Looking At The Carry Trade

Perpetual motion machines are objects of derision and justifiably so; they violate the principles of thermodynamics and, like so many politicians, promise something for nothing.

The carry trade in currencies, which involves borrowing a low-yielding currency, selling it, and then lending in a high-yielding currency, should fall into this free lunch category. The higher interest rates prevailing in the second currency both are propping that currency up and are sending a signal to the market that the currency is at risk of substantial decline. Thus when the trade is unwound by selling the high-yield currency, it will command fewer unit of the low-yield currency borrowed originally.

Yet this is not what was hinted by the long-term simulated performance tables of the ABN-Amro currency trading style indices presented last month (see "Currency Traders Should Be Humbler," May 2007). The carry trade index outperforms the other three, those of fundamental valuation, volatility response and trend-following, and by a wide margin. Let's take a look at some elements of the carry trade in greater detail, with particular focus later in the examination of the yen carry trade.

Carry Trade Decomposition

All currency trades can be broken into their interest rate spread component and their spot rate component. Let's look at the interest rate spread component first across a range of 29 selected currencies. A table of these currencies and their ISO codes is presented below, color-coded by status as a major currency (green background), EMEA (Emerging Europe, Middle East, Africa; yellow background), Latin American (orange background) or Asia (violet background).

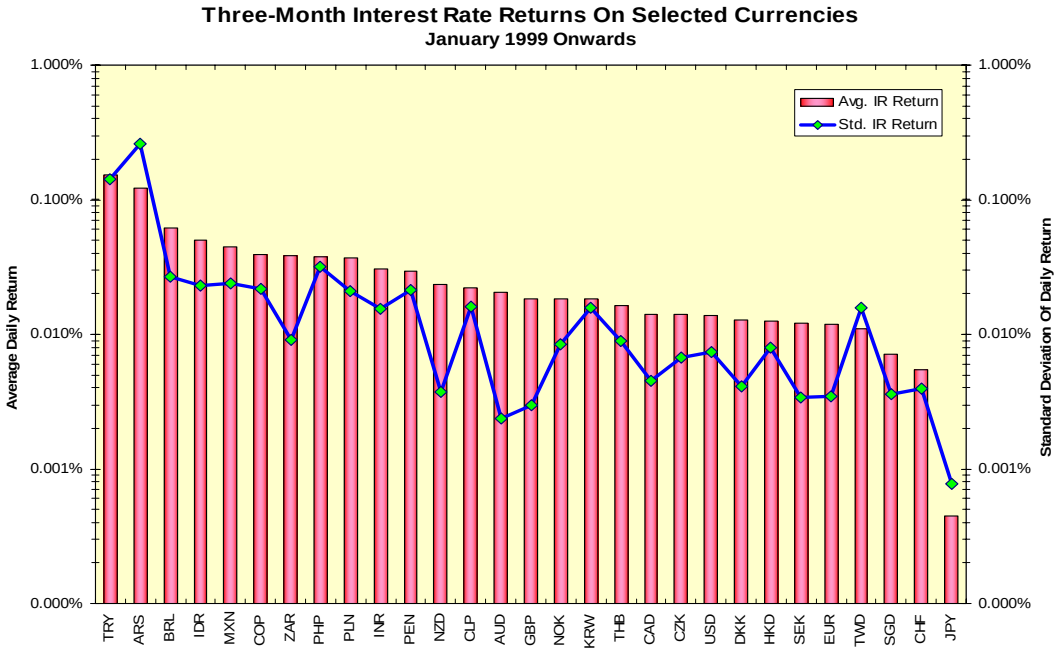
ISO Code	Country
ARS	Argentina
AUD	Australia
BRL	Brazil
CAD	Canada
CHF	Switzerland
CLP	Chile
COP	Colombia
CZK	Czech Rep.
DKK	Denmark
EUR	Eurozone
GBP	United Kingdom
HKD	Hong Kong
IDR	Indonesia
INR	India
JPY	Japan
KRW	Korea
MXN	Mexico
NOK	Norway
NZD	New Zealand
PEN	Peru
PHP	Philippines
PLN	Poland
SEK	Sweden
SGD	Singapore
THB	Thailand
TRY	Turkey
TWD	Taiwan
USD	United States
ZAR	South Africa

The carry trade returns calculated below are based on borrowing at the three-month LIBOR rate of the lower-yielding currency (LY_3) and lending at the three-month LIBOR rate of the higher-yielding currency (HY_3). The returns on the higher-yielding currency are adjusted for the daily changes in the spot rate for the lower-yielding currency (LYS). A 260-day trading year is used.

