

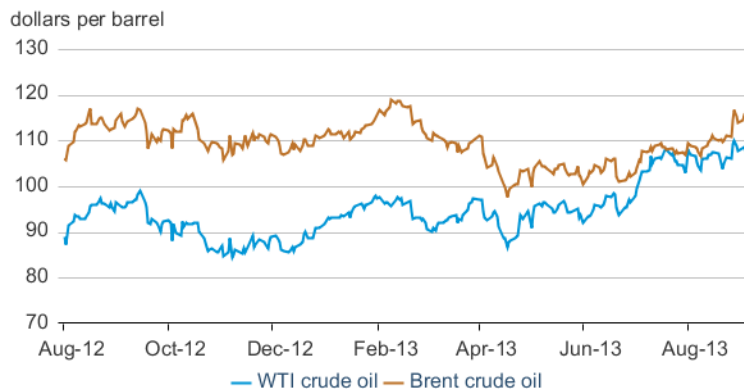


Short-Term Energy Outlook Market Prices and Uncertainty Report

Crude Oil

Prices: The front month futures price for Brent, the world waterborne crude benchmark, increased by \$5.72 per barrel to settle at \$115.26 per barrel on September 5 (**Figure 1**). Front month futures prices for West Texas Intermediate (WTI) crude oil also increased over the same time period but by a lesser amount, to settle at \$108.37 per barrel on September 5.

Figure 1. Historical crude oil front month futures prices



Intercontinental Exchange, CME Group

The primary drivers of higher crude oil prices over the past five weeks included an uptick in unplanned crude oil production outages and increased tensions in the Middle East. Continued disputes between local governments in the eastern oil producing regions of Libya and the central government in Tripoli combined with worker strikes at ports and exporting terminals resulted in a sharp drop in production and exports from Libya. At the same time, rising concerns over the conflict in Syria and its possibly larger impacts in the region loom over oil markets, creating uncertainty over future supply and applying upward pressure to prices.

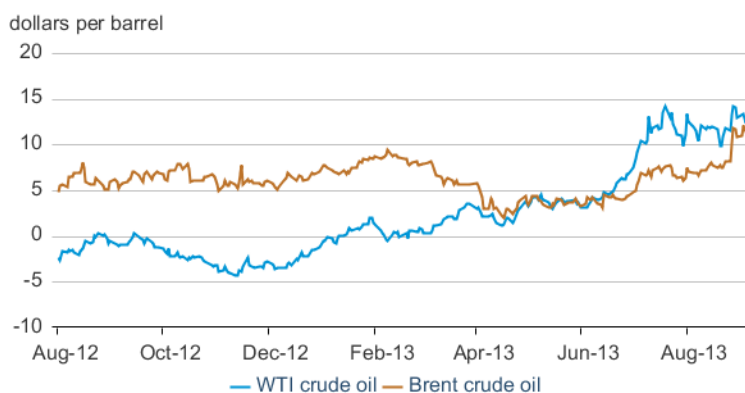
This is a regular monthly companion to the EIA Short-Term Energy Outlook

(<http://www.eia.gov/forecasts/steo/>)

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For the third month in a row, backwardation (when near-term prices are higher than further dated ones) in the Brent and WTI futures curves increased, reflecting continued tightness in the near-term global crude oil market. The Brent 1st-13th futures contract spread reached its all-time highest level and settled at \$11.49 per barrel on September 5, an increase of \$4.08 per barrel since August 1 (**Figure 2**). Similarly, the 1st-13th spread for WTI also increased to a new all-time high, settling at \$14.23 per barrel on August 28 before declining to settle at \$13.15 on September 5.

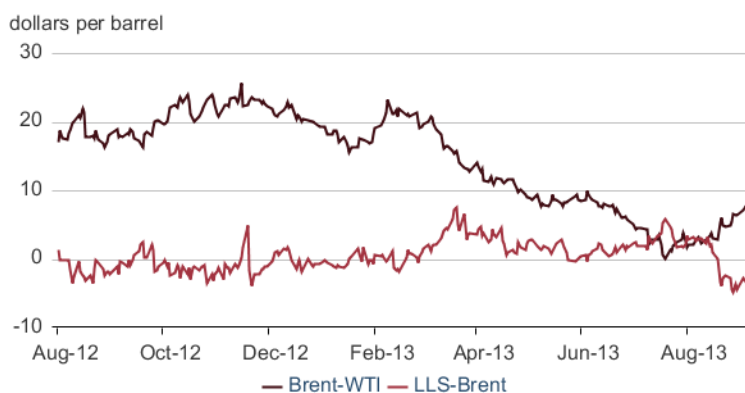
Figure 2. Crude oil front month - 13th month futures price spread



