Bache Commodity Index[SM]

Research Report

The BCI[SM] Risk Reduction Methodology: A Case Study

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Introduction

After a significant rally in the first half of 2008, most commodity indices declined more than 50% during the period from July 1 to October 31. The decline over that 6-month period was all-encompassing across commodity sectors—all markets were under significant price pressure at the same time. Specific commodity allocation proved to be less of a differentiating factor among index performance because the index component losses were so broad-based.

The Bache Commodity Index (BCI[SM]) declined 31.4% in the same period—a considerably smaller loss than comparable indices–making it the best-performing among all commodity indices tracked by Bloomberg. The BCI[SM] outperformance was driven by the index's risk reduction methodology, which manages risk and volatility through a flexible allocation to Treasury bills. This study explains the unique BCI[SM] risk reduction methodology, and shows how this feature allowed the BCI[SM] to outperform comparable indices and prevent a major loss for the year 2008.

DJ-AIG Commodity Sector Indices
July 1 to December 31

Sector	Return
Energy	-66.1
Industrial Metals	-54.9
Agriculture	-39.4
Precious Metals	-14.0

Broad-Based Decline in Commodity Prices

The 2008 decline was unusual in that all commodity sectors were under significant pressure at the same time. The table above right shows the return of the Dow Jones-AIG (DJAIG) sector indices from July 1 to December 31, 2008. Precious metals was the best-performing sector, declining 14.0%, while energy was the worst-performing sector, falling 66.1%. Because all commodity sectors declined substantially, it made little difference whether an index was weighted more towards energy or towards agriculture, because both sectors declined by 40% or more.

The BCI[SM] was able to avoid a 50+ percent decline by dynamically allocating a portion of the index out of commodity futures and into Treasury bills. The table at right shows the performance of BCI[SM] sector indices during this down period. The BCI[SM] energy sector declined 39.9%, which is 26.2% better than the DJAIG Energy index. The BCI[SM] industrial metals sector outperformed DJAIG by 25.5%, agriculture by 16.8% and precious metals by 2.9%.

BCI Sector Indices
July 1 to December 31

Sector	Return
Energy	-39.9
Industrial Metals	-29.4
Agriculture	-22.6
Precious Metals	-11.1

Source: Bache Commodities

Detailed Analysis of the 2008 Drawdown

The performance of the BCI^{SM} steadily improved in comparison to the other indices as drawdown continued. The chart below right shows the drawdown of the BCI^{SM}, the DJAIG, and the SPGSCI starting on June 31, 3 days before all three indices opened the trading session at all-time highs.

During the first week of the decline, the BCI^{SM} risk reduction methodology did not offer any benefits, as the BCI^{SM} matched the other two indices in declining 5%. After the initial decline in the month of July, the BCI^{SM} began to outperform the other indices over the next five months. In the five months from July 31 to December 31 the BCI^{SM} declined 24.6%. The SPGSCI fell 56.9% and the DJAIG lost 42.6% during the same period.

The BCI^{SM} Risk Reduction Mechanism

The BCI^{SM} uses a dynamic asset allocation model to determine how much of each commodity to hold based on price momentum. Each commodity is given a minimum and maximum allocation in the index. The asset allocation model determines whether the allocation should be at the minimum or maximum level, or at some level between, based on the direction of commodity prices. The sum of the *maximum* allocations of all commodities in the BCI^{SM} is 100%, while the sum of the *minimum* allocations is 40%. The portion of the index that is not invested in commodities is allocated to Treasury bills.

