

Test 2
Economics 136 – Human Resources
Spring 2007
Prof. Julian Betts

May 11, 2007

Name: _____

Student ID _____

There are 4 written problems in this test, worth a total of 48 points. 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 50 minutes. Good luck.

For the graders:

1. _____/21

2. _____/9

3. _____/10

4. _____/8

SUM _____/48

OPTIONAL 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 Spring _____ Course Econ 136 _____ Date _____

Instructor Julian Betts _____

Student ID# _____

Print Name _____

Signature _____

1. You have been asked to design a compensation scheme where earnings = $a + bE$ where E is worker effort. The utility of workers is

$$U = \text{earnings} - 2E^2$$

where the second term reflects the disutility of effort.

Currently, given the strength of the labor market, workers will quit unless $U \geq 0$.

Each worker will be assigned an area of the state in which to sell the company's product. Each salesperson will know from your database which areas of his or her region are going to have the most people likely to buy your product. You tell your salesperson to start selling in those most promising areas, and then after, if there is time left, try to sell the product in the less promising areas of his or her assigned sales region.

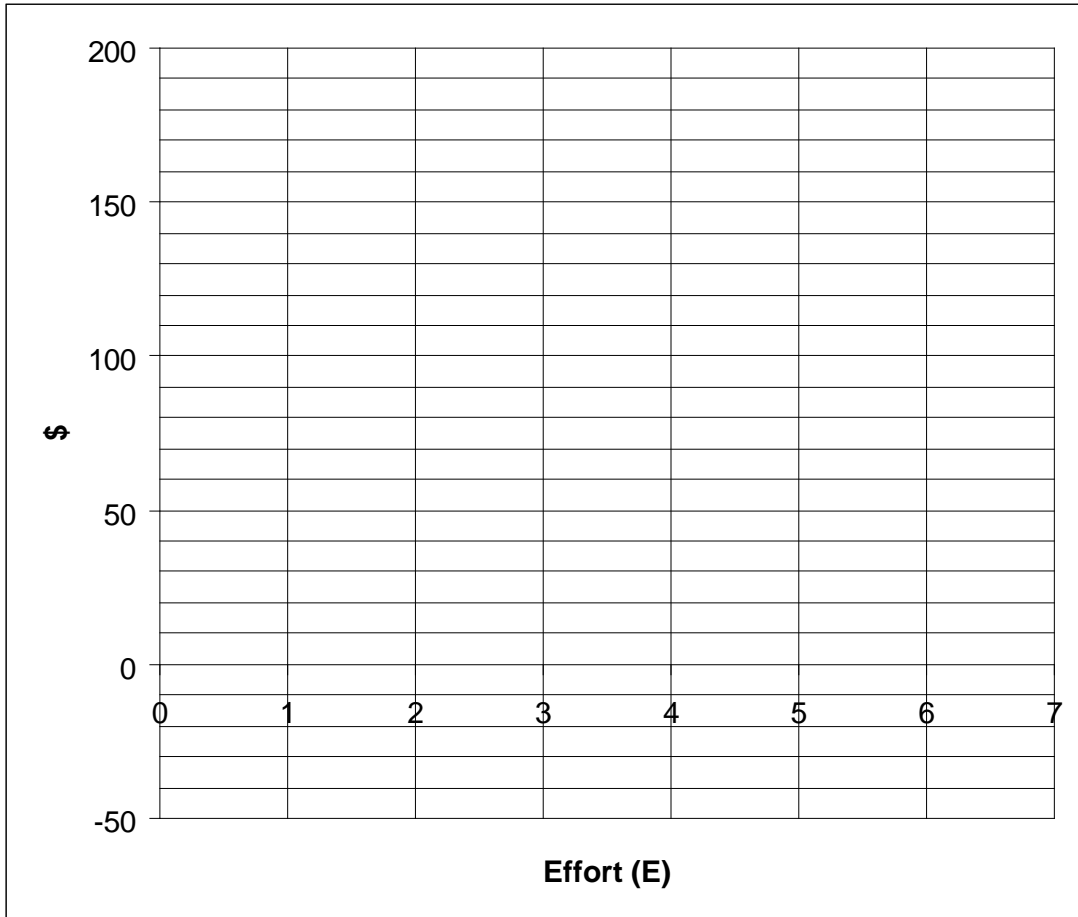
Because of this, there are diminishing returns to each worker's effort. Thus, production per worker per unit of time at your company is given by $Q = E^{1/2}$.

