

Australian Dollar And Seemingly Related Cross-Rates

One of the bad parts of econometrics is any double entendre coming from it is likely to be missed by non-econometricians, probably to the general good of humanity. The title is a play on a “seemingly unrelated regression,” a technique developed in 1962, for solving a system of equations with no apparent common factors other than – and here is the punchline – correlation between each equation’s residuals.

The world of carry trading and currency cross-rate matrices includes a number of seemingly related pairs. A common refrain in the carry trade, from hedge fund traders in particular, is, “I don’t know anyone who does this.” That is the beauty of arbitrage pricing: Markets gravitate toward their lowest energy state as buyers are unwilling to bid higher and sellers are unwilling to offer lower. This happens not only within a given market, but it happens on an intermarket basis as well. Seemingly unrelated markets can influence one another.

The Aussie/Euro Cross-Rate

The Australian dollar (AUD) is a trading favorite as it has strong resource linkages, an active cross-rate against currencies as varied as the Indonesian rupiah and Canadian dollar, an active arbitrage against other major currencies, and it is one of the four currencies included at a 25 percent weight in the Dow Jones FXCM Dollar index. The two keys to this trading popularity are Australia’s economic linkage to East Asian economies in general and the Chinese economy in particular and its post-crisis status as a high-yielding major currency.

The general impression of Australian trade can be summarized by the image of large chunks of minerals from Western Australia and coal from Queensland being dug up, loaded on to a ship and sent northward to China. However, the European Union is Australia’s second-largest trading partner overall and it is the leading importer of Australian services. Moreover, the European Union is Australia’s second-largest source of foreign investment. As the European Union and Australia are moving to establish a free-trade agreement, the AUD/EUR cross-rate is going to increase in importance.

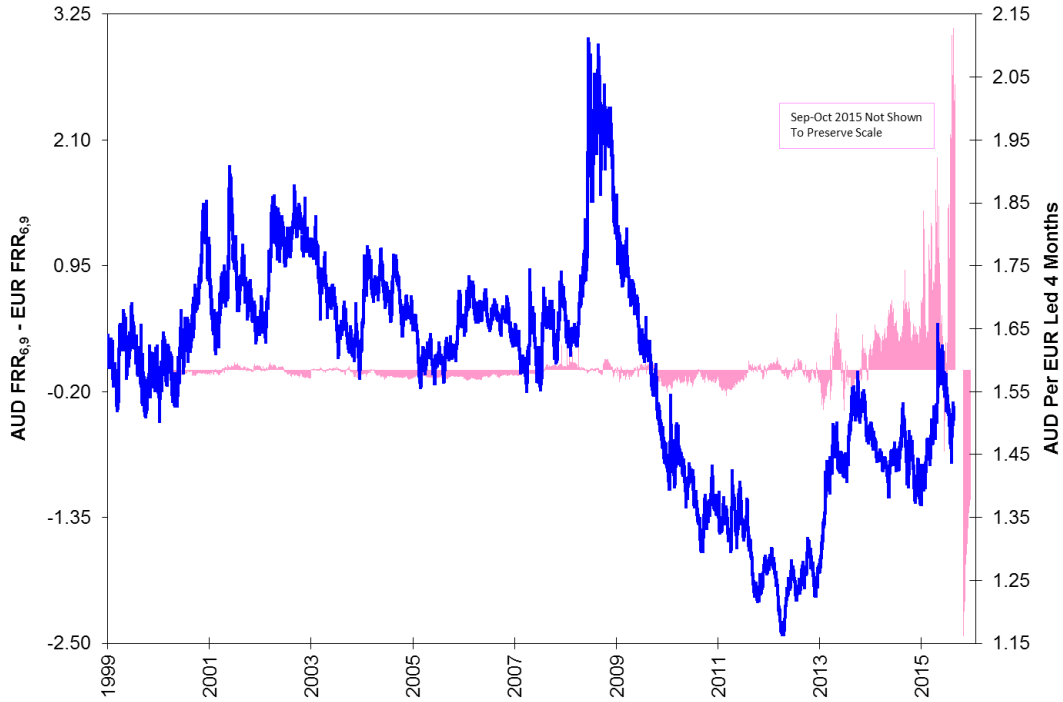
Still, the drivers of currency cross-rates are never as neat as they may seem from either trade flows or even from interest rate differentials. This has been especially true for all cross-rates against the EUR since the European Central Bank began lowering short-term interest rates aggressively in 2014. Near-zero and negative short-term rates can and do play havoc with money-market yield curves.

