

## 14.02 Principles of Macroeconomics

### Problem Set #3, Questions

Posted: Wednesday, October 15, 2003

Due Date: Wednesday, October 22, 2003

### Part I: True/False

Decide whether each of the following statement is true or false, and justify your answer with a short argument.

1. The ratio of imports to GDP cannot be larger than 1.
2. If GM decides to use only French made [Michelin](#) tires for its cars instead of [Firestone](#) US made tires, the total demand for US goods decreases.
3. An American tourist spends his holidays in Egypt. Once in Egypt, he pays \$100 for his hotel, \$50 for kebabs and a \$50 statue of [Nefertiti](#) to bring back home for his mother. He generated \$200 worth of exports from Egypt to the US.
4. The [Queen of England](#) pays £500,000 to a US insurance company to insure her precious jewels. The jewels get stolen. The insurance (after a long legal procedure) reimburses the Queen £2 million. Thanks to the thief of the jewels of the crown, the British capital account has been increased by £1.5million.

### Part II: The Uncovered Interest Parity with transaction costs.

Consider the decision of a US investor to invest \$100 in a US bond or in a Eurobond. The exchange rate between \$ and € is denoted  $E$  (the price of one euro in dollars). The annual interest rate paid on US bonds is  $i$  and the annual interest paid on Eurobonds is  $i^*$ . The investor expects that the exchange rate will be unchanged next year, at  $E$ .

1. Derive the condition on  $i$ ,  $i^*$  and  $E$  that must hold for the US investor to be indifferent between buying US bonds or Eurobonds (this is exactly the uncovered interest parity we saw in class with zero expected depreciation).

Now assume that in order to buy €s with \$'s, the investor must pay a proportional fee  $f$  for each dollar changed. Conversely, if he wants to change back €s into \$'s, he must again pay the same proportional fee  $f$  for each dollar changed (or we could say equivalently that he must pay a proportional fee  $E^*f/E=f$  for each euro changed).

2. How many dollars will the US investor get next year if he puts all his \$100 in a US bond this year?
3. How many euros will the investor get if he changes his \$100 for euros today (remember, he has to pay a fee  $f$  for each dollar exchanged)?
4. How many euros will he get next year if he uses all the euros he has to buy a Eurobond?
5. How many dollars will the investor get next year if he changes back his euros for dollars (remember, the exchange rate has remained the same, but he has to pay a fee again).
6. Give the condition on  $i$ ,  $i^*$ ,  $f$  and  $E$  that must hold for the US investor to be indifferent between buying a US bond or a Eurobond.
7. **Trick question:** consider a European investor who must decide between investing his €100 in Eurobonds or in US bonds. He must pay the same proportional fee  $f$  for changing euros against dollars or dollars against euros. If the condition in sub-question 6 is satisfied, is he indifferent between investing in Europe or in the US, or does he want to put all his money in Eurobonds, in US bonds?

**Part III: the goods market in an open economy. What is the impact of openness on the Keynesian multiplier?**

We consider the following open economy model. Consumption and investment are given by:

$$C = c_0 + c_1(Y - T)$$

$$I = d_0 + d_1 Y - d_2 i$$

Imports are given by:

$$IM = m_1 Y$$

All the parameters are positive, and  $c_1 + d_1 - m_1 < 1$ . We assume for simplicity that the real exchange is equal to 1. Government spending,  $G$ , exports,  $X$ , and the interest rate,  $i$ , are exogenous.

1. What is the total demand for domestic goods?
2. What is the equilibrium level of output in this economy?
3. What is the balance of trade at that level of output?

4. What is the effect on equilibrium output of an increase of government spending of 1 unit? What is the effect on the trade balance?
5. What is the Keynesian multiplier?
6. If the economy becomes more open, in the sense that  $m_1$  increases, does the Keynesian multiplier increase, decrease, or stays unchanged?
7. Now assume that  $X = m_2 Y^*$  where  $Y^*$  is the foreign output. What is the effect of a foreign expansion (an increase in  $Y^*$ ) on the domestic output? On the balance of trade?