

Channels of inequality of opportunity: The role of education and occupation in Europe

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- What are the channels of inequality of opportunity in Europe?

1 INTRODUCTION

2 METHODOLOGY

3 DATA

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INTRODUCTION

Background

- Inequality in income due to circumstances considered unfair ((Rawls (1971), Sen (1980), Roemer (1993), Fleurbaey (2008)) → Public intervention should help to level the playing field (Roemer et al. (2003))
- Literature has endeavoured in better measuring IO (Lefranc et al. (2008); Checchi and Peragine (2010); Ferreira and Gignoux (2011); Marrero and Rodríguez (2012)).
 - Different approaches (ex-ante and ex-post)
 - Cross-country comparisons
- Not much research about the *links* between circumstances and income → necessary for public intervention
 - Insufficient data
 - No methodological approach

INTRODUCTION

Contribution

- New method to disentangle IO in its principal mediating factors (education and occupation), based on the ex-ante approach and the MLD index, arriving at:

$$1 = IO_{EDU}^R + IO_{OCC}^R + IO_{OTH}^R \quad (1)$$

- Level of education → Up to 30% of IO in some European countries
- Occupational category → 1% to 8% of IO depending on the country
- Illustrative cross-country correlation analysis between the channeling role of education and the expansion of higher education

- There is *ex-ante* equality of opportunity if all *types* (groups of people sharing the same circumstances) face the same *set* of opportunities and have the same mean income: $\bar{y}_i^t = \bar{y}_i^m, \forall t, m$
- Inequality of opportunity is then measured as inequality between types' means (or parametric estimates)

Decomposition of the MLD inequality index

- The Theil-0 index (Mean Logarithmic Deviation) [$I_{MLD}(y) = \frac{1}{n} \sum_{i=1}^n \ln(\frac{\bar{y}}{y_i})$] is additively decomposable in *between* and *within* components [Bourguignon (1979); Shorrocks (1980); Foster and Shneyerov (2000); Jenkins (1995)]:

$$I_{MLD}(y) = \underbrace{\sum_{t=1}^T p_t \ln\left(\frac{\bar{y}}{y_t}\right)}_{\text{Between} \rightarrow IO} + \underbrace{\sum_{t=1}^T p_t I_{MLD}(y^t)}_{\text{Within}} \quad (2)$$

- Alternatively, the decomposition can be done parametrically [Ferreira and Gignoux (2011), Checchi and Peragine (2010)] using the *smoothed* distribution μ and the *standardized* distribution ϕ :

$$I_{MLD}(y) = \underbrace{I_{MLD}(\mu)}_{\text{Between} \rightarrow IO} + \underbrace{I_{MLD}(\phi)}_{\text{Within}} \quad (3)$$

Obtaining the 'smoothed' distribution

- We condition income to circumstances and assume a log-linear relationship [Ferreira and Gignoux (2011)]:

$$\ln y_i = C_i\psi + \varepsilon_i \quad (4)$$

- $\hat{\psi}$ estimates are used to get a *smoothed* distribution in which all individuals belonging to the same type have the same expected income:

$$\tilde{\mu}_i = \exp[C_i\hat{\psi}] = \mathbf{E}(y_i | C_i) = y_i^C \quad (5)$$

- Inequality of this distribution is the inequality of opportunity

$$I_{MLD}(\tilde{\mu}_i) = IO \quad (6)$$

- Circumstances do not *directly* convert into future income \rightarrow there must exist a set Z of intermediate variables, which are related to individual circumstances and affect the income of the individual. The 'smoothed' distribution can be expressed as: $y_i^C = f(Z_i, \nu_i)$.
- A possible candidate is **the level of education** E_i , so that $Z_i = E_i$. We can do a parametric estimation of $\mathbf{E}(y_i^C \mid E_i)$ to measure that relation:

$$\ln y_i^C = E_i \eta + \nu_i \rightarrow \begin{cases} y_i^{C,EDU} = \exp[E_i \hat{\eta}] \\ y_i^{C,\overline{EDU}} = \exp[\hat{\nu}_i] \end{cases} \quad (7)$$

$$\underbrace{IMLD(y^C)}_{IO} = \underbrace{IMLD(y^{C,EDU})}_{IO_{EDU}} + \underbrace{IMLD(y^{C,\overline{EDU}})}_{IO_{\overline{EDU}}} \quad (8)$$

