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Commodity Futures Investing: Method to the Madness

by Michael Plante and Jackson Thies

Commodity futures market participants have traditionally fallen into one of two groups: hedgers and speculators. Hedgers produce or consume a commodity and enter the market to reduce the risk of adverse price movements. Speculators, on the other hand, seek monetary gain by anticipating when and in what direction futures prices will move.

Recently, a third group has entered the marketplace. Seeking neither to hedge risk nor to speculate on prices, these individuals invest in commodity futures as a separate asset class, not unlike someone buying stocks or bonds.

Just as there are popular indexes that measure the value of groups of stocks, such as the Dow Jones industrial average, there are indexes that do the same for commodity futures. Investors in commodity futures often seek to create a portfolio that mimics one of these indexes—thus, they are known as commodity index investors.

The amount of money associated with commodity index investing has become nontrivial. For example, the net exposure to West Texas Intermediate (WTI) crude oil was recently estimated at around \$36 billion. This compares with about \$179 billion for all outstanding futures and options contracts on WTI crude oil.¹

To illustrate the rationale behind some market participants' determination that commodity futures investment is beneficial, we developed an example based on oil futures. This example shows that the benefits from investing in futures have varied over time and, at least for oil futures, appear to have diminished recently as markets have increasingly moved in sync.

Indexes and Commodity Indexes

An index provides a value for a variable (usually a basket of goods) on a specific date relative to the price it could command on some other

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date. For instance, the Standard & Poor's 500 index (S&P 500) is an index of stock prices for 500 publicly traded corporations in the U.S. Comparing the index's value on two different days provides a measure of how much the stock prices for those 500 companies have changed.

Commodity indexes are similar to stock indexes; they track the value of a group of commodity futures contracts instead of a group of stocks. The index specifies what commodities are tracked, which futures contracts are used (noting when delivery is to occur) and how the futures contracts are weighted within the index. (See *Index in Action: The S&P GSCI*.)

Most commodity indexes assume that the investor is going "long"—that is, buying a commodity that will be delivered in the future. The strategy implied by this is passive and distinguishes index investing from speculation.

When a futures contract is created, no money is exchanged between buyer and seller. The futures exchange requires both to post a deposit, although this is typically a fraction of the underlying value of the commodity involved. This means that for \$1, an investor gains exposure to more than \$1 worth of a commodity.

To ensure that the returns from a \$1 investment in commodity futures can be compared with the returns from \$1 in a stock, commodity indexes often assume that an amount equal to the total dollar value of the contract is posted as a deposit. This deposit is usually in the form of a short-term government bond. Returns on the commodity index, thus, come from two sources: the futures contract itself and the deposit.

Why Commodity Futures?

Why might an investor want to add commodity futures to a portfolio? Diversification could be one reason. Correlation measures the degree to which two variables move together. If commodity futures returns have a low or negative correlation with returns

from stocks, a portfolio that contains both may be a better choice than one composed of only stocks or commodity futures.²

To show how this works, consider a simple example using the S&P 500 index and a commodity index constructed to contain only futures for crude oil—specifically, contracts for NYMEX WTI (West Texas Intermediate crude oil traded on the New York Mercantile Exchange).³ Chart 1 shows the inflation-adjusted values for the S&P 500 and our index of oil futures from 1984 to February 2012.⁴

The S&P 500 had an average annualized return of 7.1 percent per month and the oil index an average return of 14.1 percent per month.⁵ While the average return on the oil index was greater, the volatility associated with that index was also higher because the dispersion of individual returns from the oil index around their

average was much wider.⁶ This implies that there was greater uncertainty associated with the returns in any given month when compared with stocks. The oil index is also visibly more volatile than the S&P 500 in Chart 1.

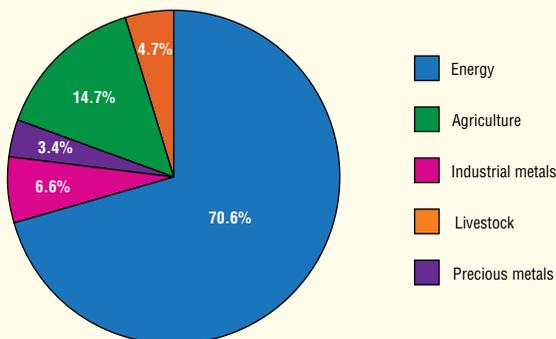
The closer to zero the correlation between the returns, the less the returns move together and the greater the diversification benefit achieved by combining assets in a portfolio. The correlation between the returns on the oil index and the S&P 500 over this period was low, approximately 5 percent. This suggests there could be a benefit to having both assets in a portfolio as opposed to just one or the other.

