Intergenerational Educational Mobility in Europe

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Introduction

- Economics expands its focus to the *distribution* of economic variables & evolution of economic *inequalities*
 - ▶ Studies on *intergenerational* persistence of labor earnings, income and wealth on the rise (Chetty *et al.*, 2017 *Science*; 2016 *AER*; 2014 *AER P&P*; 2014 *QJE*; Rauh, 2017 *JPubE*; Braun and Stuhler, 2016 *Econ J*; Holter, 2015 *QE*; Jäntti and Jenkins 2014, *ECINEQ WP*; Jäntti *et al.*, 2006 *IZA*, . . .)
 - Rigorous attempts on intergenerational educational mobility rather limited (Hertz et al., 2008 BEJEAP; Schneebaum et al., 2015 Empirica; Corak, 2013 JEP)
- Dynamics of educational attainment critical in economic inequality
 - Higher stages of education most pivotal in human capital accumulation (Mankiw, 1997 NBER Annual)
 - Education correlates highly with income and wealth (Díaz-Giménez, *et al.*,2011 *FRB MN*), and affects political outcomes (e.g. *Brexit*, 2016 U.S. Presidential Election)

Motivation

- No earlier study with a panel perspective investigating the evolution of intergenerational educational mobility
 - Earlier literature on intergenerational educational mobility
 - ... focuses only on country averages, thereby ignoring heterogeneity due to parental education levels, gender, parental finances
 - ... relies almost exclusively on standard years-of-schooling OLS regressions, thereby assuming symmetry, cardinality and monotonicity, while being more susceptible to measurement error
- Provide output to contribute to future research on
 - ... exploring interaction of different economic policies and economic variables with mobility dynamics
 - ... materializing parameters/inputs and calibration targets in economic models featuring education and human capital

Main Findings

- Considerable heterogeneity in intergenerational educational mobility in European countries (both in *level* & in *trend*), albeit with *similarities* within country groups
- Intergenerational educational persistence:
 - declined drastically in the least-mobile Mediterranean group
 - increased monotonically in the Post-Socialist group
 - exhibited a U-shaped time-trend in the Nordic group
 - remained rather constant in the Rest of Europe group
- Gender gap in better-education prospects diminishes and reverses historically
- Educational background of both parents matter, albeit heterogeneously over country groups and time
- Conditional on being born to *equally-educated fathers*, parental finances of descendants when 14 year old positively (yet heterogeneously) predicts better-education prospects

Main Findings (cont'd)

- Within-cohort education inequality decreases historically in most of Europe
- Education inequality & intergenerational education elasticity correlate *positively*, i.e. "*Educational* Great Gatsby hypothesis" holds true
 - ...robust to linearity/non-linearity
 - ...robust historically
- We propose a set of *equality of educational opportunity* measures: how *de facto* better-education prospects of descendants vary over their parental education
 - ... improves historically in many countries, yet stagnant at very low levels in several others
- Education inequality & equality of opportunity measures correlate *negatively*
 - ... more evidence in support of the *Educational* Great Gatsby hypothesis
 - ... some measures more robust for earlier cohorts than others

Outline

- Introduction
 - Motivation
 - Main Findings
 - Outline
- 2 Data & Methodology
 - Data
 - Methodology
- Results
 - Evolution of Intergenerational Educational Mobility in Europe
 - Intergenerational Educational Mobility & Gender, Parental Couple Composition and Parental Finances
 - ► Intergenerational Educational Mobility & Education Inequality
- Conclusions

Data Source

- European Social Survey (ESS) waves 1-7
 - data on descendants's (25+ years old) and their parental educational attainment (via ISCED categorization), gender, . . . for 196,362 individuals
 - exclude cohorts with limited sample size and ongoing education
 - ... concentrate on cohorts born in 1940-1985
 - ▶ 34 countries, clustered into 4 country groups:

Mediterranean	Nordic	Post-Socialist	Rest of Europe
▶ Albania	Denmark	▶ Bulgaria	► Austria
Cyprus	Finland	▶ Croatia	► Belgium
▶ Greece	Iceland	The Czech Republic	► France
▶ Italy	Norway	► Estonia	▶ Germany
Portugal	Sweden	▶ Hungary	► Ireland
▶ Spain		► Kosovo	► The Netherlands
► Turkey		► Latvia	▶ Switzerland
		▶ Lithuania	▶ United Kingdom
		► Poland	_
		► Romania	
		► Russia	
		▶ Slovakia	
		► Slovenia	
		▶ Ukraine	

Data Source (cont'd)

- Educational attainment of descendants and parents divided into three ordinal categories:
 - Low: Early childhood education, primary education and lower secondary education (ISCED 0, 1 & 2)
 - Medium: Upper secondary education and post-secondary non-tertiary education (ISCED 3 & 4)
 - 6 High: Tertiary and above-tertiary education (ISCED 5 & 6)

