

University of California, Davis  
Department of Economics  
**Labor Economics**

Date: June 27, 2008  
Time: 3 hours  
Reading Time: 20 minutes

**PRELIMINARY EXAMINATION FOR THE Ph.D. DEGREE**

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**Answer ANY 4 of the following 5 questions.**

**Q1.** Consider the following empirical relationship, designed to capture the relationship between the log of labor supply (hours per year) and the log of the hourly wage (calculated as total earnings per year divided by total hours worked per year). Assume that there is no measurement error in total hours worked. Also assume that the estimation is for a population of prime-age males so that sample selection bias is not a concern.

$$\ln h_{it} = \alpha_0 + \alpha_1 \ln w_{it} + \alpha_2 y_{it} + \gamma X_{it} + \varepsilon_{it}$$

Other included variables are non-wage income,  $y$ , and additional controls  $X$ .

- a. Describe how the estimated parameters (or which combinations of them) could be used to produce estimates of the compensated wage elasticity of labor supply, the uncompensated wage elasticity of labor supply, and the income elasticity of labor supply. What is the predicted sign of each of these? What additional controls are typically included in  $X$  and what is the conceptual reason for including them?
- b. Briefly discuss any expected source(s) of bias from OLS estimation of the above empirical specification, taking into account the assumptions stated above.
- c. Suppose that non-wage income in the estimating equation above is replaced with a measure of annual consumption. How does this change the nature of the relationship between labor supply and wages that is being estimated and why? Be specific about the role of consumption given the underlying standard model of consumer choice.
- d. In Altonji's (1986) study of labor supply, he assumes that individuals are able to forecast year-to-year changes in their wage levels. Why is this assumption important to his analysis? If this assumption is not correct, does he expect his estimated elasticities to be biased towards or away from zero? Why?

**Q2.** You are interested in measuring the impact of an early-childhood intervention. A child is eligible for the treatment if they are ages 3-5 and if their family income is below a pre-defined multiple of the poverty line (this multiple varies by state: sometimes it is 100% of the poverty line, sometimes 133%, sometimes 150%). You have a dataset comprised of a nationally representative sample of 20,000 households with children of the right age to have been exposed to the program. Your dataset contains information on family conditions for the child throughout the child's youth (family demographic composition, parental education, occupation, and income (both at child's ages 3-5 and later), child sex, child birthweight, child's outcomes later in life (test scores, grade progression), and geographic location throughout life.

Your colleagues propose four different identification strategies. For **each** strategy, provide the following:

- (1) How would you implement this strategy? Be as specific as possible. Identify what specifications you would run, and what estimates you would use to get at the question.
- (2) What are the strengths and weaknesses of this strategy?
- (3) What critical assumptions are needed for this strategy to correctly measure the causal impact of interest?
- (4) Cite 1-2 papers in literature that utilize a similar empirical strategy, and briefly describe the context of those papers (key LHS and RHS variables, etc).

- Strategy #1: OLS regression with control variables.

- Strategy #2: Propensity score estimation with control variables.
- Strategy #3: Instrumental Variables strategy based on the fact that different states have different income qualifying thresholds.
- Strategy #4: Regression Discontinuity strategy based on the fact that you are only eligible for the treatment if your income is at or below your state's income threshold.

**Q3.** Richard Freeman (1979) uses the entry of the baby-boom cohort into the labor market as a natural experiment to estimate the elasticity of demand for different types of labor.

- Freeman estimates an elasticity of complementarity between older and younger men of approximately  $-.25$ . What does this tell us about the responsiveness of older men's wages to the influx of younger workers into the labor market? What other information about worker prices and/or quantities is needed to calculate the desired wage elasticities (the elasticity of the wage with respect to a change in quantity of labor supplied)?
- In motivating his focus on younger and older men, Freeman shows that, while earnings of older men increased sharply relative to the earnings of younger men during this period, there was no similar pattern for women's earnings. Provide at least two possible explanations for this lack of change in relative earnings for women (assuming the baby boom produced as many women as men).
- As the baby boom cohort retires from the labor force, the ratio of older to younger workers will decline substantially. Describe an empirical strategy that could make use of this change in relative labor supply to estimate the demand elasticity of the wages of experienced workers with respect to changes in the quantities of more and less experienced workers. How, if at all, would a relationship between individual retirement decisions and individual wages affect the validity of your study design?

**Q4.** A study by Bound and Turner (2002) investigates the potential effect of the World War II G.I. Bill on men's educational attainment. The study uses data from the 1970 Census. The Census data includes information on race, gender, year and quarter of birth, veteran status, schooling level, employment and earnings. G.I. benefits were only available to WWII veterans.

- One way of estimating the effects of the G.I. Bill would be to compare the educational attainment of veterans to the educational attainment of non-veterans. Why would this approach be less than ideal?
- Describe how you (or Bound and Turner) might construct an estimate of the effect of the WWII G.I. Bill on men's schooling levels. Be sure to include the following elements in your discussion:
  - The population of individuals to be included in the analysis, and why that particular population is chosen
  - The basic regression equation, including the key variables of interest and the important control variables
  - A brief description of the identification strategy
- Briefly discuss the pros and cons of the identification strategy you describe in part (b). What are its main strengths and main weaknesses?
- What do Bound and Turner conclude about the effects of the G.I. Bill? Should we expect the effects to be the same for men and women? Should we expect the effects to be the same for blacks and whites? Explain your answer.

- e. In what ways can an analysis of the G.I. Bill provide us with information about the likely effectiveness of current education policies? Which existing policies would an analysis of the G.I. Bill be most likely to shed light on?

**Q5.** An enduring (and still largely unanswered) question in labor economics is how much of the correlation between family background characteristics and children's long-run outcomes reflects "nature" vs. "nurture." In other words, to what extent are children's outcomes determined by their genetic inheritance and to what extent are they determined by their environment? One family background characteristic that has received particular attention is parental education. Researchers have tried to obtain estimates of the causal effect of parental education using the following approaches

- Comparing the outcomes of cousins, whose mothers were identical twins, but obtained different levels of education
- Comparing the outcomes of siblings, whose mother changed her level of education between births
- Comparing the outcomes of children whose parents were subject to different compulsory schooling laws because of the state and year in which they were born
- Comparing the outcomes of children whose mothers birthdays fall on either side of the school entry cutoff date
- Comparing the outcomes of adopted children who were randomly placed in households in which the parents had different levels of education
- Comparing the estimated coefficient on parental education for biological child-parent pairs to the estimated coefficient on parental education for adopted child-parent pairs

- a. Briefly describe why running a simple OLS regression of a particular child outcome,  $Y$ , on parental education (along with additional family background controls) might yield a biased estimate of the causal effect of parental education on  $Y$ .
- b. Discuss the pros and cons of each of the alternative estimation approaches above. How do each of the different estimation approaches get around the problem described in (a)? Might any of the approaches described above make the problems in (a) worse? Explain your answer.
- c. Are some of these approaches better than others? Explain why or why not.