Major Currencies And Capitalization-Dependent Stock Returns

Urban legends are fun. Not only do they add a little spice to the dreary realities of living in the big city, they allow for some interesting mind-games involving crocodiles living beneath your nearest manhole cover.

But do they have a place in market analysis? No; of course not. Let's take the urban legend about large-capitalization stocks, here represented by the Russell 1000 index, being more subject to the vagaries of currency movements than their small-capitalization brethren in the Russell 2000 index. The logic here is large corporations have more global presence and do business in more different currencies than do smaller firms.

As different responses would make sense only if the Russell 1000 and 2000 indices had material divergences in behavior, we first should establish whether this is true or not. Over the period beginning with the January 1999 advent of the euro, the Russell 2000 has demonstrated it is a higher beta version of the Russell 1000 on a total return basis:

$$R2_{tr} = 1.840 * R1_{tr} - 47.9408, r^2 = .885$$

However, once we move past the dotcom bear market of 2000-2002 and its enormous impact on the large-capitalization stocks of the technology sector, we see parallel return paths for the two indices including, surprisingly enough, the 2008 financial crisis and its aftermath. As a result, the rolling three-month correlation of returns has been surprisingly stable since the 2002 low, as demonstrated by its continuously in-sample average of 0.922. Large- and small capitalization stocks differences are more in the greater variance of small stocks' returns than in their return paths.

U.S. Large- And Small-Capitalization Stocks' Correlation Stable Since 2002
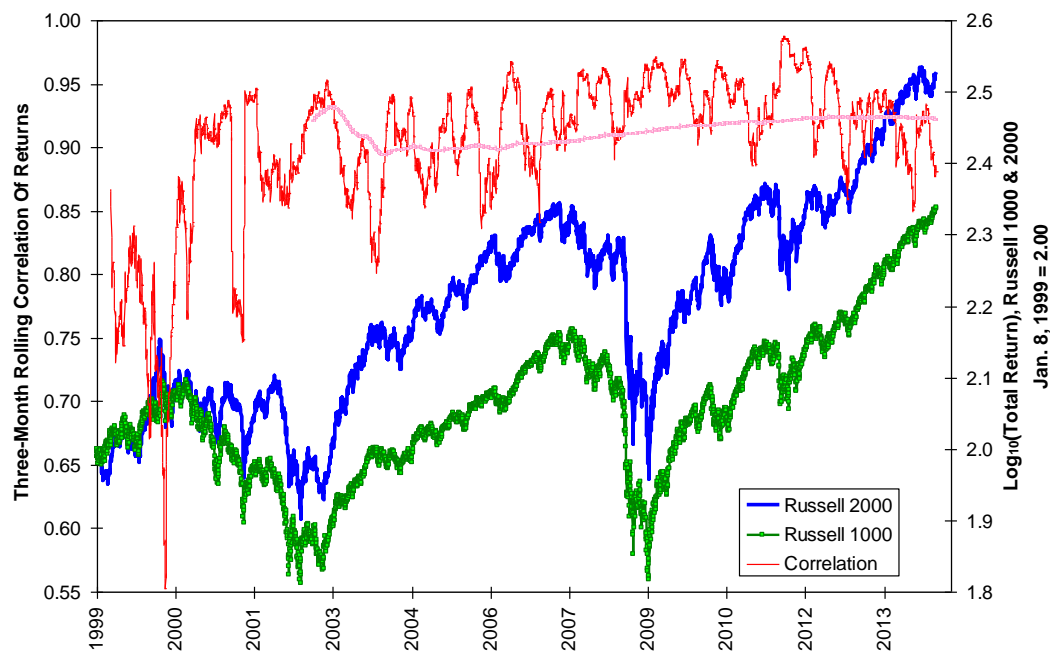
Major Currencies And Capitalization

Now let's turn to the rolling three-month correlations of returns between the Russell 1000 and 2000 total return indices and the carry returns of the USD into a set of seven major currencies. These carry returns effectively are a continuous long futures position for each currency.

If large-capitalization stocks are more sensitive than small-capitalization stocks are to changes in major currencies, we should be see large swaths of magenta representing the correlation of the Russell 1000 index to individual currencies below outside of the tan columns representing the Russell 1000 index' correlation of returns in the charts following shortly. These periods will be referred to as excess correlation for the Russell 1000.

