

Economics 101

Fall 2000

Practice Question #7

Goal:

- Describe the market failures arising from externalities and public goods.
- Explain how marginal social cost and marginal social benefit can help guide government policy in dealing with externalities.
- Classify goods as purely private, purely public, or mixed, based on the characteristics of rivalry and excludability.

1. Suppose that there is a small town in Colorado called Nepsa, and at one end of town there is a great ski mountain called Ajax Mountain. The market for skiing this large mountain is perfectly competitive- that is, there are lots of firms all over the mountain that each sells tickets to their own lift. The demand for lift tickets in this market is given by $Q_d = 320 - 4P$. The market supply curve is given by $Q = 6P$. Also suppose the only way for skiers to get to the mountain is to drive through the town. Assume that each skier drives his or her own car. This flow of skiers through the town increases traffic and therefore the damage done to the roads, costing the town money in additional road repair. This marginal external cost of the skiers to the town is $(1/12)Q$.

- a. Graph the demand and supply curve in this market for lift tickets.
- b. Find the equilibrium price and quantity for lift tickets, and also label these values on your graph.
- c. Is this equilibrium allocative efficient? Why or Why not?
- d. Find the equation for the Marginal Social Cost (MSC) of skiers and graph this on your diagram. What is the MSC of the quantity of lift tickets that are sold in equilibrium?
- e. Find the socially efficient quantity of lift tickets sold, and also label this point on your graph.
- f. What is one way that the town of Nepsa could achieve this Q ?

2. Now suppose that the Nepsa Chamber of Commerce realizes that although the skiers that drive through the town do damage the roads, the local merchants are selling a lot more of their goods and services. The Nepsa Chamber of Commerce estimates that

there is actually a net benefit to the town equal to $(1/20)Q$. This means that even after subtracting the cost of road damages, the town benefits by $(1/20)Q$ for the marginal lift ticket sold. Assume as before that the demand for lift tickets is still given by $Q_d = 320 - 4P$, and the market supply curve is given by $Q = 6P$.

- a. Graph the demand and supply curve in this market for lift tickets, as well as the equilibrium price and quantity.
- b. Is this equilibrium efficient now? Why or Why not?
- c. Find the equation for the Marginal Social Benefit (MSB) of skiers and graph this on your diagram. What is the MSB of the quantity of lift tickets that are sold in equilibrium?
- d. Find the socially efficient quantity of lift tickets sold, and label this point on your graph.
- e. What is one way that the town of Nepsa could achieve this Q ?

3. Tracey and Justin are the two residents of Chejoo Island. They use the surrounding waters to fish. Because the waters are sometimes rough and they often return to the island after dark, the residents of Chejoo Island desire to build a lighthouse to light their way home at night. The two persons have different demands for lighthouse and their demand are given by the following.

$$\text{Tracey: } Q_d = 20 - P$$

$$\text{Justin: } Q_d = 20 - 2P$$

The marginal cost of providing the lighthouse is $MC = Q$, where Q represents the intensity of the lighthouse beacon.

- a. What is the optimal amount of lighthouse to be provided?
- b. What is the total price paid to provide this lighthouse?
- c. Of this price, Tracey will pay _____ and Justin will pay _____.
- d. Will this optimal amount of the public good necessarily be provided by the residents of Chejoo Island? Explain your reasoning, using arguments developed in class.