

# ECONOMICS OF EDUCATION





NEW

SZÉCHENYI PLAN

# ECONOMICS OF EDUCATION

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# ECONOMICS OF EDUCATION

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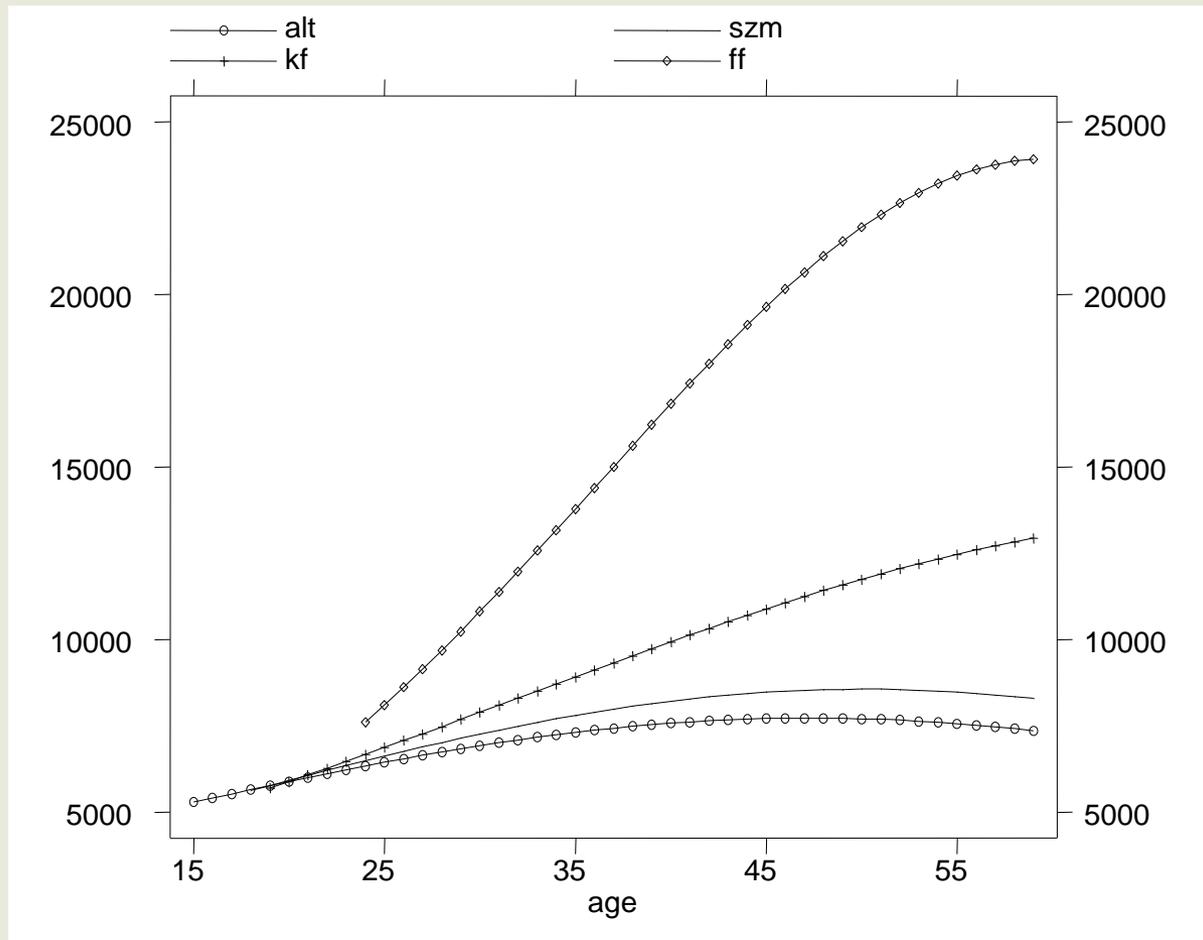
# ECONOMICS OF EDUCATION

## Week 7

### Signaling/screening models

Júlia Varga

# What we can observe: empirical age – earnings profiles



# Signaling models

## 1. SIGNALING MODELS

Education act as a signal for pre-existing abilities

$$MP=W$$

- filtering theory (*Arrow, 1973*),
- screening theory (*Stiglitz, 1975*)
- signaling theory in the strict sense  
(*Spence, 1973, 1974; Riley, 1976, 1979*)

