State-Dependence Of Currency/Equity Correlations

Some of the funkier theories at physics' frontiers involve multiple dimensions of time and questions whether it flows backwards as well as forwards or even whether it flows at all. That last notion that events apparently far apart in time actually are concurrent and their separation is but an illusion, has been around in religious texts for years. Talmudic scholars have interpreted Chapter 82 of the Book of Jasper, "And all Israel heard all these commandments, and all Israel rejoiced exceedingly in the Lord on that day," to mean all the Children of Israel, including those who had yet to be born.

A similar sentiment was voiced in Stanley Kubrick's The Shining: "You are the caretaker. You have always been the caretaker."

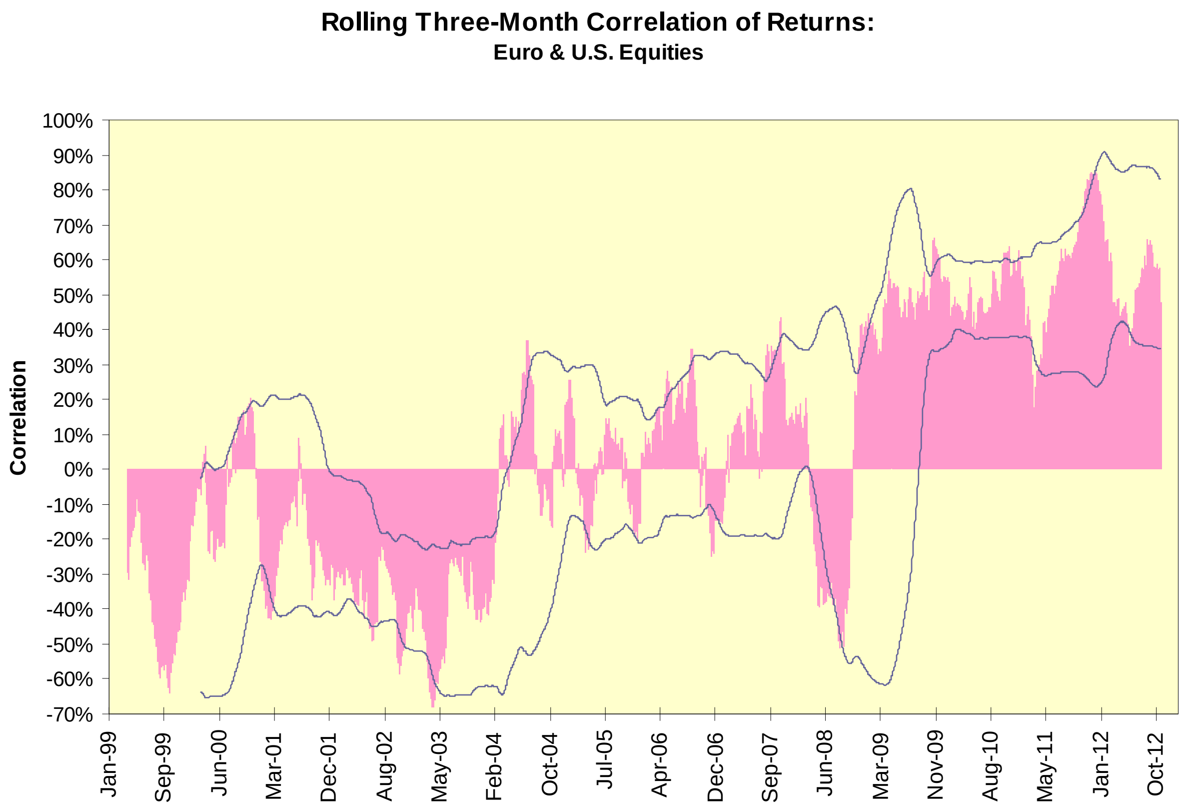
The Temporal Illusions Of Correlation

Intermarket relationships must trigger some very deep-rooted triggers in our brains to create the illusion whatever exists today always has existed and, while we are at it, always will exist. How else can we explain anomalies such as the switch between the longstanding perception higher crude oil prices were bad for equities held prior to 2004 moving to the exact opposite by 2009 and then completing the circuit by 2012 to the extent intraday twitches in stocks led to similar spasms in crude oil? Similar transformations existed between the euro and stocks or between gold and stocks.

