

Beyond Beta—Passive Alternatives to Active Commodities Strategies

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The economic rationale for momentum-based long/short commodity investing

Following weaker investor activity last year, investment flows into commodities rebounded in the first quarter of 2012 with \$6.9 billion fresh inflows into the asset class. As a result, assets under management in the commodity markets totaled \$435 billion, an all-time high. Commodities Exchange-Traded Products (ETPs) have continued to be one of the fastest growing ETP asset classes, largely in part to price increases that have occurred over the past few years. In 2011, Commodities ETPs saw net inflows of \$10 billion, taking total assets to \$152 billion.

This surge in assets is mirrored by equally impressive gains in many commodities' spot prices. Unfortunately—and to the chagrin of many investors—products linked to commodity indexes often experience much lower returns. Negative roll yield (which occurs when distant delivery prices exceed near delivery prices) means that many investors lost out even as prices rose. In response, a growing number of commodity investors are eschewing the traditional long-only approach in favor of alternative strategies that are better able to manage roll yield.

With the rise of more innovative strategies, there is reason to question how well investors are being served by the traditional long-only commodity indexes as either benchmarks or proxies for investment products. Traditional approaches to representing pure beta exposures work well for stocks and bonds but not so well for the commodities "asset class." In fact, we argue that there is no such thing as commodity beta. Moreover, we assert that new passive strategies that use a momentum-based long/short approach rather than the long-only approach of the most common commodity indexes are better benchmarks for active strategies.

No Such Thing as Commodity Beta

For many asset classes it is very easy to take a pure beta exposure—multiple asset class proxies are available, many of which are reasonable substitutes for each other. The Russell 3000, S&P 500, and Dow Jones Wilshire 5000 indexes, for example, are representative of the broad stock market and have similar performance characteristics, just as the Citigroup Broad Investment-Grade (BIG), Barclays Capital U.S. Aggregate, and Merrill Lynch U.S. Domestic Master bond indexes mirror the wider fixed-income market and perform alike. Yet for commodities, fewer choices and more disparity exist among the index options.

Not All Indexes Are Alike

Figure 1 illustrates the similar risk and return characteristics of the broad stock and bond indexes and the disparity among the three traditional commodity indexes—the S&P GSCI™ Commodity Index, Dow Jones UBS Commodity IndexSM, and Reuters/Jefferies CRB Index. When we plot standard deviation and compound annual return for each index over a common time period (January 1991–April 2012), we see that the nearly identical risk and return characteristics of both the stock and bond indexes place the plot points on top of one another. The commodity indexes, however, do not display the same level of consistency. Dramatic differences in constituents and weighting schemes as well as rebalancing rules are likely the cause of the performance differences in the commodities indexes. The S&P GSCI index, for example, has about double the weighting to the energy sector as the Dow Jones UBS Commodity and Reuters/Jefferies CRB indexes and only one third of the weighting to agriculture.

Both Long and Short Positions for Positive Risk Premiums

Long-only commodity futures strategies can prove inadequate in providing investment exposure to commodities, which is why professional commodity trading advisors (CTAs) tend to take both long and short positions in commodity futures, often based on trends in prices.

Sources of Excess Return

A futures strategy generates excess return (i.e., return in excess of the risk-free rate) from two sources:

- ▶ Changes in futures prices
- ▶ The roll yield—which can be either positive or negative—that results from replacing an expiring contract with a further out contract in order to avoid physical delivery yet maintain positions in the futures markets.

A complete understanding of these two sources of return requires an analysis of three interrelated markets for each commodity:

- ▶ The spot market—the cash market for the commodity itself.

