Homework 6

ECON 380
UNC Chapel Hill

Name: _____

ONYEN: _____

This homework is due on **November 14** by **2:15PM**. 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. There are a total of 50 available points.

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? **[4 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)? **[3 pts]**

(c) Suppose that this firm is non-discriminatory. What proportion of its labor will come from male workers? **[3 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? **[5 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? **[3 pts]**

(f) How many workers does this firm hire? How much profit does it earn? **[5 pts]**

(g) Based on your results, 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. **[5 pts]**

2. Assume there are two demographic groups in the population. In year 1950, black workers have low average education levels and low average wage levels. In year 1950, white workers have high average education levels and high average wage levels. Using the concept of statistical discrimination, explain why both (i) the wage gap and (ii) the education gap can persist into the future. **[5 pts]**

3. 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]**

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. **[5 pts]**

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

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