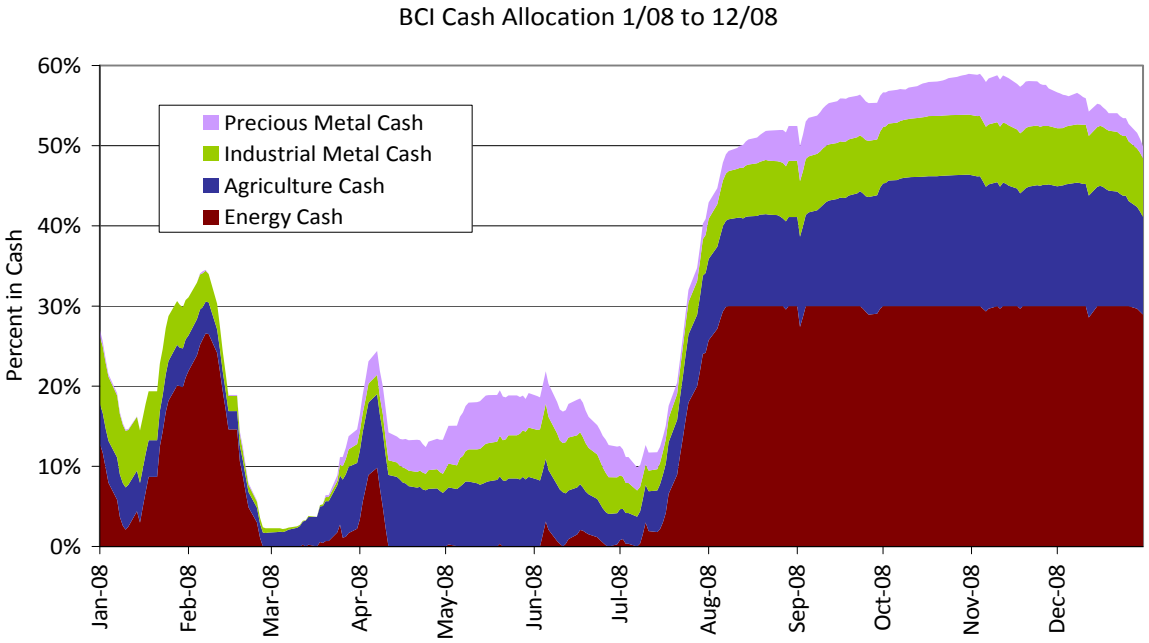
Treasury bills have an allocation in the BCI^{SM} alongside commodity futures contracts such as crude oil and soybeans (the Treasury bill allocation in the BCI^{SM} is also referred to as the *cash allocation*). At times, such as in November 2008, the allocation to Treasury bills in the BCI^{SM} is the largest single allocation in the index. At other times, for example in March of 2008, the allocation to Treasury bills is smaller than all but a few minor commodities in the index.

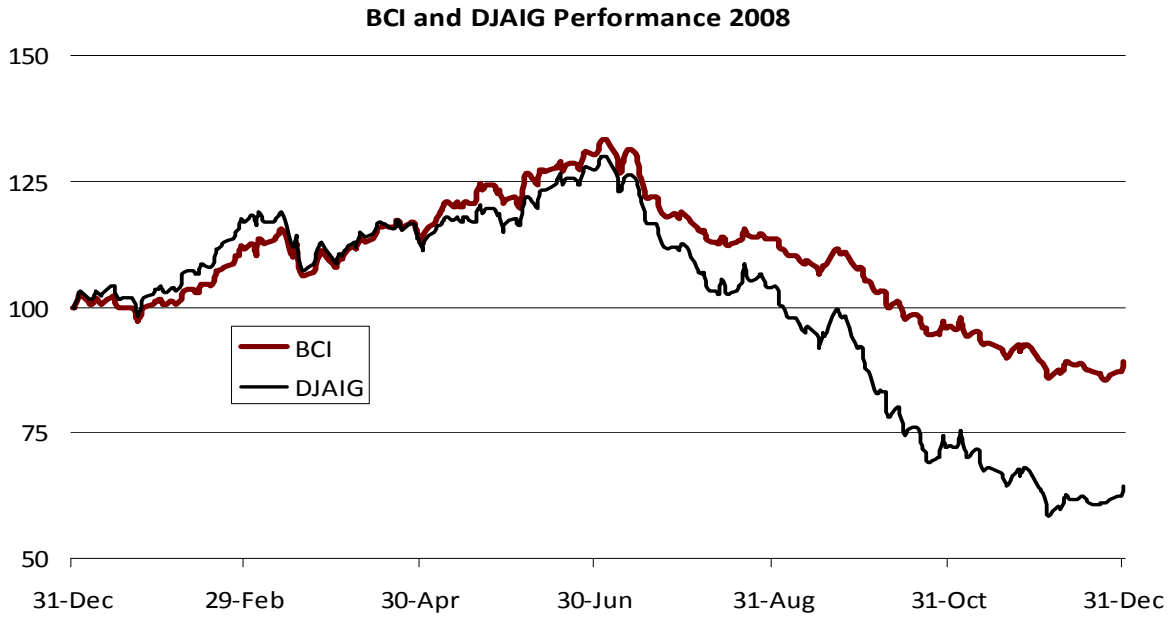
The risk reduction mechanism is based on research into the behavior of commercial commodity traders. Traders typically build commodity inventories when a shortage is anticipated and reduce inventories if a surplus is expected. The BCI^{SM} mimics this behavior by slowly increasing the allocation when prices are rising, and slowly decreasing the allocation when prices are falling.

The main benefit of the dynamic cash allocation is better performance for the BCI^{SM}. When commodity prices are falling, the index can move assets into cash to preserve gains. When commodity prices are rising, the dynamic cash allocation moves more money into the commodities that are trending higher. While holding cash can reduce returns in an up market, volatility is reduced by even more. As a result, the risk-adjusted performance of the BCI^{SM} is improved. The dynamic cash allocation also helps reduce the odds of a large loss because the cash allocation rises during broad-based declines in commodity prices.

