Homework: FX Carry Strategy

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1 Introduction

An FX carry strategy borrows in a (low-interest-rate) currency and lends in another currency (usually an emerging or frontier market currency with high interest rates). This is frequently arranged via a cross-currency basis swap. Here we will investigate it in terms of foreign-currency bond position, which adds FX risk for the notional payment[1].

2 Data

Obtain the shortest available rates for UK overnight index swaps (OIS) [2] along with spot FX rates for the dollar versus pound [3].

Obtain swap yield curves and FX rates of Turkish Lira, South African Rand, Pakistani Rupee, Brazilian Real and Nigerian Naira from the earliest possible date through now[4]. You may need to interpolate from sparser data in some cases. (Not all maturities are available in all currencies.)

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[1] The basis swap repays principal in the original funding currency.

[2] Use the API-accessible series IUDSOIA, or in the multi-tenor downloadable zip file "Daily overnight index swap curve: archive data" from the Bank of England website. In the latter case you will have to stitch two files together.

[3] Use the Nasdaq EDI/CUR tables API database for all FX rates. You will need currency codes for that.

[4] Source your swap rate data from the *Emerging_Mkt_YC* file on the class website. See also the Jupyter notebook *Zero_And_Spot_Curves* on the class website.

3   Exercise

We will synthesize an approximate PL of weekly-traded cross-currency bond positions from the OIS rates and swap curves[5], normalized to have a USD notional of US$10MM at the beginning of each week[6]. You may assume zero trading costs. 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 OIS+50bp, paid on 4/5 the notional amount (5x leverage) in the borrowing currency for each active position. In the lending currency, assume the schedule has a coupon every quarter at the 5Y swap rate, or (optionally) the 5Y treasury rate.

Weeks in which the 5Y swap rate of the lending currency is less than 50bp higher than the 5Y swap rate in the funding currency 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 rate, 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) on the new interest rate curve, with 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.

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[5]Use at least the 1 and 5 year points.

[6]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[7] 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 $\text{OIS} + 50\text{bp}$.

5 Analysis

Study and describe performance. What do correlations of various pairs to each other look like? How about market risk factors? Which currencies contribute best to the Sharpe ratio? Worst to drawdown?

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[7]In this context when talking about *our* '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.