ECON 115 - Labor Economics
Drake University, Spring 2018
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EXAMINATION 2 VERSION A
"Equilibrium and Differences in Pay"
March 29, 2018

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 pts each, 10 pts total]

(1) In the simple model of a competitive labor market,
a. the equilibrium wage is zero.
b. the equilibrium quantity is zero.
c. total surplus is zero.
d. unemployment is zero.

(2) Suppose labor supply is perfectly inelastic. Who bears the burden of a payroll tax?
a. Workers bear all of the burden.
b. Workers bear most of the burden.
c. Workers and employers each bear half of the burden.
d. Employers bear most of the burden.
e. Employers bear all of the burden.

(3) Suppose employers are required by law to provide a free lunch that workers may or may not want. This mandated benefit tends to decrease the equilibrium wage
a. more if workers actually value the lunch.
b. less if workers actually value the lunch.
c. the same amount, regardless of whether workers actually value the lunch.
d. None of the above, because mandated benefits always increase the equilibrium wage and employment level.

(4) In the cobweb model of labor markets, it is assumed that
a. workers make career plans based on likely future market wages.
b. workers make career plans based on current market wages.
c. labor supply responds instantly to changes in wages.
d. wages are rigid and inflexible in the short run.

(5) Agreements between employers not to "poach" each others' workers
a. tend to keep wages up.
b. are recommended by the government.
c. are illegal under antitrust laws.
d. never occur because they are unprofitable.

(6) Consider a diagram with the wage on the vertical axis and risk of injury on the horizontal axis. If firms could eliminate the risk of injury on the job *at no cost*, their isoprofit curves would be
a. upward-sloping curves.
b. downward-sloping curves.
c. upward-sloping 45-degree lines.
d. vertical lines.
e. horizontal lines.

(7) Consider a diagram of hedonic equilibrium with the wage on the vertical axis and risk of injury on the horizontal axis. At any point on the hedonic wage function, the slope equals
a. the slope of some worker's indifference curve.
b. the slope of some employer's isoprofit curve.
c. Both of the above.
d. None of the above.

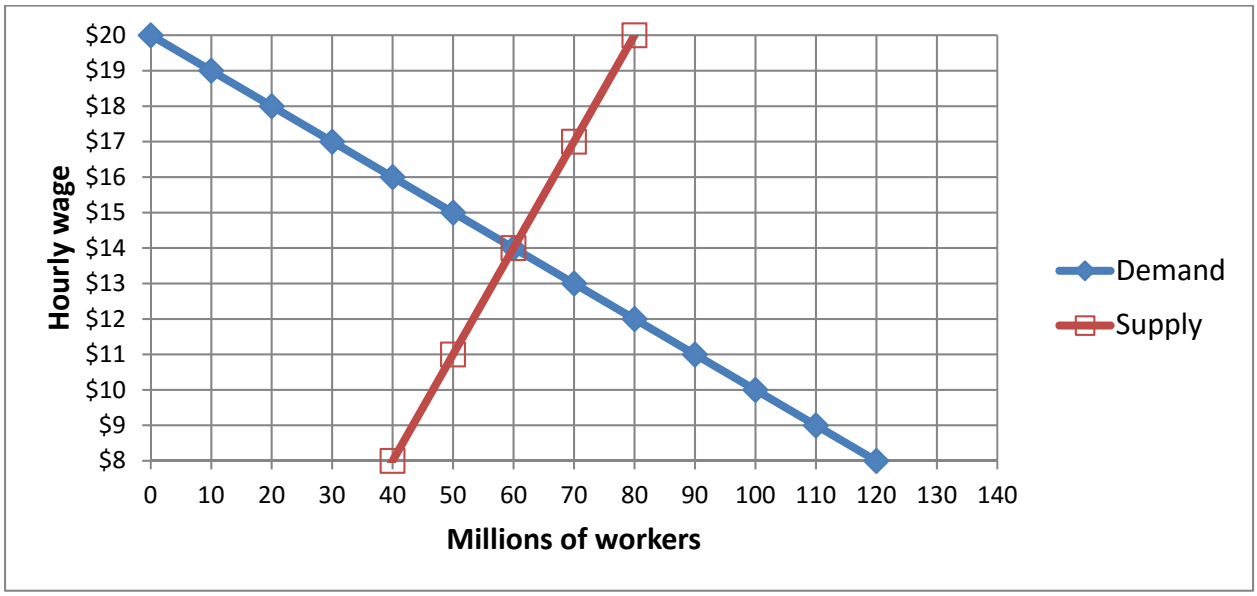
(8) Consider a diagram with the wage on the vertical axis and health insurance benefits on the horizontal axis. If workers like both wages and benefits, their indifference curves must be
a. upward-sloping curves.
b. downward-sloping curves.
c. upward-sloping 45-degree lines.
d. vertical lines.
e. horizontal lines.

(9) According to the signaling model, by getting more education, a worker increases her or his
a. productivity.
b. pay.
c. ability to learn on-the-job.
d. All of the above.
e. None of the above.

