Answer Key to Homework I

1. The equation $S^p = I + CA + (G - T)$ tells us that to reduce a current account deficit, a country must increase its private saving, reduce domestic investment, or cut its government budget deficit. Nowadays, some people recommend restriction on imports from China (and other countries) to reduce the American current account deficit. How would higher US. Barriers to imports affect its private saving, domestic investment, and government deficit?

SOLUTION:

Higher U.S. barriers to imports may have little or no impact upon private savings, investment, and the budget deficit. If there were no effect on these variables then the current account would not improve with the imposition of tariffs or quotas. Nonetheless, it is possible to tell stories in which the effect on the current account goes either way. For example, investment could rise in industries protected by the tariff, worsening the current account. (Indeed, tariffs are sometimes justified by the alleged need to give ailing industries a chance to modernize their plant and equipment.) On the other hand, investment might fall in industries that face a higher cost of imported intermediate goods as a result of the tariff. Or based on the equation, you can view that an increase in current account surplus reflect the reallocation of funding from domestic investment towards wealth accumulation in foreign countries.

2. Suppose the Canadian dollar is currently traded at C$ 1.40/$. The Deutsche mark is traded at DM 1.39/$.

   a. Determine the C$/DM exchange rate consistent with these direct quotations.

   b. Suppose the C$/DM cross rate in the market was at C$ 1.05/DM. Is there any arbitrage opportunity?

   c. How would you take advantage of any arbitrage situation?

   d. What is your profit?

SOLUTIONS:

   a. Spot is C$ 1.0072/DM = (1.40 [C$/$] / 1.39 [DM/$])

   b. Arbitrage opportunity: DM cheaper with combination of direct rates than using the cross rate.

   c. Buy US $ with C$ at 1.40, buy DM with US $, sell DM at the market's cross rate of C$ 1.05/DM.

d. Gain is C$ 0.0425 for each C$ 1.0 that can be arbitraged or 4.25% [(1/C$1.4/$) * DM1.39/$ * C$1.05/DM = C$1.0425; 1.0425 - 1 = 0.0425]

3. Calculate the dollar rates of return on the following assets:

a. A painting whose price rises from $200,000 to $250,000 in a year.

b. A bottle of a rare Burgundy, Domaine de la Romanee-Conti 1978, whose price rises from $180 to $216 between 1999 and 2000.

c. A £10,000 deposit in a London bank in a year when the interest rate on pounds is 10 percent and the $/£ exchange rate moves from $1.50 per pound to $1.38 per pound.

SOLUTIONS:

a. ($250,000-$200,000)/$200,000 * 100 = 25%

b. ($216 - $180)/$180 * 100 = 20%

c. In this case, we can use the approximated formula for rate of return on pound deposit in terms of US dollar.

$$R_{£} + (E_{\$/£,new} - E_{\$/£,old})/ E_{\$/£,old} = 0.10 + (1.38 - 1.50)/1.50$$
$$= 0.02 \text{ or } 2\%$$

In terms of the full steps,

1. You have to have £10,000 * 1.50 $/£ = $15,000 originally.

2. In a year, you would receive £10,000 * (1 + 0.1) = £11,000.

3. Exchange back to the US dollar, you would receive £11,000 * 1.38 $/£ = $15,180.

4. Therefore, the rate of return on the pound deposit is ($15,180 - $15,000)/$15,000 * 100 = 1.2%.

4. Suppose the spot rate is $ 0.20/FF. The US one-year rate is 6%. You expect the future exchange rate to be $0.1923/FF.

a. What is the current one-year French interest rate that will satisfy the Interest Rate Parity?

b. Suppose the one-year French interest rate is 12% instead. What kind of arbitrage would you perform to take advantage of this opportunity?

SOLUTIONS:

a. Using the exact formula, $0.06 = (1 + R_F) * 0.1923/0.2 – 1 = 10.24\%$
Using the approximation, $0.06 = R_F + (0.1923 – 0.20)/0.20 \rightarrow R_F = 9.85\%$

b. An interest rate of 12% is greater than the rate that results in interest rate parity. Arbitrage with a capital outflow to FF: borrow $ at 6%, buy FF spot, invest FF at 12%, sell FF in the future for US$.

5. Petroleum is sold in a world market and tends to be priced in U.S. dollars. The Nippon Steel Chemical Group of Japan must import petroleum to use in manufacturing plastics and other products. How are its profits affected when the yen depreciates against the dollar? Which hedging instrument is likely to be the most appropriate scheme for this particular company, and why?

