

EE375: Applied Economics for Natural Resources and Environment
Assignment 2 (Group)
Due on Tuesday August 30, 2022

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.

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a. $P = MC_s$

$$360 - 4Q = 6Q + 2Q$$

$$360 = 12Q$$

$$Q^* = 30$$

$$P^* = 360 - 4(30)$$

$$P^* = 240$$

$\therefore Q^* = 30$
 $P^* = 240$

b. $P = MC_p$

$$360 - 4Q = 6Q$$

$$360 = 10Q$$

$$Q_p = 36$$

$$P_p = 360 - 4(36)$$

$$P_p = 216$$

$\therefore Q_p = 36$
 $P_p = 216$

c. Formular: $P = MC_s + t_{ax}$

$$360 - 4Q^* = 6Q^* + t_{ax}$$

$$360 - 4(30) = 6(30) + t_{ax}$$

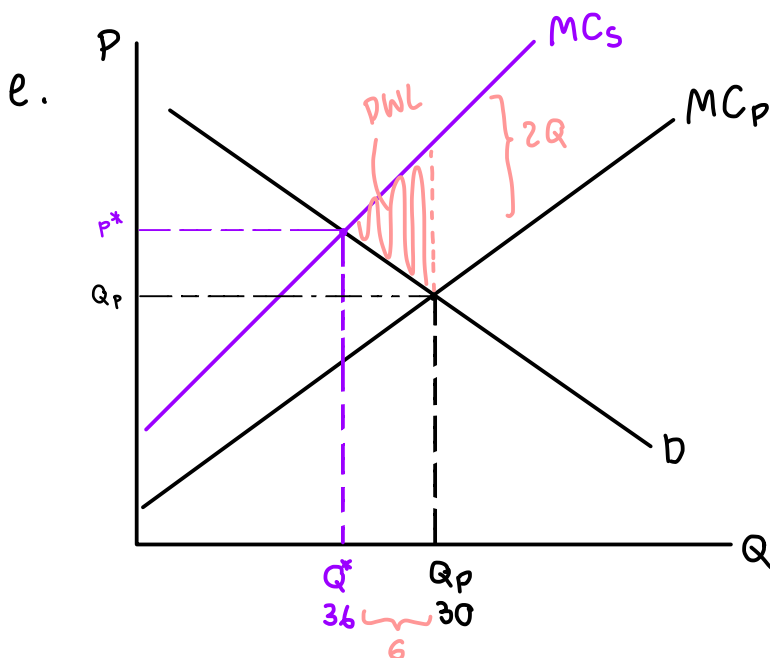
$$t_{ax} = 60$$

d. $DWL = \frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times 2Q^* \times 6$$

$$= \frac{1}{2} \times 2(30) \times 6$$

$$DWL = 180$$

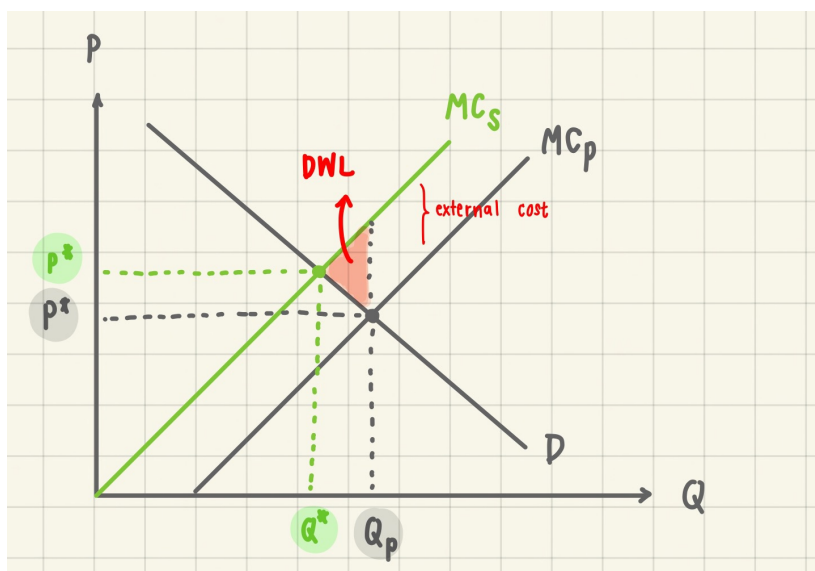


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- What policies could be considered to reduce deadweight loss in this case and describe the effects of such policies in the cigarette market.

a)



The company decides to produce cigarettes at private optimal level of outputs to maximize their profits. However, there is an externalities that come from the production and consumption of cigarettes impact to social lead to environmental and health problems. It's clear to see that the supply curve shifts from MC_p to MC_s due to the externalities. If producer decides to produce cigarettes at Q_p and P_p , it is inefficiency point which is an overproduction. Moreover, it creates deadweight loss to society. Therefore, producer should consider negative impacts that affects to society by producing cigarettes at Q^* and P^* to prevent the occurrence of deadweight loss.

- In this case, the policy that can reduce deadweight loss is putting price by imposing tax. Price increases for cigarettes contribute to lower consumer welfare and producer profits, or deadweight loss. Higher prices of cigarettes can reduce consumption among remaining smokers by reducing consumption by daily smokers. As a result, raising taxes is one of the most effective measures in the cigarette market.