

PUBLIC ECONOMICS



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EXERCISES

TOPIC 2.2. THEORY OF PUBLIC GOODS AND EXTERNALITIES

EXERCISE 1

Answer the following reflection questions:

- What are the differences between the private optimum and the social optimum in the presence of externalities?
- What are the implications of externalities for the functioning of the economy?
- Why can environmental goods be considered public goods in an economic sense?
- What are the problems for the efficient management of environmental goods?
- What mechanisms can correct the problem of externalities?
- What are the difficulties of the *Coase* theorem to be applied in solving environmental problems?

EXERCISE 2

Suppose that near a coastal town in Cantabria there is a company called “RESIDUC, S.A.” which is currently developing a manufacturing activity of which it is known that its marginal private cost curve is $MPC = 12,000x + 80$. As a result of the production activity of this company over time, polluting waste is dumped into a nearby estuary, which causes continuous complaints from the fishermen of the area as this is causing damage to their fishing activity which can be approximated and quantified, in terms of increased costs per unit manufactured by “RESIDUC, S.A”, as $AVC = 8,000x + 25$. On the other hand, the demand for the product manufactured by the company “RESIDUC, S.A.” is known and therefore presents the following standard structure in €: $P_x = 150,000 - 120x$, the marginal valuation (marginal willingness to pay) of consumers being a function that can be constructed as dependent on the number of units consumed of the product being manufactured. With the data that you have here, you are asked to determine the following:

- a) The volume of production that maximises the private profit of the company “RESIDUC, S.A.”, its corresponding price, as well as the gross income in € of the company (without any correction for the external effect). Give reasons for your answer.
- b) The efficient production volume (with internalisation of the negative external effect), its corresponding price, as well as the gross revenue in € of the company. Please give reasons for your answer.

- c) Looking at the results obtained in the previous section respect to the level of output, prices and gross revenues of the firm, are they higher or lower than before? Are these results consistent with the theory of public finance regarding externalities, and why? Please give reasons for your answer.
- d) Suppose it is decided to correct the negative externality by the public sector through the tax system. Calculate the efficient unit tax rate in € that corrects this externality. What other result does this figure coincide with? Give reasons for your answer.
- e) Once the efficient unit tax rate has been obtained in the previous section, calculate the total revenue obtained in € and how much this amount represents as a percentage of the gross revenue (with internalisation of the negative external effect) of the company "RESIDUC, S.A."

EXERCISE 3

The company "CONTAM, S.A." in its manufacturing activity incurs a marginal private cost equal to $MPC = 14,000x + 60$. As a result, over time, polluting waste is dumped into a nearby river, which generates damage to fishing activity that can be approximated and quantified, in terms of increased costs per unit manufactured by "CONTAM, S.A.", as $AVC = 9,000x + 20$. On the other hand, the demand for the product manufactured by "CONTAM, S.A." is in euros: $P_x = 90,000 - 105x$. With these data, the following is requested:

- a) The volume of production that maximises the private profit of the company "CONTAM, S.A.", its corresponding price, as well as the gross income in euros of the company (without any correction for the external effect). Give reasons for your answer.
- b) The volume of efficient production (with internalisation of the negative external effect), its corresponding price, as well as the gross revenue in euros of the company. Are these results consistent with the theory of public finance regarding externalities, and why? Please explain your answer.
- c) If it is decided to correct the negative externality by the Public Sector through the tax system. Calculate the efficient unit tax rate in euros. What other result does this figure coincide with? Give reasons for your answer.

EXERCISE 4

1. The main conditions that define a Pure Public Good are:

- a) The consumption of one subject does not reduce the consumption of others.
- b) It is difficult or impossible to put a price on it.
- c) Answers a) and b) are correct.
- d) None of the previous answers is correct.

2. A Free Rider will be:

- a) Some consumer of Public Goods.
- b) The consumer of Public Goods who always expresses their preferences.
- c) The consumer of Public Goods who always contributes to its supply.
- d) The consumer of Public Goods who does not express their preferences.

3. *The efficient provision of a Private Asset supposes:*

- a) $MRS_{XY}^A = MRS_{XY}^B = MRT_{XY}$
- b) $MRS_{GY}^A + MRS_{GY}^B = MRT_{GY}$
- c) $MRT_{XY} = MRTS_{KL}^X$
- d) $MRS_{XY}^A = MRT_{XY}$

4. *An externality is generated when:*

- a) The performance of a subject is reflected in the price of the goods.
- b) The performance of a subject benefits another without reflecting it in prices.
- c) The action of a subject does not harm the other.
- d) None of the previous answers is correct.

5. *A production externality occurs when:*

- a) The consumption of a company subtracts consumption for other subjects.
- b) A company pollutes a river with its waste at no cost.
- c) A consumer harms another with the consumption of a good.
- d) None of the previous answers is correct.

6. *When a negative externality of consumption occurs, the Public Sector can intervene:*

- a) Establishing subsidies to whoever generates the externality.
- b) Establishing taxes on those who are harmed by the externality.
- c) Establishing taxes on who generates the externality.
- d) None of the previous answers is correct.