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Cheap Ethanol Threatens Refiners' Gasoline Share

E15 waiver will increase blend levels.

Morningstar Commodities Research
Sept. 4, 2018

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Data Sources for This Publication
U.S. Energy Information Administration
CME Group
Renewable Fuels Association
U.S. Census
To discover more about the data sources used, click here.

High Seasonal Stocks Pressure Prices

U.S. biofuel producers brewed an average 1.05 million barrels/day, or mmb/d, of ethanol from corn during the first eight months of 2018 according to the Renewable Fuels Association, or RFA, up over 2% from the same period last year and very close to plant capacity of 1.06 mmb/d. Domestic consumption of fuel ethanol—mostly used as a gasoline blend component—has averaged 0.9 mmb/d this year, relatively flat compared with the same period in 2017—as a result of lax enforcement of Renewable Fuel Standard mandates by the Environmental Protection Agency, or EPA. A boom in exports soaked up the excess of supply over domestic demand between January and April this year, but Chinese tariffs and a growing surplus in Brazil have shut the door to the largest markets since then. The result is growing ethanol inventories that now sit 24% above their average level for this time of year according to the Energy Information Administration, or EIA, and ethanol prices averaging 52 cents/gallon below regular gasoline. At the same time, the Trump Administration is promising to lift restrictions on sales of higher percentage blends in gasoline that could boost domestic ethanol demand at the expense of refiners. This note looks at ethanol fundamentals and the implications for gasoline markets.

Lower Producer Margins

Ethanol is 200% proof alcohol, distilled in the U.S. by fermenting the sugar in corn. According to stats maintained by the State of Nebraska, 208 corn ethanol plants operate in the U.S. as of July 2018, with total capacity of 1.06 mmb/d. About 119 producers own these plants, with the top five controlling roughly 43% of capacity (Archer Daniels Midland, POET Biorefining, Green Plains Renewable Energy, Valero Renewable Fuels, and Flint Hills Resources). The basic economics of a corn ethanol plant follow the "corn crush" equation that we detailed in a September 2016 note (see "Corn Crush and RINS – Tighter Margins for Producing and Blending Ethanol"). Our analysis indicates plant margins falling steadily since 2014. Based on ethanol and corn prices as well as the value of byproduct distiller's dry grain, less plant costs, average margins were 32 cents/gallon between January and August 2018—a third of the 94 cents/gallon enjoyed in 2014.

Renewable Fuel Standard

Growth in U.S. ethanol production has been driven entirely by Federal regulation. The Energy Policy Act of 2005 and the 2007 Energy Independence and Security Act, or EISA, mandated increasing use of renewable components blended into gasoline and diesel to reduce U.S. reliance on imported fossil fuels. By far the largest renewable fuel component is ethanol that now commonly makes up 10% of most gasoline, a blend known as E10. The EISA includes a mandate for a renewable fuel standard, or RFS. Under the RFS, refiners and importers are required to blend minimum renewable volume obligation, or

RVO, quantities into their fuel based on gasoline and diesel sales into the domestic market. These RVOs increase over time to meet growing RFS annual targets set by the EPA.

