

When Excess Becomes Predictable: The Majors

The course of the past four months has been examining whether the skew and smile of currency options could be used in conjunction with those currencies' money-market yield curves to predict carry returns from the USD into individual currencies. In general, the skew of the options curve as measured by risk reversals proved useful while the smile of the options curve as measured by the butterfly did not.

Now let's turn the tables and ask whether carry returns from the USD in conjunction with the money-market yield curve can be used to predict the excess of implied volatility over historic volatility. Readers of these articles may be familiar with excess volatility, the market's demand for insurance, defined as the ratio of the implied volatility for three-month non-deliverable forwards to high-low-close (HLC) volatility, minus 1.00.

HLC volatility is defined as:

$$\sum_{i=1}^N \left[\frac{.5 * \left(\ln \left(\frac{\max(H, C_{t-1})}{\min(L, C_{t-1})} \right) \right)^2 - .39 * \left(\ln \left(\frac{C}{C_{t-1}} \right) \right)^2}{N} * 260 \right]^{1/2}$$

Where N is the number of days between 4 and 29 that minimizes the function:

$$\frac{1}{N} * \sum_{i=1}^N \frac{N}{Vol^2} * |(P - MA)| * |\Delta MA|$$

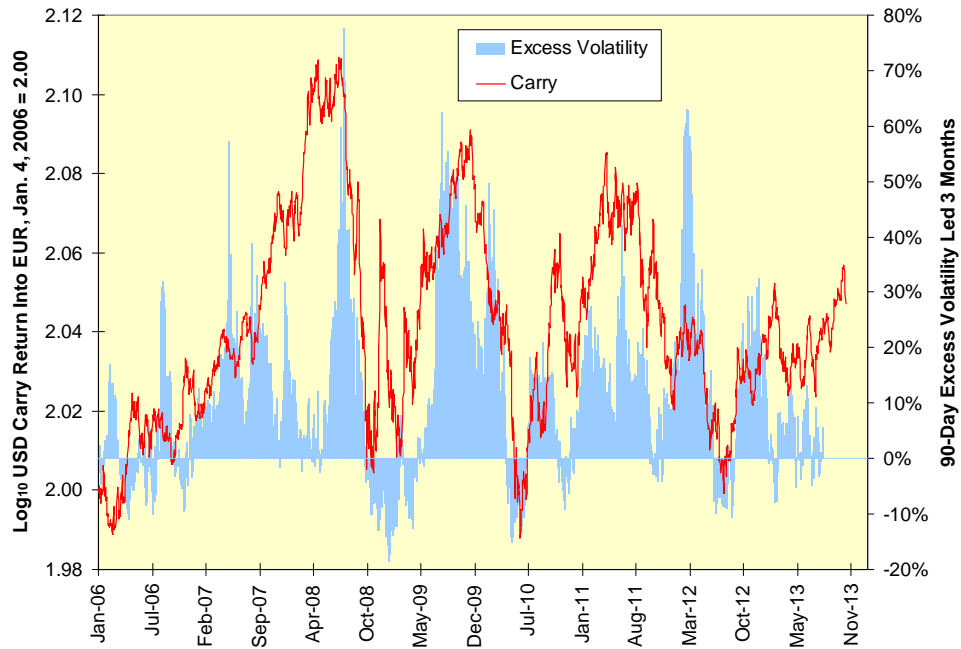
As our target now is to predict a measure of excess volatility with the ultimate objective of trading it, let's switch from this dynamic measure to a simple ratio of 90-day volatility to 90-day realized volatility, minus 1.00. The first section of the discussion below will be devoted to mapping returns on the major currencies as the common logarithm of the total carry return from the U.S. dollar into those currencies reindexed to January 2006. This both approximates the return path of a continuous currency future and allows for the more intuitively appealing rising line depicting a stronger currency.

The second section will look at this measure of excess volatility as a function of the carry return over the past three months and of the lagged value of the money-market yield curve as measured by the forward rate ratio between six and nine months (FRR_{6,9}) for the major currencies. The FRR_{6,9} is the rate at which we can lock in borrowing for three months starting six months from now, divided by the nine-month rate itself. The steeper the yield curve, the more this ratio exceeds 1.00; an inverted yield curve has an FRR_{6,9} less than 1.00.

