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Leverage Ratio Requirements and Peculiar Foreign Exchange Market Dynamics

Bill Nelson | Dec. 7, 2017

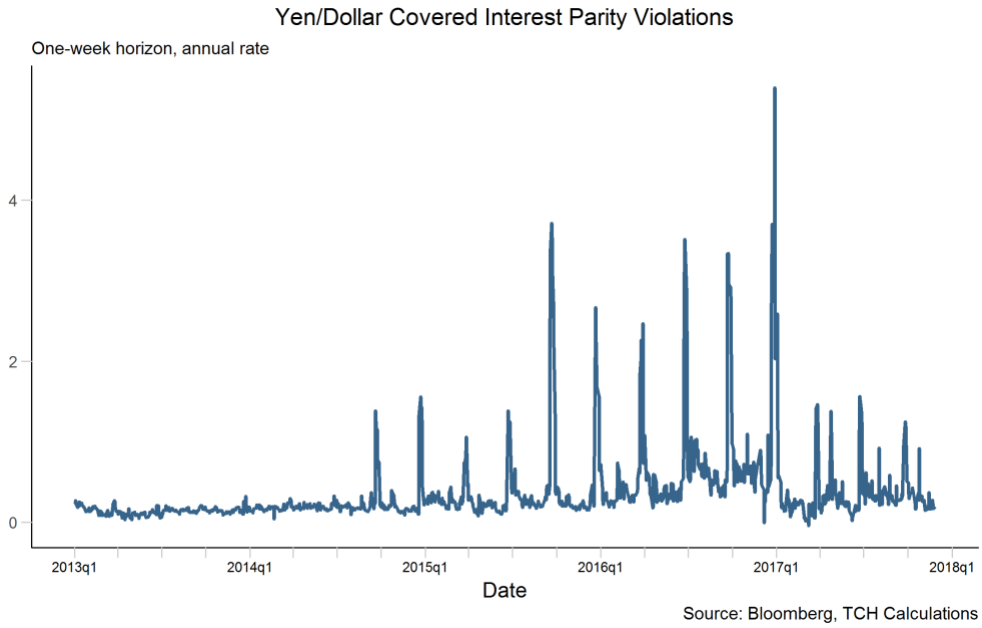
Last month, we published a blog post discussing the impact of bank regulations, particularly the leverage ratio requirement, on U.S. money markets. This new post discusses the impact of regulations on foreign exchange markets. In both cases, a key difference in how the leverage ratio is applied in the United States versus Europe allows us to see just how powerfully regulation can affect market behavior.

Quick background: a leverage ratio is a measure of a bank's capitalization that is calculated as the ratio of equity to assets with no risk-weighting of the assets. As part of the Basel post-crisis international regulations, all internationally active banks are subject to the supplementary leverage ratio (SLR). The Basel standard is a SLR of 3 percent, but the United States bank regulators adopted an "enhanced" supplementary leverage ratio (eSLR) of 6 percent for the largest commercial banks of and 5 percent for their bank holding companies.

Most importantly, for the present analysis, note that the SLR in the United States is measured as an average of daily values while, in Europe, the SLR is measured only at quarter end.

Laws are rare in economics, a discipline so prone to waffling that Harry Truman famously asked for a one-handed economist. However, one law that does exist is the law of covered interest parity (CIP). CIP states that the cost of borrowing in dollars must equal the cost of borrowing in a foreign currency, exchanging the foreign currency for dollars, and purchasing a forward contract to exchange the dollars back to foreign currency when the loan matures (the law, of course, applies to any two currencies). If CIP were violated, there would be a riskless arbitrage, and finance theory in economics is built on the reasonable assumption that there should be no riskless arbitrages.

