

## Problem Set # 4

Due date: 4/8

*Answer the following questions. Show your work. As mentioned in class, you are encouraged to work in groups but must write your own answers.*

1. **(Based on FT 17.1 - External Wealth Changes)** Answer the following questions on the changes in External Wealth (use the equations and notations discussed in class and the chapter 17 of FT). Assume the NFIA is zero, no capital gains on external wealth, and no unilateral transfers.
  - (a) Express the change in external wealth ( $\Delta W_0$ ) at the end of period 0 as a function of the economy's trade balance ( $TB$ ), the real interest rate (a constant  $r^*$ ), and initial external wealth ( $W_{-1}$ ).
  - (b) Using the result in (a), write an expression for the stock of external wealth at the end of period 0 ( $W_0$ ). This should be written as a function of the economy's trade balance ( $TB_0$ ), the real interest rate ( $r^*$ ), and initial external wealth ( $W_{-1}$ ).
  - (c) Using (a) and (b), write an expression for the stock of external wealth at the end of period 1 ( $W_1$ ). This should be written as a function of the economy's trade balance ( $TB$ ) each period, the real interest rate, and initial external wealth.
  - (d) Using your answers from (a), (b), and (c), write an expression for the stock of external wealth at the end of period 2 ( $W_2$ ). This should be written as a function of the economy's trade balance ( $TB$ ) each period, the real interest rate, and initial external wealth.
  - (e) Suppose we require that  $W_2$  equals zero. Write down the condition that the three trade balances (in periods 0, 1, and 2) must satisfy. Arrange the terms in present value form.
2. **(External Wealth and Current Account)** Consider a country with no initial wealth that exists for two periods. The country can produce 100 units of output in the first period and 120 units of output in the second period. The country can borrow or lend on world markets at a world real interest rate of 5 percent. The household has the utility function  $u = \min(C_0; C_1)$  and  $C_t$  is the household consumption in period  $t$ .

Assume there is no government expenditure, nor investment ( $G = I = 0$ ).

- (a) Solve for the level of gross national expenditure in both periods. Assume there is no government spending nor investment. [Hint: replace  $TB = GDP - GNE$  in the LRBC and check closely the relation between  $C$  and National Expenditure under our assumptions, also remember that consumption smoothing is optimal in this case]
- (b) What is the current account balance (and its components), and what is the financial account balance in each of the two periods? Assume no unilateral transfers and a capital account of 0

in both periods when answering ( $KA = 0$ ,  $NUT = 0$ ).

3. **(Cross border investment and productivities)** Germany has the production function  $q_G = 30k_G^{1/3}$ , where  $q$  is output per worker and  $k$  is capital per worker. Brazil has the production function  $q_B = 15k_B^{1/3}$ .
- (a) If  $k_G = 1000$  and  $k_B = 900$ , which country has a higher output per capita?
  - (b) Would you expect to see Germany investing in Brazil or Brazil investing in Germany? Explain your answer.
  - (c) Suppose Germany country imposed a tax on foreign interest payments of 5 percent. Would this change your answer to part (b)? Explain your answer.
4. **(IS-LM-FX)** Suppose the (Home) economy is initially in equilibrium and there is a sudden increase in the interest rate of the foreign country  $i^*$ . Use the IS-LM-FX model to answer the following questions. Assume the home country has a *floating exchange rate regime*. Provide plots with your answers.
- (a) How the change in  $i^*$  affects the new equilibrium values of the home interest rate ( $i$ ), output ( $Y$ ), and spot exchange rate  $E_{h/f}$ ? Does the home currency appreciate or depreciate?
  - (b) Explain the effect in the home trade balance.
  - (c) Now assume that the home country has a *fixed exchange rate regime*. How does the central bank responds to the change in  $i^*$
  - (d) How does the home interest rate ( $i$ ), output ( $Y$ ), and spot exchange rate  $E_{h/f}$  change in this case? Show the new equilibrium values with plots.
  - (e) When is an economy that follows a fixed exchange rate regime less likely to commit to this policy (and increase the interest rate at home). Pick one and explain your answer.
    - i. During a recession at home an a boom in the foreign country
    - ii. During a recession at home an a recession in the foreign country
    - iii. During a boom at home and a boom in the foreign country
    - iv. During a boom at home and a recession in the foreign country