ECON 115 - Labor Economics
Drake University, Spring 2014
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EXAMINATION 2 VERSION A
"Equilibrium and Differences in Pay"
March 24, 2014

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. Numerical answers, if rounded, must be correct to at least 3 significant digits. 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. [2 pts each, 20 pts total]

(1) In a 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) The government is considering imposing a payroll tax of $2 per hour of work. Which causes a greater loss of employment in the long run?
a. A tax imposed on workers causes greater employment loss.
b. A tax imposed on employers causes greater employment loss.
c. A tax on workers causes the same employment loss as a tax on employers.
d. A tax has no effect on employment, regardless if who pays.

(3) 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.

(4) In a monopsony labor market, a modest increase in the legal minimum wage will
a. decrease employment.
b. increase employment.
c. have no effect on employment.
d. reduce average wages.

(5) Among U.S. states, wage growth since 1960 is
a. negatively correlated with 1960 wage levels.
b. positively correlated with 1960 wage levels.
c. uncorrelated with 1960 wage levels.

(6) Suppose that low-risk jobs pay $12 per hour and high-risk jobs pay $20 per hour. The average reservation price for increased risk among all workers currently in *high*-risk jobs is
a. exactly $8.
b. greater than $8.
c. less than $8.
d. cannot be determined from information given.

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

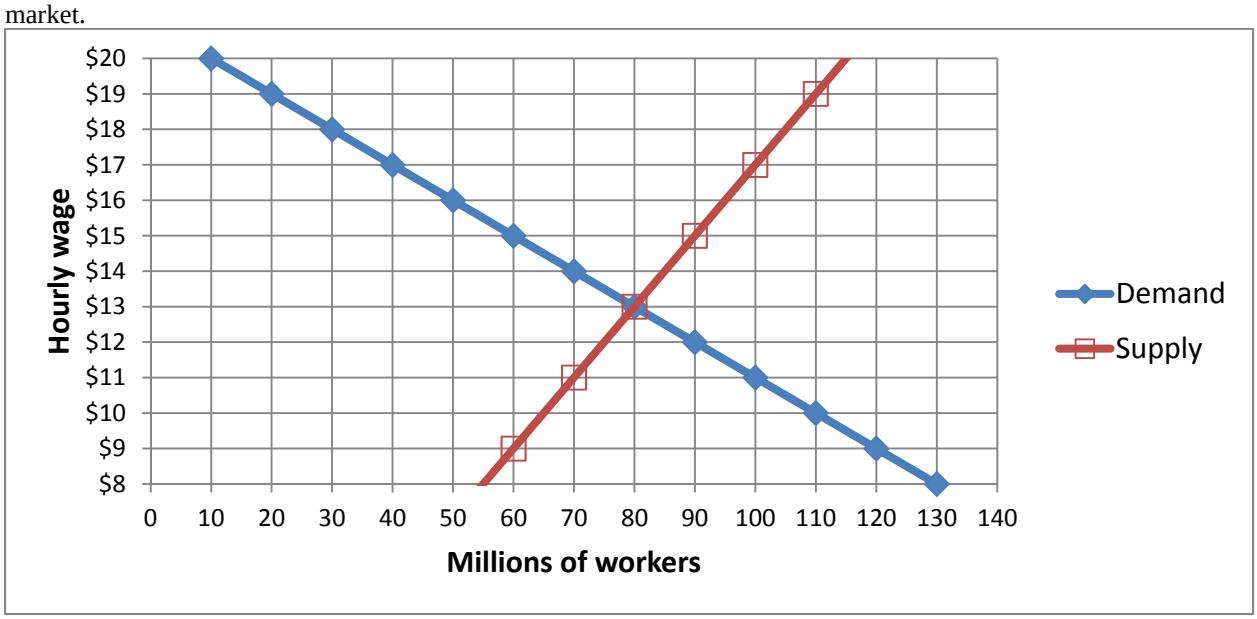
(8) A typical estimate for the value of a statistical life in the United States is
a. $4 thousand.
b. $50 thousand.
c. $600 thousand.
d. $7 million.
e. $80 million.
f. $900 million.

(9) Consider the population over 25 in the United States today. How many have a high school diploma?
a. About 90%.
b. About 70%.
c. About 50%
d. About 30%.
e. About 10%.

(10) Suppose the government encouraged people to get more education--for example, by raising the age of compulsory schooling. According to the signaling model of education, in the long run this action would raise the average worker's
a. productivity.
b. pay.
c. ability to learn on-the-job.
d. All of the above.
e. None of the above.

