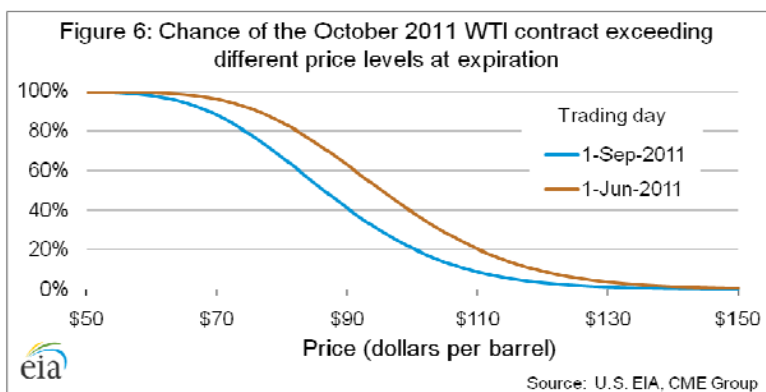


The implied volatility of crude oil can often be affected by uncertainty in future economic growth. Metrics like the VIX, an equities volatility measure, and the OVX, an oil volatility index, can provide market measures of this forecast uncertainty (**Figure 5**). During the last month, concerns over the strength of future growth in the U.S. economy and fears associated with a worsening European debt crisis were followed by large spikes in the VIX index as doubts increased for future corporate earnings. Similar spikes were observed in the OVX, with this measure of oil uncertainty peaking on August 9 at over 60 percentage points, coinciding with the price lows. This volatility level equates to anticipated daily price moves of over 3.5 percent.

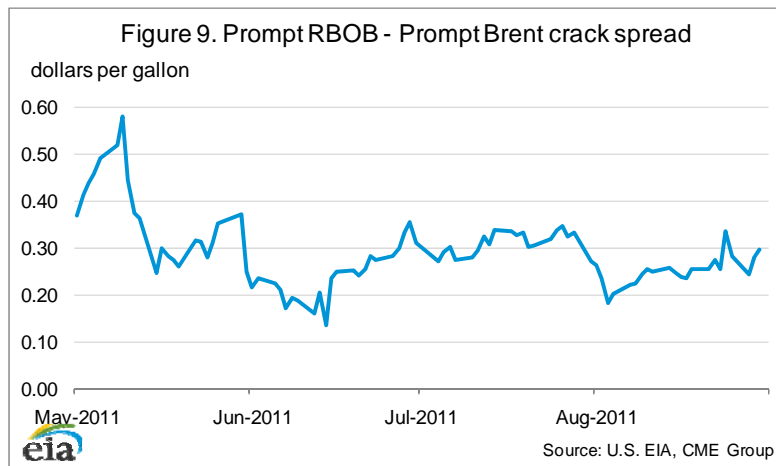
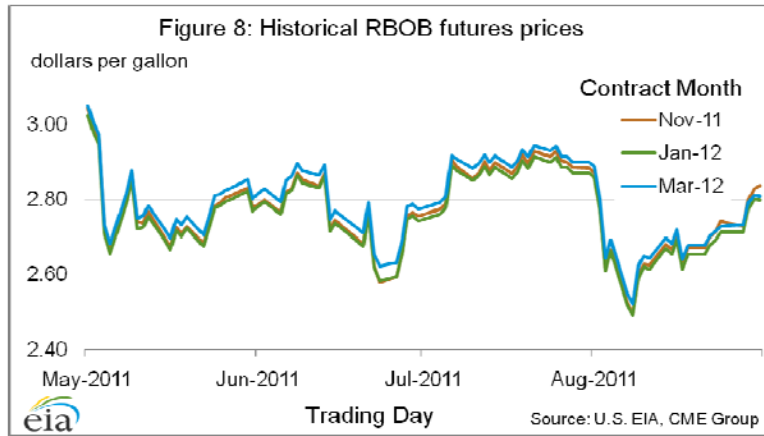


With implied volatility of options at the beginning of September significantly higher than three months ago (40 percentage points versus 29), the uncertainty in the forecast for crude oil prices for the next few months is similarly elevated. As noted in the Short-Term Energy Outlook, the 95 percent confidence interval on price expectations over the next two months is about \$50 wide. However, with WTI prices having fallen \$10 per barrel, the probability that the WTI futures contract for October delivery will be above \$100 per barrel, based on the price of energy

