

# Exam 3

ECON 380  
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UNC Chapel Hill

Name: \_\_\_\_\_

ONYEN: \_\_\_\_\_

Honor Code Signature: \_\_\_\_\_

## Directions:

- For multiple choice questions, clearly circle the answer choice which best answers the question.
- For short answer questions, show all of your work and justify your answers where needed.
- Round answers to the nearest hundredth.
- Assume firms operate in perfectly competitive markets for labor and output.
- Points available: 50
- Write legibly, write legibly, write legibly!
- Good luck! ☺

### Multiple Choice [2 pts each]

1. Which of the following best describes the trend in US earnings inequality since the 1970s?
  - (a) Inequality has substantially decreased, mostly due to changes at the top of the income distribution.
  - (b) Inequality has substantially increased, mostly due to changes at the bottom of the income distribution.
  - (c) Inequality has substantially decreased, mostly due to changes at the bottom of the income distribution.
  - (d) Inequality has substantially increased, mostly due to changes at the top of the income distribution.
2. Suppose that the earnings of two households are \$50,000 and \$80,000. If the intergenerational earnings correlation coefficient is 0.60, what is the expected percent earnings difference between the households two generations from now?
  - (a) 22%
  - (b) 36%
  - (c) 13%
  - (d) 24%
  - (e) None of the above.

Consider the following theories of labor market discrimination for questions 3 and 4.

- Employer discrimination
  - Employee discrimination
  - Customer discrimination
  - Statistical discrimination
3. How many of the theories can explain observed wage gaps in the short-run?
    - (a) 0
    - (b) 1
    - (c) 2
    - (d) 3
    - (e) 4
  4. How many of the theories can explain observed wage gaps in the long-run?
    - (a) 0
    - (b) 1
    - (c) 2
    - (d) 3
    - (e) 4

Use the following for questions 5 and 6. Suppose the wages of males and females are determined as follows

$$w_m = 10 + 0.65 \cdot S$$

$$w_f = 8.5 + 0.40 \cdot S$$

where the  $m$  and  $f$  subscripts refer to males and females, respectively, and  $S$  refers to the number of years schooling a worker obtains. Assume schooling is the only relevant skill to a worker's productivity. Finally, suppose the average years of schooling for males is 16 years and for females it is 14 years.

5. How much of the wage differential can be attributed to differences in schooling (i.e., pre-market factors)?
  - (a) \$1.50
  - (b) \$0.80
  - (c) \$3.50
  - (d) \$1.30
  - (e) None of the above
6. How much of the wage differential can be attributed to discrimination?
  - (a) \$6.50
  - (b) \$5.00
  - (c) \$5.50
  - (d) \$6.30
  - (e) None of the above
7. Which of the following statements is an example of statistical discrimination?
  - (a) Jax tends bar and gets disutility from working with Hispanics, so will only work with them if he is paid more.
  - (b) Stassi perceives the price of drinks at PUMP to be 5% higher than they truly are because most employees are male.
  - (c) Lisa chooses to employ Lala over James because on average locals tend to stay in the business longer than foreigners.
  - (d) Tom is paid less than Tequila Katie because she has been working in the bar industry for longer.
  - (e) None of the above.

8. Neal & Johnson (1996) analyze the role of pre-labor market factors in the black-white wage gap. Which of the following most accurately describes their main findings?
- (a) Differences in AFQT scores explain much of the male white-black wage gap, but almost none of the female white-black wage gap.
  - (b) Differences in AFQT scores explain much of the male white-black wage gap, and all of the female white-black wage gap.
  - (c) Differences in AFQT scores explain much of the female white-black wage gap, and all of the male white-black wage gap.
  - (d) Differences in AFQT scores explain much of the female white-black wage gap, but almost none of the male white-black wage gap.
  - (e) None of the above
9. Suppose a researcher is analyzing the racial wage gap through the earnings model

$$Y = \alpha B + \beta X + \varepsilon$$

where  $X$  contains a set of productive characteristics (e.g., schooling, experience) and  $B$  is an indicator variable equal to one if an individual is black. If the researcher is concerned that  $X$  does not contain every relevant characteristic determining wages, what is this issue called?

- (a) Omitted variable bias
  - (b) Self-selection
  - (c) Variable endogeneity
  - (d) Life-cycle effect bias
  - (e) None of the above
10. Which of the following is FALSE regarding skill-based technology change (SBTC) and its proposed role in driving US wage inequality?
- (a) SBTC proposes that as new technologies substituted for low-skill labor, the decrease in wages to low-skill workers and increase in wages to high-skill labor increased the wage gap.
  - (b) SBTC predicts that technology intensive industries should have significant wage growth relative to non-technology intensive industries.
  - (c) Wage inequality growth within industries rather than between industries would support the SBTC theory.
  - (d) SBTC predicts that wage inequality should increase fastest during technological booms.
  - (e) None of the above is false.

