

Noon Seminar # 8 - RBC model

Problem 1 - from midterm

Assume an individual optimising consumption and labor input in two periods with utility function

$$u(c_1, l_1, c_2, l_2) = \ln c_1 + b \ln(1 - l_1) + \frac{1}{1 + \rho} [\ln c_2 + b \ln(1 - l_2)]$$

- Write down the intertemporal budget constraint of an individual, if we assume that he gets wage w_1 and w_2 in the first and second period, respectively. He can use this income either for consumption or to invest at the interest rate r .
- Write down Lagrangian and the F.O.C's with respect to first and second period's labor input.
- Write down the expression relating the choice of labour input in the first and second period, and explain how it depends on the relative wage.

Problem 2 - RBC model, optimisation under uncertainty

Consider the following simple RBC model. Preferences are given by

$$E_0 \sum_{t=0}^{\infty} \beta^t [bc_t^{1-\eta} + (1-b)l_t^{1-\eta}]^{\frac{1}{1-\eta}} \quad 0 < \beta < 1$$

where $l = 1 - n$ is leisure and production technology is given by

$$y_t = e^{z_t} k_t^\alpha n_t^{1-\alpha}$$

and the resource constraint

$$c_t + k_{t+1} - (1 - \delta)k_t = y_t$$

1. Set up the social planner's problem for the economy and derive the first order conditions.
2. Instead of a social planner, assume there are households that maximize utility and firms that maximize profit. Households and firms interact in competitive markets. Write down the decision problem of the representative households and firms. Derive the first order conditions and show that they imply the same equilibrium as derived from the social planner approach.
3. For a given value of consumption and wage, how does the increase in b affect the labor supply curves?