This article was originally published by Opalesque Futures Intelligence (Issue #5, April 7th 2009) and is a synopsis of the paper : "Term Structure and Roll Yield: Not Your Father's Backwardation"

Is "Roll Yield" a Fictional Return?

This article is an extract from "Term Structure and Roll Yield: Not Your Father's Backwardation," a paper by Michael "Mack" Frankfurter, managing director and co-founder of Cervino Capital Management and chief investment strategist of Managed Account Research Inc. Mr. Frankfurter will continue this discussion in future articles.

Term Structure and Roll Yield

Question: if something is stated repeatedly as fact, does that make it necessarily true? We no longer believe the sun circles the earth, but that idea was once conventional wisdom.

A similar issue faces investors who use passive commodity indexes. In a recent Financial Times story, "Steep 'contango' forces traders to adapt commodities plans", we are told that investors in commodity index products "obtain a separate return, known as the roll yield, as they shift their positions each month from the expiring futures contract into the following month." This idea is so commonly asserted that it is accepted as fact—but is it?

The problem is that empirical tests using a variety of models have produced inconsistent conclusions as to whether there is in fact positive expected returns from speculating in the futures market. This is vexing to financial institutions who sell products structured around commodity benchmarks such as the S&P GSCI or DJ-AIG, and who need to "market" a structural source of return in what is essentially a zero-sum game.

Notably, ten years ago mainstream thinking about commodities was largely negative. Thomas Schneeweis and Richard Spurgin in their 1996 paper, "Multi-Factor Models in Managed Futures", stated that the low level of investment in managed futures was due to the fact that investors required both a theoretical basis and supporting empirical results.1 In other words, prevailing wisdom at the time was against speculation in commodities.

The industry's marketing solution came in the form of a series of studies over the past decade of which the most cited is "Facts and Fantasies about Commodity Futures" written by Gary B. Gorton and K. Geert Rouwenhorst, two Yale University

academics.2 After their paper was referenced by Jim Rogers in his book Hot Commodities, the concept and theory of the roll yield became well established in the investor mindset.

Our working paper “Is Managed Futures an Asset Class; The Search for the Beta of Commodity Futures” nonetheless takes issue with Gorton and Rouwenhorst's conclusions.3

To begin with, the roll yield is derived from a simplified definition of backwardation and contango based on what Hilary Till, co-editor of Intelligent Commodity Investing, describes as the “term structure of the futures price curve.” Nowadays, backwardation is commonly defined as conditions when “the futures price is below the current spot price” and contango as conditions when “the futures price is above the current spot price.”

However, this paradigm is not in line with the original definition of normal backwardation as described by John Maynard Keynes (1923, 1930), and related phenomena identified by Nicholas Kaldor (1939) and Holbrook Working (1948, 1949).4 Classically, backwardation and contango correlate the futures price to the “expected future spot price,” which is an unknown, to be discovered in the future, at the time the futures converges with the spot.

This difference in assumptions is not insignificant. The conundrum is that for every buyer of a commodity futures contract there is a seller—sine qua non, there is no intrinsic value in forward contracts. They are simply agreements which commit delivery of an asset at some place/point in time. So how does rolling contracts yield positive expected returns?

Rolling the Futures Contract Backward

Futures and forward contracts, unlike securities, are instruments with a finite life and terminate on pre-specified dates when the futures contract converges with the spot price. At that point the spot price is discovered and delivery of the underlying cash commodity is made between commercial participants.

A wheat futures contract, for example, has delivery contracts for March, May, July, September and December. For this reason, and as a matter of practice, most speculators do not allow their positions to enter the delivery period, and a perpetual long futures position requires a trader to “roll the contract” from one contract month to the next.

A close look at the studies written by proponents of the roll yield reveals use of a model or algorithm that results in a fictional trade. Rather than rolling the futures contract forward, they in effect roll the futures contract backward to provide “proof”

for their thesis. This is facilitated with the assumption that the “expected future spot price” is a pre-determined static constant, which it is not.

As a real world example, let's assume that a trader goes long a March futures contract at $100. The trader subsequently rolls that contract in sixty days by selling it at $120, and simultaneously reenters the long position via a July futures contract at $121. Another sixty days later the trader exits the position altogether by liquidating the July contract at $111.

