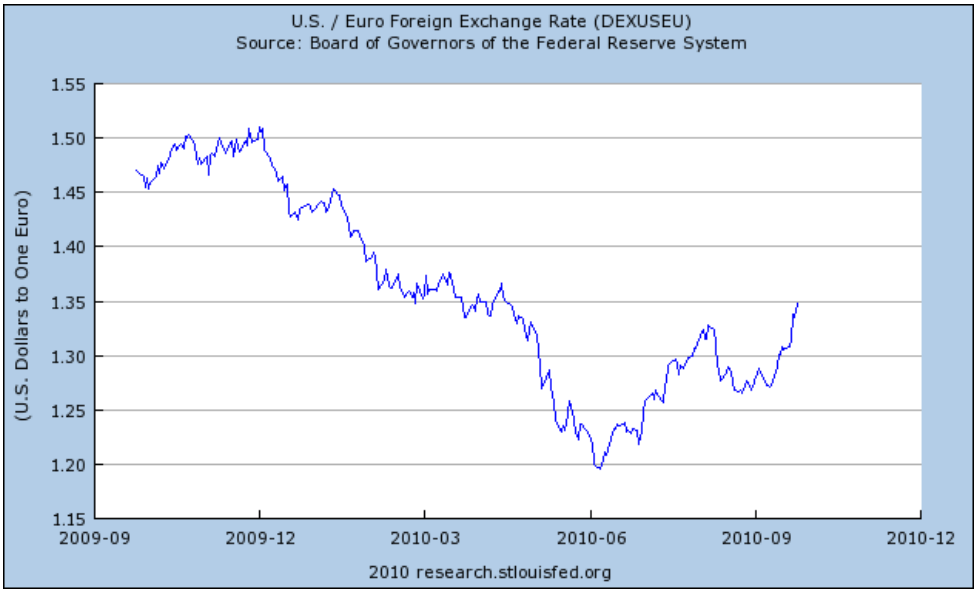
Answer Key – HW3 – International Economics – DENG - Fall 2011

Problem 1
Understand currency risk hedging



The above chart shows you the USD/Euro exchange rate during 2009-2010. As you can see, the currency movement has been very dramatic during this period because of European financial crisis.

Imagine you are the manager of Finance Department of a big German retailer, and your company needs to import $10-millon dollar worth of goods from the US on a quarterly basis. Your task is to help the company control currency risk.

1) The time now is March 2010. The dollar/euro is traded at $1.35 per euro. Now you are convinced that the European financial crisis may not end very soon, and you have to act to prevent any further currency loss. So you bought a 3-month forward contract worth of $10 million at $1.3450 per euro, which locks in today's exchange rate at $1.35. Three months later, the exchange rate drops to $1.20 per euro. How much money have you saved for your company?

   The forward contract enables you to buy US dollar using Euro at today's exchange rate. So to calculate the company's savings, you need to figure out first Euro's deprecation rate. In 3 months, Euro had depreciated by (1.35-1.2)/1.35 = 11.11%.

   Had you not purchased the forward contract, you would have incurred a loss of: $10m x 11.11% = $1.111 million.

   The forward contract costs you: ($10m/1.35) x (1.35 – 1.345) = $0.037m

   The money you saved for your company is therefore the net of the saving minus the cost of the forward contract, i.e., $1.111m – $0.037m = $1.074 million (or $1.074m/1.2 = €0.895m).

2) The time now is June 2010. With the financial crisis deepening, rumor is spreading that the Euro may collapse. You feel quite confident that the Euro is going lower in coming months. So you bought another 3-month forward contract worth of $10 million from your bank. You paid the bank $1.19 per euro and you locked in the exchange rate at $1.20. Compared to three months ago, the contract costs much more now because everyone wants to buy such forward contract to hedge the risk (demand has been rising). Three months later, when the new contract expires, the exchange rate is again traded at $1.35. In this case, what is the net gain (or loss) of buying the second forward contract?

You locked in the exchange rate at $1.20 per euro, but Euro was traded at $1.35 on 09/30, which means Euro has appreciated by (1.35-1.2)/1.2 = 12.5%. In this case, you lost money and the total loss was: $10m x 12.5% plus the cost of forward contract, ($10m/1.20) x (1.2 – 1.19) =$ 0.083 million, i.e., $1.25m + $0.08m = $1.33 million.

3) What lessons have you learned from the above example? What's the disadvantage of using forward contract to hedge currency risk? Are there better alternatives?

The lesson is that when exchange rate is extremely volatile, using currency forward contract may not achieve the intended goal of currency risk hedging. In the above case, Euro reversed its direction in a very dramatic way, so buying forward contract actually increased loss to the company.

