

Homework #3: Overlapping-Generations Model
 ECON 5163
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1. Consider an overlapping-generations model with a government where taxes are lump-sum (t_t) on the young and transfers (u_t) are made to the old. The government's budget constraint is
- $$t_t + s_{t-1}^g(1+r_t)/(1+n) - u_t/(1+n) = s_t^g$$
- where s_t^g is government savings. Given this information, prove that the law of motion for capital stock is

$$k_{t+1} = [1/(1+n)][s_t w_t + s_t^g]$$

2. Consider an overlapping-generations model with logarithmic utility and a Cobb-Douglas production function. Show mathematically how each of the following affects k^* :
- A. A rise in n .
 - B. A downward shift of the production function (that is, $f(k_t)$ takes the form Bk_t^α and B falls).
 - C. A rise in α . (Hint: Take the natural log of the k^* equation and then find $\partial \ln(k^*)/\partial \alpha$)
3. Consider an overlapping-generations model where the population is constant and where agents live for two periods. Agents in generation t derive utility from consumption in old age only and suffer disutility from working in youth only according to the following function

$$u(C_{t+1}, L_t) = C_{t+1} - L_t^2/2$$

Capital does not depreciate and output is produced according the following function:

$$F(K_t, L_t) = 2(K_t L_t)^{1/2}$$

Given this information, find L^* , K^* , Y^* , and C^* .