704 Part II

In the following there are 11 questions for 100 points. Be as BRIEF as you can and good luck.

Lucas Trees with search and work

Consider a Lucas-tree type economy with a measure one of trees. The amount of fruit in each tree, z, is random and Markovian with transition $\Gamma_{z,z'}$. All households are identical, discount the future at rate β, and have preferences each period given by $\theta u(c)$, θ is an iid shock to preferences with probability distribution γ, c is fruit. The household has one unit of time that can be allocated either to find trees to buy fruit and we denote it d, or to work in a backyard technology n^α, that yields fruit that does not have to be searched for (obviously $1 = d + n$). There is a matching function $M(T, D)$ that determines the number of matches, given the trees T and search effort D. Assume that search is directed via competitive search.

1. (10 points) Write the problem of the agent and define state variables.
2. (10 points) Define recursive equilibrium.
3. (15 points) Characterize as much as possible how time is allocated.
4. (10 points) Argue whether the equilibrium is optimal or not.
5. (5 points) Write a formula for an option to buy or sell a tree at price $\bar{q}$, either tomorrow or two periods after, but not both periods.

Monopolistic Competition

Imagine that preferences of a representative consumer in a static closed economy are given by

$$u(\{c(i)\}_{i\in[0,A]}, n) = \left(\int_0^A c(i)^\gamma \, di \right)^{\theta/\gamma} - \chi \ n^2$$

Where $1 - n$ is leisure and n is time spent working. Output is produced with one unit of labor that is taken to be the numeraire. All firms are owned by foreigners.

6. (10 points) Give an expression for the price that each firm charges.
7. (10 points) Give an expression for labor share.

Search meets Aiyagari

Imagine a household that cannot borrow or issue state contingent assets but can save at rate r. It can either work or not work. Work yields disutility $\widehat{u} < 0$. The household cares about consumption according to per period utility $u(c)$, is infinitely lived, and discounts the future at rate β.

A job is a meeting with a tree that produces s units of the good if the job is taken and zero otherwise. There are many types of such trees $s \in S$, and a measure μ_s of them. Total measure of trees is 1. The jobs last two periods but leave the worker so tired that she has to rest at least another period before taking another job.

To get a job, the household has to engage in search which Search yields a disutility $\widehat{d}$ each period. Trees and searchers meet via a matching function $M(D, 1)$, where D is the measure of job searchers.

8. (10 points) Write down the problem of the households including state variables.

9. (10 points) Define stationary equilibrium and discuss whether or not all households search for a job every period. If it depends say on what.

10. (5 points) Imagine, that a goverments taxes wages to pay vacation that takes the form of one half of the average wage. Define stationary equilibrium.

11. (5 points) Discuss the extent to which a household is affected by the actions of other households in the previous two questions.