Michal Kejak

Macro III

Summer 2007

Homework 2

Due May 30, 2007

Consider the following two modifications of the standard Ramsey model:

1. *Distortionary taxation in the Ramsey Model.* Consider the basic setup of the Ramsey model discussed in class, augmented to include distortionary subsidization of capital. The representative household solves

$$\max_{\{c_t\}} \int_0^\infty u(c_t) e^{-(\rho - n)t} dt$$

   subject to

$$\dot{v}_t = w_t + (1 - \sigma) r_t v_t - n v_t - c_t + f_t$$

   where $u(c)$ has a constant intertemporal elasticity of substitution given by θ^{-1}, $\rho > n > 0$, $\sigma > 0$, and f_t is a lump-sum subsidy financed by the capital tax revenues. Assume output is produced according to the production function $y = k^\alpha A^{1-\alpha}$ where A is exogenously growing at rate $g > 0$, and assume that capital depreciates at rate $\delta > 0$.

   (a) Solve the model to find the Euler equation for consumption per effective labor and the steady-state ratio of capital per capita to the level of technology. Write down the government budget, both the flow and the intertemporal one.

   (b) Show the dynamics of the system in a phase diagram. Discuss the effect of tax on the equilibrium paths.

   (c) Suppose, starting from steady state, there is a permanent, unanticipated increase in the tax rate to σ'. Analyze the change in a phase diagram. Be sure to show how consumption evolves over time.

   (d) Suppose instead that the change in the tax rate is *anticipated*, i.e. it is announced one year in advance. Analyze this change in a phase diagram. How and why is the consumption path different?

2. *End of the World.* Suppose that the Ramsey model is the same as we had in class, except that everyone knows that the world will end deterministically at time $0 < T < \infty$.

(a) How does this modification affect the model equations for $\hat{k}$ and $\hat{c}$?

(b) How does this modification affect the transversatility condition?

(c) Use the phase diagram to show the new transition path of the new economy starting from $\hat{k}_0 > 0$. Can this transition path be characterized by a policy function $\hat{c} = \hat{c}(\hat{k})$ and why or why not?

(d) As T gets larger, how does the new transition path relate to the transition path of the standard Ramsey model? What happens as T approaches infinity?