

Disclaimer: This article appeared in the AIMA Journal (Winter 2006), which is published by The Alternative Investment Management Association Limited (AIMA). No quotation or reproduction is permitted without the express written permission of The Alternative Investment Management Association Limited (AIMA) and the author. The content of this article does not necessarily reflect the opinions of the AIMA Membership and AIMA does not accept responsibility for any statements herein.

The Tortoise versus the Hare: The Role of Term Structure versus Spot Price Trends in Determining Commodity Futures Returns¹

By Hilary Till, Premia Capital Management, LLC, and Research Associate, EDHEC Risk and Asset Management Research Centre

In the past, even if *spot* commodity prices declined, a commodity futures investor could still have a positive statistical expectation of profit and that has been through the “roll yield” embedded in certain commodity *futures* contracts.

When a near-month futures contract is trading at a premium to more distant contracts, we say that a commodity futures curve is in “backwardation”. Conversely, when a near-month contract is trading at a discount to more distant contracts, we say that the curve is in “contango”.

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

The other source of return involves a bit more explanation. 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. The spot price can stay constant (or mean revert) but an investor will still earn returns from buying discounted futures contracts, which continuously roll up to the spot price. A bond investor might liken this situation to one of earning “positive carry”. In a contango market, the reverse occurs. An investor continuously locks in losses from futures contracts converging to a lower spot price. Correspondingly, a bond investor might liken this scenario to one of earning “negative carry”.

Over *very* long timeframes, a number of authors have shown how the term structure of a commodity futures curve has been the dominant driver of returns for individual futures contracts.

In particular, Nash and Shryer of Morgan Stanley (2004) have illustrated how over a single 21-year timeframe, the returns of a commodity futures contract have been linearly related to how backwardated the contract has been. Over the period, 1983 to 2004, the commodity futures contracts, that have had the highest returns, are those in which the front-month contract traded at a premium to the deferred-delivery contracts; that is, those contracts that had the highest levels of backwardation had the highest returns. Figure 1 illustrates this empirical result.

In Feldman and Till (2006b), we extend this framework. We find evidence that the power of backwardation to explain commodity futures returns is indeed valid but require that investors have a *long* investment horizon when relying on this indicator, at least for the futures contracts that we studied. Specifically, we examine the soybean, corn, and wheat futures markets over

¹ This article is excerpted from two articles that were previously published in the following publications: the June 2006 issue of Commodities Now, and the June 2006 issue of Global Alternatives magazine. These articles are noted in the References section as Till (2006a) and Till (2006b) respectively.

Disclaimer: This article appeared in the AIMA Journal (Winter 2006), which is published by The Alternative Investment Management Association Limited (AIMA). No quotation or reproduction is permitted without the express written permission of The Alternative Investment Management Association Limited (AIMA) and the author. The content of this article does not necessarily reflect the opinions of the AIMA Membership and AIMA does not accept responsibility for any statements herein.

the period, 1950 to 2004. We find that a contract's average level of backwardation has only explained 24% of the variation in futures returns over 1-year timeframes and 39% of variation over 2-year timeframes. One must extend the evaluation period to five years and then at that time horizon, average levels of backwardation have explained 64% of the variation in the returns of these futures contracts. Figure 2 illustrates this result.

Our results show the cumulative effects of the slight short-term predictability of a slow-moving variable over long time horizons, paraphrasing Cochrane (1999).

While we found that backwardation has been the driver of returns *over long time horizons* for three futures contracts, there is another noteworthy feature of these results. While normally over five-year periods, the futures contract's curve shape has been the driver of returns, there is one exception and that is the 1970-to-1974 period. These are the data points in Figure 2 that do not fit the nearly linear trend-lines of annualised returns as a function of average backwardation.

What this means for an investor is that there can be an additional fundamental rationale for a long-term, passive investment in a commodity futures contract *besides* predicting structural backwardation for the contract. The second rationale would be to predict that the factors are in place to repeat the 1970-to-1974 experience of a rare trend shift in prices.

Now obviously one needs to be very careful about predicting trend shifts in asset prices. Grantham (2005) notes that his firm has completed research on "30 completed [asset price] bubbles ... all of which came back to the pre-existing trend". But, he states, "of these, we now believe 29 were genuine bubbles and one - oil - was a paradigm shift ..." that occurred in 1973. Grantham, a dedicated mean-reverter, who underweighted Japanese equities in the late 1980s and later underweighted U.S. technology stocks in the late 1990s, is pausing in calling for oil to mean-revert from its present levels at this time. Even if oil becomes \$80 per barrel, "given the unique features of oil, we cannot be sure it has not ratcheted up again with another trend shift".

One challenging aspect of investing in oil futures at this time is that they appear to have shifted into "structural contango". Historically, the behaviour of oil prices has been one of "structural backwardation", consistent with crude oil inventories generally being scarce.

That crude oil futures have shifted into structural contango seems to contradict the tightness that is implied by this commodity's high spot price. What has changed?

