Hilary Till of Premia Capital suggests three approaches for how to benefit from structural opportunities in commodity markets – two based on the statistical properties of commodity markets, and the third based on the shift that commodity markets may be currently undergoing

Trading strategies

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★ When I recently co-edited the book, *Intelligent Commodity Investing* (Till, 2007a), a risk management professional asked me if the title of the book was an oxymoron. This question was posed soon after the Amaranth debacle, so perhaps it is an appropriate one.

However, I believe that one can indeed intelligently invest in the commodity markets. This article identifies three key approaches drawn from *Intelligent Commodity Investing*. The first two are historically profitable approaches that take into consideration the largely mean-reverting properties of commodity prices. The third approach, by contrast, is based on the assumption that we are in the midst of a rare trend shift in prices for some commodity markets.

Term structure: primary driver of return

Over very long time frames, a number of studies have shown how the term structure of a commodity futures curve has been the dominant driver of returns for individual futures contracts. In the past, even if spot commodity prices declined, there was an additional way a commodity investor could have a positive statistical expectation of profit – through the 'roll yield'.

Typically, when there are low inventories for a commodity, its commodity futures curve trades in backwardation, with higher spot prices and prices falling along the curve. This demonstrates that consumers are willing to pay a premium for the immediately deliverable contract relative to deferred-delivery-month contracts.

When a commodity futures contract is in backwardation, an investor has two potential sources of return. Since backwardation typically indicates scarcity, one source of return is being on the correct side of a potential price spike in the commodity by being long at that time.

The other source of return is roll yield. In a backwardated futures market, a futures contract converges (or rolls up) to the spot price. This is the 'roll yield' that a futures investor captures. A bond investor might liken this situation to one of earning 'positive carry'.

Nash & Shrayer (2005) empirically demonstrate how over long periods of time, the accumulation of roll yields, rather than trends in spot prices, has determined the returns from investing in individual commodity futures contracts.

Figure 1 illustrates how, over a 20-year-plus history, the annualised (total) returns (including interest income) from investing in 21 individual commodities have been very linearly related to the average percentage of backwardation for each commodity. The average percentage of backwardation, in turn, is mathematically related to the average roll yield, as covered in Till (2007a).

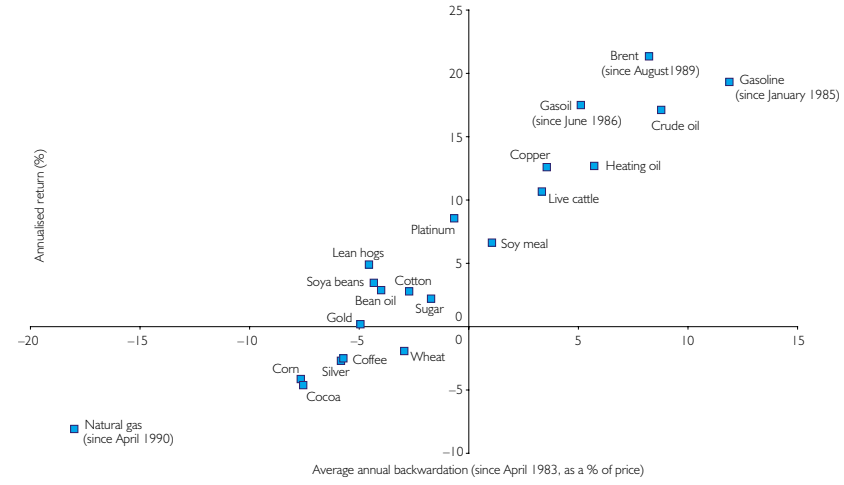
Since the expectation (in the main) has been that spot commodity prices mean-revert to the commodity's cost of production over the long run, spot commodity prices could not have historically been the driver of return. (Instead, the roll yield has had to be the driver of individual commodity futures returns over the long term.)

Note that the Nash & Shrayer results require a 20-year-plus time frame for their results to hold. Most investors may not be this patient. In Feldman & Till (2006) and Till (2007b), we examine how long the time horizon needs to be before roll yields (and backwardation) become the dominant explanatory variable for commodity investment returns. This study is confined to the agricultural futures markets since these markets have continuous data since the late 1940s.

We specifically examine the crop futures markets over the period 1950–2004. We found that roll yield only explains 25% of the variation in futures returns over one-year time horizons and 40% of the variation over two-year time horizons. One must extend the evaluation period to five years, and then at that time horizon, roll yield explains 67% of the variation in futures returns, which is illustrated in figure 2. The significance of these

results is that at least under the time frame and markets studied, if one were to rely on the cumulative effects of roll yield for investment returns in a market that is structurally backwardated, then that investor's time horizon would have needed to be at least five years.

Even a five-year time horizon seems like quite a long time for even the most patient of investors. Are there other opportunities in the commodity markets that rely on mean-reversion and have more reasonable (and shorter) time horizons? The short answer is yes.



