

Beyond Beta—Passive Alternatives to Active Commodities Strategies

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

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Once considered too obscure and illiquid, commodities have increasingly captured investors' interest in recent years.

The huge multiyear rally in commodity prices has only increased their allure. Additionally, several recent studies have shown that real assets such as commodities are excellent portfolio diversifiers, as they tend to appreciate in price when inflation is on the rise, unlike most financial assets.

Commodity-index-linked investment vehicles now command almost \$100 billion in assets, and this trend seems unlikely to abate. Seventy percent of respondents to a recent institutional survey by Barclays Capital planned to further increase their commodity allocation over the next three years. However, despite the rising popularity of commodities, 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 for taking pure beta exposures in portfolios.

Traditional approaches to representing pure beta exposures work well for stocks and bonds but not so well for the commodities "asset class." While we do not offer an approach to taking pure beta exposures in this study, 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 the active strategies of professional investors and could offer better returns.

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 Wilshire 5000, for example, are representative of the broad stock market and have similar performance characteristics just as the Citigroup Broad Investment-Grade (BIG),

Lehman Brothers Aggregate, and Merrill Lynch U.S. Domestic bond indexes mirror the wider fixed income market and perform alike. Yet for commodities, fewer choices and more disparity exist among the index options. In addition, long-only indexes do not capture the full excess return (i.e., return in excess of the risk-free rate) from a commodity futures strategy.

Not All Indexes Are Alike

The chart below 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 AIG Commodity Index, and Reuters Jefferies CRB. When we plot standard deviation and compound annual return for each index over a common time period (January 1991 through August 2007), 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 for the performance differences in the commodities indexes. The S&P GSCI, for example, has about double the weighting to the energy sector as the Dow Jones-AIG and the Reuters Jefferies 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.

Compound Annual Return Graph



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. Below 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 case of excess demand, inventories will be drawn down until the shortage causes prices to rise and equilibrium is restored. However, it 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 who need to hedge than consumers who do, 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 future spot price. Hence, they expect the futures price to trend upward as it approaches the actual future 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 future spot prices. 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 storable 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 future 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 the image below 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 since, replacing contracts results in locking in a loss.

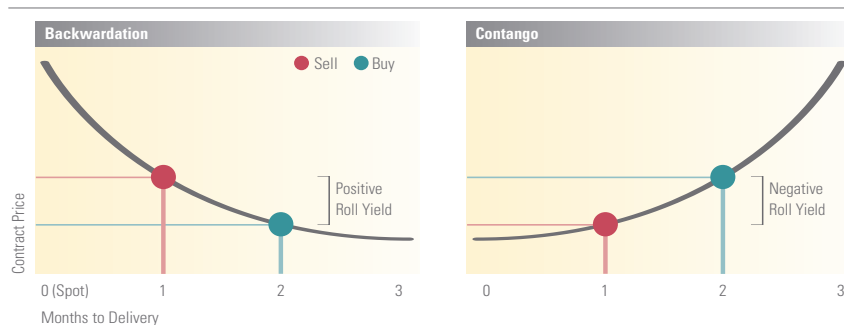
The benefit of storage tends to be high when inventories are low. For example, when a commodity is scarce, having it in storage will improve commercial consumers' readiness to meet their needs in the near future, leading to backwardation and positive roll yields. Conversely, the benefits of storage are 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 the shape of the futures curve into its signal.

Building A Better Strategy

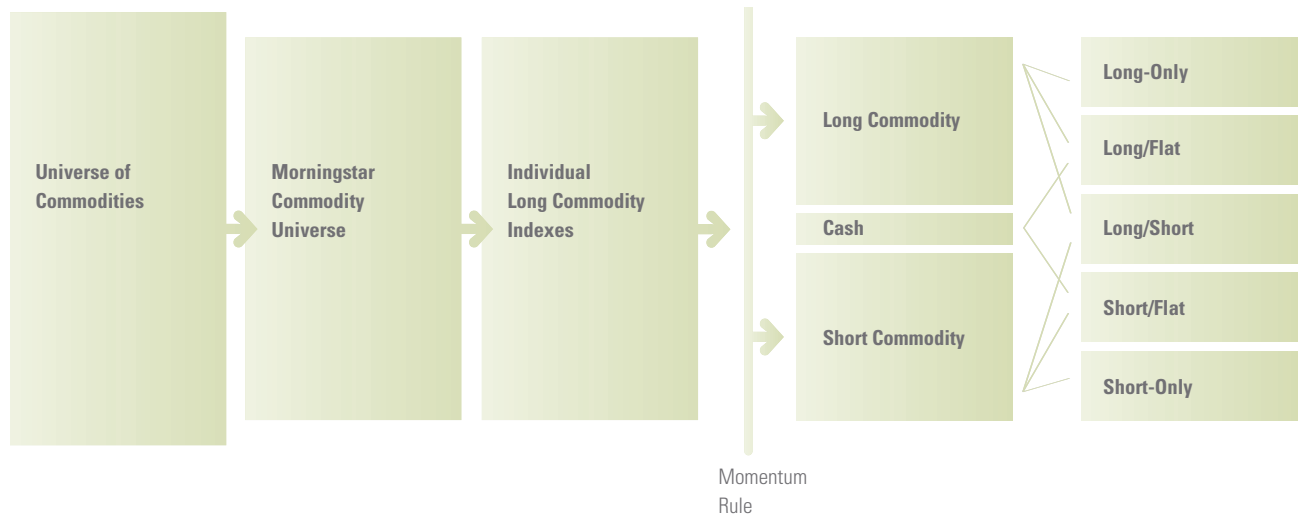
Passive strategies that use a momentum-based long/short approach rather than the long-only approach of the most common commodity indexes can better serve investors by attempting to capture the full excess return from a futures strategy. Such passive strategies are also likely to prove a better benchmark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