One theory from a prominent hedge fund is that the true inventories for crude oil should be represented as above-ground stocks *plus* excess capacity. Historically, the markets could tolerate relatively low oil inventories because there was sufficient swing capacity that could be brought on stream relatively quickly in the case of any supply disruption. This excess supply cushion has dropped to sufficiently low levels that there have been two market responses; (1) there have been continuously high spot prices to encourage either consumer conservation or the development of alternative energy supplies and; (2) the market has undertaken precautionary stock building, which has led to the steep contangos that the crude oil market has been experiencing.

Stuart of UBS (2006) has examined the predicted supply and demand growth through 2010 and it appears that on trend there will be no meaningful increase in oil spare capacity over the next four years.

Disclaimer: This article appeared in the AIMA Journal (Winter 2006), which is published by The Alternative Investment Management Association Limited (AIMA). No quotation or reproduction is permitted without the express written permission of The Alternative Investment Management Association Limited (AIMA) and the author. The content of this article does not necessarily reflect the opinions of the AIMA Membership and AIMA does not accept responsibility for any statements herein.

The implication of this structural change in the oil markets is that the returns to energy-focused commodity investments could become ever more long-option-like. The investor will pay away option-like *premia* in the form of negative carry from the persistent contango in the oil markets but will simultaneously be positioned for periodic (and entirely unpredictable) price spikes *until* an adequate supply cushion re-emerges in the oil markets.

That said, as Murti *et al.* (2005) predict, one would expect that eventually a supply cushion will re-emerge, either through behavioural changes on the part of consumers *or* through new infrastructure finally being constructed by producers. These changes may not occur until the end of the decade, given the very long lead time for large-scale energy projects. It is at that point one may see oil spot-prices dramatically mean-reverting, which would be consistent with the expectation that a futures curve signal is only useful at *very* long investment horizons.

References

Cochrane, John, 1999, "New Facts in Finance", *Economic Perspectives*, Federal Reserve Board of Chicago, Third Quarter, pp. 36-58.

Feldman, Barry and Hilary Till, 2006a, "Separating the Wheat from the Chaff: Backwardation as the Long-Term Driver of Commodity Futures Performance: Evidence from Soy, Corn and Wheat Futures Markets from 1950 to 2004", *EDHEC-Risk Publication* & Premia Capital and Prism Analytics White Paper.

Feldman, Barry and Hilary Till, 2006b, "Backwardation and Commodity Futures Performance: Evidence from Evolving Agricultural Futures Markets", forthcoming *Journal of Alternative Investments*.

Grantham, Jeremy, 2005, "GMO Quarterly Letter", July.

Murti, Arjun N., Brian Singer, Luis Ahn, Jonathan Stein, Ashwin Panjabi and Zachary Podolsky, 2005, "Oil Bull Market in the Early Part of its Middle Phase", *Goldman Sachs Global Investment Research*, 12 December.

Nash, Daniel and Boris Shrayer, 2004, "Morgan Stanley Presentation", IQPC Conference on Portfolio Diversification with Commodity Assets. London, 27 May.

Stuart, Jon, 2006, "The Fundamentally Bullish Case for Oil Stretches Through 2008, At Least", UBS Securities Presentation, April.

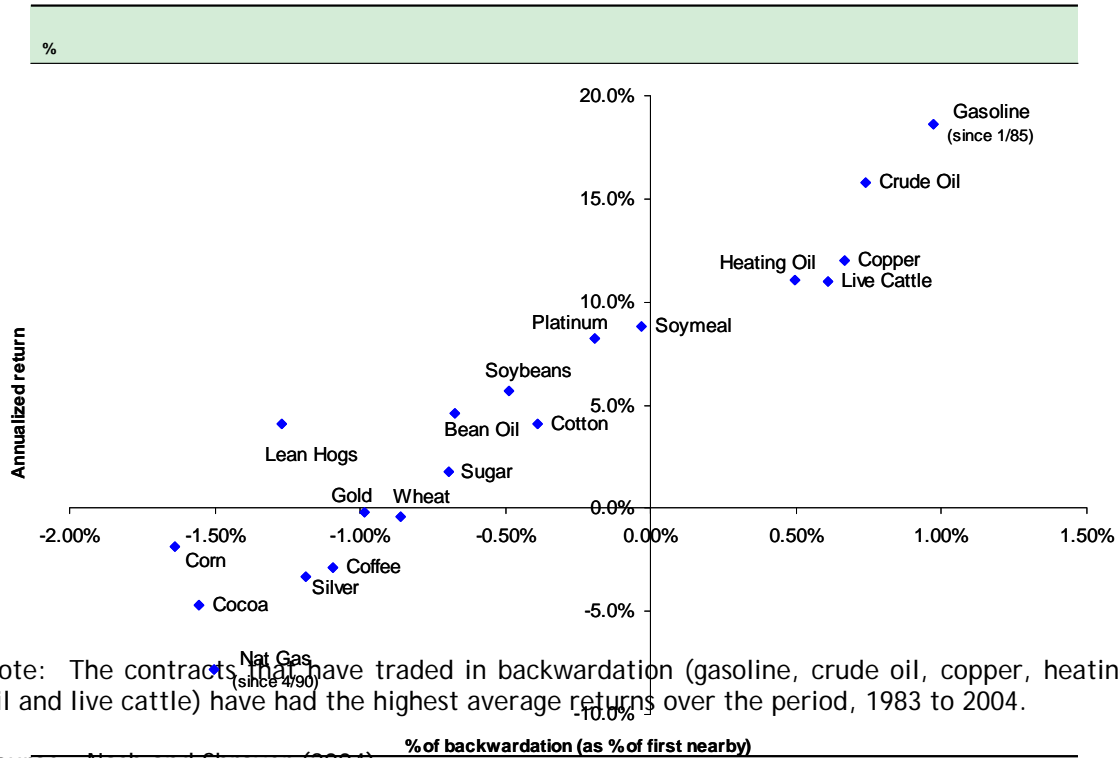
Till, Hilary, 2006a, "Structural Sources of Return & Risk in Commodity Futures Investments", *Commodities Now*, June 2006, pp. 57-65.