Excess Volatility And Returns

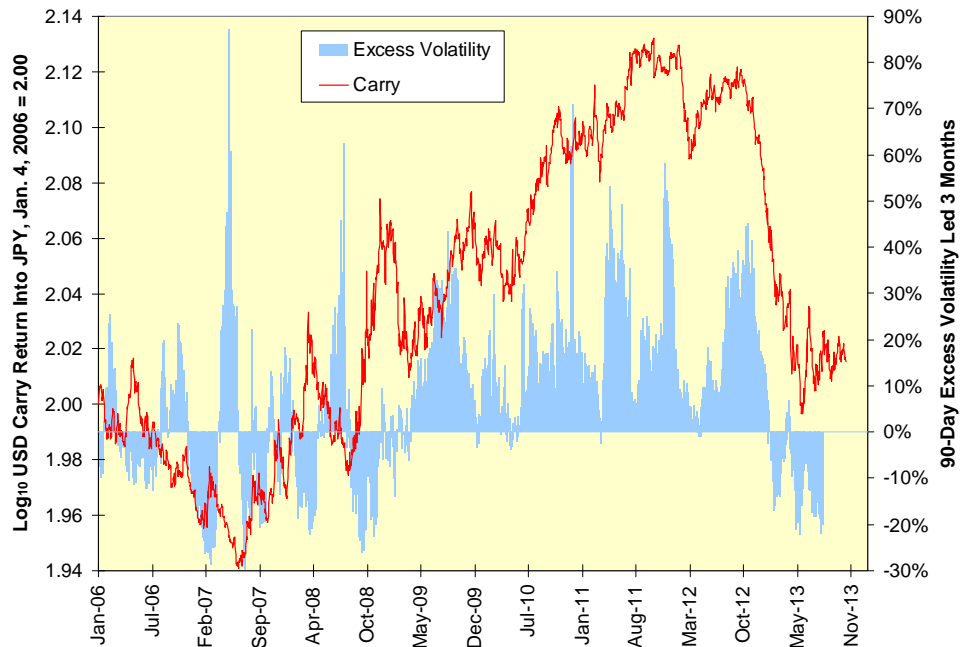
The euro's excess volatility appears to be an asymmetric process with positive spikes greatly exceeding negative ones. The general ebb-and-flow of excess volatility with a three-month lag to carry returns is expected, but the increasing demand for insurance when carry returns rose in early 2008, 2009 and again in mid-2011 is somewhat surprising. This pattern of increasing anxiety in the face of a currency's strength is far more common for emerging market and minor currencies, not for what is still the second-most important currency in the global system. Critically, when carry returns start to rise from low levels, excess volatility tends to rise as well; this suggests option strategies involving long euro volatility positions would work.

The Euro And 90-Day Excess Volatility



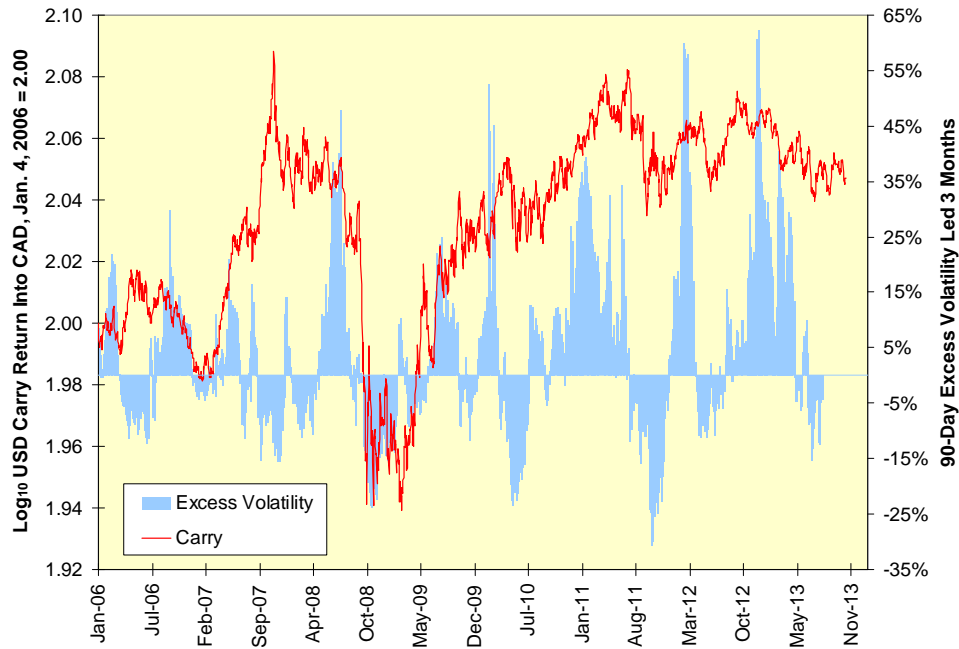
The yen's excess volatility was symmetric prior to the adoption of quantitative easing by the U.S., U.K. and Switzerland in March 2009. It then shifted to an asymmetric pattern as Japan began a series of attempts to drive the JPY lower in late 2012 and early 2013. These attempts pushed excess volatility to negative levels as implied volatility declined in the face of predictable policy.