1. $$Long\,\mathrm{Re}turn_t = \left[\left(1+\frac{HY_{3_t}}{260}\right)*\frac{LYS_t}{LYS_{t-1}}\right]-1$$
2. $$Short\,\mathrm{Re}turn_t = \frac{LY_{3_t}}{260}$$
3. $$NetCarry\,\mathrm{Re}turn_t = Long\,\mathrm{Re}turn_t - Short\,\mathrm{Re}turn_t$$

What do these interest rate carry returns look like since the January 1999 advent of the euro? Several observations are in immediate order. First, even on the logarithmic scales used, the low return on the JPY is an outlier; it is for this reason we will focus on it as a case study. Second, Argentina and in particular Turkey are outliers both on their average daily returns and on the standard deviation of these returns.

Third, several G-10 countries with high-yielding currencies, such as New Zealand, Australia and the United Kingdom have unexpectedly low standard deviations of return. Fourth and finally, the opposite is true for several Asian countries, including Taiwan and Korea. It appears the central banks of the former group have learned the lessons of transparency and monetary policy and predictability pioneered by the Federal Reserve while the central banks of the latter group remain inscrutable.



A second set of observations emerges from a correlation matrix of these returns over the period in question, and it involves several of the countries noted above. We might feel safe in assuming short-term interest rates worldwide are positively correlated (green cells) over long periods of time, and this is the near-universal case for 25 of the 29 countries in question. However, the carry returns for the ARS, BRL, AUD and NZD exhibit large swaths of negative correlation (yellow cells) against other currencies.

