

Test 1
Economics 136 – Human Resources
Spring 2012
Prof. Julian Betts

April 24, 2012

Name: _____

Student ID _____

There are 4 written problems in this test, worth a total of 45 points (plus 1 bonus point). Please write neatly. If you place the answer to a question in an odd place, such as the back of the page, please indicate this clearly, for the sake of the graders.

If you use pencil, the exam cannot be regraded. If you do submit your test for regrading, you must do within the time and other guidelines listed in the syllabus.

SHOW ALL YOUR WORK!

You have 80 minutes. Good luck.

For the graders:

1. _____/9

2. _____/9

3. _____/19

4. _____/9

SUM _____/46 (will be graded out of 45)

STUDENT CONSENT FOR RELEASE OF STUDENT INFORMATION
(Buckley Waiver)

I hereby authorize the UCSD Economics Department to return my graded final examination/research paper by placing it in a location accessible to all students in the course. I understand that the return of my examination/research paper as described above may result in disclosure of personally identifiable information, that is not public information as defined in UCSD PPM 160-2, and I hereby consent to the disclosure of such information.

Quarter _____ Course _____ Date _____

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1. (9 points) You are hiring less skilled and more skilled workers (dropouts and high school graduates) to sell cable TV subscriptions door to door. Each worker is given his or her own neighborhoods in which to do sales. The total sales your workers will generate is given by

$$Q = 3L + 5H$$

where Q is sales per day and L and H are the numbers of high school dropouts and high school graduates you hire to do sales. Suppose that currently the hourly wage for the two type of workers is $W_L = \$8$ and $W_H = \$12$.

a) (5 points) Calculate the cost to output ratio for L workers, and then repeat this calculation for H workers. Which type(s) of worker should you hire?

b) Draw a graph of L vs. H that illustrates using isoquants and isocosts the firm's optimal choice of L and H workers (from low and high quality universities) for a given output Q^* . (You don't need to worry about the exact number for output.) (4 points)

2) (9 points) Your firm provides on-the-job-training (OJT) that increases workers' productivity at the current firm but not at other firms. But it is expensive to provide this training. In period 1, when training takes place, the worker produces \$8. In period 2, his or her productivity rises to \$15. If the worker, who works for two periods before retiring, works instead for any other firm on average he or she will earn \$11 in both periods 1 and 2. The worker's goal is to maximize the sum of earnings in periods 1 and 2. Your firm will pay wages in periods 1 and 2 of W_1 and W_2 .

a) Is this OJT specific or general? (1 point)

b) In general terms what is the "holdup problem" in economics? Give two examples of the holdup problem and how it might occur for two different possible arrangements of which party pays for the costs of training in period 1 and earns rents (profit) in period 2. (6 points)

c) Outline a range of solutions to the holdup problem by explaining how the firm could set W_1 and W_2 to avoid the possible holdup problems. (2 points)

3) (18 points plus 1 bonus point) Suppose that in the labor force 99.5% of workers are of low ability and 0.5% are of high ability. Employers cannot survive unless they recruit a few high ability workers. They realize that although it is hard for them to tell whether a job candidate is an “H” or “L” worker (the high or low ability types), H type workers find it less costly to obtain a given level of schooling than L type workers. The costs of schooling for types H and L are, respectively:

$$\text{Cost}_H = 0.25S \text{ and}$$

$$\text{Cost}_L = 0.5S$$

where S = years of schooling. Schooling S can be 0, 1, 2, 3, 4, 5 or 6.

Workers’ utility functions are given by

$$U = \text{Earnings} - \text{Cost}$$

where cost is the cost of schooling.

Firms find that the VMP of workers is given by $\text{VMP}_H = \$11.30$ and $\text{VMP}_L = \$10$. (The level of schooling a person acquires does not change his or her productivity.) Firms decide to pay \$11.30 to workers with schooling at or above some level S^* and \$10 to everybody else.

a) Over leaf in the table are listed the possible values for S^* that firms could choose. For each type of worker, calculate the cost of obtaining the given level of education, and the utility they would receive if they were paid \$11.30 for getting that level of education. Enter these values separately for type H and L workers on the four rows of the table.

Possible Levels of S*:	1	2	3	4	5	6
C_H						
C_L						
Utility of H type if got given level of S*						
Utility of L type if got given level of S*						

(8 points)

b) Firms assume that workers with schooling equal to or greater than S^* are H and pay them \$11.30, while those with less are paid \$10. *Workers can choose 0 schooling at zero cost, by the way, in which case they would earn \$10 and utility of 10.* For each of the 6 possible values of S^* listed in a), indicate in the table below whether the H types would choose the given S^* , whether the L types would choose that S^* , and finally, indicate in the bottom row whether this would be a pooling equilibrium or a separating equilibrium.

Possible Levels of S*:	1	2	3	4	5	6
Would H types agree to acquire this level of education (Yes/No)						
Would L types agree to acquire this level of education (Yes/No)						
Would there be a separating (S) or pooling (P) equilibrium?						

(6 points)

c) It can often be the case that there are various levels of S^* that will lead to separating equilibria. Did you find that above? If so, which level of S^* do you think that firms might choose eventually? In a sentence, why? (2)

d) What did Altonji and Pierret learn about whether and for how long firms rely on a person's education as a signal of productivity? (2 points)

e) (1 bonus point) In a sentence or two explain how Altonji and Pierret came to this conclusion.

4. (9 points) Your boss tells you to design a probationary wage system under which workers earn W_1 during period 1 and W_2 in period 2. Your goal is to make skilled workers want to work for your firm, and to prevent unskilled workers from working for your firm. To simplify the math, let's assume that your goal is to leave unskilled workers indifferent between applying and not applying. Assume that workers maximize the sum of earnings over 2 periods, and that their discount rate=0. Unskilled and skilled workers' wages in the general labor market are:

W_U and $W_S = W_U + G$.

After one period, you will keep all workers you believe to be skilled and fire all those you believe to be unskilled. However, there is a problem: there is a probability 0.8 that at the end of period 1 an unskilled worker will be identified as "skilled" and will not be fired.

a) Derive the values of W_1 and W_2 that will make skilled workers want to work at your firm, and which will leave less skilled workers indifferent between applying and not applying. Show your work and explain each step in words. (6)

b) Did you find that you should set the wages differently in periods 1 and 2? Explain the intuition behind this result in a few sentences. (3 points)