The Mysterious Case Of Gold And Crude Oil

Not too many people realize it yet, but the worst part of machine-driven trading is the absence of human traders making the same mistake over and over again. Two different pseudo-sciences, technical analysis and behavioral finance, are based on nothing more. No matter how many times you can demonstrate principles such as markets overshooting and then forming convergent retracement patterns or how traders feel the pain of loss far more than they do the pleasure of gain, you will be afforded an opportunity to do so again, perhaps quickly.

Viewed in another reference, if love makes the world go around, then the repetition of previous errors drives lovers' behavior. Enough of that; this is a trading magazine and besides, Dear Abby has left the building.

Spread This

All trades are spreads. You are not so much buying a stock as you are swapping the return on cash for the return on that stock. Spreads themselves can be divided into categories such as process spreads, joint products spreads, substitution spreads, related spreads, yield curve spreads and intermonth spreads (see "Think Before You Spread," *Futures*, April 2001). The purported relationship between gold and crude oil does not fall into any of these categories. It is an unrelated spread, something with no defining economic bounds and no expected distribution of returns. To get to the punchline, whenever you hear someone talking about the gold/crude oil ratio, you will profit more from walking away than hanging around for the damage to your cerebral cortex.

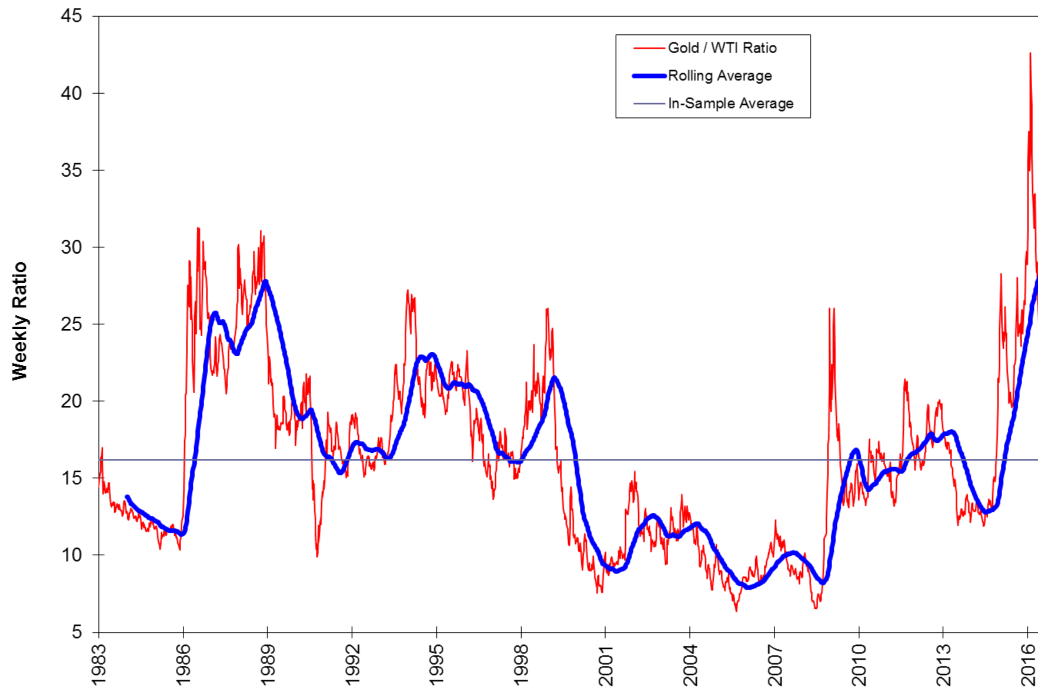
Speaking of matters neurological, the relationship between gold and crude oil must be hard-wired into our collective hard heads. This no doubt goes back to the inflationary 1970s, a time when both markets were rising, crude oil as the result of a series of supply shocks and gold as the result of monetary debasement. As an aside, crude oil often gets blamed for triggering that era's inflation even though Richard Nixon imposed wage and price controls in August 1971 and the first oil shock did not arrive until October 1973. How crude oil can cause something already underway for two years has been a puzzle ever since.

