

Crush Spreads In A Biofuel Age

Future old-timers in agricultural markets will bore their younger colleagues to tears with stories about how we used to use food grains and oilseeds to feed for people and livestock. Then someone came up with the brilliant idea for feeding corn to yeast instead and of converting edible vegetable oils into something called biodiesel.

While these processes work in the engineering sense, they have been unmitigated disasters in the economic sense. Nature was kind enough to give us millions of crop-years in the form of pre-converted biofuels known as petroleum, coal and natural gas. All we had to do is extract them from the ground. This worked so well that for years the major problem with crude oil was excess supply and the delivered prices for both coal and natural gas still reflect transportation costs more than raw material costs.

This is not, however, one more screed about the economics of ethanol or biodiesel, but rather a look at how the changing nature of grain and oilseed markets has affected the venerable crush spread for soybeans. Given the time of year, we will focus on the single new-crop spread of between November soybeans and December soybean meal and bean oil.

The New Crop Crush

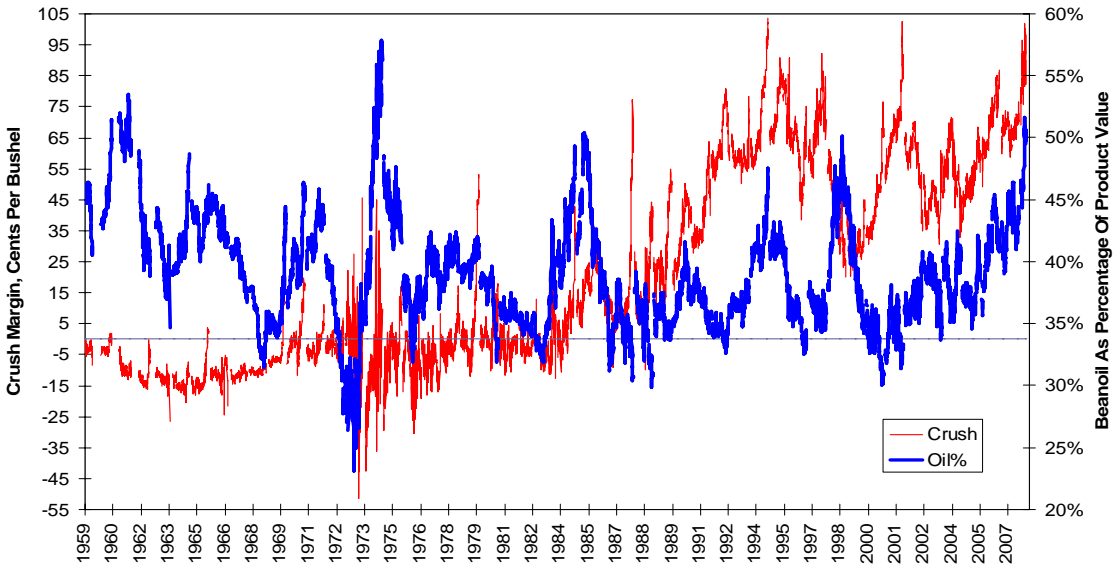
The crush margin is fairly easy to calculate: Multiply the price of soybean meal expressed in dollars per ton by 0.022 and the price of bean oil expressed in cents per pound by .11. Subtract the price of soybeans expressed in dollars per bushel from the sum of the converted soybean meal and bean oil, and you have the gross crush margin expressed in dollars per bushel of soybeans.

A crush spread package is 11 contracts of soybean meal, 9 contracts of bean oil and 10 contracts of soybeans. For those of you keeping score at home, the soybean meal yield of crushing ten 5,000 bushel contracts of soybeans at 44 pounds of 48% protein soybean meal is 2.2 million pounds of meal, while the bean oil yield at 11 pounds of oil is 550,000 pounds of oil. As the bean oil contract is for 60,000 pounds of oil, the 9 contracts cover only 540,000 pounds of oil, leaving a 10,000 pound gap between the physical bean oil yield and the futures contract yield. We might shrug and say, "Close enough for government work" if this was in fact government work and not actual commerce.

A second spread, the percentage of bean oil in the crush product value, hereinafter referred to as the "Oil%," is a critical determinant of crush margins. Soybean meal competes with corn, feed wheat, fishmeal and other high-protein feedgrains. Bean oil competes with palm oil, sunseed oil, canola, corn oil and other edible fats and oils. As these are different markets with vastly different demand and substitution structures, the Oil% always was volatile. Now that bean oil is affected by biodiesel and soybean meal is affected by corn-derived ethanol, the economics of the soybean crush have changed dramatically.