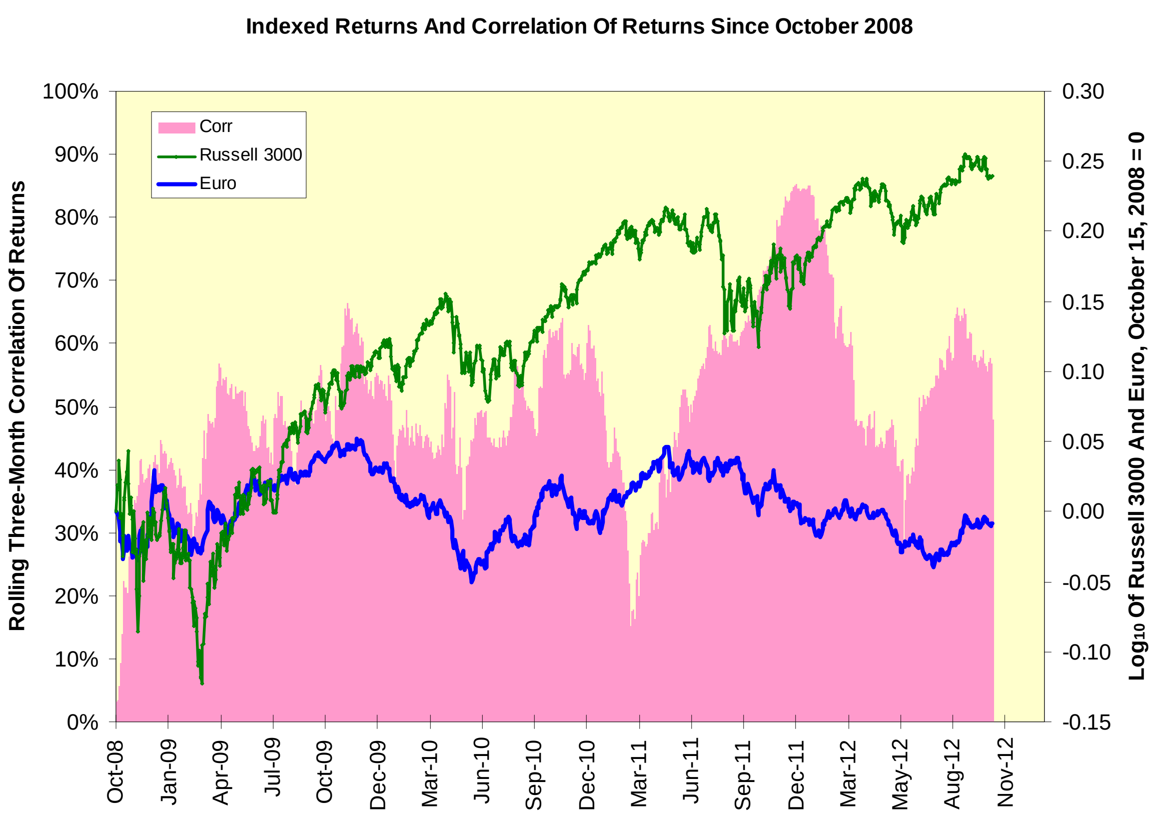
While the linking variables involved inevitably include excess financial liquidity, expected growth rates, expected inflation and, increasingly, the effects of algorithmic trading programs duplicating and therefore reinforcing one another in a fashion, some commentators posit a state-dependence: Correlation between X and Y rises during a bear or bull market for one or the other. Is this the case for currencies and U.S. equities?