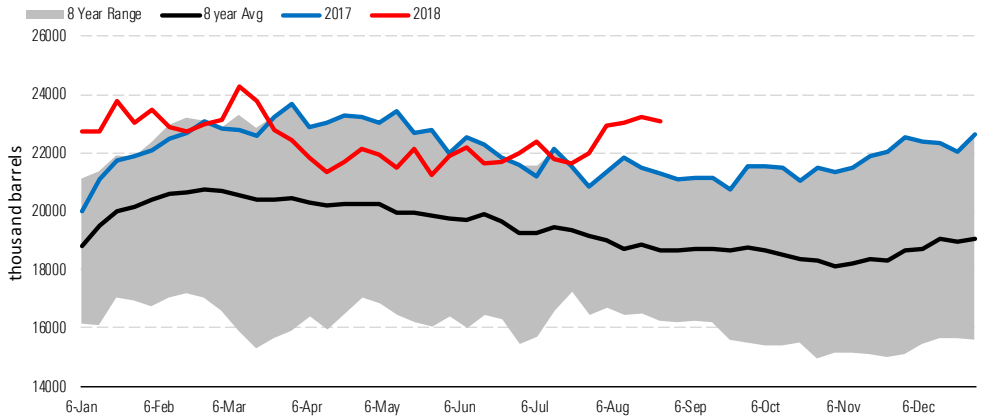
Refiners and importers that fail to meet their RVO are subject to heavy fines. RVOs are met when obligated parties surrender Renewable Identification Numbers, or RINs, that are attached to every gallon of renewable produced and released when that renewable is blended with gasoline or diesel. As we discussed in an April note, the allocation of RVOs and the need of some refiners to purchase RINs to meet those obligations have been the subject of contention between the farm lobby and refinery owners (see "Trump Strings Along Farmers and Refiners With Waivers"). A series of 24 RVO waivers granted this year by the EPA to small refineries having less than 75 mb/d capacity has infuriated the farm lobby by removing as much as 98 mb/d or about 9% of ethanol demand according to biofuel industry estimates. An as-yet unfulfilled promise by the Trump Administration to remove seasonal restrictions on selling greater volumes of higher percentage ethanol blends (known as the "E15 waiver") upsets refiners. That's because E15 potentially boosts the ethanol blended into gasoline from current levels around 10% to 15%. Over time, that means the E15 waiver could transfer 5% of refiners' market share of transport fuels to ethanol producers.

So far this year, refiners are pleased with the EPA small refinery exemptions that have caused RIN prices to tumble by about 80% from around 95 cents/gallon in October 2017 to 20 cents/gallon at the end of August. That means refiners without facilities to blend ethanol into gasoline at distribution terminals are paying a lot less to buy RINs to meet their RFS obligations this year. However, as we detail next, recent high ethanol inventory levels are pushing prices well below gasoline. That could open the floodgates if the E15 waiver is granted, because blenders are particularly incentivized to replace more gasoline with ethanol when the latter is cheaper.

Oversupplied Market

EIA data certainly indicates the fuel ethanol market is oversupplied this year. Exhibit 1 shows seasonal inventory based on weekly supply reports since January 2012 which was the first full year EIA reported data. The red line is 2018 inventory that was 23.1 million barrels as of Friday Aug. 24, 2018, down slightly from the prior week but still up more than 8% over 2017 (blue line) and 24% over the average of the past eight years (black line).