## Short Answer

1. Consider the economy of Vanderpump. It contains 1,000 individuals, of which 800 report an annual after-tax income of \$37,500 (the “low-income” group), while the other 200 report an annual after-tax income of \$100,000 (the “high-income” group).
  - (a) Draw the Lorenz curve for this economy in the space below along with the perfect equality Lorenz curve. It does not need to be scaled correctly, but you should label any relevant points and each axis. **[3 pts]**
  - (b) What is the Gini coefficient in this economy? **[3 pts]**
  - (c) Suppose that, under intense political pressure from the plebes, the government increases the tax rate for those individuals in the “high-income” group. The tax rate for low-income earners remains the same. Will the post-tax Gini coefficient in this economy increase, decrease, or remain the same? What does this indicate about post-tax inequality in this country (i.e., will it fall, rise, or stay the same)? **[3 pts]**

2. The production function for SUR is given by

$$q = 8 \cdot (E_b + E_w)^{1/2}$$

where  $E_b$  and  $E_w$  refer to black and white workers employed by the firm, respectively. Suppose the wage rates for whites and blacks are  $w_w = \$21$  and  $w_b = \$10$ . The price of each unit of output is \$20. Finally, the marginal product of labor is given by

$$MP_E = \frac{4}{(E_b + E_w)^{1/2}}$$

- (a) The firm maximizes its utility-adjusted profit by hiring exactly 40 black workers and zero white workers. What is SUR's discrimination coefficient,  $d$ ? **[3 pts]**
- (b) What is the firm's actual profit (i.e., only considering their true out-of-pocket costs)? **[3 pts]**
- (c) Compare the workforce composition and employment level of SUR to that of a non-discriminatory firm (i.e., is it smaller, larger, or the same). Explain why they are different or the same. You don't need to numerically calculate anything for this part. **[2 pts]**
- (d) Compare the profit of SUR to that of a non-discriminatory firm (i.e., is it smaller, larger, or the same). Explain why they are different or the same. You don't need to numerically calculate anything for this part. **[2 pts]**

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  $\alpha_M$  and  $\alpha_F$  (i.e., is one larger, or are they the same)? **[2 pts]**

- (b) In Figure 2 below, clearly label the earnings curve of each group. **[3 pts]**

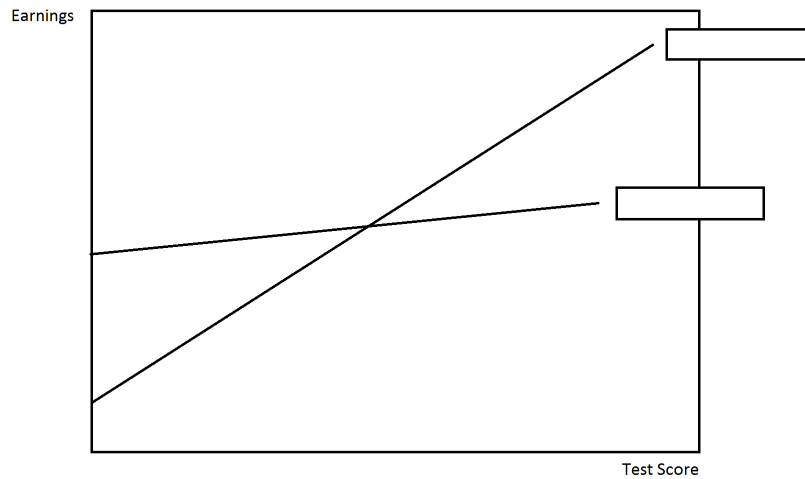


Figure 2: Earnings as a Function of Test Scores

4. Consider the following excerpt from the podcast *50 Things That Made the Modern Economy*:<sup>1</sup>

Soon enough, the application of the new technology [the gramophone/phonograph] became clear: you could record the best singers in the world and sell the recordings. At first, making a recording was a bit like making carbon copies on a typewriter. A single performance could only be captured on three or four different phonographs at once. . . . When Emile Berliner introduced recordings on a disc rather than Edison's cylinder, this opened the way to mass production. Then came radio and film. Performers like Charlie Chaplin could reach a global market just as easily as the men of industry Alfred Marshall had described.

For the Charlie Chaplins and Elton Johns of the world, new technologies meant wider fame - and more money. But, for the journeymen singers it was a disaster. In Elizabeth Billington's day, many half decent singers made a living performing live in music halls. Mrs. Billington, after all, couldn't be everywhere. But when you can listen at home to the best performers in the world, why pay to hear a merely competent tribute act in person? . . . Small gaps in quality became vast gaps in income. . . . Inequality remains alive and well. The top 1% of artists take more than five times more money from concerts than the bottom 95% put together.

- (a) What is this type of phenomenon is known as in labor economics? **[2 pts]**
- (b) State and briefly describe the two reasons discussed in class why this type of phenomenon might exist. **[4 pts]**

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<sup>1</sup>Hartford, Tim. "Gramophone." Audio blog post. *50 Things That Made the Modern Economy*. BBC World Service, 24 Mar. 2017.