Market and Information Economics
Preliminary Examination
Department of Agricultural Economics
Texas A&M University

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Instructions: This examination consists of seven questions. You must answer the first question and you must answer four of the remaining six questions (i.e. you must answer four of the questions numbered 2-7). 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 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!
1. In agricultural markets spatial monopsonies can arise. For example, farm production and procurement for processing of canning tomatoes might be characterized by monosony market power. In answering the questions below consider the canning tomato industry when developing your answers. Production of canning tomatoes requires inputs of labor, land and machinery, and purchased materials. Production of processed canned tomatoes requires inputs of canning tomatoes, labor, capital, energy, and other purchased materials.

a) (2 points) Discuss factors that can lead to markets characterized by a small number of purchasers (processors like tomatoes canners) of an input within a regional market area.

b) (5 points) Suppose you are trying to determine the extent of a regional market for canning tomatoes. Develop two different tests to determine if transactions at three different locations are within the same market area. In answering this question be sure to define all terms and discuss data needs, estimation procedures, and how you would interpret the results.

c) (2 points) Often when researchers find evidence that prices in two different regions are cointegrated, they conclude that markets are competitive. Is this conclusion correct? Explain why or why not.

d) (11 points) Suppose you determine from (b) that transactions at different locations are in different market areas. Set up and discuss a specific test procedure to determine if tomato processors in a specific market are actually exerting monopsony market power in procuring canning tomatoes. In answering this question be sure to: 1) develop specific estimating equations including specific functional forms; 2) show how those equations incorporate or can be tested for standard conditions to required for profit maximization; 3) define all terms and discuss; 4) discuss data needs and estimation procedures to obtain results; and 5) how you would interpret the results.
ANSWER FOUR OF THE FOLLOWING SIX QUESTIONS.

2. You are hired as a consultant to develop an incentive contract for a new coffee shop. The firm (principal) wants to hire a manager (agent) for the new shop. The principal cannot directly observe the agent's effort but the agent's action affects the firm's profit in a probabilistic way. Both the principal and agent can observe the firm's profit.

If the manager exerts high effort $e^H$:
\[
\begin{aligned}
\pi^G &= 10 \text{ with probability } \frac{3}{4} = p^H \\
\pi^B &= 5 \text{ with probability } \frac{1}{4} = (1 - p^H)
\end{aligned}
\]

If the manager exerts low effort $e^L$:
\[
\begin{aligned}
\pi^G &= 10 \text{ with probability } \frac{1}{4} = p^L \\
\pi^B &= 5 \text{ with probability } \frac{3}{4} = (1 - p^L)
\end{aligned}
\]

Where $\pi^G$ is the principal’s profit when the outcome is good, $\pi^B$ is the principal’s profit when the outcome is bad, $p^H$ is the probability of good profit when the agent’s effort is high, and $p^L$ is the probability of good profit when the agent’s effort is low. Assume the agent's disutility (cost) of effort is $e^H = 2$ and $e^L = 1$.

The agent's utility is given by: $U = 2y^{1/2} - e$, where $y$ is income or the principal's payment to the agent. The agent’s next best alternative employment opportunity provides him with reservation utility $\bar{U} = 0$.

a) (5 points) What is the full-information contract? Provide an intuitive explanation for your results.

b) (2.5 points) Suppose the firm cannot observe the agent’s effort level. Explain and show mathematically why the full information contract is not incentive compatible.

c) (10 points) Find the optimal incentive-compatible contract. Provide an intuitive explanation for your results.

d) (2.5 points) What is the expected income for the firm (Principal) under full and asymmetric information? Explain why is the principal worse off under asymmetric information?
3. A) Consider the following the graph that generates variables on Coke Sales at a supermarket as a function of Coke Price, Pepsi Price, an Unobserved Latent Variable called Consumer Preferences, and Consumer Income. Answer parts I.A and I.B with respect to economic science on observational data.

\[ \frac{\partial (\text{COKE-SALES})}{\partial (\text{PEPSI-PRICE})} \]

i. Specify an equation to obtain unbiased estimates of \( \hat{\partial} (\text{COKE-SALES}) / \hat{\partial} (\text{PEPSI-PRICE}) \) via ordinary least squares regression.

ii. Specify an equation to obtain unbiased estimates of \( \hat{\partial} (\text{COKE-SALES}) / \hat{\partial} (\text{COKE-PRICE}) \) via ordinary least squares regression.

iii. What role do consumer preferences play in your estimating equation? Do we need an explicit measure of this variable to find unbiased parameter estimates for the partial derivatives in parts i and ii? If so how do we proceed?

