

### Homework 3

*Show all your work. Graphs should be clearly labeled. The total for the homework is 5 points. Start early. Homework is due in class on Wednesday, March 10 (or if you cannot make it to class, drop it off in the main office, Buchanan Tower 997, by the end of the class). No late homeworks are excepted.*

#### Problem 1 (1.5 points)

This is Example 6.3 from Champ-Freeman (page 127).

Find the expected rate of return of farm machinery that costs 10 goods but produces 18 goods in normal weather, 8 goods in rainy weather, and 5 goods in a drought. There is one-fourth chance of rainy weather occurring and a 10 percent chance of drought. Find the expected rate of return.

#### Problem 2 (1.5 points)

This is Exercise 6.1 from Champ-Freeman (page 128).

Suppose people in our overlapping generations model have the opportunity either to hold fiat money with complete safety or to lend to someone who may never repay the loan. The chance of such a default is 10 percent. Assume a stationary monetary equilibrium in which the population grows at a net rate of 8 percent and the fiat money stock is fixed. What real interest rate will be charged the borrower if people are risk neutral? What can you say about the level of the real interest rate if people are instead risk averse?

#### Problem 3 (2 points)

This is Exercise 7.3 from Champ-Freeman (page 145).

Consider an economy in which people live two-period lives in overlapping generations but are endowed only in the first period of life. Capital has a minimum size,  $k^*$ , which is greater than the endowment of any single individual but less than the total endowment of a single generation (e.g., think of capital here as a factory). Capital pays a one-period gross real rate of return equal to  $x$ . The population grows 10% in each period. There exists a constant nominal stock of fiat money owned by the initial old.

- a) In what sense is capital illiquid in this economy? Is fiat money subject to this same liquidity problem?
- b) Describe an intermediary that might overcome the illiquidity of capital so that intermediated capital may be used to acquire consumption in the second period of life.
- c) Suppose there is only one person in each generation who is able to run an intermediary. What is the minimum rate of return that person must offer in order to attract depositors? For what values of  $x$  can this individual make a profit?
- d) What rate of return will be offered on deposits if there are many people in each generation able to run an intermediary?