A Brief History Of Commodities Indexes

An evolution from passive to active indexes

By Adam Dunsby and Kurt Nelson

Commodities indexes have been around for a long time. The Economist's Commodity-Price Index, for example, has been published for nearly 150 years, starting in 1864. However, this index, like many of the earlier indexes, tracks spot commodities prices and is therefore not investable.

First-Generation Indexes: Passive

The era of investable commodities indexes is much shorter. It arguably began in 1991 with the creation of the S&P GSCI (originally the Goldman Sachs Commodity Index), an index comprising exchange-traded commodities futures. The Dow Jones-UBS Commodity Index (originally the Dow Jones-AIG Commodity Index) was launched in 1998. Although there are many other commodities indexes today, these two have become the industry-standard benchmarks for commodities investing.

While both the S&P GSCI and DJ-UBSCI have become popular with commodities investors, they were not originally designed to serve as the basis for investable products. Both indexes emphasize global production, liquidity, open interest and scalability as primary determinants for weighting individual commodities and sectors. As a result, the S&P GSCI is heavily weighted toward the energy sector. Although this index has five unique sectors, the energy sector regularly has a weighting of 60 to 70 percent of the overall index. Furthermore, of the 24 components that comprise the index, the eight smallest components collectively have an index weighting of less than 5 percent. This makes the S&P GSCI less attractive to investors looking for diversified exposure to the commodities markets.

The DJ-UBS Commodity Index was developed with sector constraints that compensate for the energy focus of the S&P GSCI. According to the rules of the DJ-UBSCI, no single sector of the commodities universe can account for more than one-third of the index. However, energy is usually at this limit and can even exceed this limit between annual rebalancings if the price of energy rises during the year. In addition, many of the DJ-UBSCI components have 4 percent or less weighting, and 10 of the 19 DJ-UBSCI components have a collective weight of less than 30 percent.

These indexes have other characteristics that may be of concern to investors. Chief among them is the fact that for any given commodity, the indexes invest only in a single futures contract that is close to expiration. As a result, they must frequently roll their futures position forward to the next contract, leading to significant trading costs for index replication with exchange-traded futures.[1] Also, from an investor perspective, the front of the curve may not be the most desirable area to hold a long futures position. Indeed, in recent years, steep contango at the front end of many commodities futures curves has been blamed for degrading the returns of various commodities investment products, including those based on the S&P GSCI and the DJ-UBSCI.

Ironically, some market participants and asset managers may find it helpful that the industry-standard benchmarks are not designed to maximize investor returns. When compensation and career advancement depend on outperforming a particular benchmark, it is better to have one that is easy to beat.

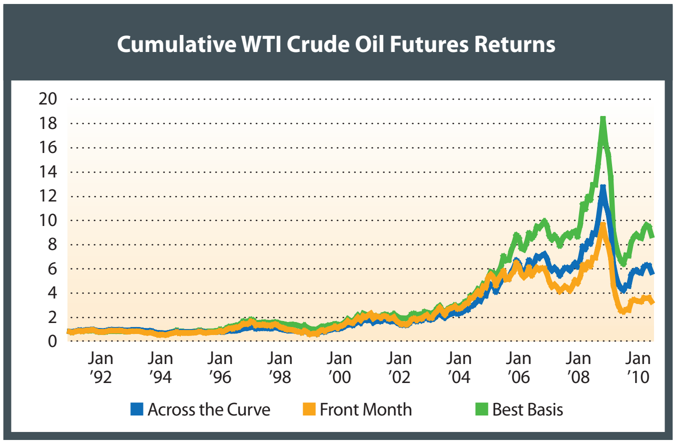
Second-Generation Indexes: Curve Management

Investors have placed huge amounts of money in products that track these first-generation, front-month indexes. But for investors, an easily beatable benchmark is not desirable.

Figure 1 shows three different possible results investors could have achieved in the WTI crude oil futures market, depending on where exactly on the futures curve they positioned their investments. The line labeled "Front Month" displays the payoff from holding a position in the nearest-to-maturity WTI crude oil futures contract and rolling it every month, similar to how the S&P GSCI and the DJ-UBSCI incorporate this position.[2] The line labeled "Across the Curve" displays the payoff from a strategy that holds equally weighted positions in each of the front 12 contracts. This strategy rolls one-twelfth of its position every month. The Front Month and Across the Curve strategies generate similar returns until the mid-2000s. Thereafter, the Across the Curve strategy generates a higher return. Why is this? Since the mid-2000s, the oil contract has typically been in contango, with the steepest contango generally appearing toward the front end of the curve. By distributing positions across the curve, investors have mitigated this impact and achieved higher returns.

