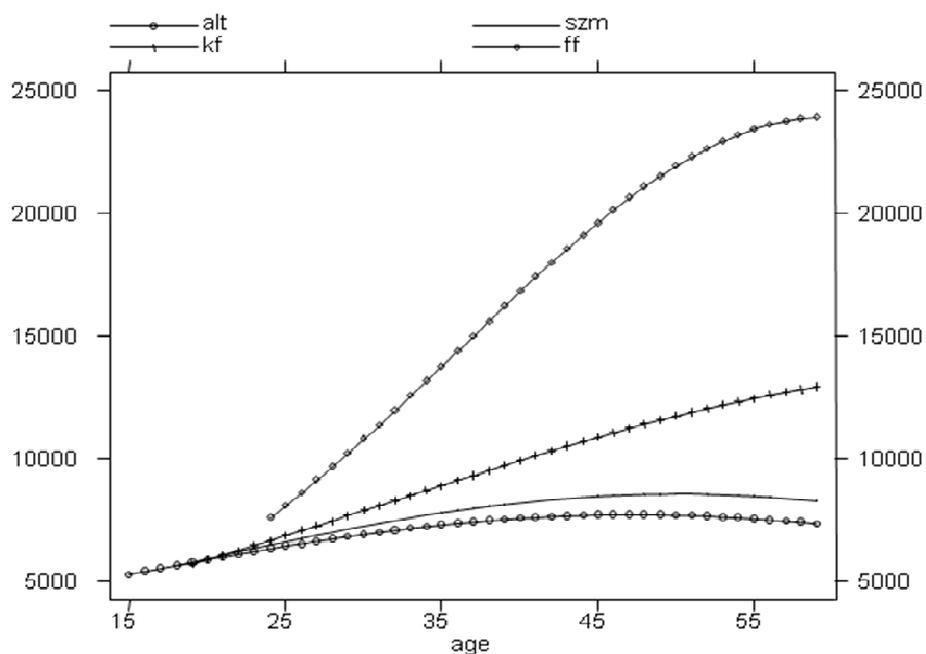# ECONOMICS OF EDUCATION

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Week 7

Signaling/screening models

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≠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
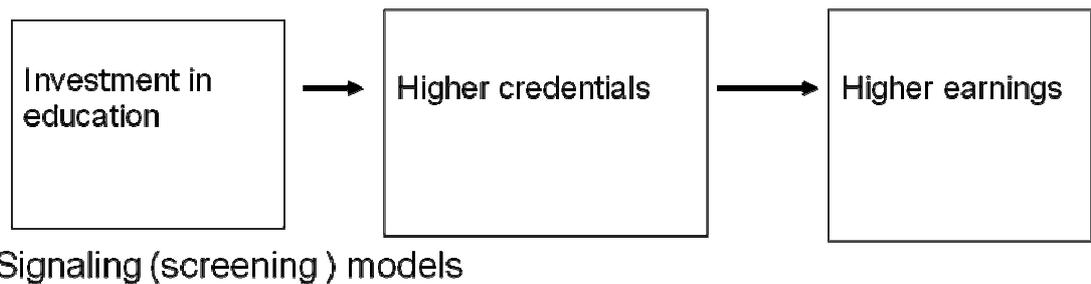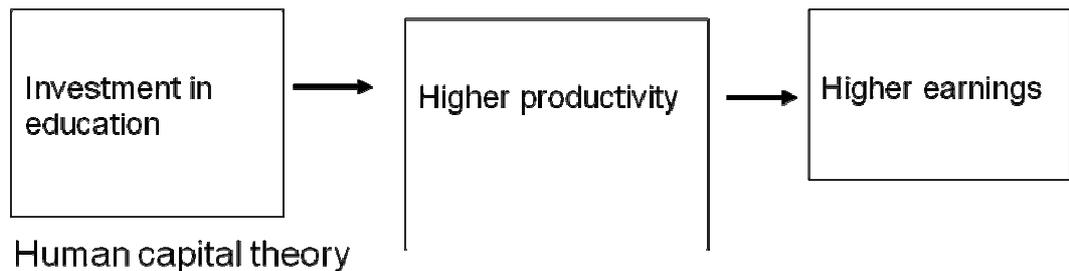
Assumptions of screening models

