WRITTEN PRELIMINARY Ph.D. EXAMINATION

Department of Applied Economics

June 30, 2009

Consumer Behavior and Household Economics

Instructions

• Identify yourself by your code letter, not your name, on each question

• Start each question’s answer at the top of a new page

• You are to answer a total of FOUR questions

• Answer Question #1 (you MUST answer this question)

• Answer THREE of the remaining FIVE questions (question 2 - 6)

• You have four hours to complete the examination
Question 1. All students must answer this question.

1. Consumer Demand and Labor Supply. Consider a two-person household that has the following utility function, defined over the leisure of person 1 \((q_1^0)\), the leisure of person 2 \((q_2^0)\), and an aggregate consumption good \((q)\):

\[
u = (q_1^0 - \gamma_1)^{\beta_1}(q_2^0 - \gamma_2)^{\beta_2}(q - \gamma)^{\beta}
\]

where \(\beta_1 + \beta_2 + \beta = 1\) and \(\beta_1, \beta_2\) and \(\beta\) are all > 0.

a) Let \(\mu = \) nonlabor income, \(\omega_1 = \) wage of person 1, \(\omega_2 = \) wage of person 2, and \(p\) is the price of the aggregate consumption good. The total time available for person 1 is \(T\), and the total time for person 2 is also \(T\). Show the “full” budget constraint for this household. [Hint: Don’t forget that leisure has to be “bought” in the full budget constraint equation.]

b) Derive the Marshallian demands for the composite good and for both types of leisure, using standard constrained optimization methods. For simplicity, express the demands in terms of the value of the amount demanded, that is in terms of \(pq\), \(\omega_1q_1^0\), and \(\omega_2q_2^0\). Near the end please use \(\beta_1 + \beta_2 + \beta = 1\) to simplify your result. [Hint: The functional form of all three demands should be quite similar to the linear expenditure system (LES) demands. Also, this part of the question is the most time consuming, so plan to spend about half of your time on this part.]

c) Now assume that this two person household is a “traditional” family, where person 1 is the husband and person 2 is the wife, and the husband’s wage is higher than the wife’s wage \((\omega_1 > \omega_2)\). Use your answer to b) to show the husband’s labor supply function. Is it possible that his labor supply is “backward bending” in the sense that at some point an increase in the wage will reduce his labor supply?

d) Now consider the labor supply of the wife (person 2). Is her labor supply function more or less likely to be “backward bending” than the labor supply of her husband (person 1)? For convenience (and realism), assume that it is always the case that \(q_1^0 > \gamma_1\) and \(q_2^0 > \gamma_2\). For “fairness” in the utility function, assume that \(\beta_1 = \beta_2\) and \(\gamma_1 = \gamma_2\).
Questions 2 through 6: Answer any three of these five questions

2. Over two-thirds of American adults are overweight or obese, and the proportion is rising rapidly in many other countries. There are serious consequences for health and a major impact on health care costs.

   a) Use each of the following economic concepts to help explain the rise in obesity in the United States:

      i. The opportunity cost of time and the relative price of food versus physical activity/exercise.

      ii. Consumers’ preferences for the sensory versus the health attributes/characteristics of food and the nature of their inter-temporal utility function.

      iii. The impact of technological change on the relative price of food versus physical activity/exercise.

      iv. The impact of the relative price of food service labor versus food ingredients on the size of servings at restaurants.

   b) You have received a million dollar grant to design, conduct, and analyze an economic experiment that will extend over two years and would test the significance of each of the above factors as a cause of obesity. Describe the experiment that you would design involving a control group and an experimental group of subjects.
3. Labor supply and allocation of time.

a) Many studies of labor supply lump together time spent on home production and leisure time as non-market work time. Under what assumptions is it reasonable to combine home production time and leisure time into a composite or aggregate measure? Explain.

b) There has been a significant increase in leisure time (and corresponding declines in market work time and home production time) in the U.S. over the past 40 years. Men with less education, in particular, are consuming higher levels of leisure relative to more highly educated men. Explain this phenomenon using a basic static labor supply model, given that real wages for less educated men have fallen over this time period, while those of highly educated men have risen.

c) In the U.S., the Earned Income Tax Credit (EITC) provides a supplement to the earnings of low-income parents with children. The amount of the supplement varies with the level of earnings, up to a maximum amount. What would you predict to be the effect of an increase in the EITC on the labor supply (labor force participation and work hours) of unmarried mothers with children? Explain.

d) To test your predictions in part c), suppose we have longitudinal data on labor supply before and after an increase in the EITC. What problems arise if we use the mother’s change in EITC benefit before and after the policy change in order to estimate the policy impact? Describe an econometric study to identify the effect of the EITC policy change on the labor supply of unmarried mothers with children. Be sure to explain and defend your identification strategy, including details on the data and variables needed for your study.
4. Intra-household Allocation. This problem is based on the paper by Browning, Bourguignon, Chiappori and Lechene (1994), which shows how one can estimate a sharing rule (or at least a change in the sharing rule) in a two person household.

