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Commodity Indexes **Overview and Analysis**

Unanticipated Inflation

Investors own commodities to protect themselves from unanticipated inflation, which may result from short-term wars (Gulf Oil War of 1990-1991), inclement weather (periodic droughts, floods and frosts), and currency devaluations (Asia in 1997 and Russia in 1998). In the 1990's, the returns from commodities have not been competitive with either stocks or bonds. It is likely that the declining values of physical products have benefited the bond market and supported stock market valuations during the decade. Commodity prices, measured in inflation adjusted terms, reached levels equivalent to their 1930's lows in mid-1999. Although average commodity prices have risen 25-30% in the past three years, the sector remains undervalued, particularly when compared to the financial markets.

Commodity investments will not produce the spectacular returns of the U.S. stock market during the 1990's. No other decade has witnessed anything close to stocks' 20% annual average return. Commodities represent insurance against unanticipated inflation. At current prices, this insurance is relatively inexpensive. Investors need not invest in commodities directly or hire a trading advisor. There are a number of commodity indexes, which can serve as a surrogate for direct investments. This paper evaluates the major indices available to investors.

Index Analysis

Five commodity indexes were reviewed and evaluated. Returns on these indices depend on the volatility of the individual commodities, the intercorrelations between commodities (these tend to be higher for the energy and grains than for metals or

foods and fibers) and the individual commodity weights. There are five major commodity sectors: energy, grains, metals, food and fiber and livestock. The London Metals Exchange Index (metals) was eliminated from consideration because it included just one or two of the five commodities sectors. The four indices analyzed were the Commodities Research Bureau (CRB), the Goldman Sachs Commodity Index (GSCI), the Rogers Raw Materials Index (RRMI), and Dow Jones-AIG Commodity Index (DJ-AIG). These indices and their June 2003 sector weightings are shown in Table 1.

The CRB index, which began trading on the New York Futures Exchange in 1986, is the oldest. The index has a number of drawbacks. First, its 17 components are equally weighted which means that orange juice has the same weight as crude oil while oil has 50 times the economic significance. Second, the CRB is the geometric average of its components rather than an arithmetic average. Geometric averages will understate their arithmetic counterparts. Most inflation indices are arithmetic.

The GSCI index was created in 1992 and is also exchange traded. Weights assigned to individual components are based on a five year moving average of world production values. There are two drawbacks to this index. First, the index automatically allocates more weight to commodities which have risen in price. Because commodities tend to revert to their mean average prices, a system which allocates more weight to assets which are above their mean prices and less to those below will generally underperform an index with constant comparable weights. The energy component of the GSCI has ranged from 42% to 60% depending on the price of oil.



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Secondly, the GSCI is rebalanced only once a year. Rebalancing allocates more capital to underperforming assets by taking away from outperforming assets. Indexes rebalancing monthly or more often have an average 2% annual average performance advantage over unbalanced indexes.

The Rogers Raw Materials Index was established in 1998. It is the broadest and most comprehensive index, comprising 35 commodities. Seven percent of the index value is traded on international exchanges. Assets are weighted according to their importance in international commerce. The weights are fixed. The index is rebalanced monthly.

The Dow Jones – AIG Commodity Index started in 1999. It relies on liquidity data (i.e., relative trading activity of an individual commodity) and the dollar adjusted world wide production data. These are averaged over a five-year period to determine component weights. Individual commodities must have a minimum weight of 2%. A sector's weight may not exceed 33% at the beginning of any calendar year. The index is rebalanced annually, losing about 1.5% return compared to monthly rebalancing.

Summary and Recommendations

Table 1 shows the characteristics of the four indices analyzed. The index which showed the best performance over the 1994-2003 period was the Rogers RMI. The Rogers RMI showed a 12% return for the past 10 years and a 10.9% return for the past 5 years. This return was 4%-9% better than the other three commodity indices for

the past 10 years and 3% to 12% better over the last 5 years. Although the standard deviation of the Rogers RMI was higher than the DJ-AIG and CRB indices, the index's nominal performance more than offset the difference. The Rogers RMI better performance characteristics are evident in its higher information and Sharpe ratios. Its correlations to the stock and bond markets were both very low. The major drawback of the index was its large 37% maximum drawdown in 1998. This is the most an investor could have lost, which could be an issue for endowments and foundations who seek to make steadily rising annual payments (as a fixed percentage of their assets) to support their institutions and charities. It is less of a concern to family offices and pension plans.

The stock market is unlikely to continue to produce strong gains without some corrections. There will always be periods of unanticipated inflation. Commodities offer insurance against these events. The Rogers RMI has produced returns superior to the stock and bond markets over the past 5 years and competitive returns over the past 10 years. China's massive new infrastructure program will continue to increase the demand for commodities over the next decade. China is also the source of the manufactured goods' deflation which is restraining corporate earnings growth. Institutions interested in investing in a commodity index should consider the Rogers Raw Materials Index if they are looking for a broad index with international diversification.



Table 1
Commodity Indexes
 (Returns 1994-2003)

	<u>CRB</u>	<u>GSCI</u>	<u>Rogers RMI</u>	<u>DJ-AIG</u>
Started	1986	1992	1998	1999
Exchange Traded	Yes	Yes	No	No
Number of Components	17	22	35	20
Energy	18%	50%	44%	31%
Metals	24	12	21	29
(Gold)	6	2	3	9
Grains	18	18	21	21
Food/Fiber	30	10	11	10
Livestock	12	11	3	9
Annual Return				
1994 - 2003	2.9%	7.1%	12.0%	8.2%
5 Years to Q2:03	-1.0%	7.9%	10.9%	6.6%
Standard Deviation				
1994 - 2003	8.8%	19.9%	15.4%	12.9%
5 Years to Q2:03	10.1%	23.7%	18.4%	15.7%
*Information Ratio				
1994 - 2003	-3.00	1.72	8.75	4.08
5 Years to Q2:03	-0.84	0.84	2.43	1.55
Sharpe Ratio (3.00%)				
1994 - 2003	0.03	0.30	0.63	0.45
5 Years to Q2:03	-0.36	0.29	0.46	0.27
S&P 500 Correlation				
1994 - 2003	18%	3%	8%	11%
5 Years to Q2:03	19%	4%	13%	13%
Lehman Gov Correlation				
1994 - 2003	-9%	11%	-2%	1%
5 Years to Q2:03	-9%	12%	4%	5%
Maximum Drawdown				
1994 - 2003	-28.4%	-48.3%	-36.9%	-36.2%
5 Years to Q2:03	-28.4%	-48.3%	-36.9%	-36.2%

*Information Ratio (cumulative excess returns vs cash divided by the standard deviation of excess returns)

There is a substantial risk of loss trading futures, forex and options. Before investing please understand that changes in the cash and commodity futures price do not typically correlate on a one to one ratio with the corresponding commodity option price. Moreover, past trends in cash and futures prices on specific commodities do not necessarily forecast current profitability of options on those commodity futures. All known market news will not necessarily affect option prices since the news is usually already factored into the underlying futures price, as well as option value.

Futures trading involves risk of loss and is not appropriate for all investors