Discussion 13

Today's Topics

- Externalities
- Tax Incidence
- Public goods

Externalities

Exercise 1 Sriracha hot sauce is supplied according to $P = 3 + \frac{1}{4}Q$. Demand for sriracha is $P = 7 - \frac{1}{4}Q$.

(a) What is the market quantity and price?

(b) The production of sriracha also produces noxious fumes that irritate residents that live near the sriracha plant in Irwindale, California (this is real; there have been several lawsuits). Suppose that these fumes represent a negative production externality of \$2 per unit. What is the marginal social cost (MSC) of a unit of sriracha?

(c) What is the socially optimal quantity and the deadweight loss of the market equilibrium?

(d) What policy could the Irwindale city council use to achieve the optimal quantity of Sriracha?

Tax Incidence

Exercise 2 Suppose demand is given by $P = 200 - Q$ and supply is $P = Q$.

(a) What is the competitive equilibrium price and quantity?

(b) Suppose the government now imposes a \$20 tax on consumers. What quantity will be traded?

(c) What price will consumers pay? What price will producers receive?

(d) How much tax revenue does the tax raise?

(e) Who bears the economic burden of the tax?

(f) Is there any deadweight loss?

(g) What would change if supply was perfectly inelastic, i.e. just $Q = 100$?

Public Goods

Exercise 3 What are the two characteristics of public goods that distinguish them from private goods?

Exercise 4 Alice, Bob and Charlie are looking forward to the end of semester: they are getting tired of appearing in so many questions. To celebrate they plan to have a fireworks display after the final exam. Their individual demand curves for fireworks are:

$$\text{Alice:} \quad P = 5 - \frac{1}{4}Q$$

$$\text{Bob:} \quad P = 10 - \frac{1}{2}Q$$

$$\text{Charlie:} \quad P = 20 - Q$$

Suppose fireworks cost \$14 each.

(a) Draw the individual demand curves separately. If Alice, Bob and Charlie each have their own separate fireworks displays, how many fireworks will each of them buy?

(b) Now vertically sum the three demand curves to form a market demand curve. What key feature of public goods makes vertical summation appropriate (instead of the horizontal summation we have been doing all semester?).

(c) What is the optimal quantity of fireworks that Alice, Bob and Charlie should buy together?

(d) How much should Alice, Bob and Charlie contribute per-firework to ensure the optimal quantity of fireworks is purchased?

Exercise 5 (Questions 108-109 from Review Questions with extra question added)
Andrew, Bob and Christian live on Short Street outside Madison. They decided to build a small public garden at the corner of the street right by the lake. They each have a different demand curve for the garden given by the following equations:

Andrew: $P_A = 60 - Q$
Bob: $P_B = 60 - 2Q$
Christian: $P_C = 30 - 3Q$

The marginal cost of building the garden is given by MC = 2Q where Q represents the area in terms of square feet that will be allocated to the garden.

(a) Find the aggregate demand.

(b) What is the optimal area to be allocated for this public garden?

(c) How much each person is going to pay?