ECON 115 - Labor Economics
Drake University, Spring 2017
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EXAMINATION 3 VERSION A
"Wage Structure, Mobility, and Discrimination"
April 13, 2017

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators, calculators with alphabetical keyboards, computers, wireless devices and mobile phones are NOT permitted. Point values for each question are noted in brackets. Maximum total points are 100.

I. Multiple choice: Please circle the one best answer to each question. [1 pt each, 11 pts total]

(1) Since about 1980 in the U.S.,
a. the returns to education have increased.
b. the returns to experience have increased.
c. wage inequality has increased within groups of workers with the same education and experience.
d. all of the above.

(2) Expansion of international trade has likely increased the
a. relative demand for unskilled workers in the U.S.
b. relative demand for skilled workers in the U.S.
c. relative supply of unskilled workers in the U.S.
d. relative supply of skilled workers in the U.S.

(3) Since 1980, the real minimum wage in the United States (that is, adjusted for inflation) has
a. increased.
b. decreased.
c. remained roughly constant.

(4) Mass production technology, such as television, tends to make the distribution of earnings among sports stars
a. more equal.
b. more unequal.
c. Mass production technology has no effect on the distribution of earnings.

(5) The intergenerational correlation between the earnings of fathers and earnings of children in the U.S. is about
a. zero.
b. 0.2.
c. 0.6.
d. 0.8.
e. 1.0.

(6) Over the last century, average wages across U.S. states have
a. converged.
b. diverged.
c. neither converged or diverged.
d. fallen.

(7) On average, immigrants who arrived fifty years ago
a. enjoyed higher earnings than native workers as soon as they arrived.
b. eventually caught up with native workers in earnings.
c. remained well below native workers in earnings throughout their careers.

(8) Most workers who quit a job
a. take another job immediately at a higher wage.
b. are unemployed for a while, then take another job at a higher wage.
c. take another job immediately at a lower wage.
d. are unemployed for a while, then take another job at a lower wage.

9) The frequency of quits and layoffs seems to decrease with job seniority because
a. some workers are “movers” and other workers are “stayers.”
b. workers with more seniority enjoy returns to specific human capital.
c. both (a) and (b).
d. neither (a) nor (b).

(10) Becker’s theory of customer discrimination predicts labor-market segregation
a. by firm.
b. by job assignment.
c. by plant.
d. by shift.

(11) Suppose an employer receives job applications from a blue worker and a green worker with identical education and experience qualifications. If the employer has experienced more frequent quits by blue workers in the past, the employer may offer the job to the green worker. This would be an example of

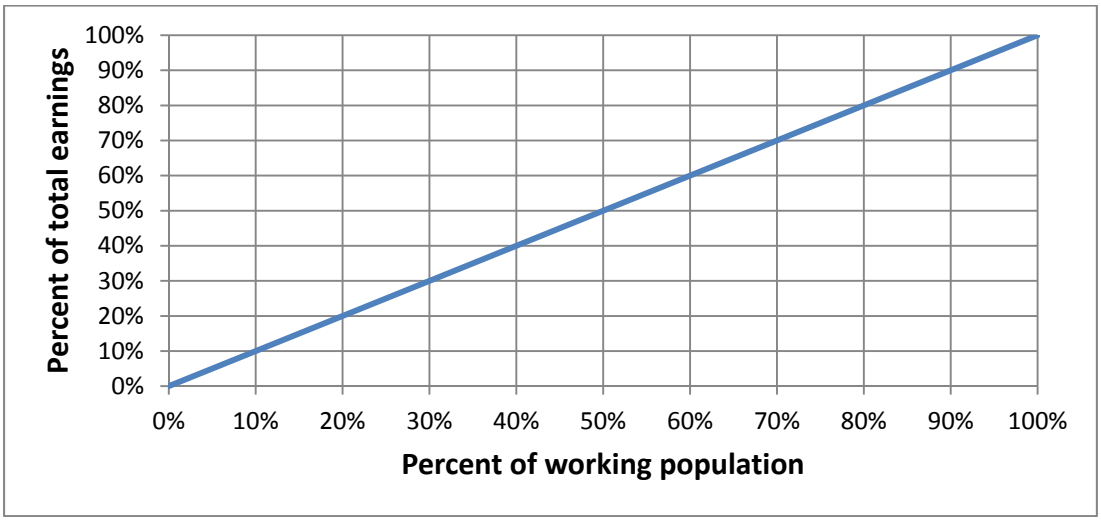
a. preference-based employer discrimination.
b. preference-based employee discrimination.
c. preference-based customer discrimination.
d. statistical discrimination.
e. monopsony wage discrimination.

II. Problems: Please insert your answer to each question in the box provided. You may use margins and graphs for scratch work. Only the answers in the boxes will be graded.

