

Managerial Economics – Fall 2012

Problem Set 3

DUE: Monday November 26th at beginning of lecture

Short, precise answers will be better rewarded than long, vague ones. All of the questions in can be answered with 5 sentences or less. Include graphs only when requested

Only provide graphs when requested, and highlight key outcomes.

No late assignments will be accepted.

You can work in groups, but each student has to submit his/her OWN work.

You are required to answer all problems.

Problem 1 (30 points)

Using concepts we have discussed in class, discuss the effect of having a minimum wage. The minimum wage raises workers' wage above the equilibrium wage. Using a graph and explanation in prose, discuss whether the minimum wage is efficient. Is it fair? Give one argument for why it is fair, and one argument for why it is not.

Problem 2 (35 points)

The following is an example of an intertemporal problem of nonrenewable resource depletion.

Assume that the remaining oil supply in the world is

$$S = 50,000 \text{ units}$$

The energy demand for economic production during each period is

$$D = 5,000,000 / P$$

And the annual interest rate is 2%. Round all of your answers to whole numbers.

a) We are interested in three periods: today (period 1), 10 years from now (period 2), and 20 years from now (period 3). Assume that there is a backstop (solar energy) currently available, and its price is \$300. Solve for the price of energy and the consumption of energy in the three periods, as well as how much of it in every period comes from oil versus the backstop technology. (*Hints: Start by thinking about period 3. Also, think about what prices would have producers be indifferent between selling today and selling in the future?*)

b) We will now compare scenario (a) with one where today's society can forego some consumption in the present to develop alternative technologies for the future. Assume that solar power can be made available for period 2 at a price of \$250 only if we choose today to

pay the equivalent of 7000 energy units into R&D (assume that energy available for economic production is equal to energy demanded minus the amount put into R&D). Under this scenario, when will we begin to use solar power? Is any time period better off (in terms of energy used for economic production) compared to the same time period in (a)? Will the present generation choose to invest in the R&D, assuming it cares about its own well-being much more than about the future, and that its well-being is directly proportional to its energy used for production?

c) Now assume that the price of solar technology made available by R&D for period 2 is \$150. What is the new energy use for the three periods? Will today's generation invest in the R&D, assuming it cares about its own well-being much more than about the future?

Problem 3 (35 points)

Suppose a diamond producer is a monopolist in the market for diamonds. The company has five potential customers, each of which will buy no more than one diamond, and only if the price is equal to or less than the customer's willingness to pay. Customer 1 is willing to pay \$400, customer 2 \$300, customer 3 \$200, customer 4 \$100 and customer 5 is willing to pay \$0. The marginal cost of production for the company is \$100 per diamond. This leads to the following demand schedule:

Price of Diamond	Quantity of Diamonds Demanded
\$500	0
\$400	1
\$300	2
\$200	3
\$100	4
\$0	5

- a) Calculate the company's total revenue and its marginal revenue. Draw the demand curve and the marginal revenue curve.
- b) Explain why the marginal revenue from an additional diamond sale is less than the price of the diamond.
- c) Draw the marginal cost curve into your diagram and determine which quantity maximizes the company's profit and which price the company will charge.
- d) Calculate the consumer surplus, the producer surplus, and the total surplus.
- e) If the government breaks the monopoly and the diamond market becomes perfectly competitive, what will happen? What is the new consumer surplus, producer surplus, and social surplus? What should the government do?
- f) What if, instead of diamonds, the product being studied is tons of fish from a fishery? Should the government allow the monopoly or open up competition? What more information would the government like to have in order to make the decision?