We can dismiss the fundamental relationship between crude oil and gold out of hand. After all, virtually all of the gold ever mined remains visible above-ground. Essentially, we extract it from the ground and re-bury it in vaults. Even industrial gold gets recycled endlessly, often by underage and underpaid laborers in places such as Ghana and the Philippines. Nearly all of the crude oil extracted has been consumed; inventories are a very trivial portion of this total and only a tiny amount of refined petroleum products such as lubricating oils ever get recycled.

The psychological linkage between crude oil and gold is a mathematical irrelevancy. If the spread was mean-reverting in nature, we should be able to classify it as a stationary series with attributes such as no trend in their mean, stable variance and an autocorrelation structure wholly dependent on the lag.

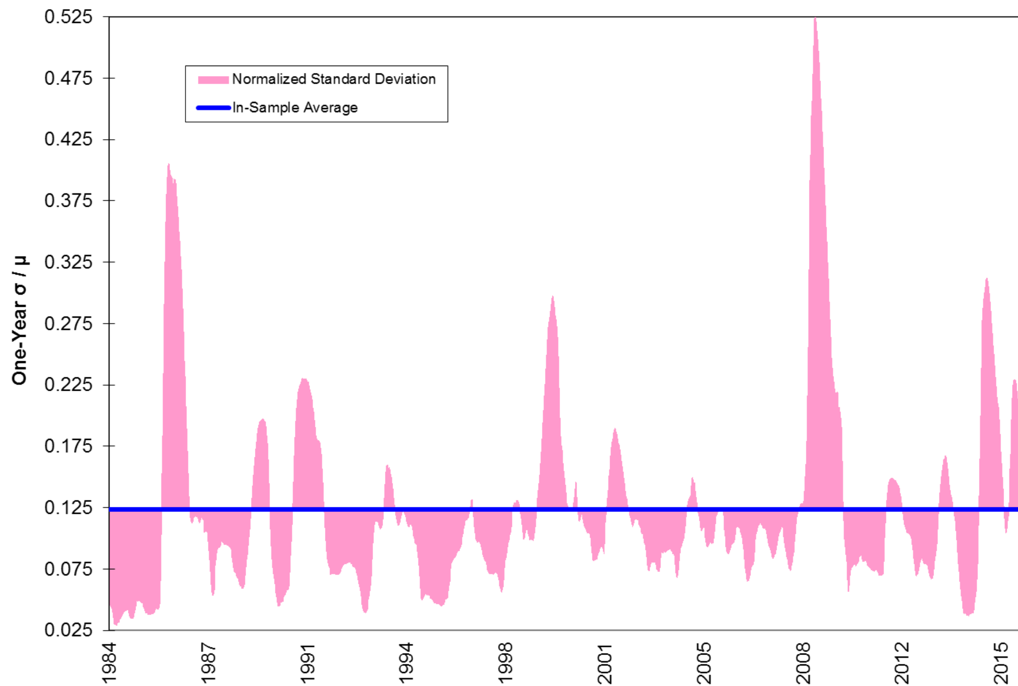
As seen below, the ratio of weekly cash market averages for gold and West Texas Intermediate crude oil (WTI) going back to January 1983 does not demonstrate a stable mean over time. Moreover, a rolling one-year average of the ratio ranges from about 7.9 to the February 2016 observed high of 42.61. At the end of June 2016, the ratio remained at a historically high level of 27.47.