## 2. CREDENTIALISM

Education serves as an admission ticket for certain professions

$$MP \neq W$$

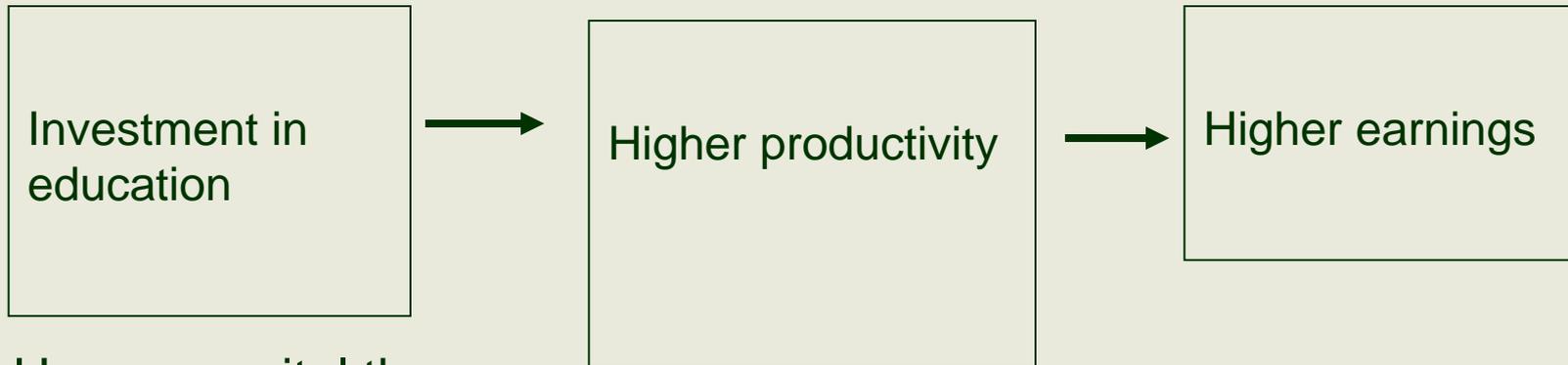
*Thurow (1970), Berg (1970)*

# Basic assumptions of signaling models

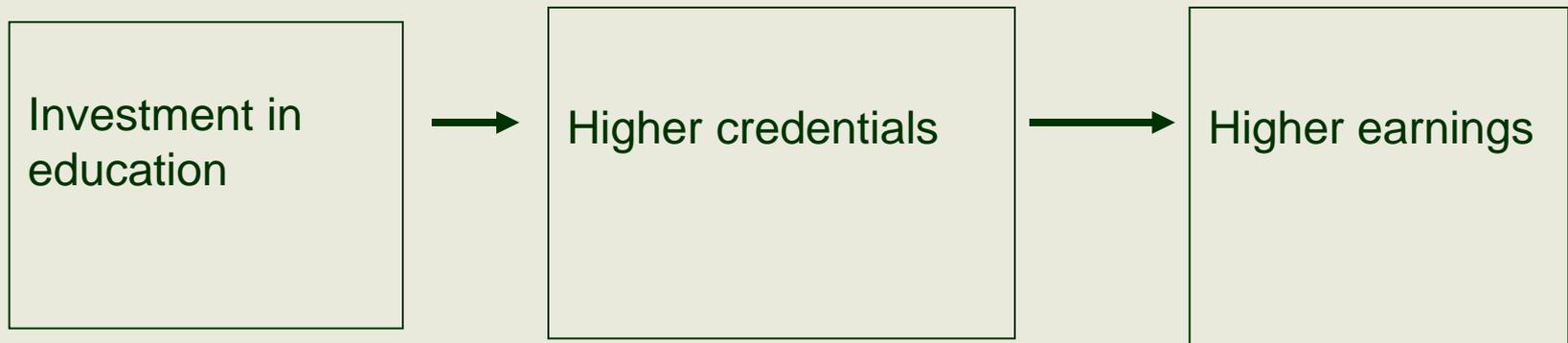
$$MP = W$$

- The empirical relation between education and wages is a result of the productivity-identifying role of education.
- More productive individuals have higher educational attainment.

