

## Forging a New Commodity Index

By Paul D. Kaplan

Traditional, long-only commodity indexes only tell half the story. Why a momentum-based long/short approach makes a better benchmark.

Commodity prices and the level of investment in commodities strategies have risen significantly in the past few years. With more investors focusing on commodities, more money is expected to pour into commodity indexes through exchange-traded products, mutual funds, and futures. Commodity-index-linked investment vehicles now command approximately \$185 billion, and this trend seems unlikely to abate.

There is reason to question, however, how well investors are being served by these 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. 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 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 Wilshire 5000, for example, are representative of the broad stock market and have similar risk and return characteristics; the Citigroup Broad Investment-Grade, 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. The risk and return characteristics of three commonly used commodity indexes—the S&P GSCI Commodity Index, Dow Jones AIG Commodity Index, and Reuters Jefferies CRB—vary greatly. Dramatic differences in constituents and weighting schemes and rebalancing rules are likely the cause for the performance differenc-

es in the commodities indexes. The S&P GSCI, for example, has about double the weighting to the energy sector as have the Dow Jones-AIG and the Reuters Jefferies, and only one third of the weighting to agriculture.

#### **Sources of Excess Return**

Professional commodity-trading advisors often take both long and short positions in commodity futures. Why? Because they know that long-only strategies provide inadequate investment exposure to commodities.

A futures strategy generates excess return from two sources: changes in futures prices and the roll yield. The roll yield, which can be positive or negative, results from replacing an expiring contract with one farther away from expiration. This allows the trader to avoid the physical delivery of the commodity yet maintain positions in the futures markets.

To understand these two sources of return, investors need to analyze three interrelated markets for each commodity—the spot market, the futures market, and the storage market—and their effects on each other.

#### **The Spot Market**

The spot market is the cash market for the commodity itself. 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. In case of excess demand, inventories will be drawn down until the shortage causes prices to rise and equilibrium is restored.

It can take significant time, however, for inventories to be regulated through price changes due to production and storage situations, leading to trends in commodity spot prices. These trends 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 (wheat farmers, for example) and consumers (cereal manufacturers). Therefore, they both have incentives to hedge against the risk of future price fluctuations.

The 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 rise 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, it makes more sense to store the commodity for future use or sale than using or selling it now. It also means that the futures price will be lower than the spot price, causing time to expiration and the futures price to be inversely related. 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.

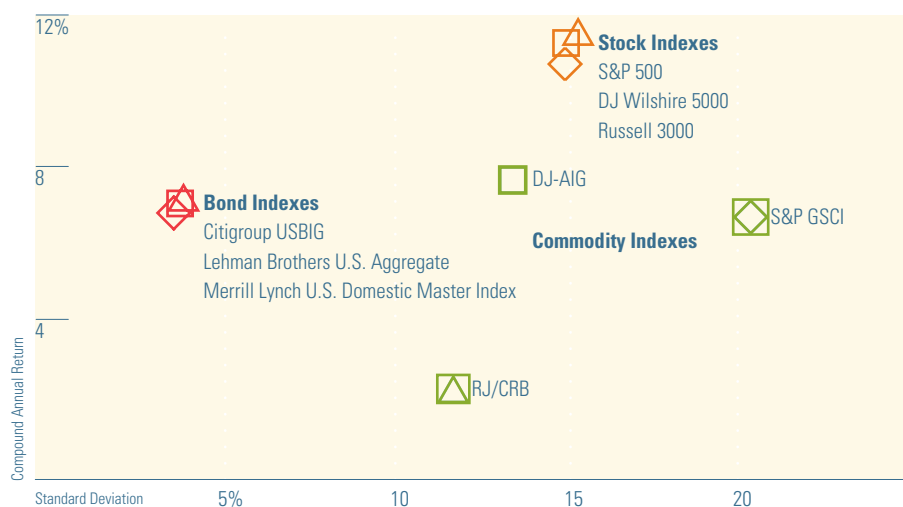
In a backwardated market, owners of a commodity in storage are being more than compensated for the costs of storage, but the compensation is not in monetary payments. Rather, it is in less-tangible benefits such as securing a supply of fuel as insurance against an energy crunch. Investors who are taking long positions in futures contracts, however, 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. 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 is 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. Because 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.

