

## Minor Currencies And Capitalization-Dependent Stock Returns

I concluded last month (see “Major Currencies And Capitalization-Dependent Stock Returns”):

*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.*

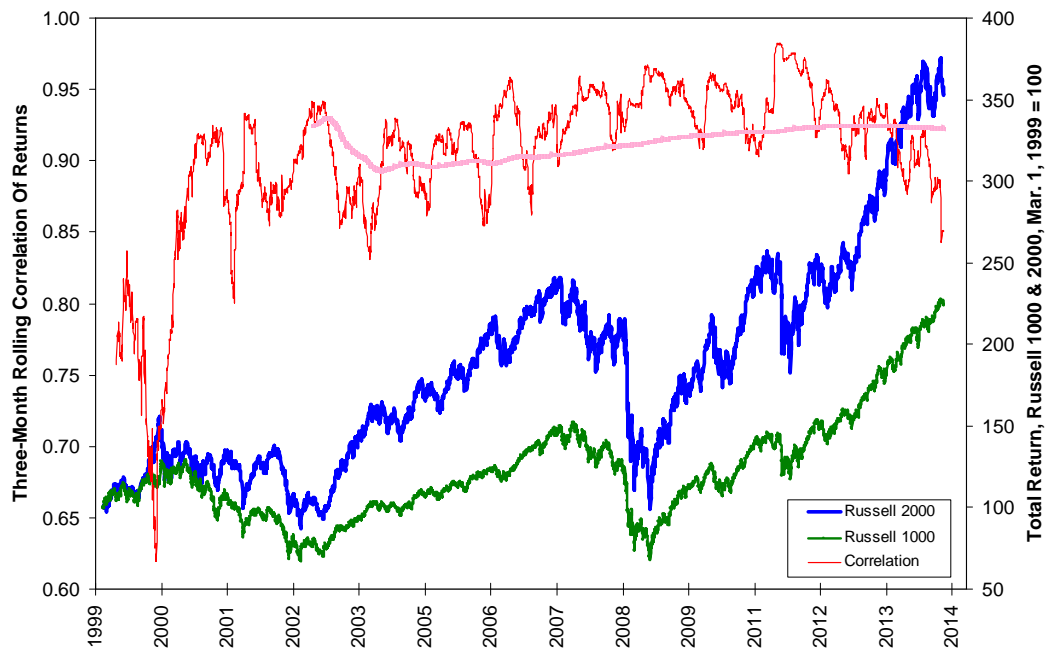
The inspiration then was to examine the commonly accepted premise large-capitalization stocks, here represented by the Russell 1000 index, are more subject to the vagaries of currency movements than their small-capitalization brethren in the Russell 2000 index. The logic here is large corporations have more global presence and do business in more different currencies than do smaller firms. Is the conclusion noted above for major currencies valid for a set of minor currencies?

As noted then, size-dependent different responses would make sense only if the Russell 1000 and 2000 indices had material divergences in behavior. To refresh, over the period beginning with the March 1999 startdate for many minor currencies’ carry return series, the Russell 2000 has demonstrated it is a higher beta version of the Russell 1000 on a total return basis:

$$R_{2tr} = 1.926 * R_{1tr} - 49.852, r^2 = .891$$

The rolling three-month correlation of returns has been surprisingly stable since the 2002 low, as demonstrated by its continuously in-sample average of 0.905. 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**



### Minor 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 six minor 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 minor currencies, we should 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 2000 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.

<b>Regression Synopses; <math>\ln(R1000\ TR) = f(\ln((\text{CurrencyTR}))</math></b>					<b>Regression Synopses; <math>\ln(R2000\ TR) = f(\ln((\text{CurrencyTR}))</math></b>				
	Beta	Const	R-Squared	DW		Beta	Const	R-Squared	DW
<b>MXN</b>	1.111	0.849	0.373	0.0032	<b>MXN</b>	2.087	5.397	0.692	0.0063
<b>BRL</b>	0.310	3.079	0.491	0.0045	<b>BRL</b>	0.518	2.327	0.723	0.0066
<b>KRW</b>	1.252	1.195	0.438	0.0062	<b>KRW</b>	1.973	4.245	0.573	0.0077
<b>INR</b>	0.953	0.123	0.396	0.0045	<b>INR</b>	1.764	3.445	0.714	0.0010
<b>IDR</b>	0.499	2.174	0.332	0.0044	<b>IDR</b>	0.958	0.174	0.644	0.0073
<b>CLP</b>	1.245	1.059	0.717	0.0096	<b>CLP</b>	1.785	3.196	0.764	0.0103

Several things stand out immediately. First, the betas or relative variances, for the Russell 2000 against the currency carries are uniformly higher than those for the Russell 1000, and by significant margins. This tells us the more volatile Russell 2000 has a greater relative movement to the minor currencies than does the Russell 1000. The same observation applied to the major currencies with the exception of the Japanese yen, which has a habit of being exceptional.

