

CLASS PROBLEM ON LORENZ CURVE  
ECON 302

The population of country A consists of 11 people who live for two periods. Each individual  $i$  ( $i = 0, 1, \dots, 10$ ) has some wealth,  $W_i$ , only when young. Preferences are given by Cobb-Douglas utility function of the following form:

$$U^i(C_1, C_2) = C_1^{1/2} C_2^{1/2},$$

where  $C_1$  and  $C_2$  are the first and the second period consumption, respectively.

**Table 1. Initial Wealth Distribution**

Person	Initial Wealth ( $W_i$ ), \$
0 (a child)	0
1	1
2	3
3	5
4	7
5	9
6	11
7	13
8	15
9	17
10	19

Table 1 shows the initial wealth distribution among the population of the country.

There are two mechanisms of saving in this economy. First, there is a voluntary social security system, which provides savers with a gross interest rate  $R_{low}$ . This form of saving can be accessed by *anyone*. Second, there are some private “Richie-rich” bonds with a higher gross interest rate  $R_{high}$ . These may *only* be accessed by the *richest four* people in the economy.

Suppose that  $R_{low} = 1.03$ ,  $R_{high} = 1.3$ , answer the following questions:

- A. Compute mean and median values of the initial wealth distribution among the population of country A.
- B. Construct the Lorenz Curve for the wealth distribution in the first period.
- C. Derive the general formula for the optimal saving by individual  $i$ . Do NOT substitute numerical values for the first period income. Does a person’s saving depend on the interest rate?
- D. Using the numerical values of initial wealth and interest rates, compute the second period wealth distribution among the population of country A.
- E. Construct the Lorenz Curve for the second period. Compare it with the first period Lorenz Curve. Comment on the transmission of wealth inequality.