2020 年度実施

大学院経済学研究科修士課程入学試験問題

問題訂正

問題 4

(Problem 4)

次の条件を仮定して下さい。

$$\alpha \neq 0, \bar{x} \neq 0,$$

ここで $\bar{x}$ は X_i の標本平均

Assume the followings:

$$\alpha \neq 0, \bar{x} \neq 0,$$

where $\bar{x}$ is the sample mean of X_i

２０２０年度実施

慶 應 義 塾 大 学 大 学 院 入 試 問 題

経済学研究科（修士課程）

２０２０年7月１１日 実施

科目名	Economics (English)	受験番号	Application number	氏名	Name

注意事項（Please note:）

1. This set of problems contains 9 pages (including the cover page).

2. There are 7 problems from which you should choose 2 to answer. Each problem should be answered on a separate answer sheet. Please write the number of the problem you are answering on each answer sheet.

3. If you answer 2 or more problems on 1 answer sheet, only the first answer will be treated as a valid answer. Everything after the first answer will not be marked.

4. Answer in English.

5. Although the problem sheets will not be collected after the examination, please write your name and exam application number (受験番号, jyuken-bango) on the cover page.

２０２０年度実施 大学院経済学研究科修士課程入学試験問題	科目名	Economics (English)	／

Problem 1. Answer all questions.

Two players negotiate over how to share 100 dollars as follows. First, player 1 (the proposer) offers $(x, 100 - x)$ where player 1 receives x dollars and player 2 receives $(100 - x)$ dollars. Player 2 (the responder) then chooses to accept or reject this offer by player 1. If player 2 accepts, the offer is realized and player 1 receives x dollars and player 2 receives $(100 - x)$ dollars. However, if player 2 rejects, each of the two players gets nothing.

Denote the allocation of dollars resulting from this negotiation by (y_1, y_2) where y_1 is the amount of dollars that player 1 gets and y_2 is the amount of dollars that player 2 gets as a consequence of the negotiation.

(1) Assume that player 1 can only offer $x = 50$ or $x = 100$.

(a) Draw a game tree.

(b) Define the strategy of player 2, and list up all strategies of player 2.

(c) Derive the set of allocations of dollars that are feasible in this game.

(d) Define a Pareto efficient allocation.

(e) Is the allocation $(50,50)$ Pareto efficient?

(f) Does there exist a subgame perfect equilibrium that leads to the allocation $(50,50)$? If so, specify the strategy profile and show that it is a subgame perfect equilibrium. If not, show that there is no such equilibrium.

(2) Assume that player 1 can offer any real number between $x = 0$ and $x = 100$.

(a) Does there exist a Nash equilibrium that leads to the allocation $(50,50)$? If so, specify the strategy profile and show that it is a Nash equilibrium. If not, show that there is no such equilibrium.

(b) Does there exist a subgame perfect equilibrium that leads to the allocation $(50,50)$? If so, specify the strategy profile and show that it is a subgame perfect equilibrium. If not show that there is no such equilibrium.

２０２０年度実施 大学院経済学研究科修士課程入学試験問題	科目名	Economics (English)	／

Problem 2.

Consider an economy consisting of a large number of profit-maximizing firms. The firm faces competitive product and factor markets, and produces the final good according to the production function $Y_t = K_t^{\alpha}(N_t)^{1-\alpha}$, where K_t is the stock of capital, N_t is the is the working population that grows according to $N_t = (1+n)^t$.
Investment is financed by savings to ensure $sY_t = I_t$, where s is the saving rate and I_t is the investment in capital. The stock of capital evolves according to
$K_{t+1} = I_t + (1-\delta)K_t$, where δ is the depreciation of capital.

(1) We solve this problem by dividing variables in terms of *N*, such that $Y/N \equiv y$ and $K/N \equiv k$. What is the advantage of this transformation?

(2) Rewrite the equilibrium equation for $sY_t = I_t$ by the first-order differential equation for k_t.

(3) State the dynamics of k_t when the initial capital labor ratio, k_0, is smaller than the steady state value. Explain this using the graph with k_t measured on the horizontal axis.

(4) Solve the interest rate at the steady state.

(5) Assume that this economy opens the capital market internationally. In addition, assume that the world interest rate, denoted *r*, is higher than the rate solved in (4). Explain the behavior of k_t. State the implication on the equality of savings and investment.

２０２０年度実施 大学院経済学研究科修士課程入学試験問題	科目名	Economics (English)	／

Problem3.

Answer the following two questions on capitalism. Base your answer on the methodology of Marxian economics.

(1) Briefly explain the following concepts.
①Use-value
②Extra surplus-value
③Organic composition of capital
④Fictitious capital
⑤Differential rent

(2) Discuss the relationship between industrial cycles and technological changes in the competitive stage.