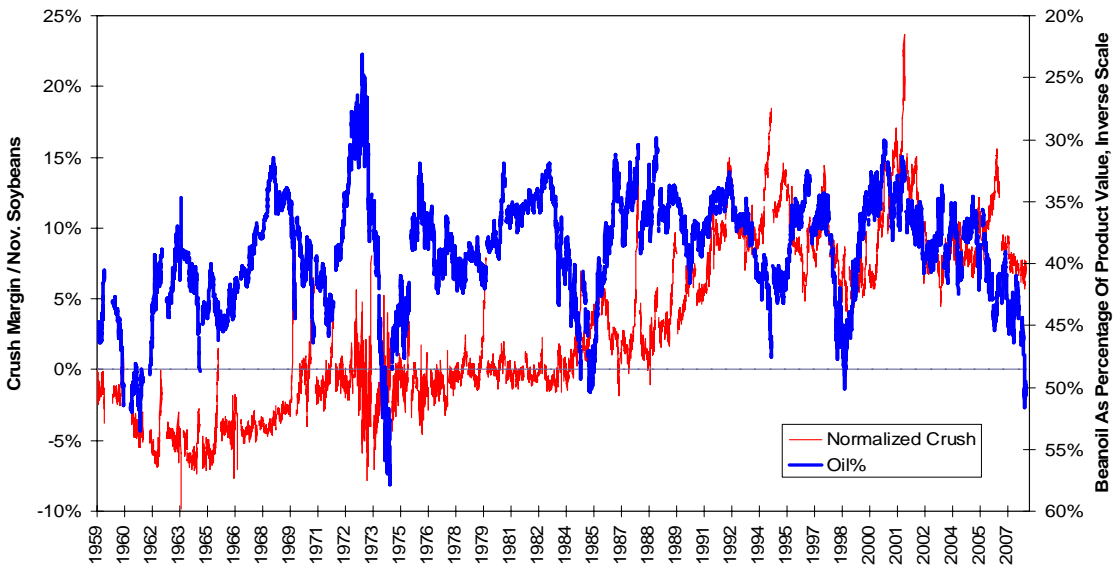
If we use the long-term data histories available on the CRB-Infotech CD-ROM as our data source and calculate the histories of both the crush spread and the Oil%, we see a secular rise in new crop crush margins since the mid-1980s, the time when the South American export market really emerged, while the Oil% has remained in a broad trading range. We cannot call this a "mean-reverting" range as there are no substitution possibilities between soybean meal and bean oil. Interestingly, the Oil% has been on a near-constant climb since the 2001 crop year; we can attribute much of this trend to biodiesel's impact on edible oil prices.

Long-Term New Crop Soybean Margins



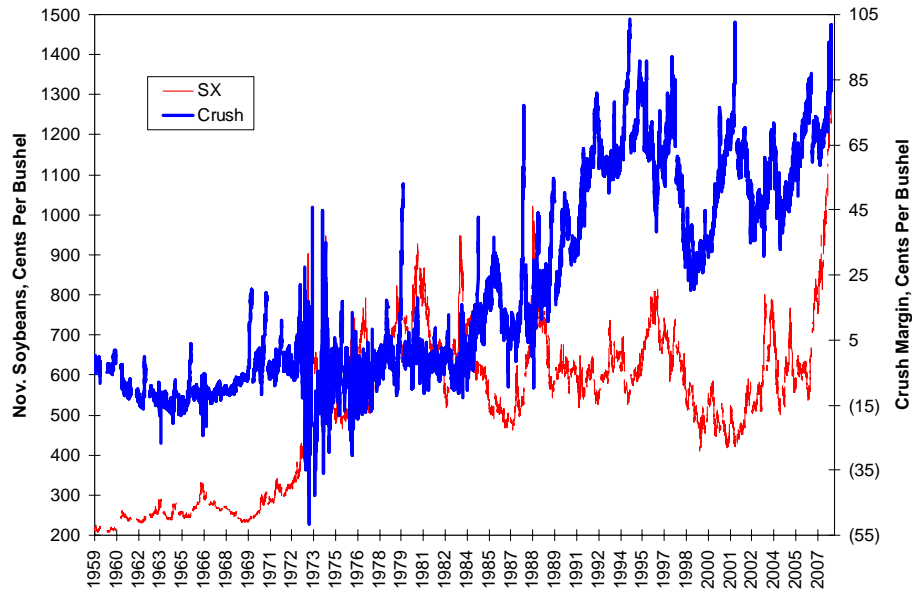
However, the chart above compares an ordinal price margin, the crush, against a normalized series, the Oil%. Let's normalize the crush spread by dividing the crush margin by the price of soybeans. Now an interesting relationship emerges. If we plot the Oil% on an inverse scale, we can see how new crop crush spreads and the Oil% have been correlated negatively since the mid-1980s. A higher Oil% can reflect either lower soymeal values or higher soybean feedstock costs, or both; regardless, it is associated with lower normalized crush margins and vice-versa.