Exhibit 1 Seasonal Ethanol Inventory



Source: EIA, Morningstar

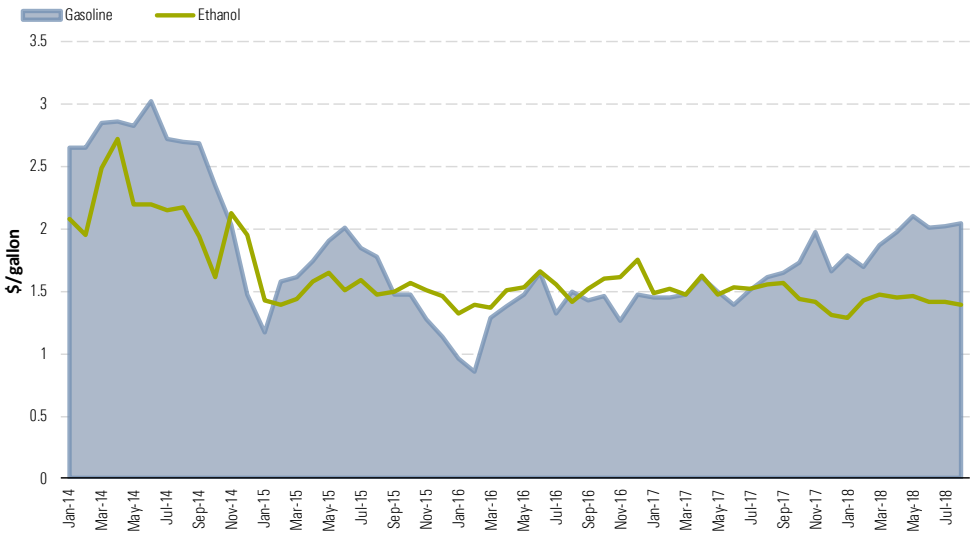
Weekly data from the RFA shows that domestic fuel ethanol demand between January and August this year averaged 0.9 mmb/d, which is level with the same period last year. This flat demand comes even though annual mandated biofuel volumes are supposed to increase under RFS legislation and despite recent record gasoline sales. But this year, the EPA set preliminary annual ethanol mandate volumes for 2018 at the same level as last (15 billion gallons) and their small refinery waivers have offset any natural growth from higher gasoline consumption. The lack of domestic demand hasn't tempered production, which averaged 1.05 mmb/d between January and August 2018 according to the RFA—running very close to total U.S. nameplate plant capacity of 1.06 mmb/d. As we pointed out earlier, ethanol plant margins are smaller than in prior years but still positive with the help of byproduct sales. Producers also enjoyed higher export sales earlier this year, averaging 123 mb/d between January and June 2018 according to U.S. Census data including record sales to Brazil and China in February. Census data is not available after June but high domestic inventory levels suggest exports may have fallen off sharply since then. The Chinese market has effectively been closed by their imposition of additional tariffs on ethanol as part of their initial response to the Trump Administration's steel and aluminum tariffs in April. Brazil—the world's largest producer of ethanol from sugar—developed a glut of ethanol in the second quarter when sugar prices collapsed and record stockpiles there have cut off U.S. exports.

Blender Incentive

Growing ethanol inventory in the wake of flat domestic demand and export headwinds left ethanol prices languishing well below gasoline this year. Exhibit 2 shows a Chicago ethanol blender margin between January 2014 and August 2018. The pretax wholesale gasoline price is the blue shaded area and the green line is the price of Chicago ethanol. When ethanol prices are lower than gasoline, blenders profit from the difference and are incentivized to maximize ethanol content. When gasoline prices are lower than ethanol, blending is minimized to the level required to meet RFS obligations. Average gasoline prices in Chicago were 44 cents/gallon above ethanol in 2014, level with ethanol between 2015 and 2017 and 52 cents/gallon above this year. In the circumstances, if the Trump

Administration delivers on promising to implement the E15 waiver, blenders have every incentive to increase ethanol levels where permitted.

Exhibit 2 Chicago Gasoline and Ethanol Prices



Source: CME Group, Morningstar

Wider Implementation

Although in theory, lifting the E15 waiver could lead to ethanol blends increasing to 15% across the board, this will not be an overnight process. At the moment, E15 ethanol blends are dispensed using purpose-made pumps in part because vehicles built prior to 2001 are not designed to use anything more than E10 blends. Green Plains, the third-largest ethanol producer, estimates that only 11.4 mb/d of ethanol will be sold through about 2000 E15 gas stations in 2018. But an E15 waiver would permit year-round use of E15 pumps—incentivizing wider implementation even if it takes a few years to roll out.

Refiner Loss

The net result will be a further loss of domestic market share for U.S. refiners as they surrender another 5% to ethanol producers. The impact of this transition will be mixed. Some refiners like Valero and Flint Hills Resources are also large ethanol producers, so they will be less impacted. Refiners situated along the Gulf Coast will also be less concerned since they have access to gasoline export markets that don't require ethanol blends, making it easier to maintain sales. East Coast refiners are insulated from demand concerns because the region is short gasoline and can absorb any surplus gasoline freed up by losses to ethanol. The West Coast is a more balanced refining market, producing what it needs and exporting less. Refiners there are vulnerable to growing ethanol blends. The largest impact will be in the Midwest where refineries are landlocked and struggle to find new markets for excess product. The major ethanol producers are also located in Midwest states and are likely to invest more rapidly in distributing higher ethanol blends.

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