Public Economics

Final exam

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The exam lasts 90 minutes. Documents are not allowed. The use of a calculator is allowed. Any other electronic devices are forbidden. You can answer either in French or in English.

Question 1 3 points

Why is there more litter along highways than in people's yards?

Question 2 3 points

For which efficiency reason would we like to use lump-sum taxation? In other words, why do we say that not using lump-sum taxation results in second-best allocations? Also explain why lump-sum taxation is only rarely used.

Exercise 1 7 points

We consider an economy populated by two individuals—indexed by $i = 1, 2$—who have different preferences. Specifically, individual i's preferences over consumption c and labor l are given by:

$$u_i(c, l) = c - \frac{l^{1+\mu_i}}{1 + \mu_i},$$

where $\mu_i > 0$. An individual with hourly wage w supplying labor l, earns $z = wl$ (pre-tax earnings) and consumes $c = z(1 - \tau)$, where τ is the tax rate on labor income.

1. Show that the optimal labor supply by individual i is: 1

$$l_i^* = [w(1 - \tau)]^{\frac{1}{\mu_i}}.$$

Let us now assume that the government is able to set a different tax rate τ_i for each individual i.

2. Determine optimal τ_1 and τ_2 that allow the government to maximize its total revenue. 2

3. Interpret $\frac{1}{\mu_i}$. Comment on the relative values of τ_1 and τ_2 depending on μ_1 and μ_2. What is the general taxation principle illustrated here? 3

4. Further discuss depending on fairness considerations and on potential differences in wages across individuals. 1

Exercise 2   7 points

Let us consider and economy populated by three individuals—indexed by $i = 1, 2, 3$—who derive utility from the consumption of a public and a private good. All have similar preferences that are represented by the following utility function:

$$u_i = x_i G,$$

where x_i is the quantity of private good consumed by individual i and G is the total available quantity of public good. All individuals have the same income, such that $w_1 = w_2 = w_3 = 1$. The unit-price of the private good is 1. The cost of producing one unit of the public good is also 1.

1. Determine the equilibrium allocation if the public good is financed thanks to individuals' voluntary contributions g_1, g_2, and g_3.   1

2. Show that the efficient allocation is such that $G = \frac{3}{2}$.   2

3. Quickly check that the efficient allocation is Pareto-superior with respect to the one obtained thanks to voluntary contributions. Explain why they differ.   1

   Assume that the government is able to exclude individuals from the consumption of the public good. This implies that it is now possible to let each individual pay a unit price p to gain access to the total available quantity of the public good.

4. Determine p that allows to reach the efficient allocation.   2

   This equilibrium situation is known as Lindhal pricing. It amounts to let consumers pay an individualized price to access the public good.

5. All consumers are identical so far. What kind of issue would the government face if they were not?   1