SPENCE'S JOB MARKET SIGNALING MODEL

Michael Spence (1973). "Job Market Signaling". *Quarterly Journal of Economics*, **87** (3): 355–374.

Two groups of workers:

workers of type I → productivity level =1 (q)

workers of type II → productivity level =2 (1-q)

Education = potential signal

y = length of time devoted to education

- workers of type I:

$$C_I (y)=y$$

- workers of type II:

$$C_{II} (y)=y/2$$

The firm fixes:

$$y^* = \text{signal of high productivity}$$

$$y \geq y^* \longrightarrow w_2 = 2.$$

$$y < y^* \longrightarrow w_1 = 1.$$

(figure)

The level y * is a **signalling equilibrium** if:

the most productive workers spontaneously decide to acquire it, and the less productive decide not to acquire it.

What conditions must be satisfied?

Workers of type II:

Acquire y* if:

$$w_2 - w_1 > C_{II}(y^*) \qquad (1)$$

that is:

$$y^* < 2$$

Workers of type I:

Do not to acquire y* if:

$$w_2 - w_1 < C_I(y^*) \qquad (2)$$

That is:

$$1 < y^*$$

We get the following condition:

$$1 < y^* < 2 \qquad (3)$$

(figure)

If the firm sets a threshold value:

$$1 < y^* < 2$$

a screening equilibrium exists

- who owns the signal (threshold value of the number of years of education) is considered productive;

- only for the more productive agents it is convenient to acquire the signal

- the firm's belief that the acquisition of the signal is a test of quality is confirmed by the facts.

Properties of the signaling equilibrium

1. **Social optimality**.

- Each worker's choice is a **private optimum**
- What about *social optimality*?

FIRM:

The two situations (signaling and not signaling equilibria) are identical:

Expected productivity = expected wage =

$$= q + 2(1 - q) = 2 - q.$$

WORKERS:

The expected wages are the same

- Signaling equilibrium $\Rightarrow$ *2(1-q)+1q=2-q*

- Not signaling equilibrium $\Rightarrow$*(1-q)(2 − q) +q(2−q)= 2-q*

BUT:

in the signaling equilibrium some workers have to bear the cost of acquisition of the signal.

$\Rightarrow$Workers' total welfare is lower.

$\Rightarrow$The cost that imperfect information imposes on society.

- **Workers of type I**:

The signaling equilibrium is worse than the no-signaling eq:

$$W_1 = 1 < (2 - q)$$

- **Workers of type II**:

The signaling equilibrium <u>may be</u> worse than the no-signaling eq, if:

$$2 - C_{II}(y^*) < 2 - q$$

(net benefit < average wage)

Try with: q=0,5; y*=1,5

- Both types of workers would prefer an equilibrium in which the firm is not screening the market.

  $\Rightarrow$asymmetric information, and the need to solve it, impose costs in terms of welfare.

$\Rightarrow$Acquiring the **signal** "education" is a waste from a social point of view.

- Most productive workers acquire the signal **ONLY** to differentiate themselves from less productive workers and not because it implies an increase of their level of productivity.

- The output produced is the same as in the absence of the signal.

- There is only an increase in the costs that must be borne by workers who acquire the signal.

Properties of the signaling equilibrium

2. ∞ equilibria may exist.

There is not a precise level of education y*, but a range of values for the signal

13 - 15 (diploma and not undergraduate degree)
16 - 17 (undergraduate degree and not master)

Equilibria with highest signal (eg. y* = 15) are dominated by equilibria with the lowest signal (eg. y* = 13),

→productivity, wages, profits do not increase

→ only the cost of acquiring education

increases