SOLUTIONS:

The yen depreciation will make the imports of Japanese-based companies more expensive and hence raise the cost and lower profit. The company can arrange for a forward contract with its commercial bank. The contract should suit the company's profile as it seems to be large in size and hence should be able to receive bargaining power for cheaper deal over the counter. The large contract size makes futures a less convenient option.

6. Suppose the dollar interest rate and the pound sterling interest rate are the same, 5 percent per year. What is the relation between the current equilibrium $/£ exchange rate and its expected future level? Suppose the expected future $/£ exchange rate, $1.52 per pound, remain constant as Britain interest rate rises to 10 percent per year. If the U.S. interest rate also remains constant, what is the new equilibrium $/£ exchange rate?

SOLUTIONS:

The interest parity is already in equilibrium in this case which means we are at the equilibrium interest rate also. Therefore, we expect no changes in exchange rate in the future and hence expected exchange rate equals current spot exchange rate.

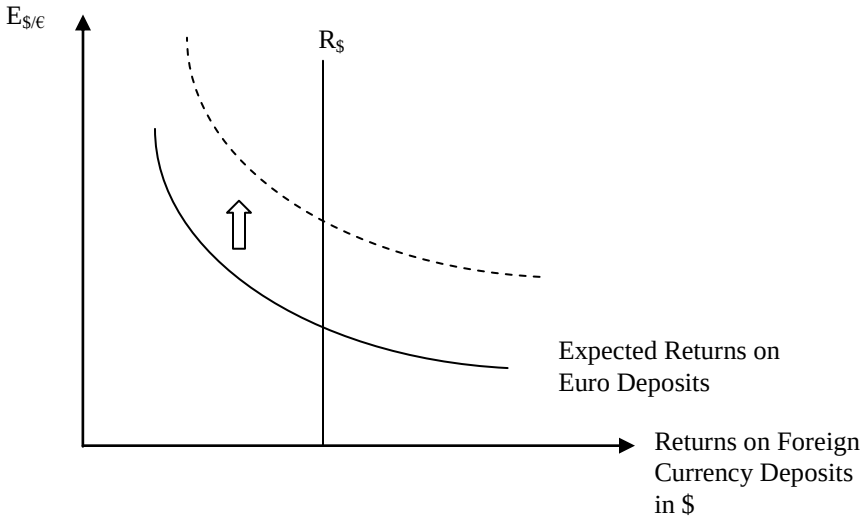
As interest rate in Britain rises to 10 percent, exchange rate has to adjust given constant exchange rate expectation.

$R_{\$} = R_{£} + \{(E^e - E)/E\}_{\$/£}$
$0.05 = 0.10 + (1.52 – X)/X$

$X = 1.60_{\$/£}$

7. Traders in asset markets suddenly learn that the interest rate on dollars will decline in the near future. Use the diagrammatic analysis based on the Uncovered Interest Parity to determine the effect on the current dollar/euro exchange rate, assuming current interest rates on dollar and euro deposits do not change.

SOLUTIONS:



8. Assume that the Citibank trading room is dealing on the following quotations Spot Sterling = $1.5000, Euro-Sterling interest rate = 11.00% p.a. Euro-$ interest rate = 6.00% p.a. and that Barclays Bank is quoting Forward Sterling at $1.4550.

   a. Describe the transactions you would make to earn risk-free covered interest arbitrage profits?

   b. How much profit would you expect to make?

SOLUTIONS:

The implied, or synthetic, forward rate that Citibank is quoting using the exact formula is

$F_{Citi} = E_{\$/£} (1 + i_{\$}) / (1 + i_{£})$

$= \$1.50 * 1.06 / 1.11 = \$1.4324 / £$

Since $F_{Barclays} = \$1.4550 / £$, it follows that forward contracts at Barclays are dear and synthetic forward at Citibank are cheap.

a. The arbitrager should <u>BUY</u> synthetic forwards (i.e. borrow £, sell £ spot, and lend $) at Citibank and <u>SELL</u> forwards at Barclays to earn a profit.

b. The profit would be \$0.0226/£ (1.4550 – 1.4324) or about 1.58% on capital.

9. What is the short-run effect on the exchange rate of an increase in domestic real GNP (y), given expectations about future exchange rates?

An increase in domestic real GNP increases the demand for money at any nominal interest rate. This is reflected in the following figure as an outward shift in the money demand function from L1 to L2. The effect of this is to raise domestic interest rates from R1 to R2 and to cause an appreciation of the domestic currency from E1 to E2.

A story could go as an increase in output raises money demand which pushes up the interest rate as people would rather hold cash and convert the interest denominated assets into cash. A rise in interest rate hence attracts investors which eventually raise the value of the local currency against foreign currency.