This point can be illustrated by mapping the cross-rate led four months against the difference between the forward rate ratios between six and nine months ($FRR_{6,9}$) for the AUD and EUR. These are the rates at which we can lock in borrowing for three months beginning six months from now, divided by the nine-month rate itself. The more the $FRR_{6,9}$ exceeds 1.00, the steeper the yield curve is; an inverted yield curve has an $FRR_{6,9}$ less than 1.00.

The EUR $FRR_{6,9}$ was steeper for most of the pre-April 2013 history, something that should have made the AUD stronger on the cross-rate as the EUR would “roll down” its yield curve faster. However, this relationship was not a strong one at all.

Then things became strange as the EUR $FRR_{6,9}$ first became negative and then sharply positive in 2015. The chart below omits the September-October 2015 period to preserve scale as the differential ranged from -35 to 65. While the notion of any currency cross-rate being driven by expected relative interest rate differentials is an appealing one, we simply have to look elsewhere for a driver.

Expected Short-Term Rate Differentials Not Strong Indicator For Cross-Rate



Source: Bloomberg

A better explanatory relationship comes from the excess volatility of AUD options by a EUR holder. Excess volatility is defined as the ratio of three-month implied volatility to high-low-close volatility minus 1.00. HLC volatility in turn is defined as:

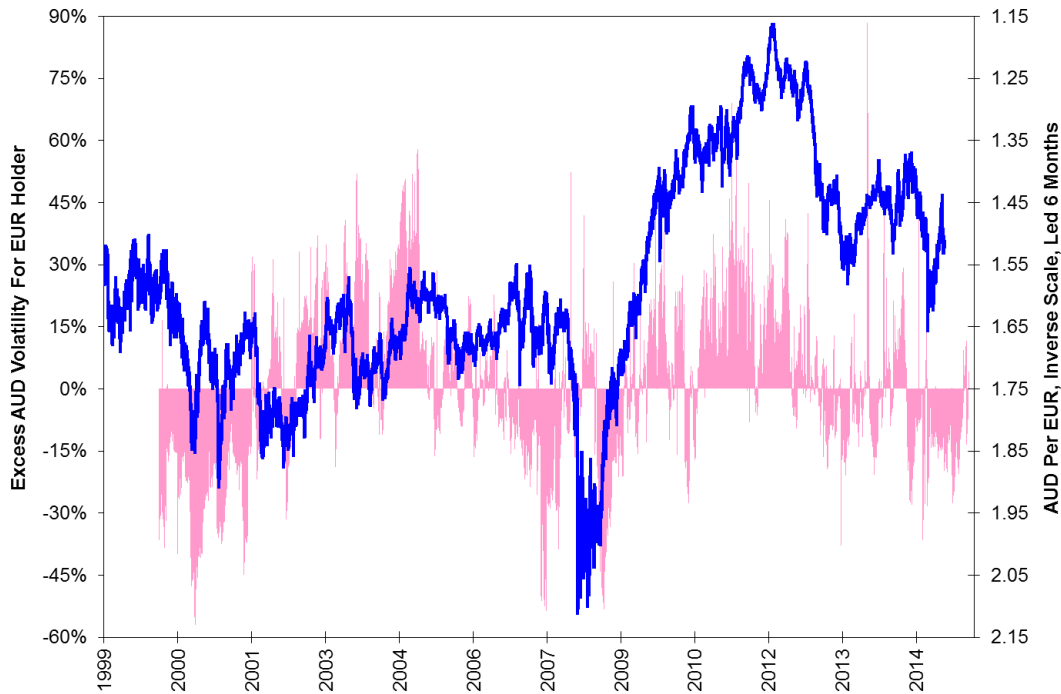
$$\sum_{i=1}^N \left[\frac{[.5 * (\ln(\frac{\max(H, C_{t-1})}{\min(L, C_{t-1})}))^2 - .39 * (\ln(\frac{C}{C_{t-1}}))^2] * 260}{N} \right]^{1/2}$$

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

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

This excess volatility has led the cross-rate by a fairly long six-month timeframe. Higher excess volatility signals rising demand to insure against a stronger AUD and vice-versa.