The long March futures contract trade results in a $20 realized gain and the long July futures contract trade results in a $10 realized loss. Using a simple method for calculating rate-of-return of an investment, the net gain of $10 is divided into the original $100 March futures contract price, resulting in a 10% return. This is straightforward and logical.

By contrast, the model for calculating the roll yield is complicated and arguably illogical. The following example is based on formulas conventionally used by researchers to calculate roll yield as documented by Till.[5]

COMMODITY RETURN SOURCES

* Spot Return
Gain or loss from changes in the underlying spot prices. When the spot price of the commodity rises, the value of the futures contract tends to rise.

* Collateral Return
Interest on the deposit required to trade derivatives.

* Strategy Return
Some analysts refer to a return derived from how one weights and rebalances the components of a commodity index.

* Roll Return
Generated by owning a futures contract for a time, and subsequently selling that contract and uying a longer dated contract on the same commodity.

Let's assume a trader goes long a March futures contract at $100, and then sixty days later sells the March contract at $120. The net gain of $20 is then divided into the original investment of $100 resulting in a 20% return. This is referred to as the “spot return.”

Now at the time the trader purchased the March futures contract, assume that the July futures contract was trading at $90. The algorithm for calculating the roll yield then subtracts this $90 July futures contract price in the past from the current $120

March contract liquidation price. This is called “excess return” and the net gain of $30 is then divided into the $90 July contract price for a 33% return.6

The “arithmetic roll yield” is calculated by subtracting the spot return of 20% from the excess return of 33%, which results in a supposed 13% return to the investor. Obviously, this mathematical trick mixes up past and present prices, and creates roll yield out of an imaginary transaction that is impossible to duplicate in the real world.

Admittedly, models are an abstraction from reality. Expecting such models to be exactly right is unreasonable, and it is generally understood that neoclassical economic models have inherent limitations. Ergo, we must be careful not to follow models over a cliff.

As noted by Robert Greer in his paper “What is an Asset Class, Anyway?”, the inherent problem with investing in commodities as an “asset class” is that they are not capital assets but instead consumable, transformable [and perishable] assets with unique attributes.7

By definition, any commodity trading facilitated for financial rather than commercial reasons is speculation. Further, derivatives are risk management tools, fundamentally different from the “rising tide raises all ships” concept of the capital formation markets.

Investors should recognize that commodity markets are more complex than what many proponents would have you believe. In truth, the “zero-sum conundrum” makes it impossible to isolate a persistent source of return without that source eventually slipping away.

NOTES AND REFERENCES

1 Schneeweis, Thomas; Spurgin, Richard (1996). “Multi-Factor Models in Managed Futures, Hedge Fund and Mutual Fund Return Estimation” University of Massachusetts, School of Management

2 Gorton, G.; Rouwenhorst, K.G. (2006). “Facts and Fantasies about Commodities Futures” *Financial Analysts Journal*, 62(2), pp. 47-68.

3 Frankfurter, Mack; Accomazzo, Davide (2007). “Is Managed Futures an Asset Class? The Search for the Beta of Commodity Futures” December 2007. Available at SSRN: http://ssrn.com/abstract=1029243

4 Kaldor, Nicholas (1939). “Speculation and Economic Stability” *Review of Economic Studies* 7, No. 1, October, pp. 1-27.
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Guardian, and *A Treatise on Money*, Vol. II: *The Applied Theory of Money*, London: Macmillan, 1930, pp. 142-147.
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5 Till, Hilary (2007). “Part I of A Long-Term Perspective on Commodity Futures Returns: Review of the Historical Literature” from *Intelligent Commodity Investing*, (Till, and Eagleeye, Ed.), Published by Risk Books, a Division of Incisive Financial Publishing, Ltd., pp. 39-82. See pages 73-78 for the calculation of roll yield.

6 Hilary Till cites the following with respect to excess returns: “As explained by Shimko and Masters, the convention in calculating excess returns is to treat the futures investment as being fully collateralized based on the second-nearby price.” D. Shimko and B. Masters, 1994, “The JPMCI—A Commodity Benchmark.” JP Morgan Securities Inc. Commodities Derivatives Research, 20 September.

7 Greer, Robert J. (1997). “What is an Asset Class, Anyway?” *Journal of Portfolio Management*, Winter, pp. 86-91.