UC Berkeley Department of Economics

Field Exam in Labor Economics - August 2016

There are three parts in the exam, each designed to take about 1 hour. Answer all questions in each part. Be sure to explain your reasoning and use equations and graphs whenever possible to develop your answers.

Part I. Answer all questions. Use a separate booklet for the answers to this part, clearly labelled as "Part 1".

1. You are interested in the question of whether professional women are forced to work "more hours" than they prefer. Suppose a worker can take a job with fully flexible hours paying wage w_0, and also has the opportunity to take other jobs ($j = 1, 2, 3 \ldots$) that pay wages $w_1, w_2, ...$ but require her to work a fixed number of hours $h_1, h_2, ...$Assume she uses a simple one-period (or static) framework to evaluate different jobs.

a) Use a diagram to show that if the worker chooses h_0 hours on the flexible job when presented with the wage w_0 then if $h_1 > h_0$ the wage for job 1 must be *higher* than w_0 (i.e. $w_1 > w_0$). Explain how the wage premium for job 1 is related to the hours gap $h_1 - h_0$ and the compensated elasticity of labor supply, ϵ^c.

NOTE: **a formal derivation is preferred.** If you cannot provide one, develop an intuitive argument using a series of graphs illustrating the comparison of w_1 and w_0 for higher and lower values of ϵ^c.

b) Suppose you postulate a specific functional form for the worker's utility function $U(x, h; z)$ where $x =$ value of consumption, $h =$ hours of work, and z is a vector of characteristics of the worker:

$$\frac{-U_h(x, h; z)}{U_x(x, h; z)} = exp(z'\beta)h^\gamma \tag{1}$$

Note that the r.h.s. of equation (1) does not depend on x.

(i) What is ϵ^c for this specification of preferences?

(ii) Briefly comment on the empirical evidence on the validity of assuming U_h/U_x does not depend on x.

c) You have access to a data set that has information on a sample of working women who report their wage (w), hours of work (h), characteristics (z), and the answer to the following question:

Compared to your current job, would you prefer to work fewer hours than you are now at the same wage rate per hour? (yes or no).

Explain how you would set up a statistical model for the observed hours choices of women using the specification of preferences in (1) but taking into account their answers to this question.

HINT: think about the relationship between U_h/U_x and w for someone who answers yes or no to the question.

d) Suppose, in contrast to the situation in part (c), that you only observe wages and hours, and not whether a woman would prefer to reduce her hours and earnings. However, you have a panel data set and see some women who change jobs, and have different wages and hours on the second job than the first. Explain how you could use the job changers to try to identify whether there are some people who are "constrained to work long hours." Discuss the likely issues that would arise in interpreting these results. SUGGESTION: think about people who change jobs with no intervening spell of unemployment versus those who have a spell of unemployment between jobs.

Part II. Answer all questions. Use a separate booklet for the answers to this part, clearly labelled as "Part 2".

You are interested in estimating the effects of a job training program on wages. Let $w_i(1)$ and $w_i(0)$ denote potential wages for person i with and without training, and let $D_i \in \{0,1\}$ denote an indicator equal to one for individuals who participate in training. You observe D_i along with realized wages $w_i = w_i(D_i)$ for an *iid* random sample of N people.

1) You start by estimating the following equation by ordinary least squares (OLS):

$$w_i = \alpha + \beta D_i + e_i.$$

Write down an expression for β, the population OLS coefficient. Decompose this parameter into a component that reflects the causal impact of training and a component that reflects selection bias.

2) Now suppose you also observe another binary variable, $Z_i \in \{0,1\}$. This variable is randomly assigned, so a classmate suggests you use it as an instrument for job training. Explain the additional assumptions you need for this variable to serve as a valid instrument for training. Maintaining these assumptions, provide an instrumental variables (IV) estimator of the effect of training on wages. What parameter does this estimator identify?

