Market and Information Economics
Preliminary Examination

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June 2020

Instructions: This examination consists of six questions. <u>You must answer the first question</u> and you must answer <u>four of the remaining five</u> questions (i.e. answer four of the questions numbered 2-6). Each question answered (five in total) has a weight of 20% in the final examination score. Please read through the entire examination before making a decision on the particular set of five questions you actually answer. The examination proctor will review the content of the exam at the beginning of the time period (9:00 am). He or she will answer general questions for the entire set of students writing this prelim. You have until 1:15 pm to complete the exam. Good Luck!

You Must Answer this Question

1. Every night, all 60 inhabitants of a tiny village visit one of the village's two taverns (not necessarily the same tavern) and an average of 10 strangers do the same. Both the villagers and the strangers are willing to pay up to $3 for a drink, and no one ever buys more than one. But, whereas the strangers pick either of the taverns at random, the villagers compare prices and go where the drinks are cheapest. Suppose the market is in free-entry equilibrium and each tavern's costs of providing q drinks a night are $C(q) = 36.75 + 0.1q + 0.03q^2$.

   (a) What do the taverns charge for a drink?

   (b) What happens if the village suddenly becomes a tourist attraction and an average of 75 strangers visit every night?

Answer four of the following five questions

2. As an employee in the marketing division of Jack Daniels, Inc., a key manufacturer of liquor, you have been asked to construct a table of Marshallian and Hicksian demand elasticities for beer, liquor, and wine. From previous work, the Marshallian own-price elasticity for beer is -1.5, the Marshallian cross-price elasticity of demand for beer with respect to liquor is 0.35, and the Marshallian cross-price elasticity of wine with respect to liquor is 0.4. In addition, based on recent marketing intelligence, the budget share for beer is 0.5; for wine 0.2; and for liquor 0.3.

   (a) Assuming that the total expenditure elasticity is the same for beer, liquor, and wine, use the restrictions from demand theory to construct estimates of the Marshallian and Hicksian demand elasticity matrices.

   (b) Are the respective alcoholic beverages substitutes, complements, or independent? Explain.

   (c) Does the negativity condition hold? Explain.

3. Explain the difference between a logit, a conditional logit and a mixed logit model. Please explain differences in the model formulation and in the framework of data analysis, i.e. for the same dataset, what are the assumptions of each model?

4. Suppose that you wish to investigate the demand for food away from home for fast food restaurants. You have access to a cross-sectional data set for calendar year 2019, wherein the data correspond to expenditures made at fast-food restaurants, a host of demographic variables and household income for 2,000 households located in the United States.

   (a) Specify a particular expenditure function for food away from home from fast-food restaurants, taking into account a potential nonlinear relationship between expenditures and income. Also calculate the concomitant expression for the income elasticity.

   (b) Specify and justify the set of demographic variables that you would entertain in the model specification. Describe how to augment the model specification given in (a) to address demographics.

   (c) You wish to investigate the effects of time on the demand for food away from home from fast-food restaurants. Describe the appropriate methodology to handle this issue.

   (d) How would you verify that your data set is representative of households located within the United States?

   (e) Suppose that 1,600 of the sample of 2,000 households record non-zero expenditures associated with food away from home for fast-food restaurants. Explain how you would handle the estimation of the model given this additional information about the data.

5. In the following system of three equations x_i and z_i are scalars and ε_i, u_i and v_i are all independent draws from a N(0,1) distribution, $i=1,2, ..., n$.

$$y_i = x_i\beta + \varepsilon_i$$
$$x_i = w\varepsilon_i + u_i$$
$$z_i = \mu u_i + v_i$$

(a) Why x is an endogenous variable?

(b) Show that $plim(\hat{\beta}_{OLS}) = \beta + \dfrac{w}{w^2+1}$

(c) Show that $Corr^2(x,z) = \dfrac{\mu^2}{(w^2+1)(\mu^2+1)}$

(d) Under what conditions, in addition to those already given, will z be a valid instrument? When we can consider z as a weak instrument?

(e) The asymptotic distribution of the IV estimator is given by:

$$\sqrt{n}(\hat{\beta}_{IV} - \beta) \rightarrow N[E(z'x)^{-1}E(z'z)E(x'z)^{-1}].$$

Given the system of three equations above, provide the expression for the variance as a function of the parameters of the model.

6. The Dannon Company supports research to analyze the structure of consumer demand for yogurt in the United States. Specifically, as part of competitive intelligence, Dannon expresses interest in brands of particular categories of yogurt, not only Dannon but also Chobani, Yoplait, and store brands (private label brands of yogurt like HEB or Kroger). In order to obtain research funds, Dannon requires a formal research proposal. In such a proposal, you are specifically to do the following:

   (a) Develop and justify a theoretical model to analyze the consumer demand of the aforementioned yogurt brands.

   (b) Describe the data that you would use in this investigation.

   (c) Describe the estimation procedure to carry out the empirical work.

   (d) Describe the usefulness of the information gleaned from the analysis.