The UBS Bloomberg Constant Maturity Commodity Index (CMCI) and the JP Morgan Commodity Curve Index (JPM CCI) take an approach analogous to the Across the Curve strategy. In these indexes, a constant weighting scheme is applied across commodities (i.e., a fixed weight in corn, a fixed weight in coffee, and so forth), but within individual commodity markets, the position is spread across several contract expirations. For example, the CMCI meets its overall target weighting for WTI crude oil by using three-month, six-month, one-year, two-year and three-year constant maturity weightings. When contango is "spread evenly" across expirations (i.e., the futures curve is a straight line), these indexes will perform the same as the first-generation indexes. When contango is more pronounced in the front end of the futures curve, as is typically the case for, say, corn and has recently been the case for crude oil, then these indexes will outperform the first-generation indexes. When futures markets are backwardated, and the backwardation is concentrated in the front end of the curve, then these indexes will underperform the first-generation indexes. Figure 2 displays the 13-year performance of these two second-generation indexes using multi-tenor contract selection.

Figure 1



Source: CRB

The line labeled "Best Basis" in Figure 1 displays the payoff from a strategy that every month takes a long position in the contract that maximizes basis. Basis is defined as:

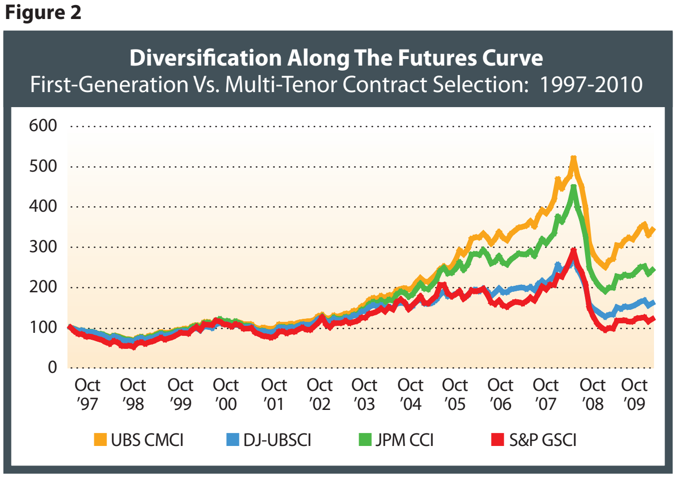
$$\frac{F_1}{F_N} - 1$$

where F_1 is the price of the front futures contract and F_N is the price of the Nth futures contract.[3] That is, this strategy takes a position in just one oil futures contract, and the contract selected has the maximum basis among the contracts out to 12-month maturity. If the futures curve is in contango, and the contango is concentrated at the front of the curve, this strategy will take a position farther out the curve. If the curve is in backwardation, and the backwardation is steepest toward the front of the curve, this strategy will place its position at the front of the curve.

As can be seen in Figure 1, the Best Basis strategy produces the highest return among the three strategies. The return differential opens up significantly during the mid-2000s, the period during which oil was consistently in contango, with the steepest contango typically toward the front of the curve. During this time period, the Best Basis strategy outperformed the other two strategies by placing its positions farther out on the curve.

It is important to note that markets in contango do not guarantee negative returns. The price of any individual futures contract can obviously increase, and a curve can move from contango to backwardation. For example, in 1999 the crude oil curve moved sharply from a state of contango to backwardation. However, all else being equal—that is, when the shape of a curve is persistent, and the spot price does not change—it is true that contango will weaken returns and backwardation will strengthen them.

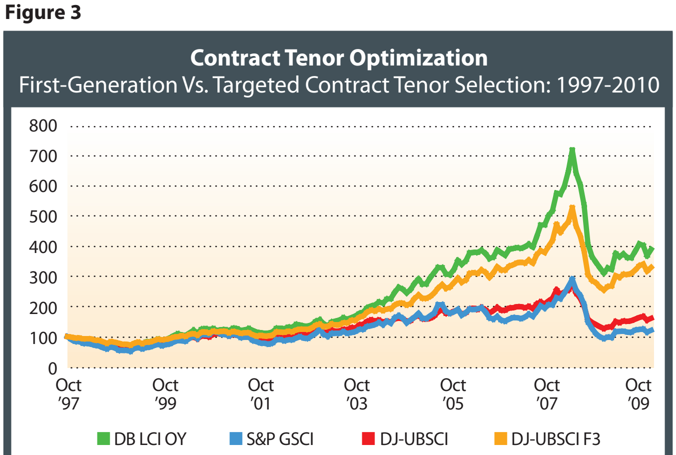
Figure 2



Diversification Along The Futures Curve
First-Generation Vs. Multi-Tenor Contract Selection: 1997-2010

