

Practice Midterm 2
Economics 152
Professor: Philip Babcock

Spring 2009

Name _____

Student ID _____

There are 6 written problems on this exam, worth a total of 100 points. Please write neatly. If you place an answer to the question in an odd place, or on the back of the page, please indicate clearly.

Points will be deducted for any incorrect reasoning on a question, even if the correct answer to that question also appears.

Please show your work.

You have 75 minutes

For grading:

Clicking

In: 5 / 5

1. _____ /10

2. _____ /20

3. _____ /20

4. _____ /15

5. _____ /15

6. _____ /15

Total _____ /100

1. Short answers (10 points)

a. For which firm should you be more willing to accept a job that offers pay based on seniority: Exxon-Mobil or an internet start-up? Explain.

b. Briefly answer the following two questions from the readings:

i) One of the short readings (which illustrated an important aspect of tournament theory) concerned a sport. What was the sport?

ii) What policy did Wal-Mart adopt to help with its problems of worker absenteeism?

2. Variable Pay (20 points)

A firm wishes to establish a wage

$$w = a + bE,$$

where E is worker effort and a and b are to be chosen by the firm. The worker maximizes utility given by

$$U = w - 8E^2 \quad (\text{which is to say the worker's cost of effort is } 8E^2.)$$

Each unit of effort generates 12 units of output which can be sold for \$4 per unit. Assume the workers' utility must be at least 0 for him to be willing to accept the job.

a. Calculate the workers choice of effort E^* and the profit-maximizing values of a and b .

b. Calculate the firm's profit, given this optimal wage schedule.

c. On the same graph, plot the line that represents the firm's net revenue, plot the compensation line that represents the firm's wage offers as a function of effort (a^*+b^*E), and plot the worker's cost of effort function $C(E)$.

d. Suppose firm must pay a "registration" fee of \$8 to employ worker. Deduct \$8 from your net rev. Add the new net rev line to your graph. Without doing new calculations, show the new E^* . Does E^* rise, fall or stay the same?

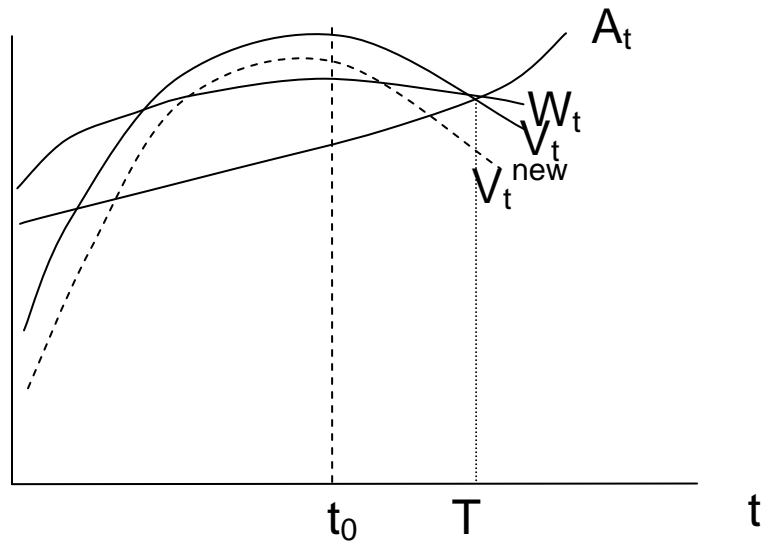
3. Turnover and Buyouts (20 points)

You are CEO of a firm that makes MP3 players. You invest up front in workers by paying them less than their VMP while they acquire firm-specific capital, and you reap the benefit later in their careers. Assume interest rate $r=0$ throughout this problem

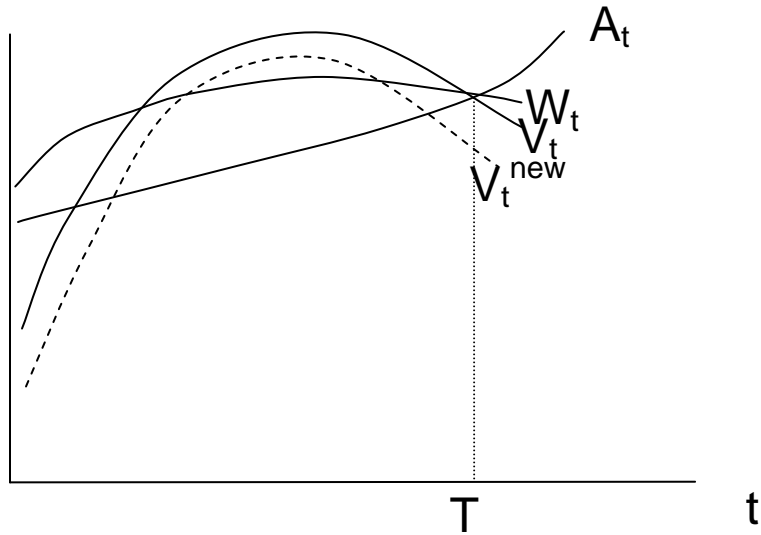
a. In competitive equilibrium, what is the numeric value of R_0 (the rent from a newly hired worker)? Explain why this is the case.