The Japanese Yen And 90-Day Excess Volatility



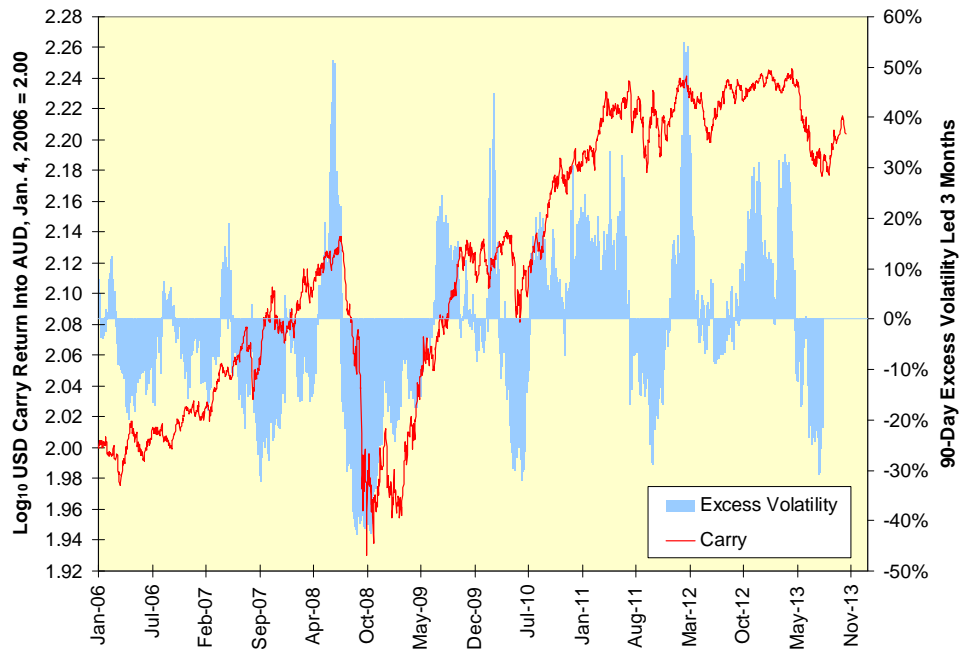
The pattern for the Canadian dollar has been very different. Not only has excess volatility been a symmetric affair, its positive spikes have been unrelated to changes in the CAD's carry return. However, just as in the case of the EUR, shifts higher in the carry return have led to shifts higher in the excess volatility measure. A stronger CAD invites a long volatility position.

The Canadian Dollar And 90-Day Excess Volatility



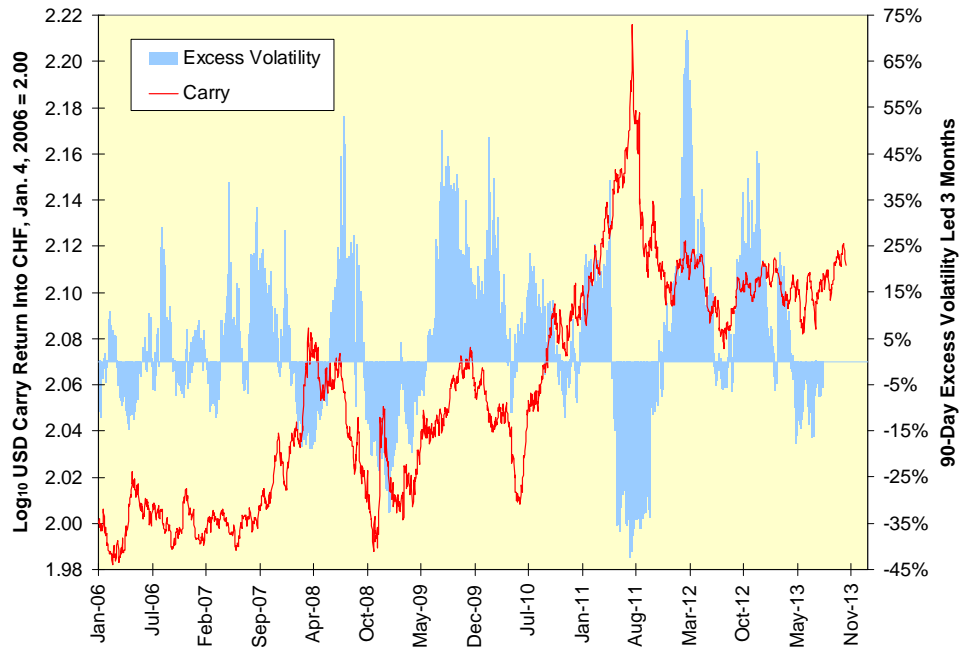
The pattern for the Australian dollar retains both the symmetry of the Canadian dollar's excess volatility and its tendency to move higher after carry returns move higher, but adds irregular episodes of positive spikes following gains in the AUD's carry return.

