ECN/ARE 200C : MICRO THEORY

## HOMEWORK 6 (for due date see the web page)

Let  $e \in [0, \infty)$  denote the amount of education. There are two types of potential workers: those with productivity  $\theta_L$  and those with productivity  $\theta_H$ , with  $\theta_H > \theta_L > 0$ . Each potential worker knows what her productivity is, while the potential employer does not. For each type  $i \in \{H, L\}$  the cost of acquiring *e* units of education is  $e\theta_i$ . The fraction of type *H* in the population is  $\mu_H \in (0,1)$ .

- (a) Is there a signaling equilibrium where the employer offers a salary  $w = \theta_L$  to those who choose education level  $e_L$  and salary  $w = \theta_H$  to those who choose education level  $e_H$  with  $e_L \neq e_H$  and refuses to hire anybody with education level  $e \notin \{e_L, e_H\}$ ? (Recall that at a signaling equilibrium each worker is paid a wage equal to her actual productivity.) If there is a signaling equilibrium, describe it. If not, explain why not.
- (b) (b.1) Suppose that the employer offers the following wage schedule (AP means "average productivity"):  $\begin{cases} AP & \text{if } e = e^* \\ \theta_L & \text{if } e \neq e^* \end{cases}$ Find necessary and sufficient conditions for a pooling equilibrium, that is, an equilibrium where both types make the same education choice (thus it is not a signaling equilibrium, since workers are not paid a salary equal to their productivity). (b.2) Find all the pooling equilibria when  $\mu_H = \frac{2}{5}$ ,  $\theta_L = 1$  and  $\theta_H = 6$ .
- (c) (c.1) Suppose that the employer offers the following wage schedule (where  $0 < e^* < \hat{e}$ ):

 $\begin{cases} \theta_L & \text{if } e < e^* \\ \text{AP} & \text{if } e^* \le e < \hat{e} \\ \theta_H & \text{if } e \ge \hat{e} \end{cases}$  Find necessary and sufficient conditions for a pooling equilibrium.

(c.2) Find a pooling equilibrium when  $\mu_H = \frac{2}{5}$ ,  $\theta_L = 1$  and  $\theta_H = 6$ .