Intermediate Microeconomics (Honors)
Fall 1999
Assignment 4

Due Date: October 5
Be sure to show all of your work and clearly indicate your final response to each question

1. An individual with the utility function \( U = \ln(x_1) + x_2 \) initially faces prices \( p_1 = 1 \) and \( p_2 = 1 \) and has income \( I = 10 \). If the price of good 1 changes to 2, determine the size of the substitution effect:
   1. when using a Marshallian compensated demand function.
   2. when using a Hicksian compensated demand function.

2. Argue why it would be the case that the substitution effect is the same whether Marshallian or Hicksian demand functions are used when utility functions are:
   1. linear in goods, i.e., \( U(x_1, x_2) = \alpha x_1 + \beta x_2, \alpha > 0, \beta > 0 \).
   2. fixed coefficients, i.e., \( U(x_1, x_2) = \min[\alpha x_1, \beta x_2] \).

3. Chapter 8, Problems 5 and 6 [Note: The only compensation method used in the book is Hicksian, which holds utility constant, so use that concept only in answering this question.]

4. An individual has preferences represented by the utility function
   \[ U(x, l) = \min[x, l], \]
   where \( x \) denotes a good purchased in the market [with price equal to 1] and \( l \) denotes leisure. The individual’s total time endowment \( T \) is 5, the wage rate is equal to 1, and nonlabor income is equal to 2. Find the individual’s optimal supply of time to the market.

5. Same as question 4 except
   \[ U(x, l) = .75 \ln(x) + .25l. \]