- $y^{C,\overline{EDU}}$ is the part of y^C *not* associated with education.
- But, is that part of the smoothed income associated with other mediating variables, such as **occupation**? We can estimate that association with:

$$\ln y_i^{C,\overline{EDU}} = O_i\kappa + \xi_i \rightarrow \begin{cases} y_i^{C,OCC} = \exp[O_i\hat{\kappa}] \\ y_i^{C,\overline{OCC}} = \exp[\hat{\xi}_i] \end{cases} = y_i^{C,OTH} \quad (9)$$

$$\underbrace{IMLD(y^{C,\overline{EDU}})}_{IO_{\overline{EDU}}} = \underbrace{IMLD(y^{C,OCC})}_{IO_{OCC}} + \underbrace{IMLD(y^{C,\overline{OCC}})}_{IO_{OTH}} \quad (10)$$

- Decomposing the smoothed distribution.

$$\tilde{\mu}_i = \underbrace{C_i \hat{\psi}_i}_{\ln y_i^C} = \underbrace{E_i \hat{\eta}}_{\ln y_i^{C,EDU}} + \underbrace{\hat{\nu}_i}_{\underbrace{O_i \hat{\kappa}}_{\ln y_i^{C,OCC}} + \underbrace{\hat{\xi}_i}_{\ln y_i^{C,OTH}}} \quad (11)$$

- Decomposing IO

$$\underbrace{I_{MLD}(y_i^C)}_{IO} = \underbrace{I_{MLD}(y_i^{C,EDU})}_{IO_{EDU}} + \underbrace{I_{MLD}(y_i^{C,OCC})}_{IO_{OCC}} + \underbrace{I_{MLD}(y_i^{C,OTH})}_{IO_{OTH}} \quad (12)$$

- Obtaining the IO shares (dividing by $I_{MLD}(y_i^C) = IO$):

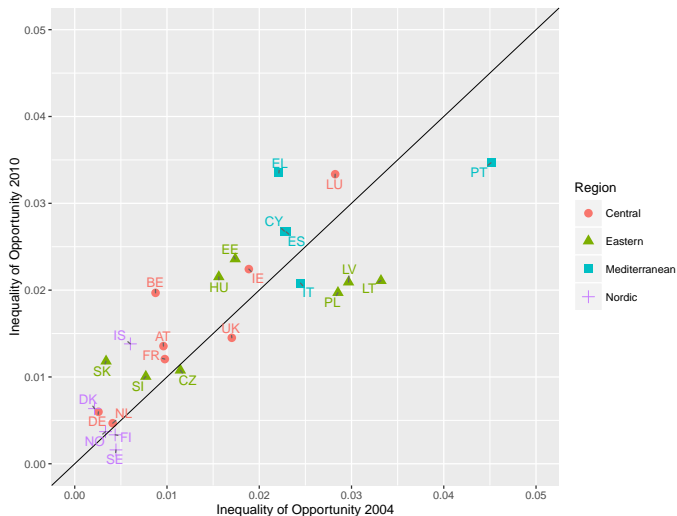
$$1 = IO_{EDU}^R + IO_{OCC}^R + IO_{OTH}^R \quad (13)$$

- EU-SILC framework
 - 2005 and 2011 intergenerational transmission of advantage modules (data from 2004 and 2010)
 - 26 european countries in both waves
 - Advantage: equivalent household income (household heads aged 30-50)
- Circumstances
 - Parental education (4 levels; father and mother), parental occupation (11 one-digit categories; father), gender, immigration status (national, other-EU, non-EU), financial difficulties perceived during household (5 levels).
- Channels of transmission
 - Education (6 ISCED levels)
 - Occupation (11 ISCO-88 categories)

