

The Economist recently ran an article that looked at the bull market in commodities over the past several years and explained the enormous popularity of a number of commodity asset classes with the following rationales:

“Commodities promised a decent long-term narrative (Chinese and Indian demand) and the prospect of diversification, the only free lunch in the investment world: positive returns that are not correlated with other asset classes.”

http://www.economist.com/finance/displaystory.cfm?story_id=8031246

The thrust of this article suggests that as investors loaded up on commodities, the correlations between commodities and the broader markets has increased---thereby diminishing their appeal as a source of portfolio diversification. While this argument makes sense, it is also true that outsized gains in many commodities have simply ‘priced in’ assumptions of a high level of future scarcity that are very aggressive. If growth in demand is not as high as current prices suggest, then prices will either decline or may simply provide less attractive future returns. While I do not agree with the article’s heavy emphasis on the relative importance of increased correlation (as opposed to price) in making certain commodities markets less attractive, the discussion of correlation as a driver of value is timely.

Correlation is a pretty abstract concept to most investors, but it is a foundation of portfolio theory. Investments that are not well correlated to one another will help to limit total portfolio volatility. When one asset goes down, other assets will go up, etc. I especially like the description of low correlation with other asset classes as the ***only free lunch in the investment world***. This is indeed the case. There is very little agreement as to what investors should do to improve their portfolios, but the importance of combining assets that are not well correlated is universally accepted. People need to combine things that *zig* when others *zag*. The total risk in your portfolio is strongly determined by the correlations between portfolio components.

The correlation is a statistical measure that shows the degree to which any two things move together. Correlation is 100% when two things always move together, 0% when two things move independent of one another, and -100% if one always goes up when another goes down. ***It is crucial to understand that correlation does not tell you anything about volatility.*** You can have two asset classes that are perfectly correlated, but one may be three times as volatile as the other. A commodity such as gold may be very attractive in terms of correlation but still add so much volatility to a portfolio that you will never want more than a small fractional holding in gold.

It does make sense to consider correlation between asset classes in investing choices, and there are asset classes that have relatively low correlation to major equity and bond indices. Quantext Portfolio Planner (QPP) is a Monte Carlo tool that models total portfolio performance, including risk. QPP accounts for correlation between individual assets and asset classes. QPP uses historical data to look at correlations between portfolio components and I have calculated a correlation matrix between a series of broad ETF's and a Vanguard bond fund (VBIIX) for the last four years:

	SPY	QQQQ	EFA	IDU	IGE	VBIIX	^GOX
SPY	100%						
QQQQ	87%	100%					
EFA	82%	61%	100%				
IDU	36%	6%	48%	100%			
IGE	41%	28%	59%	39%	100%		
VBIIX	-12%	-24%	3%	51%	1%	100%	
^GOX	13%	12%	39%	23%	58%	10%	100%

Trailing Four Year Correlations (10/1/2002-9/30/2006)

The assets included here are an S&P500 fund (SPY), a NASDAQ fund (QQQQ), a fund that tracks the EAFE index of international large-cap stocks (EFA), a utilities index fund (IDU), and a natural resources ETF (IGE). We have also included ^GOX, the CBOE Gold Index. A correlation matrix shows you all possible correlations in a set of variables. In this case, we are looking at correlations in monthly total returns. The diagonal of a correlation matrix is always 100% because anything has perfect correlation to itself. To put these numbers in context, the correlation between SPY and the CBOE Gold Index (an

index that tracks gold mining stocks, ^GOX) is 13% over the past four years—very low. Over this period, the CBOE Gold Index has exhibited volatility that is about 3.5 times the volatility for the S&P500 and about twice the volatility of IGE and QQQQ, the most volatile of these ETF's.

The bond fund, VBIIIX, exhibits negative correlation with respect to SPY. This is quite common. The reason that bonds are attractive in a portfolio, despite relatively low total returns, is that they provide diversification effects that are very high. Negative correlation between asset classes is very attractive from a portfolio risk management standpoint. Utilities (IDU) and natural resources stocks (IGE) both exhibit low correlation to the S&P500 (SPY), but are still far better correlated to SPY than ^GOX.

While more and more investors have increased their allocations to international funds over the past several years in order to achieve improved diversification, it is interesting to note that the correlation between SPY and EFA over the past four years has been 82%.

It is also important to note that the natural resources index ETF (IGE) has exhibited much higher correlation to the international index fund (EFA), with a correlation of 59%, than to the two major U.S. equity index funds represented here (SPY and QQQQ). This is not surprising, since the U.S. has a relatively smaller fraction of its productive capacity associated with extraction and production of natural resources than many other economies.

It is interesting to note that there is a very low correlation between QQQQ and IDU: utilities appear to make a very effective diversifier for NASDAQ exposure.

	SPY	QQQQ	EFA	IDU	IGE	VBIIX	^GOX
SPY	100%						
QQQQ	89%	100%					
EFA	65%	47%	100%				
IDU	20%	-4%	29%	100%			
IGE	40%	26%	68%	39%	100%		
VBIIX	-11%	-15%	-13%	22%	-29%	100%	
^GOX	31%	28%	69%	19%	77%	-22%	100%

Trailing Two Year Correlations (10/1/2004-9/30/2006)

In light of *The Economist* article's point about the changing correlation between gold and other asset classes, we calculated the correlation matrix for the most recent two years (above). How have the correlations over the last couple of years changed, as compared to the trailing four year period? The correlations between the S&P500 and a number of the other asset classes are remarkably stable in time. QQQQ, IGE, and VBIIX all exhibit a very constant level of correlation with SPY between the two periods. By contrast, the correlation between ^GOX and SPY over the past two years is more than double the value observed over the past four years. The correlations of ^GOX with QQQQ and with EFA are also substantially higher over the past two years than over the past four.

So what do we learn from all of this? *The Economist* article cited at the start of this discussion points out that the low correlation that made gold so attractive a few years ago has increased to the point that gold provides far less diversification value. Aside from correlation, the volatility of an asset is crucial in determining its attractiveness—and gold is, and has always been, very volatile. There are a number of broad asset classes that provide low correlation and far lower volatility. Broad natural resource funds like IGE and utilities funds such as IDU exhibit low correlation to the broader markets with a manageable level of volatility. An asset class with a very high risk/return level, such as precious metals, is harder to manage around because of the enormous swings that are possible.

The second key point from looking at the correlation matrices is that an investor ultimately needs to look at correlations to the overall portfolio rather than correlations between individual asset classes. IGE exhibits higher correlation to EFA than to SPY. If

you mix SPY and EFA in a portfolio, the incremental value of adding in IGE will be lower than if you have no EFA. We add EFA to SPY in a portfolio to gain the diversification value that adding international stocks provides, but adding EFA diminishes the incremental value of adding natural resources. The same is true of bonds. To determine how to build a strong asset allocation plan, an investor will, ideally, be able to look at the incremental value of adding an asset to a portfolio. Further, because the total portfolio impacts of adding an asset are a combined function of both *volatility* and *correlation*, the investor needs to see the portfolio impacts of both. ***Quantext Portfolio Planner*** accounts for the range of correlation effects between assets as well as generating realistic projected values for volatility for individual assets, but many common methods do not. Without accounting for these correlations and volatility effects, it is often not possible to properly measure the impact of adding an asset class to a portfolio or to calculate the total portfolio risk with confidence.

Quantext Portfolio Planner is a Monte Carlo portfolio management tool. Extensive case studies, as well as access to a free extended trial, are available at <http://www.quantext.com/gpage3.html>