i # Candidate instructions

ECON4240 – Equilibrium, Welfare and Information

This is some important information about the written exam in ECON4240. Please read this carefully before you start answering the exam.

Date of exam: Wednesday, May 22, 2019

Time for exam: 9.00 – 12.00 (3 hours)

The problem set: The problem set consists of three questions, with several sub-questions. They count as indicated. Start by reading through the whole exam, and make sure that you allocate time to answering problems you find easy. Multiple choice questions are graded such that you will always be better off providing an answer, than to leave it blank.

Sketches: In this exam, you may submit sketches on questions 2 and 3. You are to use the sketching sheets handed to you. You can use more than one sketching sheet per question. See instructions for filling out sketching sheets below. It is very important that you make sure to allocate time to fill in the headings (the code for each problem, candidate number, course code, date etc.) on the sheets that you will use to add to your answer. You will find the code for each problem under the problem text. You will NOT be given extra time to fill out the "general information" on the sketching sheets (codes for each problem, candidate number etc.) Do NOT hand in sketches on question 1. **Sketches handed in for the multiple choice questions, will not be included in the assessment.**

Resources allowed: No written or printed resources - or calculator - is allowed (except if you have been granted use of a dictionary from the Faculty of Social Sciences).

Grading: The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

Grades are given: Wednesday, June 12, 2019

1 # Multiple choice questions

Problem 1

Each correct sub-question gives 2%. All correct questions gives 20%.

1. Suppose you are covered under health insurance and you are insured against all or most of the costs of visits to the doctor. As a result you are likely to make greater use of medical services of all kinds. This tendency of people with insurance to change their behavior in a way that leads to more claims against the insurance company is called

Select one alternative

○ moral hazard

○ signaling

○ screening

○ adverse selection

2. The fact that big banks are considered "To Big to Fail,"

Select one alternative:

○ creates a problem of moral hazard. Banks take hidden actions that determine the riskiness of their loan portfolios. Because of the free insurance the big banks get, the big banks will select loan portfolios that are excessively risky.

○ creates a problem of adverse selection. Bank regulators solve this problem by signaling their hidden information.

○ creates a lemons problem. In the long run equilibrium, only the "lemon" banks will survive.

○ creates a problem of adverse selection. Bank regulators solve this problem by screening the banks to separate healthy banks from unhealthy banks.

3. The limited liability constraint:
Select one alternative

○ makes it difficult to induce high effort

○ helps the talented individuals to obtain a larger payoff

○ induces sellers to offer better-quality products

○ ensures the agents will want to accept the contract

4. The shutdown contract:
Select one alternative

○ emerges in adverse selection when it is optimal to offer a contract that only the "good" type will accept

○ emerges in adverse selection when it is optimal to offer a contract that only the "bad" type will accept

○ emerges in moral hazard when the principal decides the agent should not exert high effort

○ none of the others

5. In moral hazard:
Select one alternative

○ A negative transfer for low outcome is optimal with a risk-neutral agent

○ The only way to incentivize high effort is to punish low outcome with a negative transfer

○ A negative transfer for low outcome is optimal with a risk-averse agent

○ none of the others

6. In a Walrasian equilibrium,
Select one alternative

○ firms use market power to increase their profits.

○ Walras law states that the allocation is Pareto efficient.

○ Walras law states the any Pareto efficient allocation can be decentralized.

○ consumers are price takers.

7. Strategic actions of firms

Select one alternative

○ can increase their profits if there is limited competition.

○ increases their profits under Bertrand competition.

○ always increases their profits under Cournot competition.

○ always increases their profits.

8. Compare the impact on the supplier and the consumer when imposig a small tax in partial equilibrium:
Select one alternative

○ the actor with the less elastic response takes the higher price change.

○ The relative price response of producer over consumer price is determined by the ratio of the income over the profits.

○ the actor with the more elastic response takes the higher price change.

○ The relative price response of producer over consumer price is determined by the ratio of the long-run equilibrium response to the short-run equilibrium response.

9. In general equilibrium

Select one alternative

○ the value of excess demand must sum to zero.