Before we begin the graphic narration, we can look at two sets of regression statistics of stock index returns against currency carry returns.

Regression Synopses; ln(R1000 TR) = f(ln((CurrencyTR))					Regression Synopses; ln(R2000 TR) = f(ln((CurrencyTR))			
	Beta	Const	R-Squared	DW		Beta	Const	R-Squared	DW
EUR	0.693	1.536	0.217	0.0017	EUR	1.439	1.574	0.477	0.0049
JPY	0.016	4.448	-	0.0028	JPY	0.336	6.557	0.012	0.0021
GBP	0.790	1.028	0.170	0.0034	GBP	1.618	2.529	0.365	0.0039
CAD	0.940	0.192	0.469	0.0043	CAD	1.671	3.010	0.756	0.0075
SEK	0.986	0.178	0.427	0.0050	SEK	1.673	2.670	0.630	0.0071
AUD	0.516	2.190	0.521	0.0011	AUD	0.875	0.750	0.765	0.0076
CHF	0.909	0.555	0.354	0.0057	CHF	1.626	2.416	0.580	0.0082

Several things stand out immediately. First, the betas or relative variances, for the Russell 2000 against the currency carries are higher than those for the Russell 1000 with the exception of the Japanese yen with its negative beta, and by significant margins. This tells us the more volatile Russell 2000 has a greater relative movement to the major currencies than does the Russell 1000.

Second, the r-squared or percentage of variance explained for the Russell 2000 is greater for each currency carry return series with the exception once again of the Japanese yen. Third, none of the r-squared levels meets the 0.80 standard set forth in FAS 133 as a bona fide hedge. Finally, the Durbin-Watson statistics for all of the regressions involved are very near zero; we want these to be near 2.00. This indicates serial correlation in the residuals as opposed to a random and white-noise process and is a telltale sign the independent variables of currency carry returns are poor explicators for stock index returns.

We can account for this serial correlation by converting the total return series into daily percentage returns, or $\ln(P_{t0}/P_{t-1})$. Now let's run the regressions in the form $Stock_{ret}=f(Currency_{ret})$ and isolate the partial correlation coefficient, or correlation after removing the effect of other variables, for the currency carry's daily return.

Partial Contribution

	Russell 1000	Russell 2000
EUR	0.112	0.129
JPY	0.269	0.234
GBP	0.153	0.157
CAD	0.440	0.428
SEK	0.284	0.283
AUD	0.432	0.409
CHF	0.079	0.051

The two sets of partial correlation coefficients are very similar. This tells us we should not expect to see systematically greater correlation of returns for the stock indices against the currency carry indices in the charts below.
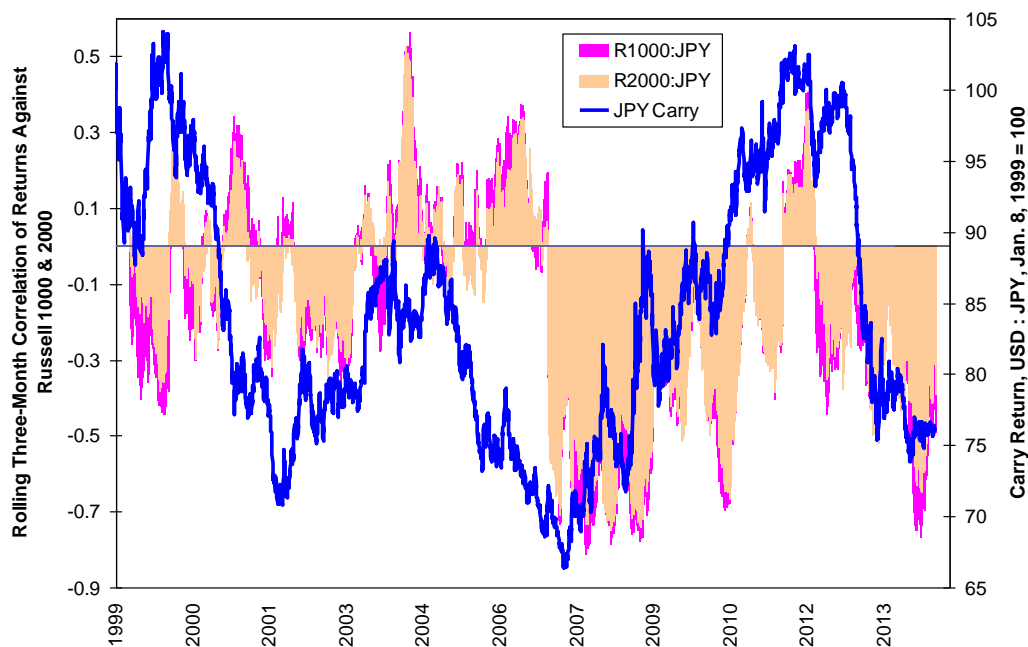
Correlation History
If we look at the case of the euro, we see periods of strong absolute excess correlation for the Russell 1000 during the 1999 tech bubble and again during the 2010 Eurozone financial crisis. Both of these occurred during periods of USD strength vis-à-vis the euro, the very sort of market condition alleged to be deleterious to large-capitalization equities with major global operations.