Second, the r-squared or percentage of variance explained for the Russell 2000 is greater for each currency carry return series; this also was the case with the major currencies with the exception of the Japanese yen. Third, none of the regression  $r^2$  levels meet the 0.80 standard set forth in FAS 133 as a bona fide hedge. Only the Russell 2000-Chilean peso relationship comes close. Finally, the Durbin-Watson statistics for all of the regressions involved are very near zero; we should 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  $\text{Stock}_{\text{ret}}=f(\text{Currency}_{\text{ret}})$  and isolate the partial correlation coefficient, or correlation after removing the effect of other variables, for the currency carry's daily return.

### **Partial Contribution**

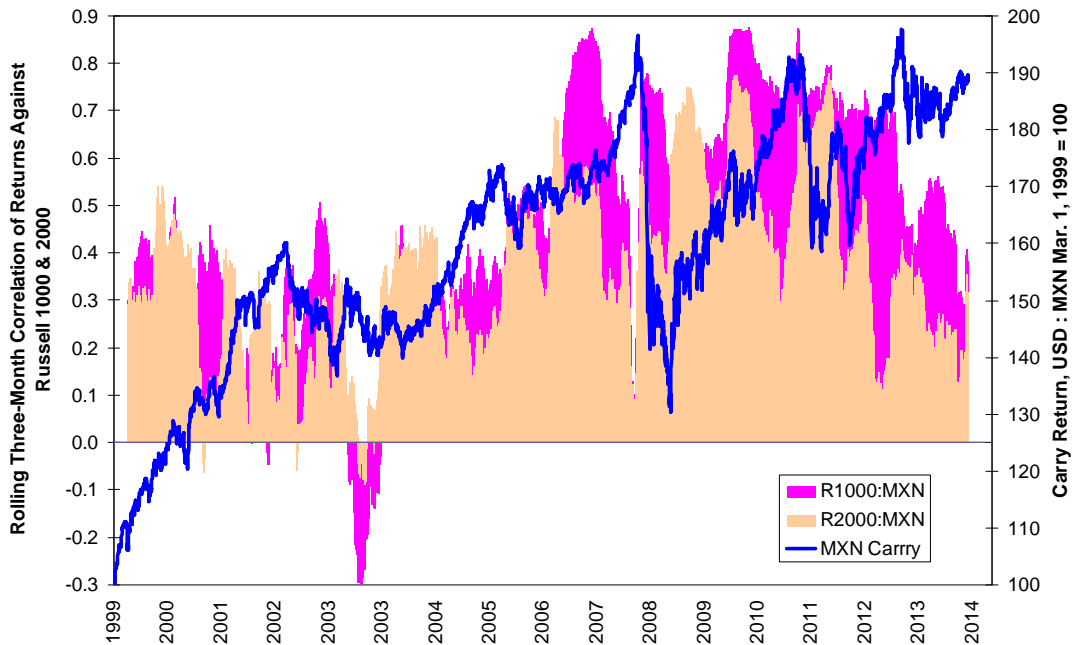
	<b>Russell 1000</b>	<b>Russell 2000</b>
<b>MXN</b>	0.519	0.496
<b>BRL</b>	0.404	0.374
<b>KRW</b>	0.111	0.110
<b>INR</b>	0.149	0.136
<b>IDR</b>	0.032	0.031
<b>CLP</b>	0.262	0.248

