Microeconomics III: Problem Set 11[a]

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PS12, Ex. 1 (A): Job-market signaling

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Consider figure 4.2.8 in Gibbons (p. 201). Remind yourselves about the separating equilibrium related to the figure. Why can the high type not choose $e^*(H)$ in a separating equilibrium?
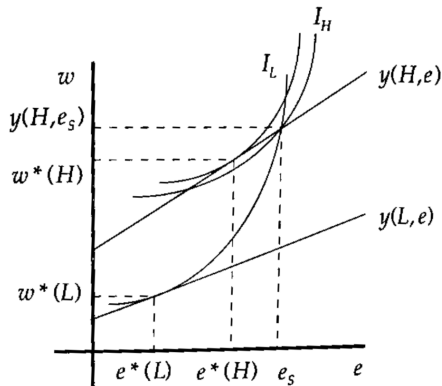

Figure 4.2.8.

PS12, Ex. 2 (A): Farrell & Rabin (1996): "Cheap talk"

In their paper "Cheap Talk" published in the *Journal of Economic Perspectives* (1996), Joseph Farrell and Matthew Rabin describe the following situation: "Sally knows which one of two tasks is efficient to perform. Rayco [the firm] could hire Sally specifically to perform Job 1, specifically to perform Job 2, or as a highly paid manager who will choose which job to perform. If Rayco knew which task is efficient, it would still hire her to perform the task, but at a lower salary, because she has lost her informational advantage. Sally wants to be hired as manager, but prefers to be hired to do the right task and be more productive rather than to do the wrong task and be less productive." Payoffs in this situation are

		Job 1	Job 2	Manager
Sally's knowledge	Task 1 efficient	2, 5	1, -2	3, 3
	Task 2 efficient	1, -2	2, 5	3, 3

where the left number in each cell is Sally's payoff and the right number is the firm's payoff (note that this matrix does not describe the normal form of the game!)

(a) Formulate this strategic situation as a cheap talk game, assuming that the type space is equal to the message space ($T = M$).

(b) Show that a separating equilibrium exists where Sally truthfully reveals which job is efficient, and the firm then places Sally in that specific job.

(c) Discuss whether or not this separating equilibrium seems reasonable. Why isn't Sally able to convince the firm to give her the manager position?

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		Job 1	Job 2	Manager
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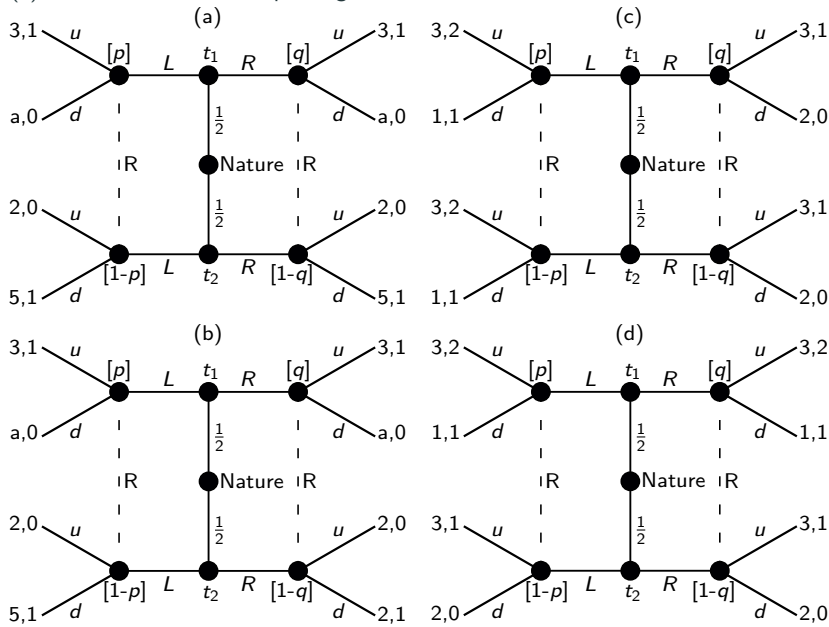
PS12, Ex. 3 (A): Cheap talk games (extensive form)

Consider the games (a)-(d) on the next page. (ii) Which of these are cheap talk games? (ii) For those which are cheap talk games, find a separating equilibrium if such an equilibrium exists, or show that no separating equilibrium exists.

(ii) Which of these are cheap talk games?

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(ii) In cheap talk games, payoffs don't depend on the message: $u_S(t_i, a_k)$, $u_R(t_i, a_k)$.

(ii) (a) and (d) are cheap talk games as messages don't affect $u_S(t_i, a_k)$, $u_R(t_i, a_k)$.