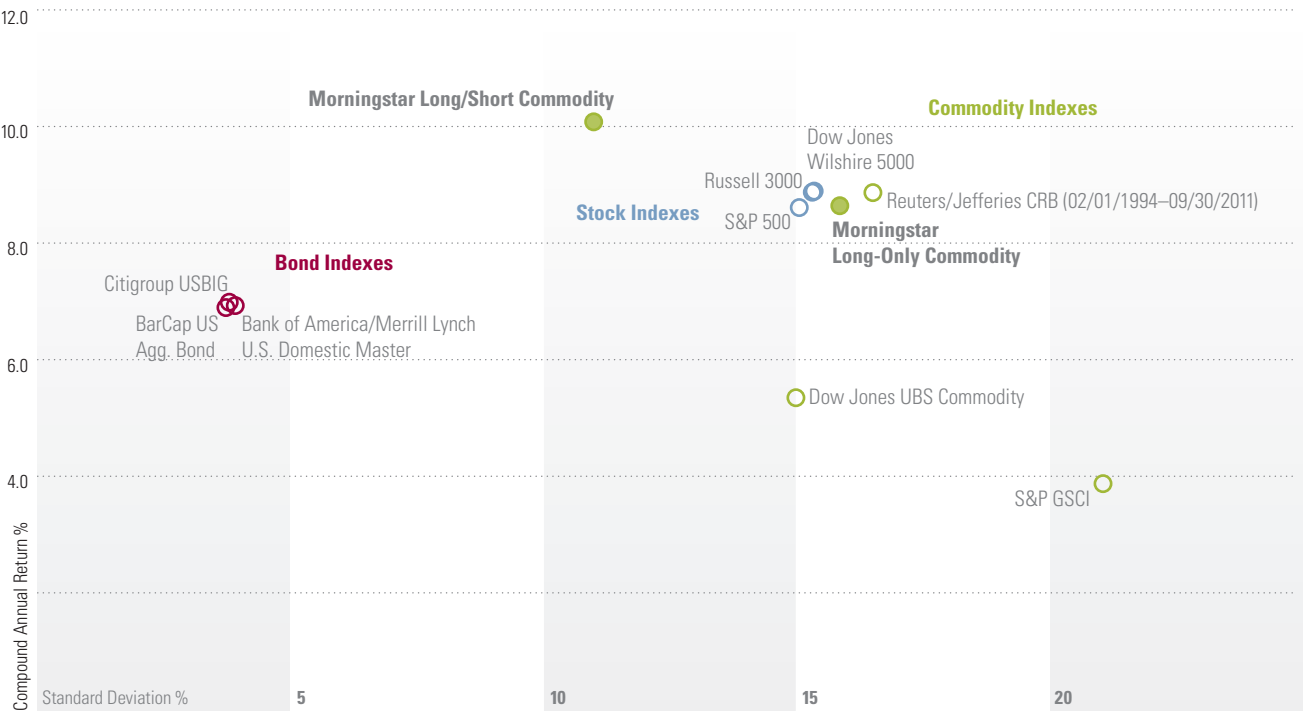
- ▶ The futures market—the market for contracts to deliver the commodity in the future for a price set today.
- ▶ The storage market—the market for the service of storing the commodity on behalf of its owner.

What happens in spot markets is important to futures investors because changes in spot prices impact futures prices. The storage market is important because it interacts with the spot market and influences the slope of the futures price curve, which is the source of roll yield. Next we discuss how the spot and futures markets influence price changes and how the storage market impacts the slope of the futures price curve and hence the roll yield.

The Spot Market

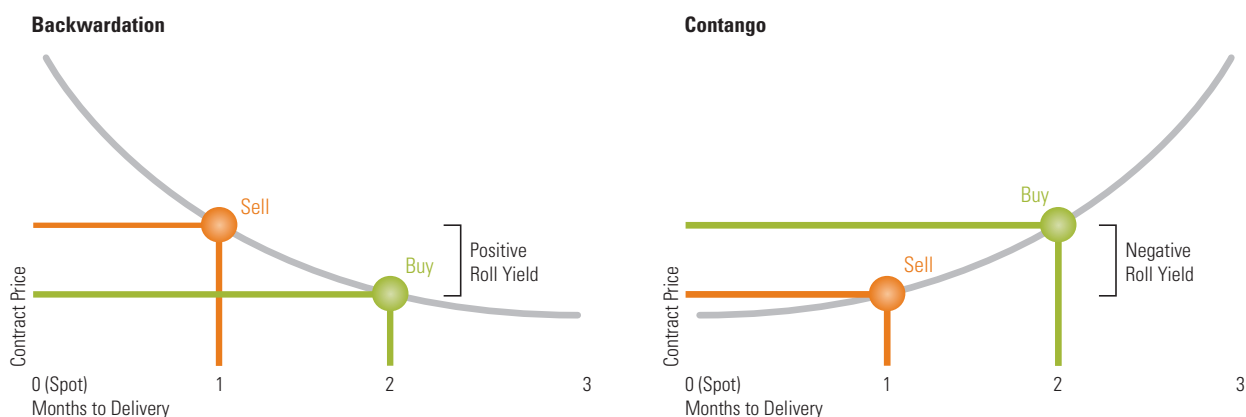
Commodity prices fluctuate based on the supply and demand of any commodity. If there is excess supply, then inventories build up until there is downward pressure on prices and producers reduce supplies in response to that price signal. Conversely, in the case of excess demand, inventories will be drawn down until the shortage causes prices to rise and equilibrium is restored. However, it

Figure 1. **Compound Annual Returns, January 01, 2001–April 30, 2011**



Source: Morningstar

Figure 2. **Futures Price Curves**



can take a significant time period for inventories to be regulated through price changes due to production and storage situations, leading to sustained trends in commodity spot prices. These trends in commodity spot prices are reflected in futures prices.