3. B) Consider a possibly more general model that considers the state of the economy (recession versus expansion) as affecting Coke and Pepsi pricing and consumer incomes. Further, consider the representation of preferences by the proxy (observable variable) coke/pepsi advertising (dollar) ratio.

\[ \frac{\partial (\text{COKE-SALES})}{\partial (\text{PEPSI-PRICE})} \]

i. Specify an equation to obtain unbiased estimates of \( \hat{\partial} (\text{COKE-SALES}) / \hat{\partial} (\text{PEPSI-PRICE}) \) via ordinary least squares regression.

ii. Specify an equation to obtain unbiased estimates \( \hat{\partial} (\text{COKE-SALES}) / \hat{\partial} (\text{COKE-PRICE}) \) via ordinary least squares regression.
You have been asked by the US government to study the effect of media accounts (newspapers, television, etc.) of H1N1, which was labeled “swine flu” in its early stages (April 2009) on US hog prices. Use prior theory and your understanding of econometrics to design a study to measure
\[ \frac{\partial \text{(Hog Price)}}{\partial \text{(Media Accounts of H1N1)}}. \]

i. What variables will you attempt to find measures? Why these variables?

ii. What estimation techniques will you suggest for use? Why? Justify these.

iii. What evidence will you report to convince US governmental officials that your estimate of \[ \frac{\partial \text{(Hog Price)}}{\partial \text{(Media Accounts of H1N1)}} \] is indeed the best available?
5. In a Vickrey auction or second price auction, the winner (the highest bidder) pays the second highest bid. Under the assumptions: (i) independent private value paradigm (IPVP); (ii) risk neutral bidders; (iii) no reserve price, one can show that the optimal bidding strategy is to bid one’s true value.

Consider a variant of the Vickrey auction in which the winner pays the average of the his own bid and the second highest bid. Derive the optimal bidding strategy in this auction under the same set of assumptions as above. Also assume that there are \( n \) bidders, \( n \geq 2 \).
6. Consider the classical labor economic problem in which one is to estimate the causal effect of a training program on people’s wage rates. Suppose one observes a sample which includes individual wage rate, training record (whether one obtained the training) and other potentially relevant social economic attributes.

i. Under what conditions a simple linear regression of wage rate of training record and other covariates produces consistent result on the effect of the training program in question?

ii. If the above conditions are not met, one can use an instrumental variable approach to obtain consistent results. Under what criteria an instrumental variable is valid in this case?

iii. Good instrumental variables are often difficult to find. Can you propose an alternative approach to estimate the causal effect of the training program in question 6. Explain carefully what conditions are required such that the proposed method works.
7. System of demand functions involve the $n$ demand equations

$$q_j = q_j(p_1, p_2, \ldots, p_n, I, u_j), \quad j = 1, 2, \ldots, n,$$

where $u_j$ is the disturbance term, the variables $q_1, q_2, \ldots, q_n$, the quantities consumed of each of the goods, are typically treated as endogenous variables, while the variables $p_1, p_2, \ldots, p_n$, the prices of each of the goods, and $I$, the income, are typically treated as exogenous variables.

i. Various functional forms have been employed in estimating the system above. List at least two of the widely used functional forms, explain their properties and discuss reasons they are widely used.

ii. One of the issues in empirical work on household demand is aggregation over consumers. Define exact aggregation and discuss the conditions and their implication, under which exact aggregation will hold.

iii. There are two ways in which the problem of aggregation over commodities can be addressed in empirical work. Compare and contrast the advantages and disadvantages of these approaches.