The Australian Dollar And 90-Day Excess Volatility



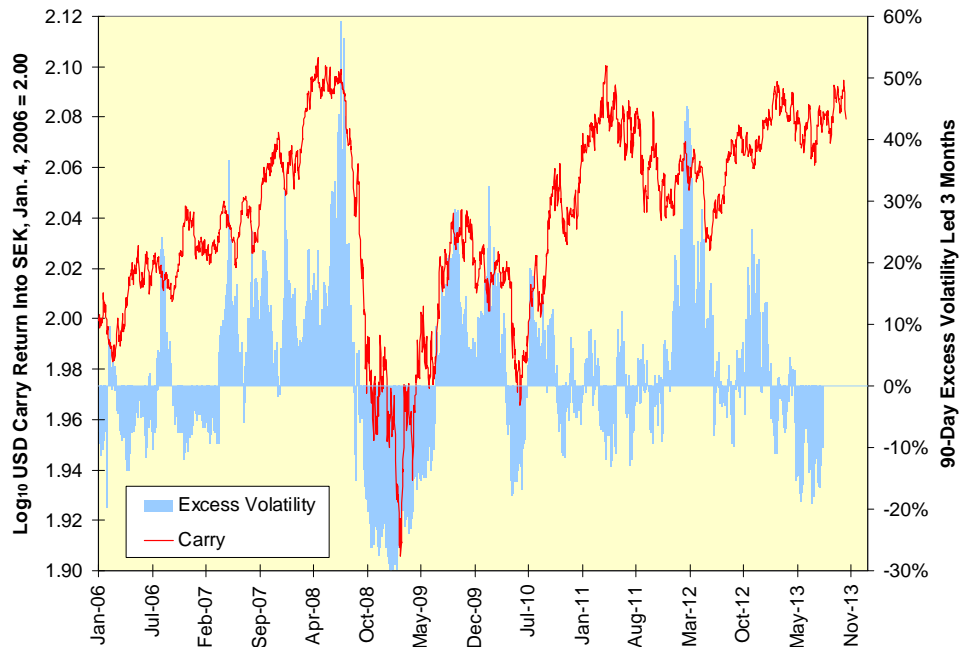
We should expect the pattern for the Swiss franc to have been distorted by the September 2011 imposition of the franc ceiling and simultaneous pledge to print the CHF in unlimited quantities to enforce that pledge. Excess volatility plunged to deeply negative levels on the imposition of the ceiling and then jumped as 90-day realized volatility, the fraction's denominator, fell.

The Swiss Franc And 90-Day Excess Volatility



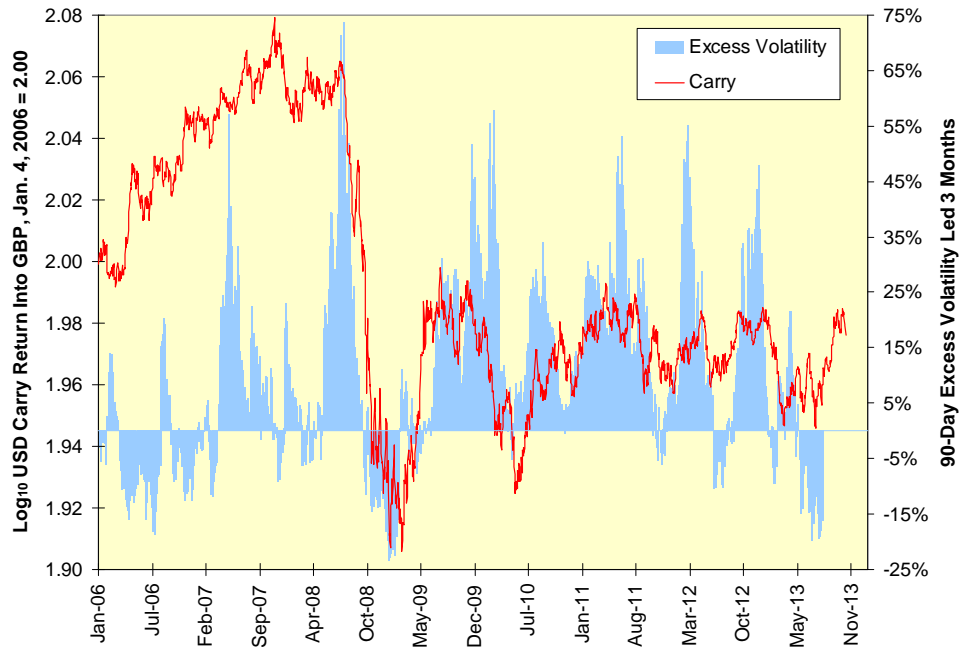
The Swedish krona had one of the cleanest patterns and direct linkages to carry returns of any currency prior to the May 2010 backstopping of Greece. Then the SEK became a safe-haven currency, albeit not as much as the CHF was, and implied volatility fell as the carry return moved higher. The market simply accepted the SEK's strength and did not fear a Swiss-like response to it.

The Swedish Krona And 90-Day Excess Volatility



Finally, the linkage between the carry into the British pound and its excess volatility has been very direct throughout the data sample. Excess volatility has been asymmetric in a manner very similar to Japan's since the U.K. began its quantitative easing program in March 2009. While the U.K. has not engaged in direct and public campaigns to weaken the GBP as Japan has with the yen, no one has had to question the bias of British monetary policy.

