Commodities at the Cross-Roads: Where to Now?

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Performance Review
By now it is well known that commodities have had superior performance over the past four years. Figure 1 reviews just how superior that performance has been: from December 2001 through February 2006, the Goldman Sachs Commodity Index (GSCI) has returned 20.9% per year while the S&P 500 has returned a more modest 4.5% per year.

Given these returns, commodity investing has become a sign of sophistication. Commodities can give “turbo returns if things go wrong for equities and bond markets,” stated the chief investment officer of a large British pension plan, as quoted in Rees (2006).

What Can Investors Expect Now?
The positive performance of commodities has largely been due to the following two factors: (1) adverse supply shocks resulting from the aging energy infrastructure in the US and Europe, and (2) expanding demand, particularly from China, as discussed in Till and Eagleeye (2005).

But while it is useful to review the past performance of commodities, investors are most concerned about what to expect going forward. And unfortunately, one cannot look in the rear-view mirror to see what is coming up ahead. In the following, we will review the drivers of commodity returns along with some observations on what the future may hold.

Term Structure of Commodities Futures Contracts
The history of inflation-adjusted commodity prices has largely been one of secular decline with a great deal of cyclicality around this trend. Until very recently, commodity investments could not rely on a commodity boom for profitability and instead had to take into account the largely mean-reverting nature of spot commodity prices.

In the past, even if spot commodity prices declined, there was an additional way that a commodity investor could have a positive statistical expectation of profit, and that was through the “roll yield” embedded in certain commodity futures contracts. In case the reader finds concepts like the “term structure of a commodity futures contract” and “roll yield” esoteric, these concepts are explained below.

By term structure, we mean one should examine the relative price differences of futures contracts across delivery months. When a near-month 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,” as explained in Till (2000).

Typically when there are low inventories for a commodity, its commodity futures contract trades in backwardation: 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 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, but an investor will still earn returns from buying discounted futures contracts, which continuously roll up to the constant 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.”
A number of authors have shown how, the term structure of a commodity futures curve has been the dominant driver of returns in futures investing. In other words, trends in the spot price of a commodity have generally not been a meaningful driver of returns over long periods of time.

In particular, Nash and Shrayer 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. This empirical observation is shown in Figure 2. 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. Correspondingly, the contracts that have had the most negative results are those that typically traded at a discount to the deferred-delivery contracts; again, those contracts that had the highest levels of contango on average had the lowest returns.

More recently, Feldman and Till (2006) extend the framework originated by Nash of Morgan Stanley. Feldman and Till find evidence that the power of backwardation to explain commodity futures returns is indeed valid, but requires the investor to have a long investment time horizon when relying on this indicator. Specifically, Feldman and Till examine the soybean, corn, and wheat futures markets over the period, 1950 to 2004. They find that a contract’s average level of backwardation only explains 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 explain 64% of the variation in futures returns. Figure 3 illustrates the latter result. Figure 4 provides a related analysis: this graph shows that over five-year time horizons, the relationship of annualized return to a contract’s average-time-in-backwardation is again highly linear.

**Excessive Monetary Stimulus: The 1970’s Revisited**

While Feldman and Till find that backwardation has been a driver of returns over long time horizons for three agricultural futures markets, there is another noteworthy feature of their historical results. While normally over five-year periods, an agricultural futures contract’s curve shape has been the driver of returns, there is one exception, and that is the period 1970-to-1974. These are the data points in Figure 4 that do not fit the nearly linear trend-lines of annualized 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. For example, Howell of Schroders (2005) points out how excessive monetary stimulus had contributed to the high returns of commodities in the past. Specifically, Howell notes that negative real interest rates in the 1970’s contributed to a commodity boom at the time. And real short-term interest rates had become negative in the United States and in China during early 2005 as shown in Figure 5. Further, Roach of Morgan Stanley (2006) discusses the current economic environment as a “super liquidity cycle,” which is pushing the “Asset Economy to its limit,” of which one manifestation is the boom in prices of certain commodities.

**Long-Options-Like Profile: Inadequate Spare Capacity in Crude Oil**

Because it is well established that curve shape has been the dominant driver of historical commodity futures returns, commodity investors’ focus on the term structure of commodity futures contracts has intensified. For example, writes Morrison (2006), “The [current] contango in the crude futures markets, West Texas Intermediate and Brent, have a big impact on the commodity indices. Together they represent 45 per cent of the GSCI.”

Historically, crude oil futures contracts have typically traded in backwardation, and this has been a reliable indicator of scarcity in this market. In the past 12 months, though, market participants have witnessed a surprising contradiction: crude oil futures prices have rallied to record highs while the futures curve shape has traded in persistent contango.
It appears that there has been a structural change in the crude oil markets.

One significant change in the oil markets has been the recent reduction in spare capacity in the global production of oil. This is illustrated in Figure 6 by Schwab of AIG Financial Products (2006). In the past when there was significant spare capacity, it was acceptable for refineries to hold minimal stocks of oil because there was a safety valve of swing capacity that could be drawn upon during any disruption in the oil markets. This supply cushion is currently not present. As a result, there has been a large increase in precautionary stock building, leading to a persistent contango in the crude oil futures markets.

In the absence of oil producers building up a spare capacity cushion and in the absence of alternative energy sources effectively replacing oil usage, the only lever to eventually balance supply and demand is demand destruction, as reasoned by Murti et al. of Goldman Sachs (2005a). The Goldman analysts examine the experience of the late 1970’s and early 1980’s to see what price spikes are required to create demand destruction and refer to their predictions as a "super spike" range.

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 an option-like premium in the form of the 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 reemerges in the oil markets.

That said, as Murti et al. (2005b) predict, one would expect that eventually a supply cushion will reemerge, either through behavioral 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 confirm Feldman and Till’s study that a curve indicator can be expected to be reliable only at very long timeframes.

In the meantime, until excess capacity in the oil markets is built up again, oil markets may be in continuous crisis, as predicted by Fusaro of Global Change Associates (2005), resulting in a "major bull market (that is) sustainable for ... years."
References


Data Source: The Bloomberg.

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

Figure 3
Five-Year Annualized Excess Return vs.
Average Backwardation
1950 to 2004


Figure 4
Five-Year Annualized Excess Return vs.
Average Time-in-Backwardation
1950 to 2004

Figure 5

Excessive Monetary Stimulus

Source: Howell (2005), which was derived from an analysis by Geoff Blanning of Schroders Alternative Investments.

Figure 6

World Oil Spare Production Capacity

Author’s Notes:
- The 2005 and 2006 figures are projected.
- Spare capacity hit its lowest level in 30 years in 2004; little increase in 2006.

Author’s Data Sources:
- History: EIA.
- Projections: Short-Term Energy Outlook, June 2005.