Table: Intergenerational Educational Mobility Transition Matrix

Parent Descendant	Low	Medium	High
Low	Low-type		w-type
	persistence	upward mobility	
Medium	Medium-type	Medium-type	Medium-type
	downward mobility	persistence	upward mobility
High	High-ty	High-type	
	downward m	persistence	

Educational Distributions

Desc. Stat. by Country

Desc. Stat. by Country Group

Methodology

- We rely primarily on *ordered logistic regressions* in our estimations
- Educational attainment of descendant (E_i) depends on parental background via a latent variable (E_i^*) that relates to P_i : the *better* parental education of both parents, and the parental educational couple structure D_i :

$$E_{it}^* = (\beta_1 + \beta_2 t) P_{it} + (\gamma_1 + \gamma_2 t) F_{it} + \sum_{j=1}^{6} (\alpha_{1j} + \alpha_{2j} t) D_{ijt} + \sum_{k=1940}^{1985} \eta_k Y_{kit} + \sum_{l=1}^{34} \theta_l C_{lit} + u_{it}$$

- \triangleright P_{it} : better-parental education of descendent i born in year t
- $ightharpoonup D_{ijt}$: dummy variable to capture the educational attainment of parental couple
- \triangleright Y_{kit} : dummy variable to capture cohort-fixed effect
- ► *C*_{lit}: dummy variable to capture country-fixed effect
- $ightharpoonup F_{it}$: dummy variable to capture gender effect

Generalized Ordered Logit

Methodology

• The educational outcome of individual *i*:

$$E_{it} = \begin{cases} 1 & \text{if } E_{it}^* \le \theta_1 \\ 2 & \text{if } \theta_1 < E_{it}^* \le \theta_2 \\ 3 & \text{if } \theta_2 < E_{it}^* \le \theta_3 \end{cases}$$

1-Low: Early childhood education, primary education and lower secondary education

2-Medium: Upper secondary education and post-secondary non-tertiary education

3-High: Tertiary and above-tertiary education

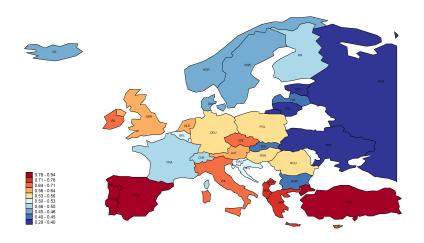
• Then descendant's educational attainment being *k* follows:

$$\Pr(E_i = k | X_i) = \Pr(\theta_{k-1} < E_i^* \le \theta_k) = \Pr(\theta_{k-1} - \beta X_i < \epsilon_i \le \theta_k - \beta X_i)$$

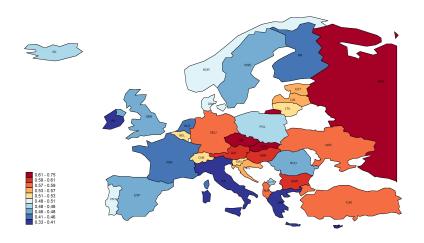
where X_i : vector of independent variables

- Types of intergenerational educational mobility:
 - **1** Downward Educational Mobility: $Pr(E_i < P_i)$
 - 2 Intergenerational Educational Persistence: $Pr(E_i = P_i)$
 - **3** Upward Educational Mobility: $Pr(E_i > P_i)$

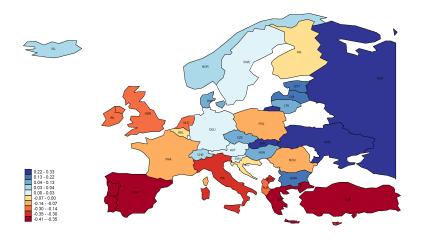
Intergenerational Edu. Persistence (born in 1940-1944)



Intergenerational Edu. Persistence (born in 1981-1985)



Change in Edu. Persistence (1981-85 vs 1940-44 cohorts)



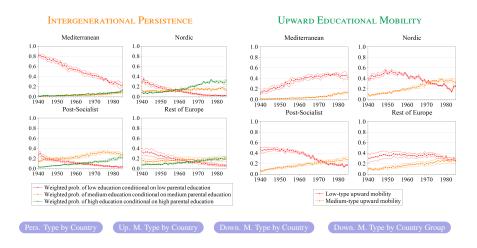
Persistence & Upward Mobility

Intergenerational Persistence UPWARD EDUCATIONAL MOBILITY Mediterranean Nordic Mediterranean Nordic 1.0 1.0 1.0 1.0 0.8 0.8 0.8 0.8 0.6 0.6 0.6 0.4 0.4 0.2 0.2 0.2 0.0 0.0 0.01940 1950 1960 1980 1940 1950 1970 1940 1970 1940 1960 1970 1980 Post-Socialist Rest of Europe Post-Socialist Rest of Europe 1.0 1.0 1.0 1.0 0.8 0.8 0.8 0.8 0.6 0.6 0.6 0.6 Service Control 0.4 0.4 0.4 0.2 0.2 0.2 0.2 0.0 0.01940 1950 1960 1980 1940 1950 1970 1980 1940 1950 1970 1980 1940 1950 1960 1980 Intergenerational educational persistence - Intergenerational educational upward mobility

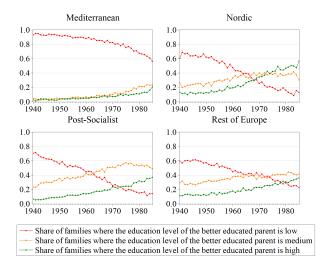
† Dates on the horizontal axis refer to the birth-cohort of interest. Dashed lines correspond to country-clustered 95% C.I. S.E. bands.