Weekly Cash Gold / WTI Ratio



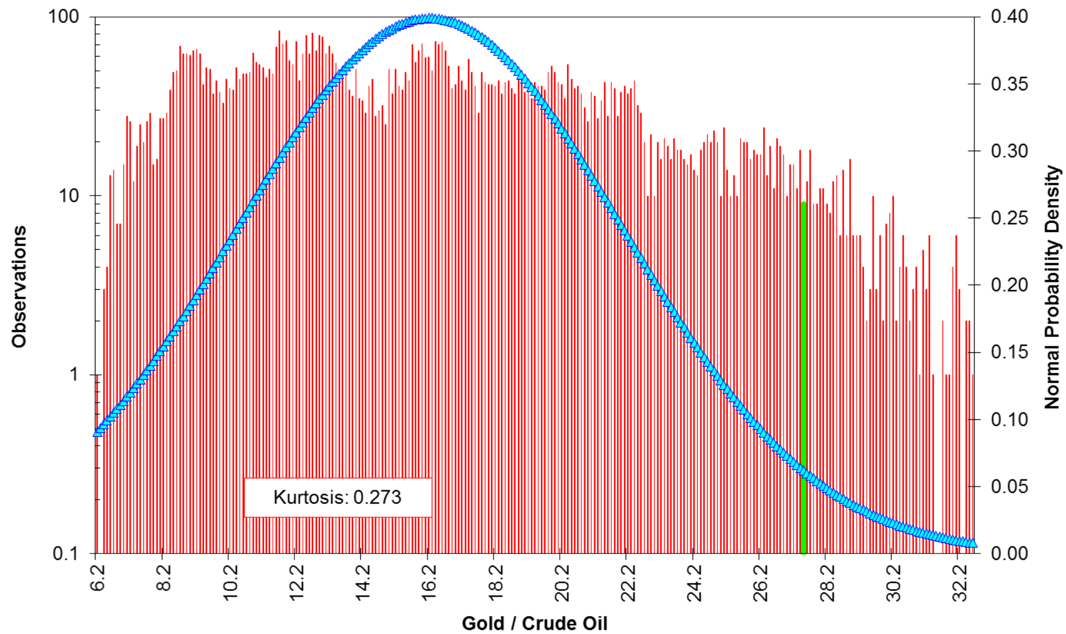
Source: CRB-Infotech CD-ROM

The series lacks stable variance over time. If we map its one-year rolling standard deviation divided by its one-year rolling mean, we see significant instabilities. The ratio's normalized volatility became strongly positive during much of 2015 before turning negative as gold approached its bear-market low in December 2015. The end-June 2016 level of normalized volatility of 0.1739 remains above the long-term in-sample mean of 0.12368.



Source: Bloomberg

Finally, a histogram of the ratio's distribution with a normal probability density curve overlain with a normal probability density curve shows an extremely flat (platykurtic) distribution with a strongly positive skew of 0.27. This is not a characteristic of a mean-reverting series. Should the ratio decline under a combination of higher crude oil prices and/or lower gold prices that would not be the result of a move back to a long-term stable mean but rather the intersection of two unrelated commodity price movements.

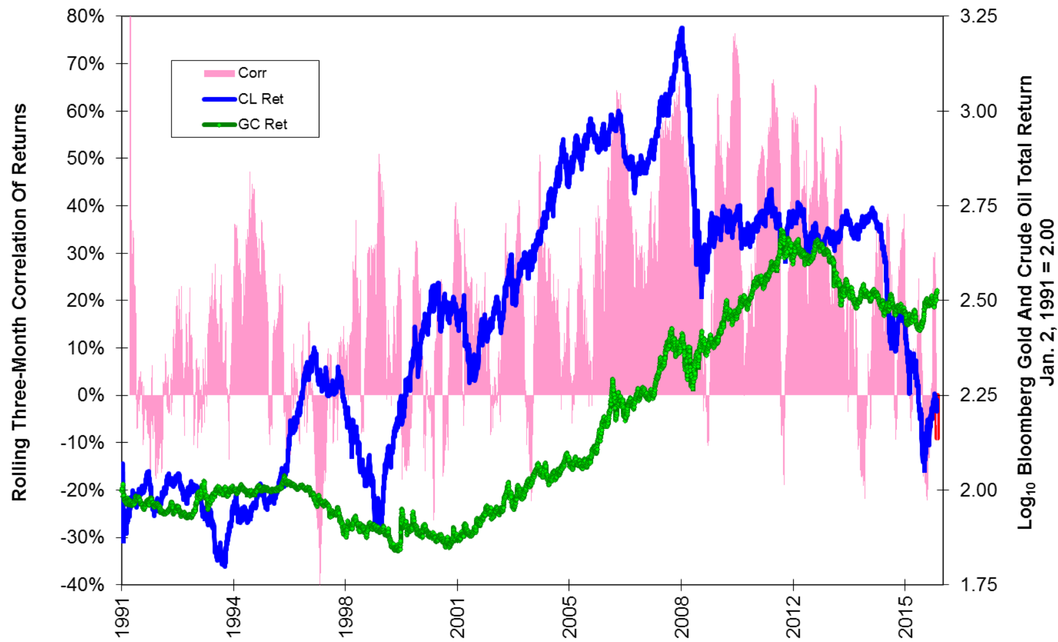


Source: Bloomberg

Investable Indices

What happens when we move away from spot markets to investable indices? Total returns for both WTI crude oil and gold as measured by the Bloomberg indices have rebounded over the past year. Gold's total return hit a local minimum of December 17, 2015, the day after the Federal Reserve's first post-crisis rate-hike and has gained 27.36% since then; WTI's total return hit its local minimum on February 11, 2016 and has gained 49.46%.

