Test 2
Economics 136 – Human Resources
Spring 2003
Prof. Julian Betts

May 13, 2003

Name: _____

Student ID _____

There are 4 written problems in this exam, worth a total of 44 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 80 minutes. Good luck. Please check that your test has 7 pages, including this first page. There should be no completely blank pages.

For the graders:

1.   _____/16
2.   _____/14
3.   _____/8
4.   _____/8
SUM   _____/44

1. (16 points) Suppose that you have been hired into a company that wants to switch from a straight salary to a piece rate. You have been asked to design a compensation scheme where earnings = a + bE where E is worker effort. Based on past experimentation with worker quit rates under different salary levels and work loads, your company estimates that the utility of workers can be expressed as

U = earnings - $2E$ - E^2 where the last two terms reflect the disutility of effort.
Currently, workers will quit unless $U \geq 0$.
Production per worker per unit of time at your company is given by $Q=5E$. Output sells at $2 per unit. In addition to labor costs, there are material costs that rise with worker effort, of $2E$.

a) Solve the worker's problem, given earnings of a + bE. (4 points)

b) Write down the firm's profit maximization problem, and then solve for a, b, optimal effort E* that results, and profits per worker. (8)

c) Over leaf, draw a diagram that illustrates your solution. The diagram should clearly indicate three lines, one for the disutility of effort, second for the compensation = a + bE and a third showing net output. Indicate clearly where the optimal effort level is, and how profits are determined. (4)

2. (14 points) a) In a sentence or two, define general on the job training and firm-specific on the job training. (2)

b) The theory of human capital argues that firms should not provide training that provides general human capital unless it makes the workers bear the entire costs of the training. Explain in a few sentences and a diagram what would happen to a firm that subsidized general training for new workers. (It would do this in the hope that it could later make up for this lost profit by paying the worker less than his VMP after training.) (If you prefer you can instead give a specific mathematical example.) No matter how you choose to answer this question be sure to define all of your terms carefully. (6)

c) Temp agencies hire employees which they then send to work temporarily at client companies. These temp agencies have often been observed to provide general training such as computer training at no cost to the employee. According to the work of David Autor, why would a temp agency want to do this? (2)

d) According to the work of Derek Neal, what is the third type of human capital that exists in addition to general and firm-specific? What is the approach he used to prove this? (4 points)

3) (8 points) A person aims to maximize the present discounted value of lifetime earnings over two periods. In period 1 she can either work or go to college and in period 2 she will work. In period 1, if she attends college, she works part-time, earning $10,000, while paying tuition of $5000 and $1000 for books. In period 2, after finishing college, she earns $55,000.

   This worker discounts period 2 earnings at a discount rate of 10%.

   Suppose that if she does not attend college in period 1 then she will earn a fixed salary of $V in both periods 1 and 2.

a) Calculate the PDV of earnings conditional upon attending college and not attending college, which you can label PDV_C and PDV_{none} respectively. (6)

b) Write down a rule that determines whether this student will attend college, conditional upon the value of $V. Show your work. (Hint: Do not panic if you don't get round numbers.) (2)

4. (8 points) a) Write down the three main factors that we discussed in class that determine whether it is worthwhile to spend on screening job applicants for ability before hiring them. (Hint: assume that it is easy to fire workers who turn out to be unproductive. This should narrow down the possibilities for you.) (6)

b) Explain why from the firm's point of view it may not be a great idea to use a large variety of job titles where the job titles of workers are based on the workers' productivity. (2 points)