# Assumptions of human capital and of signaling models



Human capital theory



Signaling (screening ) models

# Assumptions of screening models

- Individuals differ in productivity, productivity is fully person specific and not affected by schooling.
- Individuals know their productivity, firms do not (asymmetrical information).
- Educational qualification can be observed without cost.
- Hiring decisions and wages are determined by observable characteristics such as educational qualification.
- Education is merely a selection or signaling device.

# Stiglitz's screening model

$$p = m\theta$$

$$p = \theta$$

$\theta$  – characteristics of the individual

$P$  – individual's productivity

$$m = 1$$

# Stiglitz's screening model

Able

$$\theta_1$$

Less able

$$\theta_2$$

$$\theta_1 > \theta_2$$

Fraction of the population that is  
of type  $\theta_1$ :

$$h(\theta_1)$$

Fraction of the population that is  
of type  $\theta_2$ :

$$(1-h(\theta_1))$$

With perfect information:

$$W_1 = \theta_1$$

With perfect information:

$$W_2 = \theta_2$$

# Stiglitz's screening model

Non-screening situation

$$W = \bar{\Theta}$$

$$\bar{\Theta} = \Theta_1 h(\Theta_1) + \Theta_2 (1 - h(\Theta_1))$$

# Supply of labor is inelastic

- There is a screening process which screens perfectly.
- Screening cost per individual:  $c^*$

# Possible equilibria with different screening costs 1

$$\Theta_1 - \Theta_2 > c^* > \bar{\Theta}$$

Two equilibria

1. Non-screening equilibrium

$$\Theta_2 < \bar{\Theta}$$

$$\Theta_1 - c^* < \bar{\Theta}$$

2. The full screening equilibrium

$$\Theta_1 - c^* > \Theta_2$$

# Possible equilibria with different screening costs 1

$$\Theta_1 - \Theta_2 > c^* > \bar{\Theta}$$

- There may be multiple equilibria.
- Social returns differ to private returns.
- The gross social return is 0 (only distributional effects).
- The private return to education to the more able is positive:

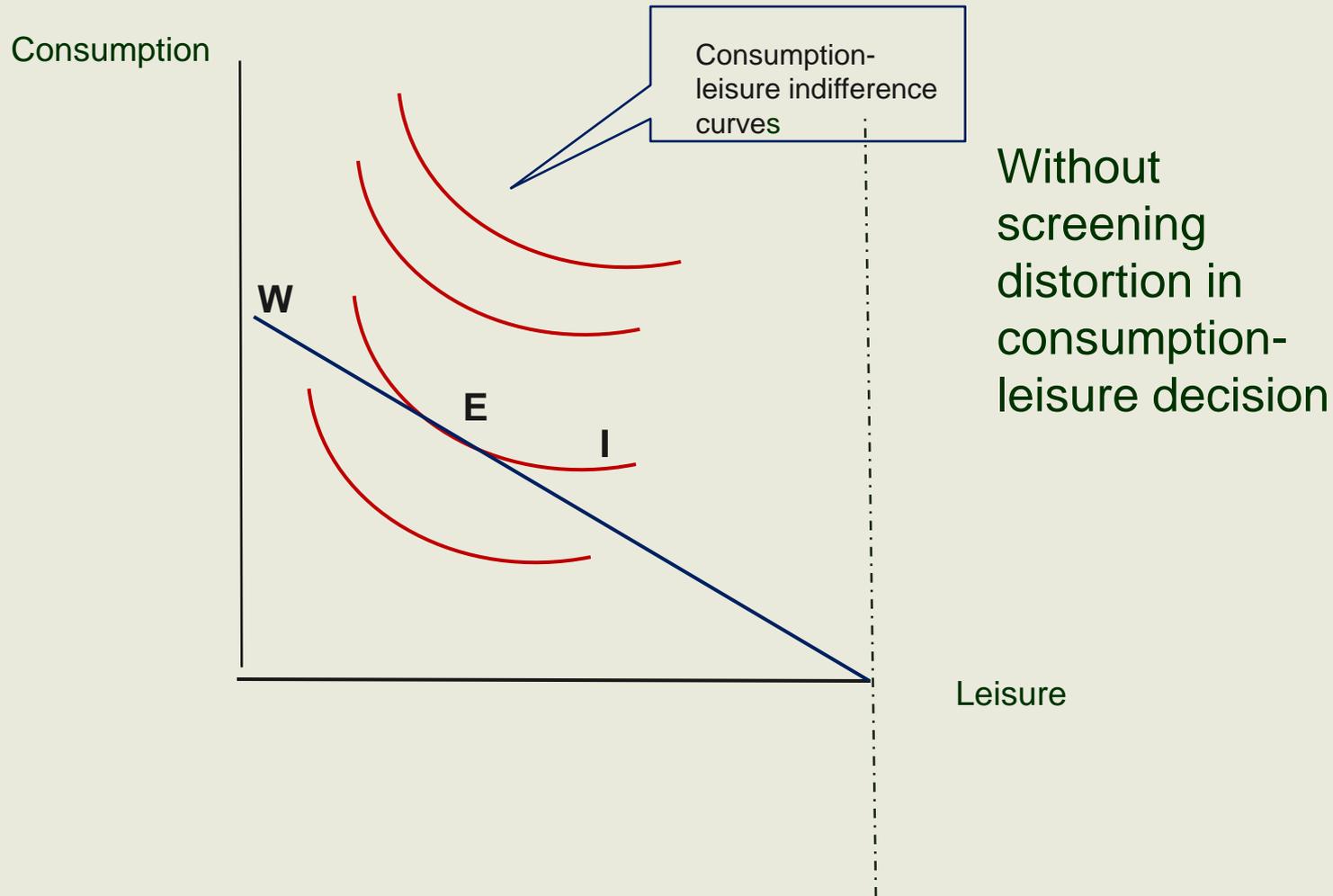
$$\frac{\Theta_1 - \Theta_2}{c^*}$$

# Possible equilibria with different screening costs 1

$$\Theta_1 - \bar{\Theta} > c^*$$

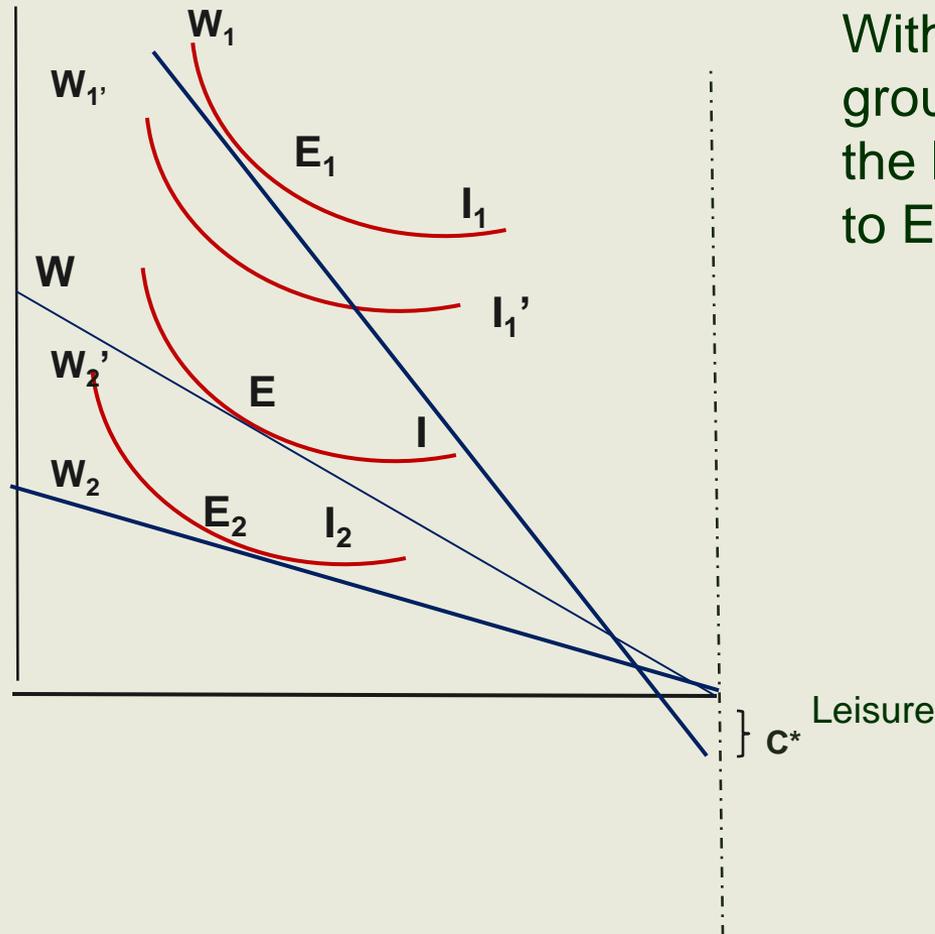
- Not exist a non-screening equilibrium.
- Screening increases the inequality of income (the losses to group 2 exceed the gain to group 1).
- Screening lowers net national output since there is screening costs.