Till, Hilary, 2006b, "What the Future Holds for Commodities", *Global Alternatives Magazine*, June, pp. 39-40.

Disclaimer: This article appeared in the AIMA Journal (Winter 2006), which is published by The Alternative Investment Management Association Limited (AIMA). No quotation or reproduction is permitted without the express written permission of The Alternative Investment Management Association Limited (AIMA) and the author. The content of this article does not necessarily reflect the opinions of the AIMA Membership and AIMA does not accept responsibility for any statements herein.

Figure 1

Annualised Total Return vs. Average Backwardation
April 1983 to April 2004



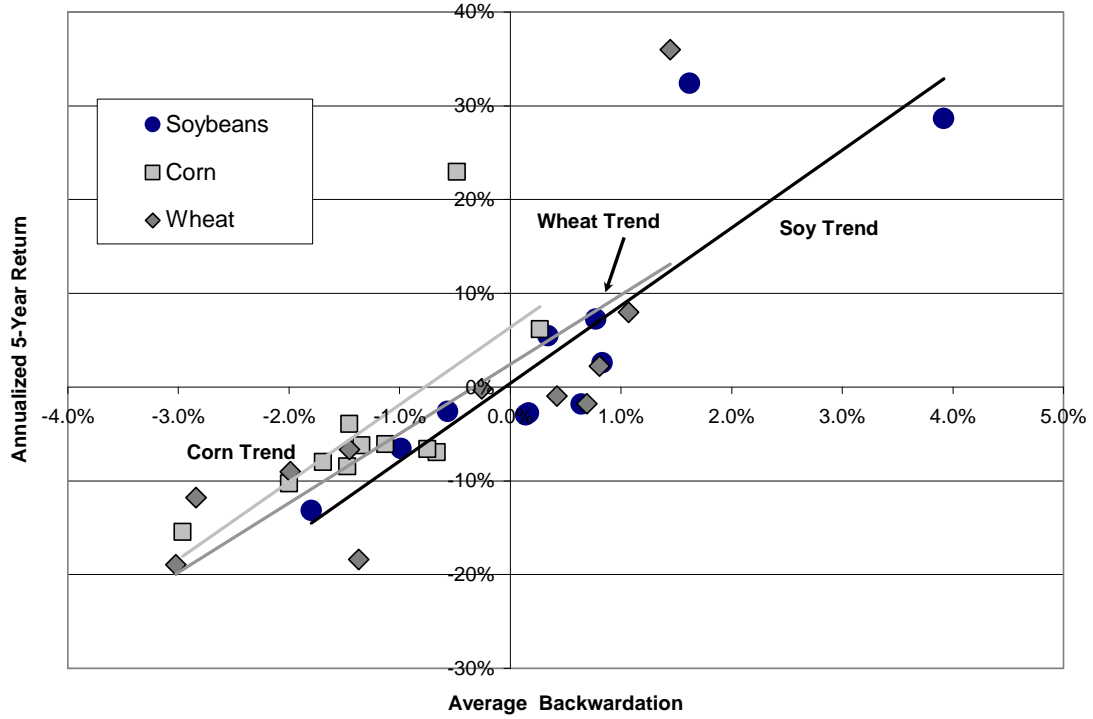
Note: The contracts that have traded in backwardation (gasoline, crude oil, copper, heating oil and live cattle) have had the highest average returns over the period, 1983 to 2004.

Source: Nash and Shrayar (2004).

Disclaimer: This article appeared in the AIMA Journal (Winter 2006), which is published by The Alternative Investment Management Association Limited (AIMA). No quotation or reproduction is permitted without the express written permission of The Alternative Investment Management Association Limited (AIMA) and the author. The content of this article does not necessarily reflect the opinions of the AIMA Membership and AIMA does not accept responsibility for any statements herein.

Figure 2

Five-Year Annualised Excess Return versus
Average Backwardation
1950 to 2004



Source: Feldman and Till (2006a).