- 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

$$p = m\theta$$
$$p = \theta$$

θ – characteristics of the individual

P – individual's productivity

m = 1

Able	Less able
θ_1	θ_2

$$\theta_1 > \theta_2$$

Fraction of the population that is of type θ_1:	Fraction of the population that is of type θ_2:
$h(\theta_1)$	$(1 - h(\theta_1))$
With perfect information:	With perfect information:
$W_1 = \theta_1$	$W_2 = \theta_2$

Non-screening situation

$$W = \overline{\Theta}$$

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

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

$$\Theta_1 - \Theta_2 > c* > \overline{\Theta}$$ Two equilibria

1. Non-screening equilibrium

$$\Theta_2 < \overline{\Theta} \qquad \Theta_1 - c* < \overline{\Theta}$$

2. The full screening equilibrium

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

$$\Theta_1 - \Theta_2 > c* > \overline{\Theta}$$

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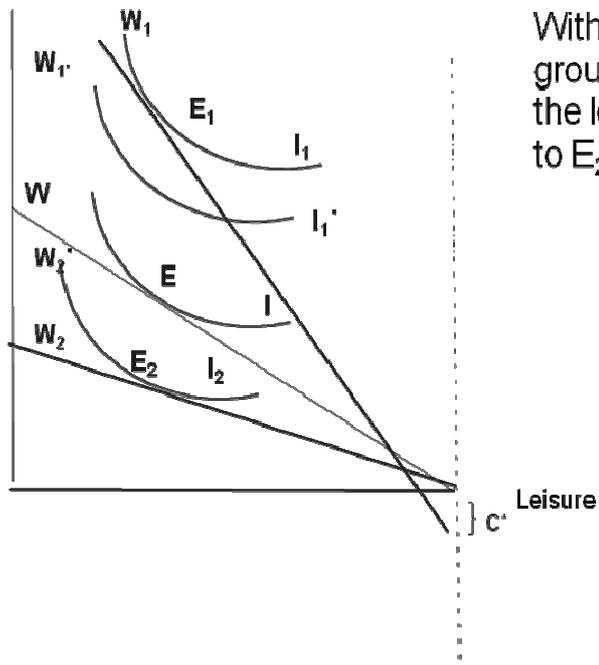
$$\frac{\Theta_1 - \Theta_2}{c*}$$

$$\Theta_1 - \overline{\Theta} > c *$$

- 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.
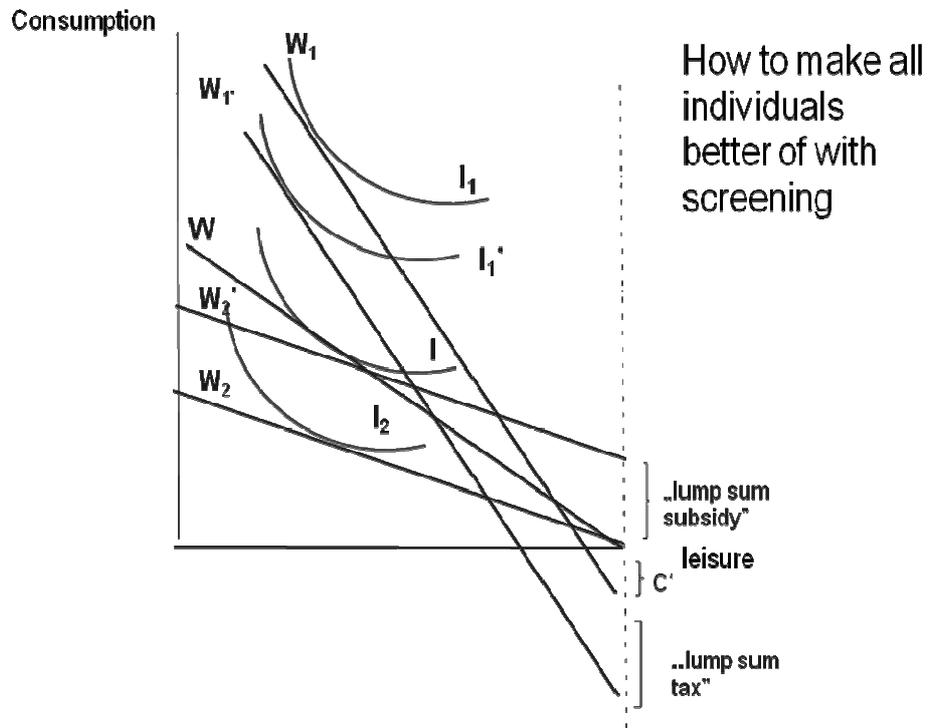
Labor is elastically supplied

