

Homework 5

ECON 380
UNC Chapel Hill

Name: _____

ONYEN: _____

This homework is due on **November 13** by **2:25PM**. You must turn in your work on a printed copy of this document in order for it to be graded. Your assignment must be stapled and in the correct order. Non-stapled assignments will automatically receive a 10 point deduction.

1. Suppose a firm's production function is given by

$$q = 4(E_M + E_F)^{1/2}$$

where E_M is the number of males and E_F is the number of females employed by the firm, respectively. Suppose the wage rates for males and females are $w_M = \$25$ and $w_F = \$20$. The price of each unit of output is \$30.

- (a) How many units of output does the firm produce if it hires 18 male workers and 18 female workers? How many units of output does it produce if it hires 12 male workers and 24 female workers? **[2 pts]**
- (b) Based on the firm's production function and your work in part (a), what is the relationship between male and female labor (complements, substitutes, perfect complements, or perfect substitutes)? **[2 pts]**
- (c) Suppose that this firm is non-discriminatory. What proportion of its labor will come from male workers? **[2 pts]**

It can be shown that the marginal product of labor with this production function is

$$MP_E = \frac{2}{(E_M + E_F)^{1/2}}$$

- (d) How many workers would a firm hire if it does not discriminate? How much profit does this non-discriminatory firm earn if there are no other costs? **[4 pts]**
- (e) Now, suppose the firm is discriminatory and has a discrimination coefficient of 0.3 attached to female workers, and a discrimination coefficient of 0 attached to male workers. What proportion of the firm's labor will come from male workers? **[2 pts]**
- (f) How many workers does this firm hire? How much profit does it earn? **[4 pts]**
- (g) Explain in 3-4 sentences why we might expect discriminatory firms to exit the market in the long-run, while non-discriminatory firms remain in the market in the long-run. **[4 pts]**

2. Consider the following competitive labor market:

- There are two types of workers, beagles and retrievers, with respective wage rates of $w_b = \$8$ and $w_r = \$12$.
- The firms operate in a competitive output market where the price of the good they sell (all natural dog treats) is \$30.
- The marginal product of labor is the same for beagles and retrievers. At the current market price, the VMP_E curve is given as

$$VMP_E = 32 - \frac{(E_b + E_r)}{2}$$

- Some firms in this labor market are discriminatory and have a distaste for hiring beagles. There is no nepotism.

(a) Sketch the VMP_E curve below.

[2 pts]

(b) Suppose Mambo's Munchies optimal choice is to only hire retrievers. What is the possible range for the firm's discrimination coefficient? If it is possible find the exact number, state it. **[2 pts]**

(c) How many retrievers does Mambo's Munchies hire? Label this point on your graph in part (a) - both the number of workers on the x-axis and the dollar value on the y-axis. **[2 pts]**

- (d) Cookie Crumbs is another firm in this labor market. However, their optimal choice is to hire 42 beagles. What is the possible range for the firm's discrimination coefficient? If it is possible find the exact number, state it. **[2 pts]**
- (e) Label Cookie Crumbs optimal hiring choice on your graph in part (a) - both the number of workers on the x-axis and the dollar value on the y-axis. **[2 pts]**
- (f) Finally, Stella Selects does not discriminate at all ($d = 0$). How many workers (and of what type) should this firm hire? Label this point on your graph in part (a) - both the number of workers on the x-axis and the dollar value on the y-axis. **[2 pts]**
- (g) Rank the true short-run profits of each firm below, with 1 having the highest profits and 3 having the lowest. If any firms realize the same profit, write them on the same line. **[3 pts]**
- 1.
 - 2.
 - 3.

3. Suppose that firms statistically discriminate based on sex. Available information about each candidate (e.g., education, GPA, etc.) is used to calculate an individual test score T for each applicant. In order to determine wages, firms take the weighted average of an individual's actual score and their group average as follows:

$$w = \alpha_g T + (1 - \alpha_g) \bar{T}_g$$

where g denotes which group an individual belongs, $g \in \{M, F\}$. Finally, firms use historical information to calculate the average score for each group and find that is the same, $\bar{T}_M = \bar{T}_F$.