To examine the validity of this claim, we calculate the average returns and volatility associated with various portfolio combinations ranging from a portfolio entirely weighted toward the S&P 500 to one entirely weighted toward oil. We then plot these data to

Index in Action: The S&P GSCI

One real-world example of a commodity index is the S&P GSCI Index (previously known as the Goldman Sachs Commodity Index). This index tracks the value of futures contracts for 24 widely traded commodities. For each commodity, there are specific rules about which futures contracts are used. The weight of each commodity is determined by its economic significance in the global economy.¹

The chart below shows the weights used for broad categories of commodities in 2011. Given oil's importance, energy has the greatest weight, roughly 70.6 percent. This means that for every \$1 invested, 70.6 cents goes into energy-related futures contracts. The index assumes that the collateral on the contracts is invested in Treasury bills (short-term U.S. government debt).



Note

¹ More details regarding which contracts are included and how the weights are calculated can be found on the Standard & Poor's website at www.standardandpoors.com/indices/sp-gsci/en/us/?indexId=spgscirg-usd-sp-----.



create what is called the “efficient frontier” (Chart 2).

Point A represents the all-stock portfolio; point D, the all-oil portfolio. It is clear that, at least over this time period, an investor would have been better off moving away from the all-stock portfolio (A) to a portfolio with a small weighting to an oil index, such as point C. This is because point C, for a similar amount of risk (depicted by the standard deviation), increased the average return by an additional 2 percent.

One might wonder if the same benefit can be derived from simply investing in the stock of commodity-producing companies. Although we do not investigate that here, several factors might cause their returns to differ. For one, commodity-producing companies may hedge the price they receive for their production, eliminating exposure to the commodity price. Additionally, commodity-producing companies are affected by factors besides the price of the commodity they produce; company management plays a role, as does the firm’s capital and debt structure.

Diversification Potential Reduced

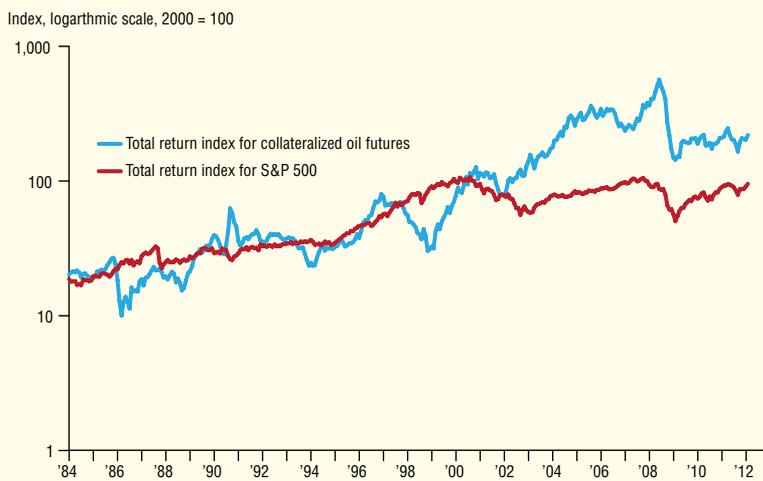
Given the significant changes that have occurred in the global economy and the increased interest in commodity futures markets, one might wonder whether diversification benefits have changed over time. For example, if crude oil futures respond to macroeconomic news to a greater extent now, the returns from them might be more correlated with stock returns than before.

To explore this question, we look at the efficient frontiers created using data over our entire sample, from 1984 to the present, as well as those created using data over just the past 10 and five years. The resulting efficient frontiers are displayed in Chart 3.

The frontiers created using the full sample and the recent 10-year period show that, in both cases, it would have been beneficial to hold at least a small portion of the oil index in combination with stocks. However, the proportion of the minimum-variance portfolio

Chart 1

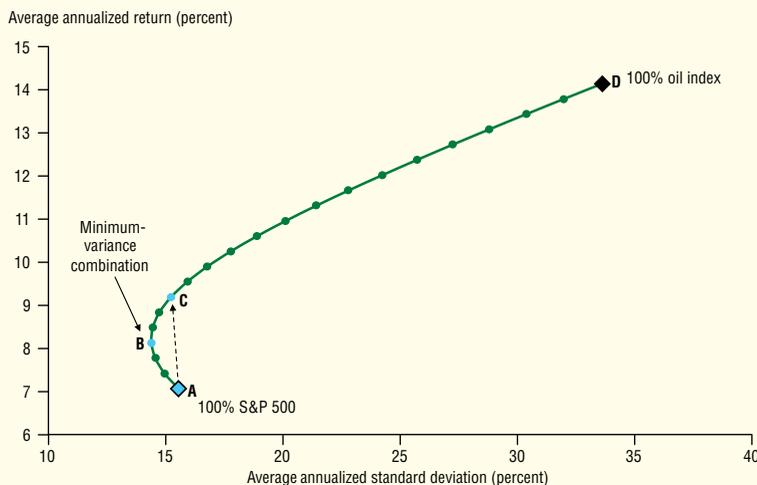
Oil Index Shows Greater Volatility than S&P 500



