

## The Producers

*The arrival of futures on individual stocks and narrow-based indices will bring some of the more esoteric strategies of hedge funds linking commodities and equities to the exchange-traded futures. In this first of three articles, we'll take a look at the link between commodity prices and the stocks of the producing companies. – Editors*

Is there an older profession than commodity production? No, the first organized economies organized themselves around life's little necessities, goods such as food, drink and clothing. The production and distribution of services came later, and their role is a topic for another day.

Just as a child can be spoiled by too-easy access to wealth, both countries and corporations can be deceived by the prospect of wealth extracted from natural endowments. And yet we know from experience that the two worst calamities to befall any nation are either having no resources or having them in such abundance that its economy is distorted. The unmanageable oil riches of the Middle East have done little to lift the lot of these countries' citizens. An earlier example of this same phenomenon was the Spanish plundering of gold from Mexico and Peru. The easy money led to inflation and helped perpetuate a feudal caste system. The nascent middle class on the Iberian Peninsula was destroyed, and both Spain and Portugal spent the next four centuries falling behind the rest of Western Europe.

### The Corporate Connection

Commodity producing companies, such as miners and crude oil producers, are in a position to provide investors with exposure to unique factors, such as copper or platinum prices, that can diversify a portfolio. The non-correlation or even negative correlation of these commodity price factors to such common financial factors as interest rates can lower a portfolio's risk. Of course, lower risk by itself is fairly worthless if unaccompanied by higher expected returns. If the stocks of commodity-linked corporations do not outperform the broad market when the underlying commodity is rising in price, or if these equities are not protected on the downside when the commodity price falls, then these stocks are destined to be chronic underperformers.

The relative performance of commodity-linked equities to the broad market as a function of the underlying commodity's price should describe the generalized profit profile of a call option. In principle, the only reason an investor should want to own one of these stocks is to gain exposure to the commodity for those few wonderful bursts of time when the commodity surges in price.

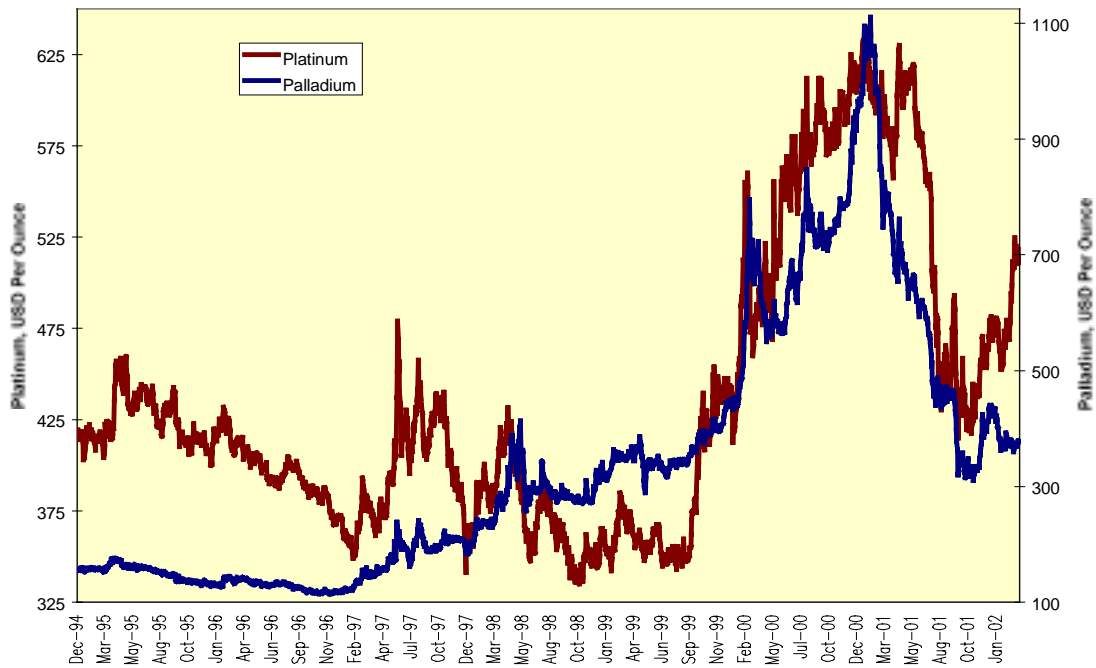
In fact, the exposure to a single commodity price is so risky for the producing company that it is difficult to locate and isolate single-commodity plays. Most commodity producers diversify across a portfolio of commodities, integrate vertically to include processing, transportation, distribution and marketing, or are included in state marketing boards. Let's take a look at some examples.