F1. Annualised return versus average annual backwardation

Source: Nash and Shrayer (2005)

Relative-value trading opportunities in energy and agriculture

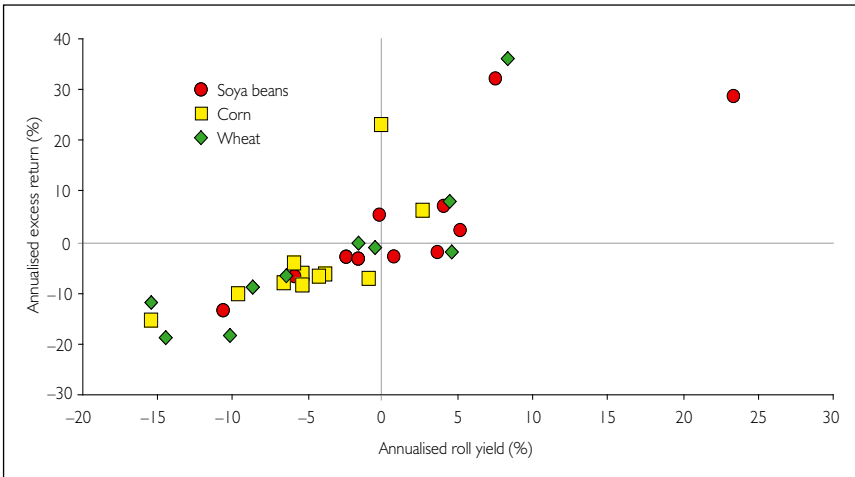
The yearly inventory cycles for most commodities follow a sine-wavelike seasonal pattern. In the agricultural markets, the build-ups and drawdowns of inventory follow the harvest calendar. In the energy markets, the build-ups and drawdowns of inventory follow seasonal demand cycles due to weather, as touched upon in Eagleeye (2007).

The mean-reverting nature of inventory patterns tends to be mirrored, on average, by mean-reversion in related commodity futures spreads, which can potentially be exploited by relative-value trading strategies, be they calendar spreads (for example, July versus December heating oil); processing spreads (for example, crude versus its products); substitution spreads (for example, corn versus wheat); quality spreads (for example, #2 oil versus jet fuel); or location spreads (for example, Brent crude versus West Texas Intermediate crude), as covered by Pringle & Fernandes (2007). Two of Pringle and Fernandes' examples from *Intelligent Commodity Investing* are discussed below.

Propane versus crude – an example

A trader observes that the propane price is on average about 70% of the price of crude oil, but has ranged from about 55% to 130% (as outlined in figure 3). Low ratios usually came in the summer and high ratios in the winter. In October, a trader looks at prices 15 months out and sees that propane is trading at 60% of crude in the October/November/December deliveries. He thinks 60% is a good entry point, especially for the fourth quarter, and that it's likely that the ratio will return to 70% at some time during the next year. When this trade is put on, he will buy propane (via swaps or physicals; futures are not tradable) and sell crude futures in the current ratio, that is, 60%. Thus, it will be an equal dollar spread. For every 1 million gallons of propane, he'll sell 600,000 gallons of crude. When the trade is structured this way, the only risk is that the percentage ratio will change, and the amount of gain or loss will be equal to the percentage change applied to the crude price on exit.

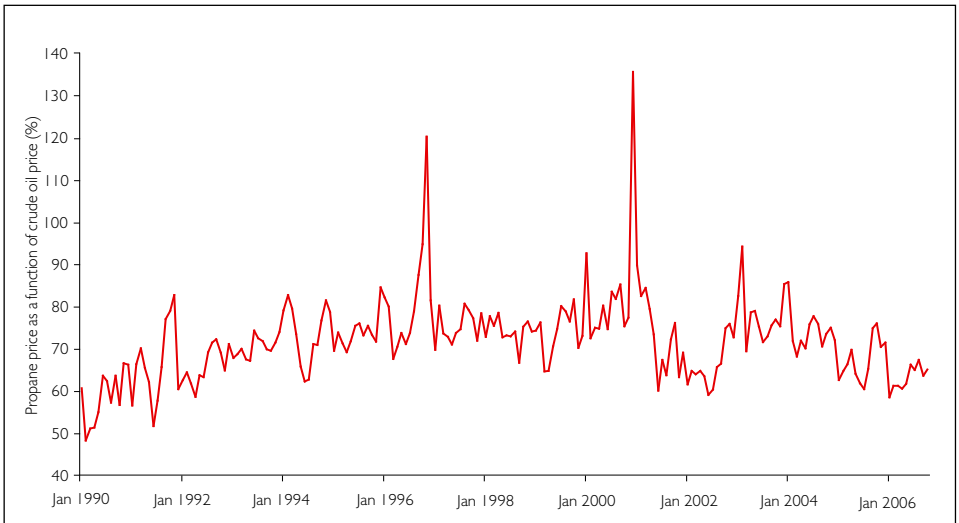
Being short crude (or natural gas) is a wild card these days, so, to avoid event risk, one would add a cost-free



F2. Five-year annualised excess return

Soya bean, corn and wheat futures contracts that trade on the Chicago Board of Trade are shown as a function of five-year annualised roll yield for the period 1950 to 2004.