The Futures Market

Wild fluctuations in spot prices can lead to the risk of operating losses for both commercial commodity producers (e.g., wheat farmers) and consumers (e.g., cereal manufacturers), so they both have incentives to hedge against the risk of future price fluctuations. The commodities futures markets provide one of the most common and effective ways of hedging price risk. When there are more producers than consumers who need to hedge, speculators (including investors in commodity futures strategies) enter the market and provide insurance against falling spot prices by taking the long side. Speculators receive a premium for this insurance in the form of a futures price that is less than the expected futures spot price. Hence, they expect the futures price to trend upward as it approaches the actual futures spot price over the life of the contract. Conversely, net hedging pressure can be greater on the long side. That is, when there are more consumer hedgers than producer hedgers, speculators provide insurance against rising futures prices by taking the short side, leading to a futures price that is higher than the expected futures spot price. Hence, they expect the futures price to trend downward as it approaches the spot price over the life of the contract.

The Storage Market

Producers of stable commodities use inventories to fill gaps between production and sales. Similarly, consumers use inventories to fill gaps between consumption and purchases. This creates a market for storage.

Storage is costly, however. Besides the direct cost of physical storage, there is also an opportunity cost because the money tied up in the commodity could be earning interest. On the margin then, an extra unit is only worth storing if the benefits of storage are at least equal the costs (including the opportunity to earn interest). If this benefit is high enough (so that it makes sense to store the commodity for later use or sale rather than using or selling it now), the futures price will be lower than the spot price, causing time to expiration and the futures price to be inversely related so that the further out the futures contract, the lower the price, thus compensating for the cost of storage. If this is the case, we say that there is “backwardation” in the futures market.

In a backwardated market, owners of a commodity in storage are being more than compensated for the costs of storage, but the compensation is not in monetary payments. Rather, it is in less-tangible benefits such as securing a supply of fuel as insurance against an energy crunch. However, investors who are taking long positions in futures contracts can realize this compensation monetarily by replacing the contracts that they are holding with longer-term ones, thus locking in profits.

This component of excess return realized by investors is referred to as roll yield. As Figure 2 shows, in backwardated markets, roll yields are positive. Likewise, when the marginal benefits of storage are low, the relationship between time to expiration and the futures price is positive, a condition known as contango. In contangoed markets, roll yields are negative because replacing contracts results in locking in a loss.

The benefit of storage tends to be high when inventories are low. For example, when a commodity is scarce, having it in storage

will improve commercial consumers' readiness to meet their needs in the near future, leading to backwardation and positive roll yields. Conversely, the benefits of storage are low when inventories are plentiful, leading to contango and negative roll yields. Since inventory conditions in some commodities are slow to adjust due to the time it takes to increase their production, backwardation or contango could persist for a period of time, causing investors to consistently experience positive or negative roll yield over the period. Thus, a passive investor should benefit from a trend-following strategy that incorporates roll yield into its signal.

Roll Yield and Excess Return

Roll yield's effect on excess return can be substantial. In fact, several studies have shown that excess return is primarily attributable to roll yield, not to changes in futures prices. Long-term excess returns on commodities that exhibit mean reversion in price and that tend to trade in contango will generally be negative, and those that tend to trade in backwardation will generally be positive.

This behavior can be seen in Figure 3, which shows the relationship between roll yield and excess returns on the commodities listed for the 21-year period April 1990–September 2011. Commodities that tended to trade in contango experienced negative excess return, while those that tended to trade in backwardation saw positive excess return.

Of particular interest are the natural gas futures. Because the price of natural gas grew at 4.1% per year over the 21-year period, one might have expected a natural gas futures index to have provided a comparable rate of return. However, because natural gas futures traded in contango (and consequently experienced negative roll yield), the excess return was an abysmal negative 12.5%.

Building a Better Strategy

Passive strategies that use a momentum-based long/short approach rather than the long-only approach of the most common commodity indexes can better serve investors by attempting to capture the full excess return from a futures strategy. Such passive strategies are also likely to prove a better benchmark for the active strategies of professional futures investors.

