

INVESTING IN COMMODITIES: ISSUES AND CURRENT RESEARCH

This issue presents excerpts from a White Paper on commodity-related investments recently completed by Schultz Collins Lawson Chambers, Inc. (SCLC). Industry data indicate that fiduciary portfolios are increasingly incorporating “alternative” investment strategies, including strategies delivering commodity-based returns. Before they add commodity linked instruments to their portfolios, prudent fiduciaries might want to better understand the implications of doing so. This White Paper presents an objective overview of recent research into the nature of commodity investments and into the potential risks and benefits thereof so that each fiduciary may make an informed and intelligent decision.

The full text is found on our firm’s website (www.schultzcollins.com). We provide two excerpts in the form of:

- 1) The White Paper’s introduction; and,
- 2) A technical discussion on asset allocation.

Please note that we have removed all footnotes from these excerpts to conserve space. Footnotes are available in the full text version.

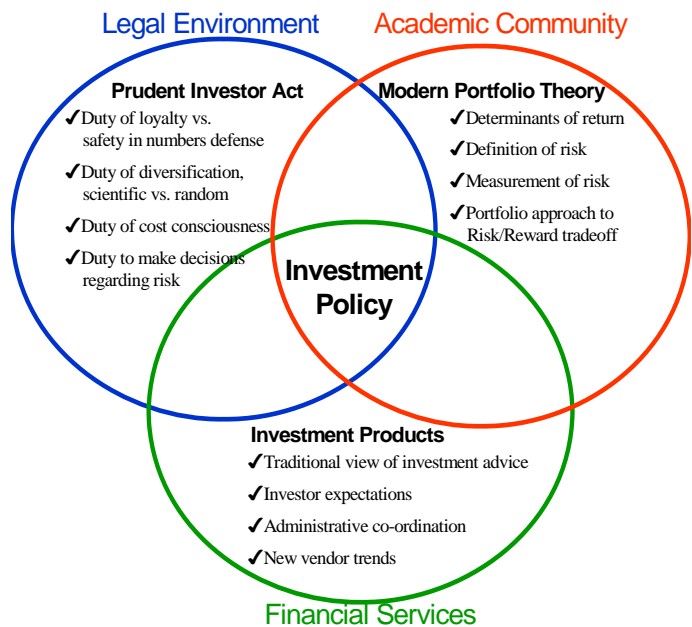
INTRODUCTION

A well-known aphorism in statistics states: “If you torture data long enough, it will confess to anything.” Perhaps nowhere is this truer than in the study of the risks and returns of commodity-related investments.

Historically, investors viewed commodities as a highly speculative venture advocated by salespeople using questionable – if not fraudulent – promotion methods. Recently, however, both institutional and individual investors have reconsidered commodities. The reasons for increased interest include:

- 1) The recent disappointments in equity returns (primarily associated with the meltdown in technology stocks and the lackluster performance of the S&P 500);
- 2) The sharply rising price of many commodities (especially in the energy sector);
- 3) The availability of investment programs and products offered by vendors (mutual fund companies, brokerage houses, etc.) with a better reputation for honest dealing;
- 4) The emergence of commodity indexes that provide suitable benchmarks for investment manager evaluations; and,
- 5) The appearance of several academic studies suggesting that ownership of commodities can provide significant economic benefits.

As institutional investors move more assets into commodity-related investments, discussions about the suitability of the



category increase, along with divergent opinions regarding future risk/reward expectations. The interest in and promotion of commodity-related investing also parallels the marketing of hedge funds, venture capital/private equity and other “alternative asset class” investments. However, hedge funds and private equity remain problematic for many institutional investors because of their lack of transparency and the difficulty of evaluating performance vis-à-vis any benchmark.

A brief chronology of sales pitches for commodity investments is instructive. In the 1970’s and early 1980’s, promoters recommended commodities as good investments because they acted as a “store of value” that preserved purchasing power against the ravages of inflation (or, in a more recent variation of this theme, against declines in the US dollar versus other currencies). As inflation subsided in the mid 1980’s commodity investments lost much of their luster (the gem trading companies that occupied space in almost every office building on Montgomery Street in San Francisco have completely disappeared). However, the market crash of 1987 generated a renewed enthusiasm for the doomsday portfolio, which was long commodities (especially gold and energy sector commodities), Swiss Francs, and non-US government bonds, and short both stocks (US and foreign) and the US dollar. Enthusiasm for the doomsday portfolio arises periodically due to war and terrorism scares as well as other macroeconomic uncertainty [“Yes, the doomsday portfolio has been a poor past performer – but this time is different”].

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In the mid 1990s, promoters argued that commodities provided a “pure play” on the growth of third world markets (especially China and India), where it was risky or impossible for a US investor to own local stocks or bonds.

