Economics 503 Fall 1999
Problem Set III

The due date for this assignment is Thursday, October 28, 1999 (in class).

1. Consider the Solow growth model with exogenous technical progress at the rate λ and with depreciation at the rate δ. Suppose that the production function is Cobb-Douglas. That is, it can be written:

$$Y = K^{\alpha} A L^{1-\alpha}$$

where $\alpha < 1$ is a parameter, and A grows at the rate λ.

   (a) Find the steady state values of output-per capita and the capital-labor ratio, as functions of the parameters in the model.

   (b) Show the effect on the steady state value of the capital-labor ratio (suitably defined) of changes in the parameters (s, δ, λ, n, and α).

   (c) Find the golden rule value of k.

   (d) What savings rate is needed to yield the golden-rule capital stock?

2. Consider an economy described by the Ramsey model, and assume that initially the economy is on its balanced growth path. suppose that at some time t_o, the government initiates a (completely unanticipated) policy of capital taxation at the rate $\tau < 1$. The after-tax rate of return to capital, r_t, is now equal to $(1 - \tau)f'(k_t)$. The government returns the proceeds of the tax in a lump-sum fashion back to the households.

   (a) How does this tax affect the steady-state equilibrium of the economy? Explain. Draw the initial and new equilibrium in a phase diagram.

   (b) How does the economy adjust to the adoption of this new tax at time t_0? How does the economy adjust to the new equilibrium?

   (c) How do the values of c and k on the new balanced growth path compare with their values on the old balanced growth path?

   (d) Given your answer to part (c) would it make sense to subsidize investment by setting $t < 0$? Explain.