The Euro

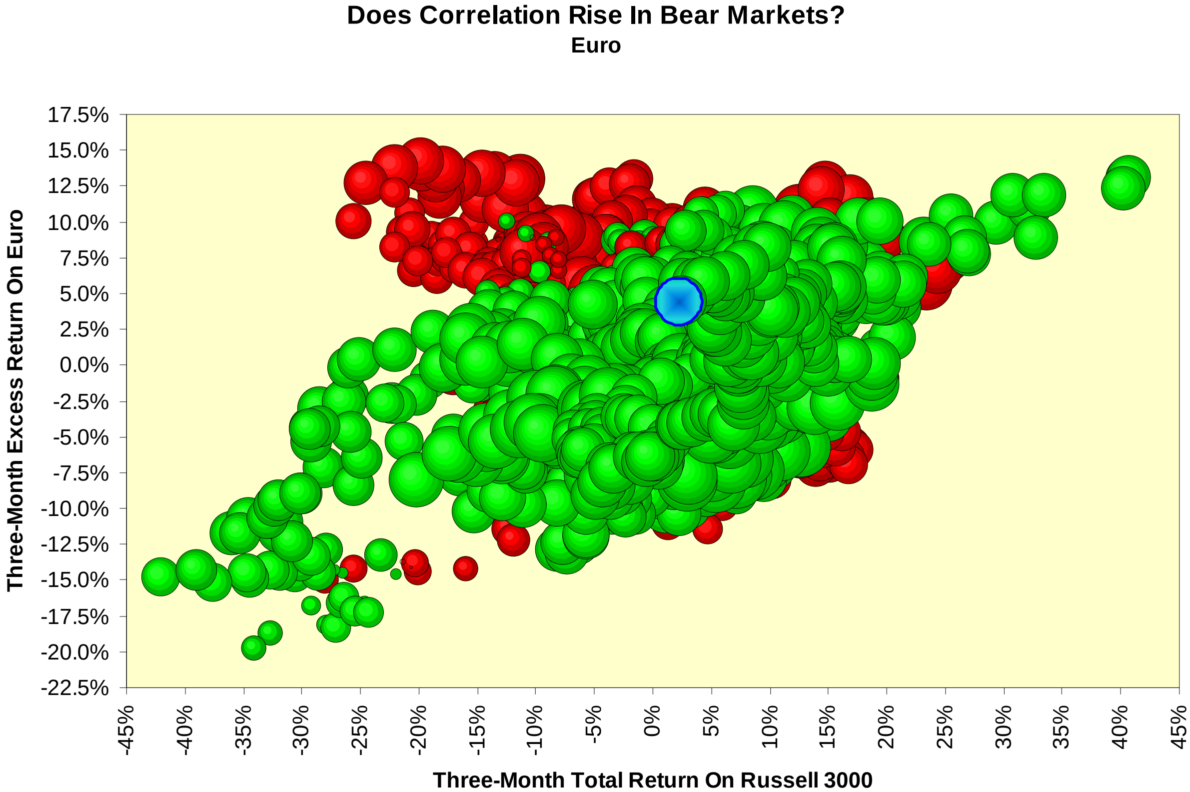
Let's take the rolling three-month correlation of returns between the Russell 3000 total return index and the excess carry return from the USD into the EUR. Overlaid on this correlation is a one-year rolling 10 percent confidence interval around the correlation's mean. This is displayed to accentuate the extreme lack of what is called stationarity in the relationship. A stationary relationship has no trend in the mean and stable variance over time along with an lag structure, or autocorrelation, that is solely a function of the lag itself. If X and Y have a fundamental and not a coincidental economic relationship, we should expect their correlation to be stationary. A mere glance at this chart tells us the euro and the Russell 3000 do not have a stable fundamental relationship. It has moved from negative to one oscillating about zero to positive over time; if that is not a trend in the mean, what is?



Another way to highlight this in recent years is the two return paths re-indexed to the depth of the October 2008 credit crisis on a common logarithmic scale. The two paths rose in parallel between May 2010 and May 2011 and then diverged until August 2012. Anyone who had fallen for the long-term correlation argument on a timescale greater than that used by high-frequency traders would have been trapped at the turns.



Now let's ask the question whether correlation is state-dependent by plotting it as a function of three-month returns on the Russell 3000 and excess carry returns from the USD into the EUR. The green bubbles represent positive correlation; the red represent negative correlation and the diameter of the bubbles represent the absolute value of the correlation. The last datum used, from October 31, 2012, is highlighted in blue.