(ii) For those which are cheap talk games, find a separating equilibrium if such an equilibrium exists, or show that no separating equilibrium exists.
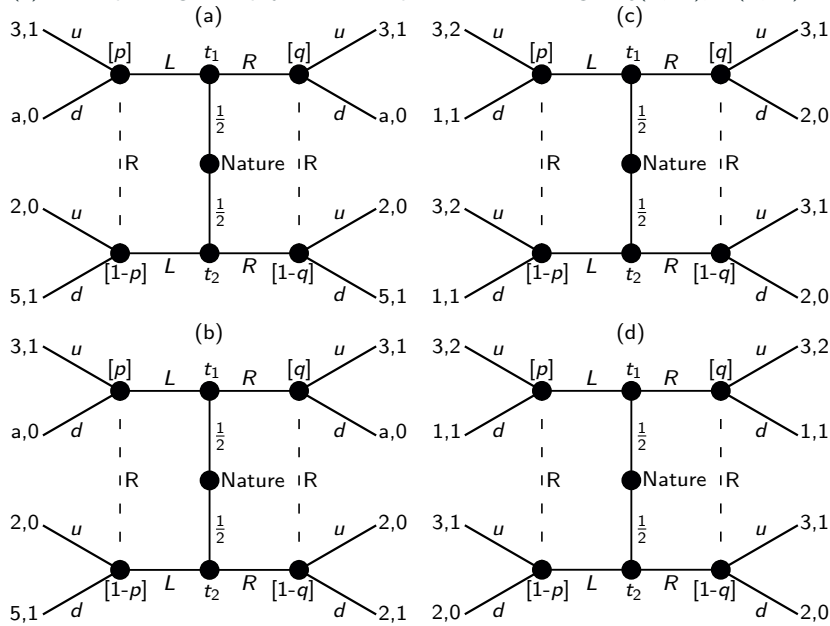

(a)
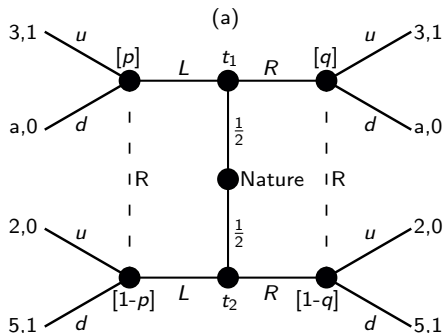
**PS12, Ex. 4: Three-type
job-applicant cheap talk game**

Consider the following job-applicant cheap talk game based on Farrell-Rabin (1996). Suppose that there are three types of potential applicants (high ability, medium ability, and low ability) and the firm can place the applicant in one of three possible positions (highly qualified, medium qualified, low qualified). The applicant is equally likely to be each of the three types (probability $1/3$). Payoff are represented below, where for each cell, the left entry gives the payoff of the applicant, and the right entry gives the payoff of the firm, conditional on the firm's action and the applicant's type. Notice: this matrix does not show the normal form game! It merely gives you the payoffs for each type-job combination, but does not incorporate the cheap talk message.

The game is as follows: first, the applicant's type is realized: $t \in \{L, M, H\}$, where $t = L$ corresponds to low ability etc. The applicant observes his type and sends a cheap talk message $m \in \{L, M, H\}$. The firm observes the message and chooses a job for the applicant: $a \in \{L, M, H\}$, where $a = L$ corresponds to giving the applicant the low qualified job etc.

	Highly qualified	Medium qualified	Low qualified
High ability	3, 3	0, 0	0, 0
Medium ability	1, 0	2, 2	0, 0
Low ability	1, 0	2, 0	1, 1

(a) Show that no fully separating PBE exist, where each type of applicant sends a different message. What is the intuition behind this result?

(b) Show that a partial pooling PBE does exist, where $m(H) = H$ and $m(M) = m(L) = M$. What are the firm's beliefs? Solve for each case.

(c) (If time permits) Does a fully pooling PBE exist, $m(H) = m(M) = m(L) = M$?

	Highly qualified	Medium qualified	Low qualified
High ability	3, 3	0, 0	0, 0
Medium ability	1, 0	2, 2	0, 0
Low ability	1, 0	2, 0	1, 1

(a) Show that no fully separating PBE exist, where each type of applicant sends a different message. What is the intuition behind this result?

	Highly qualified	Medium qualified	Low qualified
High ability	3, 3	0, 0	0, 0
Medium ability	1, 0	2, 2	0, 0
Low ability	1, 0	2, 0	1, 1

(b) Show that a partial pooling PBE does exist, where the high-ability applicant sends the message $m = H$, and the other two types send the message $m = M$. What are the firm's beliefs about the applicant if he receives the message $m = H$ or $m = M$ (on the equilibrium path), or if he receives the message $m = L$ (off the equilibrium path)? In each case, solve for the firm's optimal action given its beliefs.

	Highly qualified	Medium qualified	Low qualified
High ability	3, 3	0, 0	0, 0
Medium ability	1, 0	2, 2	0, 0
Low ability	1, 0	2, 0	1, 1

(c) (If time permits) Does a fully pooling PBE exist where all types send the message $m = H$? If so, describe the players' equilibrium strategies and beliefs, and discuss whether this pooling PBE looks more or less reasonable than the partial pooling PBE from (b).