(10) "Specific human capital" means
a. specific job specialties that are in wide demand.
b. especially productive workers who are important assets to a company.
c. skills useful only at one employer.
d. specific machines and computers designed to make workers more productive.

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) [Payroll tax or subsidy: 14 pts] The graph below shows demand and supply for workers in a particular labor market.



Suppose the government imposes a **payroll tax of $ 4** per hour.

a. Find the new level of employment.

b. Find the new total labor cost per hour paid by employers (including the tax).

c. Find the new net ("take-home") wage per hour received by workers (excluding the tax).

d. Compute the loss of employer surplus as a result of the tax (per hour).

e. Compute the loss of worker surplus as a result of the tax (per hour).

f. Compute the tax revenue collected by the government (per hour).

g. Compute the deadweight loss caused by the tax (per hour).

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(2) [Monopsony: 18 pts] Suppose a monopsony employer's demand for workers is given by

$$VMP = 70 - (E/20).$$

Labor supply to the employer is given by

$$w = -20 + (E/10).$$

a. [4 pts] Compute the efficient level of employment (E), where the value of the next worker's time equals that worker's contribution to the firm's revenue. Show your work and circle your final answer.

b. [2 pts] 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 (MLC).

MLC =

c. [4 pts] What level of employment (E) will the employer choose to maximize profit? Show your work and circle your final answer.

d. [4 pts] What wage (w) will the employer pay? Show your work and circle your final answer.

e. [4 pts] Suppose the government imposes a minimum wage of $15 per hour. What level of employment (E) will the employer now choose? Show your work and circle your final answer.

(3) [Gains from migration: 12 pts] Suppose there are two labor markets: North and South. Demand for labor in North is given by $\mathbf{W_N = 30 - (E_N /2),}$ where W_N is the annual wage (in thousands of dollars) and E_N is the number of workers (in millions). Demand for labor in the South is given similarly given by $\mathbf{W_S = 40 - (E_S /2).}$ Labor is supplied inelastically to each market. Currently, there are 20 million workers in each market, for a total of 40 million workers.

a. Compute the current wages in each market. Show your work and circle your final answer.

Suppose workers can migrate costlessly between markets in the long run.

b. Compute the equilibrium wages and employment levels in each market in the long run. Show your work and circle your final answer.

c. Compute the total gain in efficiency for the two regions from migration. Show your work and circle your final answer. Show your work and circle your final answer. [Hint: sketch graphs first.]

(4) [VSL, safety regulation: 12 pts] The following regression equation has been fitted to data on a large sample of workers:

$$\text{annual earnings} = -7533 + 3247\,S + 65\,R$$

where S = total education in years, and R = annual occupational death rate per 100,000 workers.

a. Compute the value of a statistical life implied by these estimates. Show your work and circle your final answer.

Suppose a particular factory employs a large number of workers. A special ventilating system, designed to reduce workers' exposure to noxious fumes, would cost $900,000 per year. It is estimated that the system would reduce the factory's average annual death rate from 1.2 to 1.1 persons per year.

b. Compute the cost of the system per statistical life saved. Show your work and circle your final answer.

c. Given the numbers you have computed above, should the system be required? Why or why not?

(5) [Simple model of schooling decision: 16 pts] Suppose a person lives for two periods and must choose between two careers. If the person chooses "no college," the person earns $150 thousand in the first period, and then $324 thousand in the second period. If the person chooses "college," the person earns nothing in the first period and pays college costs of $50 thousand, and then earns $540 thousand in the second period.

First, suppose the person's discount rate between the two periods is **r = 5%.**

a. [4 pts] Compute the net present value as of the first period of "no college," to the nearest thousand dollars. Show your work and circle your final answer.

b. [4 pts] Compute the net present value as of the first period of "college," to the nearest thousand dollars. Show your work and circle your final answer.

c. [2 pts] Which career will the person choose: "no college" or "college"?

Next, consider the discount rate r* between the two periods would make the person exactly indifferent between the two careers.

d. [4 pts] Compute r*. Show your work and circle your final answer.

e. [2 pts] If the person's discount rate were *greater* than r* (found in part d) would that person choose "no college" or "college"?

(6) [Who pays for OJT: 8 pts] Suppose that, without training, an automotive technician's value of marginal product is $25,000 per year. If the worker is trained in the first year, the worker's value of marginal product rises to $30,000 per year in the second year. However, training costs the employer $4,000. (Assume the interest rate is zero.)

a. Suppose that this training raises the worker's value of marginal product at this employer but also at *many other* employers. If the worker is trained in the first year, what will be the worker's wage in each year? Why?

b. Alternatively, suppose that this training raises the worker's value of marginal product *only* at this particular employer. If the worker is trained in the first year, what will be the worker's wage in each year? Why?

(7) [Education in the labor market: 4 pts] {2012 Spring E2} In 1970, men aged 18 to 25 were subject to military draft, with likely service in Vietnam. Men could qualify for a student deferment, however, if they were enrolled in college and making satisfactory progress toward a degree. By 1976, the draft had ended. (In fact, no one born in 1954 or later was actually drafted.) Women were never subject to the draft, so they form a potential control group. Estimate the effect of the military draft on male college enrollment using a difference-in-differences methodology and the following data.