SOURCES: Bloomberg; Haver Analytics; authors’ calculations.

Chart 2

Combining Oil Futures, Stocks May Aid Returns, Cut Risk



SOURCES: Bloomberg; Haver Analytics; authors’ calculations.

dedicated to the oil index decreased in the more recent time frame.

An even more distinct shift comes when we examine the frontier created using data from the recent five-year period. As one might expect when looking at this bumpy time for stock and bond markets, the average return

declined significantly while volatility rose. During this period, little diversification benefit was gained by holding the oil index because the minimum-variance portfolio was one composed of only stocks.

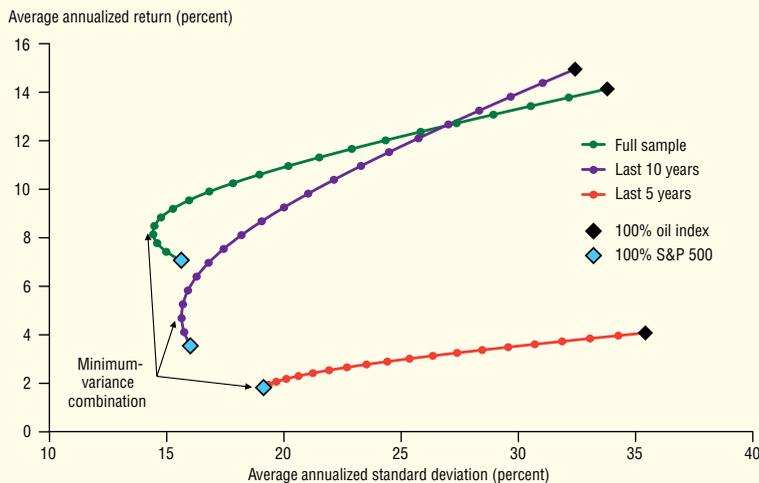
These results may not be surprising when we consider what has happened

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Chart 3
Efficient Frontier Varies over Time



SOURCES: Bloomberg; Haver Analytics; authors' calculations.

to the correlations between the returns. The correlation averaged about 28 percent over the past 10 years and 56 percent over the past five. While the diversification benefits achieved by combining the two assets in a portfolio were reduced, this may or may not hold for other commodities or commodity indexes.

Varying Benefits

Clearly, the possibility of higher returns and less volatility is an important rationale for commodity index investing. An important finding, however, is that these benefits appear to vary over time. Investors trying to diversify their portfolios by including commodity futures should bear this in mind.

Plante is a research economist and Thies is a senior research analyst at the Federal Reserve Bank of Dallas.

Notes

¹ See the Jan. 31, 2012, release of Index Investment Data from the Commodity Futures Trading Commission: \$36 billion is the net long exposure of commodity index investors to WTI crude oil to futures equivalent contracts; \$179 billion is the

notional value of total futures equivalent contracts for WTI crude oil.

² For more details, see "Portfolio Selection," by Harry Markowitz, *The Journal of Finance*, vol. 7, no. 1, 1952, pp. 77–91.

³ Our commodity index is constructed using the methodology found in Gorton and Rouwenhorst ("Facts and Fantasies About Commodity Futures," *Financial Analysts Journal*, vol. 62, no. 2, 2006, pp. 47–68). The details are as follows: In any given month, we hold the futures contract that is nearest to expiration but does not expire in that month. For example, in January, we hold the March contract (which expires in February). On the last business day of the month, we sell the contract using the closing price for that day, record our gains or losses and initiate a new position in the next futures contract. We assume the collateral is invested in three-month Treasury bills. The total return of the commodity index is the return on the futures contract plus the return on the T-bills, measured using a total return index.

⁴ The S&P 500 total return index assumes dividends are reinvested.

⁵ Returns are pretax and adjusted for inflation and do not account for transaction costs.

⁶ Volatility is the standard deviation of the returns over the time frame considered.

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