Quantitative Economics for the Evaluation of the European Policy

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- Solow model with poverty trap or better **multiple equilibria** (but why only two?)
  - ☑ **endogenous investment rate**
  - ☑ **endogenous growth rate of population/employment**
  - ☑ **increasing returns to scale (change in output composition)**
  - ⇨ **endogenous level of human capital**
- Solow and **limited technological spillovers**
- Solow with open economy and **factor reallocation** across regions
- Solow with open economy, factor reallocation across countries, and limited technological spillover
- Solow with **two sectors** and factor reallocation across regions (core-periphery, i.e. North-South model)
- Solow with **many intermediate goods**

Human capital in European regions

Could human capital explain the differences in GDP per worker in European regions?
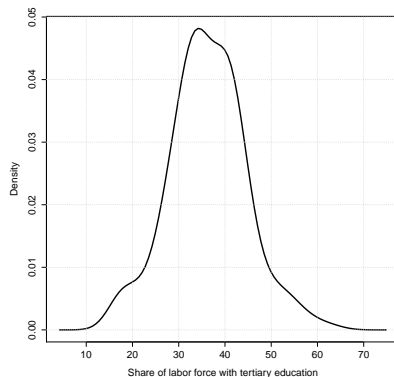

Figura: Distribution of the share of employment with tertiary education in European regions

Main issues about human capital

Main issues:

- How human capital is accumulated

- How is possible to measure it

- How is possible to favour the accumulation of human capital?

The theory of human capital

Remind standard Solow model:

$$\dot{k} = sf(k, h) - (\delta + g_A + n)\, k, \tag{1}$$

where

$$k \equiv \frac{K}{AL} \; , \; f \equiv F\left(\frac{K}{AL}, h\right) \equiv f(k, h) \text{ and } f_k > 0, f_{kk} < 0 \tag{2}$$

and s and n are the exogenous saving/investment rate and growth rate of employment, h the level of human capital, δ the depreciation rate of physical capital, and g_A the growth rate of technological change.

$\Rightarrow$ **Now we want to formulate a theory of the level (dynamics) of h**

Suppose that the accumulation of human capital can be expressed as:

$$\dot{h} = \Phi\left(h, y, s_h y, CN\right) - \delta_h\left(g_A\right) h, \tag{3}$$

with $\Phi_h > 0$, $\Phi_y > 0$, and $\Phi_{s_h} > 0$.

Why these explanatory variable?

- h: **spillover effects** deriving from living in a "skilled" environment (Lucas, Durlauf, Brock and Durlauf, etc.)

- y: **learning by doing** (Arrow and Lucas)

- s_h: **financial investment in education/human capital** (Lucas, Galor and Zeira)

- CN: other determinants related to **cultural norms** (gender discrimination, etc.) (Weil)

- δ_h: depreciation of human capital due to various factors, among which the most important is the technological progress