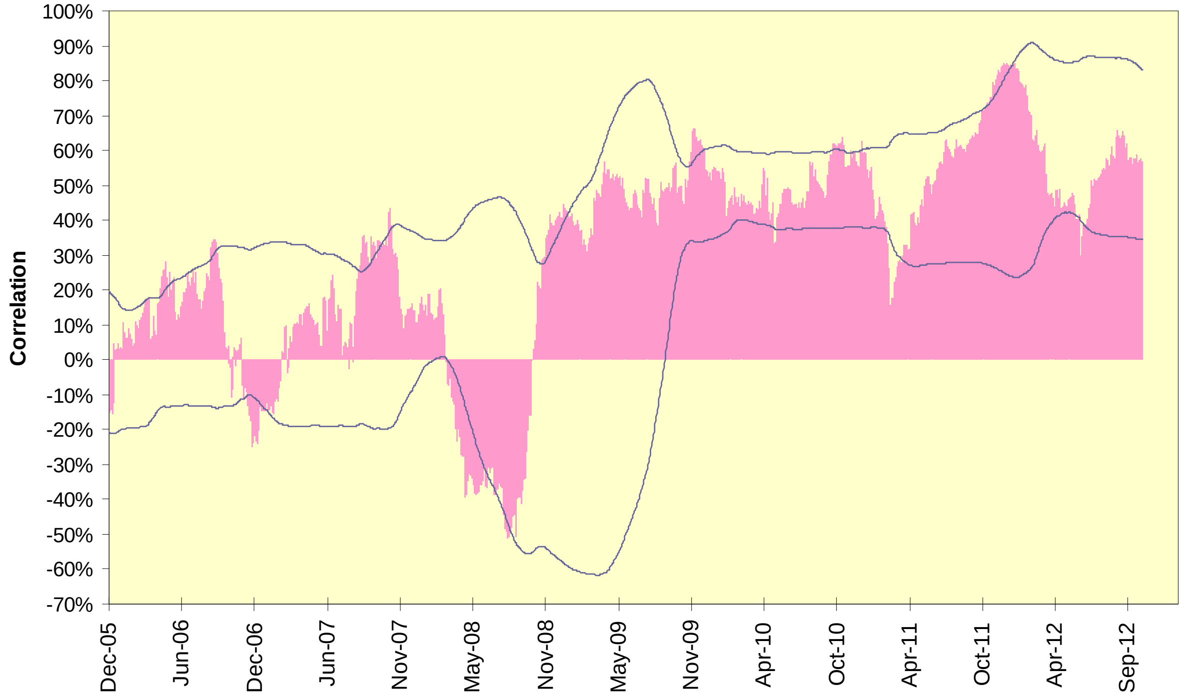


If the correlation was state-dependent on the stock market, we would see some division along the X-axis. We do not. The only division really visible is a cluster on the northwest corner linked to the combination of a strong euro and weak U.S. stocks.