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After achieving near parity on July 19, the Brent-WTI spread has widened (**Figure 3**). Recent supply disruptions pushed up world waterborne crude oil prices relative to U.S. Midcontinent crude oil prices, which continue to be dominated by supply, demand, and transportation dynamics within the United States. Although refinery gross inputs for PADD 2 remain at near historic highs, a decline in runs for refineries in PADD 3 is partly responsible for the increase in the Brent-WTI differential. Decreased demand for crude oil from refineries on the U.S. Gulf Coast closed the import window for light sweet crude oil into the U.S. Gulf Coast, as can be seen by the LLS-Brent spread settling at -\$3.28 per barrel on September 5. The reduction in U.S. Gulf Coast crude prices relative to Brent also affects other crude oils being brought there by either pipeline or rail and likely putting further downward pressure on WTI prices and widening the differential to Brent.

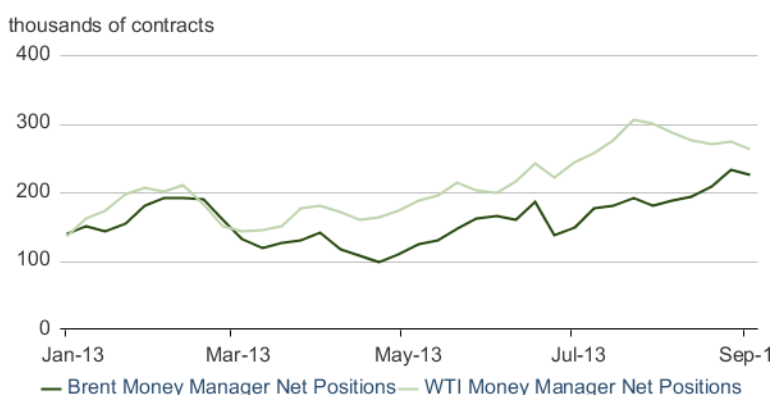
Figure 3. Historical crude oil differentials



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Money Manager Open Interest: Money managers held net positions of 262 thousand and 214 thousand futures contracts in WTI and Brent, respectively, as of September 3 (**Figure 4**). The net positions in the WTI futures contract started rising in March when WTI prices started increasing relative to other crude oil prices and peaked when WTI and Brent prices reach parity in July. Since that time, the net long position of money managers in WTI futures contracts decreased as the Brent-WTI spread widened. Money managers increased their net long positions in Brent futures contracts more recently, coinciding with increased supply disruptions.

Figure 4. Brent and WTI Net Money Manager Positions



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Crude oil and Equities: While crude oil prices moved higher since August 1, stock prices in the United States moved lower and stock prices in China were relatively flat. From August 1 to September 5, the S&P 500 declined by 3% and the Hang Seng Chinese stock market index rose by only 2%, compared to the 5% increase in Brent crude oil prices during that time (**Figure 5**). The correlation between daily percent-changes of Brent and

the S&P 500 has also dropped during this time period, with their 60-trading day rolling correlation falling to 0.22 on September 5 from 0.51 on August 1. The lack of co-movements of crude oil and equity prices further suggests that supply disruptions are the main driver of crude oil prices since July.

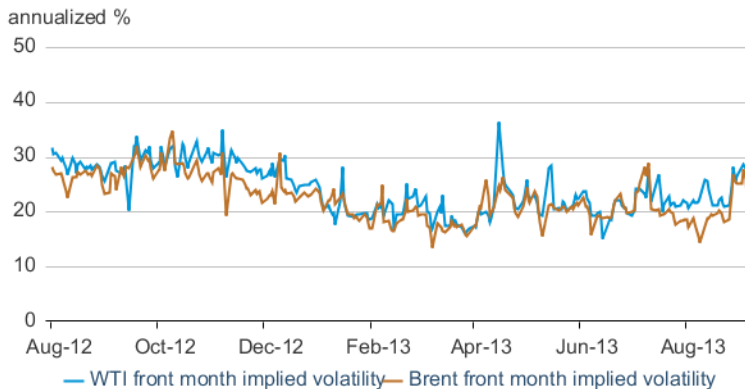
Figure 5. Brent crude oil vs U.S. and Chinese equity indices



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Volatility: Implied volatility for the front month WTI and Brent futures contracts settled at 25.41% and 21.92% on September 5, an increase of 3.7 and 3.3 percentage points since August 1, respectively (**Figure 6**). Most of that upward movement occurred in the same week that production estimates for Libya fell and tensions rose concerning Syria. The co-movement of both crude oil price and implied volatility suggests that uncertainty over current and future supply caused both measures to move higher.