Correlation Of Three-Month Interest Rate Total Returns Since January 1999

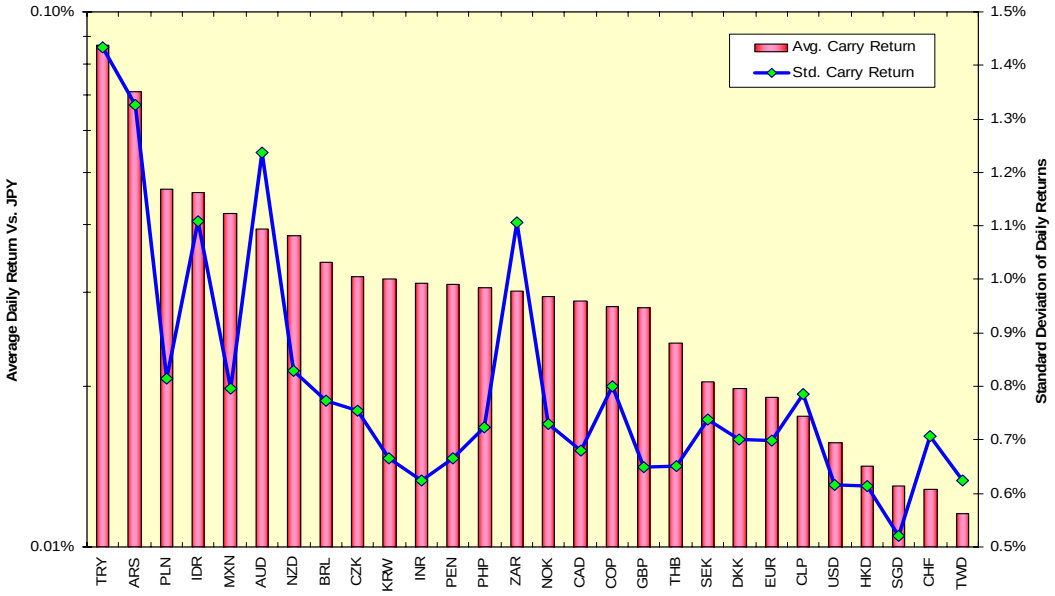
	ARS	AUD	BRL	CAD	CHF	CLP	COP	CZK	DKK	EUR	GBP	HKD	IDR	INR	JPY	KRW	MXN	NOK	NZD	PEN	PHP	PLN	SEK	SGD	THB	TRY	TWD	USD	ZAR
ARS	1.000																												
AUD	-0.463	1.000																											
BRL	0.153	-0.228	1.000																										
CAD	-0.331	0.444	-0.039	1.000																									
CHF	0.060	0.316	0.002	0.734	1.000																								
CLP	-0.013	0.086	0.543	0.658	0.513	1.000																							
COP	-0.016	-0.202	0.410	0.541	0.301	0.738	1.000																						
CZK	0.121	-0.203	0.224	0.648	0.576	0.737	0.843	1.000																					
DKK	0.129	0.199	-0.044	0.726	0.938	0.514	0.360	0.642	1.000																				
EUR	0.138	0.230	-0.086	0.695	0.940	0.456	0.273	0.562	0.980	1.000																			
GBP	-0.314	0.571	-0.044	0.812	0.720	0.600	0.439	0.587	0.624	0.591	1.000																		
HKD	-0.205	0.373	-0.006	0.903	0.680	0.710	0.532	0.653	0.632	0.599	0.801	1.000																	
IDR	0.210	-0.391	0.127	0.334	0.240	0.468	0.662	0.710	0.353	0.302	0.176	0.414	1.000																
INR	0.112	0.055	0.112	0.737	0.755	0.729	0.612	0.826	0.785	0.743	0.674	0.782	0.607	1.000															
JPY	-0.122	0.455	-0.150	0.561	0.492	0.332	0.274	0.306	0.508	0.519	0.538	0.504	0.251	0.462	1.000														
KRW	0.025	-0.033	0.295	0.223	0.191	0.412	0.347	0.324	0.232	0.201	0.195	0.211	0.224	0.288	0.107	1.000													
MXN	-0.150	-0.026	0.223	0.702	0.433	0.777	0.849	0.890	0.474	0.387	0.669	0.743	0.634	0.769	0.331	0.338	1.000												
NOK	0.322	-0.302	0.003	0.528	0.628	0.501	0.529	0.790	0.794	0.756	0.308	0.481	0.613	0.758	0.274	0.260	0.588	1.000											
NZD	-0.277	0.708	-0.121	0.077	0.154	-0.082	-0.511	-0.514	0.008	0.080	0.206	0.121	-0.439	-0.096	0.228	-0.112	-0.364	-0.451	1.000										
PEN	-0.191	0.059	0.112	0.818	0.567	0.762	0.785	0.876	0.603	0.535	0.721	0.787	0.624	0.789	0.382	0.313	0.904	0.641	-0.310	1.000									
PHP	-0.004	-0.022	0.238	0.336	0.360	0.392	0.341	0.399	0.410	0.378	0.241	0.260	0.243	0.391	0.164	0.871	0.383	0.397	-0.162	0.384	1.000								
PLN	0.078	-0.020	0.228	0.683	0.765	0.706	0.632	0.860	0.796	0.734	0.660	0.622	0.400	0.790	0.252	0.335	0.755	0.775	-0.331	0.796	0.503	1.000							
SEK	0.374	-0.234	-0.063	0.405	0.590	0.315	0.322	0.591	0.764	0.752	0.193	0.272	0.359	0.551	0.225	0.199	0.322	0.909	-0.394	0.430	0.319	0.667	1.000						
SGD	-0.290	0.629	-0.059	0.654	0.550	0.425	0.107	0.155	0.403	0.432	0.646	0.738	0.082	0.437	0.535	0.050	0.264	0.005	0.616	0.348	0.028	0.163	-0.097	1.000					
THB	-0.179	0.415	-0.001	0.931	0.786	0.717	0.532	0.686	0.723	0.693	0.866	0.961	0.365	0.806	0.549	0.211	0.721	0.504	0.121	0.798	0.295	0.700	0.333	0.739	1.000				
TRY	0.163	-0.350	-0.178	0.191	0.158	0.061	0.331	0.479	0.244	0.209	0.077	0.190	0.435	0.325	0.051	-0.003	0.336	0.482	-0.453	0.356	0.096	0.326	0.389	-0.123	0.183	1.000			
TWD	-0.016	0.018	0.427	0.585	0.572	0.771	0.677	0.691	0.589	0.546	0.526	0.584	0.503	0.692	0.374	0.721	0.704	0.546	-0.124	0.675	0.731	0.698	0.370	0.335	0.606	0.098	1.000		
USD	-0.298	0.586	-0.063	0.896	0.704	0.637	0.396	0.505	0.607	0.591	0.872	0.945	0.235	0.700	0.575	0.155	0.613	0.302	0.332	0.685	0.199	0.526	0.141	0.850	0.960	0.054	0.506	1.000	
ZAR	0.132	-0.443	0.164	0.301	0.094	0.447	0.597	0.618	0.330	0.275	0.015	0.227	0.609	0.449	0.137	0.277	0.552	0.731	-0.564	0.534	0.299	0.447	0.631	-0.249	0.173	0.422	0.413	0.011	1.000

