

Problem Set 2

Advanced Microeconomics III

Spring 2022

Problem 1 Based on MWG 13.C.2

Reconsider the Spence signaling model but assume that education is productive: Specifically, if the worker's type is θ and her education level is e , then her productivity when employed in a firm is $\theta(1 + \alpha e)$ where $\alpha > 0$ is an exogenous constant.

- a.* Determine the Pareto Efficient Allocations.
- b.* Find the pure-strategy pooling PBE.
- c.* Find the pure-strategy separating PBE.

Problem 2 Based on MWG 13.A.A.1

Consider an extension of the signaling model discussed in class in which there are three types. Focus on equilibria satisfying the property that a reasonable belief is specified for any education level for which a reasonable belief exists.

- a.* Show by example that there exist multiple equilibria with this property.
- b.* Conclude that there exist multiple equilibria that satisfy the Intuitive Criterion.

Problem 3 In class, we only considered pure-strategy equilibria in the Spence model. One may ask whether mixed-strategy equilibria exist.

- a.* Show that any equilibrium with non-degenerate mixed-strategies has an equilibrium education level \hat{e} chosen by both types.
- b.* Construct an equilibrium where both types have two equilibrium actions.

Problem 4 Suppose that workers productivity θ is distributed with a continuous distribution with cdf F . Before going to the market, workers can choose to graduate from school or not. The cost of graduating for a worker of type θ is $c(\theta)$, continuous and strictly decreasing. Assume that the outside option is zero for all workers.

a. Let w_1 and w_0 the exogenous wages that a graduated and ungraduated worker receive respectively. Argue that, if $w_1 > w_0$, the workers that decide to graduate are the more productive ones.

b. Assume, as in the Spence model, that a firm that hires a worker of type θ and pays a wage w gets a profit of $\theta - w$. Moreover assume that more than two firms make simultaneous wage offers to the worker after the graduation decision is made. Characterize a ‘separating’ equilibrium in which the relatively more productive workers graduate.