Homework #7
Economics D11-2
Due Tuesday, March 11, 1997.
Christiano

1. Exercise 6.7e-f, SL, p. 158.

2. Consider a modified version of the economy in the Christiano-Harrison paper, in which the individual firm production function has the form, $y = K^{1-\alpha} k^{\alpha} n^{(1-\alpha)}$. Here lower case letters indicate firm choice variables, and upper case indicates economy-wide average. Suppose $\sigma = 1.25$; $\beta = 1.03^{-.25}$; $\delta = .02$.

   (a) How many nonstochastic steady state levels of employment does this economy have?

   (b) Is there an equilibrium in which employment is constant? Is this equilibrium indeterminate?

3. Consider the following growth model:

$$\max \sum_{t=0}^{\infty} \beta^t u(c_t, 1-n_t)$$

   subject to the resource constraint:

$$c_t + k_{t+1} - (1-\delta)k_t \leq k_t^{\alpha}[\gamma^t n_t]^{(1-\alpha)}, \; 0 < \alpha < 1,$$
$$k_{t+1}, c_t \geq 0, \; 0 \leq n_t \leq 1, \; \gamma > 1.$$

   Also,

$$u(c_t, 1-n_t) = \begin{cases} \left\{(1-\sigma)c_t^{\frac{\rho-1}{\rho}} + \sigma(1-n_t)^{\frac{\rho-1}{\rho}}\right\}^{\frac{\rho\psi}{\rho-1}}/\psi, & \text{for } \rho > 0, \neq 1 \\ [c_t^{(1-\sigma)}(1-n_t)^{\sigma}]^{\psi}/\psi, & \text{for } \rho = 1 \end{cases},$$

   where the (constant) elasticity of substitution between c_t and $(1-n_t)$ is ρ.

(a) De¯ne a balanced growth path as an equilibrium in which

$$n_t = n; \frac{k_{t+1}}{k_t} = \frac{c_{t+1}}{c_t} = °:$$

Show that ½ = 1 is required for there to be a balanced growth path for this economy.

(b) Show that when ½ = 1; there is a scaling of the variables for this problem, in which the problem boils down to the standard growth model with no steady state growth.