Excess Volatility Leads Cross-Rate By Six Months

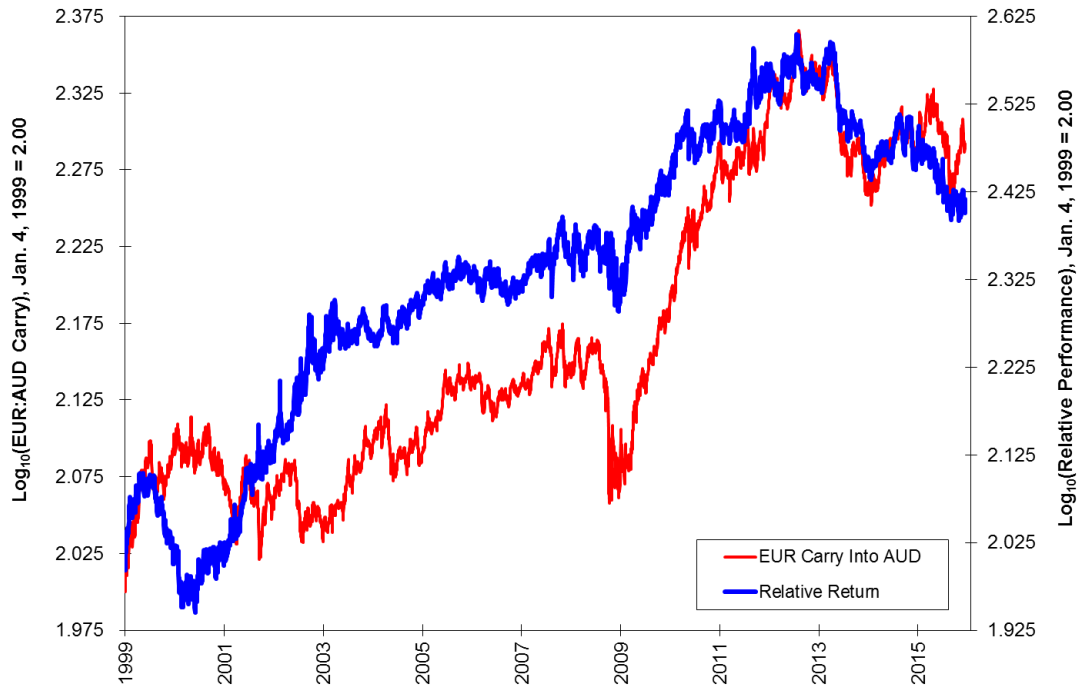


Source: Bloomberg

While both expected short-term interest rate differentials lead the cross-rate, relative equity market returns and the carry return from borrowing the EUR and lending into the AUD have tended to move simultaneously, especially after the financial crisis. Both the relative total return of the MSCI Australia index vis-à-vis the MSCI Euro index, both measured in USD terms, and the currency carry return are displayed on common logarithmic bases to facilitate comparison of growth rates.

The strong convergence of relative performance and carry after 2009 suggests relative performance was acting as if an active carry trade between the EUR and AUD was operating. As both the yen and dollar carry trades were far more active during this period, this was unlikely to be the case. All we can infer is the relative return of Australia vis-à-vis the Eurozone reflected the relative attractiveness of the two currencies. The seemingly unrelated markets, ones no one may have traded actively, became priced as if they were being traded actively.

