ECON 115 - Labor Economics
Drake University, Spring 2017
William M. Boal

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Printed name: _____

EXAMINATION 2 VERSION B
"Equilibrium and Differences in Pay"
March 23, 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 pts each, 15 pts total]

(1) A competitive labor market
a. maximizes employer surplus.
b. maximizes worker surplus.
c. maximizes the total surplus.
d. divides the surplus equally between employers and workers.

(2) Suppose in a particular labor market, the elasticity of labor supply is 3.5 and the elasticity of labor demand is -0.8. If a payroll tax is enacted,
a. employers will bear most of the burden.
b. workers will bear most of the burden.
c. the burden will be shared equally between workers and employers.
d. the side of the market that is legally required to pay the tax will bear most of the burden.

(3) In the cobweb model of labor markets, a sudden increase in demand for workers causes
a. permanent excess demand due to rigid wages.
b. a sudden drop in the wage.
c. rapid convergence to the new long-run equilibrium wage and employment level.
d. a sequence of "booms" and "busts."

(4) An employer monopsony creates deadweight loss because
a. the employer hires fewer workers than the socially-optimal quantity.
b. the equilibrium wage is excessive.
c. workers are hired whose value of marginal product is less than the value of their time.
d. employer surplus is reduced.

(5) Among U.S. states, those states with the highest average wage a century ago have seen the
a. slowest subsequent wage growth.
b. fastest subsequent wage growth.
c. the same wage growth as other states.

(6) Al currently works at a safe job and is paid $20 per hour. Al is willing to switch to a risky job if he is paid at least $25 per hour. Al's reservation price for the increased risk is
a. $5 per hour.
b. $10 per hour.
c. $15 per hour.
d. $20 per hour.
e. $25 per hour.

(7) Consider a diagram with wages on the vertical axis and risk of injury on the horizontal axis. If for some strange reason workers *did not care* about job risk, their indifference curves would be
a. upward-sloping curves.
b. downward-sloping curves.
c. upward-sloping 45-degree lines.
d. vertical lines.
e. horizontal lines.

(8) Consider a diagram of hedonic equilibrium with wages 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.

(9) By definition, the value of a statistical life equals
a. the amount a worker would earn during their lifetime.
b. the difference between what a worker would earn and what they would consume during their lifetime.
c. the amount a worker would pay to avoid certain death.
d. None of the above.

(10) "Moral hazard" means
a. an illegal activity that increases risk.
b. the risk of workers misbehaving on the job.
c. the increased risk when insurance reduces the incentives to exercise caution.
d. unethical conduct by employers who refuse to reduce job risk.

(11) The marginal return to schooling is the
a. increase in wages from one more year of schooling.
b. percent increase in wages from one more year of schooling.
c. difference between average wages at any given level of schooling and average wages with no schooling.
d. increase in schooling required to attain a one-dollar increase in wages.

(12) The lower a person's discount rate, everything else equal,
a. the more education the person will choose.
b. the less education the person will choose.
c. The discount rate has no effect on the amount of education a person will choose.
d. Cannot be determined from information given.

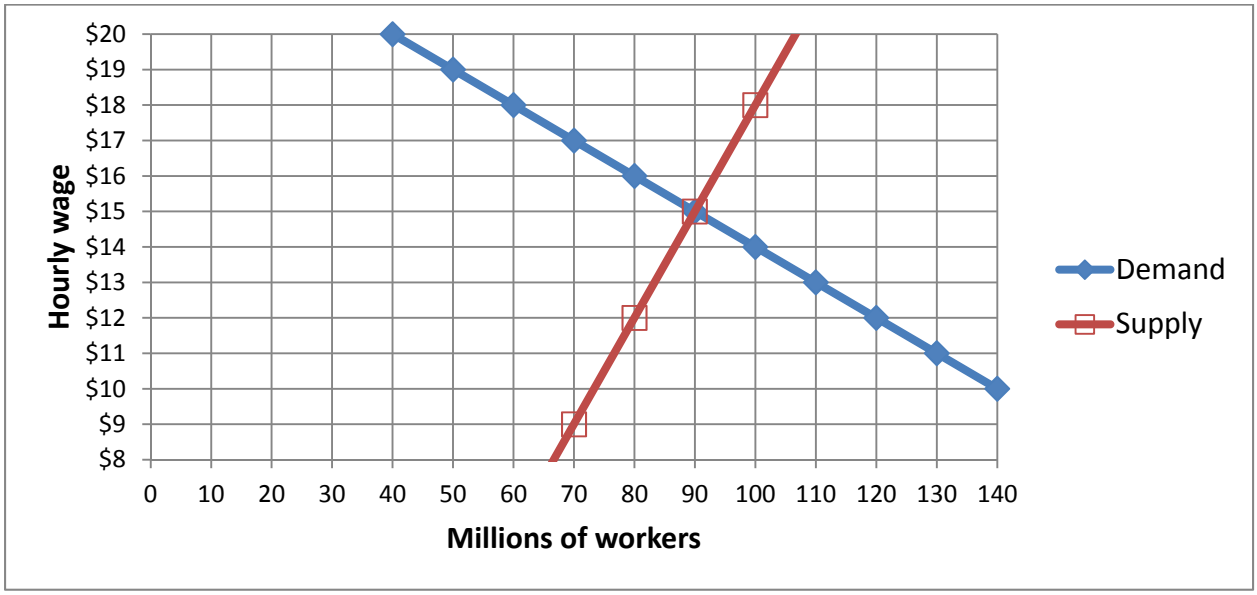
(13) The marginal return to schooling is typically estimated to be about
a. 0.02.
b. 0.10.
c. 0.50.
d. 1.00.

