

Information Economics, Fall 2014

Final Exam

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Name: _____ Student ID: _____

Note 1. This exam is in-class and open everything (including all kinds of electronic devices). However, an exam taker is not allowed to communicate with any person during the exam. Cheating will result in severe penalty. You do not need to return the problem sheet.

Note 2. In total there are 110 points in this exam. If one's original grades is more than 100 points, she/he will get only 100 points.

1. (20 points) Consider two firms producing and selling the same product to one market. While firm 2's unit production cost is $c_2 > 0$, firm 1 has a new technology and can produce at a lower unit production cost $c_1 \in (0, c_2)$. These two firms play the static Cournot game by choosing q_1 and q_2 , respectively, as the production quantities at the same time. The market-clearing price is $p = a - q_1 - q_2$, where $a > c_2$ is an exogenous constant. Each firm acts to maximize its own profit.
 - (a) (10 points) Find the equilibrium quantities chosen by the two firms. Note that under some conditions firm 2 may choose to produce nothing!
 - (b) (10 points) Suppose that before the static game starts, firm 1 may choose to license the technology to firm 2 at a fixed payment t determined by firm 1. Once getting the technology, firm 2 will also produce at cost c_1 . Suppose that firm 2 will purchase the new technology as long as her profit will become weakly higher. Apply economic reasoning to find a condition under which it is better for firm 1 not to sell the technology. Do not use mathematical derivations. Use economic reasoning only.

2. (30 points) An app developer plans to create an app and sell it to a market. She can set the app quality to q_2 by spending $\frac{1}{2}q_2^2$ as the one-time R&D cost. The app's price is denoted as p_2 . Besides selling the full-version app of quality q_2 at price p_2 , she may also create a simple-version of quality $q_1 < q_2$ by taking away some functions at no cost. The price of the simple-version is denoted as p_1 . In that market, a consumer's utility of paying p to buy an app of quality q is $\theta q - p$, where θ is the consumer's private type. We assume that θ is θ_2 with probability β or $\theta_1 < \theta_2$ with probability $1 - \beta$. When facing three options for buying the full-version, buying the simple-version, and buying nothing, a consumer chooses the option that maximizes his utility. The seller choose p_1 , q_1 , p_2 , and q_2 to maximize her profit subject to the constraint $q_1 \leq q_2$. Suppose the developer wants to sell to both types of consumers.
 - (a) (10 points) Formulate the app developer's optimization problem.
 - (b) (10 points) Solve the app developer's problem to find the equilibrium outcome.
 - (c) (5 points) Show that we have "no rent at bottom" and "efficiency at top."
 - (d) (5 points) Explain how β determines the developer's equilibrium choice on the simple version (i.e., q_1 and p_1). Use both mathematical derivations and economic intuitions.

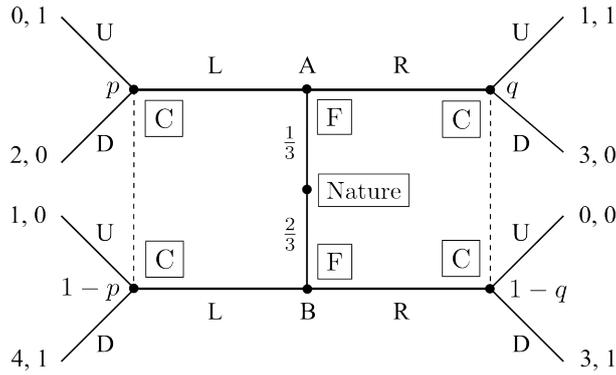


Figure 1: A signaling game

3. (20 points) Consider the signaling game specified in Figure 1.
 - (a) (10 points) Is there any pure-strategy pooling equilibrium? If so, find it (them); otherwise, prove that none exists.
 - (b) (10 points) Is there any pure-strategy separating equilibrium? If so, find it (them); otherwise, prove that none exists.

4. (15 points) Many professional baseball players tend to sign a multi-year contract with his team. In a simplest n -year contract, the team cannot fire the player in the following n years. Moreover, the monthly salaries (may be different from year to year or even month to month) for the following n years are also fixed. For example, there may be a 3-year contract saying that the player's monthly salary will be 300, 320, and 340 thousands NT dollars in the following first, second, and third year, respectively. Note that even if the player plays very bad in the next year, his salary in the second and third years will not be affected. On the other hand, if a player signs a single-year contract, his performance in the next year will definitely affect his salary in the next next year.

Many people believe that once a player signs a multi-year contract, he will lose at least some incentives to perform well. They even claim that a player may *signal* his potential/ability by signing a single-year contract. However, in practice still many teams offer multi-year contracts to players. Comment on this practice with economic reasoning learned in this course. Limit your answer to 300 words.

5. (25 points) In this course, in total five academic papers were introduced. Pick one of them to answer the following two questions.
 - (a) (15 points) What are the main research questions and main insights obtained in that paper? Limit your answer to 300 words.
 - (b) (10 points) That paper certainly makes some assumptions and thus has its limitation. Pick one assumption and explain how the main findings may change when that assumption is relaxed. Limit your answer to 300 words.