(1) [Measuring inequality: 15 pts] Suppose the lowest tercile (third) of workers all have an annual wage of $10 thousand, the middle tercile all have an annual wage of $50 thousand, and the highest tercile all have an annual wage of $140 thousand.

Tercile	Annual wage	Share of earnings	Cumulative share
Lowest	$10 thousand	%	%
Middle	$50 thousand	%	%
Highest	$140 thousand	%	%

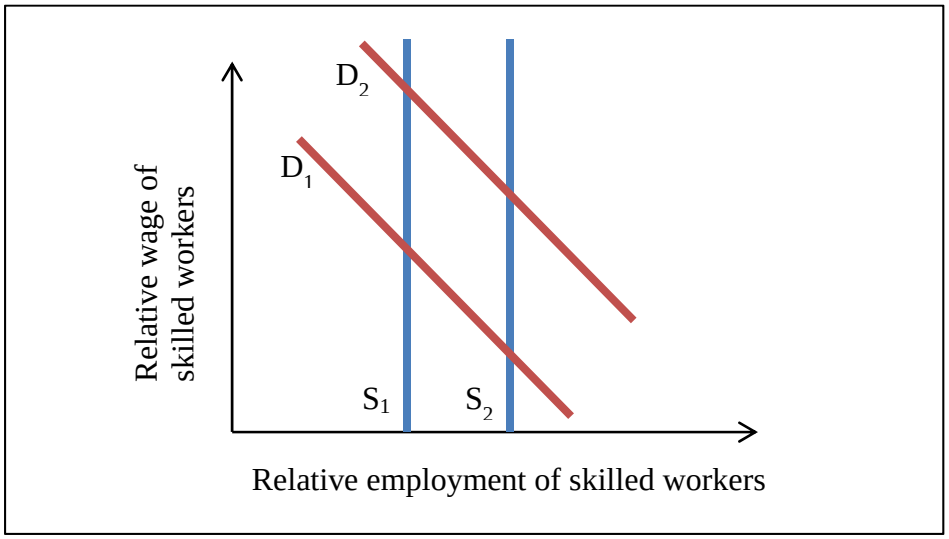
a. [5 pts] Compute the shares and cumulative shares. Check your work carefully.
b. [2 pts] **Using a straightedge,** plot the Lorenz curve for wages in the graph below.



c. [2 pts] Compute the Gini coefficient to three decimal places.
d. [2 pts] Compute the 90-10 wage gap.
e. [2 pts] Compute the 90-50 wage gap.
f. [2 pts] Compute the 50-10 wage gap.

%
%
%

(2) [Shifts in relative supply and demand by skill: 10 pts] The graph below shows demand and supply for skilled workers *relative* to unskilled workers. Assume in this problem that total employment of all skilled plus unskilled workers remains unchanged, and the average wage of all skilled and unskilled workers remains constant.



Suppose relative supply shifts from S_1 to S_2, but relative demand stays constant at D_1.

a. Does the wage of skilled workers increase, decrease, or remain constant?

b. Does the wage of unskilled workers increase, decrease, or remain constant?

c. Does the employment of skilled workers increase, decrease, or remain constant?

d. Does the employment of unskilled workers increase, decrease, or remain constant?

e. Does wage inequality (as might be measured by the 90-10 wage gap) increase, decrease, or remain constant?

Alternatively, suppose relative supply shifts from S_1 to S_2, and simultaneously relative demand shifts from D_1 to D_2 .

f. Does the wage of skilled workers increase, decrease, or remain constant?

g. Does the wage of unskilled workers increase, decrease, or remain constant?

h. Does the employment of skilled workers increase, decrease, or remain constant?

i. Does the employment of unskilled workers increase, decrease, or remain constant?

j. Does wage inequality (as might be measured by the 90-10 wage gap) increase, decrease, or remain constant?

(3) [Joint migration decision: 6 pts] Penny and Leonard live in Pasadena, but are contemplating a move to New York. Penny's net present value of earnings in Pasadena is $100,000, and her net present value of earnings in New York is $500,000. Leonard's net present value of earnings in Pasadena is $500,000, and his net present value of earnings in New York is $520,000. Each person's moving cost is $50,000.

a. Assuming Penny and Leonard remain together, will they move to New York? Why or why not?

b. Is Penny a tied mover, a tied stayer, or neither? Why?

c. Is Leonard a tied mover, a tied stayer, or neither? Why?

(4) [Roy model: 6 pts] Country A and Country B each have workers whose skill (S) ranges from 0 to 100. Suppose the relationship between wages and skill in Country A is given by $W_A = 50 + 3S$. The relationship in Country B is given by $W_B = 120 + S$. Assume that moving costs are **$10**.

a. [4 pts] For what values of S will workers in Country A want to migrate to Country B? Show your work and circle your final answer.