To make this idea operational, we created a family of commodity indexes that includes combinations of long commodity futures, short commodity futures, and cash—shown in Figure 4. The primary index, called the Morningstar® Long/Short Commodity IndexSM, holds commodity futures both long and short based on momentum signals. The other indexes are derived from this Long/Short index. The family includes a long/flat version, which holds cash in place of the short positions in the primary version so that investors who do not want or cannot have short positions can still get some benefits of a momentum-based long/short strategy. The family also includes a short/flat version for investors who already have long-only exposure to commodities and want some benefits

Figure 3. **Roll Yield and Excess Return**
April 1990–September 2011

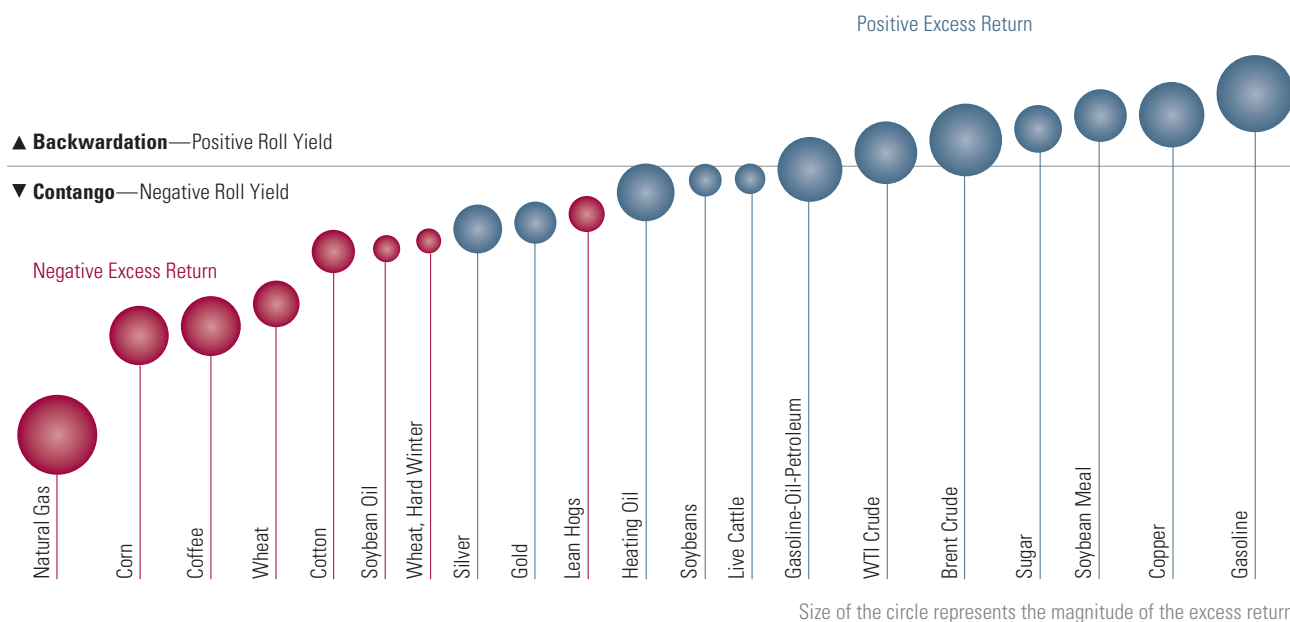


Figure 4. **Morningstar® Commodity Indexes Construction**

The Morningstar Commodity Index family consists of five indexes that employ different strategic combinations of long futures, short futures, and cash. The Long/Short Commodity Index is a fully collateralized commodity futures index that uses the momentum rule to determine if each commodity is held long, short, or flat.



of the momentum strategy without having to replicate or drop their long-only exposure.

We created a set of single-commodity indexes to serve as constituents for the Long/Short index and the related composite indexes by calculating a “linked” price series that incorporates both price changes and roll yield. The weight of each individual commodity index in each of the composite indexes is the product of two factors: magnitude and the direction of the momentum signal. We initially set the magnitude based on a 12-month average of the dollar-weighted open interest of the commodity. We then cap the top magnitude at 10% and redistribute any overage to the magnitudes for the remaining commodities. The direction depends in part on the type of composite index, and as we explain below, in part on the type of commodity in the Long/Short index.

In the Long/Short index each month, if the linked price exceeds its 12-month daily moving average, the index takes a long position in the subsequent month. Conversely, if the linked price is below its 12-month moving average, the index takes the short side. An exception is made for commodities in the energy sector. If the signal for a commodity in the energy sector is short, the weight of that commodity is moved into cash; that is, we take a flat position. Energy is unique in that its price is extremely sensitive to geopolitical events and not necessarily driven purely by supply-demand imbalances.

