Old McDonald Had A Spread

Civilizations everywhere extol the virtues of farm life and, more important in a modern context, shove vast quantities of welfare payments to agrarians. Much of this is due to collective wistfulness, a sense we have abandoned some idyllic but never-extant golden age. Actually, we all have a tie to agriculture somewhere in our past, for after we started out as hunter-gatherers, best described as a camping trip that never ends, more than 90% of our ancestors settled down to grow their own food as farmers or herders.

The remainder of human history is then a footnote to the sentence; "People leave the land and do not return." Farming is a bone-wearying, high-risk venture with relatively low monetary rewards. Small wonder industrial societies around the world bribe farmers to stay on the land and produce surpluses. The alternatives, a combination of urban subsidies and state marketing boards in the Third World or rigid controls in communist countries, produce permanent shortages, so maybe Congress and its minions in the Department of Agriculture have had the right idea all along.

Great advances in agricultural technology and productivity have been made over the years. We can now raise hogs that Americans of 100 years ago would have regarded as massive freaks of nature; some of you may find that exciting. But no one has figured out how to grow two different crops simultaneously on the same plot of ground. That physical choice creates a set of substitution spreads for traders: The land now devoted to soybeans, for example, is not producing corn or cotton. Those decisions were created by a combination of last year's prices, current growing conditions in the Southern Hemisphere, particularly in Brazil and Argentina, and by the aforementioned agricultural subsidies. They in turn will influence Northern Hemisphere prices, and so on.

The dynamics of agricultural spreading, like those of petroleum market spreading (see *"Step On A Crack,"* October 2004) provide us with stable, technically well-behaved markets wherein technical and fundamental analyses converge. Prior to planting, the inventories (carryover stocks) from previous years are known, as is the likely crop coming in from the other hemisphere. Demand is fairly predictable: Have you ever seen anyone splurge by guzzling soybean oil straight from the jug? And, once crops are planted, no additional supply decisions can be made. That leaves the considerable vagaries of the weather as the major and most uncertain input to the supply/demand balance, and while weather conditions can affect price levels massively, they tend to be more neutral in affecting the relationship between two crops grown in the same region.

Let's examine the various types of grain market spreads and how you can exploit them to make a little hay of your own.

Types of Spreads
While substitution is the easiest spread trade to understand, it is but one of four types of intermarket spread:

- **Process** spreads involve the transformation of one commodity into one or more other commodities. The soybean "crush" spread, the difference between the cost of soybeans and the prices received for the soymeal and beanoil is the only one involving exchange-traded grain and oilseed futures in the U.S. It is somewhat analogous to the petroleum crack spread, but with the important difference that the crusher, unlike the refiner, cannot influence the relative quantities of output. Try though you may, soymeal and beanoil cannot be transformed into one another.

  A long-term history (a special thanks to CRB Infotech for their database) of the soybean crush spread and its relationship to soybean prices is depicted in Chart 1. While soybean prices have never taken out their 1970s highs, the crush spread continued to move higher once China began to enter the global market in the early 1980s. The global climb up the dietary curve meant increased demand for soymeal as a high-protein livestock feed. This trend shows no signs of reversal in the long-term: The crush spread will rise so long as prosperity continues to rise in the Asian export markets.

  As an aside, the standard crush spread with soybeans priced in cents per bushel, soymeal in dollars per ton and beanoil in cents per pound is calculated as:

  $$.11 * BO + .022 * SM - .01 * S$$

**Chart 1: Crushes Move Higher As China Enters Market**
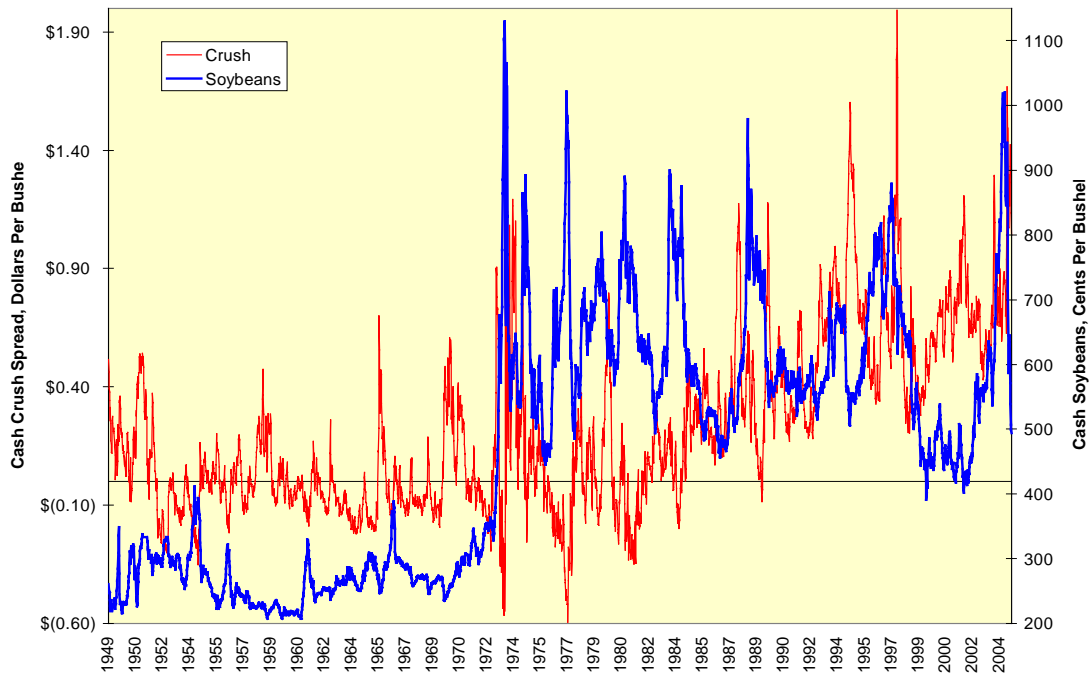
- **Joint product** spreads involve commodities produced together as part of an economic process. The spread between soymeal and beanoil, produced jointly by the soybean crusher, is influenced by the largely unrelated economics of the world fats and oils and feedgrain markets. The former includes canola, palm oil, corn oil, cottonseed and sunseed oil, peanut and safflower oils, amongst others. The latter includes corn, feed wheat, fishmeal and a host of other feedlot goodies you are better off ignoring: Commodities are not pretty.

A long-term history of the beanoil as a percentage of crush value, referred to in shorthand as the Oil%, is depicted in Chart 2. The half-century long downtrend in this spread confirms the observation made above, that soymeal increasingly is the valued component of the mix. Other regions and oils, especially Canada for canola and Malaysia for palm oil, have been able to compete with beanoil. But beanoil is fairly useless as livestock feed, the occasional farm prank notwithstanding, and its relative value has declined accordingly.

The Oil%, using the same price quote conventions as above, is calculated as:

$$(.11 * BO) / (.11 * BO + .022 * SM)$$

Chart 2: Beanoil Losing Value In The Crush
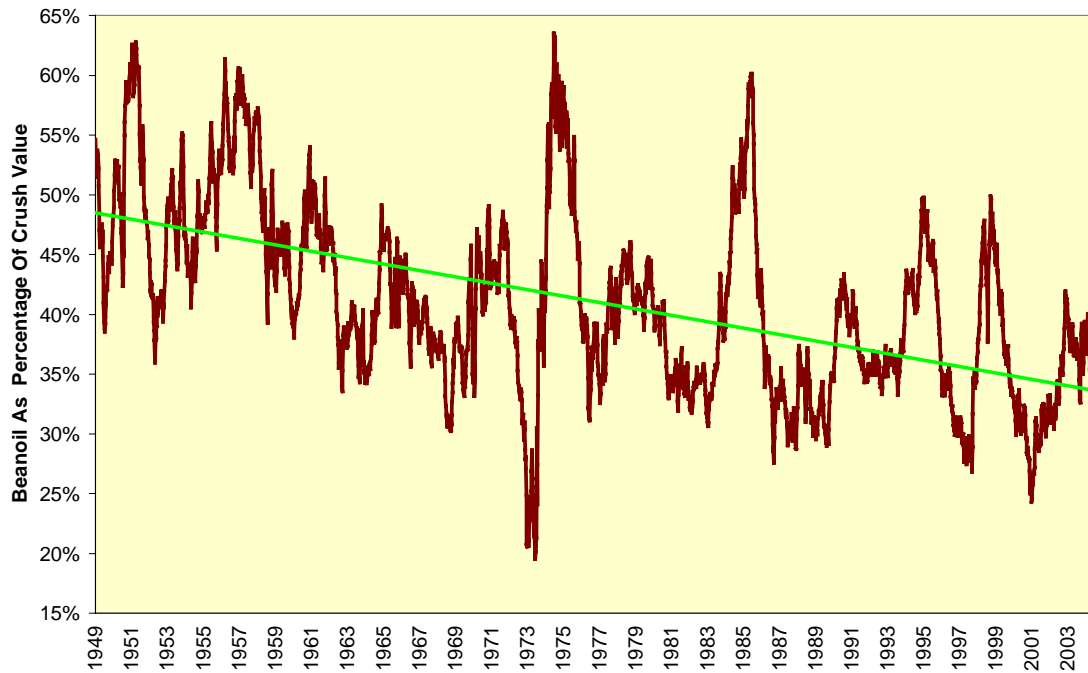
- **Substitution** spreads involve replacing one commodity with another. These spreads are never so simple as they appear as they involve downstream production economics and engineering constraints. The decision to switch between soft red winter wheat (SRW), the basis for the Chicago Board of Trade's wheat contract, and the hard red winter wheat traded principally at the Kansas City Board of Trade (HRW), involves certain costs. Bakers and food processors cannot keep switching back and forth, which creates some interesting long-term patterns in these spreads.

  A long-term history of the Chicago-Kansas City wheat spread is depicted in Chart 3. Over time HRW, the more popular grade in the export market as it is used principally for bread, has increased in value relative to SRW. The trendline is highlighted in green. Running parallel to this trendline are two parallel bands depicting the engineering channel within which the substitution between the two grades of wheat is not made. Once these support/resistance bands are exceeded, the substitution occurs and the market goes running off in the other direction for a long period of time.

Chart 3: Long-Term Wheat Substitution Trends
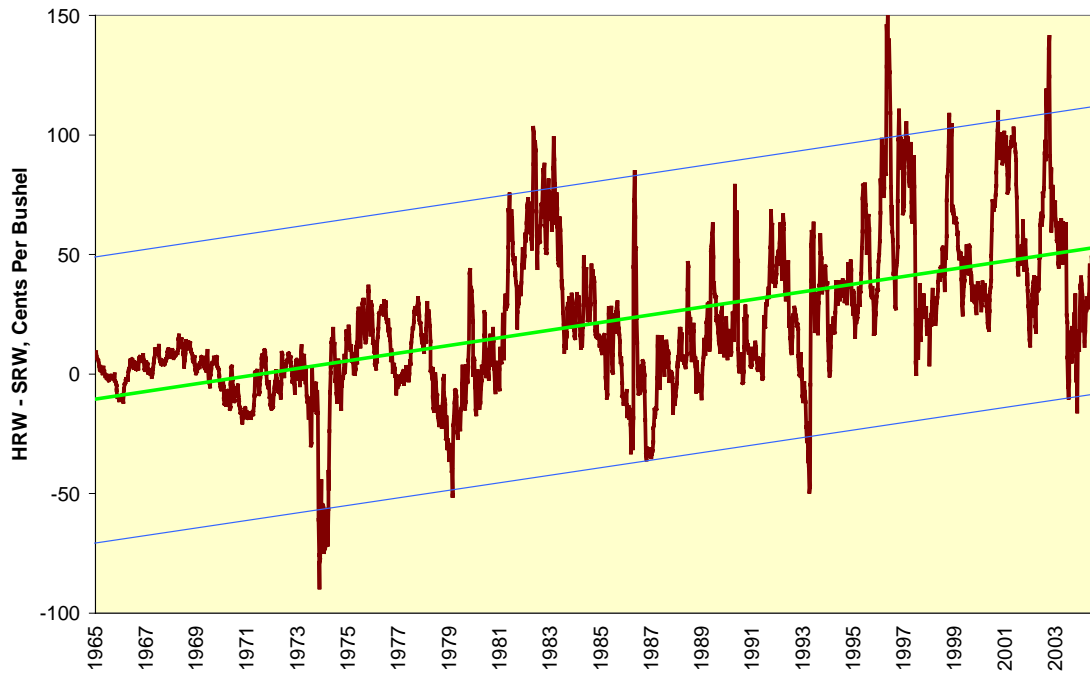
- **Related spreads** are the final classification; these are for commodities that are neither direct substitutes nor joint products. The best example here in the grain complex are the corn spreads, such as the spread between wheat and corn or between corn and soybeans.

