

Market focus

Since Nybot listed a new futures contract for ethanol in May, the product has emerged as a critical ingredient in US refining. Gasoline traders may find themselves worrying about crop reports as much as they monitor Opec meetings and Nymex crude. *Sandy Fielden* examines the dynamics of the US ethanol market

Grain versus cane

★ In December 2003, *Market Focus* reported on the phasing out of gasoline blending component methyl tertiary butyl ether (MTBE), an oxygenate added to gasoline to make it burn more cleanly. MTBE gained a bad reputation for polluting ground water. A cleaner, environmentally friendly alternative – corn-based ethanol – is now rapidly replacing MTBE as America's oxygenate blending component of choice. US politicians see increased manufacture of ethanol from corn as a win-win situation. First, they are interested in reducing dependence on foreign oil imports and non-renewable fuels and, second, ethanol production is a boon to US farmers who can distil the component from their excess corn.

Ethanol is pretty close to pure alcohol and is manufactured by distilling sugar that has been turned to alcohol by fermentation. In the US, the preferred manufacturing process for ethanol is to distil a fermented mush made from crushed corn. Other countries use different techniques to make ethanol, but the most widely used approach is the fermentation of crushed sugar cane.

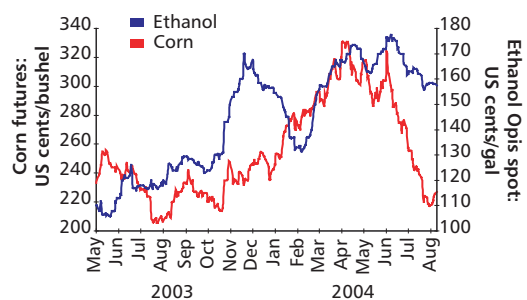
There are currently 78 ethanol production plants in the US, primarily in the Midwest corn-belt, with another 10 plants under construction. In 2003, the US produced a record 2.81 billion gallons of ethanol, and it is estimated that 3.25 billion gallons will be produced in 2004. Booming US demand for ethanol is roughly balanced with supply, and increased

production in 2004 is expected to meet demand, according to the US Energy Information Administration.

While domestic ethanol production is encouraged (ethanol production is subsidised by up to 60 cents a gallon in the US and refiners can get tax credit of up to five cents on the gallon when they blend it into gasoline), the use of imported ethanol is definitely discouraged. Ethanol imports attract a 54 cents-a-gallon tariff and a 2.5% excise tax. Imports do occur, but only on a limited scale because of the high tariffs. Brazil – the world's largest exporter of ethanol – ships an average of 300,000 barrels to the US each month, according to latest figures from data provider Platts. But this only represents about 1.5 days of production.

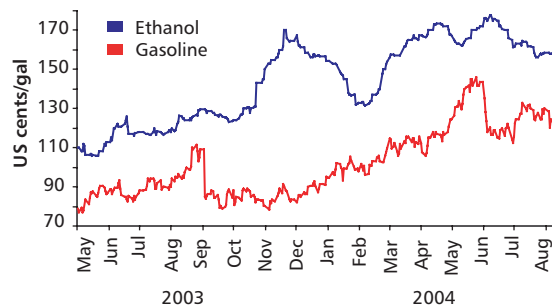
As a result of the tariff system, one would expect ethanol pricing to be an entirely US domestic concern and that oil refiners would be looking at oil or corn commodity prices to understand their gasoline additive costs. In fact, there are three major pricing points for ethanol in the US. They are Chicago – the natural trading hub for corn; New York – the hub of US gasoline trading – and Los Angeles. All three cities are in states that have switched to using ethanol as a gasoline additive and each must now attract supplies. If a risk manager were looking to find a good correlation for ethanol prices, the most obvious place to turn would be the corn futures market (see figure 1), or

F1. Ethanol and corn prices – Chicago



Ethanol prices have risen with demand when it began to replace MTBE as a gasoline additive. Falling corn prices appear to have had only a mild impact on ethanol, and the correlation between the two products is on average only 16% during this period.