**Correlation Of Returns, Russell Indices Vs. Euro**
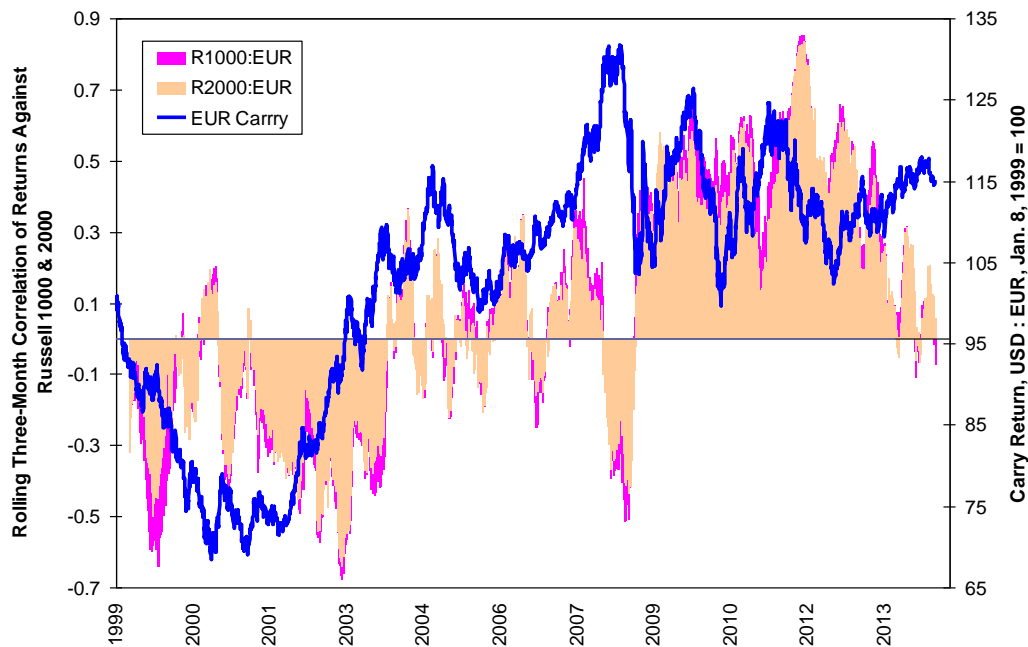
As we should expect from the summary regression statistics above, the yen presents a very different case. Correlations for the Russell 1000 have tended to be absolutely greater throughout the data sample, regardless of trends either in the U.S. stock market or in the yen's carry return against the dollar. This pattern's persistence given Japan's diminishing role in the U.S. trade picture and as a source of external financing for the U.S. is explained best by noting Japan is both a smaller customer and supplier to Russell 2000 firms than to the Russell 1000 firms in industries such as automobiles where Japan has remained a major factor.

**Correlation Of Returns, Russell Indices Vs. Japanese Yen**

We should expect the observed high degree of excess absolute correlation for the Russell 1000 against the Canadian dollar. The U.S. and Canada are linked in a free trade agreement and have a long history of inter-subsidiary trade by their major companies. Shifts in the CAD have a very direct effect on a host of firms in the energy, basic materials, industrial and technology sectors; most of the firms in these sectors are large-capitalization ones.