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**

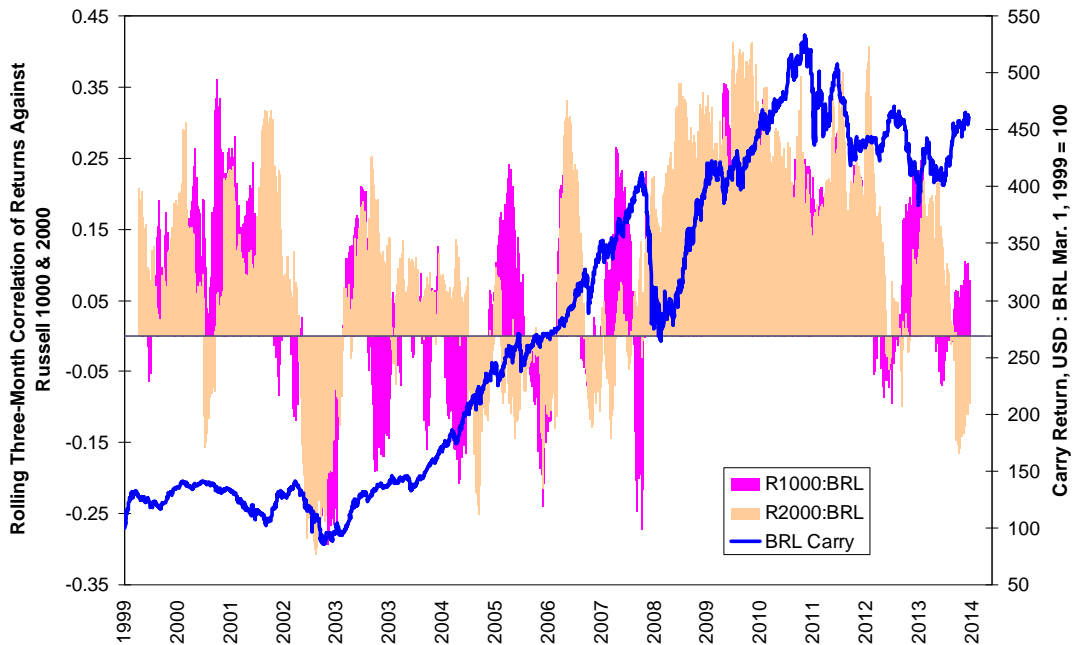
If we look at the case of the Mexican peso, we can see the effects of NAFTA, cross-border *maquiladora* plants and large-scale operations by large U.S. firms in Mexico. This is one case with a very clear dominance by Russell 1000 firms both in bull and bear market cycles. The Mexican case underscores the importance of running the statistical analysis as opposed to relying on visual observation; we might think the strong carry into the MXN would have matched the Russell 2000's post-crisis outperformance, but this did not happen until mid-2013.

### Correlation Of Returns, Russell Indices Vs. Mexican Peso



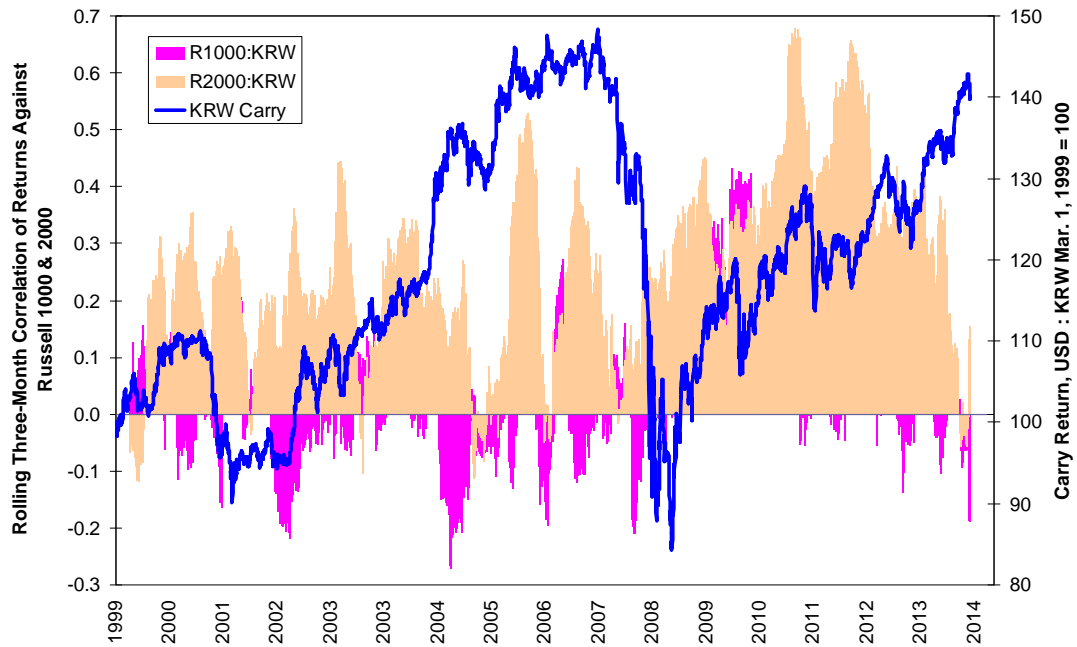
This close physical integration is absent for Brazil. While the correlation of the carry trade into the BRL was higher for the Russell 1000 than for the Russell 2000 prior to the financial crisis that dominance has dissipated since 2009. Why the correlation of the carry trade to the Russell 2000 should be as high as it is given the relatively small importance of the Brazilian market to small-capitalization U.S. stocks is something of a mystery. In addition, the strong relative correlation for the Russell 2000 persisted regardless of directional turns for the carry trade.

