

Final Examination
Suggested Answer

Name _____

Student # _____

Answer each question in the space provided. Your answer must be in English. You are allowed to use a dictionary. Please write legibly so that I can read your answer. This examination ends at 9:55. This examination consists of three parts: 1. basic part (70%), 2. standard part (20%) and 3. difficult part (10%).

Part 1 Basic Part (7pts for each, 70pts in total)

Short answer questions – Answer each question briefly.

1. Define the reservation wage.

The wage level above which a person works.

The wage level at which a person is indifferent between working and not working.

The slope of indifference curve at the initial endowment point.

2. Suppose a firm uses capital and labor to produce output. When the price of capital increases while output price and wage rate are constant, what happens on the employment due to the substitution effect?

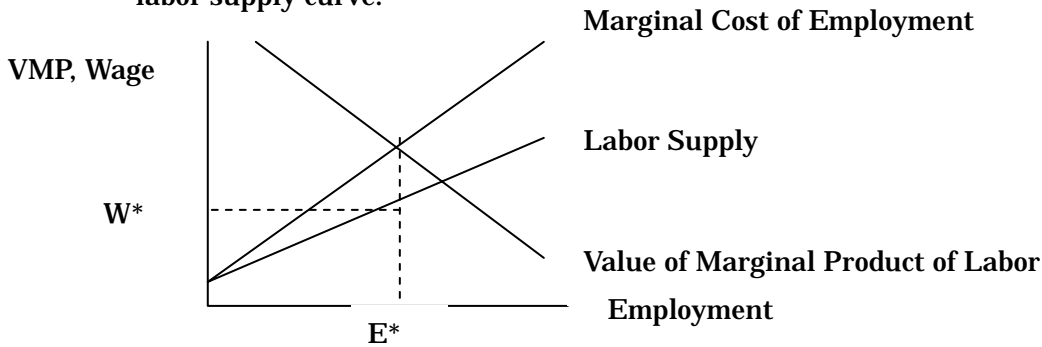
Due to the decrease in the relative price of labor, the employment increases due to the substitution effect.

(Diagram is not correct -2 points)

(Reasoning is not correct -3 points)

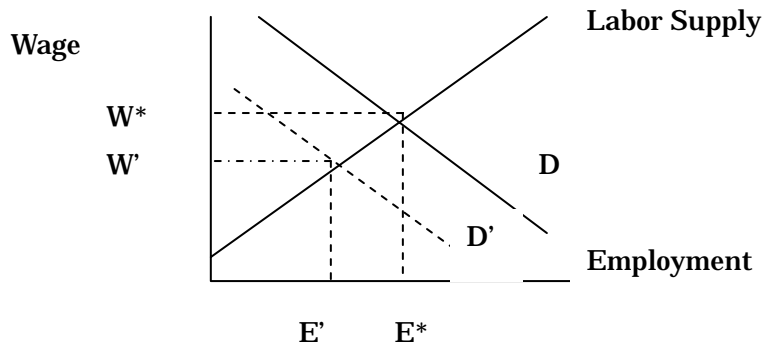
3. Discuss how the optimal employment and wage is determined by the non-discriminatory monopsonistic employer (i.e. the firm has to pay the same wage for all the workers). Draw a diagram to explain.

The optimal employment is determined at the point where marginal cost of employment equals to the value of marginal product of labor. The wage is determined at the point on labor supply curve.



3 pts for $VMP=MC$. 4pts for diagram (2pts for employment, 2pts for wage)

4. Drawing a diagram, describe the impact of a payroll tax imposed on employers on wages and employment in a competitive industry. In the diagram, clearly indicate the part of the tax shifted to workers.



Labor demand curve shifts from D to D'. The tax burden shifted to workers is $W^* - W'$.

5. Suppose there is an eighteen years old high school student who is about to graduate. He lives for two periods and if he decides to attend college, he has no earnings in the first period and he earns 110 million yen in the second period. If he decides to attend college, he earns 50 million in the first period and 55 million in the second period. There is no college tuition. If the discount rate is 0.05 to discount the earnings in the second period, should he attend the college from the purely monetary view point?

$$PV_{col}=0+110/(1+0.05)$$

$$PV_{hs}=50+55/(1+0.05)$$

$$PV_{col}>PV_{hs}$$

Thus it is better for him to attend college.

6. (Continuation of 5) For the above setting, what is the internal rate of return?