Consumption-leisure indifference curves
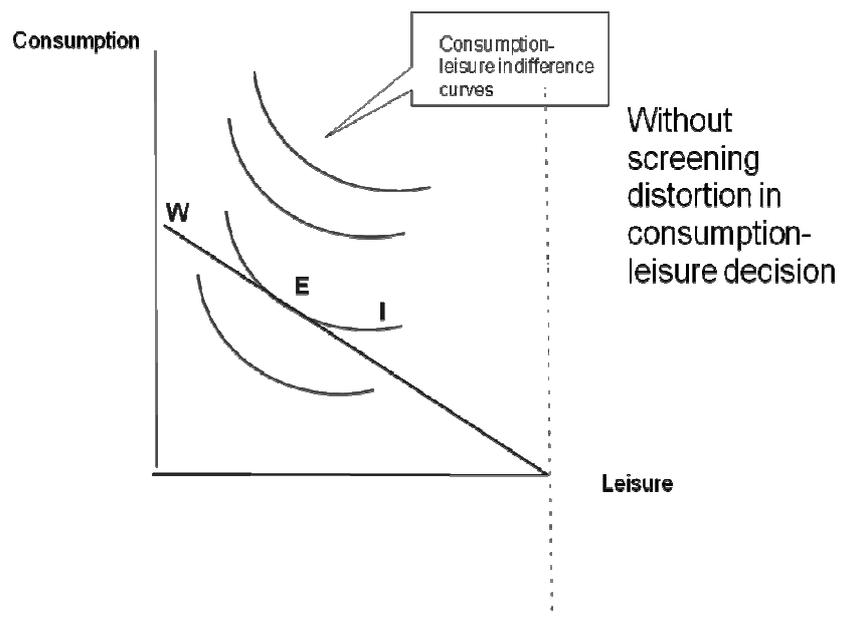
Without screening distortion in consumption-leisure decision

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

Consumption

Wᵣ'

W₁

W

W₂'

W₂

I₁

I₁'

I

I₂

How to make all
individuals
better of with
screening

„lump sum
subsidy"

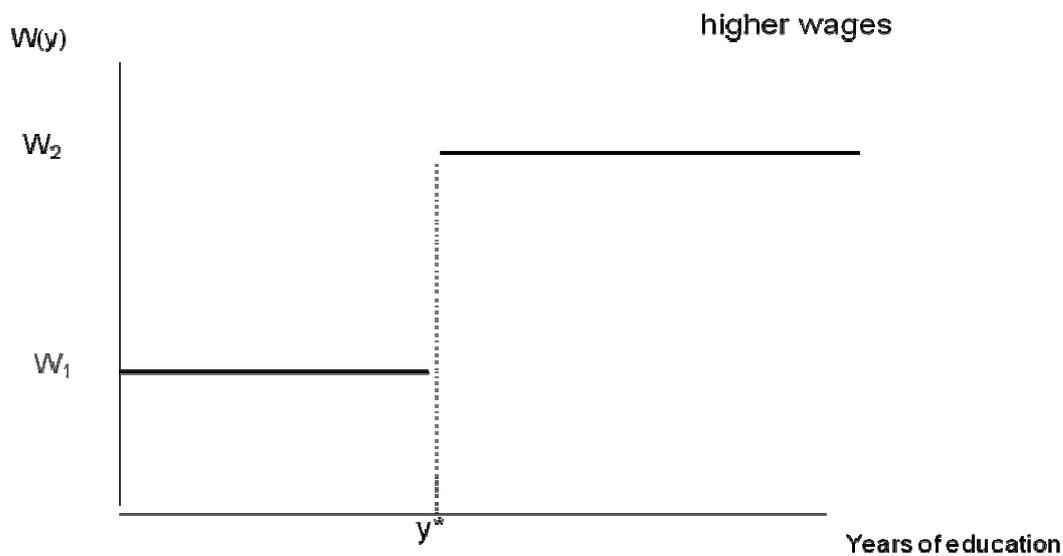leisure

C'

..lump sum
tax"