### Flatten 'Em With Platinum

Dante certainly didn't have the global distribution of resources in mind when he titled *The Divine Comedy*, but he certainly could have. On the one hand we have silicon, as abundant as sand on the beach and easy to fabricate. That this pedestrian element should be the workhorse of the information age, even more so than the faster and more exotic semiconductors such as gallium arsenide or indium phosphide is something for which we all should be grateful.

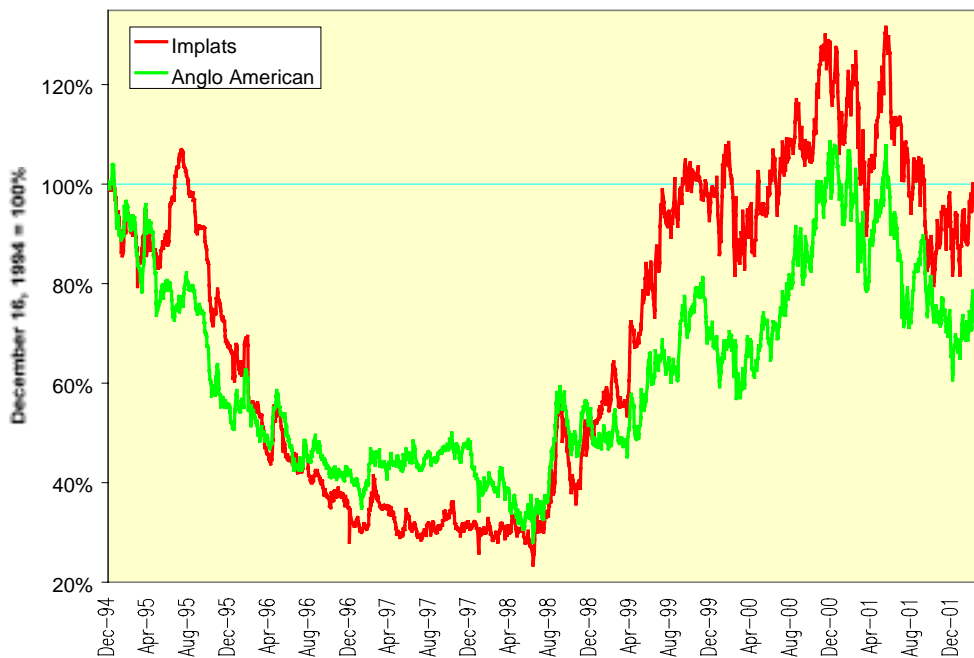
Then there's the platinum group, which includes iridium, rhodium, ruthenium and osmium in addition to the relatively more common and exchange-traded platinum and palladium. These elements are astonishingly useful as catalysts – by some estimates, more than one-fifth of all goods in the modern economy have platinum involved in their production process – and are both expensive and rare: An ounce of rhodium will set you back \$995, plus shipping and handling. To make matters worse, their production is concentrated in Russia and South Africa, with additional reserves in Australia and Canada. Disruptions in Russian production and exports have led to some significant price spikes and collapses, particularly for palladium, in recent years, as seen in "From Russia With Shove."

### From Russia With Shove



This sort of price volatility should, in a rational universe, be reflected in the attractiveness of the producers' shares. Let's take a look at the prices of two South African miners, Anglo American Mining and Impala Platinum Holdings (or "Implats"). The price of each stock relative to the Johannesburg Market Index is converted back to U.S. dollars, which will give the incremental return to an American investor desirous of platinum exposure.