F2. Nymex gasoline and Chicago ethanol spot prices



Ethanol prices have traded higher than Nymex gasoline, and although both have been driven higher by oil market events, there is no discernable correlation between their prices during this period from May 2003 to August 2004.

the Nymex gasoline futures market (see figure 2). Of these two commodities, the better correlated is the corn contract, but the numbers aren't reassuring, as the 21-day correlation between Chicago ethanol and Chicago Board of Trade (CBOT) corn futures is only 16%. The fact that the Nymex gasoline contract is based on delivery into New Jersey with a gasoline blend that still contains MTBE makes it even less suitable for hedging, with a 21-day correlation of almost zero between unleaded gasoline and Chicago ethanol prices.

If the US domestic futures markets cannot help ethanol buyers to protect themselves against higher prices, it remains to be seen how the latest New York Board of Trade (Nybot) ethanol futures contract will be able to help them further. The details of the contract confirm this is unlikely.

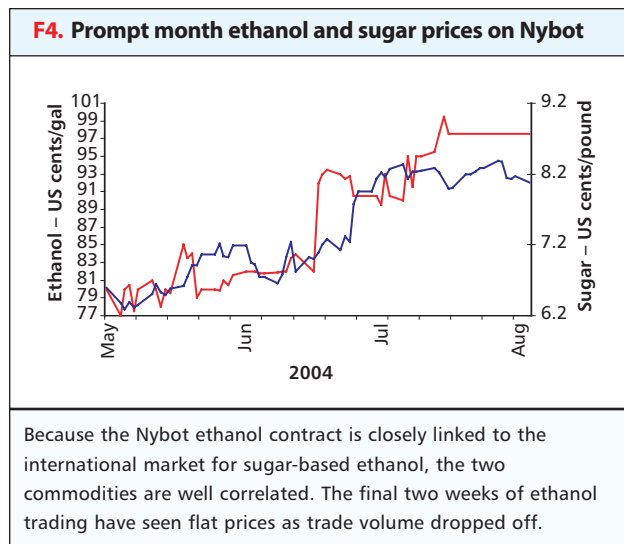
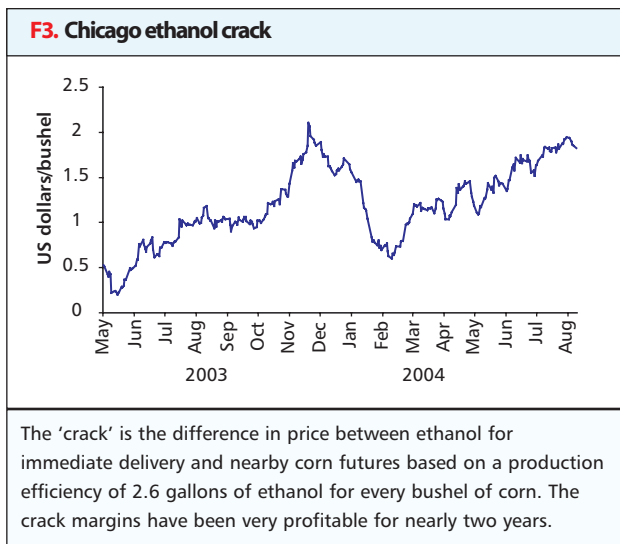
For a start, the new ethanol futures contract is international by nature and modelled closely on Nybot's most successful contract, known as 'Sugar 11'. In other words, the new futures contract is linked to ethanol that is produced from sugar cane. The Nybot ethanol specification is based on purchases of ethanol, free on board (FOB), delivered from one of nine countries of origin in the Caribbean region, the largest of which is Brazil, with 46% of the world's total ethanol production. Current data from Nybot shows that the fuel-ethanol industry in Brazil produces between 11 and 13 billion litres (3-3.5 billion gallons) of ethanol annually and accounts for 30% of world ethanol exports. All of this ethanol is made from Brazilian sugar; indeed 50% of Brazil's sugar production is distilled into ethanol. The size of the Brazilian sugar industry gives them a great degree of control over the international ethanol market because they can easily increase or decrease ethanol production and exports. By making the contract FOB Caribbean, the Nybot seeks to attract international traders who are importing or exporting ethanol, by keeping the many tariffs and duties that agricultural products attract from governments out of the trading price. If the traded price of ethanol is tariff-free, buyers do not need to worry about the destination of their cargoes, since they only pay appropriate

duties upon actual import. This 'tax free' approach has helped to make the Nybot's Sugar 11 contract successful in what is a highly protected environment for sugar. The net impact of an international ethanol contract on US ethanol traders isn't immediately apparent. The underlying manufacturing material is sugar, not corn, and the delivery and pricing mechanism ignores the tariffs built into US prices.