  These two corn spreads are depicted in Chart 4 below. Like all related spreads, they have no real trend over time such as seen in the Oil% and no real bounds such as seen in the W-KW spread. However, they are capable of significant jumps, such as seen in the crush spread. Fortunately for us, they trend sufficiently over a short-term trading horizon.
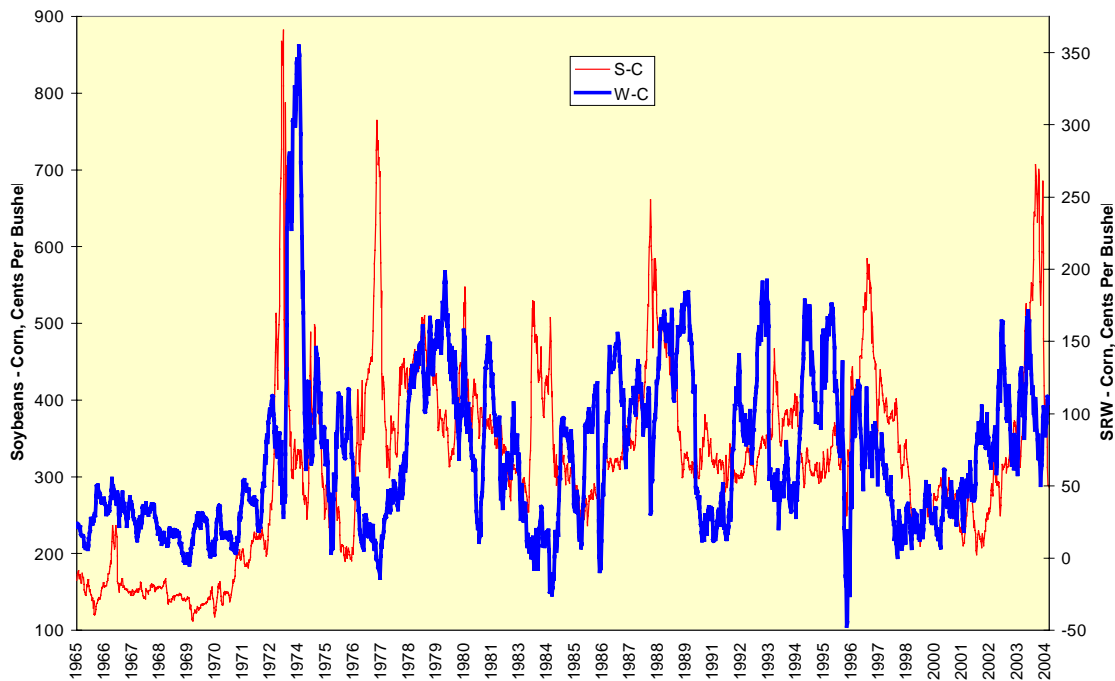
Harvesting Profits

As anyone who has held a long position in soybeans over what was supposed to have been a dry summer weekend can attest, the grain markets are subject to very abrupt reversals and way too many limit moves for their own good. Crop reports, canceled export orders and other grenades get thrown into the mix as well.