Long-Term New Crop Soybean Margins: Normalized



Now comes the punchline. Just as newbie petroleum traders always take the bait that higher crack spreads must pull crude oil prices higher, new agricultural traders always believe higher crush spreads must pull whole soybean prices higher. Once again, let's turn to CRB-Infotech's long-term histories for both November soybeans and the new crop crush spread. When crush spread margins rose in the 1980s, they did it off the back of lower soybean prices; when soybean prices shot higher in 2007, crush spreads moved higher on the back of higher product values. The conclusion is the crush value and the feedstock costs are unrelated to a most surprising extent.

Crush Spreads And New Crop Soybeans Surprisingly Unrelated

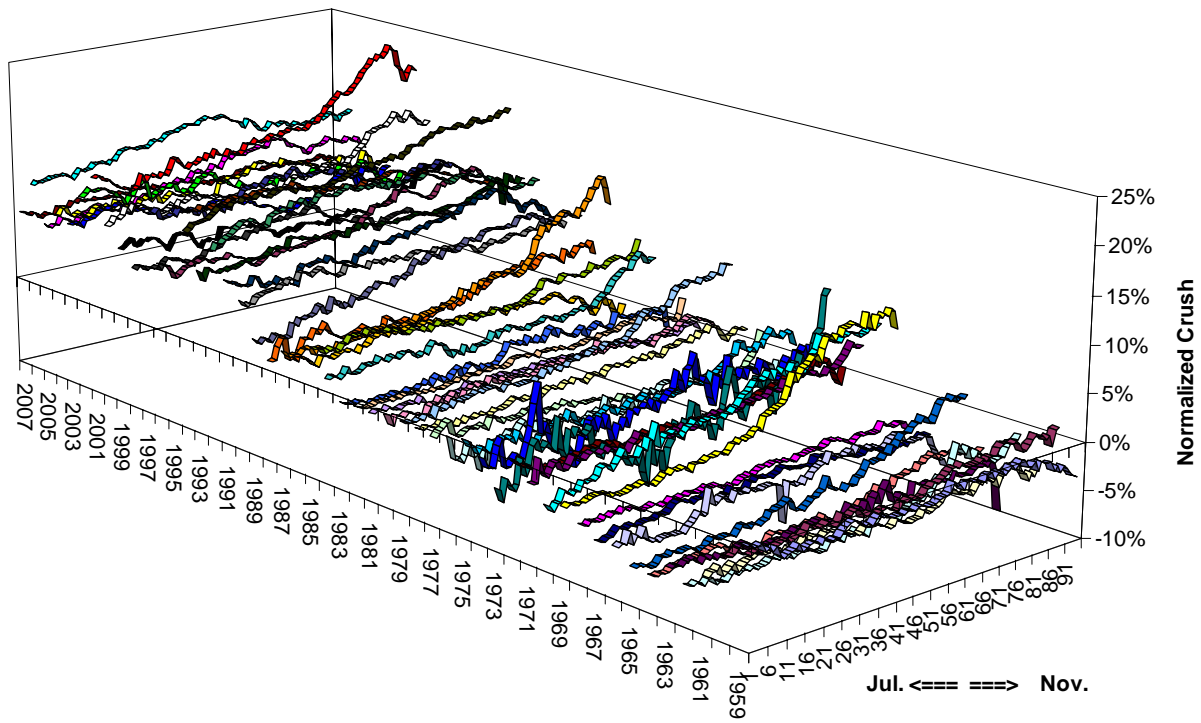


In-Season Patterns

As we enter the final stretch for the 2008 new crop soybean crush, let's go back and look at long-term trading patterns for both the normalized crush spread and the Oil%. A consistent extraction of the last 95 trading days of the new crop year is used; this will extend backwards from the November expiration of the soybean contract (day 95) to a date in early July (day 1) for each crop year between 1959 and 2007, inclusive.