For the remaining indexes, the direction is set as follows:

- ▶ Long-Only—always long for every commodity
- ▶ Long/Flat—same long positions as the Long/Short index, but replaces the short positions with flat positions
- ▶ Short/Flat—same short positions as the Long/Short index, but replaces the long positions with flat positions
- ▶ Short-Only—always short for every commodity

How They Stack Up

Figure 5 shows the general performance statistics of the Morningstar Long/Flat, Long-Only, and Long/Short Indexes from February 1991 through April 2012, compared with other indexes (For the sake of simplicity and clarity, we focus our discussion of results on these three Morningstar indexes).

Generally, the Morningstar Commodity Indexes’ return and risk characteristics rank favorably relative to other benchmarks. Note, for example, the Morningstar Long/Short Index’s better return and moderate risk compared with the S&P GSCI and Dow Jones UBS Commodity indexes.

Figure 5: **Morningstar Commodity Indexes: Risk-Return Profile**
February 1991–April 2012

	Annualized Return %	Standard Deviation %	Maximum Drawdown %	Sharpe Ratio
Morningstar Long-Only Commodity	8.73	15.80	-53.78	0.40
Morningstar Long/Short Commodity	10.44	10.93	-22.74	0.64
Morningstar Long/Flat Commodity	10.06	10.64	-24.06	0.62
S&P GSCI	3.61	21.00	-67.64	0.14
Dow Jones UBS Commodity	5.25	14.95	-54.26	0.20
S&P 500	8.66	15.02	-50.95	0.43
Barclays Capital US Aggregate Bond	6.61	3.71	-5.15	0.92

The diversification characteristics of the Morningstar® Commodity Indexes can be seen in Figure 6, which shows a correlation matrix from February 1991 through April 2012.

Downside Protection

While all long-only commodity indexes tend to provide strong protection when the stock market is down and in inflationary environments, the Morningstar® Long/Short Commodity IndexSM does a much better job by limiting downside risk while negotiating ups and downs in the commodity markets themselves. The Long/Short index's maximum drawdown in the February 1991–April 2012 period, as seen in Figure 5, was substantially lower than that of the S&P GSCI and Dow Jones UBS Commodity indexes. We also compared maximum drawdowns experienced by the listed indexes during five-year subperiods within that overall period, and the Morningstar Long/Short Commodity Index suffered much smaller drawdowns in all sub-periods. Clearly, a long-short strategy is better equipped to tap into the underlying momentum of commodity prices, thereby limiting losses in down markets.

The Long and Short of It

The long-only strategies that currently dominate the commodity index market do not best serve investors as investment vehicles or as benchmarks. Since futures price changes and roll yields are the sources of excess return, long-only indexes have no way to capture the returns available from shorting futures when there is downward price pressure or a positively sloped futures price curve. Long-only indexes generate negative roll yields when markets are in contango (when distant delivery prices exceed near delivery prices) and thus can have negative returns when commodity prices are rising. Furthermore, since many actively managed commodity trading advisors invest in long and short futures based on momentum trading rules, the long-only indexes are not appropriate benchmarks, rendering traditional approaches to representing beta exposure unsuitable.

By using a momentum-based approach that takes into account both price change and the slope of the futures price curve, these new Morningstar indexes aim to maximize both sources of excess return—price change and roll yield—to produce better performance. In addition, these indexes are logically consistent with the underlying economics of commodities futures markets, and back-tested results show an attractive risk profile, low downside risk, and low correlations to both traditional asset classes and long-only commodity indexes. As passive investment alternatives, these rules-based indexes could offer easier access to actively managed commodities trading strategies. ■■

Figure 6: **Commodity Index Correlation Matrix**
February 1991–April 2012

Index	1	2	3	4	5	6	7	8
1. Morningstar Long/Short Commodity	1.00							
2. Morningstar Long/Flat Commodity	0.55	1.00						
3. Morningstar Long-Only Commodity	0.83	0.89	1.00					
4. S&P GSCI	0.93	0.57	0.77	1.00				
5. Dow Jones UBS Commodity	0.97	0.54	0.81	0.90	1.00			
6. S&P 500	0.38	-0.08	0.15	0.33	0.41	1.00		
7. Barclays Capital US Agg. Bond	0.04	-0.09	-0.01	-0.03	0.03	-0.11	1.00	
8. U.S. 90-day T-bill	0.02	0.00	0.00	0.01	0.04	-0.06	-0.04	1.00

	1.00 to 0.61	0.60 to 0.21	0.20 to -0.20	-0.21 to -0.60	-0.61 to -1.00
	Extreme Positive	Positive	Moderate	Negative	Extreme Negative