Output sells at \$64 per unit. There are no other marginal costs.

a) Calculate the value of net revenues and the total disutility of effort ($2E^2$) for values of E between 0 and 7 and enter them into the table below. (4 points)

E	0	1	2	3	4	5	6	7
Net revenues								
Disutility of effort $2E^2$								

b) In the graph on the next page use your answers to a) to draw at least roughly (and label clearly) the lines for net revenues and the disutility of effort. Indicate with E^* what appears to you to be the level of effort that will maximize the firm's profits. Then draw in, at least roughly, a line for the optimal wage $a + bE$ your firm should pay to induce the level of effort E^* . Label this line "wages". **I do not expect you to solve for E^* exactly or for optimal a and b . But I do want you to draw at least a rough solution.** (4 points)



c) Now, let's do this using calculus. Solve the worker's problem of maximizing utility, given earnings of $a + bE$. (2 points)

d) Write down the firm's profit maximization problem, and then solve for optimal values of a , and b , and profits per worker. (4)

e) What is the *overall* commission bE (calculated at the optimal effort level E^*) as a percentage of net revenues? What is the commission *rate* b as a percentage of *marginal* revenues calculated at the optimal effort level E^* ? (3)

f) In the problems we have typically done before, with linear production functions, what was the relation between “ a ” and the firm’s profits? Is that same relation obtained here? Explain why or why not. (Hint: What did you learn from your answer to part e?) (4)

2. (9 points) Suppose that your company has 2 different types of jobs, and that it spends \$10,000 rotating each employee through the two jobs to screen them to figure out their productivity in each type of job.

a) Describe the general rule that your firm should use to assign workers to the two jobs if the number of jobs of each type is fixed (3)

b) Suppose that these same two types of jobs exist among competitor firms, and that your workers' productivity would be identical at these competing firms. What does this imply about whether the firm should subsidize the costs of screening? Explain. (3)

c) Some companies such as startups in Silicon Valley are well known for having "flat" hierarchies, meaning that apart from the President and a few others, almost everybody else has the same job title, even if they are in fact doing slightly different jobs from one another. Can you explain why this might be, in light of the issues discussed earlier in this question? (3)

3) List the 5 factors we mentioned in class that will influence whether a person is willing to obtain one more year of education before entering the labor force. In each case explain how a change in that factor will influence the decision to obtain more education. (For a silly example, don't write merely that "rainfall matters", say that "*more* rainfall causes people to obtain *more* education"! (10 points)

4) (8 points) Suppose that over two periods of their working lives, workers can get paid on average \$30,000 per period at other jobs in the economy. Your company, Acme Anvil, needs to provide extensive training in the “Acme Way of Doing Things”. This training is quite useless should your workers switch to other employers, but it does increase productivity should they stay at Acme. Acme has found that workers who take its training course in period 1 have VMP of \$20,000 in period 1 and \$40,000 in period 2.

a) Explain why setting wages in the two periods of $W_1 = W_2 = \$30,000$ is not likely to work well. (2)

b) Similarly explain why setting $W_1 = \$20,000$ and $W_2 = \$40,000$ is not likely to work well. (2)

c) Suppose that instead Acme sets $W_1 = \$25,000$ and $W_2 = \$35,000$. Is this likely to work? Explain. (2)

d) In the scenario in part c), isn't there a problem that other firms would want to “poach” Acme workers in period 2 by paying them above \$35,000? Explain. (2)