To make this idea operational, we created a new family of commodity indexes that includes combinations of long commodity futures, short commodity futures, and cash. The primary index, called the Morningstar Long/Short Commodity Index, 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 of the momentum strategy without having to replicate or drop their long-only exposure.

Futures Price Curve



Morningstar Commodity Index Construction Process



We created a set of single-commodity indexes to serve as constituents for the Long/Short 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 moving 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 demand-supply 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 and replaces the short positions with flat positions
- ▶ Short/flat—same short positions as the Long/Short index, replaces long positions with flat positions
- ▶ Short-only—always short for every commodity

How They Stack Up

The table below shows the general performance statistics of the Morningstar long-only, long/short, and long/flat indexes from January 1991 through June 2007, compared with other indexes. (For the sake of simplicity and clarity, we focus our discussion of results on these three 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 high return and moderate risk compared with the S&P GSCI and the Dow Jones-AIG. In addition, the Morningstar Long/Short Index’s Sharpe ratio is the highest of all listed indexes.

The diversification characteristics of the Morningstar Commodity Indexes can be seen in the chart below which shows a correlation matrix for January 1991 through June 2007. The indexes demonstrate very low or negative correlations with stocks and bonds.

Index Performance Statistics

	Geometric Mean (%)	Annualized Standard Deviation	Maximum Drawdown (%)	Annualized Sharpe Ratio	Skewness	Kurtosis
Morningstar Long-Only	9.96	14.46	-35.28	0.48	0.27	0.64
Morningstar Long/Short	10.44	10.62	-11.39	0.68	0.53	1.86
Morningstar Long/Flat	9.67	9.90	-8.83	0.64	0.56	2.53
S&P GSCI	5.60	20.05	-48.25	0.18	0.11	0.44
DJ AIG Commodity	7.47	13.12	-36.20	0.34	0.09	0.06
S&P 500	11.87	15.17	-44.73	0.61	-0.52	1.13
LB Aggregate Bond	6.91	3.98	-5.15	0.80	-0.42	0.76
U.S. 30-Day T-Bill	3.95	0.47	0.00	—	-0.42	-0.90

Index Correlations January 1991–December 2006

	Morningstar Long/Short	Morningstar Long/Flat	Morningstar Long-Only	S&P GSCI	DJ AIG Commodity	S&P 500	LB Aggregate Bond	U.S. 30-Day T-Bill
Morningstar Long/Short	1.00							
Morningstar Long/Flat	0.88	1.00						
Morningstar Long-Only	0.54	0.82	1.00					
S&P GSCI	0.62	0.78	0.91	1.00				
DJ AIG Commodity	0.52	0.78	0.96	0.88	1.00			
S&P 500	-0.19	-0.03	0.03	-0.02	0.08	1.00		
LB Aggregate Bond	0.03	-0.01	-0.01	0.04	0.01	0.08	1.00	
U.S. 30-Day T-Bill	0.05	-0.07	-0.07	-0.04	-0.04	0.10	0.16	1.00

The Morningstar Long/Short index also demonstrates a low correlation with the long-only commodity indexes, with correlations running between 0.52 and 0.62. The Morningstar Long/Flat Index also shows lower correlations to the other commodity indexes of about 0.8.

Lastly, we look at the sector exposures for each index through time. The following exhibit displays the sector weights of the Morningstar Long-Only Index at the annual reconstitution dates over the entire back history of the index, starting in December 1979. Note how the sector representation changes in relation to their relative importance in the commodity futures markets, but within limits so as to maintain diversification. Specifically, at the most recent reconstitution energy represents about 39% of the index and metals close to 14%, whereas in the early 1980s, energy contributed a very small proportion while metals as a group formed about 18% of the index.

The Long and Short of It

Long-only strategies that 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 CTAs 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. ■■

Morningstar Long-Only Commodity Index Sector Exposures

