EC 11. FINAL SPRING TERM 2005

Due 5.00 PM June 10

INSTRUCTIONS:

You have 3 hours to do this exam. You may return the exam to your TA, place it in my mailbox or give it to my secretary Patricia Hamad. The exam is CLOSED BOOK, which also means closed notes and closed homeworks. Do not consult with other students about the exam. The exam will count for 30% of your grade. The are four questions amounting to 100 points. Each question is worth 25 points. If you have any questions please e-mail me at wilkie@hss, or leave a message with by calling 4216. Good luck!
1.] Define and explain the following terms:

(a) Rate of time preference.
(b) Inflation Tax.
(c) Opportunity Cost
(d) Social cost of monopoly.
(e) Pigovian (or Optimal ) Tax

[2.] Consider the market for used cars with two types “Lemons” (cars that are defective) and “Peaches,” (cars with no problems). Assume that a seller knows if a car is a lemon or a peach, but a buyer cannot tell until after the car is purchased. Suppose that the value a peach to a buyer is $3,000 and to the seller is $2,500. The value of a lemon is $2,000 to the buyer and $1,000 to the seller.

(i) Suppose that the probability that a car is a lemon is 2/3. What is the equilibrium price in the market. What proportion of car sales are peaches.

(ii) Suppose now that the probability that car is a lemon is 1/3. What is the equilibrium price in the market. What proportion of car sales are peaches.

(iii) Suppose you graduate Caltech and decide to start a used car lot with the following warranty strategy. You buy used cars at the price of $2,500 and sell them for $3,000 with a warranty, if the car you a lemon you refund the purchase price and then sell the car without warranty at the lemon price. For what range of probability of lemons is this strategy profitable?

[3.] Suppose that demand for widgets is given by \( q_d = 20 - 2p \) and the supply is given by \( q_s(p) = 3p \).

(a) If the government places a $2 tax per unit sold on widget sellers, what happens to the price of widgets? What proportion of the tax is paid by consumers?

(b) If the government places a $2 per unit sales tax paid by the consumer, what happens to the price of widgets? What proportion of the tax is paid by consumers?

(c) Calculate the social cost or deadweight loss of the tax.

(d) Suppose now that widget industry is a monopoly with marginal cost function \( c'(q) = 1/3 \cdot q \) (ie same as above). How does that affect your answers to part (a) and (b) above.

[4.] Suppose that Sheila, a CS major who became dotcom pioneer, has a utility function for wealth, given by \( u(x) = x^{1/2} \). Sheila faces an uncertain prospect for future income. If the dotcom economy recovers she will be worth (in millions) 25 but if does not recover then she will only be worth 9. The chance of a recovery is given at 50%. Sheila, having read the
complete works of John von Neumann, is an expected utility maximizer.

(a) Write down Sheila’s expected utility function.

(b) What is the level of Sheila’s expected wealth. What is the level of Sheila’s expected utility?

(c) Is she risk averse?

(d) Define a risky prospect’s ”certainty equivalent” by the level of wealth that is risk free that gives you the same level of utility as the risky prospect. What is Sheila’s certainty equivalent? [Hint draw the state space diagram and her indifference curve.]

(e) How much would Sheila be willing to pay to fully insure herself against this wealth risk?