What Are the Sources of Return for CTAs and Commodity Indices? A Brief Survey of Relevant Research

Hilary Till
Solich Scholar, J.P. Morgan Center for Commodities, University of Colorado Denver Business School; and Contributing Editor, *Global Commodities Applied Research Digest*

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This survey paper discusses the (potential) structural sources of return for both CTAs and commodity indices based on a review of empirical research from both academics and practitioners. The paper specifically covers (a) the long-term return sources for both managed futures programs and for commodity indices; (b) the investor expectations and the portfolio context for futures strategies; and (c) how to benchmark these strategies.

This digest article will mainly draw from the survey paper's summary of return sources for futures programs. Accordingly, one can find strong evidence – historically at least – for there being persistent returns in futures programs due to momentum, roll yield, and also due to rebalancing. This is the case across asset classes, including in commodity futures programs.

Return Sources

Momentum

A 2012 AQR Capital Management white paper discussed how persistent momentum profits have been across time and across asset classes. This assertion is illustrated in Figure 1 on the next page. The AQR authors theorized that "price trends exist in part due to longstanding behavioral biases exhibited by investors, such as anchoring and herding, as well as the trading activity of non-profit seeking participants, such as central banks and corporate hedging programs."

Figure 1

Hypothetical Performance of Time Series Momentum

Strategy performance after simulated transaction costs both gross and net of hypothetical 2-and-20 fees.

Time Period	Gross of Fee Returns (Annualized)	Net of 2/20 Fee Returns (Annualized)	Realized Volatility (Annualized)	Sharpe Ratio, Net of Fees	Correlation to S&P 500 Returns	Correlation to US 10-year Bond Returns
Full Sample:						
Jan 1903 - June 2012	20.0%	14.3%	9.9%	1.00	-0.05	-0.05
By Decade:						
Jan 1903 - Dec 1912	18.8%	13.4%	10.1%	0.84	-0.30	-0.59
Jan 1913 - Dec 1922	17.1%	11.9%	10.4%	0.70	-0.12	-0.11
Jan 1923 - Dec 1932	17.1%	11.9%	9.7%	0.92	-0.07	0.10
Jan 1933 - Dec 1942	9.7%	6.0%	9.2%	0.66	0.00	0.55
Jan 1943 - Dec 1952	19.4%	13.7%	11.7%	1.08	0.21	0.22
Jan 1953 - Dec 1962	24.8%	18.4%	10.0%	1.51	0.21	-0.18
Jan 1963 - Dec 1972	26.9%	19.6%	9.2%	1.42	-0.14	-0.35
Jan 1973 - Dec 1982	40.3%	30.3%	9.2%	1.89	-0.19	-0.40
Jan 1983 - Dec 1992	17.8%	12.5%	9.4%	0.53	0.15	0.13
Jan 1993 - Dec 2002	19.3%	13.6%	8.4%	1.04	-0.21	0.32
Jan 2003 - June 2012	11.4%	7.5%	9.7%	0.61	-0.22	0.20

Source: Hurst *et al.* (2012), Exhibit 1.

Roll Yield

In addition to momentum, the empirical literature also documents that "roll yield" can be considered a structural source of return, at least over long periods of time. A 2014 Campbell & Company white paper attempted to demystify "roll yield." According to the white paper, futures returns "and spot returns on the same underlying asset often diverge, and the magnitude of this divergence is known as the futures 'roll yield.'"

Excerpting further from the Campbell & Company white paper: "The cumulative impact of roll yield can be quite significant, in some cases being similar in magnitude to the entire gain or loss an investor experiences over the lifetime of a trade." In summary, "the roll yield represents the net benefit or cost of owning the underlying asset beyond moves in the spot price itself." "[T]he spot return and roll yield together comprise the total return experienced by an investor (net of financing costs.)" Figure 2 on the next page shows the "benefits and costs relevant to selected asset classes." For each asset class, the roll yield can be arrived at by deducting the cost of holding the asset from its benefit.

This net benefit or net cost shows up in an asset class' futures curve. If there is a net benefit to holding the commodity, then a futures contract will be priced at a discount to the asset class' spot price, reflecting this benefit. Correspondingly, if there is a net cost to holding the commodity, then a futures contract will be priced at a premium to the asset class' spot price, reflecting this cost.

Returning to the table in Figure 2, which shows the benefits and costs of holding selected asset classes, "[f]or financial assets, these represent actual cash flows, while other assets may have non-cash flow costs and benefits [such as] the convenience yield in the case of commodities." The "convenience yield [in turn] reflects the benefits to holding a physical commodity, which tends to be more valuable when inventories are low or shortages are expected."

Figure 2

Benefits and Costs of Holding Selected Asset Classes

Asset Class	Benefits	Costs
Bonds	Current Yield (Bond Coupon) [1]	Financing Rate
Currencies	Foreign Deposit Rate	Local Deposit Rate
Stocks	Dividend Yield	Financing Rate
Volatility	Hedging Against Increases in Volatility*	Insurance Premium*
Commodities	Convenience Yield*	Storage; Transport; Insurance; Financing Rate

**Non-cash flow terms*

[1] "In fixed income markets, there is an additional component to returns called the yield curve 'rolldown' (unrelated to futures roll yield) which occurs over time as the bond cash flows experience different points along the yield curve."