To complicate matters further, the specification for ethanol futures is different from the final product used by US gasoline blenders, requiring further price adjustments. Nybot futures-grade ethanol is pure alcohol and could easily be used as a feedstock for the drinks industry. To be used as a gasoline additive, US ethanol is denatured to prevent its use as a drink – denatured ethanol contains small amounts of poisonous substances that would cost too much to remove to manufacture the component into liquor.

Having considered these points, is the Nybot ethanol futures contract simply irrelevant to the US ethanol market? After a successful start, the ethanol contract has experienced low volumes of trading since the expiration of the June 2004 contract and needs a big injection of interest to succeed. The answer is that since the Nybot contract is based on ethanol manufactured from sugar, it will only become important to the US market once the supply-demand fundamentals make ethanol imports viable and the marginal cost of buying ethanol is therefore based on sugar. At the moment, rising demand for ethanol in the US is being met by increased domestic supply, but there is also a shortage of available sugar-based Brazilian imports, which has allowed US ethanol prices to rise significantly without fear of competition from imports.

In this situation, lower US corn prices are creating very attractive crack spreads – the price difference between higher ethanol and lower corn product prices – and are spurring record domestic manufacture. While the price of corn futures has been dropping in 2004 in response to positive crop reports and weather news, the price of ethanol has continued to rise with



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high demand from gasoline refiners. By contrast, sugar prices are higher, on expectations of lower crop yields due to bad weather in Brazil. Higher world oil prices have spurred more Brazilians to buy new cars, which run on 25% ethanol-blended gasoline, increasing domestic demand and tightening supply. Therefore, there is currently no excess sugar ethanol to come to the rescue of US corn ethanol buyers.

As a consequence, the crack spread between ethanol and corn since May 2003 has increased from a low of 19 cents to a high of \$2.10/gallon (see figure 3), making ethanol a very profitable business in 2004. International agri-business giant Archer Daniels Midland reported first-quarter 2004 earnings up 94% from the year before with the company's corn processing unit's profit increasing 80% on last year to \$160 million. If the tables are turned, however, and corn prices rise when sugar softens, then we can expect to see pressure on US ethanol prices from cheaper imports produced from sugar. In this case, the Nybot ethanol futures contract will be a very effective hedging instrument for sugar-based ethanol traders. Improved correlation between the more widely traded Sugar 11 and the weaker ethanol futures contracts on the Nybot will make the latter a more attractive alternative for the ethanol market than either CBOT corn or Nymex gasoline futures (figure 4, which represents sugar and ethanol futures, suggests that the commodities are well-correlated).

A further complication may also enter the mix at such time as the Nymex gasoline futures contract specification is changed from an MTBE to an ethanol base as the former is eliminated from the US market. At that point, there may be better correlation between ethanol prices and gasoline futures.

Historical analysis of correlation between MTBE and gasoline prices might shed light on that possibility. In fact, the correlation between MTBE and Nymex gasoline is much higher than that between ethanol and Nymex gasoline, although the fact that the raw materials for MTBE come from oil tends to support that conclusion. It seems less likely that ethanol prices will be driven by gasoline except where gasoline demand leads to shortages.

Although the US ethanol market appears, at first sight, to be rather land-locked and dependent on government subsidy, the international sugar-based ethanol market has a fundamental role to play in propping up underlying US ethanol prices. As ethanol producers in the US struggle to meet growing demand, they should be aware that the protection afforded by tariffs is always threatened by a flood of lower-priced imports should the Brazilian sugar harvest exceed domestic demand. Similarly, a bad year for US corn could force farmers to choose between higher prices for the grain and bad margins for ethanol. Market analysts will need to pay careful attention to these fundamentals to determine whether sugar or corn prices are in the ascendancy for ethanol.

Certainly the advent of ethanol makes life more complicated for energy risk managers, as it not only adds a new ingredient to the mix, but it also requires an understanding of agricultural markets. As weary energy analysts might expect, it naturally appears that agricultural fundamentals are just as much at the mercy of government policy as oil ever was, so it will not be entirely unfamiliar turf for us. **ER**

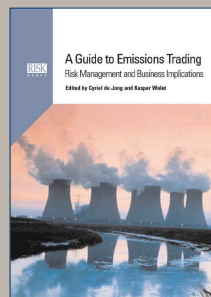
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