The Asian Currency Index

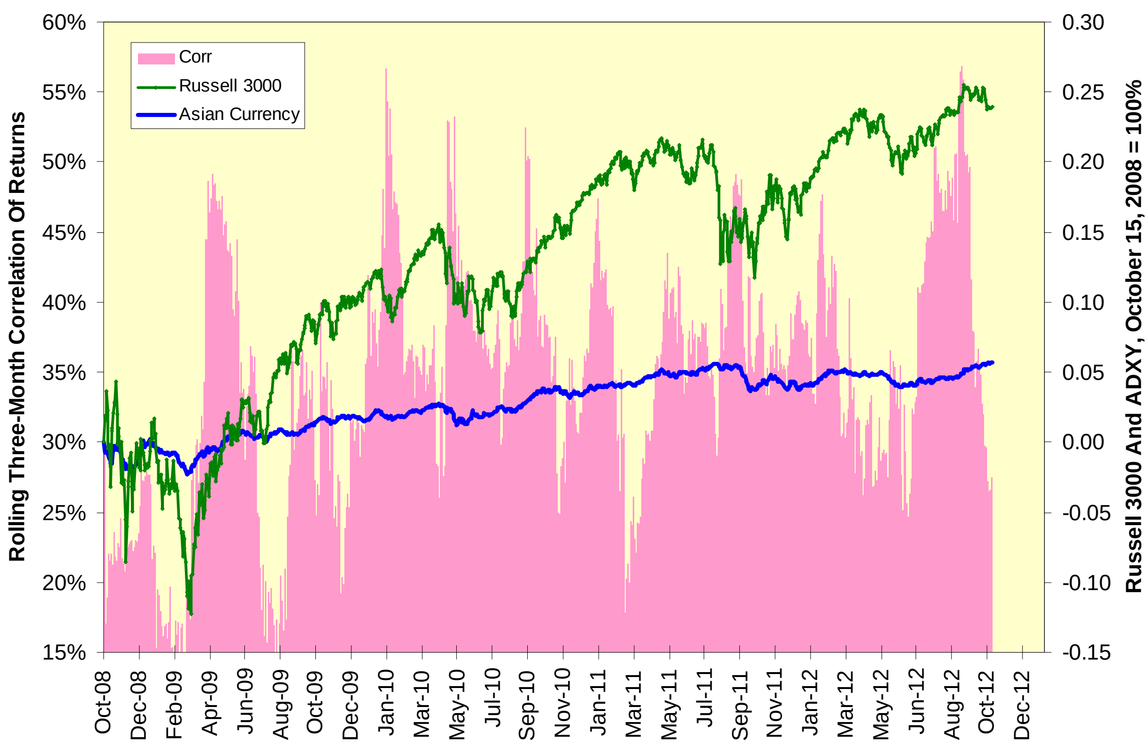
Now let's repeat the exercise with the Bloomberg-J.P. Morgan Asian currency index (see "Schadenfreude Is Not An Asian Shtick," November 2012). As this index begins in 2005, it perforce has a much shorter history than the euro, but whoever said life was fair? Its rolling three-month correlation of returns has been strongly positive since the end of the 2008 financial crisis. Fundamentally, the ultra-easy monetary policy in the U.S. has created both a positive carry into this basket of currencies and an upward bias in stocks since the March 2009 low.