### Correlation Of Returns, Russell Indices Vs. Brazilian Real



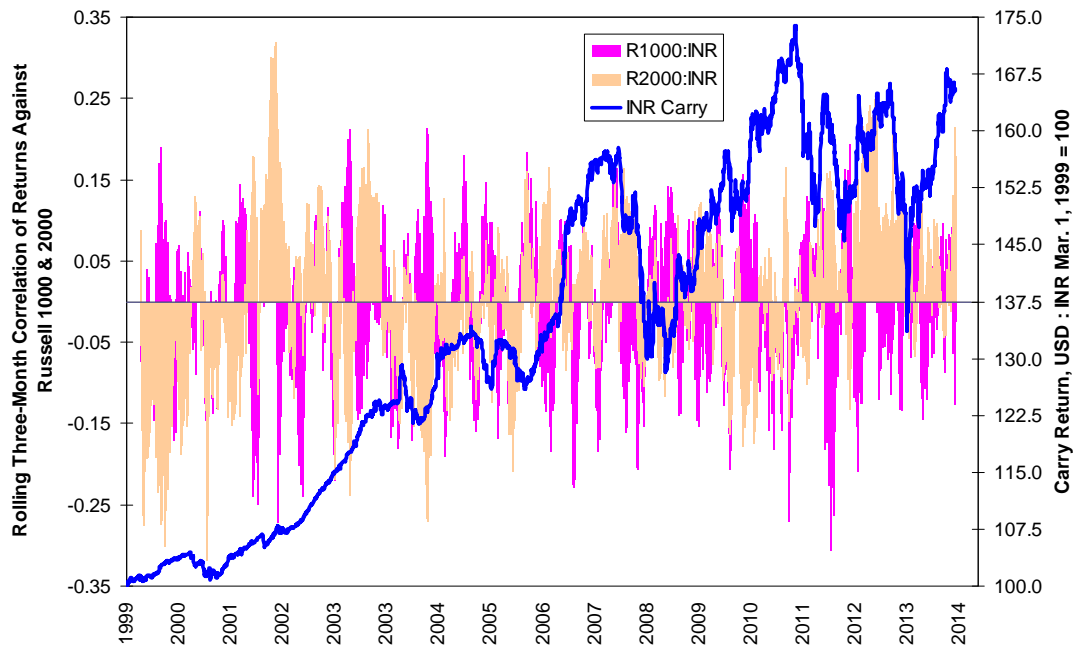
The small-capitalization bias is even more pronounced after 2009 for the Korean won, and like the case for the BRL, the strong relative correlation between the carry trade into the KRW and the Russell 2000 has persisted through both bullish and bearish cycles for the currency. As is the case for Mexico, it is the large-capitalization issues of the Russell 1000 that have the strongest business linkages with their Korean counterparts in industries such as telecommunications equipment, steel and automobile manufacture. We might expect the correlation of returns to be higher for the Russell 1000, but it clearly is not, a mid-2014 spike notwithstanding.

### Correlation Of Returns, Russell Indices Vs. Korean Won



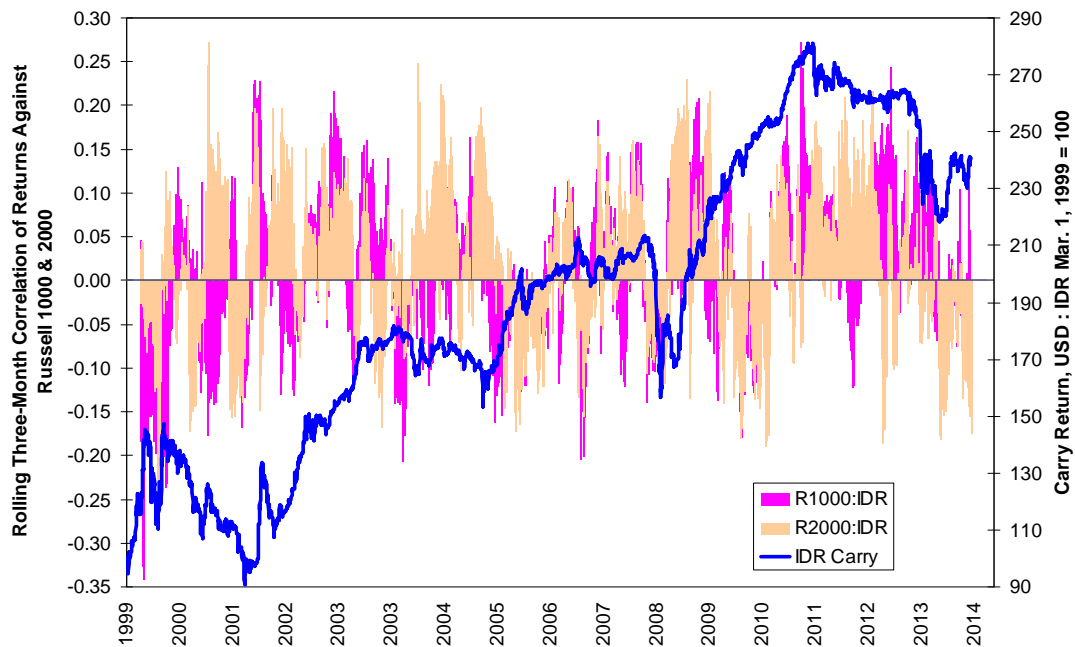
The correlations between the dollar carry trade into the Indian rupee and both U.S. stock indices are about as random as we can get. These correlations oscillate rapidly around zero at fairly low levels of correlation. This suggests trade with India simply is not as important of a factor as we might have believed given the country's growth over the past two decades.