Figure 6. Crude Oil Implied Volatility

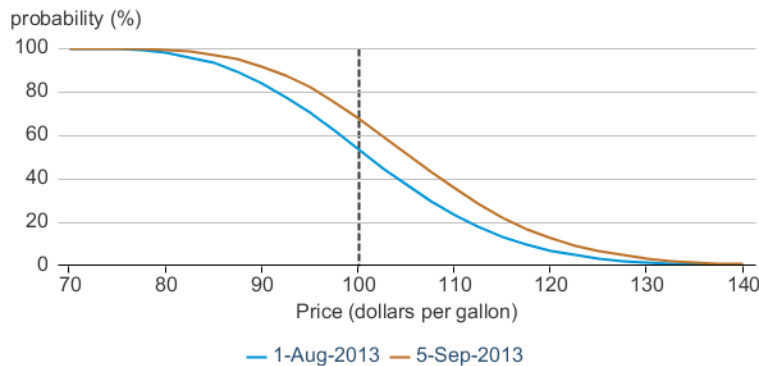


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Market-Derived Probabilities: The December 2013 WTI futures contract averaged \$106.09 per barrel for the five trading days ending September 5 and has a probability of

exceeding \$100 per barrel at expiration of approximately 68%. The same contract for the five trading days ending August 1 had a probability of exceeding \$100 of 54% (**Figure 7**). Given the elevated price of Brent relative to WTI, the probability of Brent futures contracts expiring above the same dollar thresholds is higher.

Figure 7. Probability of the December 2013 WTI contract expiring above price levels



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Petroleum Products

Gasoline prices: The reformulated blendstock for oxygenate blending (RBOB) front month futures contract price declined \$0.19 from August 1, settling at \$2.84 per gallon on September 5, (**Figure 8**). The RBOB-Brent crack spread significantly decreased, settling at \$0.09 per gallon on September 5, a drop of \$0.33 per gallon since the beginning of August.

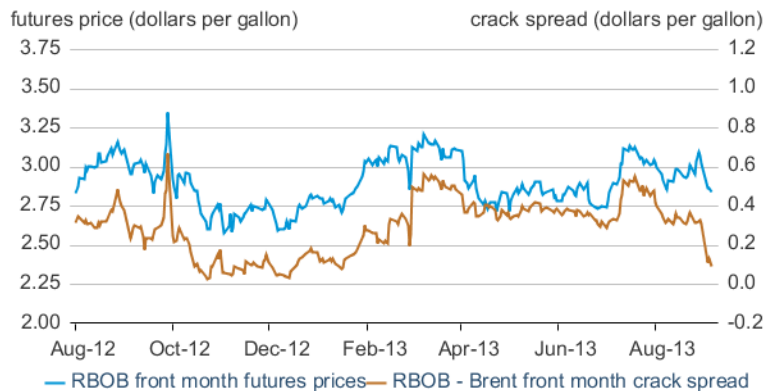
RBOB prices fluctuated greatly in August. During the first week of the month, RBOB futures prices dropped \$0.17 per gallon, settling at \$2.86 per gallon on August 8. This initial decline is attributable to higher-than-expected gasoline inventories. Every month since May of this year, gasoline stocks have consistently shown the first year-over-year increase since 2010. Finished motor gasoline and gasoline blending components inventories reported for August 30 stood at 216 million barrels, resulting in the first time since 2010 that gasoline inventories rose year over year in August. Several refineries also came back on line, including Valero Energy Corp.'s Port Arthur, Texas, facility after a fluid catalytic cracker was repaired, and Irving Oil Corp.'s plant in New Brunswick, Canada, after unplanned repairs. These events together contributed to lower RBOB prices in the beginning of August.

The decline in gasoline prices during the first part of August was then erased as prices increased with gains in crude oil prices due to supply disruptions (both realized and potential) in the Middle East. From August 8 to August 28, RBOB prices increased by

\$0.23 per gallon to \$3.09 per gallon. During this time, the RBOB-Brent crack spread remained stable at \$0.32 per gallon.

