

Problem Set #5

The first question in this problem set involves consumer surplus and producer surplus (you can think about producer surplus as equivalent to economic rent that we discussed in class. – it is also discussed in the text book). Another way of saying that free markets are efficient is the idea that unregulated markets maximize **the sum** of consumer surplus plus producer surplus. This is why problems analyzing changes in surplus, like the problems below, are sometimes called “welfare analysis” (general economic welfare rather than public assistance programs).

1) In the following problem, use appropriate diagrams to show the changes in producer and consumer surplus as the situation evolves.

- a) Begin with a market for rice in the small country of Buras. The Buras rice market is supplied only by domestic farmers with differing cost curves so that the rice industry has a standard upward sloping supply curve. Consumers have a standard downward sloping demand curve and market equilibrium is reached at \$1.05/lb. Illustrate the consumer surplus and producer surplus in your diagram.
- b) Now assume that the Buras opens itself up to international trade. The world market price for rice is \$.90 per pound. Because Buras is small, its demand will have no effect on the world price so you can assume it faces an international supply curve for rice that perfectly elastic at \$.90 per pound. Show what changes occur in Buras consumers’ surplus and the Buras farmer’s producer surplus because of this international trade. (Do not consider the producer surplus of farmers in other countries).
- c) Bowing to the protests of Buras rice farmers, the government imposes a \$.15 per pound tariff on imported rice so that each pound of imported rice has \$.15 added to its price. Using appropriate diagrams show what changes this tariff makes in the consumer surplus and Buras farmers’ producer surplus you had in (b). Can you identify the tariff revenue in your graph?

**2) NOTE: This problem involves very simple marginal and average costs curves that don’t have the standard “U” shape so that you can work the problem in algebra.**

The Cape Cod National Seashore District is about to open a new park, Tranquility Beach. District officials want food to be sold at the beach but are unsure of how best to organize sales. Initially, the officials decide that the only food to be sold on the beach is fried clams rolls produced in small, tasteful clam shops. The state has done a study of clam shops and determined that their cost structure is:

Av. Cost/Clam Roll = Marginal Cost/Clam Roll = \$2.00/Clam Roll.

Both AC and MC are constant for all levels of output up to 200 clam rolls per day, the capacity of a small tasteful clam shop.

The state has also done a market analysis and finds that the total demand for clam rolls from all

beach goers can be written as:

$$P = \$10.00 - .002Q$$

Where P is the price per clam roll  
Q is the number of clam rolls sold per day.

a) Using the information above, draw the average and marginal cost curves of a traditional clam shop.

b) Suppose anyone can open a clam shop on the beach. What will be the equilibrium price of clam rolls, the profit per shop and the total number of clam rolls sold per day?

c) After several months the state decides Tranquility Beach looks too commercial. To remedy the situation, it announces that only four tasteful clam shops will be allowed to operate and the rest of the shops will have to close. The four lucky shops will be chosen by lottery and as before, each shop will be able to produce no more than 200 clam rolls per day. Assuming the shops do not cooperate with each other and act as price takers, what will be the equilibrium price of clam rolls, the profit (i.e. economic rents) per shop and the total number of clam rolls sold per day?

d) A few months later Citizens for Good Snacks (CGS) writes the state legislature to complain that by limiting the number of clam shops the state has totally mismanaged food sales on Tranquility Beach. "Believe it or not," they argue, "if the state let one large clam shop run clam roll sales as a pure monopoly, consumers would be better off than they are with the current situation."

Explain why you agree or disagree with the CGS statement. Assume in your answer that the monopoly firm could produce at any level of output (no 200 clam roll limit) and that it would retain the same cost structure with  $AC = MC = \$2.00$  per clam roll at any level of output.

3) In Aroostock County, farmers produce green beans in a perfectly competitive industry. All farms have identical technologies with these characteristics:

- A standard "U-shaped" average cost curve, etc.
- Minimum average cost is \$.50 per pound of beans that occurs at an output of 1000 pounds of beans.
- The farms are all small and no farm can produce more than 2000 pounds of beans.

The Aroostock agricultural extension service is experimenting with a new bean seed that may be more productive than seeds now in use. To give the new seeds a fair test, the county government runs an experiment in which it distributes unmarked packages of seeds to all farmers now in the industry. Ninety-five percent of the farmers will get the old seeds. Five percent of the farmers will get only new seeds. If the new seeds work, they will reduce a farm's average and marginal cost curves by exactly \$.10 cents per pound at every point on each curve.

a) Using side-by-side diagrams draw the short run equilibrium for a typical green bean farm and for the green bean industry before the experiment. In your drawings, include as much detail as the information permits and explain how you are defining short run.

b) Assuming the seeds work, use drawings to show how the experiment will change your short-

run equilibrium in (a) for: (i) a farmer who gets the old seeds (ii) a farmer who gets the new seeds and (iii) the green bean industry.

c) Suppose that the seeds do not work as planned and, in fact produce no green beans at all. Using words and illustrations where appropriate, briefly describe the short run effect on (i) a farmer who gets the old seeds (ii) a farmer who gets the new seeds and (iii) the green bean industry.

4) New York City strictly limits the number of taxi cabs on the street by requiring that each cab have an official medallion and the city government controls the supply of medallions. In other cities – e.g. Washington, DC - essentially anyone who wants to operate a licensed taxi can do so by paying a modest fee to the city’s taxi bureau. In other words, in DC, entry into the industry is very easy and so the industry is highly competitive.

Assume that DC has a standard downward sloping demand curve for taxi rides with both an elastic and an inelastic range. To simplify the analysis, let us assume that all taxi cab rides charge the same price regardless of distance, and that the price is determined by supply and demand.

a) In general terms, describe the main factors that will determine the long run equilibrium price of a taxicab ride in DC

b) Explain whether this DC equilibrium price will occur on the elastic portion of the demand curve or the inelastic portion of the demand curve. If you do not have enough information to answer the question, explain why

c) Suppose, instead, that the DC city government decides to run the taxicab industry as a monopoly, limiting the number of cabs to produce the profit maximizing number of rides for the industry. Will the resulting price lie on the elastic or inelastic portion of the demand curve for taxicab rides? Explain. If you do not have enough information to answer the question, explain why.

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