PLCY 788 Micro Theory for Public Policy Analysis
Problem Set 4

This assignment is due in class on Thursday September 28, 2006. Do not hand in solutions to questions 3 and 4. You may work together but should not copy answers verbatim and must hand-in individual assignments. Assignments will not be returned so make a copy of what you turn in.

1. JASJEMMCYC is an enthusiastic student of Public Policy who earns $20,000 per year and spends her entire income on AOG and education. A unit of education costs $500 and she currently consumes 8 units of education.
   a. Show her initial equilibrium on an indifference curve diagram (assume the price of AOG is $1).
   b. Suppose the government provides her with a $250 subsidy for every unit of education she consumer. Show the impact of this policy and her new equilibrium on your diagram. Indicate the amount of money the government spends on JASJEMMCYC under this program.
   c. Now suppose that instead of a per unit subsidy the government gives JASJEMMCYC a cash payment equal to the amount of money spent on her in part (b). Show the result of this program on a diagram, and indicate whether JASJEMMCYC is better or worse off.
   d. Now (instead of the per-unit or lump-sum cash transfer) the government decides to provide JASJEMMCYC with education vouchers equivalent in value to the amount of money spent on JASJEMMCYC in each of the two previous programs. Show this student’s new budget constraint and equilibrium consumption of education. Is she better or worse off under this program compared to the lump-sum transfer? (Hint: It depends.)
   e. If the ultimate objective of the intervention is to increase JASJEMMCYC’s schooling which is the ‘best’ program? If the objective is to increase her welfare at least cost, which is the best policy? Explain.

2. Use the preference ordering \( U(H,B) = H^{2/3} B^{1/3} \) (which you recall from the previous problem sets) to answer the following questions.
   a. Set up the expenditure minimization problem and present the first order conditions.
   b. Solve the system to obtain the Hicksian or compensated demand functions. In what sense are these demand functions ‘compensated’?
   c. Verify that these demand functions are downward sloping (\( \partial h_i / \partial p_i < 0 \)) and that the cross price effects are the same (\( \partial h_b / \partial p_h \neq \partial h_h / \partial p_b \)).
   d. Substitute the compensated demand functions into the objective to obtain the expenditure function. Verify that the expenditure function is homogenous of degree 1 in prices.
   e. Solve the expenditure function in terms of \( U \) (in other words, isolate \( U \)) to get a new function that depends on prices and expenditure (\( M \)). Compare this function to your result in 1(c) of problem set 3. Are they the same (they should be)?

3. An individual can choose between two jobs. The first pays an hourly rate of \( w_1 \) but requires him to work exactly 6 hours per week. The second pays an hourly wage of \( w_2 \) but allows him to work as many hours as he desires (up to maximum time endowment of course). Use income-leisure indifference curve diagrams to illustrate each of the following scenarios.
   a. The individual prefers the first job.
   b. The individual prefers the second job.
   c. The individual is indifferent between the two jobs.

4. An individual earns $6 per hour and works 40 hours per week.
   a. Use an income-leisure diagram to illustrate her current equilibrium position.
   b. Suppose she is offered an overtime wage of $9 per hour for all hours over 40. Show her new choice set and equilibrium position. Depict the income and substitution effects of this ‘price change’. Does she work more or less hours?