Rolling Three-Month Correlation of Returns:
Asian Currency Index & U.S. Equities

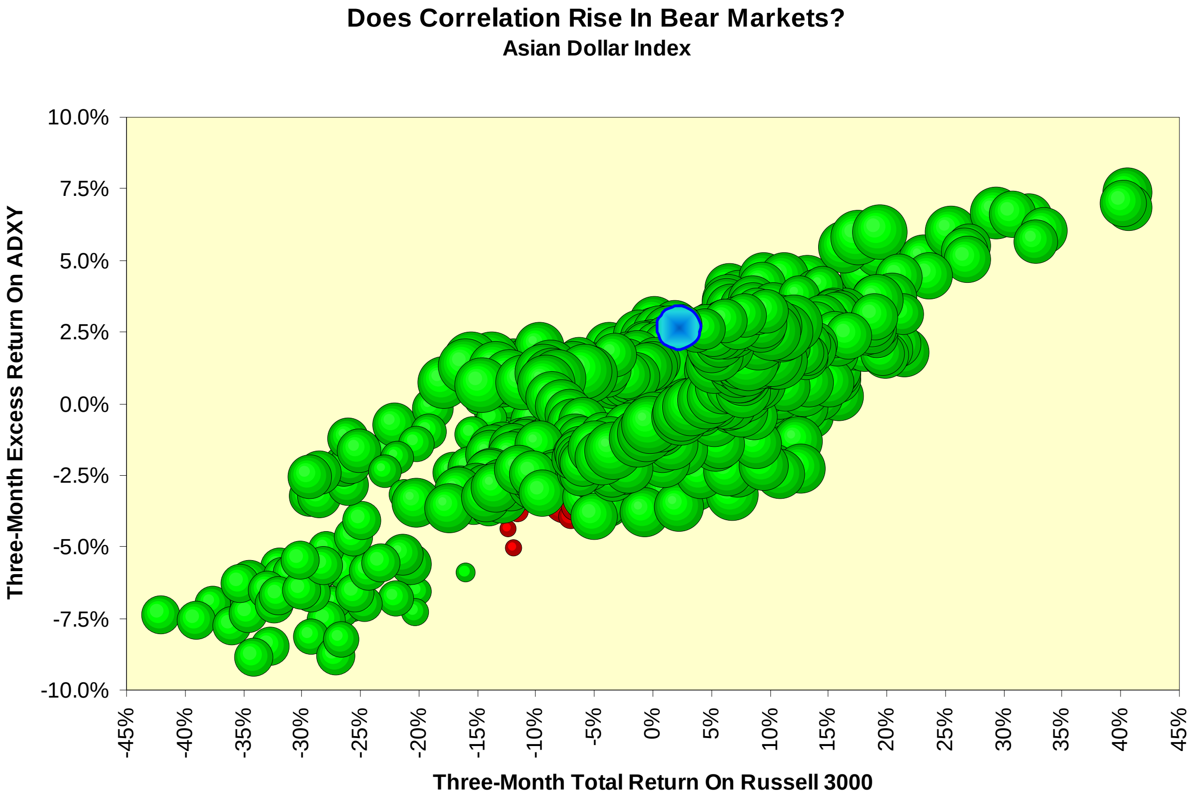


This fundamental observation is reinforced by comparing the re-indexed return paths of the Russell 3000 and the excess carry into the Asian currency index. Regardless of what the Russell 3000 is doing, the excess carry return has ground higher since October 2008.

Indexed Returns And Correlation Of Returns Since October 2008



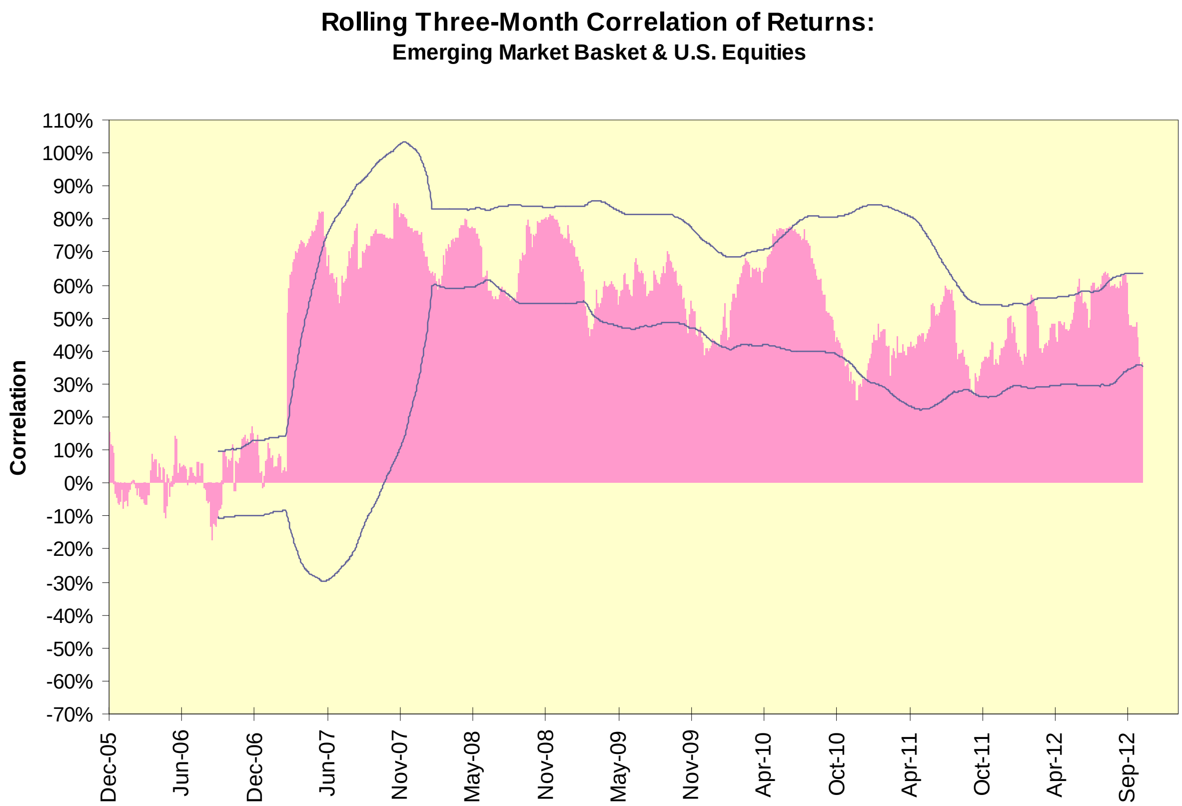
The net result is the correlation of returns between the two markets has no equity state-dependence at all. Only a few red bubbles are visible in the chart below, in the region of minor downturns in both markets. Other than that, the correlation of returns is positive.