# Labor is elastically supplied



# Labor is elastically supplied

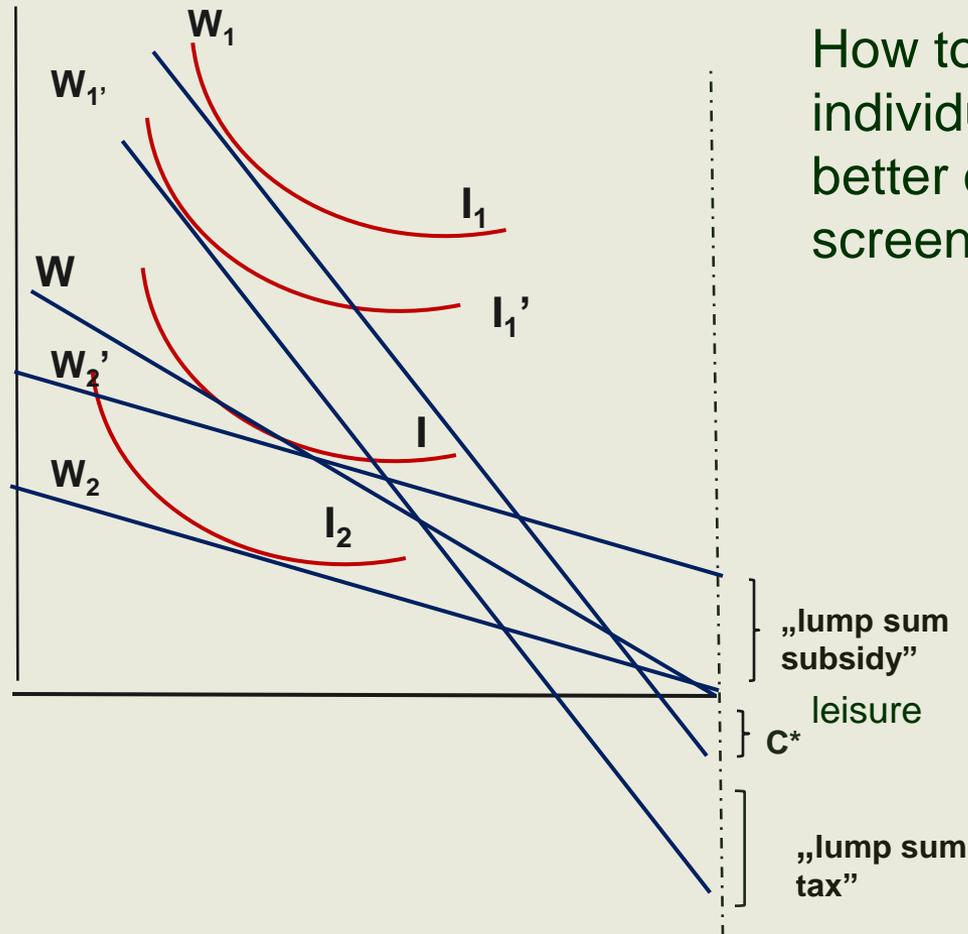
Consumption



With screening the able group moves from  $E$  to  $E_1$  the less able group from  $E$  to  $E_2$ .

