

ECON 5760
Philip Shaw
Problem Set 9

Problem 1. Consider the heterogeneous agent model as presented by Example 7.2.1. In this problem you will complete Step 4 in Algorithm 7.2.1. For the parameter values $\alpha = .36$, $\eta = 2$, $\beta = .995$, $\delta = .005$, $b = 1.199$, $\tau = .0172$, $\epsilon_1 = .01$, and guess at aggregate capital stock of $K = (\alpha/(1/\beta - 1 + \delta))^{1/(1-\alpha)}N$. The transition matrix for ϵ_t is given by equation (7.13) in the book.

- a. For the transition matrix presented by equation (7.13), iterate on equation (7.15) to find the stationary level of employment.
- b. For the initial guess for aggregate capital stock and the stationary employment rate above, what is the interest rate and the wage rate?
- c. On a grid of values for assets solve for the optimal policy functions $c(\epsilon, a)$ and $a'(\epsilon, a)$. The grid should consist of $a_{min} = -2$ and $a_{max} = 2000$ where $a_i = a_{min} + \Delta(i - 1)^2$ with $\Delta = (a_{max} - a_{min})/(n - 1)^2$ for $i = 1, \dots, n$ where $n = 200$. Plot the optimal policy function $c(\epsilon, a)$ and $a'(\epsilon, a)$ for employed and unemployed agents. How long does it take for value function iteration to converge? Now increase the grid size to $n = 1000$. Plot the policy functions on the new grid size and report the time to completion.