

ECON 133 “Global Inequality and Growth” Midterm

1. **True False Statement/Questions (10 points; 2 points each)**

Explain your answer fully based on what was discussed in lectures and sections. All the credit is based on the explanation.

- (a) Countries at the world’s technological frontiers have experienced consistently high productivity growth rates throughout history, sometimes maintaining close to 10% growth rates over the course of several decades.
- (b) The capital share of national income α always rises with the capital/income ratio β .
- (c) The functional distribution of income bears no relationship with the distribution of individual incomes.
- (d) In the long-run, and assuming that capital gains are negligible, the capital stock of the economy is equal to s/g times its national income (where s is the economy’s saving rate and g the growth rate of national income).
- (e) The income of the bottom 50% in the United States is lower after taxes and transfers than before.

2. Exercise 1 (14 points)

Consider the case of an economy where national income is distributed as follows: the bottom 50% earns 10% of total income, the middle 40% earns 40%, and the top 10% earns 50%. Furthermore, assume that in each group everyone earns the same income (i.e., groups are homogeneous).

Part 1:

- (a) Graph the line of total equality and the Lorenz curve. Clearly label each axis and data point (2 points).
- (b) What is the Gini coefficient in this economy? Clearly explain your computation (3 points).
- (c) Suppose now that there is inequality within groups, and each group's shares remain constant. Illustrate in the graph how the new Lorenz curve would look like. Is the Gini coefficient higher or lower? (1 point).
- (d) Assuming that you have all the information required to compute either coefficient, which measure do you prefer to quantify inequality: the Gini coefficient or top income shares (e.g., the share of income earned by the top 10%)? Why? This is an open question and credit fully depends on the coherence of the answer. (2 points)

Part 2:

Suppose that the average per capita income in this economy is 20,000. Remember that national income is distributed as follows: the bottom 50% earns 10%, the middle 40% earns 40%, and the top 10% earns 50%.

- (e) What is the average income of each group? Clearly explain your computation. (2 points)
- (f) Suppose that the top 10% can be characterized by a Pareto coefficient of 1.5. What is the inverted Pareto coefficient in this economy? (1 points)
- (g) Assume that the threshold income to belong to the top 1% is 200,000. What is the income share of the top 1%? (Hint: you need to calculate the average income of the top 1%). (3 points)

3. Exercise 2 (6 points)

Assume there are two countries that can be represented by the same CES production function

$$F(K, L) = \left(a \cdot K^{\frac{\sigma-1}{\sigma}} + (1-a) \cdot L^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}},$$

where $t = 1, 2$ and refers to country 1 and 2, and $\sigma = 1.5$. Suppose that in country 1, the capital income share (α_1) is 24%, and the wealth-to-income ratio (β_1) is 250%, and that in country 2 the wealth-to-income ratio is (β_2) is 800%.

- (a) What is the capital share in country 2 (α_2)? (Hint: You need to use the formula covered in section, relating α , β and σ in the CES case) (3 points).
- (b) What would be the capital income share of country 2 if the production function of both countries was Cobb-Douglas instead? (1 point).
- (c) Assume we are in steady-state and that there are no capital gains. If the two countries have the same growth rate (\bar{g}), which one has the highest savings rate? How do you know? (1 point).
- (d) Derive the savings rate of country 1 (s_1) in terms of country's 2 savings rate (s_2) (1 point).

4. Bonus (2 points)

- From the press articles and discussions circulated, briefly describe the characteristics of global wealth convergence during the COVID pandemic (verbatim or quoted text from the article/podcast will get no credit).