

Econ 702, Spring 2005

Problem Set 8

Due Days: Tuesday April 19 for Problem 1

Tuesday April 12 for Problems 2-5

Problem 1 Complete the analysis of Romer's -endogenous growth- three sector model (find the growth rate on the Balanced Growth Path and the K/A ratio needed to obtain a BGP).

Characterize the solution to the Social Planner's problem for the same model and compare the growth rates under the two different settings.

Problem 2 Consider the following production function

$$Y_t = N_t^{1-a} \int_0^{A_t} x_t(i)^a di$$

Compute the elasticity of substitution between the inputs $x_t(i)$ and $x_t(j)$, $i \neq j$.

Problem 3 Consider the following model

$$\max_{c_t, k_{t+1}} \sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma}}{1-\sigma}$$

$$s.t. : c_t + k_{t+1} = z_t k_t^a, \\ \text{where } k_{t+1} \in \{k^L, k^H\}, z_t \sim \Gamma_{z, z'} \text{ and } z_t = \{z^1, \dots, z^N\}.$$

Characterize the solution to the Social Planner's Problem.

Write down a formula for the probability that the economy ends up tomorrow in state (z, k^L) ($z = \{z^1, \dots, z^N\}$), given that the current state is (z^2, k^L) .

Write down a formula to compute the standard deviation of output.

Problem 4 Read the 04/08/05 lecture notes, and in particular the simple unemployment insurance model (with an omnipotent Social Planner).

Derive formally the envelope condition for the Planner's problem and show that $\Omega'(V) = \theta$.

Problem 5 For the same model as above (Problem 4), show that Ω is a convex function.