Argentina, which has been a proving ground for every misguided economic policy known to mankind for the past sixty years, is truly a different drummer. Not only has its interest rate return been well above norm, it has been more volatile and more unrelated to the rest of the world as well. Its larger neighbor, Brazil, whose BRL was our topic recently (see "The Stronger Real: Don't Blame It On Rio," April 2007), has been a miniature version of Argentina in some ways, but often exhibits hope in others. Australia and New Zealand have been in the unusual position of having high levels of internal debt and surging export revenues simultaneously. Their economies are linked increasingly to the East Asian boom, and their monetary policies quite literally must ride the tiger.

The Yen Carry

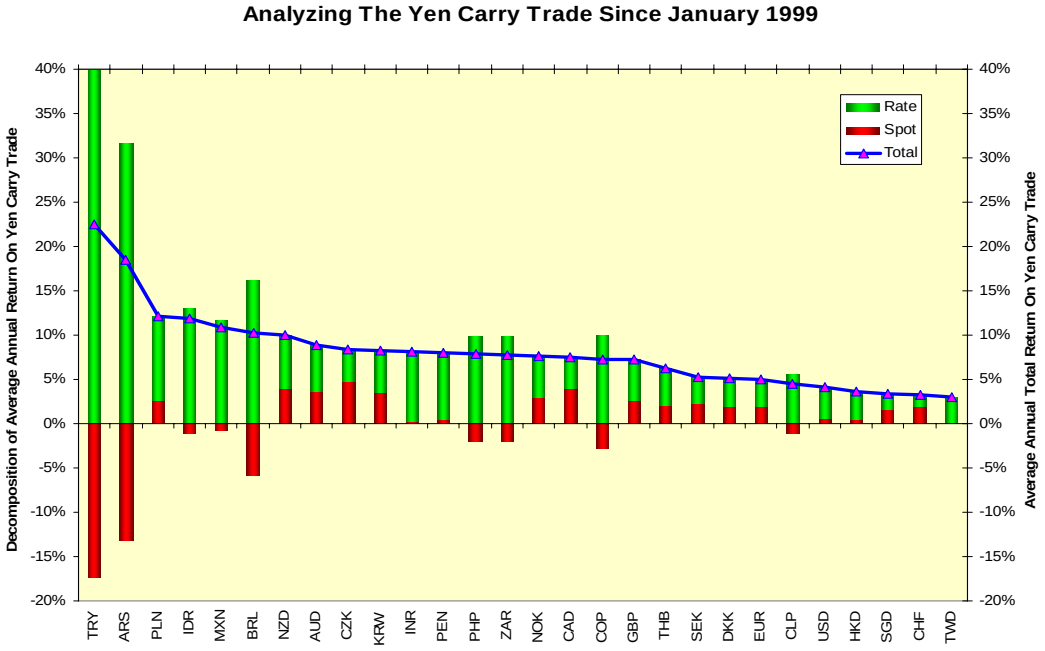
Now let's examine the total return from the carry trade of borrowing three-month JPY and lending the proceeds in three-month LIBOR of the other 28 currencies. As before, Turkey and Argentina stand out on both the total return and the standard deviation thereof. Australia once again stands out for its high standard deviation, as does South Africa. A number of countries moved up or down in their total return rank from what we saw in the simple interest rate carry rank; for example, Poland moved higher while Colombia moved lower.

