

Macroeconomics II

Problem Set 7

Sergio Ocampo Díaz

The solution of this problem consists of a PDF with all mathematical derivations and all graphs as well as julia script that produces the results. The solution must be posted in the student's github repository.

Choose one or both of the problems below (I recommend both)

1. Solve the RCE of the Neo-Classical growth model of problem set 6. Use the same parameters as you used in problem set 6. Compare your results. They must be identical (up to machine error).
2. Read Arellano (2008) before solving this problem. Consider a default model under of a small open economy. Every period there is a possible state of the world $s_t \in S$. Denote $s^t = (s_1, \dots, s_t) \in S^t$ the history of states up and including date t. Denote the country's endowment $y(s)$. The preference of this small open economy is represented by

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

International financial markets are imperfect. First, the small open economy can only borrow or lend state-uncontingent bond $b(s)$. Second, the country can choose to default, with $d(s) = 1$ denoting default, and $d(s) = 0$ denoting non-default. After default, its debt is written off, but the country enters financial autarky. **Under financial autarky, the country cannot borrow from**

international market but it can save secretly with world interest rate R . In addition, its endowment becomes $h(y)$ when the country stays at financial autarky. With probability λ , the country regains the access to international financial markets.

Given the country's option to default, international lenders incorporate the country's default risk and charge a country specific bond price.

- (a) Define a recursive equilibrium for this problem.
- (b) Prove that default decision is non-increasing in current bond holding.
- (c) Prove that country will not choose to default if it holds positive assets ($b > 0$).
- (d) Solve the recursive equilibrium under the parameter values in Arellano (2008). You can make up any parameter values you do not find.
- (e) Plot default area in a graph with endowment at x-axis and bond at y-axis. Plot the bond price schedule for the smallest endowment and for the largest endowment as a function of current loan demand.
- (f) Simulate the model 10000 times, and report the corresponding statistics as in Table 4 of Arellano (2008). In addition, report the default probability, maximum and minimum of the interest rate spread, average current account-over-GDP ratio $|CA|/y$.