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Derivative Instruments

Facts and Fantasies about Commodity Futures

Gary Gorton & K. Geert Rouwenhorst

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Abstract

For this study of the simple properties of commodity futures as an asset class, an equally weighted index of monthly returns of commodity futures was constructed for the July 1959 through December 2004 period. Fully collateralized commodity futures historically have offered the same return and Sharpe ratio as U.S. equities. Although the risk premium on commodity futures is essentially the same as that on equities for the study period, commodity futures returns are negatively correlated with equity returns and bond returns. The negative correlation is the result, primarily, of commodity futures' different behavior over a business cycle. Commodity futures are positively correlated with inflation, unexpected inflation, and changes in expected inflation.

Imagine an asset class that has returns that (1) are the same as those on the U.S. stock market but (2) are less volatile than stock returns, (3) are negatively correlated with the returns on stocks and bonds, and (4) are positively correlated with inflation. The asset class is an investment in commodity futures.

Despite being an old asset class, commodity futures are not widely appreciated. Futures contracts are agreements to buy or sell a commodity at a future date at a price that is agreed upon today. Except for collateral requirements, futures contracts do not require a cash outlay for either buyers or sellers. The buyer of a futures contract is, on average, compensated by the seller of futures if the futures price is set below the expected spot price at the time of the expiration of the futures contract. The opposite is true when the futures price is set above the expected future spot price. In 1930, John Maynard Keynes postulated that sellers of futures (hedgers) would, on average, compensate the buyers of futures (speculators)—a situation he referred to as "normal backwardation." By examining the returns to futures over long periods, we indirectly tested this Keynesian prediction.

We constructed a dataset of returns on individual commodity futures going back as far as 1959. The dataset combines information about individual commodity futures prices obtained from the Commodity Research Bureau (covering, among other exchanges, the Chicago Board of Trade and Chicago Mercantile Exchange) and the London Metal Exchange. We computed investment returns by rolling positions in individual futures contracts forward over time. Commodity futures were combined into an equally weighted index, and much of the article is concerned with the behavior of this index.

We show that over a 45-year period, a diversified investment in collateralized commodity futures earned historical returns that are comparable to U.S. stock returns. The economic rationale for these returns is the reward that investors in commodity futures receive for providing price insurance to commodity producers. The reward for providing price protection (rather than foreseeable trends in commodity prices) is the key to the returns that a futures investor can expect. Individual commodity futures can be very volatile, but much of this volatility can be avoided by investing in a diversified index of commodity futures.

The average historical returns to the equally weighted index of commodity futures has exceeded the return on U.S. T-bills by about 5 percent a year. This excess return is about the same as the historical risk premium on the S&P 500 Index over the 1959–2004 period, but the commodity futures index had a slightly lower standard deviation than the S&P 500. The relatively low volatility of the commodity futures index stems from the fact that the pairwise correlations between individual commodity futures are relatively low.

Commodity futures are less risky by other standards. First, the distribution of commodity futures returns is skewed to the right, whereas equity return distributions are skewed to the left. In other words, relative to a normal bell-shaped curve, equities experience proportionally more crashes whereas the "crashes" in commodities most often occur on the upside, leading to positive returns to investors in commodity futures. Second, commodity futures have the ability to diversify portfolios of stocks and bonds. The sources of the diversification benefits are the ability of commodity futures to provide a (partial) hedge against inflation—stocks and bonds are poor hedges by comparison—and to partially offset the cyclical variation in the returns of stocks and bonds.

Finally, when we compared an investment in our index with a portfolio of stocks of commodity-producing companies, we found that these portfolios are not close substitutes: The stocks of commodity producers are more correlated with the broad stock market than with an index of commodity futures.

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