

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.

Siraphop Chaipak 6304641423
Vichayaporn Meejaroen 6304641720
Thanaphol Sae-tang 6304641589
Kanyakorn Liampaitoon 6304640425
Ornwara Supakandechakul 6304640854

Demand : $P = 360 - 4Q$

Supply $MC = 6Q$, pollution cost $= 2Q$

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

a.) $P^* = MC_S$ $P^* = 360 - 4(Q)$

$$360 - 4Q = 6Q + 2Q \qquad = 360 - 4(30)$$

$$360 = 12Q \qquad = 360 - 120$$

$$30 = Q^* \qquad = 240$$

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

$$P = MC \qquad P_M = 360 - 4Q \quad ; \quad Q = 36$$

$$360 - 4Q = 6Q$$

$$360 = 10Q$$

$$36 = Q_M$$

$$360 - 4(36)$$

$$= 360 - 144$$

$$= 216$$

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

tax level $= 2Q$

$$2(30)$$

$$= 60$$

tax = external cost

d) Calculate deadweight loss from externalities in this case

calculate DWL

$$\Delta = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times 6 \times 60$$

$$= 180$$

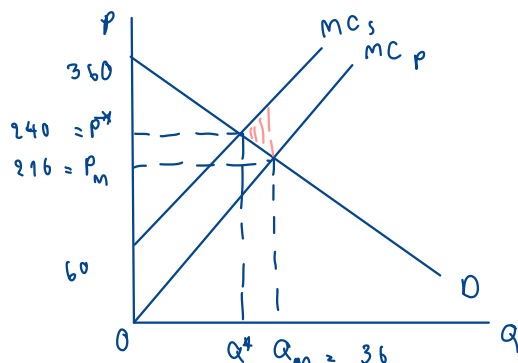
$Q_M - Q^* = \text{base}$

$$6 =$$

high = external cost

$$= 60$$

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

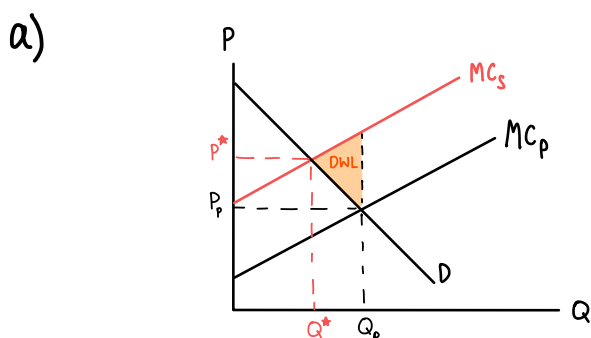


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- To reduce deadweight loss firm should produce at (Q^*, p^*) . Even though, at (Q_p, P_p) can maximize profit but it can be cause of pollution and it will impact society.

b) - Set up the rule : By specific zone for smoking The buyer will buy less if the place are not allowed to smoke .

- Increase tax : Increasing tax by shift the marginal cost up to optimal price.

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