(14) If more-able persons tend to get more education than other persons, then ordinary least squares regression of earnings on schooling will tend to
a. estimate the returns to schooling without bias.
b. underestimate the returns to schooling.
c. overestimate the returns to schooling.
d. Cannot be determined from information given.

(15) An effective job-market signal must
a. be less expensive for high-productivity workers to acquire than for low-productivity workers.
b. be more expensive for high-productivity workers to acquire than for low-productivity workers.
c. increase a worker's productivity through increased job skills.
d. clearly indicate the worker's level of desire for a job.

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 gives 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 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: 14 pts] Suppose a monopsony employer's demand for workers is given by

$$VMP = 50 - (E/25).$$

Labor supply to the employer is given by

$$w = -10 + (E/50).$$

a. [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 =

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

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

d. [4 pts] Suppose the government imposes a minimum wage of $8 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 $W_N = \mathbf{60} - (E_N/2)$, where W_N is the annual wage (in thousands of dollars) and E_N is the number of workers (in thousands). Demand for labor in the South is given similarly by $W_S = \mathbf{30} - (E_S/2)$. Labor is supplied inelastically to each market. Currently, there are 40 thousand workers in each market, for a total of 80 thousand workers.

a. Compute the current wages in each market.

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.

c. Compute the increase in efficiency for the two regions combined from migration. [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:

$$annual\ earnings = -7{,}566 + 3{,}392\,S + 48\,R$$

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 circuit-breaker system, designed to reduce workers' exposure to high voltage, would cost $800,000 per year. It is estimated that the system would reduce the factory's average annual death rate from 1.4 to 1.3 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: 10 pts] Suppose a person lives for two periods and must choose between two careers. If the person chooses "no college," the person earns $200 thousand in the first period, and then $440 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 $770 thousand in the second period.

First, suppose the discount rate between the two periods is **r = 10%.**

a. [4 pts] Compute the net present value, as of the first period, of "no college."

b. [4 pts] Compute the net present value, as of the first period, of "college."

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

(6) [Who pays for OJT: 16 pts] Suppose that, without training, a computer programmer's value of marginal product is $30,000 per year. If the worker is trained in the first year, the worker's value of marginal product rises to $40,000 per year in the second year. However, training costs the employer $6,000. (Assume the interest rate is zero.)

First, 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…

a. … what will be the worker's wage in the first year? Why?

b. … what will be the worker's wage in the second year? Why?

Second, suppose alternatively 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…

c. … what will be the worker's wage in the first year? Why?

d. … what will be the worker's wage in the second year? Why?

III. Critical thinking: Write a one-paragraph essay answering the question below. [7 pts]

(1) A 2004 article by Dora Costa and Matthew E. Kahn used data on workers in five U.S. census years to estimate the value of a statistical life, as follows.[1]

Census year	Estimated VSL in 1990 dollars
1940	$713,000 - $996,000
1950	$1,122,000 - $1,755,000
1960	$1,085,000 - $2,132,000
1970	$2,792,000 - $4,937,000
1980	$4,144,000 - $5,347,000

Note that the estimated VSL increased over time, even after controlling for inflation. Also, it turns out that jobs in the U.S. became much less risky on average during this period.

a. Consider two explanations: either the demand by employers for employment in high-risk jobs has shifted or the supply by workers of employment in high-risk jobs has shifted. Which explanation is compatible with the information given above? Why?
b. Sketch a graph of the demand and supply of high-risk jobs, showing the shift, to support your answer.
c. What might have caused this shift in demand or supply? Explain.

[end of exam]

[1] Costa, Dora and Matthew E. Kahn. 2004. "Changes in the Value of Life, 1940-1980." *Journal of Risk and Uncertainty*, 29 (2), 159-80. (See table 6, p. 172.)