FRE/ECON 374 Problem Set 2
Due: 4PM, Monday, September 29th 2008.

Instructions: a) Your grade on this problem set will be determined by randomly grading a single problem from the set below. It is thus important to do each question carefully. b) Problem sets are to be handed in at the beginning of class. Please do not upload your problem sets in vista. c) Please review the syllabus regarding academic honesty and standards. d) Remember to label and mark all graphs clearly.

1) Using data from the World Bank's World Development Indicators Online answer the following questions using data from the US, Canada and any third world country of your choice.[1]
   a) In the year 1993, how does the number of vehicles per 1,000 people compare between the three countries?
   b) Using data from 1963, 1973, 1983, and 1993, how do CO_2 emissions (in metric tons per capita) vary between the three countries? Are there any patterns or interesting outliers? What could be the cause of any differences?
   c) Look at the % of the population that is urban dwelling. How do these figures compare for the years 1963, 1973, 1983, 1993, and 2003? Which country has the highest rate of increase for this category?

   No solution.

2) A fisherman faces a cost curve of MC = 10 + 4Q in for catching fish measured in thousands and a demand for fish of P = 250- 2Q in cents.
   a) Assume that this is a static problem. Calculate the efficient equilibrium price and quantity and show your response graphically.
   MC= 10 + 4Q, P= 250 - 2Q, which implies that Q= 40, and p= 170. No graph shown in the solution.
   b) What are the net benefits to society?
   The net benefits to society is the area in the triangle formed between the P and MC curve till their point of intersection. The area of a triangle is ½*(length of the triangle* height of the triangle)=(250-10)*40/2=4800.
   c) Briefly explain the difference between static and dynamic efficiency.
   See your class notes. You do not need too much detail, no graphs are necessary, just explain intuitively what the difference is.
   d) Now assume that the problem is dynamic and there is a user cost equal to 100% of the marginal cost of each fish caught. What is the new equilibrium price and quantity?
   The new marginal cost which includes the user cost is: MSC= 20 + 8Q, the price curve is the same. The new quantity is 23, and price is 206.
   e) How do the net benefits differ from part b?

   The new net benefit calculated using the same approach as above is=(250-20)*23/2=2645. The net benefits of use in this period are smaller as there are costs imposed on future generations.

3) A national park is trying to decide what to charge visitors. Park officials know that the willingness to pay is a function of how crowded the park is. Individuals are willing to pay $(36-3N) to go to the park, where N is the number of total visitors in thousands (e.g. If N = 1, this represent 1000 people and each 1 person is willing to pay $33). The marginal cost of providing park services (per person) is a constant $15 and there are no fixed costs.
   a) If the park decides to charge nothing, how many visitors will the park receive this year? What will the total cost be? Is this desirable from a net benefit standpoint?
   Setting p =0, we know we will have the point where 36-3N=0. This implies that the number of people will be N= 12, or 12000 people. The benefits from the people visiting is the area under the

[1] If you cannot find the database look for it in the section for online databases at the UBC library.

willingness to pay curve, a triangle, 36*12/2= 216*1000= 216,000, minus the costs of these people visiting is 12*1000*15=180,000, which will be positive so yes this is desirable from a net benefit standpoint.

b) Now suppose the park decides to charge a price so that the individual willingness to pay equals the marginal cost. What is the equilibrium number of visitors?
Now we set 15= 36-3N, and get N= 7, or 7000 people.

c) Now suppose the park wants to maximize the difference between total willingness to pay and total cost. What is the new equilibrium price and quantity? (Hint: Total willingness to pay is equal to the individual willingness to pay multiplied by the number of visitors = N(36-3N), thus MSB=36-6N). Recall that at equilibrium MSB = MC.) Draw your answer graphically.
As the MSB=36-6N, setting MC=MSB we get 36-6N = 15, which implies that N=21/6 or N=3.5, and 3500 people visit. The equilibrium price for this portion can be calculated by plugging this answer into the individual marginal willingness to pay curve at this quantity, thus P=36-3N=25.5.

d) Finally, suppose that there are positive externalities from people visiting parks. Would the answer to part c) change? What would happen to the price and quantity if the park takes account into the externalities when it set the price in the same way as part c). (Hint: the park maximizes net social benefits [total WTP +externality-cost] but individual WTP is the same as before.

Here we are looking for simple answers, not too much analysis. Yes the answer to part c) changes. Ideally, the quantity should go up as there are positive benefits as well, usually in this case the price goes up as well, but in our case the price will end up going down (as the price is determined off the individual marginal willingness to pay curve). Either answer would be acceptable, as we are looking for whether you understand what happens to prices and quantities when there are positive externalities.