

ECON 152 Practice Midterm

1.

a) Suppose there are two types of workers, low and high, with different lifetime value of marginal products: $VMP_{low} = 100,000\$$ and $VMP_{hi} = 180,000\$$. It is worth $60,000\$$ to a low type not to have to go to the trouble of getting a 4-year college degree. It is worth $30,000\$$ to a high type not to go to the trouble of getting a 4-year college degree. (This includes both tuition costs and effort costs.) Suppose firms offer 2 jobs, one paying VMP_{hi} and the other paying VMP_{low} . If a firm offers VMP_{hi} to workers with at least $s = 4$ years of college and VMP_{low} to the rest of the workers (and workers best respond), will it lose money? Explain why or why not.

b) Draw a graph depicting the outcome for the firm in a) and show the distances that must be equal for a signaling equilibrium. Indicate whether these distances are equal at $s = 4$.

c) Suppose technology improves and the productivity of low types rises to $VMP_{low}=140,000\$$, while the productivity of high types stays at $VMP_{hi} = 180,000$. If a firm offers VMP_{hi} to workers with at least $s=4$ years of college and VMP_{low} to the rest of the workers (and workers best respond), will it lose money? Explain why or why not.

d) Draw a graph depicting the outcome for the firm in c) and show the distances that must be equal for a signaling equilibrium. Indicate whether these distances are equal at $s=4$. Is there a way to make high-skilled workers better off without making firms or low-skilled workers worse off? Explain.

2. You manage a mango-picking service. You are told to devise a tournament for your workers who pick mangos. The quantity of mangos they pick is

$$q = m + e$$

where q is the number of mangos, m is effort, and e is a luck factor. The company sells mangos for **\$24 each**. (They're very good mangos.) 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 the expected value of the total wage earned minus effort squared: $E(\text{wage}) - 2m^2$. **This means $C(m) = 2m^2$.**

This is a 1 period model: You announce that at the end of period 1, the worker who wove the picks the most mangos 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) If $g(0)$ were to go **down**, would workers exert more or less effort (keeping w_1 and w_2 fixed). Explain why. What does it mean, in informal language, for $g(0)$ to be a smaller number?

d) You recommend that wages be set according to the answer in b) above. Your brother-in-law, who has never studied personnel economics, has a different proposal. He says “*Why not pay workers $w_1=30$ and $w_2=22$? These wages are lower than the w_1 and w_2 you picked using your math. We’ll do better!*” With a few simple calculations, demonstrate what, specifically, is wrong with his idea.

e) What happens if you choose your optimal w_1 and w_2 , but the two workers then collude together to maximize their utility (that is, the sum of their expected utilities)? Specifically, what would be effort, m , chosen by each worker and what would be the expected profit?

3. Layoffs and Buyouts (5 points each).

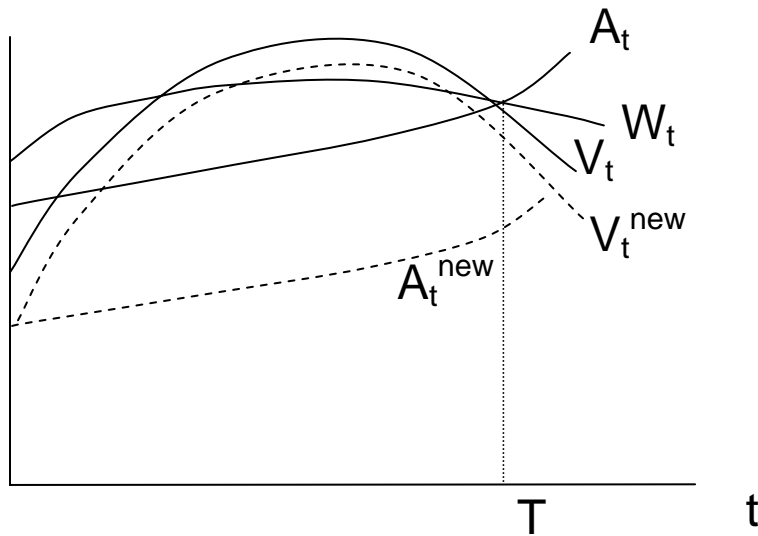
You are CEO of a firm that makes hubcaps. The price of hubcaps has gone down. This means you should lay-off some workers. Workers have varying years of service at your firm.

a) Which workers should you lay off (in terms of age)?

b) Suppose you need to buy out workers to induce them to retire. Under what specific condition on the buyout amount, B , is a worker willing to accept a buyout offer?

c) Under what specific condition on the buyout amount, B , is the firm willing to offer a buyout offer?

d) Suppose that in addition to a decline in V_t (due to the price of hubcaps falling), there is a general recession and all outside options become less attractive to workers (even leisure is less attractive, as golf courses and bowling alleys close down). What is the most you can say about which workers the firm is going to be able to buy out, given the scenario depicted in the graph below?

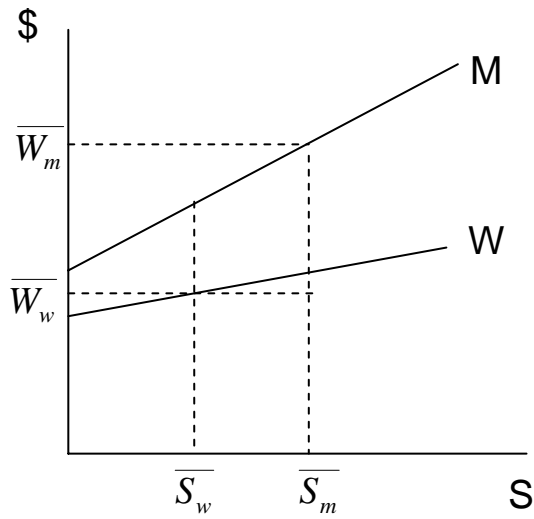


e) Does the decline in A_t depicted above affect the firm's surplus for workers with experience t ? In other words, does the decline in A_t affect the rent, R_t ? Explain.

4. a) A career path within a company involves a series of promotions, each of which involves a raise of **10,000 dollars** over the previous level. Are the promotions equally valuable to the worker? If so, explain why, according to tournament theory. If not, explain which promotion is more valuable to the worker and why.

b) Suppose you are governor of California and your most important goal is that more Californians go to college. You can't really change the interest rate, because it is set by the federal government. You can't pay students to go to school because there's no money in the budget. There's no money to pay for any special programs. Name one thing you could do. Explain briefly. (This must be a policy that a state could very plausibly enact in real life, **NOT** something like, "Make people pay a big fine if they don't go to college" or "Make the return to college higher" or "Kill anyone who doesn't go to college.")

5. a) On the diagram below, label **two** distances that could be interpreted as differences in men's and women's wages that are "explained" by differences in schooling



b) Offer 2 reasons why Oaxaca decompositions of wages by race or gender may inaccurately quantify wage differences due to discrimination.