Finally, in response to the NASDAQ’s dramatic decline in value since 2000, commodity-related investments have been touted as valuable tools for portfolio diversification and risk reduction. Often, several of these propositions are presented concurrently in an attempt to build a persuasive and elegant argument for this type of investment.

Usually, one would be inclined to listen politely to the investment promoters; check their claims; and, having confirmed that they are chimerical, go about the serious business of designing, implementing and monitoring a prudent and suitable portfolio. Indeed, there is a lot not to like about commodity investment sales pitches. However, there may be a legitimate case for using commodities. Promoters of commodities are currently quoting a jointly-authored, pro-commodity investment research paper from the heart of the ivory tower — the Wharton School at the University of Pennsylvania and the International Center for Finance at Yale. The academic evidence is mixed, so the case for investing in commodities cannot simply be dismissed as humbug.

A review of current research indicates intense debate regarding such fundamental issues as the nature of a commodity investment, sources (determinants) of return to commodity risks, and the usefulness of existing commodity-returns indexes. The debate poses questions such as whether commodity-related investments represent an asset class, whether they provide a hedge against inflation; and whether they are analogous to gambling. This essay summarizes the current thinking regarding these issues so that investors can better determine the suitability of a commodities-related investment.

ARE COMMODITIES AN ASSET CLASS?

Initially, we define an asset class as a group of assets with common statistical, economic, and fundamental characteristics. We expand the definition to capture four more concepts:

- 1) An investor in a risky asset class must have an unconditional expectation of receiving future excess return — that is a return in excess of the return on cash.
- 2) The excess return expectation comes from assuming the risk exposure inherent in the asset class and not from any specific investment strategy or skill. Thus, a stock market investor expects unconditionally that, on average, stocks

have higher returns than cash. The expected excess return can be obtained at low cost by purchasing a replicating indexed investment. Alternatively, a stock investor can buy an actively managed investment program, with returns conditional on the manager’s skills or on the strategies used in the program. That is to say, the attempt to “beat the market” is conditional on assuming a certain amount of non-market risk and active manager skill risk.

- 3) Securities within the asset class must be fairly homogeneous in nature (as with, e.g., legal contracts like bond indentures, whose returns are highly correlated to each other, and which are all subject to the same interest rate risks)
- 4) Finally, an asset class must be sufficiently uncorrelated with other asset classes that “[its] risk premium must arise from economic exposures that can neither be diversified, nor generated from other asset classes.”

Asset Allocation is the determination of the appropriate weighting (i.e., risk exposure) of an array of asset classes in a portfolio. There are two basic approaches to asset allocation: in asset-only, and asset-liability matching. An asset-only allocation algorithm may select asset classes that improve the “efficiency” (i.e., the risk/reward, or Sharpe ratio) of a portfolio’s terminal wealth; an asset-liability matching algorithm may select asset classes that minimize failure rates with respect to ongoing required cash flows. Although most tests for increased investor utility from an allocation to commodities focus on the asset-only side of the question, nevertheless, from an investor’s point of view, there are several practical criteria to consider:

“First, the asset should increase the expected utility of a portfolio. Utility is often defined in terms of the Sharpe ratio — any asset that increases the risk-adjusted return of the portfolio deserves some allocation in the portfolio. However, there are some assets that may increase the utility of a portfolio without increasing the Sharpe ratio. This is because a highly risk-averse investor may wish to add assets that offer positive cash flows in market conditions that are expected to offer the lowest returns to the remainder of the portfolio. The other criterion for an asset class is that the returns cannot be replicated with combinations of other assets.”

Fundamentally, with respect to commodities, the asset allocation question boils down to three questions:

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- 1) *Existence*: Does a commodity index represent a true asset class?
- 2) *Uniqueness*: Can the risk/return exposures of a commodity index be replicated by some combination of exposures synthesized from other asset classes?
- 3) *Utility*: Is there a realistic expectation of economically significant excess future reward?

This should not be surprising because solutions to traditional asset allocation problems depend on the existence of a variance/covariance matrix with unique properties (a positive, semi-definite, invertible matrix, the elements of which span the risk/return space). The core concept of modern portfolio theory — the “efficient frontier” — is a mapping of various asset allocations that enables the identification of that portfolio allocation which is likely to provide the maximum feasible utility for investors.

Unfortunately, it is a mistake to conclude that, because a type of investment has little correlation with other asset classes and earns positive excess returns that cannot be replicated by combinations of other asset classes, it must therefore be a truly disparate asset class. For example, it is possible to create a portfolio wherein “noise” — return patterns from random activities, such as buying lotto tickets, purchasing weather catastrophe futures, or gambling on the outcome of coin flips — satisfies these criteria.