In the first week in September, RBOB prices decreased to \$2.84 per gallon because of the contract rollover on September 3 to the October futures contract, which switches to the winter grade specification of gasoline that costs less to produce than the summer blend, RBOB prices, and subsequently the RBOB-Brent crack spread, decreased to reflect the commodity's value, as is seen every year during this rollover period.

Figure 8. Historical RBOB futures prices and crack spread



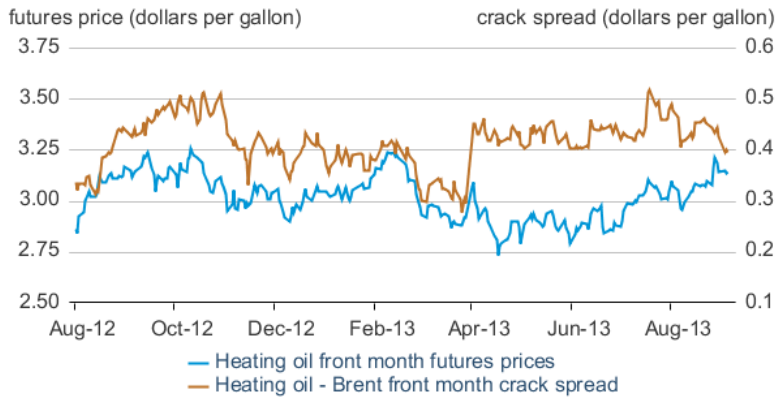
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Heating Oil prices: Heating oil front month futures contract price gained \$0.04 per gallon in August, settling at \$3.14 per gallon on September 5. The heating oil-Brent crack spread decreased to settle at \$0.40 per gallon on September 5 (**Figure 9**).

Heating oil futures prices exhibited similar patterns to those seen with RBOB prices. Heating oil declined \$0.14 in the first week, settling at \$2.96 on August 8. For the next three weeks, heating oil crack spreads widened and prices increased \$0.25 to \$3.21 on August 28. Similar geopolitical issues that influenced RBOB prices also factored in the increase of heating oil prices. However, distillate has also recently seen two months of very high demand. Taking the four week average of distillate consumption and exports combined, July demand came in at 4.92 million barrels per day (bbl/d) compared to a five-year high of 4.6 million bbl/d for the month. The August four week average distillate consumption and exports ending August 23 totaled 4.88 million bbl/d compared to the five-year high of 4.84 million bbl/d for the month. Distillate inventories for July and August reached a five-year low. These specific market factors also influenced the increase in heating oil prices in the last half of August.

The robust distillate demand this summer and its overall higher crack spread provided refiners incentives to increase refinery runs, which nearly reached five-year highs in July and August, placing additional downward pressure on gasoline prices.

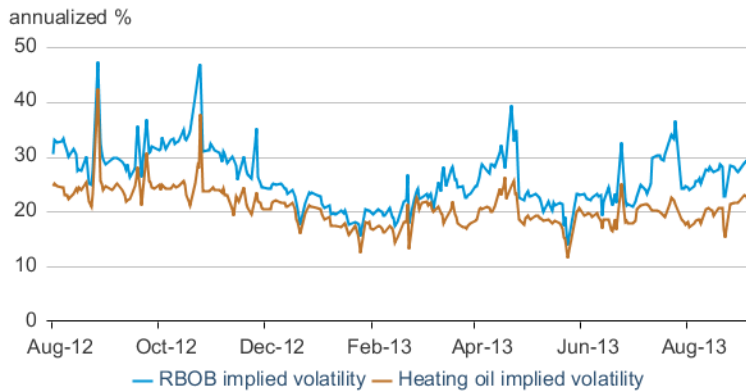
Figure 9. Historical heating oil futures price and crack spread



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Volatility: The implied volatility for the front month RBOB contract settled at 27.8% on September 5, an increase of 3.4 percentage points since August 1 (**Figure 10**). The implied volatility for the front month heating oil contract settled at 21.7%, an increase of 3.5 percentage points since August 1.