- (a) If test scores for females are “noisier” such that firms do not believe individual test scores for females are good predictors of productivity relative to male test scores, what is the relationship between α_M and α_F (i.e., which one is larger, or are they the same)? **[2 pts]**

- (b) In Figure 2 below, clearly label the earnings curve of each group. **[2 pts]**

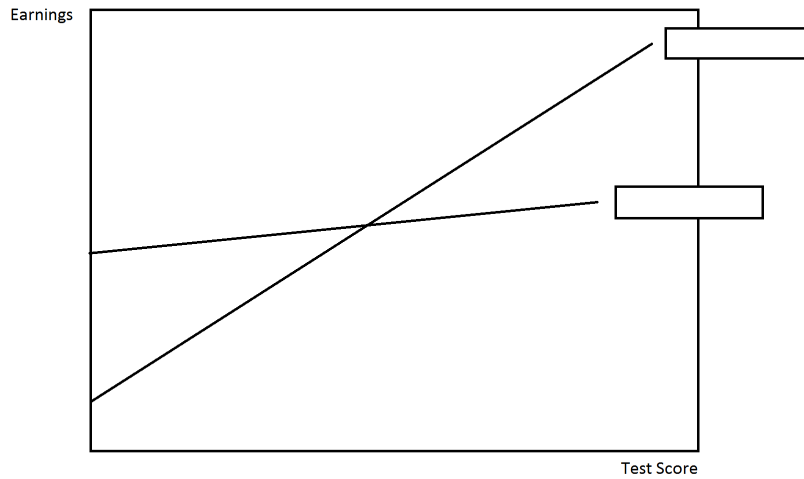


Figure 2: Earnings as a Function of Test Scores

4. Suppose that wages are paid in the labor market according to

$$w_W = 18 + 1.2 \cdot S_W$$

$$w_B = 11 + 0.7 \cdot S_B$$

where the W and B subscripts refer white and black workers, respectively. Assume that schooling, S , is the only relevant skill to worker productivity. Suppose that, on average, white workers have 14 years of schooling and black workers have 12 years of schooling.

(a) In 2-3 sentences, explain how the wage equations indicate the presence of labor market discrimination. **[4 pts]**

(b) What is the raw white-black wage differential in the labor market? **[2 pts]**

(c) Using the Oaxaca decomposition, how much of this wage differential is due to differences in schooling? **[5 pts]**

(d) Using the Oaxaca decomposition, how much of this wage differential is due to discrimination? **[5 pts]**

Directions: Type your answers to the following questions and attach them to the back of this packet.

5. Fryer, Pager, and Spenkuch (2011) estimate that at least one-third of the black-white wage gap is explained by labor market discrimination. Paraphrasing, they find that black workers receive low initial wage offers, but see their wages grow quickly as they spend time at firms, possibly indicating that firms are learning about their productivity. Explain why this pattern is consistent with statistical discrimination. **[5 pts]**

6. Listen to the podcast *The True Story of the Gender Pay Gap* from Freakonomics Radio. Answer the following questions (2-3 sentences each). **[5 pts]**

- (a) A common phrase when talking about the gender pay gap is something along the lines of “women earn 77 cents for every dollar a man earns.” How does Claudia Goldin describe what this phrase actually means?
- (b) What does Goldin believe is the most powerful explanation behind the gender wage gap? How large of a role does she believe outright discrimination plays?
- (c) What does Goldin have to say about the effect of “occupational sorting” in driving wage disparities between men and women?

7. Listen to the podcast *Reasons to Not Be Ugly* from Freakonomics Radio and watch the following clip from The Daily Show: <http://www.cc.com/video-clips/37su2t/the-daily-show-with-jon-stewart-ugly-people-prejudice>. Answer the following questions (1-2 sentences each): **[5 pts]**
- (a) What is the “ugly” penalty for males in the United States?
 - (b) Does Hamermesh find differences in the penalty for “ugliness” between males and females? What is the story he tells that may be driving this result?
 - (c) The Daily Show episode shows Hamermesh listing some policies that could be implemented to reduce looks-based discrimination. What does he state in the podcast in regards to the importance of implementing such policies?
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FOR GRADING:

Question:	1	2	3	4	5	6	7	Total
Points:	20	15	4	16	5	5	5	70
Score:								