

Assignment #4

Due Friday 10/6/06 by 6 p.m. in the Econ 301-1 slot in the Economics Alcove

Please show the calculations used to arrive at your answers. Draw graphs neatly and label axes and points clearly. In general, leave numbers in fractional form while solving problems. Round final answers to the first decimal place if necessary.

- A. In an isolated mountain village, the only crop is corn. Good harvests alternate with bad harvests: This year the harvest will be 1000 bushels; next year it will be 150 bushels. There is no trade with the outside world. Corn can be stored from one year to the next, but rats will eat 25% of what is stored for a year. The villagers combined have a Cobb-Douglas utility function, $U(C_1, C_2) = C_1 C_2$, where C_1 = consumption this year and C_2 = consumption next year.
- (1) Graph the village's budget constraint.
 - (2) How much corn will the villagers consume this year? How much will the rats eat? How much corn will the villagers consume next year?
 - (3) Suppose a road is built to the village so that now the village is able to trade with the rest of the world. Now the villagers can buy and sell corn at the world price, which is \$1 per bushel. They are also able to borrow and lend money at an interest rate of 10%.
 - a. On your graph from (1), draw the new budget constraint.
 - b. Solve for the amounts that the villagers consume in the first and second periods.
 - (4) Now suppose that there is a transportation cost of \$0.10 per bushel for every bushel of grain hauled into or out of the village.
 - a. On your graph from (1) and (3), draw the new budget constraint.
 - b. How do you think the villagers might modify their behavior relative to (3)?
- B. Assume that residential areas in Middletown have time limit parking, where if a car is parked on the street for longer than two hours, it may be ticketed. Jonah has been parking his car on the street in front of his house. In good weeks, he gets no tickets. In bad weeks, he gets a ticket, which costs \$36. Jonah's utility function is $U = 10 \cdot \sqrt{I}$, where I is his weekly income. His only income source is his job, which pays \$100 a week.
- (1) Assume an 80% chance that it will be a bad week.
 - a. Calculate Jonah's expected income.
 - b. Calculate the variance of his income.
 - c. Calculate his expected utility.
 - d. Calculate what his utility would be if he received the value of income from (a) with certainty. Is Jonah risk-loving, risk-averse, or risk-neutral?

- B. (2) Middletown institutes a parking sticker program. Residents can buy stickers that allow them to park on the street without receiving a ticket.
- If the sticker costs \$10 a week, will Jonah buy one?
 - At what price would Jonah be indifferent about buying the sticker?
- (3) Jonah has a contact at the police station who is willing to tell him each week whether or not the parking regulation will be enforced on his street that week. The situation is otherwise the same as above.
- If the contact is asking \$5 a week for the information, will Jonah buy it?
 - At what price would Jonah be indifferent between buying and not buying the information?
- (4) Assume the money the contact can make selling information on parking regulation enforcement is turned over to the city government, and the information is made available for purchase to all city residents. Would this be a “good” public policy? Discuss this with reference to the desire on the city’s part to maximize income from regulating parking, as well as with reference to other considerations.
- C. The weekly demand of an island community for gallons of heating oil is $Q_D = 5000 - 250P$. The price of oil is set at \$4 per gallon. The domestic supply of oil is fixed at 2000 gallons. An additional quantity of oil is imported, which allows demand to be met at the set price. The community has decided to discontinue importing oil. The town council is choosing between the options of rationing the domestic supply of oil at \$4, or allowing the price to rise to the market-clearing level.
- How much oil is demanded at the set price?
 - At what price would demand equal domestic supply?
 - What would be the weekly change in consumer surplus caused by raising the price to this level (compared to continuing to import)? What would be the weekly change in consumer surplus from running a rationing program (compared to continuing to import)?
 - Draw a graph of the island market for heating oil.
 - Indicate on the graph the area of consumer surplus that would be lost by stopping imports and allowing price to rise freely.
 - Indicate on the same graph the area of consumer surplus that would be lost (the deadweight loss) by initiating a rationing program while keeping the price at \$4.
 - Indicate on the same graph the area of consumer surplus that would be transferred to domestic oil suppliers under the market-clearing price option.
 - Indicate on the same graph the area of consumer surplus that is freed up for consumers to spend on other goods under either option.
 - Indicate which program you, as an outside consultant, would recommend that the community initiate, and explain your choice using sound economic reasoning.
 - Can you think of a better way to reduce the community’s dependence on imported oil? Discuss some possible alternatives.