UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Postponed exam: **ECON3200/4200 – Microeconomics and game theory**

Date of exam: Wednesday, December 11, 2013

Time for exam: 09:00 a.m. – 12:00 noon

The problem set covers 4 pages (incl. cover sheet)

Resources allowed:

- No resources allowed

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

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Question 1 (25%)

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Consider a world with two goods, good 1 and good 2. Let $\underline{x} = (x_1, x_2)$ denote a bundle of goods comprising x_1 units of good 1 and x_2 units of good 2. Suppose a consumer, call him A, has preferences which can be represented by the utility function u^A where $u^A(\underline{x}) = x_1 + x_2$. A second consumer, call him B, has preferences which can be represented by the utility function u^B where $u^B(\underline{x}) = \min\{x_1, x_2\}$. A third consumer, call him C, has preferences which can be represented by $u^C(\underline{x}) = x_1^{\alpha} x_2^{1-\alpha}$, α being some number in $(0, 1)$.

1. Find the Hicksian demands of all three consumers.

2. What is the Slutsky equation? Write down the equation and comment on the meaning of the different terms.

3. Check that the Slutsky equation indeed holds for consumer C.

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Question 2 (25%)

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Two consumers, called A and B, both have initial wealth M and both face the risk of an accident. The probability of the accident occurring is fixed exogenously, and equal to q. If the accident occurs, each of them loses L (where $L \leq M$). Both consumers are risk-averse. In addition, you are being told that A is an expected-utility maximizer. However you do not know whether B is an expected-utility maximizer. A risk-neutral insurance company offers individual insurance contracts at a unit price p (so that for a price pK, the insurance commits to making payment K in case the accident occurs).

1. Define risk aversion.

2. How is a full-insurance contract characterized in the present context?

3. Suppose that $p = q$. Show that A demands full-insurance.

4. Again suppose that $p = q$. Show that B also demands full-insurance (remember that you are not allowed to assume that B is an expected-utility maximizer).

5. Are all expected-utility maximizing consumers necessarily risk-averse? If not, illustrate with an example.

6. Are all risk-averse consumers necessarily expected-utility maximizers? If not, illustrate with an example.

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Question 3 (50%)

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Consider the signaling game depicted in the figure below. Nature first chooses the type of Player 1 (A or B type with 50% probability each). Player 1 knows her type but Player 2 does not know whether nature chose A or B. Player 1 then chooses L or R and L' or R', depending on type. Player 2 observes that L or L' was chosen or alternatively that R or R' was chosen. But Player 2 cannot distinguish between L and L' and cannot distinguish between R and R'. Player 2 needs to choose between U' and D' (if Player 1 has chosen L or L') or between U and D (if Player 1 has chosen R or R'). Payoffs are as stated in the figure.

1) Without reference to this specific problem, define formally or write in words what is a Perfect Bayesian Equilibrium (PBE).

2) Concentrating on pure strategy equilibria. What two types of PBE are there in this type of game? Describe what they imply in terms of the actions of the players in this game.

3) Solve for all pure PBE in this game.