The Dynamic Cash Allocation: A Graphical Analysis

The following graphs show the cash allocation to the BCI[SM] from the start of 2008 until December 31, 2008, and the total return of the BCI[SM] and DJAIG indices over the same period. The cash allocation attributable to each sector is highlighted in the top graph. The total allocation to cash is equal to the sum of the sector allocations. Because the energy allocation in the BCI[SM] is equal to 50% of total index weight, the largest cash allocation is also attributable to energy.





Potential Problems with the Risk Reduction Approach

While the July-August decline in commodity prices highlights the benefits of a dynamic risk reduction approach, there are potential difficulties that can arise. One issue with the BCI[SM] approach is tracking error. The BCI[SM] has a dynamic beta, while most other indices have a static beta. While the *average* beta of the BCI[SM] is highly predictable, *fluctuations* in beta can induce considerable tracking error versus other benchmarks if returns are evaluated at short time intervals. For example, the chart on the previous page shows the cash allocation of the BCI[SM] in March 2008 was close to zero, so the beta of the BCI[SM] was close to 1.0 (fully invested). However, five months later, in August 2008 the BCI[SM] had reduced its leverage (and beta) by 50%. The dynamic nature of the BCI[SM] beta means that tracking error and other benchmark performance measures are best evaluated over longer periods of time.

Consistent Performance

The BCI[SM] has outperformed the major commodity benchmarks in recent years. The table at right shows recent performance for the BCI[SM], the SPGSCI, the SPGSCI Light Energy, and the DJAIG indices. Several return horizons are analyzed. The BCI[SM] is the top performer among the four indices for the 3-month, 6-month, 1-year, 2-year, and 3-year time frames. This shows that an allocation to cash does not necessarily impair returns.

The BCI[SM] has the lowest volatility of all four indices in every time horizon. The lower volatility is a direct result of the dynamic risk reduction methodology.

Horizon Analysis for Periods Ending December 31, 2008

Total Return Horizons:	3 Months	6 Months	1 Year	2 Years	3 Years
BCI	-17.1%	-31.4%	-10.7%	4.6%	2.2%
SPGSCI	-47.0%	-62.2%	-46.5%	-15.7%	-15.5%
SPGSCI Light Energy	-36.1%	-52.8%	-39.5%	-13.9%	-9.2%
DJAIG	-30.0%	-49.4%	-35.6%	-13.5%	-8.6%

Volatility Horizons:	3 Months	6 Months	1 Year	2 Years	3 Years
BCI	19.5%	18.2%	19.3%	16.3%	15.1%
SPGSCI	58.0%	48.5%	40.0%	31.5%	28.5%
SPGSCI Light Energy	45.2%	38.4%	32.1%	25.1%	22.7%
DJAIG	39.0%	33.5%	28.6%	22.7%	21.0%

Sharpe Ratio Horizons:	3 Months	6 Months	1 Year	2 Years	3 Years
BCI	(3.55)	(3.98)	(0.54)	0.18	0.00
SPGSCI	(3.70)	(3.63)	(1.35)	(0.46)	(0.55)
SPGSCI Light Energy	(3.47)	(3.62)	(1.40)	(0.57)	(0.44)
DJAIG	(3.28)	(3.78)	(1.40)	(0.63)	(0.47)

Returns: Holding periods less than one year are not annualized. Highest return highlighted

Volatility: Annualized standard deviation of daily returns. Lowest volatility highlighted

Sharpe Ratio: Uses excess return indices and daily data. Highest Sharpe Ratio highlighted

With high returns and low volatility, the BCI[SM] delivered consistently higher risk-adjusted returns. The Sharpe ratio of the BCI[SM] and the SPGSCI are similar over 3-month and 6-month time frames. Over the 2-year horizon the BCI[SM] is the only index with a positive risk-adjusted return.

Summary

Beginning in July 2008, most commodity indices entered a 50+ percent decline. Large declines in commodity indices are rare. Broad-based declines of 20% or more occur only about once every three years in commodity markets and declines of 40% or more happen about once each decade. These events have a disproportionate impact on the long-run compound rate of return. The SPGCSI requires a 164% gain, more than twice the percentage it declined from its December 31 closing value, in order reach the July 1 level. At the same time, the BCI^{SM} needs a 46% gain to reach its July 1 value.

Notes:

Source for SPGSCI and DJAIG data is Bloomberg, LP. The source for BCI[SM] data is Bache Commodities Ltd.

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For more information about the Bache Commodity Index[SM], go to www.bache.com and select the tab marked BCI.