The yen-dollar CIP condition, measured using one-week OIS (overnight indexed swap) rates (a measure of the unsecured interbank rate in each jurisdiction) and the one-week yen-dollar forward exchange rate is plotted below. The line is calculated as the excess return, in percent at an annual rate, to a market participant who borrows dollars and invests in yen covering the foreign exchange risk. If CIP holds, the line should always equal zero. As is clear, however, while the line equals zero over the earlier part of the graph, beginning in the second half of 2014, it exhibits sharp upward spikes at quarter end and, if you look closely, drifts increasingly above zero on non-quarter ends as well.



In a recent BIS quarterly review article, Borio et. al. explain that the demand for yen/dollar hedging is driven by Japanese banks using yen deposits to fund investments in dollar assets, hedging the exchange rate risk. Reportedly, that demand is met by a range of institutions including hedge funds and international banks. The arbitrage profits reported above would be earned by the institution meeting the demand from Japanese banks by borrowing in dollars, investing in yen, and covering their exchange rate risk.

How can these arbitrage profits persist? One explanation is that the dollar interest rate used to calculate the CIP violation does not capture the true borrowing cost of the international banks. Beginning in 2014, international banks have been subject to increasingly stringent capital requirements. For European banks, as explained above, those requirements include a leverage ratio requirement that is only calculated at quarter end. Consequently, the capital costs for conducting transactions necessary to meet the demand from Japanese banks have edged up steadily from 2014 and jump at each quarter end, exactly the pattern observed above.

Rather than a precise setting of interest earned to funding costs including capital costs, the quarter-end pattern no doubt reflects the fact that European international banks are eager to shrink their balance sheets however possible at quarter end so that their measured leverage ratios are higher. While other market participants could conceivably step in, transaction costs may make it unprofitable to do so for such a brief period. Indeed the quarter-end spikes often reach a peak a couple weeks before quarter end as institutions are adjusting their balance sheets, and then ebb, perhaps as alternative arrangements are secured.

Even so, the CIP "violations" are strikingly close to what would be expected if they measure the missing cost of capital for large international European banks. As described in the addendum, for the week over quarter end, the cost of capital should be the leverage ratio requirement times the equity premium times 12. The leverage requirement is 3 percent and the equity premium about 8 percent, so the quarter-end spikes should be around 2.9 percent, about the average height of the actual quarter-end spikes. On non-quarter-ends, European bank would be relatively unrestricted; at those times, the marginal providers could be large U.S. banks/broker-dealers. In that case, the cost of capital should equal about 0.4 percent (5 percent times 8 percent), roughly equal to the CIP violations apart from the quarter-end spikes.

In other words, perhaps the law of covered interest parity continues to hold, we just need to measure funding costs correctly, which would be a relief for those of us who believe there are no free lunches. At the same time, the results could be troubling for those who maintain that regulations are not having an impact on global financial markets.

Addendum

The measure of CIP violation plotted above is

$$r^y - r^d + x \quad (1)$$

where , r^y is the one week yen interests rate, r^d is the one week dollar interest rate, and x is the one week percentage change of the exchange rate of dollars for yen implied by the yen futures market. If CIP holds, then (1) is zero. However, if the bank engaged in the transaction faces capital requirements c, and a cost of capital r^e, then its true borrowing cost is

$$(1-c)r^d + cr^e \quad (2)$$

And the correct specification of the CIP condition is

$$r^y - ((1-c)r^d + cr^e) + x \quad (3)$$

If CIP holds and (3) is zero, then (1) equals

$$c(r^e - r^d) \quad (4)$$

That is, if CIP actually holds but the international banks on the dollar side of the transactions face balance sheet costs from capital requirements, then the figure plotted above should equal the capital requirement times the cost of capital.

The implications for European bank's leverage ratio are a bit more complicated. Because the banks' leverage ratios are calculated only on quarter end but apply for the entire quarter, the banks should forgo any investment over quarter end that doesn't provide excess returns equal to 90 times the capital requirement times the cost of capital. In the case of the statistic calculated here, which uses weekly rates, the excess returns should be 12 times the capital requirement times the cost of capital.

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