Risk And Return In Three-Month Carry Against JPY Since January 1999



These shifts in rank are produced by the impact of the spot rate in the total return mix. The PLN's spot rate contributed an average annual gain of 2.6%, while the COP's was a robber, pulling the average annual return down by 2.8%. The most significant aspect of the chart below was how Turkey and Argentina both were able to stay at

the top of the total return heap in spite of average annual spot rate losses of 17.4% and 13.2%, respectively. Brazil, which slipped from its interest rate carry rank, still managed a 10.2% average annual return despite an average annual spot rate loss of 5.9%.

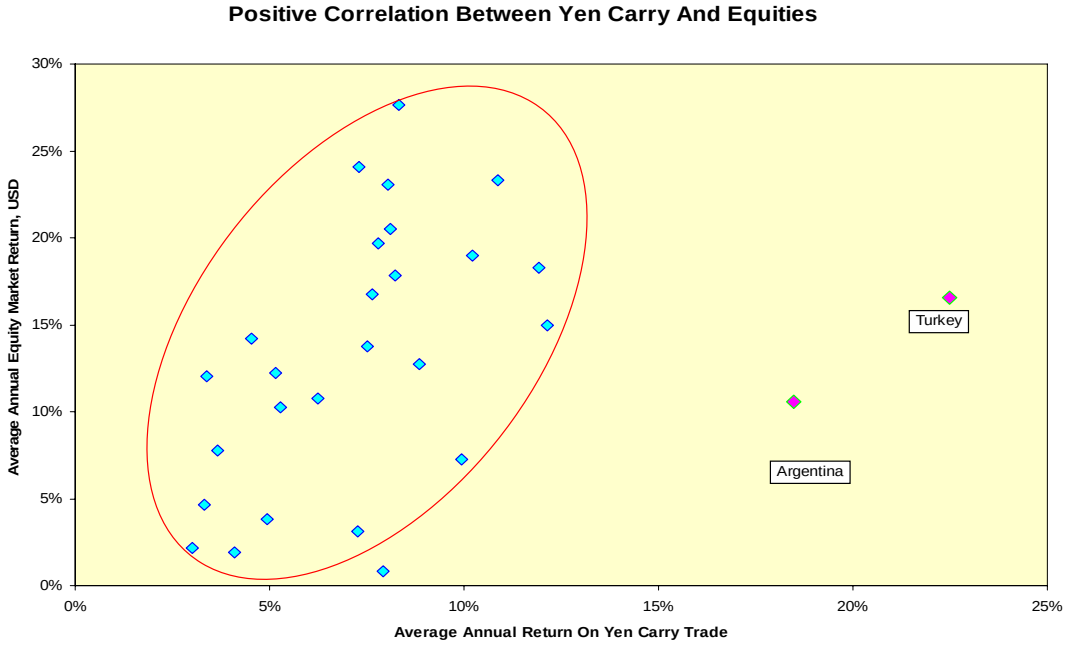


The message here is clear and unequivocal: Persistently high interest rates can lead to a profitable carry trade even for the most dreadfully mismanaged economies. Maybe these are not perpetual motion machines, but they are well-lubricated devices nevertheless.