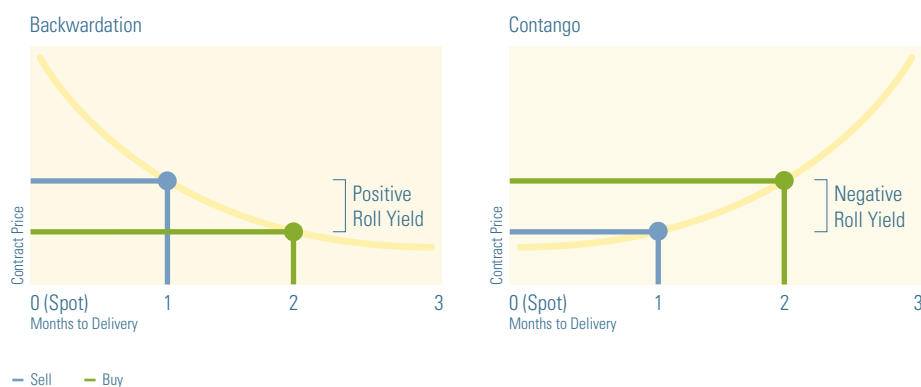
### Building a Better Strategy

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

**Inconsistent Commodities:** The three major bond and stock indexes have nearly identical risk and return characteristics. Commodity indexes, however, do not display the same level of consistency.



**Sources of Roll Yield:** In a backwardated market, contracts increase in price as they approach expiration, creating a positive roll yield. Traders profit by “rolling” into less-expensive, longer-term contracts. In a contango market, the opposite occurs.



**How They Stack Up:** The risk-return profile of Morningstar's commodity indexes rank favorably with other benchmarks. Note the Morningstar Long/Short Index's high return and moderate risk compared with the S&P GSCI and the Dow Jones-AIG. The index also does a good job of limiting downside risk. Its maximum drawdown in the 1991–2007 period was less than one third that of the DJ AIG Index and less than one fourth of that of the S&P GSCI Index.

**Risk Return Profile 01/91–03/08**

Index/ Sector	Compound Annual Return %	Annualized Std Dev%
Morningstar Long/Flat	10.80	9.57
Morningstar Long-Only	11.17	13.50
Morningstar Long/Short	11.32	10.08
DJ AIG	8.37	12.57
S&P GSCI	7.28	18.70
S&P 500	10.59	13.50
LB Aggregate Bond	7.09	3.70
U.S. 30-day T-Bill	3.81	0.43

**Downside Protection Profile 01/91–03/08**

Index/ Sector	Maximum Drawdown %	Annualized Sharpe Ratio%
Morningstar Long/Flat	-8.83	0.73
Morningstar Long-Only	-35.28	0.59
Morningstar Long/Short	-11.39	0.74
DJ AIG	-36.20	0.41
S&P GSCI	-48.26	0.29
S&P 500	-44.73	0.51
LB Aggregate Bond	-5.15	0.79
U.S. 30-day T-Bill	0.00	0.00

Source: Morningstar

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, Morningstar 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 the long/short index. The Morningstar Long/Flat Index holds cash in place of the short positions in the primary index. The Morningstar Short/Flat Index holds cash in place of the long positions. The family also has long-only and short-only versions.

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 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 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.

**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. Because 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 and thus can have negative returns when commodity prices are rising. Furthermore, because many actively managed commodities 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, Morningstar's new indexes aim to maximize both sources of excess return—price change and roll yield. In addition, the 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. ■■■

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Paul Kaplan, Ph.D., CFA, is Morningstar's vice president of quantitative research and a frequent contributor to the magazine. He last appeared in the Spring 2008 issue with an article titled "Let's Not All Become Fundamental Indexers Just Yet."