University of California   Department of Economics
Field Exam   August, 2013
                    Labor Economics

There are two parts of the exam (part I and part II) with some choice in part II. You should plan to spend about 1.5 hours per question. Be sure to use graphs and/or equations whenever they would be helpful in clarifying your reasoning.

WRITE YOUR ANSWERS FOR THE TWO PART IN SEPARATE BOOKS

Part I.   Answer both of the following questions. Use 45 minutes per question.

1. (Static labor supply).

In the current US welfare system, a single mother with one child can receive a monthly welfare benefit of $B (where B varies across states). If she has any earnings, her benefits are reduced by an amount R per dollar (i.e., R is the benefit reduction rate, which also varies across states). For purposes of this question, ignore any time limits or other constraints on the availability of welfare benefits.

An analyst collects data on the level of benefits B and the benefit reduction rate R in each state. Using the CPS, she selects a sample of single mothers with one child in different states, and defines a variable $y_{is} = 1$ if individual i in state s is observed working, and $y_{is} = 0$ if not. She fits a linear probability model

$$y_{is} = a + b X_{is} + c B_s + d R_s + e_{is}$$

where X_{is} represents a set of control variables (including controls for education and experience) B_s represents the benefit rate in state s, R_s represents the benefit reduction rate, and e_{is} is an error term. Carefully discuss the interpretation of the coefficients c and d in this regression model. In particular, address the following question:
         (i) what sign do you expect for c?
         (ii) what sign do you expect for d?
         (iii) how are the magnitudes of c and d related to the compensated and
         uncompensated elasticities of labor supply, and the income effect on labor
supply?

Hint: draw a diagram of the budget constraint facing a given single mother. Show the case where she does not work, and the case where she works. Using the diagram, discuss the effect of raising B_s while holding constant R_s, and the effect of raising R_s while holding constant B_s . How are these related to the standard elasticities and the income effect?

2. (Labor demand)
Suppose that economy-wide real output in period t, (y_t) depends on inputs of two types of labor, low skilled (L_{1t}) and high skilled (L_{2t}) through a CES production function

$$y = f(L_{1t}, L_{2t}) = [\ \theta_{1t}\ L_{1t}^{\rho}\ + \theta_{2t}\ L_{2t}^{\rho}\ ]^{1/\rho}$$

where we will assume for simplicity that $0<\rho<1$, and θ_{1t} and θ_{2t} are technology parameters that vary over time.

a) Assuming that the wages of the two groups in period t are w_{1t} and w_{2t} respectively, derive an equation for the relationship between the relative wage of skilled workers (w_{2t}/w_{1t}), the relative supply of skilled workers (L_{2t}/L_{1t}), and the technology parameters.

b) Suppose that there is **skill-biased technical change**, of the form:

$$\log \theta_{2t}/\theta_{1t}\ =\ a\ +\ b\,t\ ,$$

where $b>0$. Also assume that the relative supply of skilled workers follows a trend:

$$\log (L_{2t}/L_{1t}) = c\ +\ d\,t\ .$$

Under what conditions will the relative wage of skilled workers remain constant over time?

c) An economist has argued that unskilled labor really consists of two types of workers, immigrants (whose number is denoted by M_t), and natives, whose number is denoted by (N_t), and in particular argued that the total effective units of unskilled labor in the economy is given by a CES-aggregate of the form:

$$L_{1t} = [\ \lambda_N\ N_t^{h}\ + \lambda_M\ M_t^{h}\ ]^{1/h}\ .$$

Explain what is meant (in the context of this model) by the statement that unskilled immigrants and unskilled natives are "perfect substitutes", versus the statement that these two groups are "imperfect substitutes". Explain how you would test for perfect substitutability versus imperfect substitutability.

d) Assuming you find that unskilled immigrants and natives and imperfect substitutes, explain how you would derive a model to estimate the elasticity of substitution between skilled workers and the overall group of unskilled workers.

Labor Economics field exam, Summer 2013
Part II (90 minutes)

Choose two of the following three questions. Each question should take about 45 minutes. Note that each has multiple parts.

1. College

   Dillon and Smith have a new paper (NBER working paper 19286) finding that many college students are undermatched (attending higher quality schools than are typical for their qualifications) and that many others are overmatched (attending lower quality schools than are typical for their qualifications.

   a) What would need to be true about the educational production function for the kind of mismatch identified by Dillon and Smith to have meaningful consequences for the average college completion rate or for other outcomes?
   b) What do the results of Dale and Krueger (2002) and Goodman and Cohodes (2012) imply about whether these conditions hold?
   c) Hoxby and Turner recently released results of an experiment in which high-achieving, low-income students were given information about their likelihood of being admitted to selective colleges. Students who received this information were more likely to enroll in selective schools than randomly assigned control students. Based on your answer to (b), what would you expect to be the effect of an intervention like this on treated students' longer-run outcomes?
   d) Describe the nature of the evidence that Dale and Krueger (2002) and Goodman and Cohodes (2012) present for their results. How confident are you in relying on these studies as guidance for questions like (b) and (c)? Why?

2. Teacher quality

   A simple model for the effect of teacher j on her students in year t is:

   (2.1) $\theta_{jt} = \mu_j + f(e_{jt}) + u_{jt}$, where $u_{jt} = u_{j,t-1}\rho + v_{jt}$ and v_{jt} is i.i.d.

   Here, e_{jt} is the number of years of experience that teacher j has in year t. Suppose that the gain in student i's score from year t-1 to t is modeled as:

   (2.2) $y_{ijt} - y_{ij,t-1} = \alpha_i + \theta_{jt} + \varepsilon_{ijt}$,

   where α_i is the student's ability and ε_{ijt} is an error term that includes a component that varies at the level of the classroom (i.e., at the j-t level) and a component reflecting non-school inputs (which may be serially correlated).

   a) Assume that students are randomly assigned to teachers. Describe a strategy for

estimating θ_{jt}.

b) What guidance does the literature on value-added modeling give us about the parameters of the θ equation (2.1)? In particular, what do we know about:
   - the f(e) function
   - ρ
   - the magnitude of var(μ_{jt}) relative to var(θ_{jt})?

c) What sort of evidence would be informative about the value of ρ? Or about the hypothesis that $\rho = 0$?

d) Suppose that we implement a policy that would fire teachers if their estimated θ_{jt} (using the method you describe in step a) is below a threshold c for J consecutive years. How does the potential effect of this policy depend on the parameters of the model? (You do not need to give quantitative answers; qualitative is enough.)

e) What considerations would govern the optimal choice of J?

3. Segregation & peer effects

   Manski, in his work on the identification of peer effects, distinguishes "endogenous" from "exogenous" peer effects, and each of these from "contextual" effects.

   a) Explain what each of these effects is.
   b) Consider a policy of school desegregation. What needs to be true about the various kinds of peer effects in order for this policy to raise the achievement of minority students?
   c) Suppose that peer effects are linear and homogenous. That is, a change in the peer group by one unit has the same effect on all students, and this effect does not vary with the baseline level of the peer group variable. Assume also that the peer effects satisfy the restrictions you suggest in (b). What does this imply for the effect of the desegregation policy on white students' outcomes?
   d) In "Desegregation and Black Dropout Rates," Guryan (2004) uses a difference-in-differences strategy – comparing early and late desegregating districts and early and late cohorts of students in those districts – to analyze the effect of desegregation on the dropout rates of black and white students separately. What do his results imply about the structure of peer effects?
   e) Suppose that a researcher proposed to use a triple-differences estimator, based on the difference between Guryan's estimates for whites and blacks, to identify peer effects. Is this a credible strategy? Why or why not?