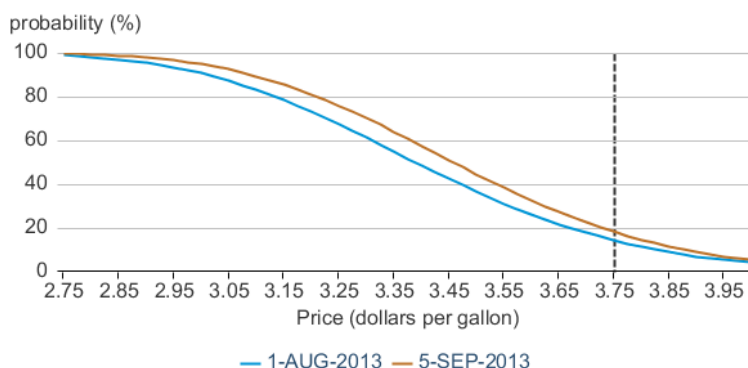
Figure 10. RBOB and Heating Oil Implied Volatility



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Market-Derived Probabilities: The December 2013 RBOB futures contract averaged \$2.82 per gallon for the five trading days ending September 5 and has a probability of exceeding \$3.10 per gallon (typically leading to a retail price of \$3.75 per gallon) at expiration of approximately 18.3%. The same contract for the five trading days ending August 1 had a probability of exceeding \$3.05 of 14.4% (**Figure 11**).

Figure 11. Probability of December 2013 retail gasoline exceeding different price levels at expiration



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Natural Gas

Prices: The price decline that began in late July continued into the first two weeks of August, but prices rose through the rest of the month and settled at \$3.58 per MMBtu on September 5, \$0.19 per MMBtu higher than the close on August 1 (**Figure 12**).

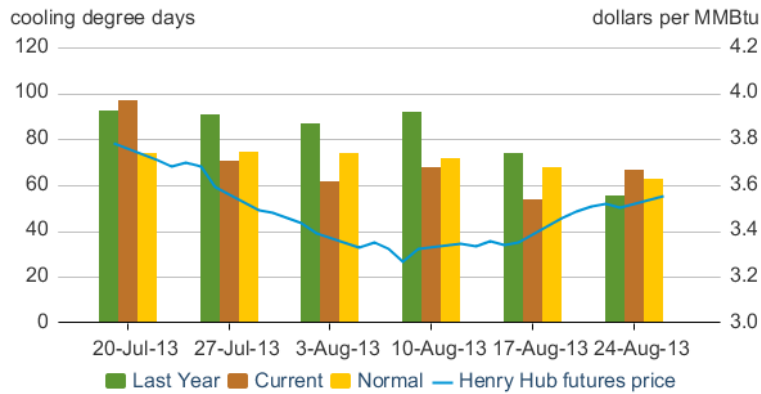
Figure 12. Historical front month U.S. natural gas prices



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Cooler temperatures led to decreases in power burn at the beginning of the month, with temperatures returning to the normal range toward the end of August. Most parts of the United States saw higher-than-average temperatures in mid-July, but temperatures cooled below the 30-year average for the four-week period ending August 17 (**Figure 13**), reducing the demand for air conditioning and contributing to the price decline in Henry Hub futures prices. Above-normal temperatures helped to move prices higher over the second half of August.

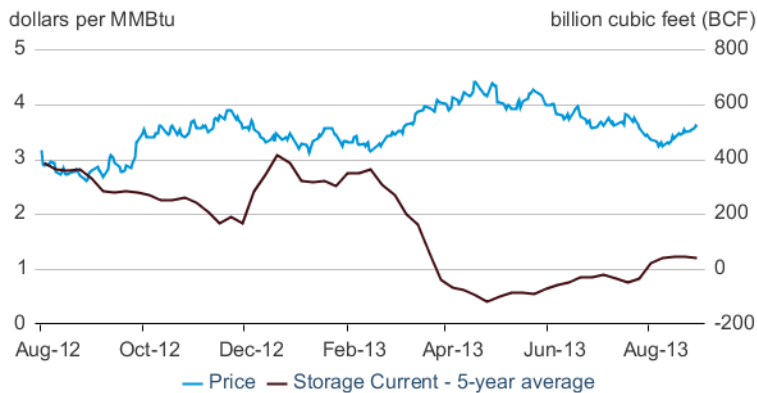
Figure 13. Cooling Degree Days



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Lower demand and fairly stable production contributed to higher storage injection rates, and natural gas storage levels rose above the 5-year average for the first time since March (**Figure 14**).

