FOREIGN-EXCHANGE FORWARD POINTS

Sparsh Sah

THE FORWARD

Consider USD as domestic currency and GBP as foreign. We wish to go long a GBP-vs-USD forward contract, that is, we wish to enter an agreement today, to hand over at a chosen date in the future, a predetermined amount of USD to receive in exchange a predetermined amount of GBP. Suppose for simplicity WLOG the exchange rate between the currencies today, defined as the "price" of a GBP in USD, is 1 USD/GBP. Suppose also that the prevailing 1-year T-Bill rate is 4%, and that the prevailing 1-year Gilt rate is 1%. Also suppose that we wish to receive a year from now exactly 1 GBP.

Just as the forward price for a stock involves compounding at the risk-free rate minus the stock's dividend yield, the forward price for this GBP will involve compounding at the risk-free rate (that is, our, *domestic* risk-free rate) minus the GBP's "dividend yield" i.e. their risk-free rate. So, by no-arbitrage, we must at maturity hand over F amount of USD[1]:

$$F(t,T) = X_t e^{(r_{\text{USD}} - r_{\text{GBP}})(T-t)}.$$

So, in our case, we must in one year hand over

$$1 \cdot e^{0.04-0.01}(1-0) = e^0.03 = 1.03$$

USD, and we will receive exactly 1 GBP.
By entering this agreement, we are effectively long GBP-vs-USD. The 3% is called the "carry" or "forward points". But if the exchange rate rises (GBP strengthens, i.e. price of GBP in USD increases) we profit. For example, suppose that X_T crystallizes to 1.10. Then, we pay out 1.03 USD's and receive 1 GBP, but can immediately convert that 1 GBP to 1.10 USD's, earning 7 cents of profit.

THE SWAP

In fact, we can reconstruct the forward with a "three-legged trade". That is, we can at t:

1. Borrow 0.99 USD from the bank.
2. Convert it at the prevailing exchange rate to 0.99 GBP.
3. Enter a swap agreement with them:
   - Today, hand them 0.99 GBP and receive 0.99 USD.
   - In one year, hand them 1.03 USD's and receive 1 GBP[2].

In fact, this is the way large systematic macro hedge funds execute this for directional currency strategies in reality, as it is cheaper than entering the forward directly. The issue with the forward is that the bank, as our counterparty, is now exposed to the exactly symmetric directional risk as us: They are short GBP-vs-USD, and will immediately hedge that by entering a GBP-vs-USD forward agreement of their own. However, in the interim, they are exposed to slippage: The prevailing exchange rate can move against them in the minutes it takes them to find a counterparty (usually another speculator) for their own GBP-vs-USD forward. The bank will charge us tcost for taking on that risk.

By instead executing a swap, we hand them their hedge right there: As short-GBP-vs-USD, the bank will lose money if the exchange rate rises (GBP strengthens); But by handing them GBP right at the outset, we've hedged them, as they will make an equal amount of money by virtue of the fact that they hold newly-stronger hard currency.

[1] Blyth, Steven (Harvard Statistics, Harvard Management Company, Oxford). 2014. "An Introduction to Quantitative Finance". OUP. §2.7.

[2] By no-arbitrage, this *must* be the swap rate, precisely because we can replicate the forward. I will not get into the detail here, but see Blyth 2014 for a treatment of replication and the Fundamental Theorem of Asset-Pricing.

FAIRNESS

The forward points are *not* a cost, as I define it. I define a cost as something you pay a counterparty because they're charging you for providing liquidity or performing some other service. It can be high if they want to rip you off, or low if they're feeling magnanimous. But forward points are not a cost – They are simply a consequence of (a) monetary policy and (b) no-arbitrage.

In fact, *they are fair*. Why? Because the fairness is what engenders them in the first place! Picture the swap. You have 99 pence in your pocket. You can give that to His Majesty's Government, and receive in a year $0.99e^{0.01} =$ a quid. Or, you can enter a swap: Hand your 99 pence to the bank, receive 99 cents in return, give those 99 cents to Uncle Sam, receive in a year $0.99e^{0.04} =$ a-buck-three, hand that to the bank, and receive the same quid. The fact that the side that owes dollars must pay "more" is simply a reflection of the fact that they get the luxury of holding a higher-yielding currency for the next year – Yield that the side that had dollars but gave them away is now foregoing.

And it doesn't just have to come from govies. Even if you invest in a risky asset, USD-denominated risky assets should, in a uniform market, give higher expected returns than GBP-denominated risky assets. (If it helps, think about a DCF model: If risk-free rates are higher, that increases the discount rate, which lowers the NPV of future cashflows, and the NPV of future cashflows is the price PE analysts are willing to pay for a deal. I prefer to think about this like a quant: Quants look at excess-of-risk-free returns. If the risk-free rate rises, but the total ER stays flat, the higher risk-free rate eats into that and lowers excess ER. The quant will decrease the price she is willing to pay for the stock, thereby increasing the total return commensurately.)

So the bank, which was holding USD, could invest in a high-total-ER climate domestically. Once you force them to give up their USD and accept GBP, their asset universe shifts to lower-total-ER GBP-denominated assets. So it is only fair that you later swap back at a rate titled slightly against you, as you should have been taking advantage of the high ER's that the bank was missing out on.