In preparation for the next class, please solve the following problems.

**Problem 6.1.** (5 points) An investor wants to hold 200 euros two years from today. The spot exchange rate is $1.31 per euro. If the euro denominated annual interest rate is 3.0% what is the price of a currency prepaid forward?

**Solution:**

\[ F_{0,T}^p(x) = 200e^{-0.03 \cdot 2} \cdot 1.31 = 246.67. \]

**Problem 6.2.** (10 points) Suppose that the exchange rate is 0.958/€, and that the euro-denominated continuously compounded interest rate is 4%, while the dollar-denominated continuously compounded interest rate is 6%. The price of a 1-year 0.93-strike European call on the euro is $0.0571. What is the price of the corresponding European put?

**Solution:** Note: See Problem 9.4. in McDonald!

We can make use of the put-call-parity for currency options:

\[ +P(K,T) = -e^{-r_f T} x_0 + C(K,T) + e^{-r T} K \]

\[ \Leftrightarrow P(K,T) = -e^{-0.04 \cdot 0.95} + 0.0571 + e^{-0.06 \cdot 0.93} = -0.91275 + 0.0571 + 0.87584 = 0.0202. \]

A $0.93 strike European put option has a value of $0.0202.

**Problem 6.3.** (15 points) The price of a 6-month dollar denominated call option on the euro with a $0.90 strike is $0.0404. The price of an otherwise equivalent put option is $0.0141. Assume that for the dollar we have \( r = 5\% \).

a. (10 pts) What is the 6-month dollar-euro forward price?

b. (5 pts) If the euro-denominated annual continuously compounded interest rate is 3.5%, what is the spot exchange rate?

**Solution:** Note: See Problem 9.6. from McDonald!

a. We can use put-call-parity to determine the forward price:

\[ +C(K,T) - P(K,T) = PV(\text{forward price}) - PV(\text{strike}) = e^{-r T} F_{0,T} - K e^{-r T} \]

\[ \Leftrightarrow F_{0,T} = e^{r T} \left[ +C(K,T) - P(K,T) + Ke^{-r T} \right] \]

\[ = e^{0.05 \cdot 0.5} \left[ 0.0404 - 0.0141 + 0.9e^{-0.05 \cdot 0.5} \right] \]

\[ \Leftrightarrow F_{0,T} = $0.92697. \]

b. Given the forward price from above and the pricing formula for the forward price, we can find the current spot rate:

\[ F_{0,T} = x_0 e^{(r-r_f)T} \]

\[ \Leftrightarrow x_0 = F_{0,T} e^{-(r-r_f)T} = $0.92697e^{-(0.05-0.035)0.5} = $0.92. \]