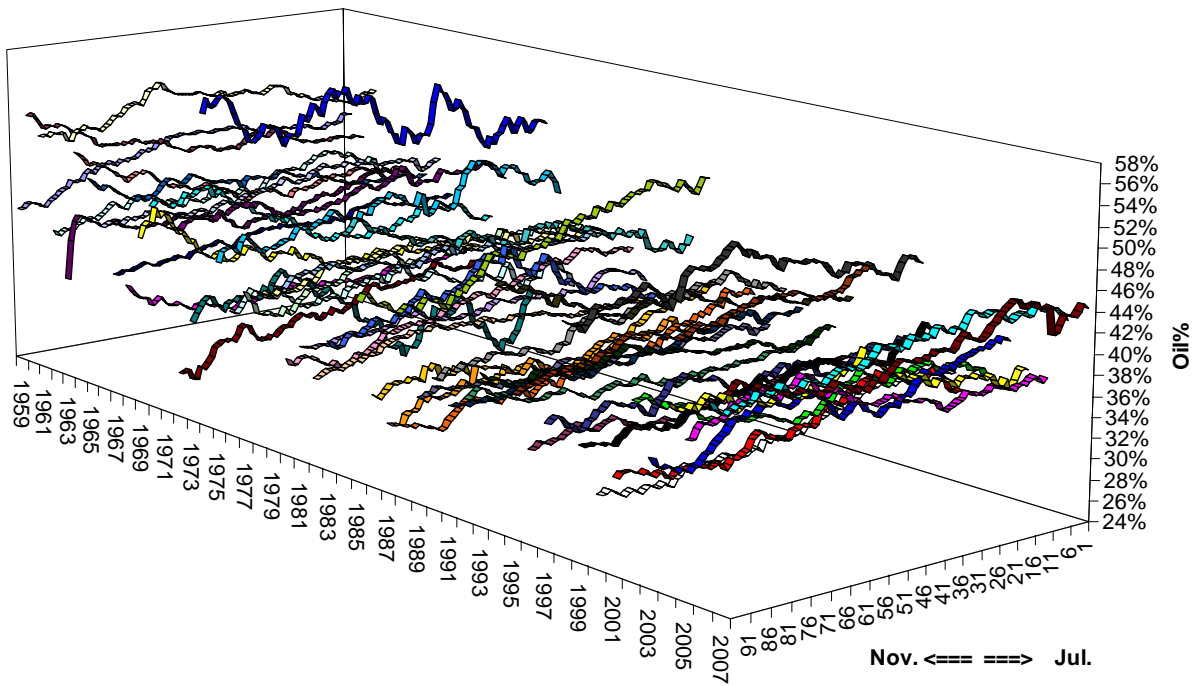
First, there is no consistent in-season trend for the normalized crush spread. As many years have upward trends between July and November as have downward trends. However, the distribution of returns is skewed to the upside. The reason, as is the case for all commodity process spreads, is simple: While any price spike in either soy meal or bean oil cannot create new soybean supplies, any collapse in crush margins will induce oilseed processors to lower throughput. That produces the asymmetric returns seen below.

The Normalized Crush Spread Trade Over The Last 95 Trading Days



We should not expect a similar distribution for the Oil% as the prices for soymeal and beanoil are affected by different market factors. The dominant in-season tendency is for the Oil% to decline into soybeans' November expiration. This suggests commercial beanoil buyers such as food companies do a much better job of covering their forward supply and price requirements than do commercial soymeal buyers such as livestock and poultry feeders. Whether this changes as biodiesel starts to dominate world edible oil demand at the margin is yet to be determined.

The Oil% Trade Over The Last 95 Trading Days



The one thing we can be certain of is any increased use of biodiesel will pull the Oil% higher; this will be offset by any increased demand for corn-based ethanol, which will pull corn prices higher directly and soybean feedstock prices higher indirectly via the soybean/corn spread. Quite simply, this is not your father's crush spread and the only way for grain traders to handle it is to become energy traders as well.