### Correlation Of Returns, Russell Indices Vs. Indian Rupee



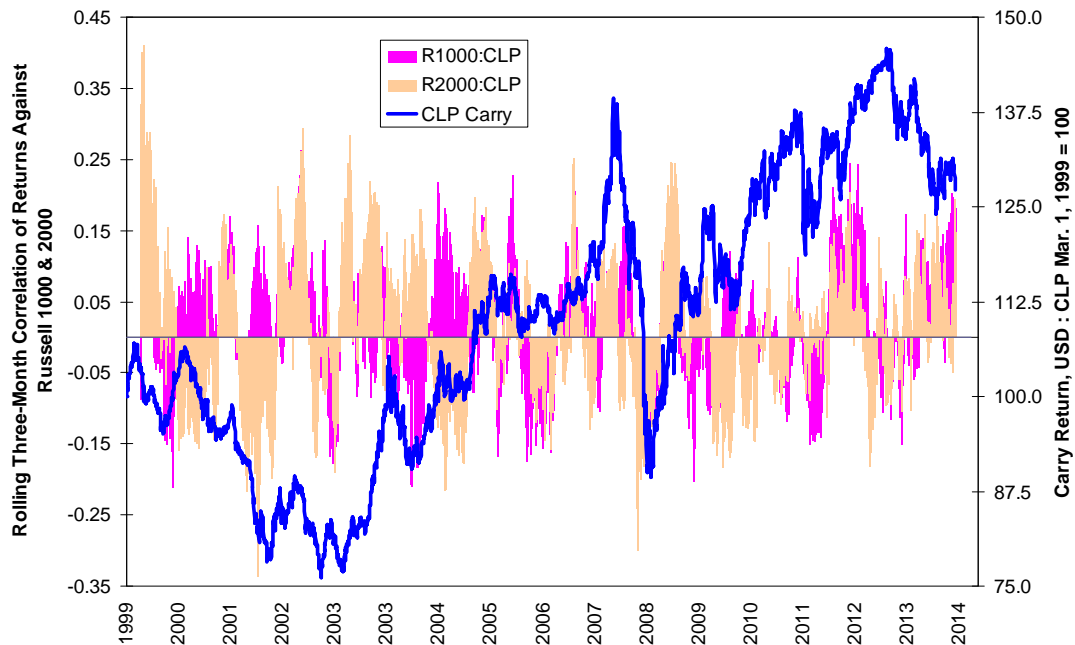
A very similar statement can be made for the Indonesian rupiah. These correlations also oscillate rapidly at small absolute levels and do so throughout bullish and bearish cycles for both U.S. equities and the IDR itself.

### Correlation Of Returns, Russell Indices Vs. Indonesian Rupiah



Correlations of returns between the dollar carry trade into the Chilean peso do not oscillate as rapidly as those for either the INR or IDR, although they are at fairly low absolute levels. We should expect the correlations against the Russell 1000 to dominate given the importance of Chile's large mining sector, and this is visible even though the absolute dominance is small.

### Correlation Of Returns, Russell Indices Vs. Chilean Peso



### No Single Answer

On balance, the same conclusion reached for the major currencies applies here as well: No single, simple and systematic relationship exists between a set of minor currencies and U.S. equities split along the capitalization dimension. Once again, any reflexive response a strong/weak dollar might favor large- or small-capitalization stocks is likely to be correct only anecdotally. It may be good enough for government work or a two-sentence soundbite on television, but it is not good enough for traders and investors.