

Macroeconomics II

Problem Set 9

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The solution of this problem consists of a PDF with all mathematical derivations and all graphs as well as julia script that produces the results. The solution must be posted in the student's github repository.

Choose one or both of the problems below (I recommend both)

1. Consider the Sargent & Ljungqvist (1998) model in the slides with the following parameters:

- (a) Model period is 2 weeks, $\beta = .9985$
- (b) Probability of dying is $\alpha = .0009$
- (c) Probability of being laid off $\lambda = .009$
- (d) Human capital h lies on grid of $[1,2]$ with 201 evenly spaced nodes (8 years to the top)
- (e) The layoff loss is large: $\psi_f = 30$ ($\sim 15\%$ human capital loss)
- (f) Unemployment entails continual losses, $\psi_u = 10$ vii.
- (g) Newborns draw their human capital from a uniform distribution and begin life unemployed
- (h) Search effort cost: $c(s) = 1/2s$
- (i) Probability of contact: $\pi(s) = s^{3/10}$
- (j) Let $b = 0.1$

(k) Wage offer distribution is normal with a mean of 0.5, a variance of 0.1, and that is truncated to the unit interval

i. Let the wage grid have 41 evenly spaced points between $[0,1]$

Solve the model and report the equilibrium tax and unemployment rate. Also, plot the optimal search effort and reservation wage of the unemployed as a function of human capital. Solve for the distribution using the histogram method.

2. Consider the model in Lise (2012).

(a) Pose the model in discrete time, define a stationary recursive competitive equilibrium, and sketch the solution algorithm be as precise as possible.

(b) Solve either the continuous or discrete time version of the model. Report the policy functions in 3D and as level curves. You can make any number of simplifying assumptions for this. Use the parameters from the paper when possible, when not you can argue for any value you think works.