○ the Walrasian equilibrium is always unique.

○ the First Theorem of Welfare Economics implies full competition.

○ a tax will always improve the welfare.

10. The Samuelson Rule states that optimal allocation of a public good requires that
Select one alternative

○ the sum of the marginal willingness to pay across agents has to equal the marginal production costs.

○ the marginal willingness to pay has to equal the sum of marginal production costs.

○ individuals are taxed proportionally to their income.

○ the subsidies for the public good are financed through the Grove mechanism.

Maximum marks: 20

Attaching sketches to this question?
Use the following code:

X X X X X X X

2 # Plutonians and health

Problem 2 - weight 40%

In Plutonia, each individual has an income of 10 plutons. The utility function is given by $U(c) = c - 0.05c^2$, where c denotes consumption. Plutonians might get sick. When a Plutonian gets sick, s/he needs to visit a hospital. A hospital visit costs 8 plutons and cures the sickness completely. Plutonians differ in terms of genetic predisposition to getting sick. Type A and type B have a probability of illness of 20%. Type C has a probability of illness of 80%. There are 25% of Plutonians of type A, 25% of type B, and 50% of type C.

1. In the absence of health insurance, find the expected utility of each type of Plutonian.

Fill in your answer here

2. The government is planning to provide health insurance. Since everyone is risk averse, the (inexperienced) government assumes that everyone in Plutonia will buy insurance (even though subscription is not mandatory). Types are not observable. The government plans to break even: it charges a premium that exactly covers the expected medical costs of those getting sick. What is such a premium?

Enter text here

3. Will every Plutonian buy insurance coverage? Show that this is not the case (i.e., the participation constraint of some type is violated).

Enter text here

4. What is the premium ensuring zero profits to the government, when individuals optimally choose whether to buy insurance? Who will buy insurance?

Enter text here

5. An economist advices the government to offer instead two insurance products. *Full coverage* (FCOV) covers completely the price of the hospital visit; the premium is given by the answer to 4. Partial coverage (PCOV) contributes to cover the medical expenses partially (the individual pays the rest) for a lower premium. How should the government design the PCOV insurance (making zero profits)? Does this strategy solve the asymmetric information problem? Briefly discuss.

Enter text here

6. A health research institute has found a way to cure the predisposition of type C Plutonians to illness: the cure ensures that type C individuals will never become sick again. The cure costs 6.8 plutons. In the absence of health insurance, will an individual of type C buy the cure? What if the FCOV and PCOV insurances are available? How is this a moral hazard problem?

Enter text here

Maximum marks: 40

3   # Exchange Economy

Problem 3 [40%, each of i-iv 10%]

Two agents, denoted a and b, live in a 2-commodity exchange economy and have the following utility functions:

$$U(x_a, y_a) = \left(\alpha x_a - \frac{x_a^2}{2} \right) + y_a$$

$$U(x_b, y_b, x_a) = \left((\alpha + \gamma x_a) x_b - \frac{x_b^2}{2} \right) + y_b$$

with $\alpha > 0$ and $\gamma \in \mathbb{R}$. Initial endowments are $w_a = (\bar{x}_a, \bar{y}_a)$ and $w_b = (\bar{x}_b, \bar{y}_b)$. All agents are price takers. Please normalize the price for good y to unity. You may assume an interior solution.

i) Explain the difference between the first and the second welfare theorem of economics. Which of them is more important for policy making? Explain why.

   Given the situation above, please explain how one of the theorems applies.

Fill in your answer here

[ ]

Please write your answer to part i in the box above. Please solve parts ii, iii, and iv on a sheet of paper (to be scanned).

ii) Derive the aggregate demand for good x. What is the equilibrium allocation of good x? What are the equilibrium prices?

iii) For which values of γ is the allocation Pareto efficient? How do you call the issue arising for other values of γ (please consider both γ positive and negative). Derive the Pareto efficient allocations for all values of γ.

iv) Assume you can tax or subsidize agent a's consumption of good x_a. What level of the tax or subsidy is required to reach Pareto efficiency? What is special here and does not always hold in general equilibrium?

Maximum marks: 40