

Education as a Market Signal

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Preliminaries

- There are two types of workers
 - “good” workers
 - “bad” workers
- Bad workers have a marginal product: a_B
- Good workers have a marginal product: a_G
- $a_G > a_B$

The Model

- If Y is output, then the production function is:

$$Y = f(L_B, L_G) = a_B L_B + a_G L_G$$

- Note: the production function is assumed to be linear: this means that marginal product = average product
- If an employer can identify “good” and “bad” workers, then he will pay each type of worker a wage equal to marginal product
- John, a “good” worker, will receive $w_G = a_G$, while Fred, a “bad” worker will receive $w_B = a_B$

But...

- The employer cannot observe the quality of the individual workers but he knows that a proportion, θ , of his workers are “good”

- So, he offers *all* his workers the average wage:

$$w = \theta a_G + (1 - \theta) a_B$$

- So, good workers are getting a wage below their marginal product while bad workers are getting a wage above their marginal product

So signal..

- Workers can acquire “education”
- It costs a good worker π_G , and a bad worker π_B , to acquire an unit of education:

$$\pi_G < \pi_B$$

- If Ω_G and Ω_B are the amounts of education acquired by good and bad workers, the cost of education is:
 - $C_G = \pi_G \Omega_G$ for good workers
 - $C_B = \pi_B \Omega_B$ for good workers

How much to signal? How much to pay?

- Workers have to decide on how much education to acquire: the value of Ω
- Employers have to decide how to pay for different levels of education: $w(\Omega)$

Employers

- Employers adopt a decision rule: for an education level, Ω^* , pay:
 - a_G if $\Omega \geq \Omega^*$
 - a_B if $\Omega < \Omega^*$
 - So, education is taken as a signal of worker quality and the education level, Ω^* , separates workers into “good” and “bad”
 - Under this rule if:
 - All good workers acquired Ω^* (or more) of education
 - All bad workers acquired less than Ω^* of education
- Then education would perfectly reflect worker quality***

But..

- The “rule” would breakdown if
 - Some bad workers thought it worthwhile to acquire Ω^*
 - Some good workers did not think it worthwhile to acquire Ω^*

Education as a perfect signal

- A bad worker will not consider it worthwhile acquiring Ω^* if:
 - $\pi_B \Omega^* > a_G - a_B$
- A good worker will consider it worthwhile acquiring Ω^* if:
 - $\pi_G \Omega^* < a_G - a_B$
- The education of a worker will be a *perfect* signal of quality if:
$$(a_G - a_B) / \pi_B < \Omega^* < (a_G - a_B) / \pi_G$$
- The education threshold, Ω^* , represents a *separating equilibrium*

Pooling Equilibrium

- If $\pi_B \Omega^* < a_G - a_B$, bad workers will consider it worthwhile acquiring Ω^* , the threshold level of education
- If $\pi_G \Omega^* > a_G - a_B$, good workers would not think it worthwhile acquiring Ω^* , the threshold level of education
- So: $\Omega^* < (a_G - a_B) / \pi_B$ or $\pi_G \Omega^* > (a_G - a_B) / \pi_G$ will represent a *pooling equilibrium*

Effectiveness of Education as a Signal

- The threshold level of education is very important:
 - If this is too low (GSCE) bad workers can masquerade as good workers
 - If it is too high (Ph.D.) good workers cannot distinguish themselves from bad workers

Effectiveness of Education as a Signal

- It is also important that the cost of education be significantly higher for “bad”, compared to “good”, workers
- This means that, intellectually, education should discriminate between good and bad workers
- But, intellectual costs should be the only costs: there should not be financial costs since, otherwise bad workers from rich families can acquire education but good workers from poor families cannot

Effectiveness of Education as a Signal

- Lastly, education should be relevant to worker quality
- If workers need to be numerate and have scientific training then an education system based on a humanities curriculum will be a poor guide to worker quality