Correlation Of Returns, Russell Indices Vs. Canadian Dollar
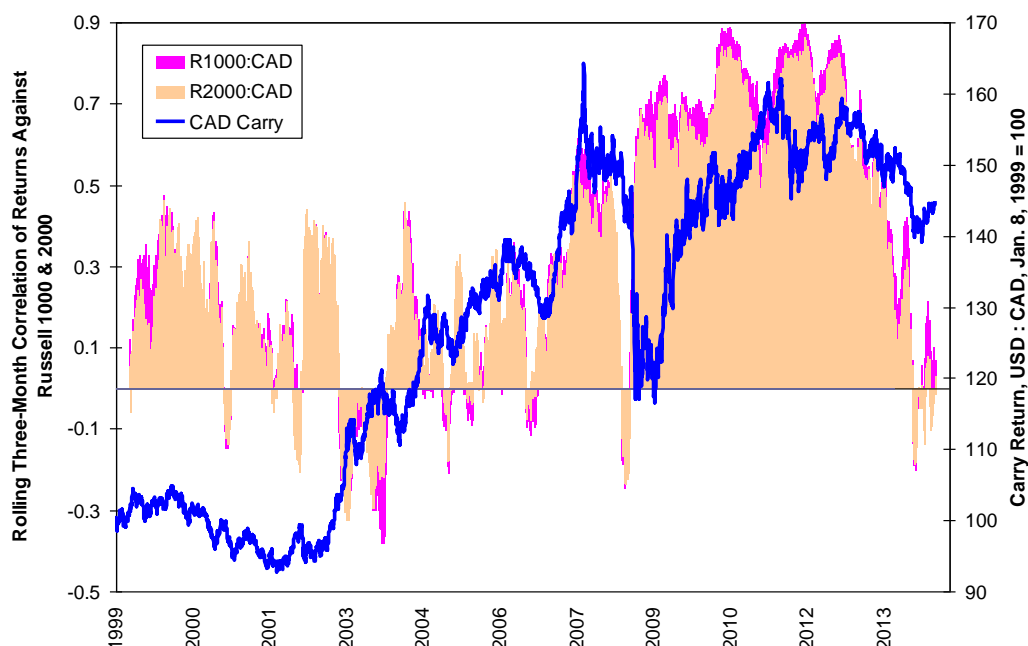

A similar phenomenon can be found in the case of the British pound. However, here the linkages are not in the resource sectors but rather in the financial sector and in the cross-rate between the pound and the euro. These effects were especially pronounced during and after the financial crisis as the Bank of England engaged in many of the same quantitative easing policies the Federal Reserve employed. Financial firms in the too-big-to-fail category are in the Russell 1000, not in the Russell 2000.

**Correlation Of Returns, Russell Indices Vs. British Pound**
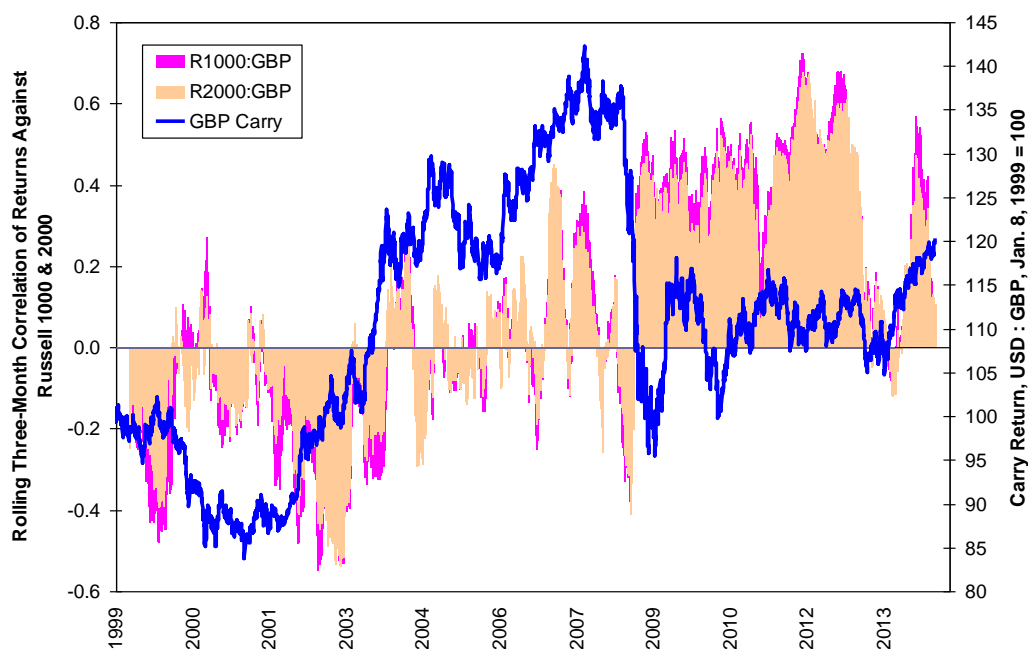
The SEK does not have a compelling narrative as it is not a major conduit of global finance nor is it a major trading partner of the U.S. It has had two periods of significant excess correlation for the Russell 100, the technology bubble ongoing in 1999 and the early stages of recovery from the financial crisis and the early phases of the Eurozone' sovereign credit crisis. The second period coincided with low excess correlation between the Russell 1000 and the euro and suggests the krona was on the receiving end of some flight capital out of the Eurozone.