Source: Bloomberg

Figure 3



Contract Tenor Optimization
First-Generation Vs. Targeted Contract Tenor Selection: 1997-2010

Source: Bloomberg

The Deutsche Bank Liquid Commodity Index - Optimum Yield Index takes an approach analogous to the Best Basis strategy for oil. This index has fixed weights for commodities, but for each commodity, it selects the contract expiring within the next 13 months with the highest "implied roll yield" (defined similarly to Best Basis). This enhancement can lessen the negative impact of contango and increase the positive effect of backwardation. Like the first-generation indexes, the DB Liquid Commodity Index - Optimum Yield continues to overweight the energy sector, which makes up 55 percent of the overall index.

The DJ-UBSCI 3 Month Forward (DJ-UBS CI F3) takes a different approach. It invests in the commodities contracts that the traditional DJ-UBSCI would hold three months from now. For example, in May 2010 the DJ-UBSCI F3 would hold the contract tenors for each commodity that the DJ-UBSCI would hold in August 2010. This feature places all the DJ-UBSCI F3 contracts farther out the futures curve, and since futures curves tend to be flatter as tenor is extended, the effects of backwardation and contango tend to be reduced. Figure 3 displays the 13-year performance of these second-generation indexes using targeted contract tenor selection.

It is important to note that the second-generation indexes were developed about 10 to 15 years after the first-generation indexes (with backfilled history), allowing them to ensure that their long-term historical performances were higher than that of the earliest indexes. That being said, the second-generation indexes *have* significantly outperformed the first-generation indexes, and this outperformance has continued in the recent, post-formation period. This suggests that these second-generation indexes can be a useful tool for commodities investors.

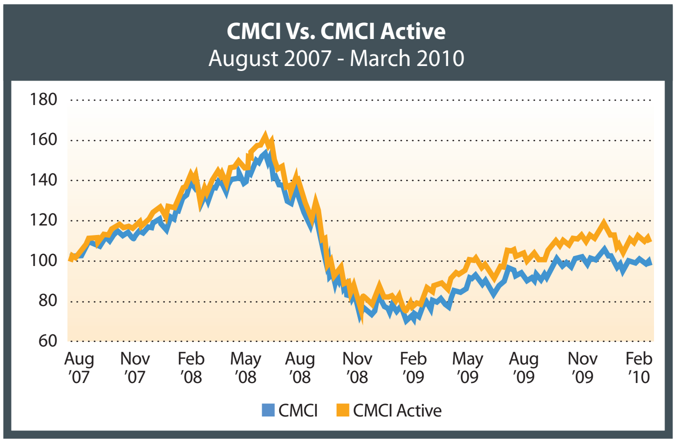
Third-Generation Indexes: Active Commodities Selection

The third generation of commodities indexes builds on the first two by incorporating commodities selection. These indexes attempt to improve returns by including (or overweighting) commodities that are expected to have high returns and omitting (or underweighting) commodities that are expected to have low returns.

One approach to commodities selection is through the use of discretionary analysis, and the UBS Bloomberg CMCI Active Index has adopted this approach. UBS research analysts assess the commodities markets and then adjust the CMCI benchmark component weightings and tenors in accordance with their views. One of the drawbacks to a discretionary approach is that it becomes impossible to create a long-term backfilled history. Historical performance must start from the launch of the index and the actual human intervention that leads to deviation from the core benchmark. Figure 4 compares the performance of the benchmark CMCI vs. the CMCI Active since its launch in August 2007.

Another approach to commodities selection is to use quanti-

Figure 4



CMCI Vs. CMCI Active
August 2007 - March 2010

Source: Bloomberg

tative model-based analysis. Recent research by Gorton, Hayashi, and Rouwenhorst[4] (GHR) has explored the relationship between the returns of commodities futures and the state of inventories. Their conclusion is that commodities with low inventories offer higher returns relative to commodities with high inventories. This occurs because producers who wish to hedge production must sell to speculators. Speculators incur price risk to the underlying commodity and require a price discount relative to the future expected price. This discount can be thought of as a risk premium. When inventories are relatively high, the price risk is less because buffer stocks of inventory can better absorb shocks, and the risk premium will be small. When inventories are relatively low, the price risk is greater, and the risk premium will be higher. GHR show the effectiveness of certain factors in assessing the state of inventories and their impact on commodities futures returns, including such measures as actual inventories, futures basis and futures momentum.

