Written Exam for the B.Sc. or M.Sc. in Economics winter 2013-14

Microeconomics C

Final Exam

January 13, 2014

(2-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by “eksamen på dansk” in brackets, you must write your exam paper in Danish.

This exam question consists of 3 pages in total (including this page).

Please read the questions carefully and answer all questions. Please explain your answers.

1. Consider the following game G, where a is common knowledge among the players:

	E	F	G	H
A	$8,8$	$1,0$	$3,3$	$3,9$
B	$2,2$	$2,7$	$1,3$	$1,3$
C	$2,0$	$3,3$	$2,1$	$2,0$
D	$9,0$	$2,a$	$4,1$	$4,0$

For questions (a) and (b), assume that $a = 0$.

(a) Simplify the game through iterated elimination of strictly dominated strategies (IESDS). Explain each step briefly (1 sentence).

(b) In the remaining game G', find all Nash Equilibria (pure and mixed).

For the following two questions, consider the original game G again and now assume that $a = 2$.

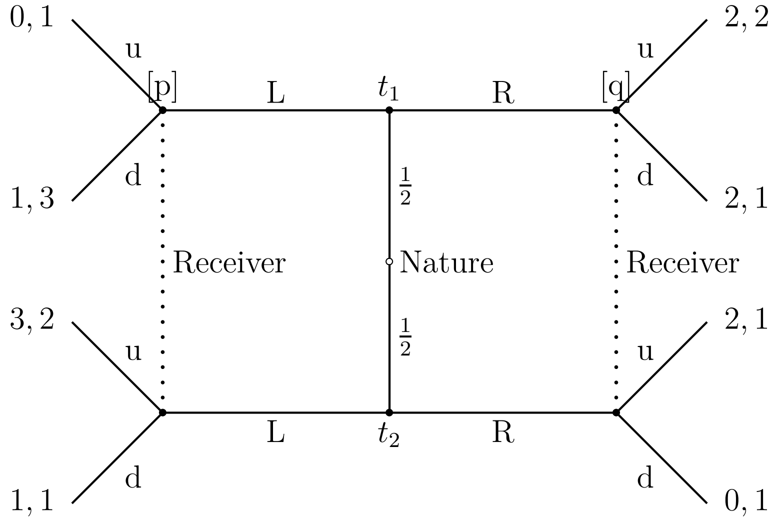
(c) Assume that G is repeated twice and consider the repeated game $G(2)$. Give a Subgame-Perfect Nash Equilibrium of $G(2)$.

(d) Assume that G is repeated infinitely often and that the players discount future payoffs with discount factor $\delta \in (0, 1)$. In this infinitely repeated game $G(\infty, \delta)$, give trigger strategies for the players such that the outcome is (A, E) in every round, and find the minimal δ such that these trigger strategies constitute a Subgame-Perfect Nash Equilibrium.

2. Order the following solution concepts from weakest to strongest (you do not need to explain your ordering):

- Perfect Bayesian Equilibrium with signaling requirements 5 and 6
- Subgame-Perfect Nash Equilibrium
- Nash Equilibrium
- Perfect Bayesian Nash Equilibrium
- Iterated Elimination of Strictly Dominated Strategies

3. Consider the following signaling game:



(a) Find all separating Perfect Bayesian Equilibria (PBE).

(b) Find the pooling PBE in which both types send message R. Does it satisfy signaling requirement 5? Explain briefly (2-3 sentences).

(c) Imagine that you want to prove to someone that you are physically strong.

i. Give an example of a signal that is not credible and explain briefly (1 sentence) why it is not credible.

ii. Give an example of a credible signal and explain briefly (2-3 sentences) why it is credible.

4. Two firms, 1 and 2, are producing a homogenous good and have to decide on quantity. The price is given by

$$P = 15 - q_1 - q_2$$

and both firms have a marginal cost of 3.

(a) Find the Nash Equilibrium quantities under the condition that the two firms choose simultaneously. What are the profits of the firms in equilibrium?

(b) Now assume that firm 1 sets q_1 first, after which firm 2 observes q_1 and sets q_2. Find the quantities in the Subgame-Perfect Nash Equilibrium and calculate the equilibrium profits.

(c) Is there a first-mover advantage for firm 1? Explain briefly (2-3 sentences) why (not).

(d) Give an example of a two-player static game (i.e. write a bimatrix) where there is a first-mover *dis*advantage in the dynamic, perfect-information version of the game. ("First-mover disadvantage" here means that the first player is worse off in the dynamic game than in the equilibrium of the static game.) Name a sufficient condition that guarantees that the dynamic version of a static game does not have a first-mover disadvantage, and explain briefly (2-3 sentences).