Cross-Rate Converged To Relative Equity Performance After 2009



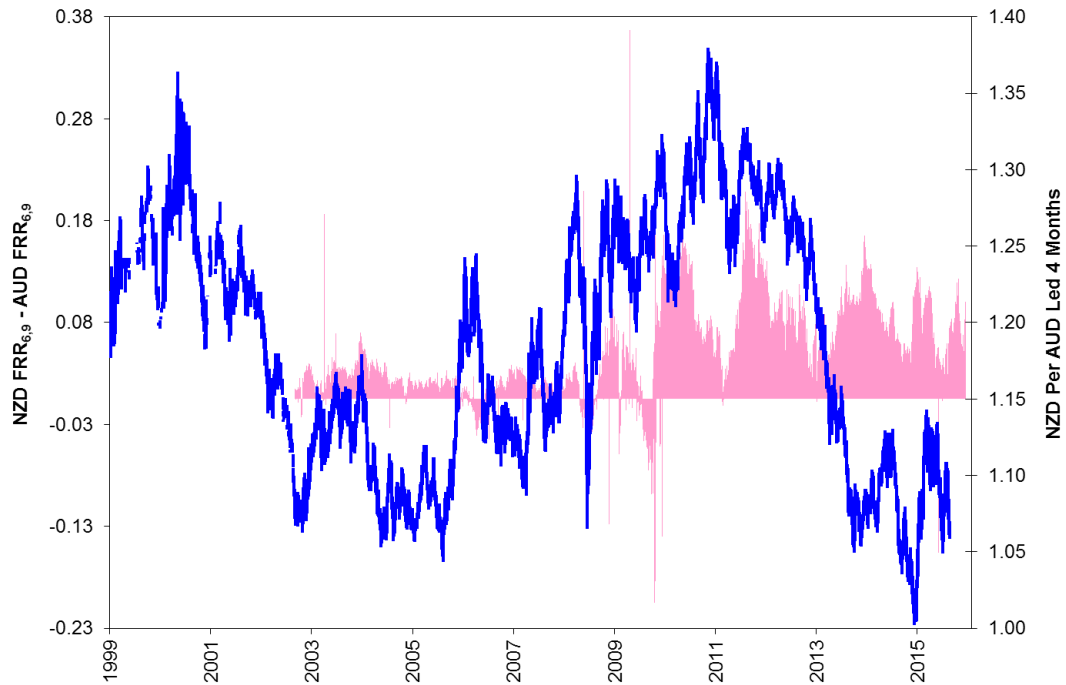
Source: Bloomberg

The New Zealand/Australia Cross-Rate

Now let's turn to another higher-yielding currency in the antipodes, the New Zealand dollar. The NZD is driven by both the yen and dollar carry trades, but it is associated with the AUD for reasons of relative proximity and high short-term interest rates. As we shall see below, this association is misplaced.

Just as we saw in the case of the EUR, the $\text{FRR}_{6,9}$ differential between the NZD and AUD has little direct effect on the cross-rate. The NZD yield curve has been steeper for most of its history, but the currency gained sharply against the AUD after early 2011. This was simply a case of a narrowing absolute rate differential. Regardless of the two yield curves' shapes, a lender simply received a higher return on NZD deposits.

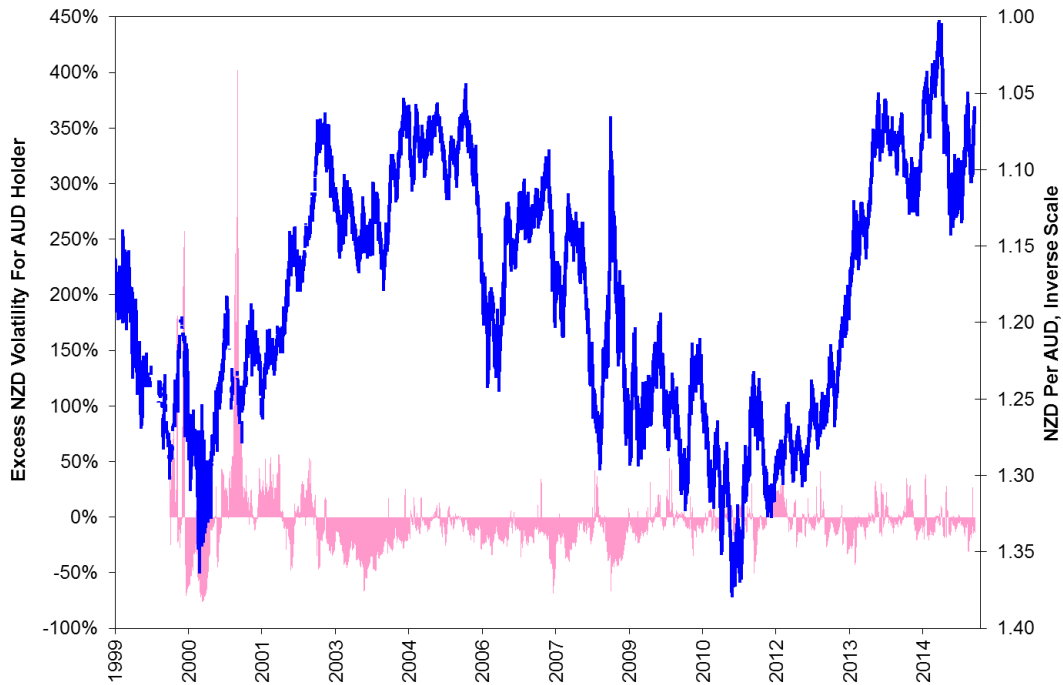
Expected Short-Term Rate Differentials Not Strong Indicator For Cross-Rate