Percent in college[1]	1970	1976
Female	49	50
Male	55	47

[1] Percent of persons 16 to 24 years old who graduated from high school in the preceding 12 months. Source: Bureau of the Census, *Statistical Abstract of the United States*, 2012, table 276.

III. Critical thinking: Write a one-paragraph essay answering one question below (your choice). [6 pts]

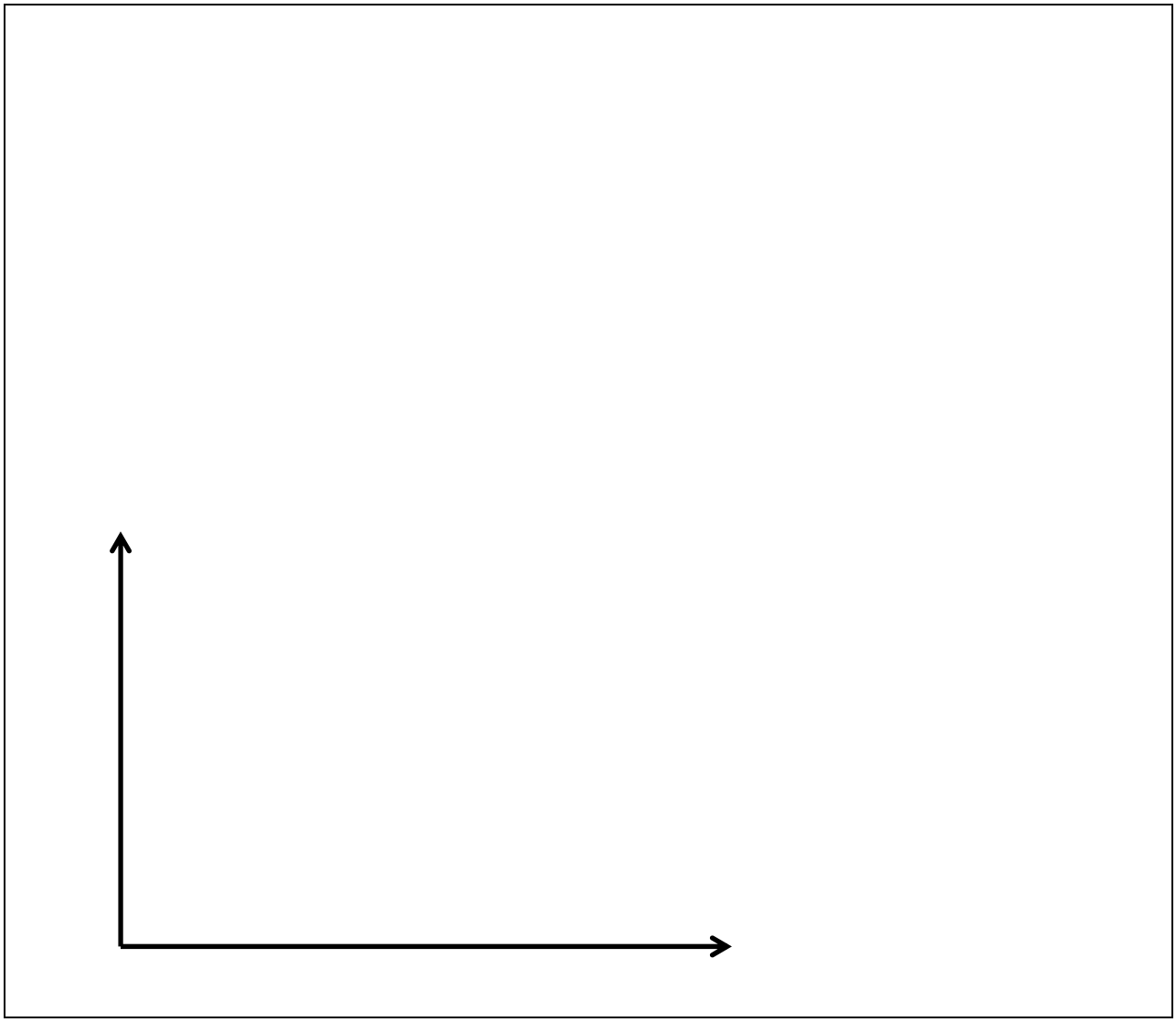
(1) Workers with higher wages tend to enjoy more benefits like health insurance.
   a. Does this fact contradict the theory of compensating differentials? Why or why not?
   b. Draw a graph of hedonic equilibrium to support your answer.

(2) Suppose we estimate the following regression equation using data on workers:

$$\ln(W) = 0.694 + 0.118\,S + 0.056\,E - 0.001\,E^2 .$$

where W is the wage, S is years of schooling, and E is labor-market experience.
   a. According to these results, if a person has one more year of schooling, all else equal, how much higher is the person's wage? Is your answer in *dollars* or *percent*?
   b. What is "ability bias"?
   c. If ability bias is present in our data, is the true marginal rate of return to schooling *higher* or *lower* than your answer to part (a)? Why?

Circle the question you are answering and write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling. Label all curves and axes.



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