The British Pound And 90-Day Excess Volatility

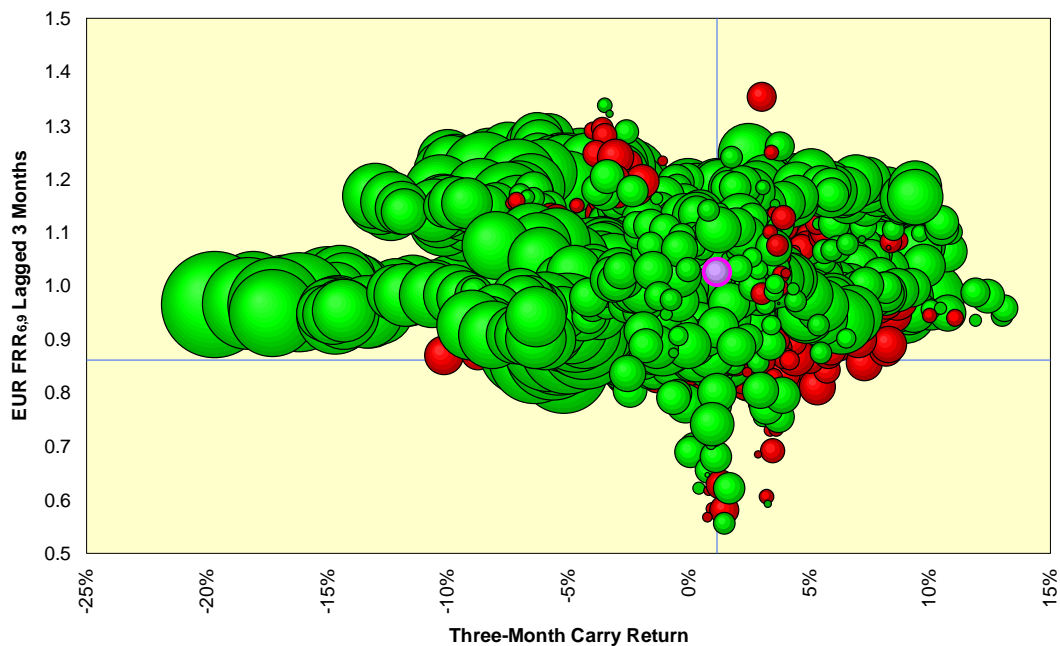


Leading Indications Of Excess Volatility

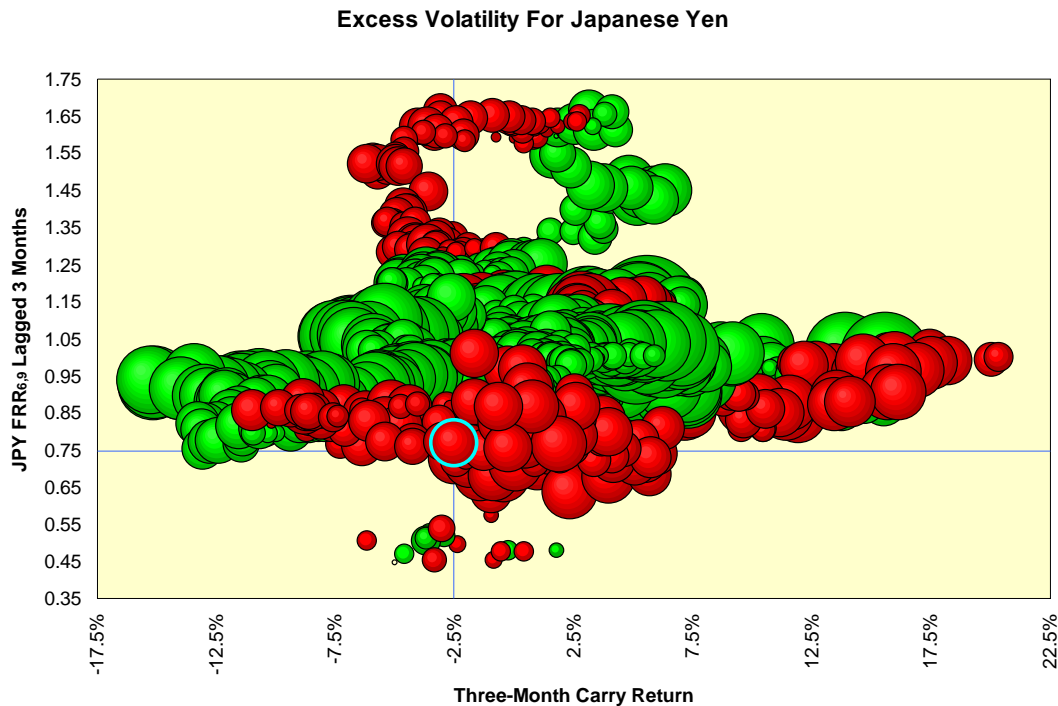
Now let's look at excess volatility for each of the major currencies as a function of the previous three months' carry return and three month-ago values of its $FRR_{6,9}$. Positive levels of excess volatility are depicted with green bubbles, negative levels with red bubbles; the diameter of the bubble corresponds to the absolute magnitude of the excess volatility level. The last datum used is highlighted and the current environment is depicted with a bombsight.

