

EE375: Applied Economics for Natural Resources and Environment
Assignment 2 (Group)
Due on Friday August 27, 2021

Question 1:

Suppose that the demand curve derived from marginal benefit associated with a consumption of chocolate is $360 - 4Q$ and the marginal cost of chocolate production is $6Q$. The marginal damage from pollutions generated by chocolate production is $2Q$

- a) Find the social optimum or efficient production level (P^* , Q^*)
- b) Find the private equilibrium price and quantity when external costs could be ignored by firms
- c) What tax level should be set to achieve the efficient/social optimal
- d) Calculate deadweight loss from externalities in this case
- e) Drawing a graph to illustrate the result from a) to d)

Question 2:

The production of cigarettes increases water pollutions while the consumption of cigarettes can put their neighbors at health risks (Hint: Impact on social marginal benefits as a whole)

- a) Explain how externalities in this case create inefficiencies in the cigarette market and draw a graph to illustrate your explanation, including the market equilibrium for cigarettes at i) socially optimal level, P^* and Q^* ; ii) private optimal level (P_p and Q_p) when externalities are not internalized by both firms and consumers and; iii) the deadweight loss area.
- b) What policies could be considered to reduce deadweight loss in this case and describe the effects of such policies in the cigarette market.

Question 1:

Suppose that the demand curve derived from marginal benefit associated with a consumption of chocolate is $360 - 4Q$ and the marginal cost of chocolate production is $6Q$. The marginal damage from pollutions generated by chocolate production is $2Q$.

- a) Find the social optimum or efficient production level (P^* , Q^*)

$$\begin{aligned} P &= MC_C \\ 360 - 4Q &= 6Q + 2 \\ 358 &= 10Q \\ Q^* &= 35.8 \end{aligned}$$

$$\therefore P^* = 360 - 4(35.8) = 216.8$$

- b) Find the private equilibrium price and quantity when external costs could be ignored by firms

$$\begin{aligned} P &= 360 - 4Q = 6Q \\ 360 &= 10Q \\ Q_m &= 36 \end{aligned}$$

$$\therefore P_m = 360 - 4(36) = 216$$

$$P = 360 - 4Q = 6Q$$

$$360 = 10Q$$

$$Q = 36$$

$$P_m = 6(36) = 216$$

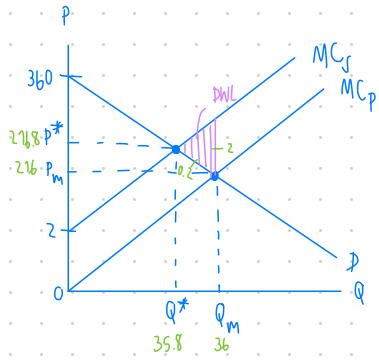
- c) What tax level should be set to achieve the efficient/social optimal

the tax level that should be set must be $2Q$.

- d) Calculate deadweight loss from externalities in this case

$$DWL = \frac{1}{2} \times 0.2 \times 2 = 0.2$$

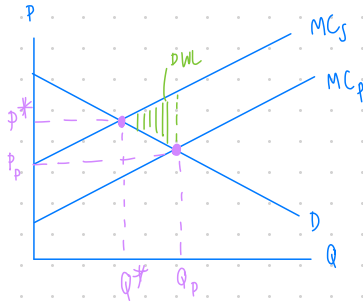
e) Drawing a graph to illustrate the result from a) to d)



Question 2:

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The externalities create inefficiencies in this case because it creates a deadweight loss, and the production is not at the socially optimum point, meaning that, the firm is producing too much cigarettes without taking social costs into account.

- b) What policies could be considered to reduce deadweight loss in this case and describe the effects of such policies in the cigarette market.

One method to decrease the deadweight loss is to impose tax on the production of cigarettes. When the government impose a tax on the cigarettes, the firm will produce less because there are more costs. Another method is to put a cap on the production of cigarettes. By setting a maximum unit of production equal to the socially optimum quantity, it could also reduce the deadweight loss.