UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 202B
Spring 2008
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Problem Set 4
Due in lecture Thursday, February 21

1. (The Diamond model with labor supply in both periods of life.) Consider the Diamond overlapping-generations model. Assume, however, that each individual supplies one unit of labor in each period of life. For simplicity, assume no population growth; thus total labor supply is 2L, where L is the number of individuals born each period.

In addition, assume that there is no technological progress, and that production is Cobb-Douglas. Thus, $Y_t = BK_t^{\alpha}[2L]^{1-\alpha}$, $B > 0$, $0 < \alpha < 1$. Factors are paid their marginal products.

The utility function of an individual born at time t is $U_t = \ln C_{1,t} + \ln C_{2,t+1}$.

Finally, there is 100% depreciation, so $K_{t+1} = Y_t - [LC_{1,t} + LC_{2,t}]$.

a. Consider an individual born in period t who receives a wage of w_t in the first period of life and a wage of w_{t+1} in the second period, and who faces an interest rate of r_{t+1}. What is the individual's first-period consumption and saving as a function of w_t, w_{t+1}, and r_{t+1}?

b. What will be the wage at t as a function of K_t? What will be the interest rate at t as a function of K_t? (Hint: Don't forget that the depreciation rate is not assumed to be zero.)

c. Explain intuitively why $K_{t+1} = (w_t - C_{1,t})L$.

d. Derive an equation showing the evolution of the capital stock from one period to the next.

2. Romer, Problem 2.17.

3. Romer, Problem 2.19.

4. Romer, Problem 3.1.

(OVER)

EXTRA PROBLEMS (NOT TO BE HANDED IN/ONLY SKETCHES OF ANSWERS WILL BE PROVIDED)

5. (Note: This problem was suggested by one of your classmates.) Consider a Ramsey model where initially k is above its balanced-growth-path level. Now suppose there is an unexpected, permanent rise in ρ.

Sketch the resulting paths of k and c, and what those paths would have been if ρ had not changed. Explain your answer.

6. Romer, Problem 2.13.

7. Romer, Problem 2.18.

8. Romer, Problem 2.20.