The map for the euro affirms the earlier observation negative carry returns lead positive movements in excess volatility. Observations of negative excess volatility cluster in zones of positive carry returns combined with slightly inverted yield curves. This cluster is too isolated and too small to be of much direct trading use.

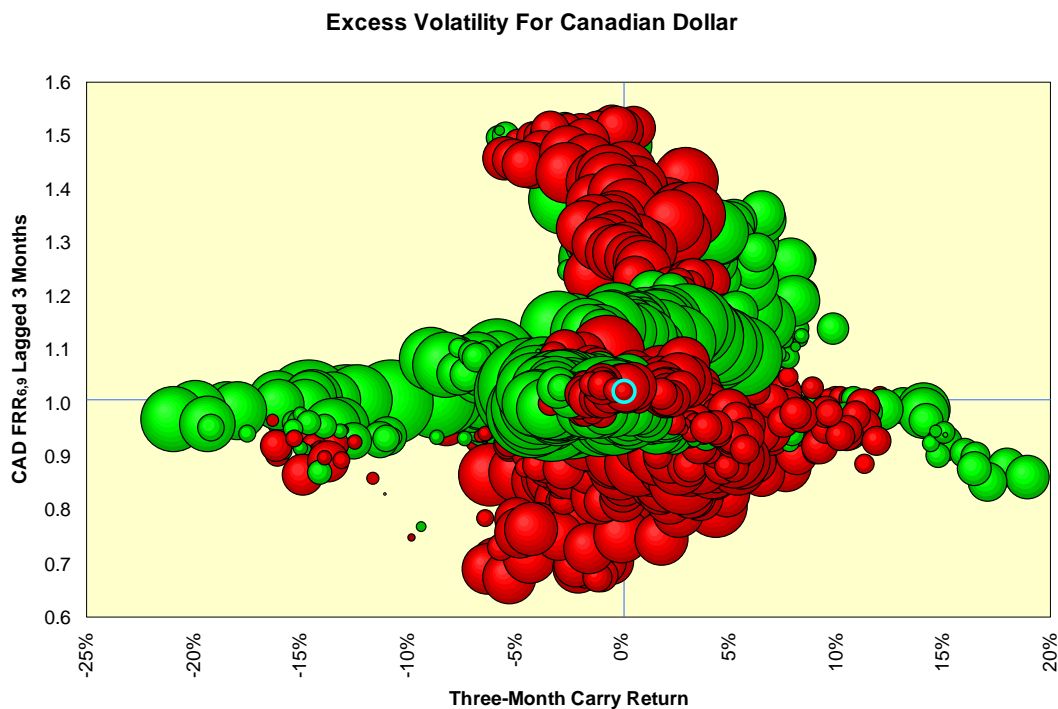
90-Day Excess Volatility For Euro



The yen has a large band of negative excess volatility readings at $FRR_{6,9}$ levels less than 0.90; these become interspersed with positive observations once the previous three months' carry moves over 5.0%. The region of the map with $FRR_{6,9}$ levels between 0.90 and 1.25 is dominated heavily by positive excess volatility levels. These defined clusters suggest direct volatility-trading strategies are available.

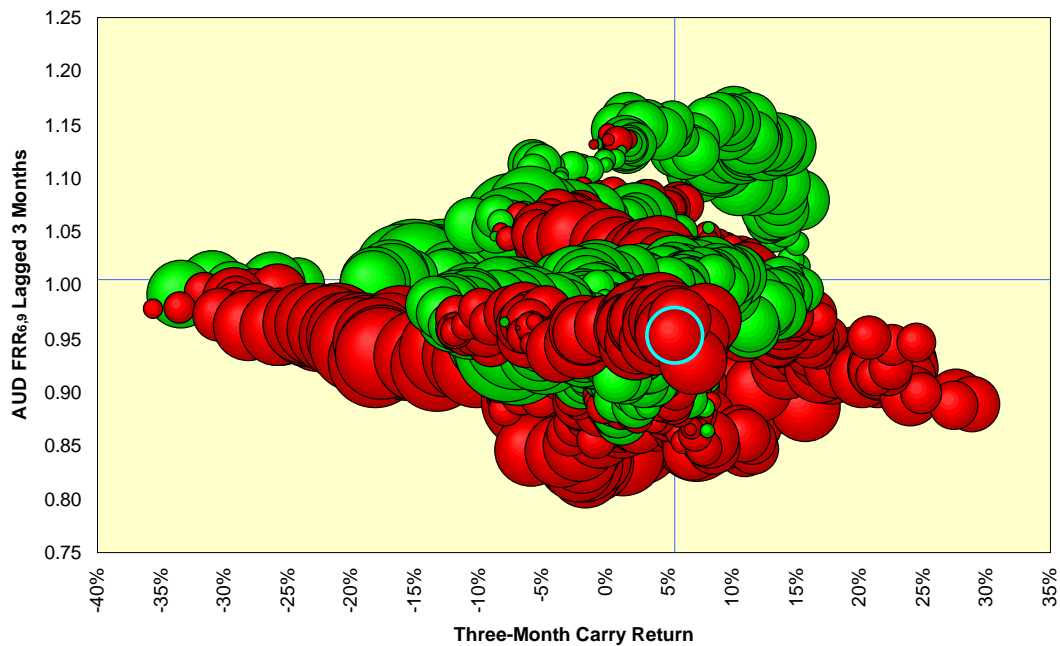


The CAD's map is somewhat discouraging for volatility trading. The clusters of excess volatility are very well-defined but they are too interspersed with each other to invite direct long- or short-volatility positions.