**Correlation Of Returns, Russell Indices Vs. Swedish Krona**
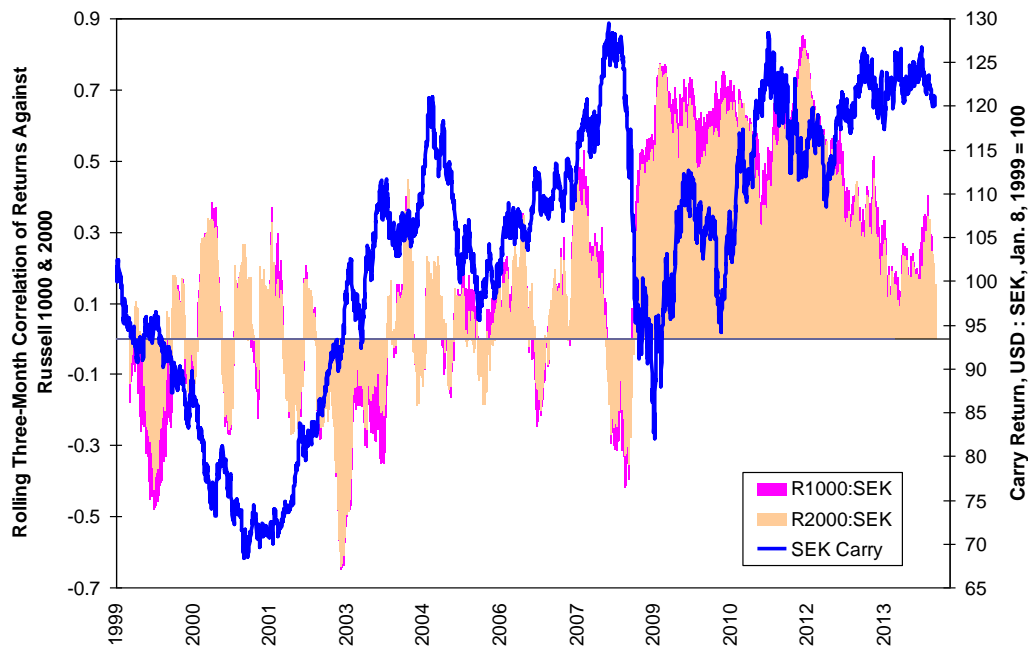
If Sweden was something of a capital haven, so too was Switzerland until the Swiss National Bank started to intervene against the CHF in December 2009 and eventually imposed the franc ceiling of 1.20 against the euro in September 2011. That move confined the carry returns into the CHF and ended a period of strong excess correlation for the Russell 1000.