Grains, more than any other physical commodity market, get traded fundamentally by people who believe, really believe, that if they just know the location of every bushel in the world market than everything will be fine. Were that only true: The abrupt reversals stand as testimony that the crowd was in error coming into that day.

Why bother with all of this in trying to trade the individual legs of a spread when you simply can trade the spread itself as a higher ratio of signal to noise? As we saw in the case of the crack spreads, all news will affect the legs of a spread more or less equally; the effects are buffered by the net spread relationship. You are now trading a slower-moving set of fundamentals, such as global dietary curves and U.S. exports of HRW rather than the next day's weather report. Which will be more predictable?

The Daily Trade Guide [sidebar?]

All of the factors can be combined into a simple and robust trading matrix, as seen below in a screenshot from the Simons Research, Inc., daily grain report for October 8, 2004.

A total of six intermarket spreads are examined. These include the two corn spreads illustrated above, two wheat substitution spreads, (MW is the Minneapolis Grain Exchange's hard red spring wheat contract) and both the soybean crush and Oil% spreads.

The screen values are adjusted for both the effects of each commodity's forward curve and for the seasonal factors involved in each of the spread markets; these adjustments are not shown in the table above. Each spread is then placed into an unsmoothed fast stochastic (%K on many quote screens) over a selected period. This stochastic produces a trend-following indicator.

A counter-trending indicator is provided in the column entitled "Quadratic Detrending." As a rule of thumb, values greater than 2.00 indicate an overbought condition on the spread, while those below -2.00 indicate oversold conditions. This counter-trending indicator takes you out of positions where a spread may be in an obvious runaway market due to weather or other singular events.

These two indicators are combined in the Stochastic Signal column. A buy signal is generated when the stochastic is greater than 84% and the spread is not overbought. A sell signal is generated when the stochastic is less than 16 percent and the spread is not oversold.

A long position in the spread means buying the first term and selling the second and vice-versa for a short. For multiple commodity spreads such as the crush, a long position means buying the combination of beanoil and soymeal and selling soybeans, and vice-versa for short positions.

Technical Data Bank: Spread Positions

Spread		Value	N-Day Stochastic	Quadratic Detrending	Stochastic Signal
		Corn Spreads			
Dec	W - C	99.75	34.5%	-1.01	None
New	S - C	323.00	77.8%	0.03	None
		Wheat Spreads			
Dec	W - KW	-24.50	19.5%	-1.02	None
Dec	W - MW	-50.50	13.8%	-0.79	Short
		Oilseed Spreads			
New	Crush	0.51	50.7%	-0.35	None
Dec	Oil%	38.8%	6.9%	-2.08	Short

A countertrending indicator is provided by the Quadratic Detrending value; these are the normalized residuals of the adjusted spread against a time sequence and the time sequence squared. The presence of a countertrending indicator is required by the embedded call option structure seen in the crack spreads: You need some governor to prevent you from buying a runaway market or to provide an exit from same.

The location of the current spread point on the Student's T-distribution defines whether the spread is overbought or oversold at present. Using a one-tailed 97.5% T-test, these values generally will be greater or less than ± 2. While the Stochastic column defines a trend, the Quadratic Detrending column defines a countertrend.

It all comes down to the action contained in the Stochastic Signal column. A buy signal is generated when the stochastic is greater than 84% and the T-distribution inverse is less than .975. A sell signal is generated when the stochastic is less than 16% and the T-distribution inverse is greater than 0.025.

A long position in the spread means buying the first item and selling the second, and vice-versa for a short. For multiple-commodity spreads such as the crack, a long position means buying the refined products and selling the crude oil, and vice-versa for short positions.

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