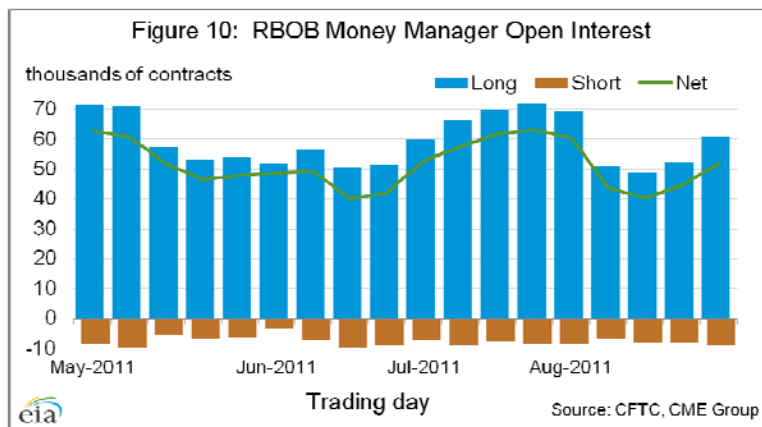
derivatives over the 5-day period ending September 1, was only 21 percent, far lower than the 39 percent level seen at the beginning of June for the same contract (**Figures 6 and 7**). The same remains true for contracts further out, with the prices of futures and options for December delivery indicating a 29 percent probability of expiring above \$100 per barrel, having fallen more than 12 percentage points from early June. Similar probabilities can be constructed for North Sea crude oil by using futures and options in the Brent market. The probability of Brent exceeding \$120 per barrel by expiration of the December futures contract declined only slightly from 36 percent in early June to 32 percent as of September 4. Unlike WTI, Brent prices at the beginning of September are only \$1 lower than those three months ago, causing this smaller probability drop. These probabilities are based on the cumulative normal densities derived from market expectations using futures and options prices. (See Appendices I and II of EIA's October 2009 *Energy Price Volatility and Forecast Uncertainty* article for discussion on how these probabilities are derived.)



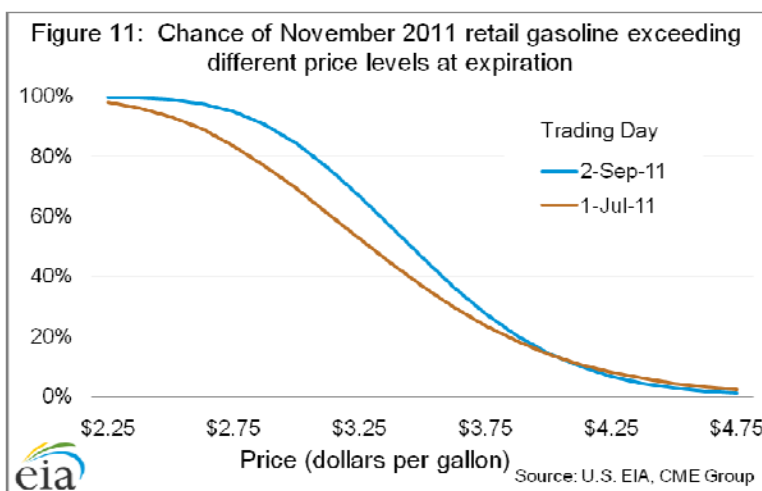
Gasoline. NY Harbor gasoline futures followed a pattern similar to that of Brent futures, dropping sharply in early August and increasing steadily during the remainder of August (**Figure 8**). Prompt month gasoline prices for the month of August have averaged \$2.87 per gallon while Brent crude prices have averaged just over \$110 per barrel. Increases in the crack spread (the gasoline prompt month price minus the crude benchmark prompt month price) were seen through the middle of the month, due to stronger gasoline demand in August than in July (**Figure 9**).