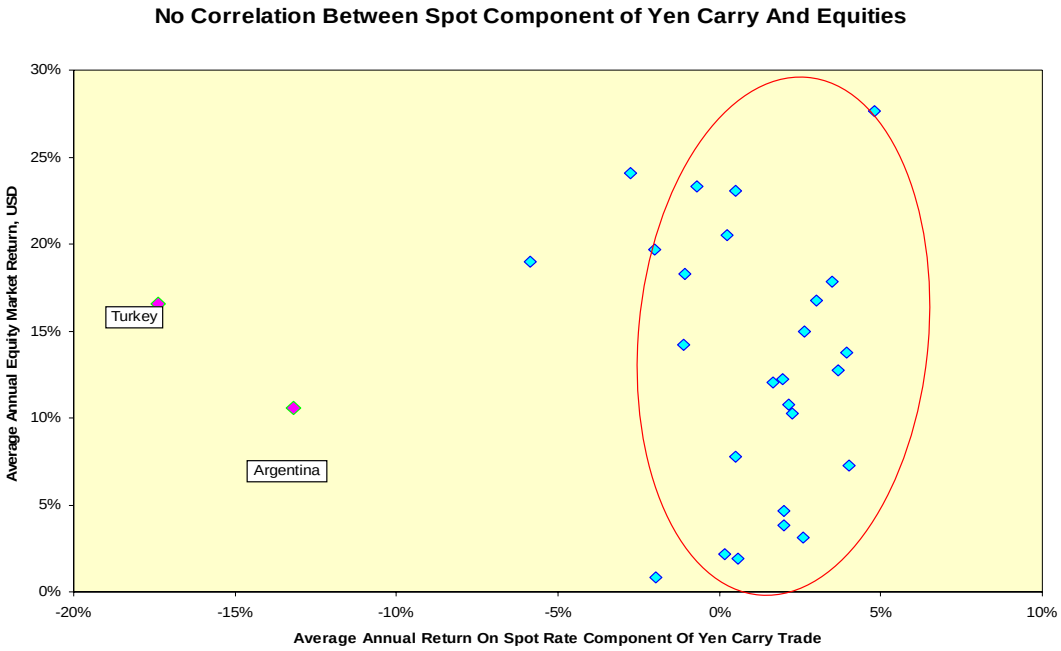
The Logical Rejoinder

If high interest rates reward risk-seeking investors who borrow JPY and lend TRY and ARS, don't those same high interest rates devastate the stock markets of those countries? Let's map average annual stock market returns in USD terms for each country against the yen carry trade and its components.

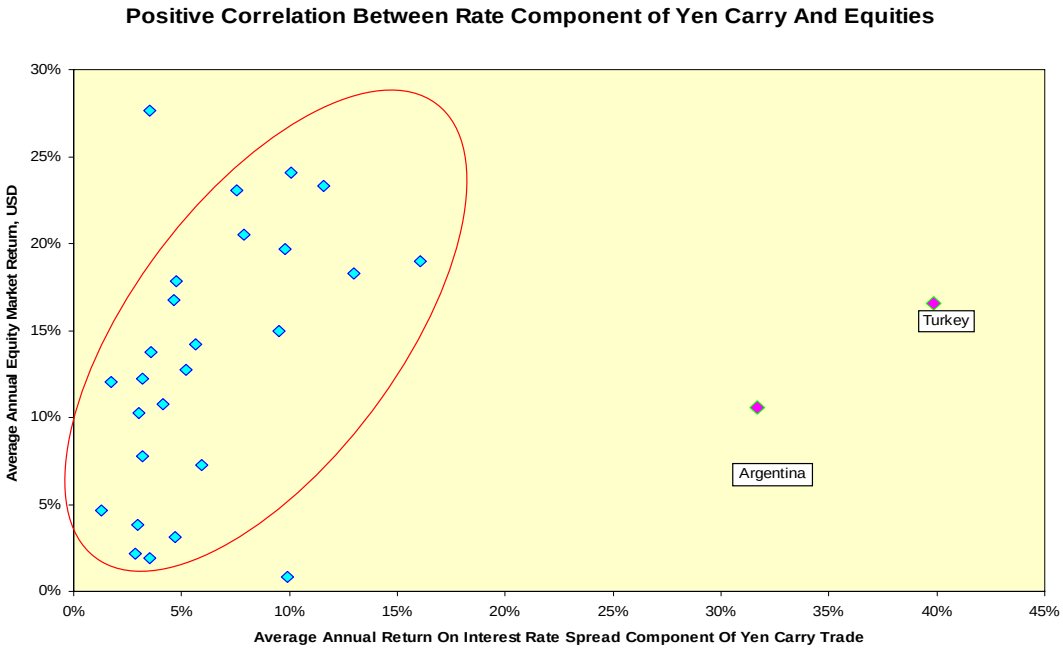
First, let's map the returns against the entire carry trade. Even if we isolate the obvious outliers of Turkey and Argentina, the positive relationship between stock market returns in USD terms and total return on the yen carry trade is both visually apparent and statistically demonstrable; the regression beta is 1.541.