Source: Campbell & Company, (2014), Exhibit 3.

For commodity traders, grasping the importance of the convenience yield is quite important. Roll yield can be referred to as the net convenience yield; i.e., the benefit of holding the commodity netted against its costs. Paying attention to the net convenience yield, or roll yield, is useful over short horizons and separately, over long horizons.

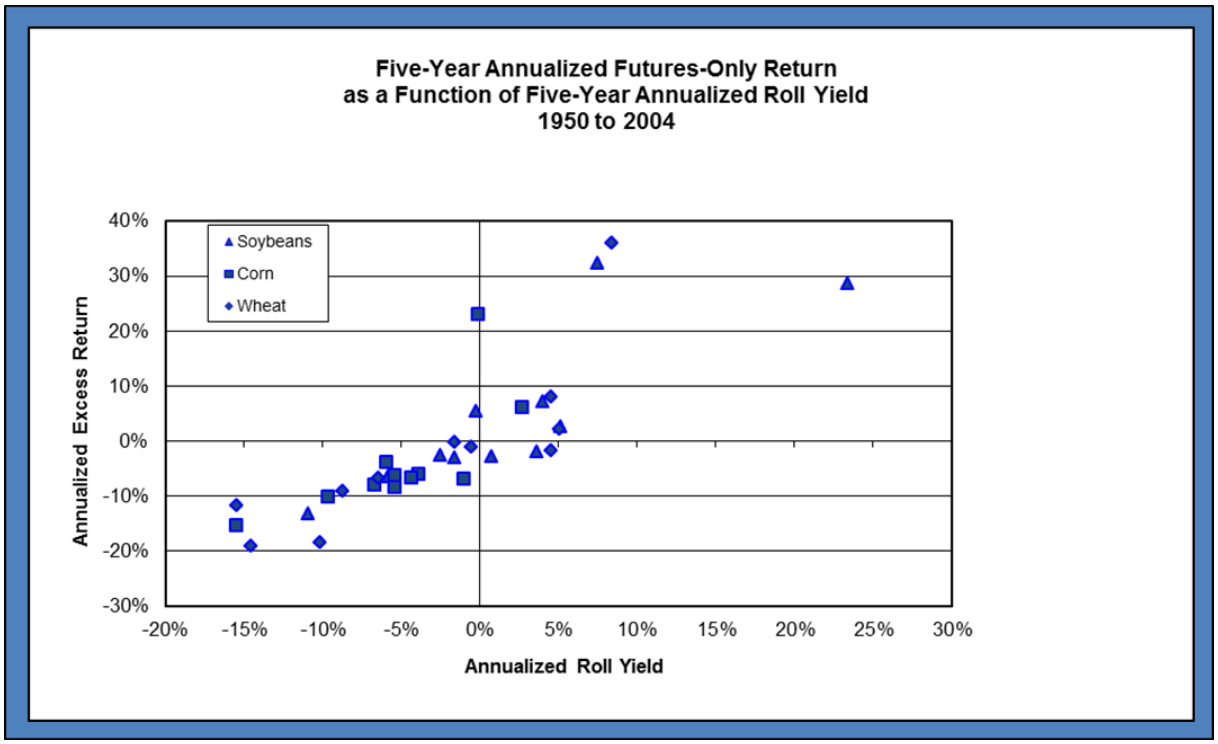
Over short horizons, given that the roll yield increases during times of shortage, this factor provides a useful price proxy for fundamental data that can be used as a timing indicator for positions in a particular commodity market. That is, one would only go long a particular commodity futures contract, if one has an indication of scarcity.

Over long horizons, the roll yield is also important for commodity futures contracts. This is because of another structural feature of commodity markets: mean reversion. If a commodity has a tendency over long enough timeframes to mean-revert, then by construction, (real) returns cannot be due to a long-term appreciation (or depreciation) in spot prices. In that case, over a sufficient timeframe, the futures-only (real) return for a futures contract would have to basically collapse to its roll yield. This can be observed historically in the commodity futures markets.

Feldman and Till (2006) examined three agricultural futures markets from which one could obtain price data since 1949. In the 2006 paper, the authors found that over a 50-year-plus timeframe, the returns

of three agricultural futures contracts were linearly related to roll yield *across time,* but this result *only* became apparent at five-year intervals, given how volatile spot prices are. This result is illustrated in Figure 3.

Figure 3



Graph based on research undertaken during the work that led to the article by Feldman and Till (2006).

