

**ECO6171 Economic Development: Internal Aspects
Midterm Exam**

Problem 1: Normative assessment of a perfectly competitive equilibrium (20 points)

Consider an economy with I consumers, J firms and L goods and services. Consumer i has an initial endowment $\omega_i = (\omega_{i1}, \omega_{i2}, \dots, \omega_{iL})$ and owns a share $T_{ij} \geq 0$ of each firm j such that $\sum_{i=0}^I T_{ij} = 1$. Suppose perfect competition and assume that the equilibrium price vector is $p = (p_1, p_2, \dots, p_L)$.

- a) Show that the equilibrium of this economy is a Pareto optimum.
- b) A libertarian analyst and a paretian analyst both consider that this economy is “good” but not for the same reasons. Explain the difference between those two views.

Problem 2: Private charity (10 points)

Consider the following economy:

- There are 2 rich et 1 poor.
- Both rich have an identical gross income y_r .
- The poor’s gross income is y_p .
- Assume that the rich’s preferences can be represented by the following utility function

$$U_{ri} = \ln(y_r - d_i) + \theta \cdot \ln(y_p + d_1 + d_2), \quad i = 1, 2$$

where d_i is i ’s gift to the poor and $\theta \in (0, 1)$ is an altruism parameter.

- a) Determine the gift at the Nash equilibrium.
- b) Assume that there is an utilitarian social planner for the rich. What is the level of the gift that he will impose to the rich.
- c) Is private charity efficient?

Problem 3: Rawls' Theory of Justice (10 points)

- a) Define the different types of primary goods.
- b) What is Rawls' *Principle of justice*?

Problem 4: Amartya Sen (10 points)

Sen agrees with Rawls that we should not take into account differences between individuals in their ability to be satisfied. However, he thinks that Rawls went to far in the elimination of the differences between individuals. Explain Sen's alternative solution.

Problem 5: Lorenz curves (10 points)

Consider two income distributions A and B . Assume that the Lorenz curve for distribution A is everywhere above the Lorenz curve for distribution B . Explain why, in this situation, we can say that inequality in A is lower than inequality in B for any inequality index that obey the Pigou-Dalton transfer principle.

Problem 6: S-Gini indices (10 points)

S-Gini indices are given by

$$I(\rho) = \int_0^1 (p - L(p))\kappa(p; \rho) dp,$$

where

$$\kappa(p; \rho) = \rho(\rho - 1)(1 - p)^{\rho-2}$$

Consider the following social welfare index

$$W(\rho) = \int_0^1 Q(p)\omega(p; \rho) dp,$$

where

$$\omega(p; \rho) = \int_p^1 \kappa(q, \rho) dq = \rho(1 - p)^{\rho-1}.$$

Show that S-Gini indices can be rewritten as

$$I(\rho) = 1 - \frac{\xi}{\mu},$$

where ξ is the EDE income associated with the above social welfare function and μ is mean income.

Problem 7: Atkinson and Clark, Hemming & Ulph indices (30 points)

Atkinson's social welfare function is given by:

$$W(\epsilon) = \int_0^1 U(Q(p); \epsilon) dp,$$

where

$$U(Q(p); \epsilon) = \begin{cases} \frac{Q(p)^{1-\epsilon}}{(1-\epsilon)}, & \text{when } \epsilon \neq 1 \\ \ln Q(p), & \text{when } \epsilon = 1. \end{cases}$$

- a) Show that $U(Q(p); \epsilon) = \ln Q(p)$ when $\epsilon = 1$.
- b) What is the expression of Atkinson's inequality indices?
- c) Consider now the censored quantile function $Q^*(p; z)$. Give an expression for Clark, Hemming & Ulph poverty indices which are based on the same social welfare function.