

Microeconomics III (Information Economics)

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Problems on signalling.

Problem 1. In the model of education as a signal, suppose that the utility function of the workers is

$$u_i = w - \frac{2e}{2 + a_i},$$

Suppose also that the abilities are $a_g = 5.5$, $a_b = 2$, the reservation utilities are $u_g^R = 3$ and $u_b^R = 0$ and the probabilities of each type are $p(g) = p(b) = 1/2$.

- (a) Compute the equilibrium in which the education is not used as a signal.
- (b) Compute the most efficient separating equilibrium in which the education is used as a signal. Which of the two equilibria do the workers of type g prefer?

Problem 2. Consider an economy with three types of workers that differ in their abilities $a_1 = 1$, $a_2 = 2$ and $a_3 = 3$ and their reservation utilities 0.5, 1 and 2.2. The probability of each type is $1/3$. A perfectly competitive firm considers hiring the workers, but the productivity is private information only known to each worker. Once the workers are hired, the production function of the firm is $y = a_1 L_1 + a_2 L_2 + a_3 L_3$, where L_1 is the amount of work done by a worker of type a_i . The product y is sold at the price of 1.

Suppose that workers can educate themselves. The utility function of the workers is

$$u_i = w - \frac{e}{a_i^2}$$

The company observes the education level e , of each worker.

- (a) Compute, if possible, the education levels e_1 , e_2 and e_3 such that a worker of type i prefers the education level e_i and the company believes them when he sees the level of education. Note: start by arguing that $e_1 = 0$. Of all the possible levels of education, find those that are better for the consumers. Explain explicitly the beliefs of the company.
- (b) Find, if possible, an equilibrium in which $e_1 = e_2 = 0$, and $e_3 > 0$. In this way, the company does not discriminate among the first two types, but distinguish among the first two types and the third one. Compute the equilibrium with the most convenient education level for the workers of type 3. Write explicitly the beliefs of the company. Compare the utilities with those of part (a).