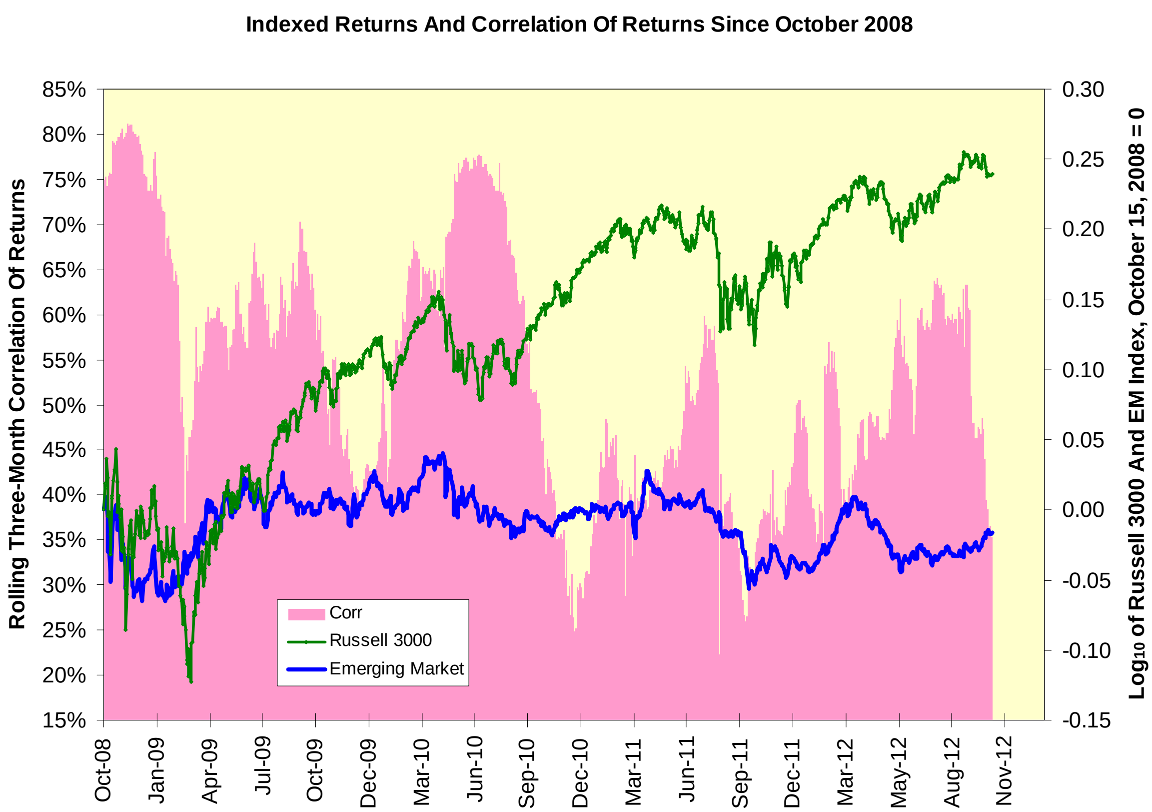
The Emerging Market Basket

Let's take a close relative of the Asian currency index, one based off of the weights for the MSCI Emerging Market index. This includes the Brazilian real, South African rand, Mexican peso and Turkish lira along with the larger currencies in the Asian index.