a) Suppose person A and person B have the following general individual utility functions:

\[ U^i = F[\omega_1 q^A, \omega_2 v(q^A, Q), \omega_3 q^B, \omega_4 v(q^B, Q), \omega_5 Q], \quad i = A, B \]

where \( q^A \) and \( q^B \) are consumption of private goods by persons A and B, \( Q \) is consumption of public goods by the household, and the \( \omega \)'s are parameters. What restrictions on the different \( \omega \)'s (that is, setting some \( \omega \)'s equal to zero) and on the \( F[\quad] \) function yield a unitary household utility function? What restrictions on the different \( \omega \)'s yield caring/nonpaternalistic preferences for each person? What restrictions on the \( \omega \)'s and on the \( F[\quad] \) function yields egotistic/selfish preferences?

b) Consider a “special” case with no public goods (no \( Q \) goods), but there are some private goods (\( q \) goods). Browning et al.(1994) showed that, under certain conditions, the assumption that the household is “efficient” (i.e. that its allocation of goods to persons A and B is Pareto optimal) implies that household expenditure on private goods, \( x \), can be divided into expenditure on private goods for person A (\( x^A \)) and expenditure on private goods for person B (\( x^B \)), so that the household’s optimal \( q^A \) and \( q^B \) are the solutions to an optimization problem where each person uses his or her \( x^i \) to maximize their (sub)utility from private goods. State what assumptions are needed (do not state assumptions that are not needed) and explain intuitively why this is the case.

c) Person A is a woman. She alone (not person B) consumes lettuce. The household’s demand for lettuce is:

\[ \text{Lettuce} = \alpha_0 + \alpha_A' p^A + \alpha_x \ln(x_A) + \varepsilon_A \]

where \( p^A \) is the vector of all prices that affect purchases of lettuce, and \( \varepsilon_A \) is an error term that is uncorrelated with all observed variables. Unfortunately \( x_A \) is not observed, but assume that there is an approximate “sharing rule” that states that \( x_A = x \times p(z, x) \), and \( \ln(p(z, x)) \approx \ln(0.5) + \delta_0 + \gamma' z + \theta \ln(x) \), where the \( z \) variables are household characteristics other than \( x \). You have data on \( p^A, z \) and \( x \). Of all the parameters in the lettuce demand equation and the sharing rule, which can be estimated by estimating the above lettuce equation alone (not jointly estimating it with another equation)? [Hint: In general, if you can estimate some parameter \( \beta \) and also \( \beta \times \mu \), then you can also estimate \( \mu \) by calculating \( \mu = (\beta \times \mu)/\beta \).]

d) Person B is a man. He alone consumes steak. The household’s demand for steak is:

\[ \text{Steak} = \beta_0 + \beta_B' p^B + \beta_x \ln(x_B) + \varepsilon_B \]

where \( p^B \) is all prices that affect purchases of steak, and \( \varepsilon_B \) is an error term that is uncorrelated with all other variables. Again, \( x_B \) is not observed, but there is a “sharing rule” that states that \( x_B = x \times (1 - p(z, x)) \), and \( \ln(1 - p(z, x)) \approx \ln(0.5) - \delta_0 - \gamma' z - \theta \ln(x) \). You have data on \( p^B, z \) and \( x \). If you estimate this together with the Lettuce equation above, what additional parameters from the two equations (if any) can be estimated? [Hint: For simplicity, you can start by assuming that there is only one \( z \) variable.]

a) Discuss the basic specification and purpose of a hedonic price model.

b) Describe the relationship between the hedonic price approach and Lancaster’s technology of consumption (attributes or characteristics) model. Your answer should begin with a brief description of the Lancaster model.

c) Specify a hedonic price model for single-family houses. Discuss the variables which you would include in its specification including those involving not just the house, but its location.

d) Discuss the data you would need to estimate this model for housing.

e) What criticisms can you raise concerning:

   i. Lancaster’s model?

   ii. Hedonic price analysis?
6. Housing Prices. One of the factors in the 2008-2009 recession is a dramatic decline in the value of homes, which affects all home owners and has caused some to owe more on their mortgages than their home is worth. These mortgages are said to be “under water.” Consumers in this situation often stop paying their mortgage payments risking a foreclosure and a loss of their home. Many of these home mortgages were, in fact, foreclosed by banks and people lost the investment in their homes and were forced to move somewhere else.

Prior to 2008 it was rare that house prices fell. Therefore many consumers bought homes with mortgages that cost more than their incomes could afford while counting on home prices to rise so they could gain wealth though the rising asset value of a home and also counting on their incomes to continue to rise.

a) Discuss how consumers “weight” risky outcomes in gain and losses and how this would lead consumers to accept a mortgage that is too large for their current income.

b) How does the weighting scheme in part a) differ from an expected utility model?

c) What is the relevance of a reference point to these decisions?

d) Using prospect theory and behavioral economics, explain why consumers whose home values declined suffered a loss of welfare greater than the gain they had enjoyed over the past 5-10 years as house prices rose.