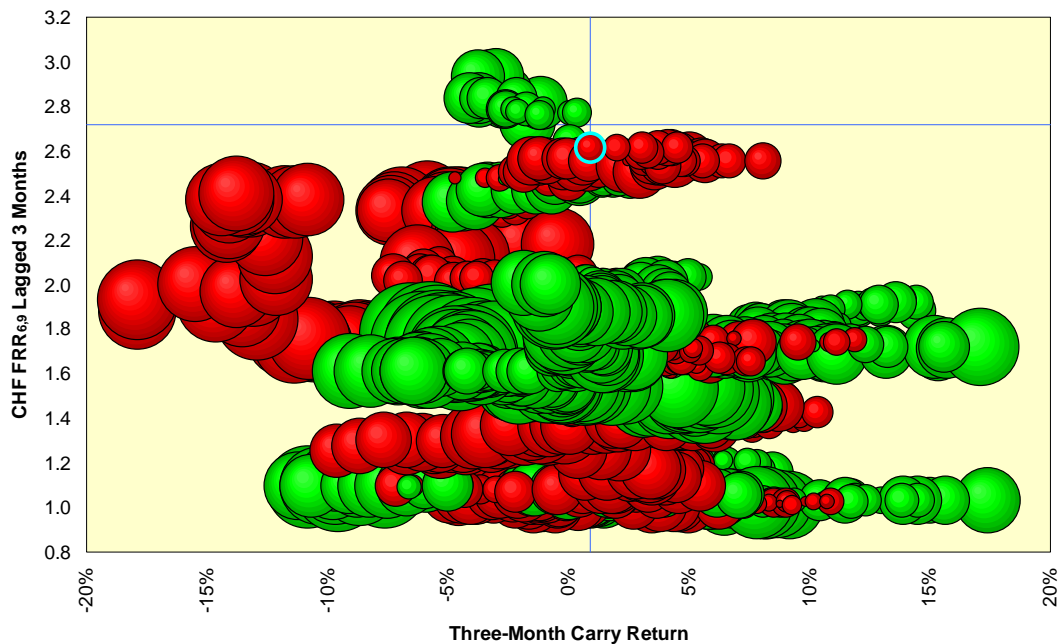
The Australian dollar, however, has an almost direct split along the dimension of the yield curve for positive and negative excess volatility levels. If the AUD $FRR_{6,9}$ was below 1.05, implied volatility was relatively cheap. Interestingly, the previous three month's carry returns were largely irrelevant for the AUD.

Excess Volatility For Australian Dollar



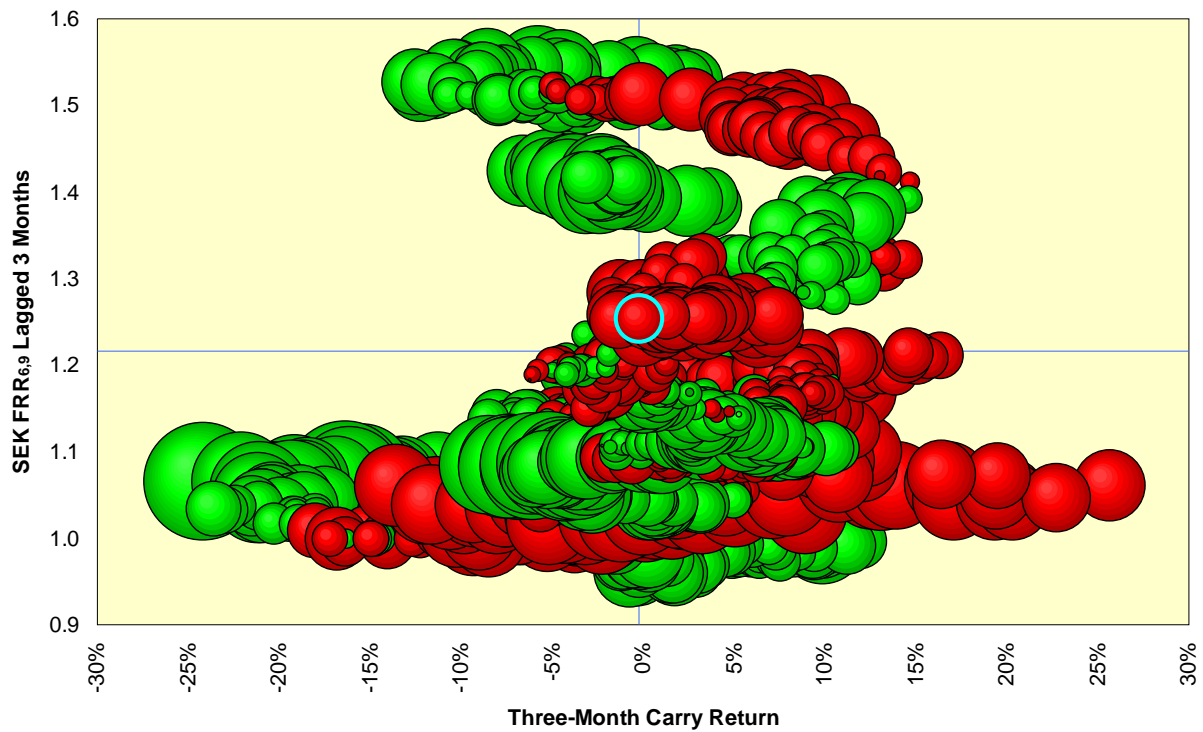
We can and probably should ignore the Swiss franc unless we have reason to believe future policies will be as dominant as the franc ceiling has been. The large cluster of negative excess volatility levels in the northwest corner of the map were the direct result of the unusual market conditions created in September 2011.

