Doutorado em Economia - EPGE/FGV *MDPEMF024 - Métodos Numéricos*

Lista #4

19 de junho de 2022

Aluno: Rafael Vetromille *Professor: Cézar Santos / TA: Ana Paula Ruhe*

This question will ask you to solve numerically a heterogeneou-agent economy. Suppose there is a continuum of individuals that are subject to endowment shocks. A person's endowment is e^z, where z follows the following stochastic process:

$$z' = \rho z + \varepsilon$$

where $\varepsilon \sim N(0, \sigma^2)$. The individual's instantaneous utility function is given by

$$u(c) = \frac{c^{1-\gamma} - 1}{1 - \gamma}$$

and they discount the future with the factor $\beta \in (0, 1)$. Each person has access to a bond that pays interest rate r. Their budget constraint can then be written as:

$$c + a' = e^z + (1 + r)a$$

Let $\beta = 0.96$ and $\gamma = 1.0001$ for now.

The interest rate r is determined to clear the bond market. The bond is available in zero net supply.

Exercícios

1. Let $\rho = 0.9$ and $\sigma = 0.01$. Use the Tauchen method to discretize the stochastic process in a Markov chain with 9 states. (Use 3 standard deviations for each side.)

2. Discretize the asset space using a grid and solve the individual's problem for each state variable.

3. Find the stationary distribution $\pi(z, a)$ and use it to compute the aggregate savings in the economy. Find the equilibrium interest rate.

4. Suppose $\rho = .97$. Redo the analysis. How does the interest rate compare now? Explain.

5. Suppose $\gamma = 5$. Redo the analysis. How does the interest rate compare now? Explain.

6. Suppose $\sigma = .05$. Redo the analysis. How does the interest rate compare now? Explain.

7. Ralate your results with Table 2 in Aiyagari (1994).