Is this positive correlation the result of the interest rate spread component or the spot rate component of the yen carry trade? First, let's map stock market returns against the spot rate component of the yen carry trade.



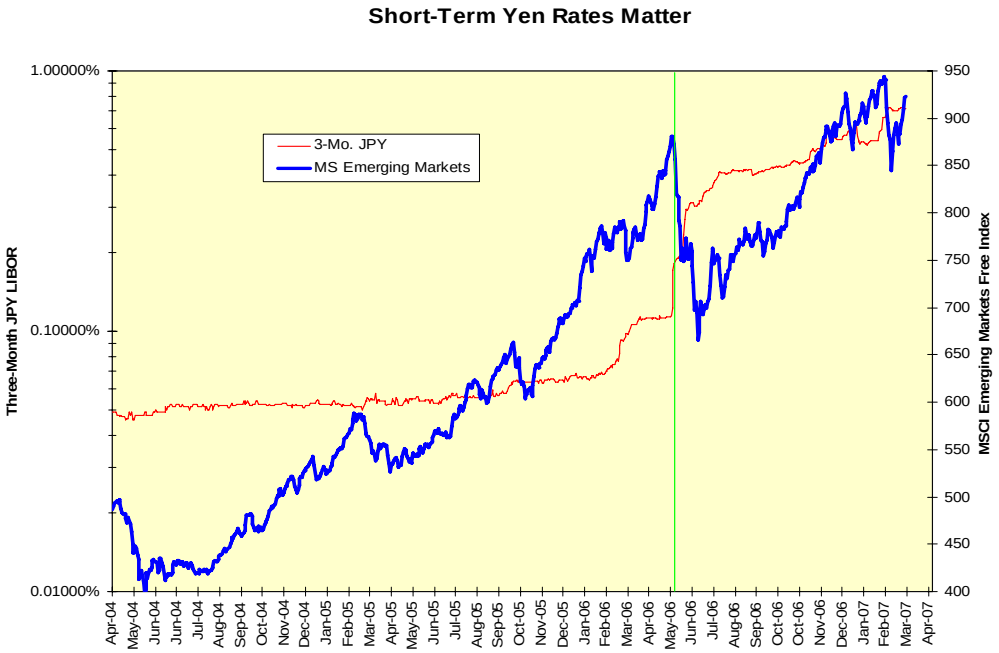
If we isolate Turkey and Argentina, we wind up with what appears to be a non-deterministic relationship. Here the regression beta is a near-vertical -0.085. This should lead us to suspect it is the interest rate spread component which drives the relationship between stock market returns and the yen carry trade. Here the regression beta is 1.085.



Implications

Japan increased its short-term rates in February 2007 by 25 basis points. This eroded the economics of the yen carry trade somewhat and created an incentive for all carry traders worldwide to rush for the exits at the first whiff of the next move. This is the classic "negative-sum" game, one wherein the players minimize the welfare of the group as a whole by attempting to maximize their individual welfare. Think of a crowd trying to leave a burning building, or of the short-lived global market panic at the end of February and beginning of March.

As we have seen above, it is the net interest rate spread, not the spot rate component, which drives the yen carry trade and its returns to both short-term interest rate (STIR) funds and to emerging market equity funds. These countries have benefited greatly from the yen carry trade as it brings badly needed funds into their economies and, if their equity markets are any indication, helps support their economies.



The world got a brief taste in May-June 2006 and again in February-March 2007 of what can happen to emerging market equities when short-term interest rates rise in Japan. The first shock was managed and contained in relatively short order, and emerging markets regained their highs within six months; the second shock was even more short-lived.

Emerging markets and others should not regard these quick rebounds as global applause for their policies or their high interest rates and depreciating spot currency rates, but rather as pullbacks by the Bank of Japan in its policy to raise short-term interest rates. The Bank of Japan had to overcome internal political resistance to make its February 2007 rate hike, and it has eschewed the opportunity to engage even in hawkish rhetoric. They are acting as if a Bank of Japan put option, similar to the fabled Greenspan put option, is in place.

The Greenspan put failed eventually, as the U.S. entered its worst bear market since the Great Depression in 2001. The same will happen eventually with the yen carry trade. Restated, anyone who thinks they found a perpetual motion machine in Tokyo had better think again.