

Is There a Devaluation of Degrees? Unobserved Heterogeneity in Returns to Education and Early Experience

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- Study returns to education & graduate sorting on unobservables during tertiary education expansion
 - ▶ In the EU: 36% of the 25-54 age group holds a tertiary degree vs. 21% in the 55-74 age group
 - ▶ In France: the number of Master 2 graduates increased from 25,000 in 1990 to 126,000 in 2015
 - ▶ The heterogeneity of unobserved idiosyncratic returns to education changes over time
 - ▶ Comparisons of average wages over time are uninformative about policy-relevant parameters
 - ▶ Efficiency: tertiary education should target individuals with the highest returns to education

Data: Panel of wages and employment intensity

- ▶ Three cohorts of French workers exiting education in 1998, 2004, and 2010
- ▶ Highest education: Less than HS, HS, Some College, Master 2, Business and Engineering Schools
- ▶ Family background at age 11: father professional status and municipality characteristics
- ▶ Quarterly unemployment rate

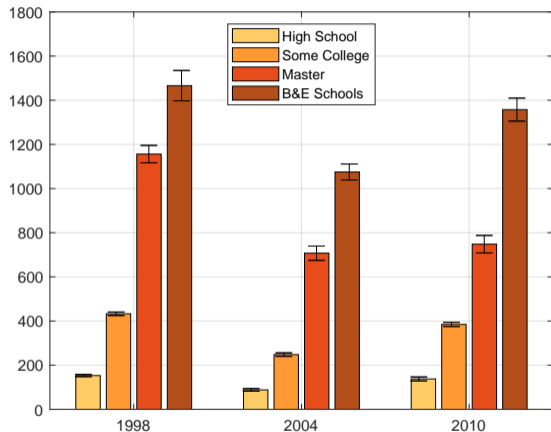
This approach is replicable across countries and periods, as it uses widely available set of variables

Model: A latent type captures unobserved heterogeneity in both education choices and productivity

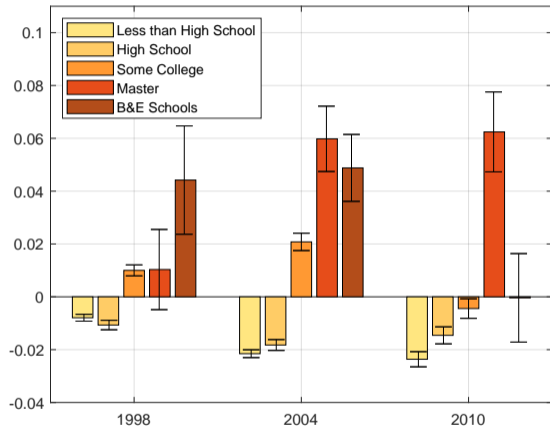
- ▶ Wage equation depending on education, experience, and exogenous controls
- ▶ Jointly estimated with discrete-choice models for education and employment ...
- ▶ In which unobserved heterogeneity is modelled with a system of latent types...
- ▶ ...that interact with all explanatory variables in every equation: each type has its own model
- ▶ Types are identified from repeated individual observations, mainly through wages and employment

- ▶ The model estimates the share of every latent type in the population
- ▶ ATE: at given education, average wages are computed with population distribution of latent types
- ▶ ATE is a counterfactual *selection-free* measure of returns to education
- ▶ Measure of Selection: difference between observed average wage and ATE at given degree
- ▶ Negative Selection: a random draw from the population outperforms self-selected individuals
- ▶ We can compute ATT and ATNT for every education level, e.g. Master 2
- ▶ ATT: Average wage at lower education levels keeping the distribution of types at Master 2 level
- ▶ ATNT: Average wage at Master 2 when the distribution of types is that of lower education levels

ATE of Degrees (D, Pop) on Wage after 7 years & Changes in Selection of Graduates



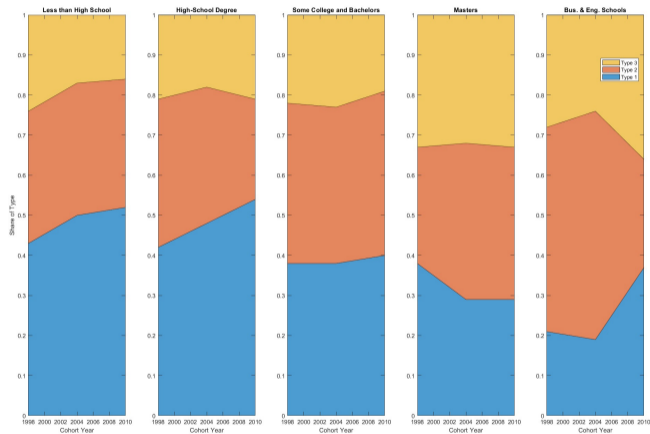
$$ATE(D, Pop) = E_{pop}[Wage|D] - E_{pop}[Wage| <HS]$$



$$Selection = (E[Wage|D] - ATE(D, Pop)) / E[Wage|D]$$

- ▶ We estimate the model pooling all cohorts together
- ▶ Obtaining a fixed system of types
- ▶ We obtain three clearly distinct types, with individuals assigned to one type almost with certainty
- ▶ Types are not proxies for available excluded variables, yet they display a clear hierarchy...
- ▶ ...of returns to education, experience, educational attainment, and cognitive measures
- ▶ Type I performs poorly, Type II average, and Type III at the top

Changes in Type Composition Across Education Levels



Type shares over time by education level

- ▶ We use a model of wages, experience accumulation, and education choices
- ▶ In which the endogeneity of education and experience is handled with a system of latent types
- ▶ Estimated using a widely available and parsimonious set of variables
- ▶ This allows us to compute policy-relevant parameters and ...
- ▶ Study returns to education and changes in selectivity over time and across education levels
- ▶ By assuming a common structure of types over time, we can study ...
- ▶ ...determinants of changes in selectivity and heterogeneity in returns to education