WRITTEN PRELIMINARY Ph.D. EXAMINATION

Department of Applied Economics
January 26, 2018

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.

• There are SIX questions in this exam.

• You are to answer a total of FOUR questions.

• You MUST answer Question 1.

• You MUST answer EITHER Question 2 OR Question 3, but NOT BOTH.

• You must CHOOSE 2 of the 3 questions from Questions 4, 5 and 6.

• You have four hours to complete the examination.

• Be sure to define all notation you use in your answers.

• Answer all questions you chose to answer completely and succinctly.
REQUIRED

Question 1: Consumer Demand Models

a. Explain the four properties of demand functions.

b. Discuss the significance of the properties of demand functions.

c. Discuss how the economic theory can guide empirical work on consumer demand.

d. Identify specific examples where the economic theory is limited in guiding empirical work on consumer demand.
Question 2: Behavioral Economics

You have to go to gym once next week. You can either do it on Monday (tired), Tuesday (tired), Wednesday (in shape), or Thursday (in shape). You have a present-biased utility function:

\[ U^0 = u_0 + \beta \left( \delta u_1 + \delta^2 u_2 + \ldots + \delta^T u_T \right) \]

The cost is immediate but the reward is delayed. For simplicity, \( \beta = 1/2 \) and \( \delta = 1 \). The utility for an individual with present bias in a period is:

\[ U^t(\tau) = \begin{cases} 
\beta v_t - c_t & \text{if } \tau = t \\
\beta(v_t - c_t) & \text{if } \tau > t 
\end{cases} \]

The rewards for the four periods are \( v = (7.75, 8, 11, 11) \) and the costs for the four periods are \( c = (1, 2.5, 4.5, 8.5) \).

For each scenario below, show how you derive your results and describe the intuition of your results.

a. If you are a time-consistent agent, when would you go to gym?

b. If you are a sophisticate, when would you go to gym?

c. If you are a naïf, when would you go to gym?

Question 3: Rational Choice vs. Behavioral Theories

Compare the following two situations:

Situation A: You go to a store to purchase a new computer that costs $900. When you are waiting for the store staff, a friend comes by and tells you that an identical computer is available five blocks away and the price is $870. You know that the service and reliability of the other store are just as good as this one. Will you walk five blocks to the other store?

Situation B: You go to a store to purchase a new sweater and the price is $50. As you wait for the store staff, a friend comes by and tells you that an identical sweater is available five blocks away for $20. You know that the service and reliability of the other store are just as good as this one. Will you walk five blocks to the other store?

According to Rational Choice Theory, would people's answers differ between the two situations? According to Behavioral Economics Theories, what difference, if any, would you expect? Explain your answer.
**Question 4: Applied Demand Analysis**

In understanding consumer demand for certain food products or category of products, one can frame two questions about household responses. The extensive margin question relates to whether the household consumes the product or not, while the intensive margin question relates to how much of the product the household consumes.

a. Identify an example of each question.

b. Discuss how the economic theory can be applied to answer the respective questions.

c. Discuss the empirical modeling approach to answer the respective questions. Your answer should demonstrate data needs in each case.

d. Discuss things to consider in an empirical application where it is important to address both questions at once.

**Question 5: AIDS Cost Function and Flexibility**

The log cost function for the Almost Ideal Demand System is of the form:

$$\log C(u, p) = a(p) + b(p)u$$

where,

$$a(p) = \alpha_0 + \sum_i \alpha_i \ln p_i + 0.5 \sum_i \sum_j \gamma_{ij} \ln p_i \ln p_j, \quad i, j = 1, \ldots, N$$

$$b(p) = \beta_0 \prod_j p_j^{\beta_j}, \quad j = 1, \ldots, N$$

and where $u$ is utility, $p$ is price, and $N$ is number of goods.

a. Show that this is an appropriate cost function (Hint: you may need to use parameter restrictions implied by the consumer theory).

b. Is this function generated from a utility function that is homothetic? Please show your work?

c. What does it mean for a functional form to be flexible?

d. Show that the AIDS cost function is flexible.
Question 6: Logit Model of Demand

Suppose you were asked to estimate demand for \( J \) products in a system approach. You observe aggregate market shares, price, \( p \), and product characteristics, \( x \), of each product. Assume that consumers have preferences over characteristics and each consumer purchases one of the \( J \) products or an outside option. Denote the utility of individual \( i \) from product \( j \) as:

\[
    u_{ij} = x_j \beta - \alpha p_j + \epsilon_{ij},
\]

where \( \beta \) and \( \alpha \) are parameters to be estimated. Assume that \( \epsilon_{ij} \sim \text{i.i.d.} \) Type I Extreme Value, so that the model is logit. In this model, the predicted market share of product \( j \) is equivalent to the logit probability, and is given as:

\[
    s_j = \frac{\exp(\delta_j)}{\sum_{k=0}^{J} \exp(\delta_k)}
\]

where \( \delta_j = x_j \beta - \alpha p_j \).

a. This specification has been criticized for not providing consistent estimates. What is the econometric problem?

b. What has been the modeling solution to this problem proposed by Berry (1994)? Please describe the method carefully and explain any new notation that you may introduce.

c. This specification has also been criticized for its elasticities not being supported by empirical observations. What are shortcomings of elasticities? Please carefully explain.

d. What has been the modeling solution to the problem in (c)?