### Currency-Adjusted Relative Performance of South African Platinum Miners

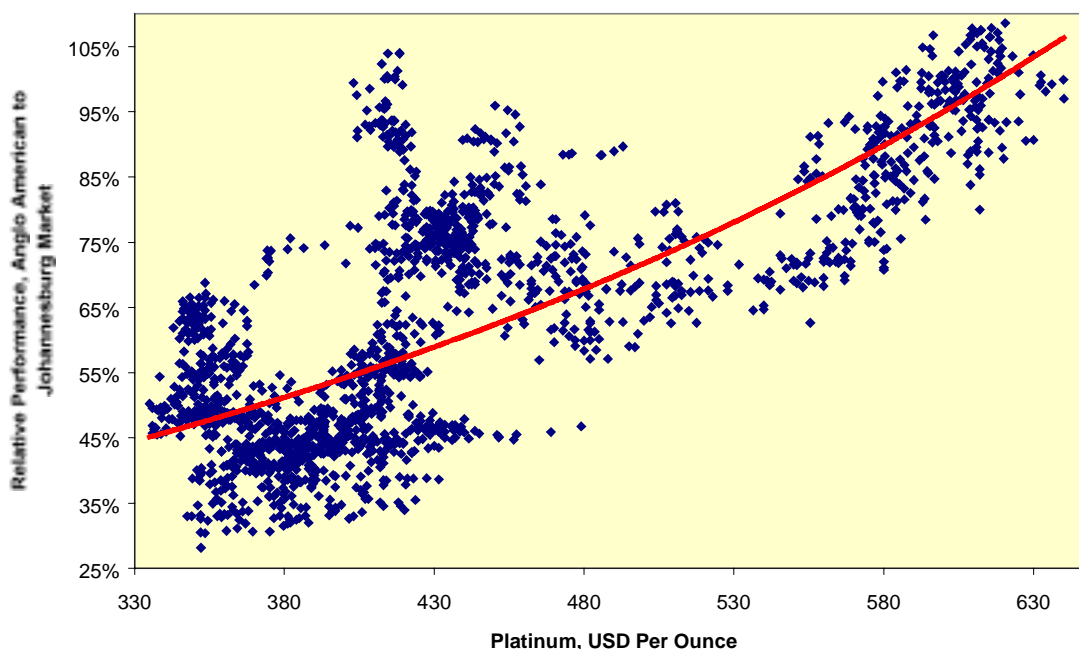


Now we can display this relative performance as a function of platinum prices; a single display, that of Anglo American (AMS), from December 16, 1994, onward will be used. After adjusting for the exchange rate performance of the South African rand (ZAR), the relative performance of Anglo American to the Johannesburg Market Index is an exponential function of the price of platinum:

$$\frac{ZAR_{t_i} * AMS_{t_i} / JOHMK_{t_i}}{ZAR_{t_0} * AMS_{t_0} / JOHMK_{t_0}} = 1.1762 * e^{.0028 * \text{Platinum}}$$

As the price of platinum moves higher, the relative performance of Anglo American rises even faster. Just the opposite is true: When platinum prices fall, the miner's stock falls more slowly. This is due in part to the ability of mine producers to shut in their high cost operations and thus preserve margins when commodity prices fall.

### Riding The Price Higher



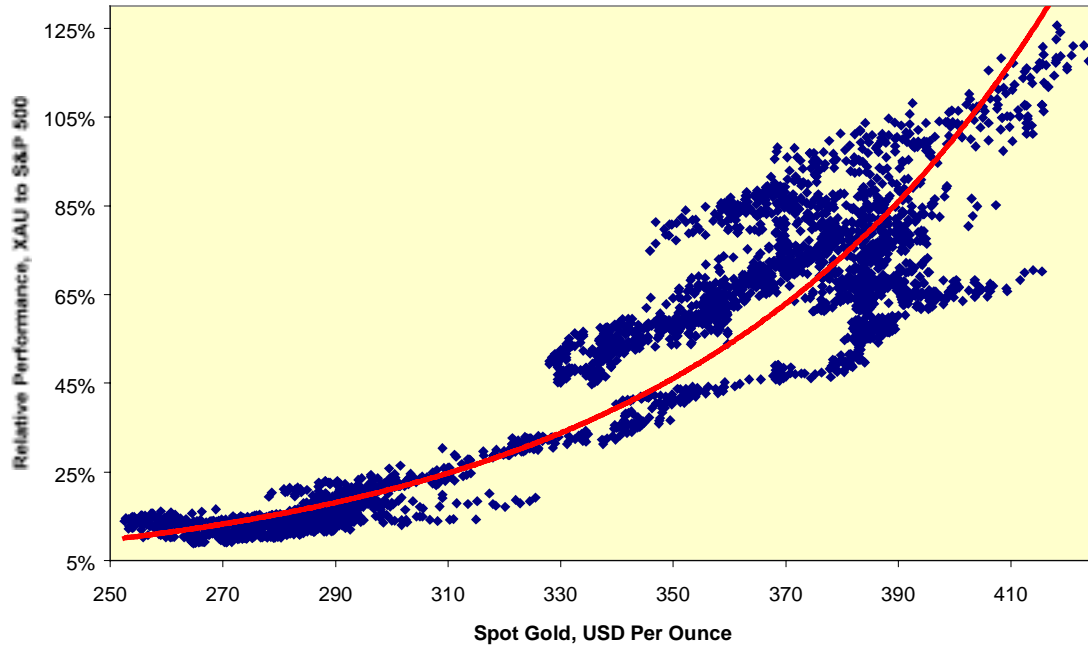
### As Good As Gold

A similar relationship can be constructed for the absolute price performance of a commodity-linked equity index, in this case the Philadelphia Gold & Silver Index (XAU), as a function of gold prices. A data sample going back to March 1989 is used here. What makes this confirmation interesting is the habit of gold producers have of selling their production forward each and every time the price of gold rises. In a rebuttal to the opening argument that commodity-linked equities should be valued in part as a call option on the commodity, these producers have decided to take away their investors' call option and simultaneously add a put option to the price of gold. This behavior should create a non-relationship between the performance of the XAU relative to the S&P 500 and the price of gold, yet we see the same call option characteristic here as we did for platinum:

$$\frac{XAU_{t_i} / SPX_{t_i}}{XAU_{t_0} / SPX_{t_0}} = .002 * e^{.0156 * \text{Gold}}$$