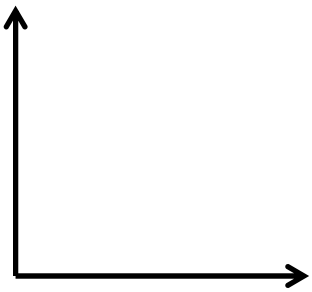
b. [2 pts] Is this immigrant flow positively or negatively selected? Justify your answer.

(5) [Immigration surplus: 8 pts] Suppose short-run demand for workers in the U.S. is given by

$$w = 25 - 0.1\,E$$

where w denotes the hourly wage and E denotes employment (in millions). Suppose there are 120 million domestic U.S. workers who supply labor inelastically. Suppose also that 40 million workers would enter the U.S. and supply labor inelastically if the U.S. allowed free immigration. Compute the following. [Hint: You may wish to sketch a graph.]

a. Compute the equilibrium wage without immigration.	$
b. Compute the equilibrium wage with free immigration	$
c. Compute the immigration surplus—the net benefit to domestic U.S. workers and employers from free immigration (per hour).	$ million
d. Compute the amount of surplus that would be transferred from U.S. workers to U.S. employers under free immigration (per hour).	$ million



(6) [Oaxaca decomposition: 6 pts] Suppose that for green workers, the relationship between schooling and the hourly wage is given by $\ln(wage_G) = 1.0 + 0.15\,S_G$. For blue workers, the relationship is $\ln(wage_B) = 0.9 + 0.10\,S_B$ due to discrimination in the labor market. On average, green workers have 16 years of schooling, while blue workers have 13 years.

a. Compute the raw log wage differential—that is, $\overline{\ln(wage_G)} - \overline{\ln(wage_B)}$.

b. Compute the log wage differential due to schooling.

c. Compute the log wage differential due to discrimination in the labor market, in Oaxaca's definition.

(7) [Employer preference discrimination: 18 pts] Suppose a firm's production function is given by $q = 30\sqrt{E_G + E_B}$, where E_G is the number of green workers employed by the firm and E_B is the number of blue workers employed by the firm. There are no other inputs besides labor. Clearly, green and blue workers are perfect substitutes in production. It can be shown with calculus that the marginal product of labor (either type) is given by $MP_E = 15/\sqrt{E_G + E_B}$. Suppose the market wage of green workers is \$15 and the market wage of blue workers is \$10. Also assume the price of the firm's output is \$4.

a. First, suppose the firm does not discriminate. How many workers will it hire of each type? How much output does it produce? How much profit does it enjoy?

Now suppose the firm discriminates against blue workers, with discrimination coefficient d. That is, the firm perceives the cost of blue workers as being (1+d) times their actual wage.

b. If d = 0.6, how many workers will it hire of each type? How much output does it produce? How much profit does it enjoy?

c. If d = 0.2, how many workers will it hire of each type? How much output does it produce? How much profit does it enjoy?

(8) [Monopsony wage discrimination: 16 pts] A certain employer enjoys monopsony power over two groups of workers. Supply of green workers to this employer is given by $w_G = 6 + (E_G/10)$. Supply of blue workers to the same employer is given by $w_B = 2 + (E_B/5)$. The value of marginal product of all workers is constant and equal to \$20.

a. Recall that if labor supply is a straight line, then marginal labor cost is also a straight line, with the same intercept and twice the slope of labor supply. Give the equation for marginal labor cost for each group of workers.

$MLC_G =$

$MLC_B =$

b. What level of employment (E_G and E_B) will the employer choose for each group?

c. What wage (w_G and w_B) will the employer pay each group?

d. Suppose the government imposes a minimum wage of \$15 for all workers. Now what level of employment (E_G and E_B) will the employer choose for each group?

III. Critical thinking: Write a one-paragraph essay answering the question below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling. [4 pts]

(1) A 2008 article by David H. Autor, Lawrence F. Katz, and Melissa S. Kearney showed that both employment and average earnings in middle-skilled jobs decreased in the United States during the 1990s.[1]

a. Consider two explanations: either the demand by employers for workers in middle-skilled jobs has shifted, or the supply of workers in middle-skilled jobs has shifted. Which explanation is compatible with the information given above? Why?
b. Sketch a graph of the demand and supply of workers in middle-skilled jobs, showing the shift, to support your answer.
c. What might have caused this shift in demand or supply? Explain. [Hint: According to Autor, Katz and Kearney, workers in middle-skilled jobs often perform routine tasks that increasingly can be performed by computers.]

[end of exam]

[1] Autor, D. H., Katz, L. F., & Kearney, M. S. (2008). Trends in U.S. wage inequality: revising the revisionists. *Review of Economics and Statistics, 90*(2), 300-323.