# Labor is elastically supplied

Consumption



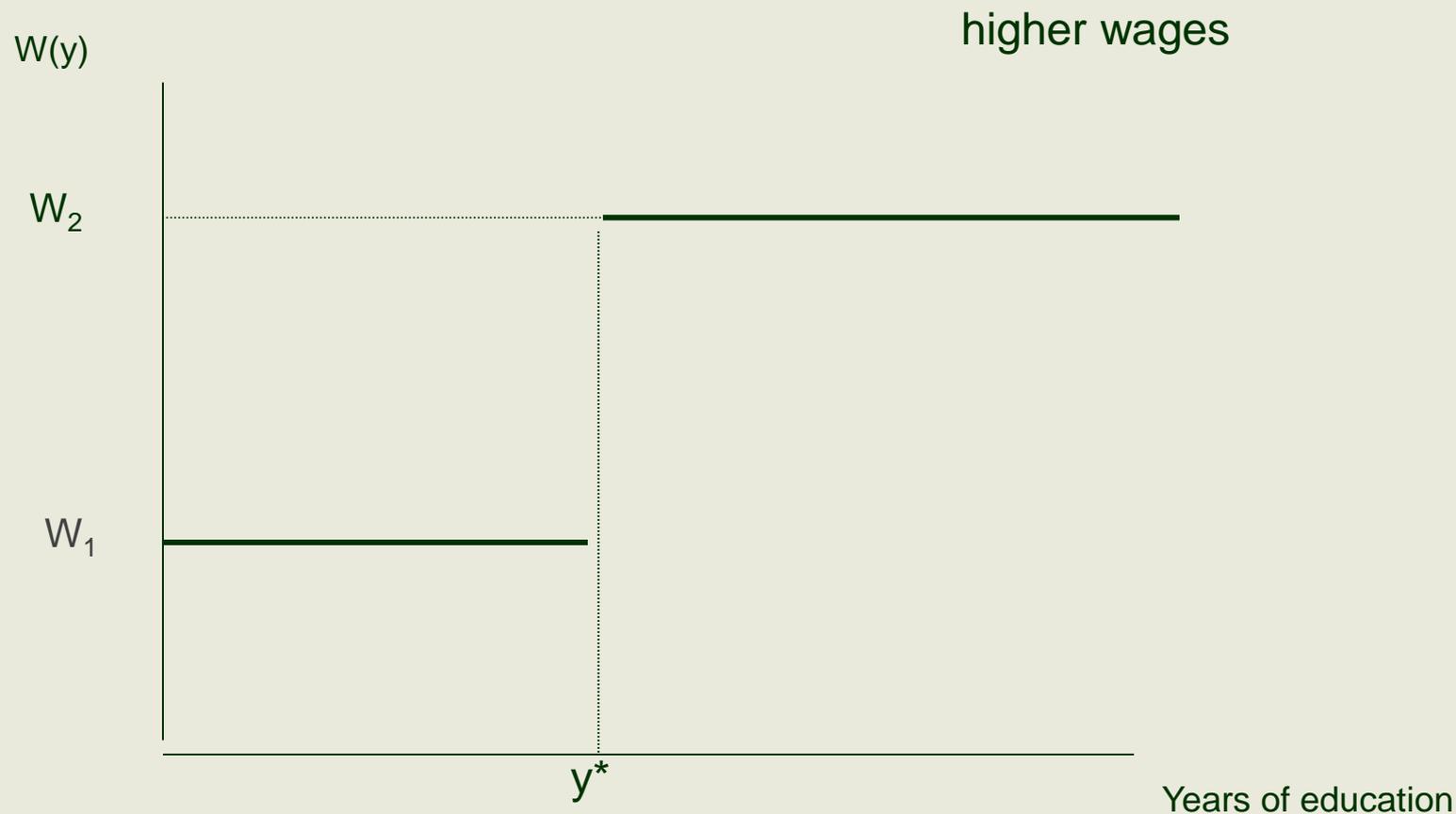
How to make all individuals better off with screening