b. Now assume Apple comes out with an MP3 player that is a lot better than yours. Demand for your product falls, as does the price. You would like to buy out some workers. Mathematically, what is the condition on the buyout price, \mathbf{B} , under which your **firm will desire to buy out a worker** of a given age (or seniority), t ? (Note: The buyout at price B may not always be possible, but the firm desires it.)

c. The situation of part b) is depicted below. Now consider the worker with tenure t_0 indicated below. Given the decline in productivity brought on by the lower price of your product (shown by V^{new}), **do you wish to buy out this worker?** Explain. (Shade in areas as needed to help explain. Assume interest rate=0.)



d. On the graph below, write “ t_1 ” on the horizontal axis to indicate the **youngest worker you would WANT to and be ABLE to buy out** (given the decline in productivity shown by V^{new}). **Show which areas must be equal for this to be true.** Assume interest rate=0.



4. Seniority (15 points)

a) You are in period $T-1$. (In other words, after this period, there is only 1 more period until you retire). The chance of getting caught shirking if you shirk this period is $.1$. If you get caught shirking, you will be fired at the end of this period. Your job pays $100K/\text{period}$. Your next best alternative is worth $10K/\text{period}$ to you. It's worth $3K$ to you to be able to goof off for a period. Calculate your expected gains for shirking and for not shirking. Which do you choose? (Show your work).

b) The situation is the same as in party a) except that you have found a screen-saver program that lets you hit the "shift" key with your pinky finger and cover your facebook page instantly. (An important-looking spreadsheet pops up instead.) This reduces your chances of getting caught shirking to $.01$. Do you shirk or not? Explain and justify with calculations.

c) A beautiful golf course near your place of business abruptly closes down. (It gets turned into a parking lot.) Would you expect this to raise or lower the probability that a senior worker would choose to shirk? (Assume workers can't sneak away during work hours to play golf.) Explain.

5. Tournaments (15)

You manage a golf ball retrieval surface. (Your workers retrieve golf balls from water hazards.) You are told to devise a tournament for your workers. The quantity of golf balls they retrieve is

$$q = m + e$$

where q is the number of golf balls, m is effort, and e is a luck factor. The company sells these golf balls for **\$12 each**. There are two workers, j and k . Each worker experiences luck, e_j and e_k , respectively. $x = e_k - e_j$ takes on values between $-1/6$ and $1/6$ with a uniform probability distribution. (This means $g(x)$, the PDF of $e_k - e_j$, is equal to 3 at all points between $-1/6$ and $1/6$. In particular, it means $g(0)=3$.)

Worker utility is $E(\text{wage}) - 3m^2$. **This means $C(m) = 3m^2$.**

This is a 1 period model: You announce that at the end of period 1, the worker who retrieves the most golf balls will receive w_1 and the worker who lost will be paid w_2 .

a. If the firm chooses the profit-maximizing w_1 and w_2 , how much effort m will each worker choose?

b. What w_1 and w_2 will the firm choose to get the workers to put forth this amount of effort?

c. Now suppose everything is the same as in a) and b) except that there are **3 identical workers instead of 2**. One worker (the winner of the tournament) will get the high wage, w_1 , and each the 2 losers will get the low wage, w_2 . Calculate the optimal amount of effort, m^* , the firm wishes to elicit from each worker.

6. Discrimination and wages (15 points)

a) Is preference-based discrimination likely to occur in competitive markets? Explain why or why not.

b) A newspaper prints an article showing that even after controlling for education levels in a Oaxaca decomposition, there is still a large “unexplained” wage gap between beautiful people and plain (or aesthetically-challenged) people. The newspaper attributes this wage difference to discrimination. Give one reason why the newspaper might be **underestimating** the effects of discrimination.

c) Write down one distinctively white-sounding name and one distinctively African-American sounding name used by Bertrand and Mullanatahan in their audit study.