

## **The signalling model**

**Higher education has no effect on productivity  
but signals which workers are productive**

### **Information problem**

- 1. Firms can't directly determine who are high and low productivity workers**
- 2. Firms observe education levels**
- 3. The cost of getting an education is inversely related to productivity**

**Consider two types of workers S and D**

**S workers have high productivity**

**D workers have low productivity**

$$P_S > P_D$$

**The cost of acquiring the degree is  $C_S$  and  $C_D$**

$$C_D > C_S$$

**The firm offers a wage  $W_E$  and  $W_N$**

$$W_E \geq W_N$$

**A Separating equilibrium – one group invests,  
one does not**

**If  $(W_E - C_{ES}) > (W_N - C_{NS})$  the S group will invest**

**If  $(W_N - C_{ND}) > (W_E - C_{ED})$  the D group will not invest**

## **Pooling equilibria**

**If  $(W_E - C_{ES}) < (W_N - C_{NS})$  neither group invests**

**If  $(W_N - C_{ND}) < (W_N - C_{ED})$  both groups invest**

## **A part-separating, part-pooling equilibrium**

**Suppose there are 3 groups S, M, D**

$$P_S > P_M > P_D$$

**The costs of investing are  $C_S, C_M, C_D$**

$$C_D > C_M > C_S$$

**Suppose  $(W_E - C_{EM}) > (W_N - C_{NM})$  and**

$$(W_N - C_{ND}) > (W_E - C_{ED})$$

**M & S types invest, D types do not**

**Suppose  $(W_E - C_{ES}) > (W_N - C_{NS})$  and**

$$(W_N - C_{NM}) > (W_E - C_{EM})$$

**S types invest, M and D types do not**

## **Diagrams**

**Implication: In a separating or part-separating equilibrium there will be a positive correlation between education and earnings**

**What is the social return to education?**

- 1) Human capital model – social returns at least equal to the private returns**
- 2) Signalling model – no productivity effect, only an improvement of matches between workers and firms**

**Effect of government policy reducing cost of education**

- 1) human capital – increased productivity  
case for wealth-contingent fees**
- 2) Signalling – reducing the cost leads to pooling equilibria and destroys the value of the signal**

## **Estimating the returns to education**

**Earnings regression – Jacob Mincer, reduced form equation**

**Log (real wage) = f (age, age<sup>2</sup>, years of education, years of education<sup>2</sup>, degrees attained, gender, race, marital status, # of dependent children, region, industry)**

**Estimated relationship – increased earnings over the life-cycle associated with education**

**Distinct increase associated with earning a degree**

## **Interpretations**

- 1) productivity effect – years coefficient reflects productivity**
- 2) omitted variable effect – years is correlated to inherent productivity which is omitted, coefficient on years is biased upwards**