# The social benefits of screening

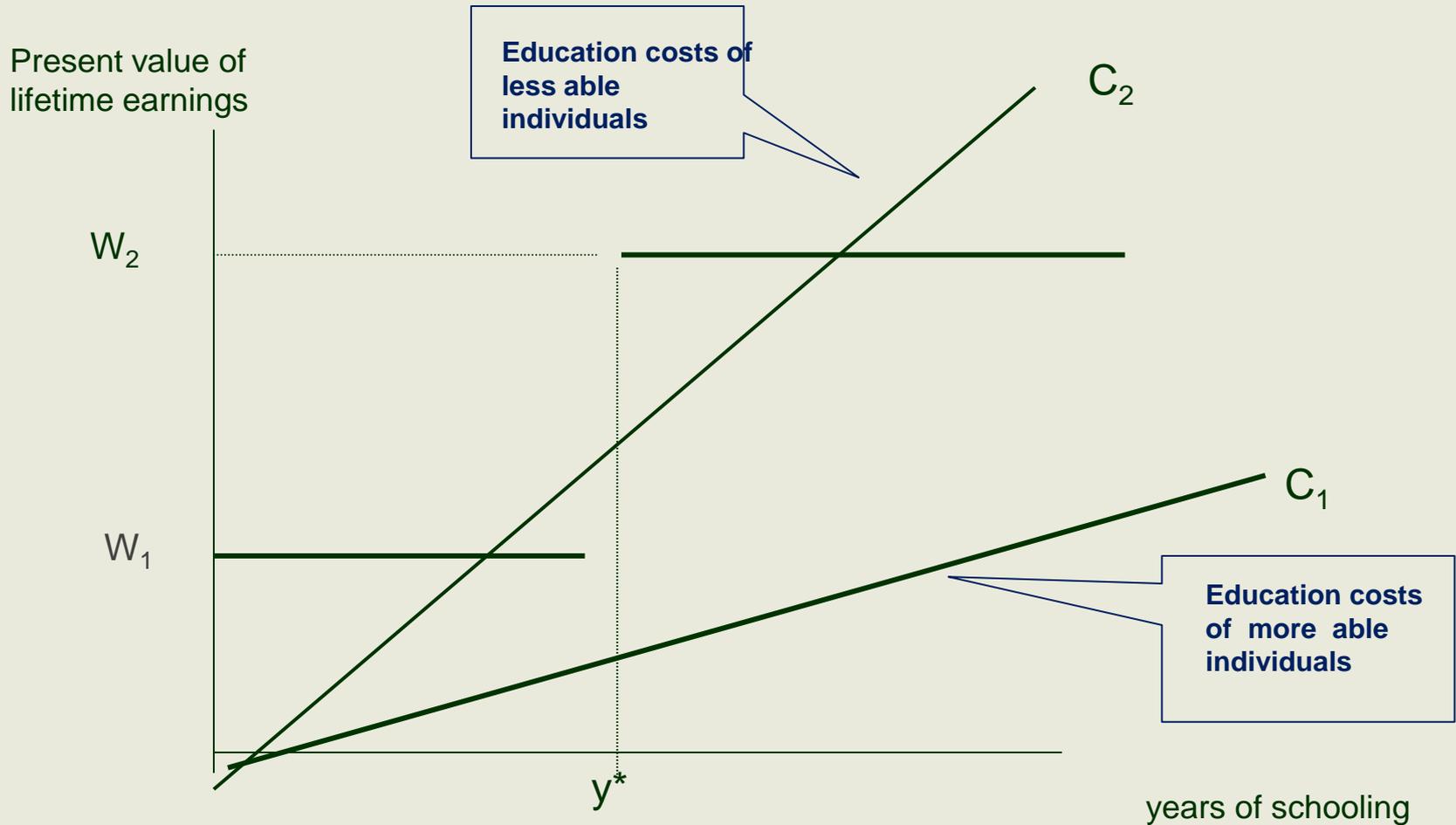
Alters consumption-leisure decision.

Total output would increase if sorting improves the match between workers and jobs.

