Problem Set 7

UCLA - Econ 102 - Fall 2018

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7 Problem Set 7

Another overlapping-generations model with government debt

In this exercise, we consider the same problem as in lecture 10, except that lifetime utility is logarithmic with $\beta = 2$ (that is, people are patient instead of impatient, so they tend to save a lot):

$$U = \log(c_t^y) + 2\log(c_{t+1}^o)$$

We denote the (net) real interest rate by r_t so that the intertemporal budget constraint is:

$$c_t^y + \frac{c_{t+1}^o}{1+r_t} = w_t.$$

Other than that, we still assume a Cobb-Douglas production function with $\alpha = 1/3$, so that:

$$Y_t = K_t^{1/3} L_t^{2/3}.$$

We assume that the labor force is constant so that $L_t = 1$. The depreciation rate is still $\delta = 1 = 100\%$.

1. Compute c_{t+1}^o and c_t^y as a function of the wage w_t.
2. What is the law of motion for the capital stock?
3. Compute the steady-state capital stock K^*, the (net) steady-state real interest rate r^*, the steady-state output Y^*, the steady-state wage w^*, and the steady-state consumption of the young $(c^y)^*$ and of the old $(c^o)^*$.
4. Compute the Golden Rule (net) interest rate r_g^*, the Golden Rule capital stock K_g^*, the Golden Rule output Y_g^*, the Golden Rule wage w_g^*, and the Golden Rule consumption of the young $(c^y)_g^*$ and of the old $(c^o)_g^*$.
5. Compare the Golden Rule and steady-state levels, and give an economic intuition.
6. What level of government debt B_g^* brings the capital stock to the Golden Rule level ?
7. Starting from the steady-state situation of question 3, assume that the government gives this money to retirees, taking on government debt. How much is this (lucky) generation of retirees able to consume ?
8. Why is national debt a Ponzi scheme here? Is it bad ?
9. Assume that the government puts in place a pay-as-you-go system, such as Social Security (think of OASDI), giving retirees an amount B_g^* each period (where B_g^* is the same level of government debt as the one found in question 6), and taxing the young an equal amount B_g^*. Compare this situation to question 7. What are the differences and similarities?
10. What is the difference between pay-as-you-go financing and deficit financing ? Explain why government debt is not a very meaningful statistic.