Source: Till (2007)



F3. Propane v. crude oil *Source: Pringle and Fernandes (2007)*

collar to the crude leg, buying an out-of-the-money (OTM) call and selling an OTM put. The rationale is that a shock to the crude market could send it skyrocketing, while propane, a small and much more domestic market, would languish. The result could be a collapse in the ratio to an extraordinary low, such as 50%. The long crude call will protect against that.

There is the short crude put, though. This risk should be inherently manageable because the cheaper crude is, the higher the ratio of propane to crude tends to be. Thus, one would expect that a weak crude market would push the ratio in their favour, and that the resultant gains would more than offset any losses that were caused by the short crude put.

Hogs versus corn – an example

Of the 220 million acres of row crops planted in the US annually, more than 170 million acres are devoted to growing corn, soya beans and wheat. A majority of these crops will be used or processed for the feeding of livestock. Therefore, the price and profitability of protein has a direct correlation with the price of grains.

When comparing corn (C), which is a major feed component of lean hogs (LH), it can be seen that hogs have rallied in the late fourth quarter/first quarter regardless of the direction of corn, although their price trends are correlated over a six-month horizon.

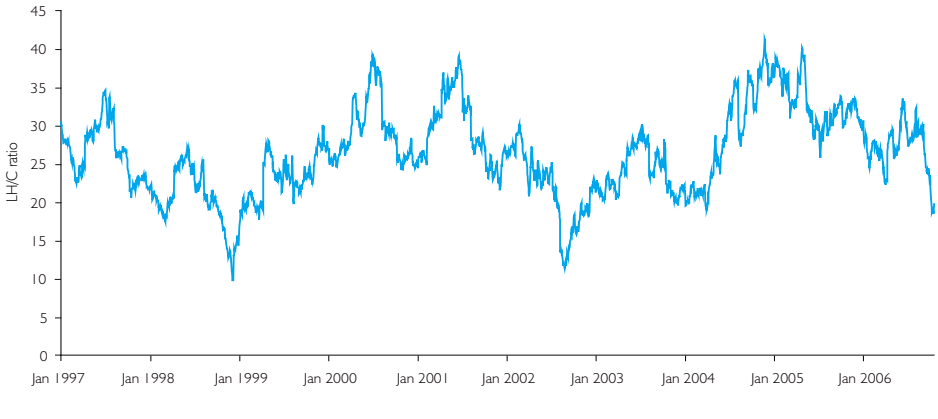
An LH/C ratio below 20 signifies lower forward pork production due to compressed profit margins (see figure 4). Taking the view that protein and pork consumption are fundamentally strong, one potentially good relative-value trade would be to spread LH/C. One would consider timing this trade in combination with the seasonal outperformance of LH to C, scaling into the trade if the ratio remains below 20 in the late fourth quarter.

New World commodity order

The long- and short-horizon investment strategies discussed here take into account the largely mean-reverting nature of commodity prices and relationships. This is understandable given that the history of inflation-adjusted commodity prices has largely been one of secular decline with a great deal of cyclicality around this trend.

Over the long sweep of history, though, there have been exceptions. Perhaps the current era will provide another exception to this long historical trend. For example, the arrival of China on the world economic scene has contributed to the current agri-commodity boom, as covered by Waugh (2007).

Waugh writes that



F4. Corn-to-hogs ratio (LH/C)
A ratio below 20 signifies lower production *Source: Pringle and Fernandes (2007)*

global macro commodity investors need to rotate their assets selectively to ensure maximum yield over time. The synthesis of this view for the years to come is that the marked over-performance of crude oil and energy products has more than drained the figurative investment soil of potential, and that industrial and precious metals will give way to a realignment, if not a reversal of fortunes, in favour of agriculture's instruments.

This will be due to the changing terms of world trade, which is inexorably beginning to favour countries and regions formerly characterised as underdeveloped or at best developing. Some of these countries have now become the low-cost highly competitive darlings of outsourcing and twenty-first century manufacturing; others are becoming the new Olympians of vital foodstuff production. It is only a matter of time before the key commodity inputs that are these countries' essential exports experience the same secular repricing manufactured goods and industrial commodities have undergone for decades, if not generations.

For Waugh (2007), the implication of this global macro view is not only to selectively favour agricultural positions over other commodity markets, but it also has beneficial implications on the relative currency values of commodity exporters versus importers.

Conclusions

Over long time horizons, the term structure of a commodity futures curve has been the dominant driver of return for individual futures contracts. For shorter time horizon opportunities, though, mean-reverting commodity spread trades that have approximately seasonal frequencies have afforded better opportunities.

But history does provide some rare examples of trend shifts upwards in spot commodity prices, and perhaps the current era will be another such rare example for agricultural prices.

In future issues of *Commodity Risk*, we will cover the flip side of these return opportunities, namely how to manage the risk inherent in these dynamic markets.

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This article benefited from editorial assistance from Katherine Farren, who is an associate at Premia Capital.

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