# The benefits to individuals of educational signaling/screening

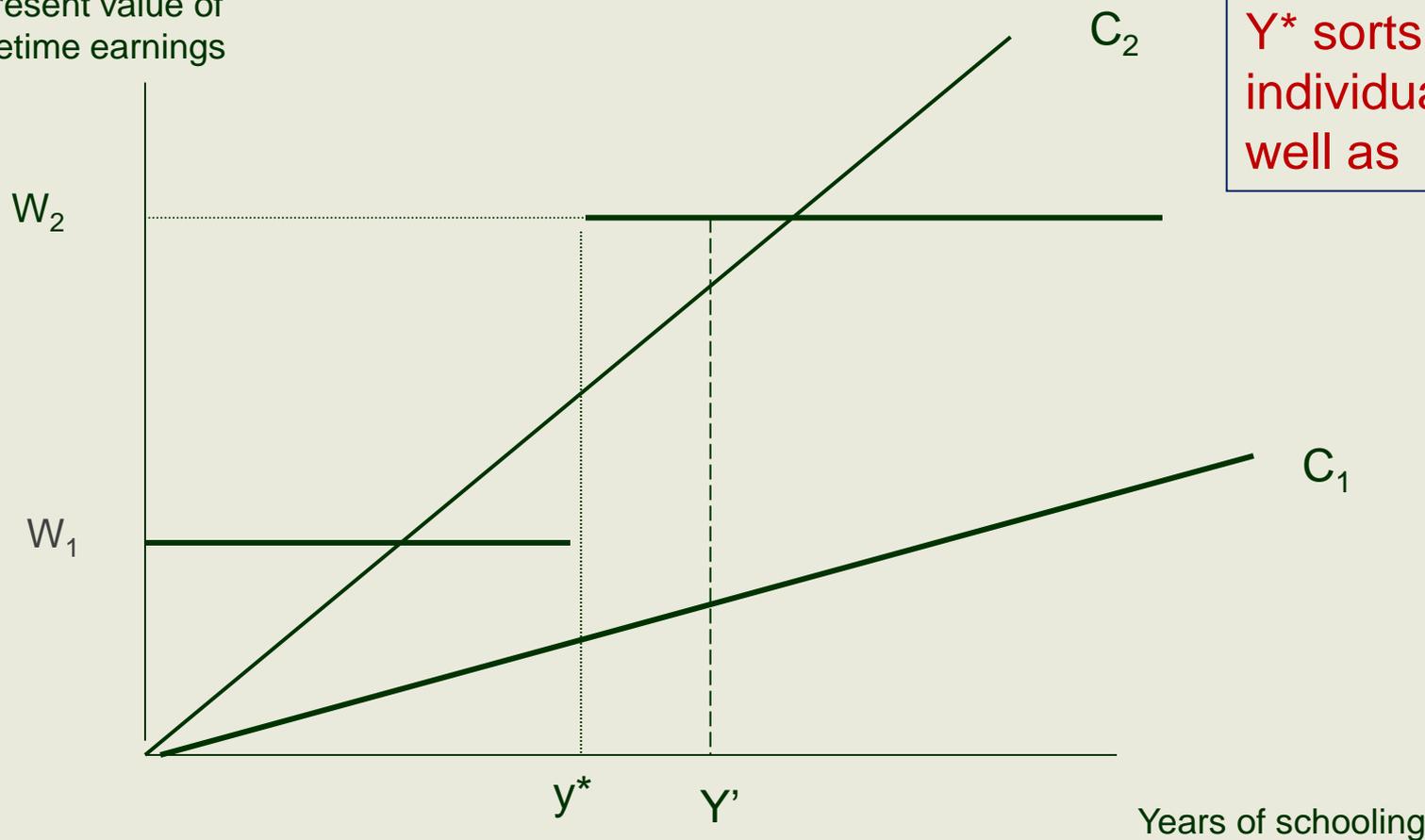


# Signaling models: costs of screening are lower for more able individuals



# Educational expansion may have costs without benefits

Present value of lifetime earnings



$Y^*$  sorts individuals as well as  $Y'$

# Weak and strong versions

Weak version: employers offer higher starting salaries to the more educated because of imperfect information on expected productivity (statistical discrimination) later on they monitor their hiring decision and make adjustment accordingly.

Strong version: employers do not have the opportunity to determine the marginal product of the employee and they pay higher wages to the more educated continually.

# Screening versus human capital?

## Empirical tests

### WILES HYPOTHESIS

If the screening hypothesis is correct, there should be no wage difference between workers with qualifications which exactly match the requirements of the profession they work in and workers with equal qualifications working in other professions (Wiles, 1974).

Specific human capital does not affect performance in the job if the screening hypothesis is correct.

# Screening versus human capital?

## Empirical tests

### SHEEPSKIN ARGUMENT

If education serves as a signal there is wage premium for completion of a course with a certificate, those who have not completed their course with a certificate (but have the same years of education) would have lower earnings.

# Screening versus human capital?

## Empirical tests

### NATURAL EXPERIMENTS

#### EFFECTS OF CHANGES IN MANDATED MINIMUM EDUCATION LEVELS

An increase in the school leaving age affects the education decision of those individuals who intended to leave school at the previous minimum leaving age, but does not effect the decision of individuals with education levels above the new minimum.

Does earnings premium for the those who are affected by the new minimum leaving age increase?

# Screening versus human capital?

## Empirical tests

### TESTING OF STRONG VERSION

Whether the partial effect of education on wages decreases with years of work experience.