

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

**Winter 2014**

Instructions: This examination consists of five questions. **You must answer the first question** and you must answer **three of the remaining four** questions (i.e. you must answer three of the questions numbered 2-5). Each question answered (four in total) has a weight of 25% in the final examination score. Please read through the entire examination before making a decision on the particular set of four questions you actually answer. The examination proctor will review the content of the exam at the beginning of the time period (9:00 am). She/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. Shepard's 1991 study exploits a natural experiment in which firms differ in the ability to price discriminate but not in the cost of production. In particular, the paper compares the price differential between full-service and self-service gasoline at stations offering both service types (multiproduct stations) with the price differential across stations offering only full-service and stations offering only self-service (single-product stations). Suppose each consumer buys no more than one unit of gasoline per period and has a utility function separable in income and gasoline consumption. Preferences is represented by

$$u = \begin{cases} V(g)(t - p_g) & \text{if she consumes one unit of service level } g \\ V(0)t & \text{if she does not purchase,} \end{cases}$$

where  $p_g$  is the price of service level  $g$ ,  $V$  is an increasing function with  $V(0) > 0$ , and  $t$  is the consumer's type. Type is assumed to be uniformly distributed on  $[0, 1]$ , with higher values of  $t$  corresponding higher levels of income.

- a) Suppose there is only one service level  $g$ , calculate the demand for the service.
- b) Now suppose there are two service levels, full service ( $f$ ) and self-service ( $s$ ) with  $f > s > 0$ . Calculate the demand for each service level.
- c) Price dispersion unrelated to price discrimination can arise if peak-load pricing is an equilibrium strategy. Suppose you are provided with Shepard's data of retail prices and characteristics for all 1,527 stations in eastern Massachusetts over a 12-week period. Data on station, ancillary services, gasoline brand, station capacity, and service level (full or self or both) are included. Full-service and self-service prices are reported for each gasoline grade. The data contain no direct cost information, but do contain information on scale and product mix that might suggest cost differences. Discuss how you would test the price discrimination hypothesis against the peak-loading pricing hypothesis. If you need to make additional assumptions, make sure you note them.

2. The minimum wage of Texas was \$5.15 in year 2007, \$5.85 in 2008, \$6.55 in 2009, and has been \$7.25 since 2010. The minimum wage of Arkansas remains at \$6.25 between 2007 and 2013.
  - a. Propose a strategy to estimate the impact of changes in minimum wage laws on the lower end of wage distribution. Provide necessary steps to implement your method.
  - b. Although minimum wage raises the wage of entry level workers, it may have the undesirable effect of increasing unemployment rate since workers become more expensive under minimum wage hikes. Propose a strategy to estimate the impact of changes in minimum wage laws on the level of unemployment of low income workers. Provide necessary steps to implement your method.

3. The propensity score method and matching method are commonly used in program evaluations.
  - a. Explain under what conditions these two methods identify the average treatment effect.
  - b. What are the main different differences between these two approaches.
  - c. The approach of instrumental (IV) variables is another popular method for causal inferences. What are the main advantages on the propensity score method and matching method over the IV approach?
  - d. In principle, the propensity score method and matching method can be implemented without instrumental variables. What assumption(s) do you need in this case to identify the average treatment effect?

4. Consider the vector of  $m$  covariance stationary series observed over time  $X_t$ ,  $t = 0, 1, \dots, T$ . Suppose one wants to model these data as a vector autoregression (VAR). Answer the following:

- a. What is a vector autoregression?
- b. Discuss at least two methods for determining lag length in the VAR.
- c. Discuss methods for estimating the unknown parameters of the VAR.
- d. Contemporaneous correlation among error (innovation) terms of the VAR has been a contentious problem in VAR modeling. Discuss at least two ways one can proceed to address this problem.
- e. Given an estimated VAR, specified and estimated using answers in parts b, c, and d, one can present the output of a VAR to inform an economic analyst as to the dynamic properties holding the  $m$  series together in several ways? Be specific on the uses of at three different ways of communicating VAR results to model users.

5. In April of 2009 an outbreak of flu in Mexico was labeled by the popular press as “Swine Flu”. This label was subsequently revised in the following month to “2009 H1N1” by the World Health Organization. Hog producers in the U.S. suggest that the initial label of “swine flu” had a deleterious effect on hog prices. In particular they cite the April 2009 drop in the nearby futures price of lean hogs of 15% as evidence confirming these negative effects. You have been asked by the USDA to design an economic study to confirm or refute the hog producers’ claim.

Design a study to address the USDA request. Include in your design an initial theoretical model to isolate possible effects of the label “Swine Flu”. Discuss as well, an econometric specification and data required to estimate possible magnitudes of this labeling.