The internal rate of return is calculated by solving the following equation.

$$PV_{col}=PV_{hs}$$

$$0+110/(1+r)=50+55/(1+r)$$

$$r=0.1$$

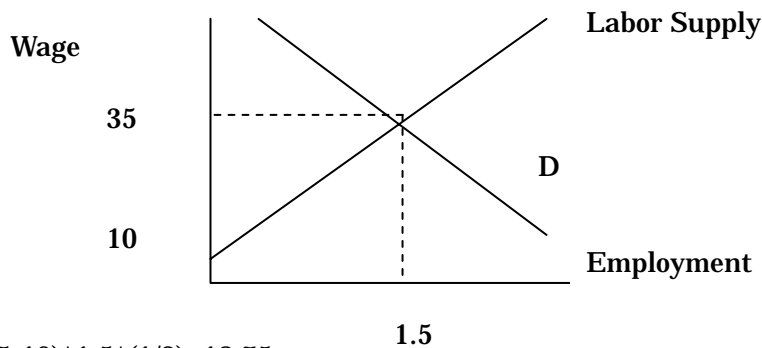
7. Explain how the optimal year of schooling is determined. Discuss how differences in ability across workers lead to differences in earnings and schooling. What problem do we face when we attempt to estimate the return to schooling?

The optimal year of schooling is the point where marginal rate of return to additional year of education is discount rate. Those higher ability people have higher marginal rate of return and accordingly receives longer year of education. However, high ability itself is likely to result in higher wage. Thus we cannot tell whether people with longer year of education earn more because of longer year of education or higher ability.

8. Suppose that the supply curve for optometrists is given by $L_s = -0.6 + 0.06 W$, while the demand curve is given by $L_d = 5 - 0.1W$, where W = annual earnings in million yen per year and L = thousands of optometrists. Find the equilibrium wage and employment levels.

$L_s = L_d$
 $W = 35, L = 1.5$.

9. (Continuation of 8) Calculate the workers' surplus in the setting given in 8.



$(35 - 10) * 1.5 * (1/2) = 18.75$

10. Explain why the existence of discriminatory employers against female workers in the market does not necessarily imply the equilibrium male-female wage differentials.

If the amount of female labor supply is relatively small, all the female workers may be absorbed by non-discriminatory employers.

Part 2 Standard Part (20pts in total)

11. Suppose there are two types of persons, high-ability and low-ability. A particular diploma costs a high-ability person 800,000 yen and costs a low-ability person 2,000,000 yen. Firms wish to use education as a screening device where they intend to pay 2,500,000 yen to workers without a diploma and K yen to those with a diploma.

A. In what range must K be to make this an effective screening device? (10pts)

To make the diploma an effective device, high ability person should obtain diploma while low ability person does not obtain diploma.

High ability person obtains the diploma if $K - 80 > 250$. Thus $K > 330$.

Low ability person does not obtain diploma if $K - 200 < 250$. Thus $K < 450$.

When $330 < K < 450$ is satisfied, the diploma works as an effective screening device.

B. Suppose the government subsidizes low-ability persons by 120,000 yen for the diploma. The subsidy only applied to low-ability persons. (i.e. the cost of obtaining diploma becomes 800,000 yen after the subsidization.) What happens to the signaling value of diploma? Can there be a perfectly separating equilibrium in this labor market? (10pts)

Because obtaining the diploma becomes equally costly for high and low ability people, the diploma does not have signaling value. There cannot be a perfectly separating equilibrium.

Part 3 Difficult Part (10 pts in total)

12. Many crimes against property (burglary, for example) can be thought of as acts that have immediate gains but run the risk of long-run costs. If imprisoned, the criminal loses income from both criminal and noncriminal activities. Using the framework for occupational choice in the long run, analyze what kinds of people are most likely to engage in criminal activities. What can society do to reduce crime?

There are three points to consider. 1. opportunity cost of committing crime, 2. risk attitude of a person, 3. Discount rate for future earnings.

Those who have low opportunity cost of committing crimes are more likely to commit crime. Thus those who have low level of human capital are more likely to commit crime. Secondly, committing crime is risky behavior because, if caught, the person has to forego the income flow due to the imprisonment. Thus risk neutral people are more likely to commit crime. Thirdly, those who discount future income at high rate are more likely to engage in criminal behavior because they care about immediate high income at the cost of the loss of future income.

Society could increase the opportunity cost of committing crime by increasing the wage of low wage earners. For this purpose, the government can offer training program toward poor people or raise minimum wage. Another possible policy is to increase the cost of committing crime by increasing the level of punishment and increase the degree of policing activity.