The very wide range of relative performance of the XAU relative to the S&P 500 suggests that the gold producers have sold their call and bought their put on the yellow metal at substantially out-of-the-money strikes. Since a far OTM put is fairly worthless unless the world comes to an end – always a bad bet as it's only going to happen once and you won't be able to collect your winnings – and since you can't collect much by selling an OTM call on a non-volatile commodity, the forward sales programs engaged in by the producers likely have been little more than a waste of time.

## Golden Confirmation



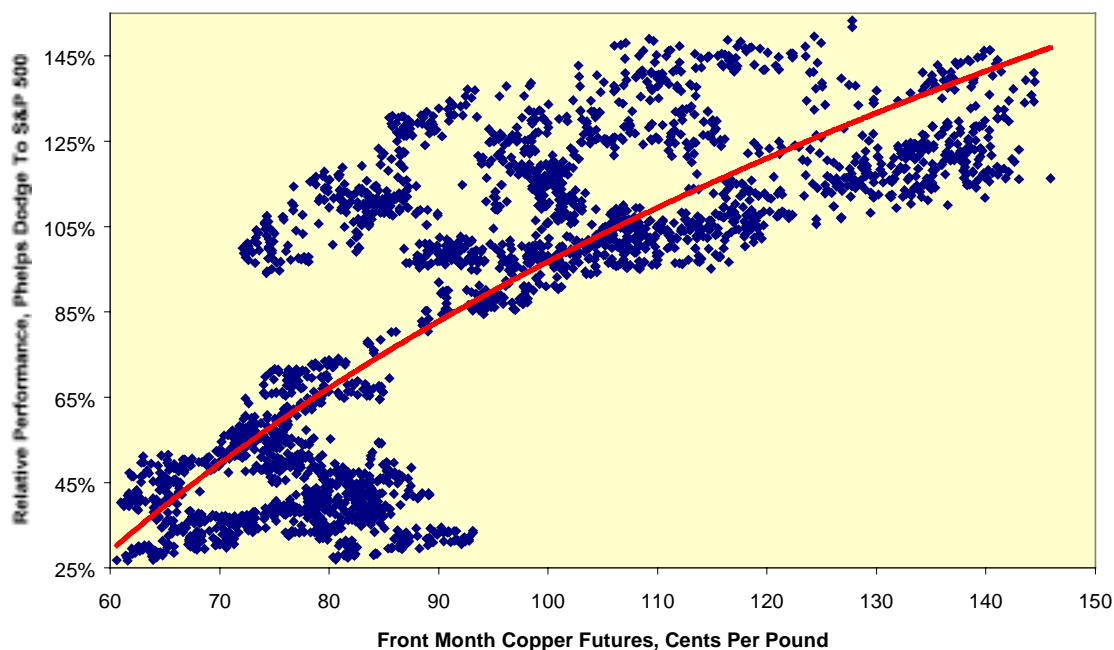
### Price Expectations

Gold almost always trades at a full carry level, and while platinum is as much of an industrial metal as a precious one, it seldom has an interesting forward curve. Copper, however, is given to spectacular bouts of backwardation on occasion due to a combination of strong industrial demand and supply disruptions/manipulations. The higher the price of copper goes, the more likely the market is to be in backwardation, and that condition is synonymous with lower price expectations. As a result, copper stocks should exhibit a declining marginal relative performance to their base index as copper prices rise.

This has been the case for one of the purest plays in the American copper industry, Phelps Dodge (PD), since July 1991. Copper stocks effectively have an embedded short call option on the price of copper:

$$\frac{PD_{t_i} / SPX_{t_i}}{PD_{t_0} / SPX_{t_0}} = -5.146 + 1.3277 * \ln(\text{Copper})$$

## Backwardation Dampens The Effect



### The New, New Thing

Financial engineering is about nothing but decomposing an asset into constituent cash flows and repackaging these cash flows into something else. A single stock future that represents the relative performance of an individual equity or index to a broader portfolio can be engineered to possess the characteristics of a call option on an individual commodity. At that point, how much of a leap is it to trade, say, a [long XAU/short SPX] future against a call option on gold?

Will there be a market for such a product? If daily trading volume in commodity-linked equities is any indication of demand for sophisticated traders for factor exposure, then it is incumbent on the futures industry to satisfy this existing demand. After all, the opposite tack of trying to create demand where none has existed before has been tried often enough.