Homework 9

May 17, 2024

- You are required to use Jupyter notebook to finish this quantitative exercise. You may refer to QuantEcon for help. Use university computer lab if you do not have a personal computer.

- This homework must be finished independently!

- You must submit your solution before the end of May 22. Submit your notebook file (**the .ipynb file**) to the following URL https://yunbiz.wps.cn/c/collect/c7G3s6U39HR.

Aiyagari (1994)

Consider the following problem. Households solve:

$$\max_c \mathbb{E} \sum_{t=0}^{\infty} \beta^t \ln c_t,$$

subject to

$$c_t + a_{t+1} = (1 + r) a_t + w \cdot s_t,$$

where s_t is a two-state Markov chain with state space $\{\text{unemployed}, \text{employed}\}$ and transition matrix

$$P = \begin{bmatrix} 0.6 & 0.4 \\ 0.05 & 0.95 \end{bmatrix},$$

and efficient labor supply

$$s_t = \begin{cases} 0.1, & \text{unemployed} \\ 1.0, & \text{employed} \end{cases}.$$

There is a representative firm with CRS production function $Y = AK^\alpha L^{1-\alpha}$. Let $\beta = 0.95$, $A = 1.0$, $\alpha = 1/3$, $\delta = 0.05$. Use a grid of 2500 points for a uniformly distributed over $a_t \in [0, 15]$. Impose a tolerance of 10^{-7} for convergence.

1. Draw both the capital supply and demand curves for different interest rate $r \in [0, 1/\beta - 1]$.

2. Solve for the equilibrium interest.