Currency options. Exchange options.

Problem 7.1. (10 points) Suppose that the exchange rate is 0.95 USD per euro, 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?

Problem 7.2. (10 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. (5 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?

Problem 7.3. (5 points) Assume that the continuously compounded interest rate equals 0.10.

Stock $S$ has the current price of $S(0) = 70$ and does not pay dividends. Stock $Q$ has the current price of $Q(0) = 65$ and it pays continuous dividends at the rate of 0.04.

An exchange option gives its holder the right to give up one share of stock $Q$ for a share of stock $S$ in exactly one year. The price of this option is $11.50.

Another exchange option gives its holder the right to give up one share of stock $S$ for a share of stock $Q$ in exactly one year. Find the price of this option.

(a) About $3.95
(b) About $11.10
(c) About $12.00
(d) About $14.25
(e) None of the above

Problem 7.4. (5 points) Assume that the current exchange rate is $1.3$ per euro. The continuously compounded interest rate for the euro is 0.03, while continuously compounded interest rate for the USD is 0.04.

Let the price of an at-the-money USD-denominated European call on on the euro with exercise date in 6 months be equal to 0.053

What is the price of an at-the-money Euro-denominated put on the USD with the exercise date in 6 months ?

(a) About 0.011.
(b) About 0.031.
(c) About 0.051
(d) About 0.071.
(e) None of the above