Labor Economics (ECON 115)
Drake University, Spring 2012
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EXAMINATION #2 VERSION B
"Equilibrium and Differences in Pay"
March 13, 2012

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

I. Multiple choice: Circle the one best answer to each question. [2 pts each, 30 pts total]

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

(2) Suppose in a particular labor market, the elasticity of labor supply is 0.2 and the elasticity of labor demand is -0.9. 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) An employer monopsony creates deadweight loss because
a. the equilibrium wage is excessive.
b. workers are hired whose value of marginal product exceeds the value of their time.
c. employer surplus is reduced.
d. the employer hires fewer workers than the socially-optimal quantity.

(4) Migration is efficient because
a. the population in the receiving region becomes equal to the population in the sending region.
b. the output level in the receiving region becomes equal to the output level in the sending region.
c. the rise in output in the receiving region exceeds the fall in output in the sending region.
d. the income level in the receiving region becomes equal to the income level in the sending region.

(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) Suppose that low-risk jobs pay $12 per hour and high-risk jobs pay $20 per hour. The average reservation price for increased risk of 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 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) A typical estimate for the value of a statistical life in the United States is
a. $900,000.
b. $7,000,000.
c. $50,000,000.
d. $300,000,000.

(9) "Moral hazard" means
a. illegal activities that increase 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.

(10) Suppose a person expects to earn $1000 at some point in the future. The present discounted value of that $1000 is larger,
a. the further into the future it will be received.
b. the lower the discount rate (r).
c. both of the above.
d. none of the above.

(11) 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.

The next three questions refer to the following information.
Economists often estimate the relationship between earnings, schooling, and age with data on individual workers, using an equation such as the following:

$$\log(W) = \beta_1 + \beta_2 \text{ Age} + \beta_3 \text{ Age}^2 + \beta_4 \text{ Schooling.}$$

(12) In the equation above, the estimated value of β_2 is typically
a. negative.
b. zero.
c. between zero and 0.5.
d. between 0.5 and 1.0.
e. greater than 1.0.

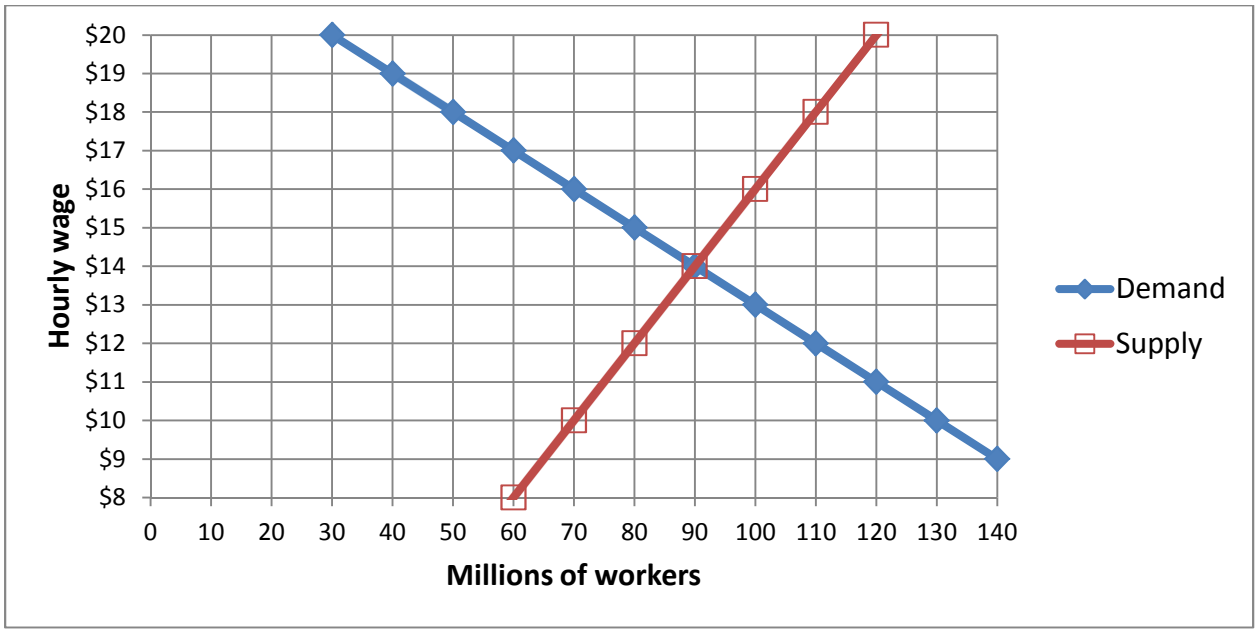
(13) In the equation above, the estimated value of β_3 is typically
a. negative.
b. zero.
c. between zero and 0.5.
d. between 0.5 and 1.0.
e. greater than 1.0.

