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INVESTING IN COMMODITIES

After many years of decline, commodity prices skyrocketed in the past few years. The price of a barrel of oil doubled over a six-month period in 2008, and the price of metals, food, and other basic materials rose rapidly, as well. These changes have had a bittersweet effect. Consumers tasted the bitter part as commodity price rises have hit family pocketbooks, dining tables, and everyday transportation. In contrast, commodities investors have enjoyed the sweet taste of rising commodity returns, along with their rising prices.

In this note we focus on commodity investing:

- How do commodity investments behave?
- What is the role of commodities in a diversified investment portfolio?
- What is the role of speculation in determining commodity prices?



Commodity investors rarely own commodities directly. Instead, they purchase commodity futures, which are quite different from stocks and bonds in that they are relatively short-term derivatives with a claim on real assets (securities that promise delivery of the actual commodity on a certain date). In addition, commodity futures prices and volatilities exhibit significant seasonality (they tend to go up in some seasons and down in others). In contrast to a stock or bond, which enable a firm to raise long-term capital, commodity futures are often used by individuals and firms to purchase insurance or hedge against the future value of their inputs or outputs. Southwest Airlines, for example, purchases oil futures to hedge (protect itself) against jet fuel price increases.

Commodity futures prices are not the same thing as commodity prices. A commodity futures price is, in essence, a bet on the future spot price of the commodity itself. So if an investor paid a dollar today for a commodity future with a delivery date in three months, that investor would enjoy a positive return at or near the end of the three month period, if the delivery or spot price is above a dollar, and a negative return if the spot price is below a dollar. It is easy to see that investors can make money when commodity prices are rising unexpectedly. Less obviously, investors can make money when commodity prices are falling unexpectedly. In declining markets, if the market has overestimated the expected future price drop, investors may be able to buy futures that are priced low enough so that the spot price just before the delivery date is higher than the futures price, even though the spot price has been falling. For example, an investor who pays a dollar for a commodity future can have a positive return if the spot price falls from \$1.25 to \$1.05 before the delivery date.

The other key element in understanding commodity futures behavior is backwardation.¹ The commodity future buyer is assuming a risk associated with the uncertainty of future spot prices, i.e., that the spot price of the commodity will be lower than he or she originally expected. The investor requires a certain compensation for taking on this risk,

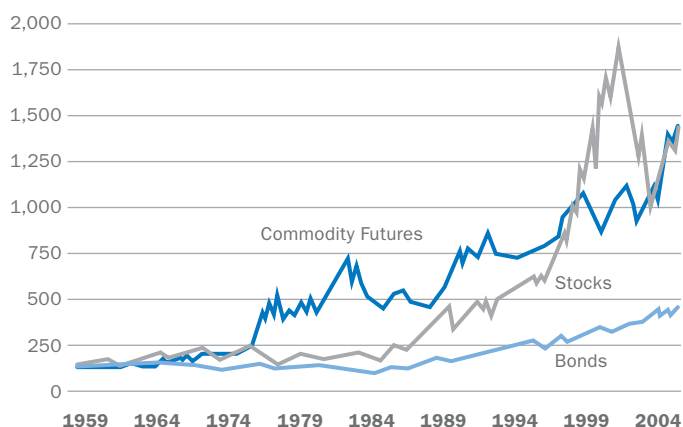
¹ A situation in which deliveries in the near future have a higher price than those made later on. This occurs when demand is greater in the near future.

which translates into a small discount on the futures price so when the futures and spot prices converge on or just before the delivery date that investor will have made a little more in return.

Research on commodity futures by Wharton Professor Gary Gorton and Yale Professor Geert Rouwenhorst shows that, from 1959 to 2004, an investor in an index of commodity futures would have earned an excess return over T-bills of about 5% per year — about the same as the excess return of stocks. In addition, the same research shows that the historical risk of commodity investing has been relatively low. A diversified, index-type investment in commodity futures has slightly lower risk (standard deviation) than stocks, and, because the distribution of commodity returns is positively skewed relative to equity returns, commodity futures have less downside risk.² As with any asset class there have been periods of volatility in commodity returns, but on average commodity prices tend to rise in a steadier manner than equities.

STOCKS, BONDS AND COMMODITY FUTURES INFLATION-ADJUSTED PERFORMANCE

July 1959 – December 2004



² Return and volatility results shown, as well as the chart above are from Gorton, Gary B., and K. Geert Rouwenhorst, 2006. "Facts and Fantasies About Commodity Futures," *Financial Analysts Journal* (Spring). See also Gorton, Gary B., Fumio Hayashi, and K. Geert Rouwenhorst, 2007. "The Fundamentals of Commodity Futures Returns" (unpublished working paper).