Problem 4.

Suppose that dependent variable Y_i and explanatory variable X_i have the following **true** relationship:

$$Y_i = \alpha + \beta X_i + u_i,\ i = 1,..,\ n,$$

where u_i is an independently and identically distributed random variable with $E(u_i) = 0$ and $\mathrm{var}(u_i) = \sigma^2$. Assume that X_i is not a random variable. Let $\hat{\beta}$ be the ordinary least square (OLS) estimator of β from this true regression model. Now, suppose that a researcher mistakenly specifies the following **wrong** regression model without an intercept for Y_i and X_i :

$$Y_i = \beta X_i + u_i,\ i = 1,..,\ n.$$

Let $\tilde{\beta}$ be the OLS estimator of β from the wrong regression model. We regard $\tilde{\beta}$ as an estimator for the coefficient β of X_i in the true regression model.

(1) Derive the expected value and variance of $\hat{\beta}$.

(2) Derive the expected value of $\tilde{\beta}$.

(3) Derive the variance of $\tilde{\beta}$.

(4) Derive the biases of $\hat{\beta}$ and $\tilde{\beta}$. Which is larger in absolute value? Prove it.

(5) Which is larger, the variance of $\hat{\beta}$ or the variance of $\tilde{\beta}$? Prove it.

(6) Derive the necessary and sufficient condition for the mean squared error of $\tilde{\beta}$ to be smaller than that of $\hat{\beta}$.

２０２０年度実施 大学院経済学研究科修士課程入学試験問題	科目名	Economics (English)	／

Problem 5.

Answer one of A, B, and C. If you answer more than one, all answers become invalid.

A

In developed countries, the level of fertility declined even though income increased. This is explained economically using the value of wife's time allocation and the tradeoff between of quality and quantity of children. Answer all of the following questions.

(1) Let $U = U(x, n)$ be the couple's utility, that satisfies the standard assumptions of utility function (monotonically increasing with respect to both arguments and quasi-concave), and the number of children be determined so that utility is maximized. Describe the budget constraint where the family income equals to the family expenditure. Explain why the number of children is smaller when the wife's income is higher, using a diagram that has the number of children (n) on the horizontal axis and consumption by couple (x) on the vertical axis using the following notation.

n: number of children (may take a real number) answer the following questions.

I: non-wife's income

T: total discretionary time of wife

t_c: time wife must spend for each child (assume wife does all child care)

w: wife's wage rate

q: goods that must be given to each child

p_q: price of these child goods

x: consumption by couple(parents)

p_x: price of parental consumption goods

(2) Tradeoff of quality and quantity of children also explains a reduction of the number of children by rising income, since as income increases, the demand for the quality of children increases more rapidly than that for the quantity. Then, describe examples in contemporary Japan with specific evidence where the couple's intension of birth declines as the demand for quality of children increases, and explain possible policy responses.

B

Answer all of the following questions about the theory of discrimination in labor economics.

(1) There are broadly two types of the theory of discrimination. Discrimination by taste, and statistical discrimination. Describe the outline of the two theories. Include in your explanation the efficiency of resource allocation at an equilibrium with discrimination.

(2) Suppose that you want to empirically find evidence on whether there exists discrimination in the male-female wage gap in Japan. Propose the data and the estimation method.

C

Answer all of the following questions.

(1) Most central banks in advanced economies adopt the inflation target of 2 percent CPI inflation. Explain the costs and benefits of raising and lowering the target level. Then discuss how a central bank should set its inflation target as the Covid-19 crisis settles.

(2) After the Global Financial Crisis triggered by the collapse of Lehman Brothers, there has been increased awareness of the importance of macroprudential policy, in addition to microprudential policy, in achieving financial stability. Macroprudential policy aims at assessing the stability of the financial system as a whole, while microprudential policy focuses on examining the soundness of individual financial institutions. Discuss why we need macroprudential policy in sustaining financial stability. Discuss also how the relationship between micro- and macroprudential policies will evolve as the Covid-19 crisis settles.

２０２０年度実施 大学院経済学研究科修士課程入学試験問題	科目名	Economics (English)	／

Problem 6.

Choose any region or country and discuss the roles of the family system and the population in its economic development, using historical facts.

２０２０年度実施 大学院経済学研究科修士課程入学試験問題	科目名	Economics (English)	／

Problem 7. Choose and answer one of the following questions (if you answer both, all answers would be invalid):

1) How has the concept of "rational economic man" been criticized outside the Classical and Neo-classical Schools of Economics? Be sure to mention two (at least) different economic doctrines in your answer.

2) What part did the ideas of the following thinkers play in the modern economic thought that was emerging at the age of Enlightenment: John Locke, Bernard Mandeville, and Jean-Jacques Rousseau? Choose two of three thinkers and discuss.