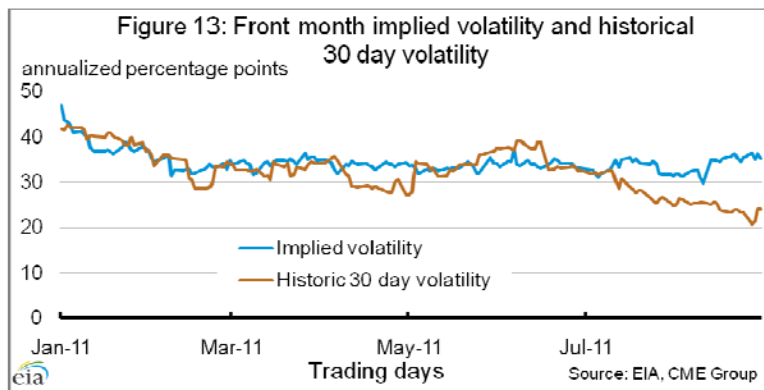
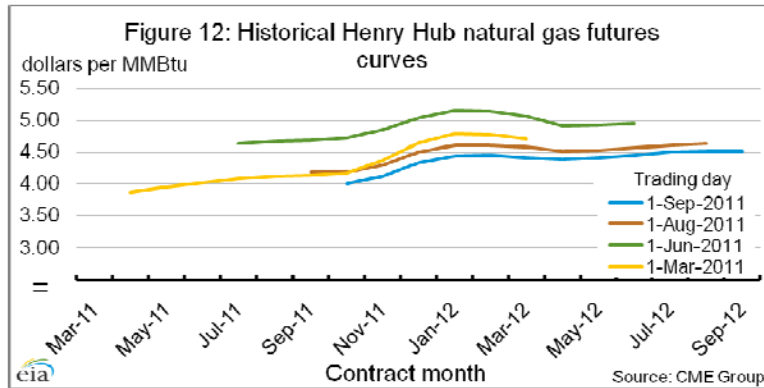
Along with decreasing spot and futures gasoline prices in the beginning of August, long positions held by money managers in gasoline futures contracts fell 27 percent from over 69,000 contracts for the week ending August 2 to under 51,000 for the week ending August 9 (**Figure 10**). Over the same time period net positions fell from 60,500 contracts to just under 44,000 contracts; during the remaining weeks in August, net long positions have recovered some of this decline during the period of increasing price.



Market expectations of uncertainty in monthly average gasoline prices are reflected in the pricing and related implied volatility of futures options contracts (**Figure 11**). New York Harbor Reformulated Blendstock for Oxygenate Blending (RBOB) futures contracts for November 2011 delivery settled on September 1 at \$2.84 per gallon. The probability the RBOB futures price will exceed \$3.30 per gallon (consistent with a U.S. average regular gasoline retail price above \$4.00 per gallon) at expiration increased approximately 13 percent. Looking further out on the curve, the RBOB futures contract price on September 1 for January 2012 came in at \$2.80 and has a probability of exceeding \$3.30 per gallon (\$4.00 retail) at expiration of approximately 16 percent.



U.S. Natural Gas Prices. The Henry Hub spot price averaged \$4.07 per MMBtu in August 2011, 35 cents lower than the July 2011 average ([Henry Hub Natural Gas Price Chart](#)). Prices during August hovered around \$4.00, with prices dropping below this level on multiple days, likely in response to robust inventory builds. Price levels over multiple expiration dates are now lower than they were at the beginning of last month and at the beginning of summer (**Figure 12**). Reversing the trend seen at the end of July, natural gas implied volatility moved higher by 3.5 percentage points during the month of August (**Figure 13**). The past month also saw 30 day historical volatility for natural gas diverge from implied volatility for the front month futures contract. As implied volatility rose, realized volatility drifted downward by 4.5 percentage points reaching a low of 20.8 percent on August 29.



In the month of August, the price of the futures contract for March 2012 delivery of natural gas fell by \$0.11 per MMBtu. This drop in natural gas prices coincided with the more broadly observed fall in equities and other commodities. The probability that the March contract will exceed \$5.00 per MMBtu at contract expiration fell by 14 percentage points from 36 to 22 percent (**Figure 14**). These natural gas probabilities are cumulative normal densities generated using market-based inputs provided by futures and options markets, i.e., futures prices and implied volatilities. (See Appendices I and II of EIA’s October 2009 [Energy Price Volatility and Forecast Uncertainty](#) article for additional discussion).