The key is to recognize that correlation plays a secondary role, while the tests of replication (“spanning tests”) may yield greater insight. Formally, the excess return of the dependent variable — the commodity return series — is regressed on the sum of excess returns for the independent variables — every other asset class in the portfolio. If the regression constant (alpha) is statistically significant, the independent variable can be considered a truly disparate asset class. If the excess return is economically significant, the increase in investor utility (often tested at various confidence intervals through changes in the portfolio’s Sharpe ratio) may warrant the inclusion of the commodity investment.

Spanning tests, in and of themselves, must also be viewed critically. Addition of an asset class into small sample opportunity sets will always yield improvement in the portfolio’s Sharpe ratio (i.e., the efficient frontier is moved upward and to the left in risk/return space). All test results are, therefore, highly sample dependent. Furthermore, the tests can produce markedly different results depending on the frequency of data. Test results based on daily returns may be much different from results

based on weekly or monthly returns. Usually the tests are more robust when they use high frequency (daily) data; but noise is most prevalent in this type of data.

The research published by Scherer suggests that:

- 1) Returns to investment products based on several commonly used commodity indexes do not permit rejection of the null hypothesis that commodities are not a separate asset class, and,
- 2) Much of the utility of holding a commodities position is subsumed by including a TIPS (Treasury Inflation Protected Securities) position in the portfolio. Furthermore, “... it is more natural to think of TIPS as an asset class ...,” for they permit the investor to target inflation directly, and “... therefore have a unique economic exposure.”

However, where commodity return indexes created by European vendors were included in portfolios (for investors operating under short-sale constraints), the Betas of the commodity return vectors relative to US stocks and bonds were both negative and small (at a statistically significant level), implying that “commodities live a life of their own.” Additionally, for many levels of risk aversion, commodity investments improved investor utility at an economically significant level.

COMMODITIES VS. REITS & TIPS

In a similar vein, a recent study by Huang and Zhong of Penn State employs spanning tests (including a test incorporating short sale constraints) on daily data to determine whether TIPS, REITs (Real Estate Investment Trusts) and Commodities (Goldman Sachs Commodity Index) are substitutes for each other in globally diversified, balanced portfolios. The authors test the portfolio diversification benefits of each of the three investments, as well as combinations thereof, by calculating the statistical significance of any resultant improvement in the portfolio’s Sharpe ratio. Based on the change in Sharpe ratio, they are able to rank the investments in terms of their diversification benefits. Finally, they break the sample period (January 1999 through December 2005) into sub-periods to find out whether diversification benefits change over time. They discuss the importance of accuracy in defining the nature of the correlation statistic. Most promoters of commodity investments use a long-term average correlation value (“unconditional correlation”). However, as with any statistical value, there can be substantial deviations from the average. One way of tracking these deviations is to calculate rolling cor-

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relations, to determine how the correlations act dynamically over the sample period. If, for example, correlations increase during periods of market uncertainty, the actual diversification benefit will be lower than that suggested by the unconditional correlation value.

We illustrate these concepts in the graph below, based on rolling twelve month correlations of monthly data. The graph illustrates the correlation of three investments (Real Estate, proxied by the NAREIT Index; TIPS, proxied by the Lehman Brothers Global Real US TIPS Index; and Commodities, proxied by the Goldman Sachs Commodities Index) with the S&P 500 from September 1998 through July 2006.

The unconditional correlations values (where 1 is perfect positive correlation, and -1 is perfect negative correlation) are as follows:

- ◆ Real Estate: 0.63
- ◆ TIPS: -0.49
- ◆ Commodities: 0.15.

However, one is struck by the changes of these values over time. For example, visual inspection indicates that, over the entire period, TIPS were the most effective portfolio diversifier. During the period of extreme market volatility in 2000-2001, however, it appears that commodities and real estate provided the greatest benefits.

Huang & Zhong used advanced econometric analysis to look at data over the 1999 through 2005 period for a more broadly diversified portfolio of US and foreign stocks and

bonds. The reader is cautioned again that test results are highly sample specific. However, the authors conclude that during the period under evaluation, TIPS were the most effective diversifier, and commodities the least. Over the entire sample period, the results of spanning tests under short sale constraints strongly reject the null hypothesis that the three return series, when introduced into the portfolio either in isolation or in combination, are not asset classes. For certain sub-periods, however, it becomes more difficult to reject the null hypothesis. This is suggestive of the authors' ultimate conclusion – that the diversification benefits of each investment change over time. The authors conclude:

“We find that the three asset classes are not substitutes for each other based on the analysis in a full sample. However, there is evidence of the substitution effect in certain sub-periods (quarters) when the analysis is done on a quarterly basis. In most of such cases commodity is redundant. Based on the increase in the tangent portfolio’s Sharpe ratio after the addition of an asset and the asset’s weight in the tangent portfolio, TIPS dominate REITs which in turn dominate commodity.”

However, because the diversification benefits of the three investments vary significantly over time, the authors find that each of the three investments benefited a portfolio of traditional stocks and bonds.

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