

FINM 37300: Homework 2

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April 11, 2016

5.

Based on Put-Call Parity,

$$\begin{aligned}\text{call} &= 0.021 + e^{-0.0075 \times 0.4} \times (1.1225 - 1.05) \\ &= 0.093\end{aligned}$$

6.

c) - foreign exchange positions must be present valued using the foreign interest rate. The growth rate of the portfolio uses the domestic rate, whereas discount the portfolio uses the foreign rate. In the basic non-dividend Black-Scholes model, both these rates are the same.

7.

The argument on slide 12 cannot apply to V , because S_t is not an investible (or tradable) asset. We are in the wrong measure to do the valuation.

8.

$$525.70 \left(\frac{1}{8.1620} - \frac{1}{8.0630} \right) = -0.790824$$

Hence the mark-to-market value of the position is -790,824 USD.

9.

a)

$$100\text{million}/8.3460 = 11.98\text{million}$$

Hence 11.98 million USD

b)

$$10\text{million} \times 1.4045 = 14.045\text{million}$$

Hence 14.045 million USD

10.

a)

$$1.1395 \times 110.10 = 125.46$$

b)

$$110.10/0.9570 = 115.05$$

c)

$$1.1395/1.4070 = 0.8099$$

d)

$$1.4070 \times 0.9570 = 1.3465$$

11.

$$F = 0.6820 \left(\frac{1 + 0.0060 \frac{182}{360}}{1 + 0.0235 \frac{182}{365}} \right) = 0.6761$$

12.

a)

NOK earns a higher rate than USD, therefore if we are buying NOK against USD, we must be earning the forward points. Hence, $F = 8.3405 + 0.0040 = 8.3445$.

b)

NOK earns a lower rate than AUD, therefore if we are buying NOK against AUD, we must be paying the forward points. Hence, $F = 6.3195 - 0.0225 = 6.2970$.

13.

To get the upper and lower arbitrage limits, calculate forward rates for (USDJPY=110.55, 6mo USD deposit=0.55%, 6mo JPY deposit=-0.15%) and (USDJPY=110.50, 6mo USD deposit=0.65%, 6mo JPY deposit=-0.25%) using:

$$F = S \left(\frac{1 + R_{JPY} \frac{181}{360}}{1 + R_{USD} \frac{181}{360}} \right)$$

We then take this minus the corresponding USDJPY to obtain the limits of forward points. i.e.:

$$\text{Forward Points} = S \left(\frac{1 + R_{JPY} \frac{181}{360}}{1 + R_{USD} \frac{181}{360}} - 1 \right)$$

Therefore, the limits are: lower limit of -4984 and upper limit of -3880.

14.

Using the forward equation, we have:

$$\begin{aligned} \text{Forward Points} &= 0.9600 \left(\frac{1 - 0.0070 \frac{92}{360}}{1 + 0.0065 \frac{92}{360}} - 1 \right) \\ &= -0.0033 \end{aligned}$$

We now want to decrease the forward points from -33 to -34 and see what S is required for this:

$$\begin{aligned} S \left(\frac{1 - 0.0070 \frac{92}{360}}{1 + 0.0065 \frac{92}{360}} - 1 \right) &= -0.0034 \\ S &= 0.9872 \end{aligned}$$

Therefore the change in pips would have to be $(0.9872 - 0.9600) \times 10000 = 272$ pips

15.

Here we don't care about the 55 million dollars; it is just an 'average' of the forward rates that needs to be calculated:

$$0.7454e^{-0.0085} + 0.7359e^{-2 \times 0.0085} + 0.7270e^{-3 \times 0.0085} = \text{AUDUSD}(e^{-0.0085} + e^{-2 \times 0.0085} + e^{-3 \times 0.0085})$$

Solving for AUDUSD gives 0.7362.