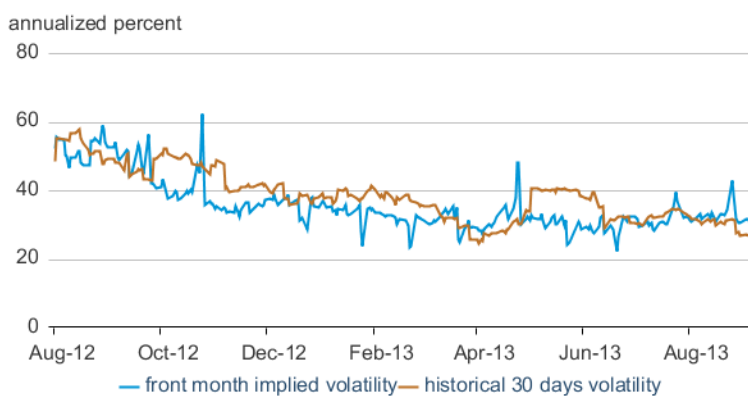
Figure 14. U. S. Natural Gas Prices and storage



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Volatility: Implied volatility for the front month settled at 29.5% on September 5, 1.6 percentage points lower than on August 1 (**Figure 15**). U.S. natural gas is affected less by geopolitical events compared to crude oil so its implied volatility has not seen the same increases.

Figure 15. Natural gas historical and implied volatility

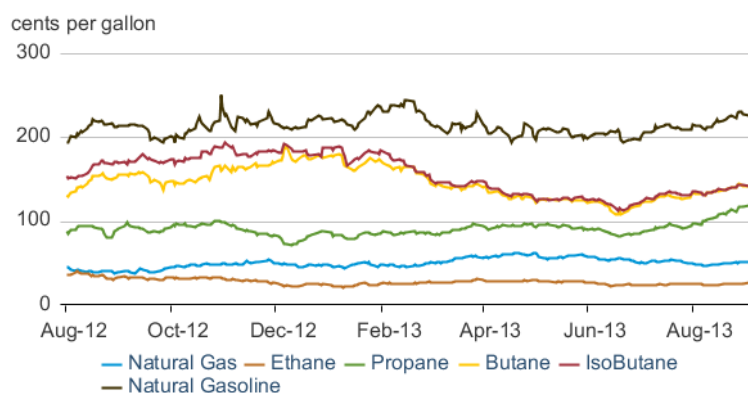


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Natural Gas Liquids (NGL): [Last month's MPUR](#) discussed the decline in some NGL prices, notably butane and natural gasoline, in the first half of 2013. Since late June, however, prices for NGL, except ethane, have risen steadily (**Figure 16**), increasing at a faster pace than crude oil prices.

New markets outside the United States—particularly Canada and Latin America—have provided additional outlets for the rising NGL production that has occurred since 2008. Through June of this year, cumulative [propane exports](#) are 57% higher than they were over the same time period in 2012 and weekly data through August suggest that the trend has not changed. Companies have expressed interest in building additional processing capacity and a new pipeline to move NGL from the Utica and Marcellus production areas to the Gulf Coast, raising the prospects for additional export capability.

Figure 16. Natural Gas and NGL prices

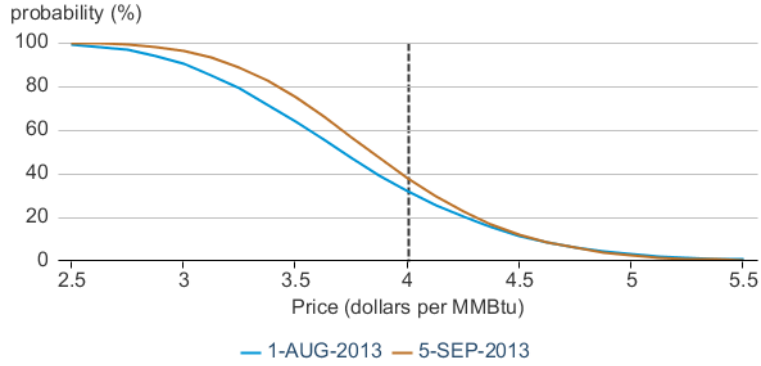


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Market Derived Probabilities: The probability that the December 2013 contract will settle above \$4.00 per MMBtu increased 6 percentage points compared to the five trading days ending August 1, from 32% to 38% (**Figure 17**). Because implied volatility

has stayed fairly flat, the increase in probability can be attributable to the higher five-day average price ending on September 5.

Figure 17. Probability of the December 2013 Henry Hub contract expiring above price levels



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