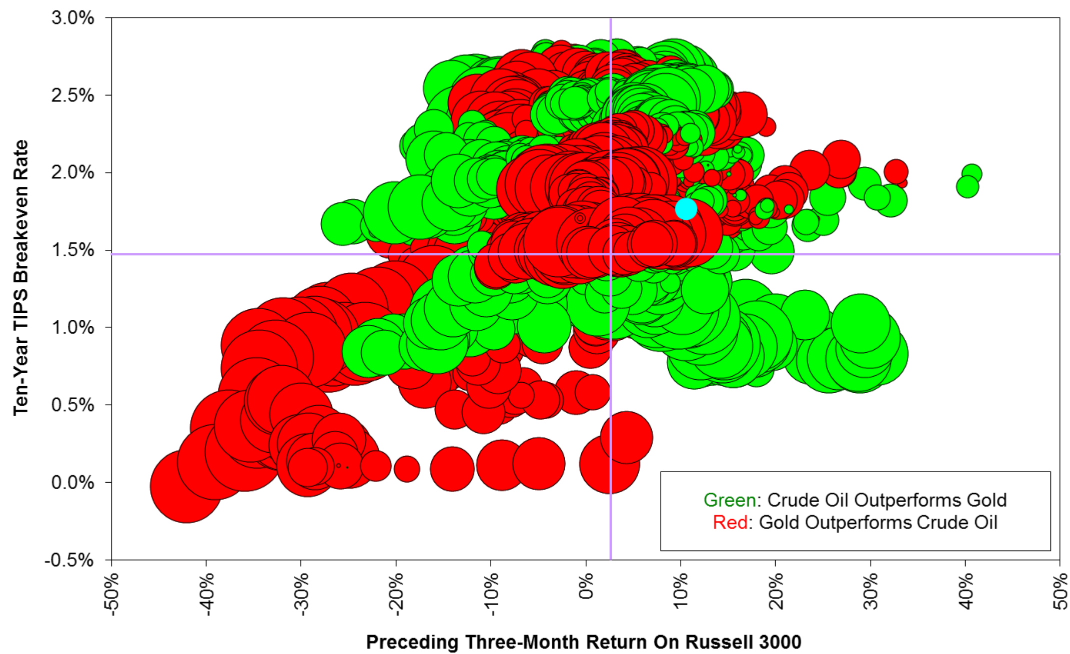
The rolling three-month correlation of returns for the two series was negative at -0.09 at the end of June 2016. To repeat the theme from above, as much as the two markets are linked in perception they remain unlinked in reality: The r-squared, or percentage of variance explained, between the two indices has been a completely insignificant 0.048 since January 1991.



Source: Bloomberg

Prospective Relative Returns

If we try to assess the prospective relative performance of crude oil and gold as a function of U.S. equity returns and long-term inflation expectations, we see a lobed pattern where gold outperforms (red bubbles) in a swath moving from the southwest to the northeast and where crude oil outperforms (green bubbles) in a swath moving from the northwest to the southeast. The end-June environment is marked with a bombsight and the last datum, from April 6, 2016, is highlighted. The present outlook is for gold to outperform over the next three months. It would take a decline in ten-year TIPS breakevens toward February 2016 lows to alter this outlook.



Source: Bloomberg

Nothing Will Change

Some things are predictable, and the notion traders, investors, commentators, speculators, analysts and, yes, quite possibly readers will associate gold and crude oil and speak of its ratio in hushed tones. Good; in a world increasingly characterized by the triumph of the machines, we need a little human messiness and sloppiness. After all, we do live in a world where PhD-toting central bankers continue to believe they and they alone can control output, employment, inflation and whatever else needs controlling. What if they, per Milton Friedman's famous aphorism, were to be replaced by a machine?