Source: Bloomberg

The relationship is even worse for the excess volatility on NZD for an AUD holder. Excess volatility remained negative for nearly all of the November 2001 – November 2010 period, a time of a broad secular uptrend for the AUD on the cross-rate, but the opposite did not apply once the NZD started its 2011-2015 advance. If Australian investors were short NZD and were anxious to cap their losses, they hardly behaved like it.

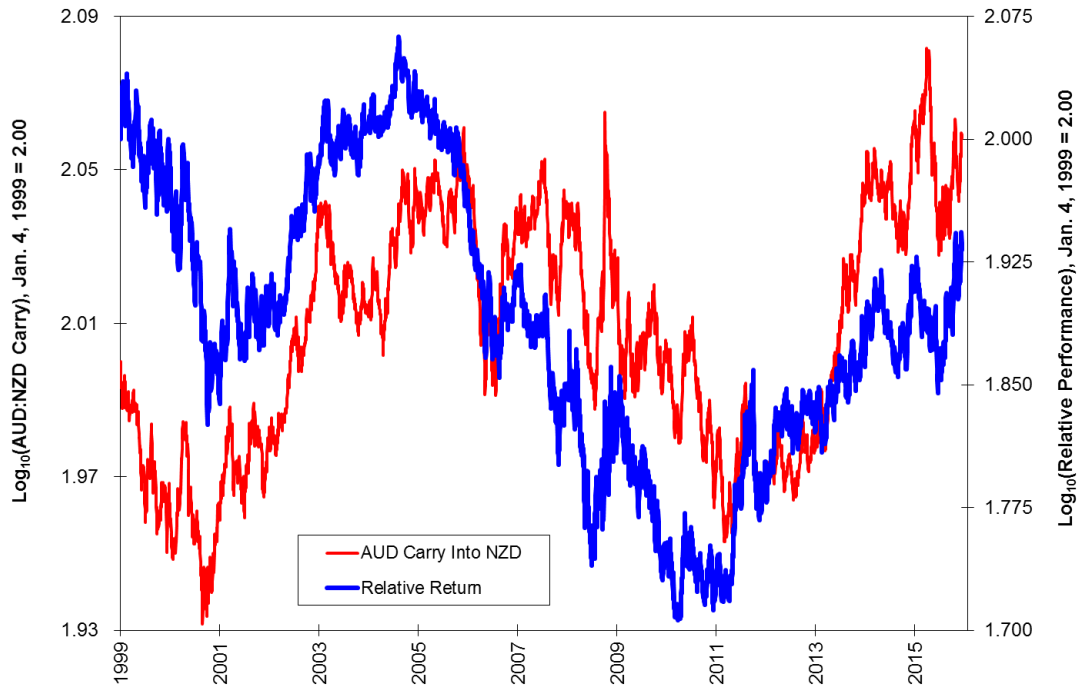
Excess Volatility Seldom Reflects Price Trends



Source: Bloomberg

The relative performance of New Zealand vis-à-vis Australia tended to lead the carry return from borrowing the AUD and lending into the NZD between 2001 and 2010, whereupon the two indices moved at the same percentage rates until April 2013. Once short-term interest rates started to rise in New Zealand while they stayed low in Australia, the carry trade diverged to the upside from New Zealand's relative performance.

Cross-Rate Diverged From Relative Equity Performance After April 2013



Source: Bloomberg

Things are not always as they seem. The presumed association between the AUD and NZD does not exist in any of the three indicators used, while the more illogical association between the AUD and EUR acts as if it is driven by the proverbial invisible hand. Hopefully, none of this was unseemly.