Commodity futures have also been shown to be especially effective in providing diversification in combination with more traditional asset classes. The correlation with stocks and bonds is strongly negative over longer holding periods, possibly because commodity futures perform better than more traditional asset classes in periods of unexpected inflation.³

CORRELATION OF COMMODITY FUTURES RETURNS WITH STOCKS, BONDS AND INFLATION

Overlapping Return Data
July 1959 – December 2004

	STOCKS	BONDS	INFLATION
Monthly	0.05	-0.14*	0.01
Quarterly	-0.06	-0.27*	0.14
1-Year	-0.10	-0.30*	0.29*
5-Year	-0.42*	-0.25*	0.45*

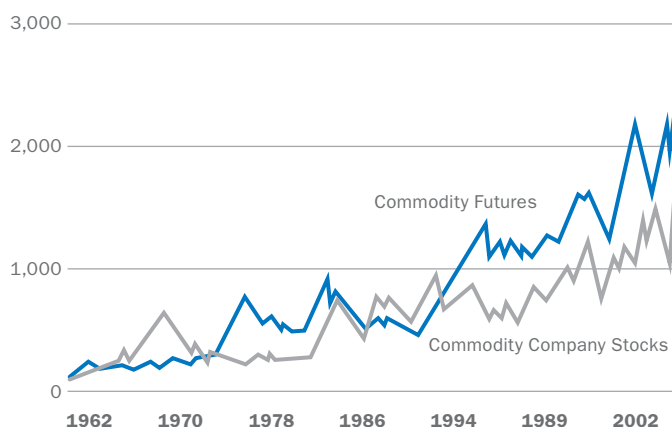
Further, commodity futures outperform and underperform stocks and bonds during different periods of the business cycle. They outperform late during an economic expansion and early during a recession. Conversely, they underperform early during an economic expansion and late during a recession. It is also clear from commodity research that futures do not behave quite like the stocks of commodity-oriented companies. The return correlation between commodity futures and commodity stocks is about 0.40, while the correlation between commodity stocks and other company stocks is about 0.57.⁴

³ The table above is from Gorton et al. 2006, op. cit. An asterisk indicates that the correlation is statistically significant. Correlation shows the degree to which two assets move together. A value of 1 indicates perfect correlation, a value of 0 indicates no correlation, and a value of -1 indicates the assets move in opposite directions. Correlations are based on the past; future correlations may be different, particularly in times of extreme negative performance.

⁴ Correlations and the following chart are from Gorton et al. 2006, op. cit.

COMMODITY FUTURES VS. SHARES OF COMMODITY COMPANIES INFLATION-ADJUSTED PERFORMANCE

July 1962 – December 2003



Finally, the research shows that there is a strong relationship between inventories and the prices of commodity futures and commodity spot prices. Commodities that are relatively easily stored (e.g., copper) attract less of a risk premium (i.e., less backwardation) than commodities that are harder to store (e.g., oil). In addition, falling or rising inventory levels can have an effect, both on futures and spot prices and returns. So there is some basis for believing that active management of commodity futures could be productive.⁵

Does this evidence suggest, as some have said, that the rapid rise in commodity prices is the result of speculators? To the contrary, much of the price increase is associated with fundamental shifts in the demand for commodities, fueled by developing nations and a healthy global economy. So the role of active investors in commodity futures, as with any security, is to bring to the market informed views on the future supply and demand fundamentals. Consequently, active investors can move commodity prices to the extent that other market participants believe that their actions are conveying relevant information on supply and demand fundamentals. And, as we have seen, commodity futures can provide positive returns when commodity prices are falling, as well as rising.

⁵ Gorton et al. 2007, op. cit.

In contrast to active investors, the role of index investors is to hold the commodity price risk that the producers wish to hedge and not to bring information to the market. Therefore, index investors do not move commodity prices in the same way as speculators. By providing additional capital to the commodity markets, the participation of index investors in the commodity futures markets can help to make those markets more efficient over the long run.

In conclusion, the historical performance of investments in commodity futures suggests that they are an attractive long-term asset class with which to diversify traditional portfolios of stocks and bonds. This can be done through one of several broad commodity indices that track the prices of a range of commodity futures (or one or more subindices that track a specific commodity). For example, the TIAA General Account's diversified portfolio includes timber and agricultural land as well as oil and gas leases. Commodities are an attractive option for a diversified portfolio.

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