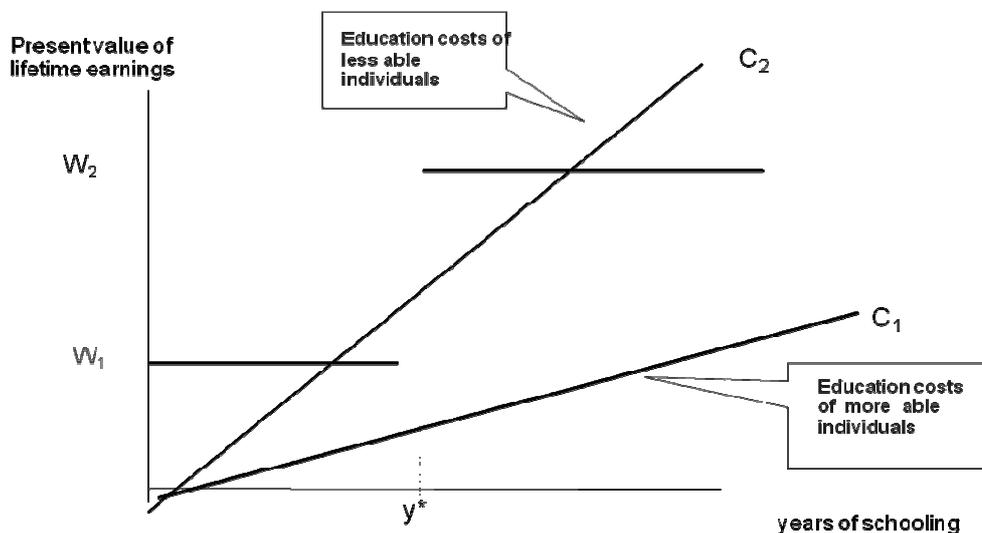# The social benefits of screening

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

higher wages

W(y)

W_2

W_1

y^*

Years of education

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

Present value of lifetime earnings

Education costs of less able individuals

C_2

W_2

C_1

W_1

Education costs of more able individuals

y^*

years of schooling

10

Educational expansion may have costs without benefits
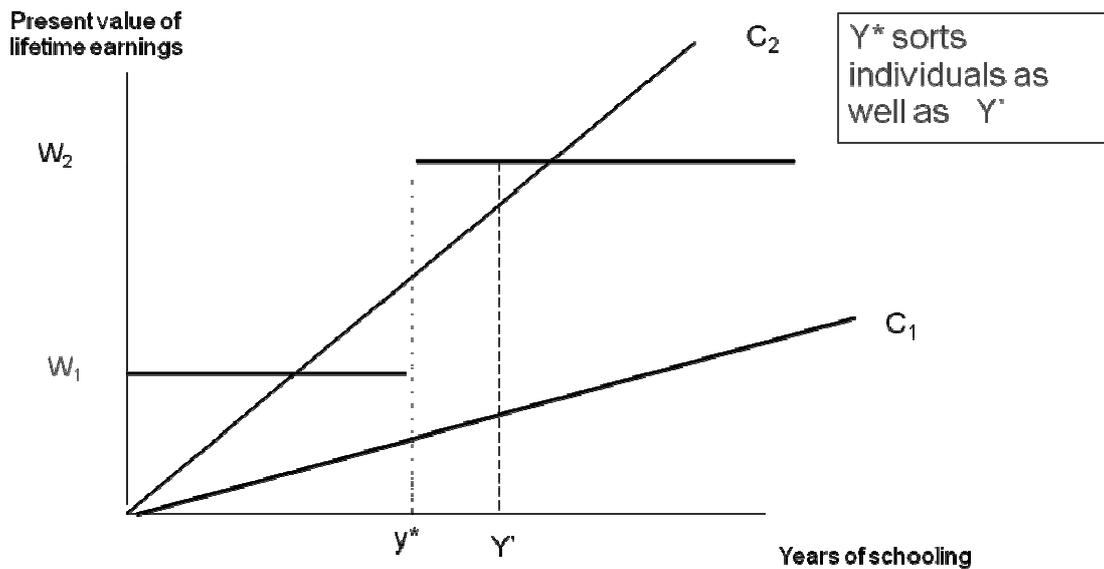
Weak and strong versions

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.

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.

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?

TESTING OF STRONG VERSION

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