Rebalancing Return

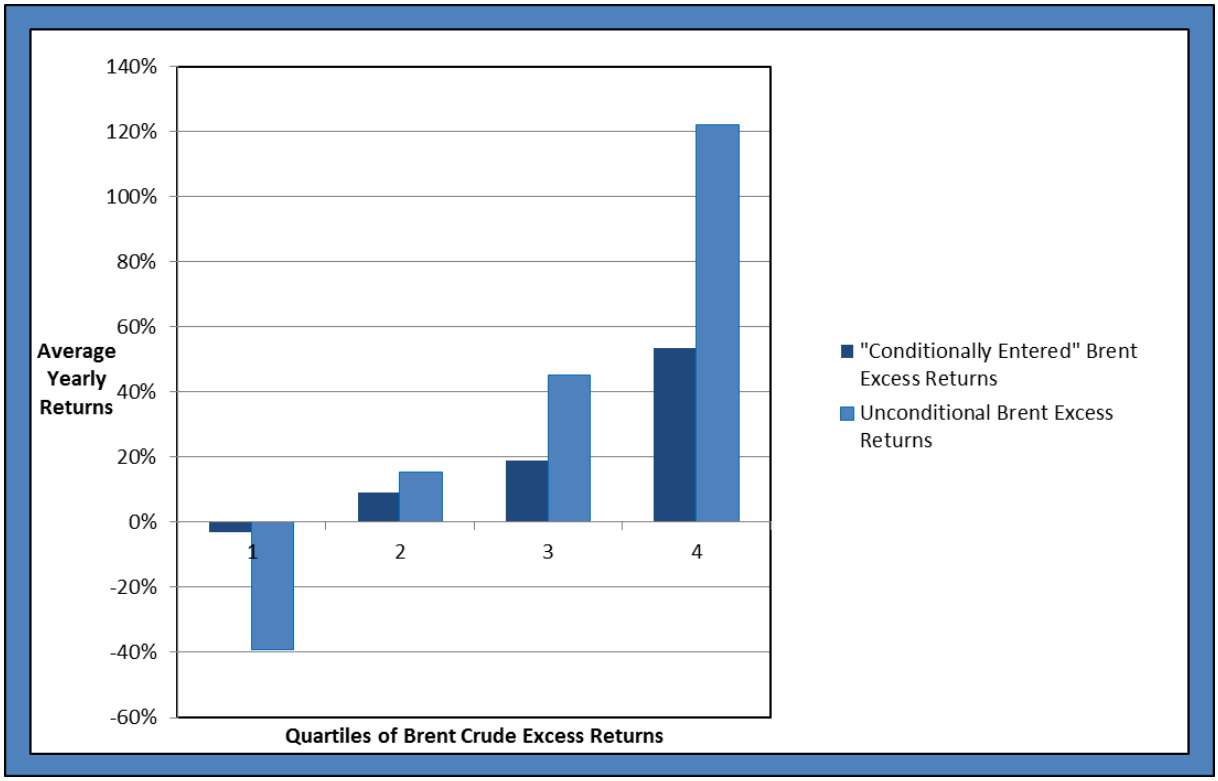
Erb and Harvey (2006) discussed how there can be meaningful returns from rebalancing a portfolio of lowly-correlated, high-variance instruments. "Commodity futures contracts happen to display … [these] characteristics …," noted Sanders and Irwin (2012).

The rebalancing effect was explained in Greer *et al.* (2014), as follows: "[A] 'rebalancing return' … can naturally accrue from periodically resetting a portfolio of assets back to its strategic weights, causing the investor to sell assets that have gone up in value and buy assets that have declined." Erb and Harvey (2006) concluded, in turn, that the returns from rebalancing are the one "reasonably reliable source of return" from owning (and rolling) a basket of commodity futures contracts. The issue, yet again, like roll yield, is that the rebalancing effect will not be apparent over short horizons.

Investor Expectations and Portfolio Context

A CTA investor may also require that a program's dynamic trading strategies produce returns that have options-like payoff profiles. Figure 4, for example, provides an example of a market-timing model for crude oil futures contracts that historically produced an option-collar-like profile across states of the crude oil market. The strategy underperforms oil in up markets, but outperforms oil during down markets. This type of analysis is drawn from Fung and Hsieh (1999).

Figure 4
"Conditionally Entered" vs. "Unconditionally Entered" Brent Crude Oil Futures (Excess) Returns
End-January 1999 through End-December 2014



Source: Till (2015), which was based on joint work with Joseph Eagleeye of Premia Research LLC.

Regarding commodity indices, institutional investors expect this investment to provide diversification for their balanced equity-and-bond portfolios. According to Fenton (2015), an updated efficient-frontier analysis for adding commodities to a standard U.S. 60/40 portfolio shows that the optimal long-run allocation over the period, March 1988 through June 2015, would have been 10%.

Conclusion

The survey paper notes that there may be structural returns in futures strategies as a result of momentum, roll yield, and rebalancing. One caveat is that an investor's holding period may have to be quite long term in order for these return effects to become apparent. But even structurally positive

returns may be insufficient to motivate investors to consider futures products. Investors may have additional requirements such as that a strategy provides exposure to an asset class while limiting its losses and also that the strategy diversifies a balanced stock-and-bond portfolio.

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Keywords

CTA, sources of return, managed futures, commodity indices, commodity futures contracts