A better alternative is to buy currency options contract, which gives buyers of the contract the option to decide *whether* to execute the trade at contract's expiration date, depending on currency's actual direction of movement. If the currency moves against buyer's anticipation, the buyer may choose not to execute the contract. The only loss then is just the cost of the options contract.

For details, please read p.327 of the 8th ed. textbook (or p.358 of 9th ed.)

Problem 2
Interest Parity Condition

Uncovered interest parity (UIP) condition is written as $R = R^* + (E^e - E)/E$. (R and R* are the interest rates of home and foreign country, respectively)

a) Explain what UIP means, intuitively. Can investors make money if such condition holds?

The uncovered interest parity condition states that there will be no arbitrage opportunities between two currencies if the interest rate differential is just enough to be offset by future appreciation of home currency.

When UIP holds, investors can't make money.

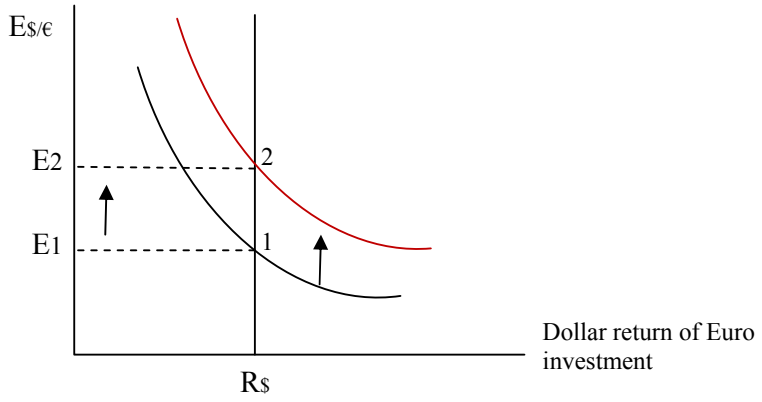
b) Rewrite the condition when carry trade is profitable.

$R < R^* + (E^e - E)/E$ (assuming R<R*);

c) If home country is the US, and foreign country is the EU. When the ECB suddenly raises its interest rate, what will happen to the exchange rate between the US dollar and Euro? Draw diagram to illustrate.

When the ECB raises interest rate, R€ rises, and it leads to appreciation of the Euro, or depreciation of the US dollar.

To show it in a graph, an increase of Euro interest rate, R€, shift the curve upward, then exchange rate moves from E1 to E2, i.e., an appreciation of the Euro.



d) If R_{US}=0.25%, R^*_{EU}=1.5%, the current exchange rate $E_{\$/€}$=1.35. One FX investor wants to use carry trade to make money by moving $10,000 to invest in Euro-denominated assets. i) The forward contract in 30 days is currently traded at 1.34. According to covered interest parity or CIP, can this investor make money in 30 days? ii) The investor is a savvy FX trader and he thinks the current market is mispriced. According to his own forecast, $E_{\$/€}$ will move to 1.25 in 30 days. How much money will he make (or lose) if he engages in such carry trade?

i) Under CIP, we replace expected future exchange rate with the forward rate, then we have,

$R€ + (F_{\$/€} - E_{\$/€})/E_{\$/€} = 1.5\% + (1.34 – 1.35)/1.35 = 1.5\% - 0.74\% = 0.76\%$

Since dollar return of carry trade, 0.76%, is greater than $R_{\$}$=0.25%, the investor will make money. And he will make 0.76% - 0.25% ≈ 0.5% of $10,000, or $50. This is a very small amount, may not be enough to cover the forward contract cost.

Notice that the above profit/loss calculation was based on percentage, then multiplied by home currency. If you are not comfortable with this method, which is much faster, you may also do the following:

First, you convert $10,000 into Euro, you get $10,000/1.35 = €7,407.4;
Then, you invest the amount in Europe, and get a total of 7,407.4*(1+1.5%)=€7,518.5;
Next, you convert the above amount back into $ using the forward rate, 1.34, which gives you €7,518.5 x 1.34 = $10,074.8;
Finally, you need to pay back $ loan plus interest, which is $10,000 x (1+0.25%) = $10,025. You are left with final profit of $10,074.8 - $10,025 ≈ $50.

ii) The investor expects the Euro will down from 1.35 to 1.25, then the $ return of the carry trade would become:

$R€ + (Ee_{,\$/€} - E_{\$/€})/E_{\$/€} = 1.5\% + (1.25\text{-}1.35)/1.35 = 1.5\% - 7.4\% = - 5.9\%.$

Since the return is negative, the investor would never want to engage in such $ carry. But if he does, he will lose – 5.9% - 0.25% = - 6.15% of $10,000.

(Note: due to different expectations in the market, this investor may find it profitable to sell the forward contract to other people. Let's assume in 30 days, the exchange rate moved to 1.25, then this investor will make money by selling currency forward contract, which locks the exchange rate at 1.34).