Excess Volatility For Swiss Franc



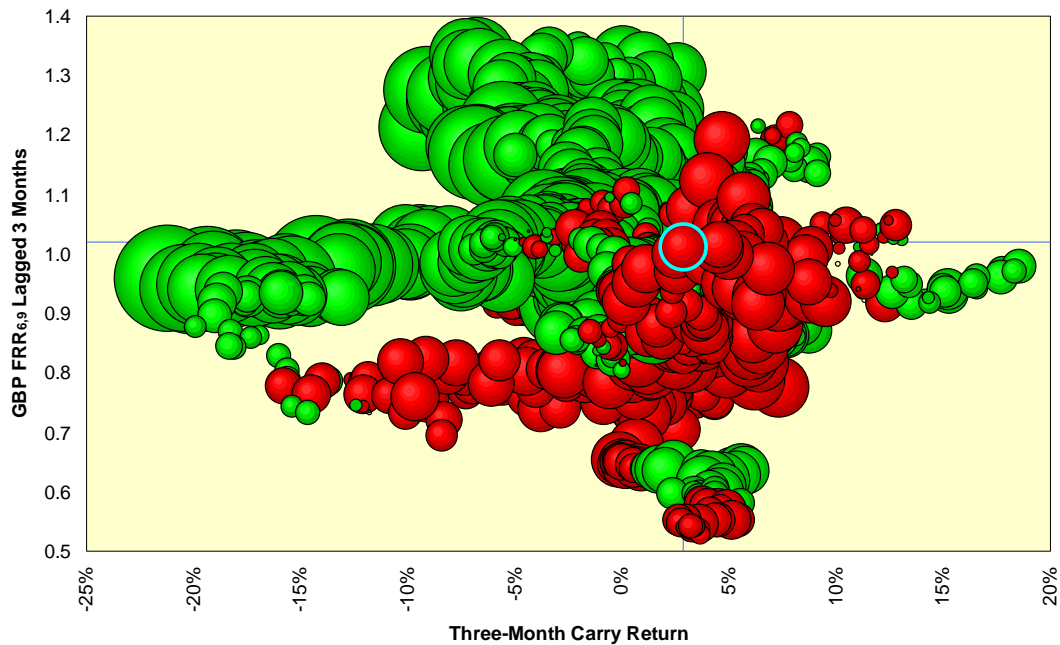
The map for the Swedish krona has two well-defined zones based on previous returns outside of an absolute 15% range; positive carry returns lead to negative excess volatility and vice-versa.

Excess Volatility For Swedish Krona



Finally, the map for the British pound has clean divisions along both dimensions. With the exception of a small cluster of negative excess volatility, a GBP FRR_{6,9} greater than 0.90 following negative carry returns is associated with positive excess volatility. Flatter yield curves have the same mean-reverting division at absolute previous carry returns greater than 15% as seen for the SEK. The available data sample suggests the GBP is highly amenable to volatility trading.

Excess Volatility For British Pound



The response of excess volatility to both the yield curve and carry returns seen for the majors should not be surprising. Both the very steep yield curves seen in recent years and the less-common inverted yield curves are responses to monetary policies often seen as temporary and unstable; these opinions lead traders to insure themselves against policy reversals. Similarly, many strong currency moves in either direction are the result of policies as well.

It would be nicer if the responses seen across currencies were more uniform and less anecdotal, but this may be asking far too much in a world where central banks and governments dominate short-term interest rate and currency markets. The key for traders is interpreting whether markets find the latest policy moves stable or not. If not, implied volatility will rise and dictate a long volatility position; if so, short volatility positions are in order.

The responses of selected minor currencies will be examined next month.