Homework: FX Carry Strategy

April 23, 2019

1 Introduction

An FX carry strategy borrows in a (low-interest-rate) currency and lends in another currency (with high interest rates). This is typically arranged via a cross-currency swap.

2 Data

Obtain yield curves, 3M interbank rates (e.g. Libor) and and FX rates at weekly intervals in pairs of Pakistani Rupee, Romanian Leu, US Dollar and Indonesian Rupiah from the earliest possible date through now[1]. You may need to interpolate from sparser data in some cases. (Not all maturities are available in all currencies.) When a 3M interbank rate is not available, use the closest available maturity such as 6M or 1Y.

3 Exercise

We will synthesize an approximate PL of weekly-traded cross-currency fixed-float and basis[2] swaps from the Libor rates and swap curves[3], normalized to

[1] You may assume the data in Quandl's YC dataset has swap curves, though in fact they are not quite the same.

[2] Recall that basis swaps require 3-month interbank rates only.

[3] Use at least the 1, 2 or 3, and 5 year points.

have a USD notional of US$10MM at the beginning of each week[4]. To keep bugs out of our cash flow tracking, we will convert flows to USD, though in some cases doing so is superfluous.

4 Fixed-Float Carry

In the borrowing (funding) currency, assume a rate of 3-month LIBOR+50bp, paid on 4/5 the notional amount (5x leverage) in the borrowing currency. In the lending currency, assume collecting a coupon every quarter at the 5Y swap rate, or (optionally) the 5Y treasury rate.

Weeks in which the 5Y swap rates of the two currencies starts within 50bp of each other will be assumed to have no position.

At the end of each week, assume you sell out of the position before opening a new one. You therefore need to tally accrued interest at the borrow and lend rates, and then compute mark-to-market for the swap exit.

4.1 Lending Currency

4.1.1 Mark to Market

Mark-to-market losses (due to swap rate and exchange rate changes) are the main source of downside deviation in this strategy.

Your original bond yield is the 5Y swap rate s_5, as are the coupons. Use the new swap curve to form a corresponding zero-coupon bond curve, and reprice the bond (with its original coupons equal to s_5) with the new interest rate curve, and the time remaining to all payments reduced by 1 week (or $\frac{1}{52}$ of a year).

This is then converted (if necessary) to USD for buyback value at the new FX rate.

[4]You may forward fill in cases where you are testing weekly and only monthly data is available. If holidays interfere, delay a day or so as necessary, being sure to align data from the same day where possible. Wednesdays work best for weekly analysis.

4.2 Borrowing Currency

4.2.1 Mark to Market

Here we can get a sufficiently good approximation just by assuming $\Delta V = 0$, since the durations are so short.

4.2.2 Accrual

Our interest payment is one week at the funding rate, multiplied by our borrowed amount. We borrowed the funding-currency[5] equivalent of \$8MM at the starting FX rate f. We must now return that same amount of home currency at the new FX rate, plus 1 week of interest on it (also in home currency) at $L_{3\text{M}} + 50\text{bp}$.

5 Analysis

Study and describe performance.

[5] In this context when talking about "home currency" we are referring to USD. If we refer to the home currency of a security, then we are talking about the currency in which that bond will pay notional and coupons.