

Final report, option 3, DSGE2021

- See *Note1201* for other options and the due date.
- Send your report and Matlab files to So. gkubotaso@gmail.com
- If you have any question, feel free to ask So or Fei. 9965jim@gmail.com

Think about the investment model in the lecture. In this report, you will numerically solve this model using the value function iteration method with Matlab. We derived some equations in the lecture, but in this report you can use only two functions below.

- Value function: $V(z) = \max \left\{ \beta \int_0^B V(z') dF(z'), z - I \right\}$
- Policy function: $\begin{cases} \text{invest} & \text{if } z > z^* \\ \text{wait} & \text{if } z \leq z^* \end{cases}$

Parameter values and the shape of distribution $F(z)$ are up to you.

Question 1: Solve this problem using the value function iteration method. You need to discretize $V(z)$ and $F(z)$ on a finite number of grids. Also, use the initial guess of the value function as $V(z) = 0$ for all z . Plot $V(z)$ and discuss its shape.

Question 2: Change the parameter values of I and β . Plot $V(z)$ and discuss how and why the shape is changed.

Question 3: Suppose that the investor can get two investment opportunities each period. These follow the same distribution as in Question 1. In addition, these two are independent. Each period, the investor can take the better offer, or wait. Solve this problem using the value function iteration method. Plot $V(z)$ and compare the result with Question 1.

Question 4: This investment model is an example of *optimal stopping problem*. In the lecture, I talked about job search as another example. Provide one more example of the optimal stopping problems from your daily life or experience. Describe your story and discuss the similarity with the optimal stopping problem. Then, write down your story as a mathematical model. Give reasonable parameter values, and solve it using Matlab. Then, plot the diagrams and discuss your results. Finally, change some parameter values and discuss its implications.