Macroeconomic Theory
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Macroeconomic Theory (8107)

Spring 2008, Mini 1

Problem set 1

Due Tuesday, Jan 29, in class

1. Problem 4.B.2 Mas-Colell, Whinston and Green
2. Consider an economy composed by I consumers each having the following utility function
$$U(c,l) = c - \frac{l^{\phi}}{\phi}, \phi > 1$$
where c is consumption and l is hours worked. Assume that each consumer supplies labor with different levels of efficiency e_i so that its budget constraint reads
$$we_i l_i = c_i$$
where w is wage rate per efficiency unit of labor.
   (a) Show that in general aggregate labor demand and aggregate consumption demand depend on the distribution of skills across consumers
   (b) Explain why this is the case even if preferences of consumers are quasilinear.
3. Problem 8.1 Sargent Ljunqvist
4. Consider a discrete time closed economy with two infinitely lived consumers and two possible states of the word. In state 1 (boom) the total endowment is $1+\varepsilon$, in state 2 (recession) the total endowment is $1-\varepsilon, 0 < \varepsilon < 1$.In each period the probability of the high state is p. Consumer 1 receives a constant share γ of the total endowment and the remaining goes to consumer 2.
   (a) Choose p so that, conditional on being in a boom, the average duration of a boom is 2 periods. Conditional on being in a recession how long you expect a recession to last?

(b) Consider the case in which the two consumers have identical preferences given by

$$E\sum_{t=0}^{\infty}\sum_{s^t}\beta^t\frac{c(s^t)^{1-\sigma}}{1-\sigma}$$

and they can trade a full set of assets contingent on all realizations of s^t, i.e. all possible sequences of booms and recessions. Solve for the equilibrium allocation and argue that asset prices do not depend on γ.

(c) Assume $\sigma = 5$ and $\varepsilon = 0.01$.Plot the average real risk free rate in the economy, i.e. the return on an asset that pays one unit of consumption for sure next period as a function of β. Pick β so to match a risk free rate of 1%.For this β compute the price of stocks (a stock is an asset which pays off a dividend equal to the aggregate endowment every period) in booms and recessions (you should be able to compute this almost analytically). Compute the average equity premium i.e. the difference between the average returns on stock and the average returns on bond. Repeat the exercise using $\varepsilon = 0.02$ (with $\sigma = 5$) and $\sigma = 10$.(with $\varepsilon = 0.01$). How is the equity premium affected by aggregate risk (ε) and by risk aversion (σ).

(d) Now assume that consumers have heterogenous preferences and that consumer 1 has a risk aversion of 10, while consumer 2 has risk aversion 2, but still assume that consumers can trade a full set of contingent assets. Compute equilibrium allocations (using the Negishi algorithm) for $\gamma = 0.3$ and for $\gamma = 0.9$. Compute average equity premia in the two economies (use the same β you computed in point c). Compare this equity premium with the one in which both consumers have risk aversion equal to 5. Briefly comment your result. What happens to the equity premium when you increase the wealth of the more risk averse agent? Explain why? How would you answer change if agent 2 were risk neutral?