(14) In the equation above, the estimated value of β_4 is typically
a. negative.
b. zero.
c. between zero and 0.5.
d. between 0.5 and 1.0.
e. greater than 1.0.

(15) According to the signaling model, by getting more education, a worker increases her or his
a. productivity.
b. ability to learn on-the-job.
c. pay.
d. all of the above.

II. Problems: Insert your answer to each question in the box provided. Show your work and circle your final answers.

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



Suppose the government imposes a payroll tax of **$ 6** per hour.

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

(2) [Cobweb model: 12 pts] Suppose the demand for rocket scientists depends on the current level of wages:

$$w_t = 60 - 0.005\, E_t \,.$$

However, it takes time for new rocket scientists to enter the market because extensive education is required. Assume the supply of rocket scientists depends on the previous period's wages:

$$E_t = 100\, w_{t-1} \,.$$

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

Now suppose a new government program shifts the demand up to $w_t = 90 - 0.005\, E_t$, creating a boom.

b. Compute the new wage for this boom period.

c. Compute the next "bust" period employment (E) and wage (w).

d. Compute the next "boom" period employment (E) and wage (w).

e. Compute the next "bust" period employment (E) and wage (w).

f. Compute the long-run employment (E) and wage (w) to which the market is gradually converging.

(3) [Monopsony: 6 pts] Suppose a monopsony employer's demand for workers is given by

$$VMP = 37 - (E/100).$$

The employer's supply is given by

$$w = 1 + (E/200),$$

so its marginal labor cost is given by

$$MLC = 1 + (E/100).$$

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 $12 per hour. What level of employment (E) will the employer now choose?

(4) [Immigration surplus: 8 pts] Suppose demand for low-skilled workers in the U.S. is given by

$$w = 30 - 0.1\,E$$

where w denotes the hourly wage and E denotes employment (in millions). Suppose there are 150 million domestic U.S. low-skilled workers who supply labor inelastically. Suppose also that 20 million workers would enter the U.S. and supply labor inelastically if the U.S. allowed free immigration.

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.

d. Compute the amount of surplus that would be transferred from U.S. workers to U.S. employers under free immigration.

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

$$U = w - 3x^{1/2},$$

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=25) pay? $

b. Compute the compensating differential for high noise. $

(6) [Value of a statistical life: 5 pts] Job A pays $22 per hour and Job B pays $19 per hour. However Job A carries an annual risk of death of 9/10,000 (0.0009) while Job B carries an annual risk of 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) [Education in the labor market: 5 pts] In 1969, 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 1979, 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. College enrollment data are shown below.

Percent of persons 16 to 24 years old who graduated from high school in the preceding 12 months	1969 Draft	1979 No draft
Female	47	48
Male	60	50

SOURCE: Bureau of the Census, *Statistical Abstract of the United States*, 2012, table 276.

Estimate the effect of the military draft on male college enrollment using a difference-in-differences methodology.

(8) [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 \$150,000 in the first period, and then \$480,000 in the second period. If the person chooses "college," the person earns nothing in the first period and pays college costs of \$50,000, and then earns \$700,000 in the second period.

First, suppose the discount rate between the two periods is $r = 15\%$.

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"?

(9) [Job market signaling: 5 pts] Suppose there are two kinds of workers: high-ability and low-ability. Employers must pay low-ability workers a wage of $w_L = \$20{,}000$. A particular certificate costs \$10,000 for high-ability workers but costs \$15,000 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. In what range must w_H be to make this an effective screening device?

[end of exam]