Correlation Of Returns, Russell Indices Vs. Swiss Franc
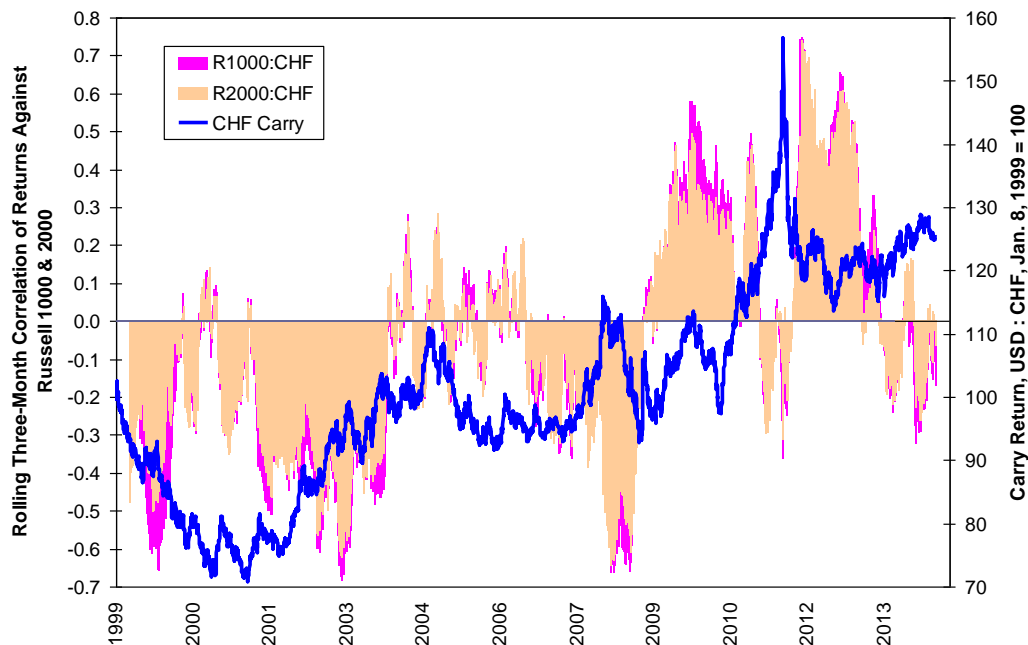
Finally, we should expect the excess correlation pattern for the Russell 1000 against the carry into the Australian dollar after the financial crisis to resemble that for the Canadian dollar by virtue of the large resource sector exposure for both economies. Once Chinese import growth started to slow in late 2011 and the large-capitalization mining firms started to decline, the excess correlation for the Russell 1000 virtually disappeared.

Correlation Of Returns, Russell Indices Vs. Australian Dollar
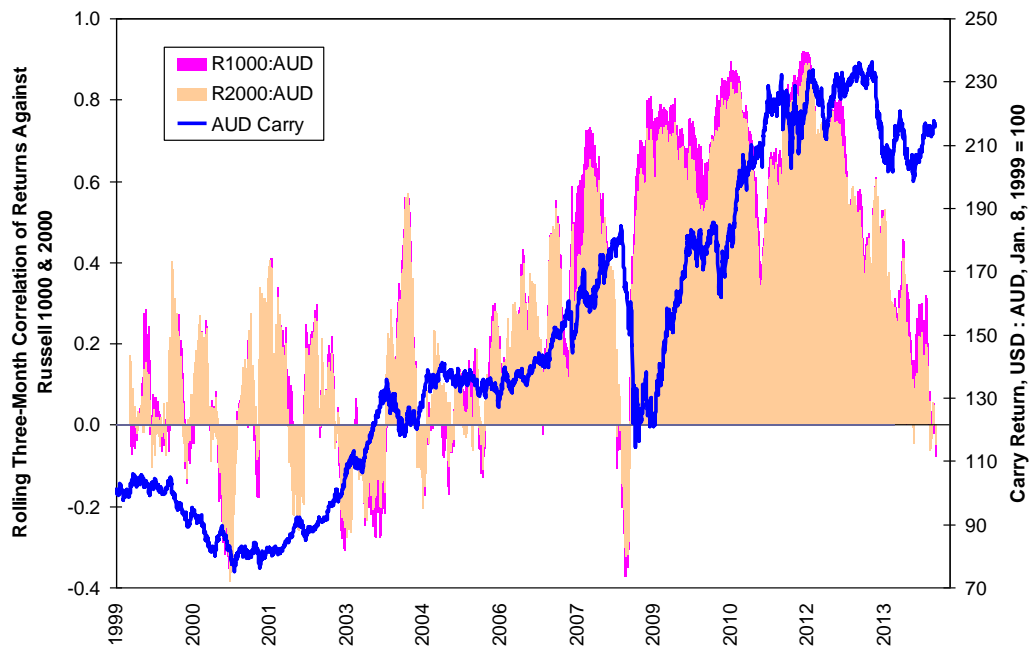
No Single Answer

The analysis above suggests no systematic excess correlation exists across major currencies and time for the Russell 1000. At best there is a series of anecdotes applicable for individual currencies and over individual market environments; several of these anecdotes are sector specific.

The question of whether various minor currencies have a systematic effect will be addressed next month.