Macroeconomic Theory (ECON 8106)

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Problem Set 3

Due Date: November 18th, 2016

Please hand in one physical copy per group and write the names of your group members on the first page. This problem set includes exercises from Ljungqvist Sargent (LS).

1. Consider an infinite horizon endowment economy with two types of agents of equal measures. The endowments for each type of agent is given in every period by $e_{it}(s_t)$, where s_t takes one of two values, $s_t \in \{H, L\}$ and follows a markov chain where $\text{Prob}(s_{t+1} = j | s_t = i) = \pi_{ij}$. In period 0, the endowment is $e_i0(s_0)$, where s_0 is drawn from the invariant distribution of the markov chain. Denote s^t the history of shocks up to period t. Agent i values consumption according to

$$E \sum_{t=0}^{\infty} \beta^t u_i(c_t(s^t))$$

where u_i is strictly increasing, strictly concave, differentiable, continuous and satisfies the inada conditions. The endowment process is given by

$$\begin{aligned} s_L: \ & e_{1t}(s_L) = 0 \quad e_{2t}(s_L) = 2e \\ s_H: \ & e_{1t}(s_H) = 2e \quad e_{2t}(s_H) = 0 \end{aligned}$$

   (a) Define an Arrow-Debreu Competitive Equilibrium for this economy in which all trading occurs in period 0 before the initial shock s_0 is realized.

   (b) Characterize the solution to this economy. In this case, you should be able to solve for the sequence of consumption for each type of agent.

   (c) Define a recursive equilibrium with arrow securities. Hint: Think about what state variables you need for the agent to infer her own position and the economy wide prices.

2. Asset Pricing
LS Exercise 14.3, 14.4, 14.8, 14.9, 14.11