Written Preliminary Ph.D. Examination

Graduate Program in Applied Economics
January 30, 2015

Labor Economics

Instructions

• Answer a total of FOUR out of the six questions.

• Identify yourself by code letter, not name, on all pages.

• Start each answer at the top of a new page.

• Number the pages of your answers.

• You have four hours to complete the examination.

• This is a closed book exam. No notes, articles, books or other sources may be used other than the article provided to you for Question 5.
**Question 1: Intertemporal labor supply**

a. Write out a general utility maximization model for an intertemporal labor supply decision (including the objective function and the constraints). Define all terms. Explain the major assumptions about the lifetime utility function. What does intertemporal separability imply about the labor supply decision in a lifecycle framework and for the first-order condition for optimization? (You don’t need to solve for first order conditions, just explain in words what the key condition is for an interior solution assuming intertemporal substitutability.)

b. Describe one or more empirical studies that have attempted to estimate the labor supply function for men using the life-cycle perspective (e.g., the Frisch labor supply function). Discuss the key parameter of interest, the estimation strategy and the key results.

c. The standard neoclassical intertemporal labor supply model predicts that workers who can choose their hours of work will work more during time periods when wages are higher, all else equal. Yet a number of studies find some workers “quitting early” on good days, that is, working fewer hours when returns to work are higher than usual. Discuss one study that estimates the intertemporal labor supply elasticity in an alternative model, such as a stopping rule or income target model (briefly describe the study hypothesis, methods and findings).
Question 2: Unemployment duration and unemployment insurance benefits

a. Studies of the duration of unemployment typically estimate the hazard rate of leaving unemployment (i.e., finding a job). Define and explain what is a hazard rate or hazard function in this context. Based on models of job search, what would you predict to be the shape of the hazard function for an unemployed worker -- does the hazard stay constant, increase or decrease with the length of the unemployment spell? Describe and compare two theoretical models and their predictions about the unemployed worker’s hazard function. (For example, discuss how a social network model contrasts with a model of unobserved heterogeneity.)

b. In the U.S., unemployed workers may be eligible for unemployment benefits, which expire after a set period of time (such as 13 or 26 weeks). Based on models of job search, what would you predict to be the shape of the hazard function for an unemployed worker who is eligible to receive unemployment benefits for 13 weeks? Explain. What does the empirical evidence show? Discuss.

c. Describe and discuss at least two difficulties in empirical studies of the effect of unemployment insurance benefit exhaustion on the length of unemployment spells.
Question 3: Estimating returns to human capital

a. Describe the basic Mincerian earnings equation and explain the rationale for the regressors and the economic (not econometric) rationale for the functional form.

b. In the introduction to one of his papers, Joseph Altonji says,

   There are two main channels through which a spurious correlation between education and wages might arise. First, family background, primary and secondary school quality, and ability might affect both postsecondary schooling and the wage level independent of postsecondary schooling. Second, family background, ability, and primary and secondary school characteristics may affect the rate at which students learn.

   The quotation refers to identifying the causal effects of education. Explain four distinct econometric approaches that have been used to try to identify the causal effect. What do they accomplish and what are their respective weaknesses?

c. The presence of “sheepskin” effects in augmented Mincerian equations has been cited as evidence that the return to education does not represent a return to human capital. What are sheepskin effects, and what is this argument? Give a counter-argument.
Question 4: Detecting monopsony in the labor market

In a recent *Review of Economics and Statistics* paper, Jordan Matsudaira studied whether the labor market for nurse aides in California long-term care facilities (nursing homes) can be characterized by monopsony. He bases his study on regulatory data from all 1030 facilities in the state.

a. Matsudaira says, “The elasticity of labor supply cannot be consistently estimated without a valid instrument for either firm-specific wages or employment.” Explain what specific labor supply elasticity he would be concerned with (given that he is interested in monopsony), the importance of estimating the elasticity in testing for monopsony, and why an instrument is needed. (The latter is not a generic econometric question, but relates directly to monopsony.)

b. Matsudaira uses a policy change that affects staffing at some facilities, but not others as an instrument for employment. Thus he regresses the change (from before the policy change to after) in the log-wage at facility $i$ in county $r$ on the change in log-employment ($\Delta n_{ir}$), and variables capturing employment conditions in the county ($\theta_r$):

$$\Delta w_{ir} = \beta_1 \Delta n_{ir} + \Delta \theta_r + \Delta \varepsilon_{ir}$$

He tests the null hypothesis that $\beta_1 = 0$. Why? The relevant coefficient turned out to be about $-0.04$ with a standard error of about 0.05. What should be (and is) his overall conclusion about monopsony? (Be careful about interpreting the test results.)

c. The monopsony literature distinguishes between information and search-induced monopsony. Matsudaira does not take a position on why one might expect monopsony in the market for nurse aides at long-term care facilities. Why might there be monopsony in this market? Does your reason suggest a threat to Matsudaira’s identification strategy?
Question 5: “Increasing complementarity between cognitive and social skills”

This question concerns the paper by Catherine Weinberger distributed in advance of the exam. A copy has been provided, which you may consult during the exam. Weinberger (2014) interprets the empirical evidence as increasing complementarity between cognitive and social skills.

a. Please describe succinctly the primary evidence that leads to this conclusion. What is the research design? What is the key empirical finding that suggests increasing complementarity? You may refer to specific parts of the paper.

b. Summarize the relationship between the econometric specifications used in this paper with the basic Mincerian approach. First describe the Mincerian model unless you have answered question 3.

c. Is “increasing complementarity” a story of changing demand or changing supply? Please describe an alternative explanation, aside from increasing complementarity, for the primary empirical finding that the paper investigates and describe the evidence the paper reports against the alternative interpretation.

d. Discuss the (omitted) role of family socioeconomic status in this study.
Question 6: Human Capital Production Functions

a. A recent model of human capital formation by Cunha and Heckman allows for two periods in childhood during which human capital investments can be made:

\[ h = m(\theta_0, [\gamma I_1^\phi + (1 - \gamma) I_2^{1/\phi}]) \]

where \( \phi \leq 1 \) and \( 0 \leq \gamma \leq 1 \)

- \( h \) = human capital output
- \( m \) = production function of human capital at the end of the second time period of childhood
- \( I_1 \) and \( I_2 \) are investments (inputs) in each time period
- \( \theta_0 \) = initial endowment of human capital

Discuss what their model predicts about human capital production over time given different assumptions about \( \gamma \) and \( \phi \) and different functional forms. What are three key empirical observations their model can explain?

b. Consider the possible property of intertemporal complementarity in the production function. Describe what this means substantively. How do you express the property of intertemporal complementarity as a derivative of the production function?

c. If (i) initial endowments of human capital and human capital investments are complements in production, (ii) one's children's human capital levels are perfect complements in parental tastes, (iii) twin A was revealed at birth to have a higher endowment than twin B, and (iv) endowment has a positive marginal effect on human capital, would the twins' parent optimally choose higher levels of investment in A, higher levels in B, or equally in both? Why? Explain.