3) The following table lists OLS and IV estimates of the effects of job training (in $1,000s), with standard errors in parentheses:

Table 1

	OLS	IV
α	10.03	9.09
	(1.60)	(2.67)
β	1.24	0.30
	(0.20)	(0.30)

Assume that (i) $w_i(1) - w_i(0) = \delta \ \forall i$. Under this assumption, develop a test for selection bias that uses only the information in Table 1. Why do you need assumption (i) for this test? Do you reject the null hypothesis of no selection bias?

4) Relax assumption (i) from part (3). Provide an alternative interpretation of the results in Table 1 that is compatible with no selection bias. Briefly discuss the economics behind this interpretation.

5) Now suppose that there are two time periods, 1 and 2. Individuals can receive job training for either period, both periods, or neither, and training is randomly assigned in each period. Assume the causal model

$$w_{i1} = \mu_i + \gamma_1 + \delta_i D_{i1} + \epsilon_{i1},$$

$$w_{i2} = \mu_i + \gamma_2 + \delta_i D_{i2} + \psi_i D_{i1} + \epsilon_{i2},$$

with $Cov(\epsilon_{i1}, \epsilon_{i2}) = Cov(\mu_i, \epsilon_{it}) = Cov(\delta_i, \epsilon_{it}) = Cov(\psi_i, \epsilon_{it}) = 0$.

a. Show that the parameters $\sigma^2_{\epsilon 1} = Var(\epsilon_{i1})$, $\sigma^2_{\epsilon 2} = Var(\epsilon_{i2})$, and $\sigma^2_{\mu} = Var(\mu_i)$ are identified.

b. Show that the parameters $\sigma^2_{\delta} = Var(\delta_i)$ and $\sigma_{\mu\delta} = Cov(\mu_i, \delta_i)$ are identified. Interpret these parameters. Why might a researcher be interested in them?

c. Show that the model's parameters are overidentified. Suggest a test of the overidentifying restriction(s).

Part III. Answer all questions. Use a separate booklet for the answers to this part, clearly labelled as "Part 3".

In the classic McCall (1970) search model the reservation wage w^* obeys the functional equation:

$$w^* = b + \frac{\lambda}{r+\delta} \int_{w^*}^{w^{max}} (w - w^*) \, dF(w)$$

where $F(.)$ is the distribution function of offered wages which obeys $F(w^{max}) = 1$, λ is the offer arrival rate, r is the interest rate, and δ is the job separation rate. Let $\bar{w} \equiv E[w|w \geq w^*]$ denote the mean accepted wage.

a) Derive an expression for w^* in terms of $\bar{w}$, the job finding rate $\lambda^* \equiv \lambda[1 - F(w^*)]$, the scaled value of leisure $\rho \equiv b/\bar{w}$, and the effective discount rate $r + \delta$.

b) The ratio $\theta \equiv \bar{w}/w^*$ gives a measure of "frictional" dispersion in accepted wages among equivalent workers. Derive an expression for θ in terms of the parameters $(\lambda^*, r + \delta, \rho)$. Provide some intuition for how wage dispersion depends on each of the parameters.

c) Hornstein, Krusell, and Violante (HKV, 2011) argue that a reasonable calibration of the parameters $(\lambda^*, r + \delta, \rho)$ yields $\theta \approx 1.05$, i.e. the average accepted wage can only be 5% above the reservation wage. By contrast, residual wage dispersion measures in cross-sectional datasets such as the CPS are typically an order of magnitude larger. Propose a modification of the basic McCall model that yields more dispersion.

d) HKV argue that the ratio of the 50th to the 10th percentile of wage residuals in the CPS should provide a conservative estimate of θ since wages are skewed and the 10th percentile is above the min. Critique their argument and propose an improved approach to measurement of θ.

e) Suppose HKV are correct that frictional wage dispersion is small. What empirical regularity might this help to explain? Hint: think about the (quasi-)experimental literature on behavioral responses to Unemployment Insurance.