Exercise Sheet 4: Short Solutions.

Exercise 1

a) Define the exchange rate E as USD per GBP. E_1 is the present exchange rate and $E\{E_2\}$ is the expected exchange rate in 12 months. The expected effective return on a UK bond for a US investor is given by $i_{UK} + \frac{E\{E_2\}-E_1}{E_1}$ or, using the log-approximation, $i_{UK} + ln(E\{E_2\}) - ln(E_1)$. Inserting $i_{UK} = 0.06, E\{E_2\} = 1.568$ and $E_1 = 1.6$, we get that the effective expected return on a UK bond is 0.04 or 4%. The expected return on a US bond is 2.5%. Hence the risk premium on a UK bond is $4\% - 2.5\% = \underline{\underline{1.5\%}}$.

b) Written in the log-version, covered interest parity is: $i_{US} - i_{UK} = ln(F) - ln(E)$. We need to solve for F. We have $i_{US} = 0.025, i_{UK} = 0.06, E = 1.6$. This gives $ln(F) = 0.43$. Then $F = e^{0.43} = \underline{\underline{1.55}}$

c) The risk premium on GBP is defined as the expected return on GBP minus the expected return on USD. Thus the risk premium equals $i_{UK} + \frac{E\{E_2\}-E_1}{E_1} - i_{US}$ or, written differently, $i_{UK} - i_{US} + \frac{E\{E_2\}-E_1}{E_1}$. Now since covered interest parity holds we can insert $i_{UK} - i_{US} = \frac{E_1-F}{E_1}$. Hence the risk premium on GBP equals $\frac{E\{E_2\}-F}{E_1}$. There is a risk premium on GBP if $E\{E_2\} > F$. If $E\{E_2\} < F$ there is a risk premium on USD. Note the interpretation of this: If $E\{E_2\} > F$ this means that if you want so sell GBP forward you pay an "insurance fee" in the sense that you get less for the GBP on the forward market than the expected exchange rate in 12 months.[1]

d) A risk-neutral firm owner cares only about his expected income, and not about the risk. If he sells the 5m GBP forward, he gets a secure income of 1.55*5m = 7.75m USD. If he waits 12 months and exchanges the GBP against USD on the spot market, his expected income is 1.568*5m = 7.84m USD. Therefore he is not going to sell the GBP forward.

[1] Of course you can also do this exercise using the log-approximations, it does not make a difference.

Exercise 2

a) According to this forecast the US Dollar will be worth less in 6 months than the current forward forward rate. If the firm believes this forecast, they will sell the 10m USD forward, and secure an income of 10m*0.91 = 9.1m SFR in 12 months.

b) According to this forecast, the US Dollar will be worth more in 6 months than the current forward rate. If the firm believes this forecast, they will not hedge the foreign-exchange risk. They will exchange the USD for CHF in the spot market in 6 months.

c) If the firm followed the forecast of Bank A, they got 9.1m SFR. If they followed the forecast of country B, they got 0.92*10m = 9.2m SFR. Thus, even though the forecast of Bank B was further away from the true exchange rate, it was the better forecast from the point of view of the firm.

Exercise 3

If the interest rate of country A is suddenly higher than in the rest of the world, and expected inflation did not change, investors from all over the world are going to invest in country A in order to profit from the higher (real) interest rate. This will *appreciate* the currency of country A. However this is no contradiction to uncovered interest parity. If the exchange rate is expected to fall to its previous level (i.e. the currency of country A is expected to depreciate in the future), then the initial appreciation is in accordance with uncovered interest parity.