RESULTS

Inequality of opportunity

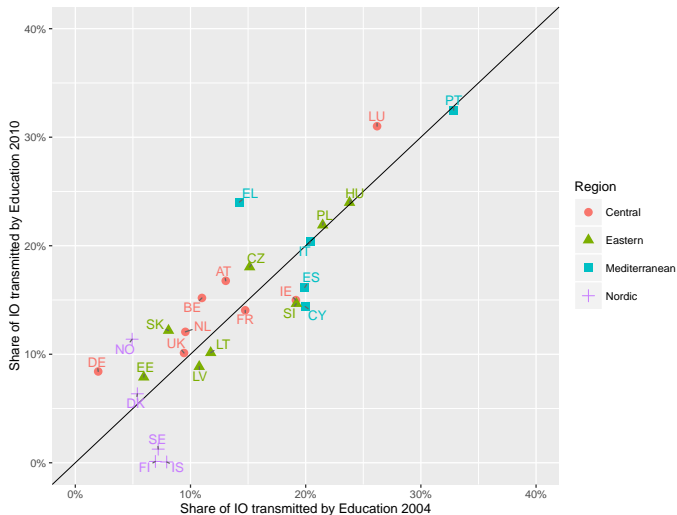
- Nordic countries at the bottom (except Iceland 2010)
- EL, LU and PT at the top (2010)
- No clear pattern overtime (EL, BE, IS, SK increase; PT, PL, LT and LV decrease)
- In general, in line with Marrero and Rodríguez (2012) and Brzezinski (2015)



RESULTS

The educational channel

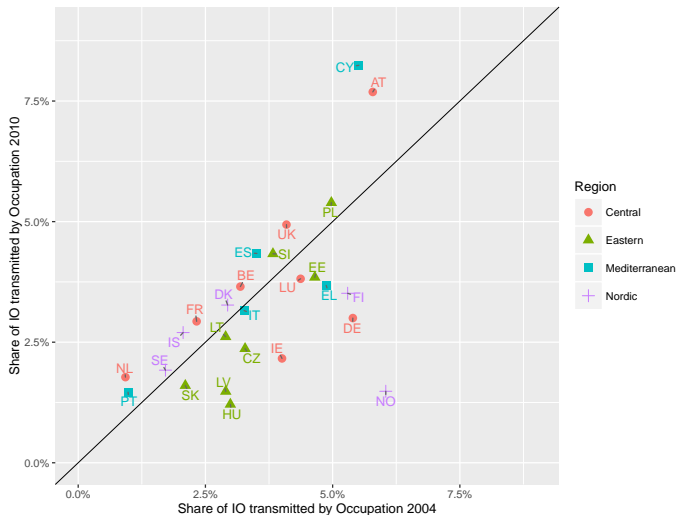
- Between 8 and 30% of IO
- PT and LU at the top
- Nordic countries at the bottom (except NO)
- No clear overtime trend (EL, LU, DE, NO increase; SE, FI, IS decrease)



RESULTS

The occupational channel

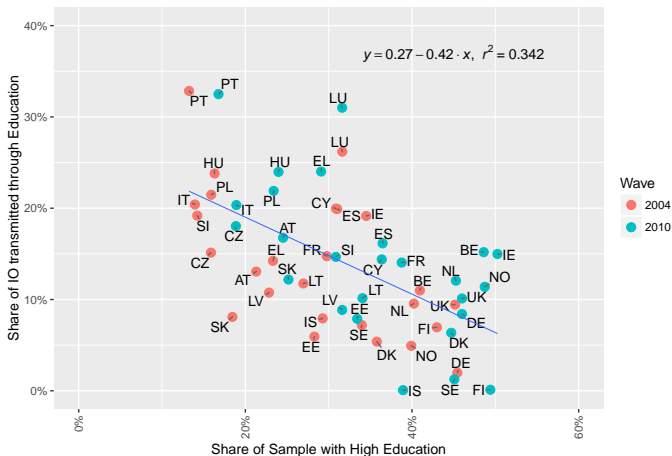
- Between 1 and 8% of IO (1-5% in most countries)
- CY and AT at the top
- No geographical pattern
- No clear overtime trend (CY, AT increase; NO, DE, HU, IE decrease)



RESULTS

The educational channel and the extension of higher education (I)

- High negative correlation between the share of the population with higher education and the share of IO channeled through education



RESULTS

The educational channel and the extension of higher education (II)

- High positive correlation between the share of the population with lower education and the share of IO channeled through education



CONCLUDING REMARKS

- A new strategy to disentangle IO channels
- Importance of the educational and occupational channels
- The educational channel and the expansion of education
- Prospective research:
 - What could explain the remaining share of IO?
 - Apply this strategy to new mediators and other measures of IO when data is available

Thanks!

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