II. Problems: Please insert your answer to each question in the box provided. Circle your final answers.

(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 subsidy of $ 3** per hour.

a. Find the new level of employment.	million
b. Find the new net labor cost per hour for employers (excluding the subsidy).	$
c. Find the new total wage per hour for workers (including the subsidy).	$
d. Compute the gain in employer surplus as a result of the subsidy (per hour).	$ million
e. Compute the gain in worker surplus as a result of the subsidy (per hour).	$ million
f. Compute the total direct cost of the subsidy program to the government (per hour).	$ million
g. Compute the deadweight loss caused by the subsidy (per hour).	$ million

(2) [Mandated benefits: 6 pts] Assume labor supply is given by $w = -200 + (E/5)$ and labor demand is given by $w = 400 - (E/10)$, where w denotes the daily wage and E denotes the number of workers employed.

a. Compute the equilibrium wage (w) and employment (E).

Now suppose that the government requires all employers to provide a free lunch to workers that costs employers $9 per day per employee.

b. Compute the new equilibrium wage (w) and employment (E), assuming the workers do not value the free lunch.

c. Compute the new equilibrium wage (w) and employment (E), assuming the free lunch is worth $6 to workers.

(3) [Monopsony: 12 pts] Suppose a monopsony employer's demand for workers is given by

$$VMP = 40 - (E/10).$$

The employer's supply is given by

$$w = 4 + (E/20),$$

so its marginal labor cost is given by

$$MLC = 4 + (E/10).$$

a. What level of employment (E) will the employer choose?

b. What wage (w) will it pay?

c. Suppose the government imposes a minimum wage of $15 per hour. What level of employment (E) will the employer now choose?

(4) [Gains from migration: 12 pts] Suppose there are two labor markets: East and West. Demand for labor in East is given by $W_E = \mathbf{70} - (E_E/2)$, where w_E is the annual wage (in thousands) and E_E is the number of workers (in thousands). Demand for labor in the West is given similarly by $W_W = \mathbf{40} - (E_W/2)$. Labor is supplied inelastically to each market. Currently, there are 50 thousand workers in each market, for a total of 100 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.

(5) [Compensating differential: 4 pts] Suppose all workers in the economy have the same preferences, as shown by the following utility function:

$$U = w - (x^2/2),$$

where w denotes the hourly wage and x denotes the noise level. Suppose a job with low noise level (x=4) pays $15 per hour.

a. How much would a job with high noise level (x=6) pay?

b. Compute the compensating differential for high noise.

(6) [Value of a statistical life: 4 pts] Job A pays $22 per hour and Job B pays $20 per hour. However Job A carries an annual risk of death of 6/10,000 (=0.0006) while Job B carries an annual risk of only 1/10,000 (=0.0001). Assume a typical worker works 2000 hours per year. Compute the value of a statistical life from these data.

(7) [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 $150 thousand in the first period, and then $525 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 $735 thousand in the second period.

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

a. Compute the net present value of "no college."

b. Compute the net present value of "college."

c. Which career will the person choose: "no college" or "college"?

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

d. Compute r*.

e. If a person's discount rate were *less* than r* (found in part d) would that person choose "no college" or "college"?

(8) [Measuring return to schooling: 6 pts] Let W denote the hourly wage received by a worker. Let S denote the number of years of schooling that the same worker has completed. Let A denote the worker's age. The following model has been estimated by the method of least-squares regression, using data on several hundred workers. The numbers in parentheses are standard errors.

$$\begin{array}{lcccccc} \log(W) & = & 0.83 & + & 0.15\,S & + & 0.01\,A - 0.0001\,A^2 \\ & & (0.07) & & (0.05) & & (0.02) \quad (0.0001) \end{array}$$

a. [2 pts] Assuming there is no "ability bias" in these data, what is the rate of return to schooling?

b. [4 pts] If there is "ability bias," is the true rate of return likely to be *higher* or *lower* than your answer to part (a)? Why?

(9) [Job market signaling: 4 pts] Suppose there are two kinds of workers: high-ability and low-ability. Employers must pay low-ability workers a wage of w_L = \$25,000. A particular certificate costs \$5000 for high-ability workers but costs \$8,000 for low-ability workers. Employers wish to use the certificate as a screening device, paying all workers who have the certificate a wage of w_H. To make the certificate an effective screening device, in what range must w_H lie?

III. Critical thinking: Write a short essay answering the question below. [8 pts]

Suppose that, without training, an auto mechanic's value of marginal product is $30,000 per year. If the worker is trained in the first year, the auto mechanic's value of marginal product rises to $40,000 per year in the second year. Training costs the employer $5,000.

a. Suppose first that this training raises the auto mechanic's value of marginal product at this employer but also at *many other employers*. What will be the worker's wage in the second year? Why? If the worker is trained in the first year, what will be the worker's wage in the first year? Why?
b. Suppose alternatively that this training raises the auto mechanic's value of marginal product *only at the employer who provides the training*. What will be the worker's wage in the second year? Why?

Write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]