

U8213 Colloquium on Policy Analysis Section 3
Spring 2001
Problem Set 1: Market supply, comparative advantage

1. In 1990, Pittsville, PA, had a free market for taxi services. Any firm (being as small as 1 car) could enter the market as long as certain safety standards were met. Suppose that the marginal cost of a taxi ride is \$5 and that the average taxi can make as many as 20 trips per day. Let the market demand function for cab rides be given by $D(p) = 1200 - 20p$, where demand is measured as rides per day. Assume that the industry is perfectly competitive (or at least close enough). Assume also that there are no fixed costs of entering the market (i.e. a cabbie can always rent and need not buy a car, or if he/she owns one, he/she may rent it out to someone else).

a. What is the competitive equilibrium price per ride? Why? How many rides per day will be sold in equilibrium? How many cabs will there be in equilibrium? Justify.

b. In 1990 the city council of Pittsville created a licensing board and issued medallions to each existing cab. The board stated that it would adjust future fares so that demand equals the supply of rides but no new medallions would be offered in the future. In 1995 costs were the same (despite cabbies' stringent claims to the contrary!), but the demand curve for cab rides had increased due to an increase in the downtown population. The new demand curve is given by $D(p) = 1220 - 20p$. What was the equilibrium price of a ride in 1995?

c. What was the excess profit per ride in 1995 (neglect any costs of acquiring a medallion)? If cabs are operated everyday, what will be the yearly profit per medallion?

d. If the interest rate is 10% and demand and costs are the same forever, what is the price of a medallion? (FYI: New York Taxi and Limousine Commission medallion prices have risen from about \$25,000 in 1970 to \$300,000 in 2000.)

e. Suppose the commission decided in 1995 to issue enough new licenses to reduce the taxicab price to \$5 a ride. How many more are needed? How much will a medallion now be worth (everything constant forever)?

f. How much would all taxi drivers together be willing to pay to bribe the licensing board not to issue any new medallions?

g. Suppose you own a medallion and drive a cab. The marginal cost of a cab ride includes your payment as driver of \$4 a ride (no tips). You drive 250 days a year. You are offered a lifetime job on the licensing board. You also have to work 250 days a year and work the same number of hours per day. What is the minimum yearly salary you must be offered to entice you to quit the cab business and join the board, i.e. what is the opportunity cost?

2. The market supply of gourmet camel humps is provided by 100 identical firms. Each firm has a total cost function that has been precisely estimated as $TC = 90,000 + 0.00001Q^2$, where Q is the number of humps per year and TC stands for “total cost.” Everyone likes a good hump, and market demand is given by $D(p) = 90,000,000 - 20,000,000p$, where p is price per hump.

- a. Find the short run equilibrium price and quantity in the market.
- b. Calculate the profit-maximizing quantity for an individual firm. Calculate the firm's short run profit or loss at that quantity.
- c. Assume there are no barriers to entry or exit from the market. Describe the long-run industry response to the profit or loss situation in (b).

3. Everyone knows it takes three conservatives to change a light bulb: one to do the work and two to talk about how great the old one was. Everyone also knows that it takes five liberals to change a light bulb: one to do the work, two to decide the environmentally-friendly way to dispose of the old bulb, and two to make sure no animals were harmed during the process. Less well known is the fact that it takes either one conservative or two liberals to mow an acre of lawn (conservatives have had more practice mowing their estates).

You have just secured a summer internship as head of a federal penitentiary with 1500 liberal inmates and 1500 conservative inmates. The only two activities the inmates engage in are changing light bulbs and mowing lawns. Grass grows so fast and light bulbs burn out so rapidly that you never run out of either kind of work to do. When you arrive at your job, you find 500 liberals and 600 conservatives assigned to light-bulb duty; everyone else is mowing lawns.

- a. Show that the total output of bulbs changed and lawns mowed could both be increased.
- b. Your new assistant tells you the following: “Liberals are useless; conservatives are better at both tasks, so we should just set up volleyball nets and let the liberals amuse themselves.” Is the assistant right? Explain.

4. Socks can be made either in Boston or Chicago. An hour of labor in Boston produces 3 pairs of red socks or 3 pairs of white socks. An hour of labor in Chicago produces 1 pair of red or 2 pairs of white socks.
- a. Suppose each city has 1000 hours of labor available each year. Draw the production possibility frontiers (PPF) for each city.
 - b. Which city has an absolute advantage in the production of red socks? How about white socks? Which city has a comparative advantage in production of red socks? In the production of white socks?
 - c. If the cities trade with each other, in which good should each city specialize?
 - d. Sketch the global production possibility frontier if the cities trade.
 - e. The mayor of Boston has decided for reasons of municipal security that the city must have 900 white socks a year and that these must be produced in Boston. Draw the new global production possibility frontier with the Boston security constraint.
 - f. The mayor of Chicago is outraged over Boston's move. He demands that Boston buy 500 pairs of "Made in Chicago" red socks. Draw the new global PPF that incorporates this new constraint. How does this world compare to the one you derived in (d)?