FACULTY OF SOCIAL SCIENCES
ECONOMICS MAJOR

First Test

Microeconomics 2
Semester 2024-2
September 9

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- You have 110 minutes.
- Be clear in your solutions. Justify each step.
- Closed books and all electronic devices are forbidden.
- You may assume any result covered in class.

Exercise 1. [5 points].

1. Provide the following definitions for a 2×2 economy. [1 point each one].
   a) Pareto optimal allocation.
   b) Walrasian equilibrium.
2. Analyze the truth or falsity of the following statements. Justify your answers. [1.5 points each one].
   a) In a pure exchange economy, if preferences are monotone, then the allocation of the Walrasian equilibrium is a Pareto Optimal allocation.
   b) When preferences are continuous, monotonic and concave, the Second Welfare Theorem holds.

Exercise 2. [5 points]. Consider two individuals in a pure exchange economy whose indirect utilities are

$$v_1(p_1, p_2, I) = \ln I - a \ln p_1 - (1-a) \ln p_2$$
$$v_2(p_1, p_2, I) = \ln I - b \ln p_1 - (1-b) \ln p_2, \;\; a, b \in (0, 1).$$

Endowments are $\boldsymbol{\omega}_1 = (1, 1)$ and $\boldsymbol{\omega}_2 = (1, 1)$. (a) Obtain the ratio of prices that clean the market and the allocation of the Walrasian Equilibrium associated to this ratio of prices [3 points]. (b) Analyze how the ratio of prices changes with respect to a and interpret. [2 points].

Exercise 3. [5 points]. Consider a 2×2 economy where preferences are represented by the following utility functions: $u_1(x_{11}, x_{21}) = x_{11}^{\theta} x_{21}^{1-\theta}$, $\theta \in (0,1)$ and $u_2(x_{12}, x_{22}) = \min\{x_{12}, x_{22}\}$, with endowments $\boldsymbol{\omega}_1 = (5,5)$ and $\boldsymbol{\omega}_2 = (2,2)$.

a) In the framework of the Edgeworth box, represent the endowments and some indifference curves (at least one for each consumer). Assume $\theta = 1/3$ for this item. [2.5 points].

b) Obtain the Walrasian equilibrium in terms of θ. and analyze how the ratio of prices changes with respect to θ and interpret. [2.5 points].

Exercise 4. [5 points]. Consider an economy with two consumers whose preferences and endowments are given by

$$u_1(x_{11}, x_{21}) = x_{11}^{1/2} x_{21}^{1/2}, \quad \boldsymbol{\omega}_1 = (a, 1)$$
$$u_1(x_{12}, x_{22}) = x_{12}^{4/5} x_{22}^{1/5}, \quad \boldsymbol{\omega}_2 = (1, a).$$

Here $a > 1 > 0$.

1. Set the optimization problem to find Pareto Optimal allocations. [1 point].
2. Plot the Pareto set in the Edgeworth box. [2 points].
3. Find all Pareto Optimal allocations. Your answer must be a subset of the Edgeworth box. This is: $(x_{11}, x_{21}) \in \mathcal{P} \subset [0, \omega_1] \times [0, \omega_2]$. [2 points].

Lima, September 9, 2024.