Econ 690
Spring, 2019
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Homework #3

1. If the spot exchange rate of the yen relative to the dollar is ¥109.75, and the 90-day forward rate is ¥107.25/$, is the dollar at a forward premium or discount? Express the premium or discount as a percentage per annum for a 360-day year.

2. As a foreign exchange trader for JPMorgan Chase, you have just called a trader at UBS to get quotes for the British pound for the spot, 30-day, 60-day, and 90-day forward rates. Your UBS counterpart stated, "We trade sterling at $1.2945-50, 47/44, 88/81, 125/115." What cash flows would you pay and receive if you do a forward foreign exchange swap in which you swap into £5,000,000 at the 30-day rate and out of £5,000,000 at the 90-day rate? What must be the relationship between dollar interest rates and pound sterling interest rates?

3. Consider the following spot and forward rates for the yen–euro exchange rates:

Spot	30 days	60 days	90 days	180 days	360 days
109.30	108.75	108.15	106.75	106.37	100.85

   Is the euro at a forward premium or discount? What are the magnitudes of the forward premiums or discounts when quoted in percentage per annum for a 360-day year?

4. Download the monthly U.S./U.K. exchange rate for January 1975 – December 2018 from FRED, the Federal Reserve Bank of St. Louis data base: https://fred.stlouisfed.org/

   a. Plot the data on a graph.

   b. Now take the natural log of the exchange rate. Then for each month, starting in February 1975, calculate the change in the log of the exchange rate: $\ln(S_t) - \ln(S_{t-1})$. Then report the mean and the standard deviation of your values for $\ln(S_t) - \ln(S_{t-1})$.

c. If the exchange rate today is $S_t = \$1.30$ per pound, what is $\ln(S_t)$? Using your calculation for the mean of $\ln(S_t) - \ln(S_{t-1})$, what value do you expect for the log of the exchange rate in one month, given that $S_t = \$1.30$? (That is, what is your expectation of $\ln(S_{t+1})$?) What value do you expect for the level (that is, S_{t+1}, not $\ln(S_{t+1})$) of the exchange rate?

d. If the change log of the exchange rate has a Normal distribution, then 95.45% of the time, the actual value of the change in the log of the exchange rate will be in a range of ± two standard deviations of its mean value. Given this knowledge, what is the 95.45% range of your predictions for $\ln(S_{t+1})$? What is the 95.45% range of your prediction for S_{t+1}?