Econ 496, Natural Resource Economics
Winter 2012

Assignment 2

The due date for this assignment is Monday, February 13, in class (16:15) or during my office hours (13:00 - 14:00). Answer all questions. All questions carry equal weight (25 marks per question). The marks assigned to each sub-question are given in parentheses. Assignments must be stapled and clearly written. MAIL BOX AND/OR ELECTRONIC SUBMISSIONS, AS WELL AS LATE ASSIGNMENTS WILL NOT BE ACCEPTED.

1. In a crowded room half of the people are smokers and half of them are non-smokers. Each smoker would be willing to pay \$0.75 to have the right to smoke. Each non-smoker would be willing to pay \$0.50 to have the room free from smoke.

   (a) Assume there is a rule that says smoking is forbidden. Could everyone be made better off if smoking is allowed? Fully explain your answer. *(10 marks)*

   (b) What difference does it make to the outcome whether there is initially a rule that smoking is allowed or smoking is not allowed? Fully explain your answer. *(10 marks)*

   (c) What problems might you envision occurring if no smoking is allowed unless all the non-smokers agree to allow smoking? Explain. *(5 marks)*

2. An oil refinery is considering three alternative production processes. Although the resulting benefits will be the same (the resulting gasoline, diesel fuel, asphalt base, heating oil, kerosene from the three different methods are of the same quality and quantity), the marginal costs associated with each method are different. More specifically, the marginal cost of method 1 is $MC_1 = 28$, the marginal cost of method 2 is $MC_2 = 12 + q_2$, and the marginal cost of method 3 is $MC_3 = 2q_3$.

   (a) If the factory wants to produce 100 units in total, how many units will be produced using each different method? *(12.5 marks)*

   (b) Repeat part (a) when the factory wants to produce 18 units in total. *(12.5 marks)*

3. The following table shows the willingness to pay of Sarah, Walid, and Ethan for a non-excludable and indivisible good:

	Q = 1	**Q = 2**	**Q = 3**
Sarah's WTP	\$4	\$3	\$2
Walid's WTP	\$6	\$4	\$2
Ethan's WTP	\$3	\$2	\$1

The corresponding marginal costs are

	Q = 1	**Q = 2**	**Q = 3**
Marginal cost	\$6	\$8	\$12

(a) What is the socially optimal quantity? Show all your calculations. (*Hint: use vertical summation to get the market demand). (9 marks)*

(b) Can a private firm supply the socially optimal quantity? Fully explain. (*Hint: How many units will a private firm supply and who has an incentive to free ride?*). *(9 marks)*

(c) How will your answers in parts (a) and (b) change if the marginal cost is now given by the table below? *(7 marks)*

	Q = 1	**Q = 2**	**Q = 3**
Marginal cost	\$7	\$9	\$13

4. True or False? Fully explain your answers.

   (a) The supply of a good in a private market is given by $Q = -2 + P$. However, the production process of this good is damaging the environment. Given the social marginal cost $MC_S = 3 + 2Q$ you have found that the socially optimal quantity (i.e., when taking the externality effect into consideration) of that good is $Q^* = 5$ units. Therefore, a corrective measure against this negative externality is a Pigouvian tax of $t_P = \$1$. *(5 marks)*

   (b) The price of a non-renewable resource will increase over time at a rate equal to the interest rate. *(5 marks)*

   (c) The risk treatment in the benefit-cost analysis assumes risk neutrality. This assumption cannot be justified for large projects. *(5 marks)*

   (d) Contingent valuation methods often suffer from bias. One of the sources of that bias is the tendency of people to state higher WTP than WTA. *(5 marks)*

   (e) Open access resources (*e.g.*, oceanic fisheries) are non-excludable and indivisible, and suffer from over-exploitation. *(5 marks)*