WRITTEN PRELIMINARY Ph.D. EXAMINATION

Department of Applied Economics

January 27, 2017

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
REQUIRED

**Question 1: Properties of Demand Functions**

a. Explain the four properties of demand functions.

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

c. Discuss the pros and cons of testing a demand model to see whether these properties hold versus building a model that embodies the properties.

d. When the properties are rejected, what aspects of consumer demand behavior should we turn our attention to?

e. Under what circumstances, if any, would a model violating demand function properties be justified?
Question 2: Behavioral Economics

On February 1, half of the consumers are asked how much they would have to be paid to wait for an extra month for their tax refunds. The other half is asked how much they are willing to pay to have tax refunds come a month early. (Assume that normally tax refunds would come on May 1 and that everyone is getting a refund.)

a. Explain HOW you would expect the answers be different between the two sets of consumers.

b. Explain WHY you would expect the answers be different between the two sets of consumers.

c. What does the difference imply for the discount rate (rate of preference) between the two scenarios? How does the difference violate the assumption of the discounted utility model?

d. What other factors would you expect to influence the answers besides differences in time preference? (Explain why for each factor you name.)

Question 3: Behavioral Bias

Calculate the posterior probabilities using Bayes Theorem for questions a and b, and discuss the potential bias(es) when people evaluate these probabilities (question c).

a. Bag A has 60 black balls and 40 black balls and Bag B has 10 black balls and 90 white balls. I took two balls from one bag (with replacement). Both are black. How likely is bag A being used?

b. Bag A has 51 black balls and 49 black balls and Bag B has 49 black balls and 51 white balls. I took two balls from one bag (with replacement). Both are black. How likely is bag A being used?

c. What of bias(es) people tend to make in evaluating these posterior probabilities? What factors would affect the size of the bias(es)?
ANSWER TWO FROM THE FOLLOWING THREE

Question 4: Application of Demand and Choice Analysis

Suppose you are involved in a research project examining high school graduates’ demand for colleges and universities.

a. The two basic approaches are demand analysis and choice analysis. Outline the two approaches, focusing on the difference in data needs.

b. Random utility theory serves as the theoretical foundation for choice analysis. Succinctly describe the model.

c. Come up with an example pertaining to this research project to illustrate the implications of the Independence of Irrelevant Alternative (IIA) property.

d. Suggest a model that would not be subject to the IIA property. Discuss the implied assumptions about the utilities and choice probabilities for these alternatives.

e. Discuss ways to incorporate heterogeneity of preferences in the analysis.

Question 5: Cost of Living Index

The Cost of Living Index (COLI) measures changes in minimum expenditure of achieving a particular level of utility given period $t$ prices compared to minimum expenditure of achieving the same level of utility given base period prices. Formally, it is defined as:

$$ COLI = \frac{e(u,p_t)}{e(u,p_0)}, $$

where $e(u,p)$ is the minimum expenditure required to obtain the utility level $u$ given prices $p$.

a. Discuss the empirical problems associated with calculating COLI.

b. Show that if the expenditure function is generated by a homothetic utility function then COLI depends only on prices.

c. Stone Price Index in the case of two goods $(q_1, q_2)$ is given as: $lnP = w_1 ln p_1 + w_2 ln p_2$, where $w$ denote budget share and $p$ is price. Show that the Stone Price Index is exact to the Cobb Douglas utility function.

d. How do Cost of Goods Indexes relate to COLI?
e. Show that under the assumptions of cost minimizing behavior and homothetic preferences Laspeyres (base period) and Paasche (current period) indexes are upper and lower bounds of COLI, respectively.

**Question 6: Excise Tax in a Differentiated Product Market**

Suppose that there are $F$ firms each producing a subset, $\gamma_f$, of the $J$ different brands in a market. Let $p_j, c_j, s_j$ denote price, marginal cost, and market share of brand $j$.

a. Assuming that firms compete in prices, set up a representative firm's profit maximization problem, and derive and interpret the first order conditions. Be sure to define any new notation that you may introduce.

Suppose that the government is considering imposing a ten-percent excise tax on all products in the market. You are hired as an advisor to evaluate the impact of the tax on prices and total consumption. To do this, you seek to develop and estimate a structural econometric model that allows measuring the impact of the tax while accounting for the firm’s competition. Suppose that your data include aggregate market shares, price, and product characteristics of a panel of brands for $T$ periods.

b. Carefully develop a random utility model of demand for estimation that explicitly accounts for consumer heterogeneity. Be sure to describe all the underlying assumptions of your model and define any new notation that you may introduce.

c. What are the potential sources of endogeneity in your econometric model?

d. Discuss how you would address the endogeneity problem in your estimation using the control function approach. Carefully describe any instruments that you may use in your estimation. What is the underlying identifying assumption(s) for your instruments?

e. Suppose you obtained estimates of all model parameters. Carefully explain how you would simulate the economic impacts of the excise tax.