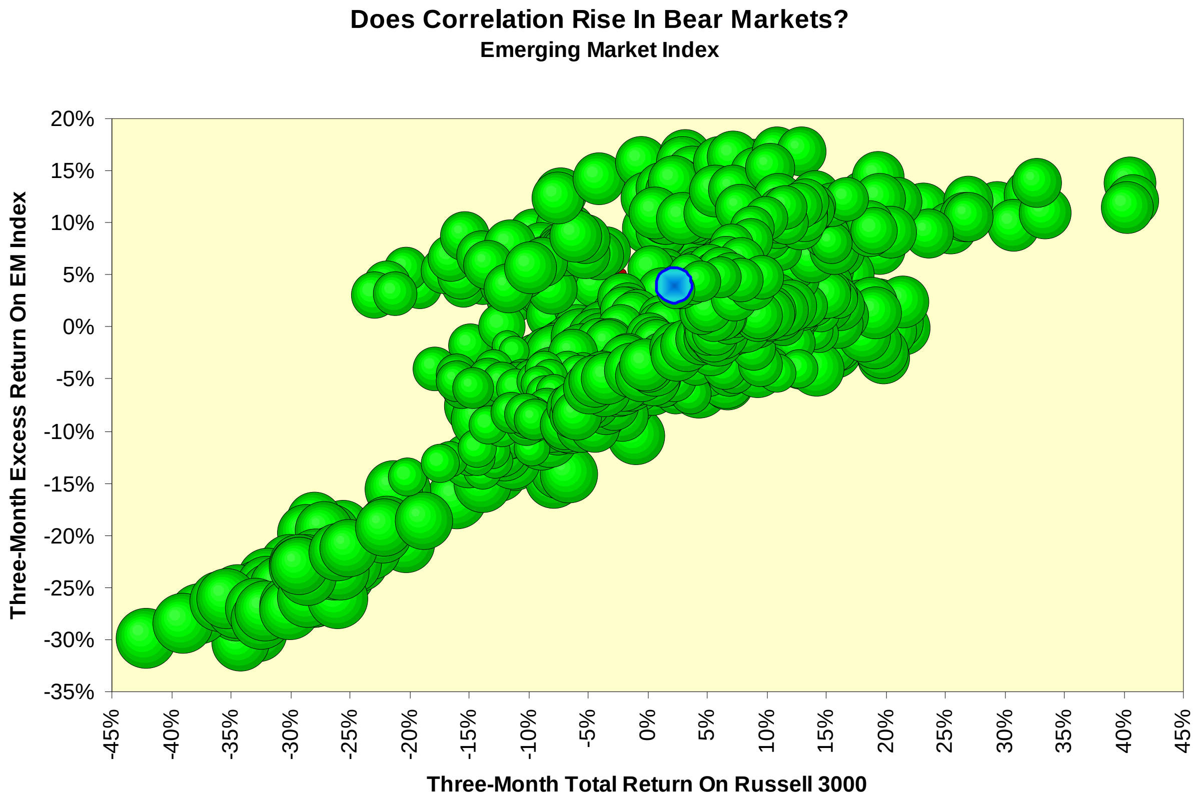
Its correlation since 2005 burst higher into positive territory in 2007 and has remained there with a modest drift lower ever since. This, too, can be attributed to the effects of U.S. monetary ease as well as to the rally in the BRL over much of this period.



However, the emerging market basket's return path is nowhere near the monotonic one seen for the Asian index; as noted earlier it has drifted lower since 2007 and has been essentially flat since October 2008.



Equity market state-dependence is absent completely: U.S. stock returns and the dollar carry trade into emerging markets are correlated positively for the entire period. Money talks; excessive money talks excessively.



Going Forward

It will be interesting to see how the observations made above endure if and when the U.S. moves off its policy of monetary ease. If high growth rates lead to high American interest rates and a negative carry into other currencies or currency baskets, the preponderance of positive correlations should shift to a negative one assuming higher interest rates are associated with firm U.S. equities.

In any case, nothing in these correlation patterns suggest time is but an illusion, that what exists now always has existed and always will exist. Past performance does not predict future results, or so we are told.