Figure 5 displays the monthly returns of the front oil contract sorted by basis at the end of the previous month, over the period January 1991 to January 2010. In months when the basis is positive (a market in backwardation), the average monthly return of the front oil contract is 2.20 percent. In months when the basis is negative (a market in contango), the return is -0.31 percent. This is consistent with both the common notion that it is better to buy commodities when they are in backwardation, and also with the GHR theory that basis is a good proxy for the state of inventory, and low inventory leads to a higher risk premium.

Utilizing a similar approach to create an active and investable commodities index, SummerHaven Index Management launched the SummerHaven Dynamic Commodity Index (SDCI) in December 2009 (and produced the index price history back to 1991). The SDCI incorporates the enhancements of the second-generation commodities indexes, such as optimizing contract selection to minimize contango effects or maximize backwardation benefits. Most notably, the SDCI utilizes model-based commodities selection. The SDCI selects 14 commodities on an equally weighted basis from an eligible universe of 27 commodities and rebalances monthly. This index construction creates a diversified commodities futures portfolio targeting specific commodity futures where the risk premium should be greatest, using basis and momentum, and also maintains diversification by returning to equal weights among the 14 components selected each month. One benefit of utilizing systematic model-based commodities selection is that the approach can be applied to historical price data to create historical index returns back to 1991, or further as necessary.

Figure 5

Oil Return Sorted By Basis: Jan. 1991 – Jan. 2010

	Positive Basis	Negative Basis
Average monthly return	2.20%	-0.31%
Standard deviation	8.94%	9.24%
Number of months	116	111
Annualized Sharpe ratio	0.85	-0.12

Source: CRB

Figure 6 displays the historical performance of significant first-, second- and third-generation commodities indexes since 1997.

Active indexes, of course, carry with them their own unique risks. The most salient is that the method used to select commodities may be unsuccessful, causing these indexes to underperform passive indexes. Analysts may not have, or may never have had, the ability to select the commodities that will outperform. Similarly, systematic methods are subject to the proviso that models that have worked in the past are not guaranteed to work in the future, even if grounded in economic theory.

Conclusion

The past 20 years have been an exciting time in the development of investable commodities indexes. Starting with the S&P GSCI and the DJ-UBSCI, the first generation of indexes were designed to represent the most widely produced commodities, in the most liquid part of the futures curve. The second generation of indexes took up where the first left off: representing the most widely produced commodities, but making some or all of the entire futures curve eligible for investment, mainly in the hope of minimizing contango. The third generation of commodities indexes takes the next step to commodities selection, actively attempting to choose, or weight, commodities in an investor's portfolio based on their attractiveness.

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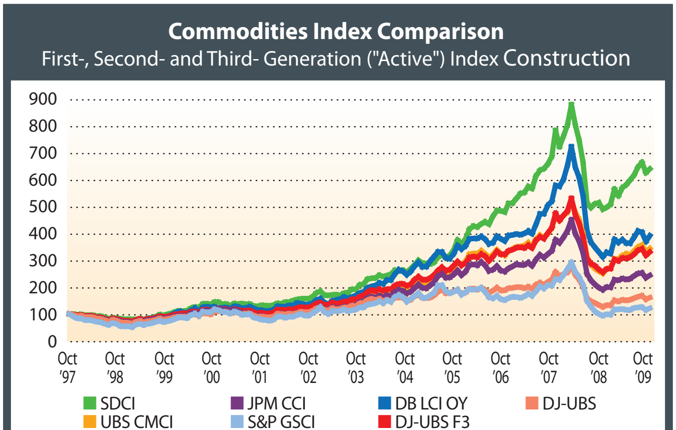
Figure 6



Commodities Index Comparison
First-, Second- and Third- Generation ("Active") Index Construction

Source: Bloomberg

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Endnotes

[1]All futures contracts eventually expire, so all indexes must roll positions.

[2]The S&P GSCI rolls WTI crude every month, while the DJ-UBSCI rolls every other month.

[3]This quantity is further multiplied by 365/(Exp_N-Exp_1), in order to adjust for time. Exp_1 is the expiration date of the front contract, and Exp_N is the expiration of the Nth contract.

[4]Gorton, Gary B., Hayashi, Fumio and Rouwenhorst, K. Geert, "The Fundamentals of Commodity Futures Returns" (Oct. 6, 2008). Yale ICF Working Paper No. 07-08. Available at SSRN: http://ssrn.com/abstract=996930