Persistence & Upward Mobility Types



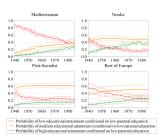
Share of Better-Educated Parents by Country Group



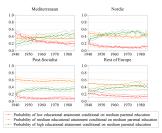
Distribution of *Better*-Parental Education by Country

Conditional Transition Probability by Country Group

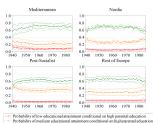
LOW PARENTAL EDIL



MEDIUM PARENTAL EDU.



HIGH PARENTAL EDIL



Cond. Prob (Low P. Edu.) by Country

Cond. Prob (Medium P. Edu.) by Country

Cond. Prob (High P. Edu.) by Country

Probability of high educational attainment conditional on high parental education

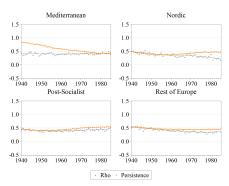
An Alternative Mobility Measure

$$E_{it} = \hat{\alpha}_t + \hat{\beta}_t \overline{P}_{it} \ \& \ \hat{\rho}_t = \hat{\beta}_t \frac{\hat{\sigma}_{P_t}}{\hat{\sigma}_{E_t}}$$

Intergenerational Mobility Coefficient

Mediterranean Nordic 1.5 Topical property of the state o 1.0 0.5 0.0 0.0 -0.51940 1980 1940 1960 1980 Post-Socialist Rest of Europe 1.5 1.5 1.0 1.0 ************************* ************************* 0.0 0.0 -0.5-0.5 1940 1960 1970 1980 1940 1950 1980 - Beta Persistence

INTERGENERATIONAL MOBILITY CORRELATION

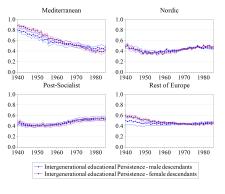


Intergenerational Mobility Coefficient by Country

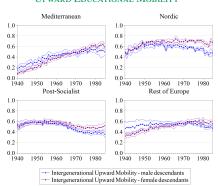
Intergenerational Mobility Correlation by Country

Mobility & Gender





Upward Educational Mobility

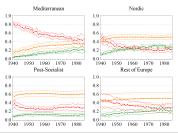


Downward M. by Gender & C.

Conditional Education Probability by Gender

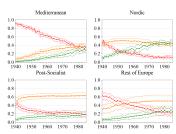
CONDITIONAL ON LOW PARENTAL EDUCATION

MALE DESCENDANTS



Probability of low educational attainment condititional on low parental education - male descendants
 Probability of medium educational attainment condititional on low parental education - male descendants
 Probability of high educational attainment condititional on low parental education - male descendants

FEMALE DESCENDANTS



Probability of low educational attainment conditional on low parental education - female descendants
 Probability of medium educational attainment conditional on low parental education - female descendants
 Probability of high educational attainment conditional on low parental education - female descendants

Pr(E = 1|P = 1) by Gender & C.

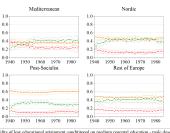
Pr(E=2|P=1) by Gender & C

Pr(E = 3|P = 1) by Gender & C.

Conditional Education Probability by Gender (cont'd)

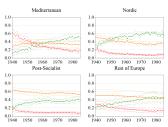
CONDITIONAL ON MEDIUM PARENTAL EDUCATION

MALE DESCENDANTS



Probability of low educational attainment conditional on medium parental education - male descendants Probability of medium educational attainment conditional on medium parental education - male descendants Probability of hise deucational attainment conditional on medium parental education - male descendants

FEMALE DESCENDANTS



Probability of low educational attainment conditional on medium parental education - female descendants
 Probability of medium educational attainment conditional on medium parental education - female descendants
 Probability of high educational attainment conditional on medium parental education - female descendants

Pr(F=1|P=2) by Gender & C

Pr(E=2|P=2) by Gender & C

Pr(E = 3|P = 2) by Gender & C.

Conditional Education Probability by Gender (cont'd)

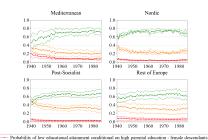
CONDITIONAL ON HIGH PARENTAL EDUCATION

MALE DESCENDANTS

Probability of low educational attainment condititonal on high parental education - male descendants
 Probability of medium educational attainment condititonal on high parental education - male descendants
 Probability of high educational attainment conditional on high parental education - male descendants
 Probability of high educational attainment conditional on high parental education - male descendants

1950

FEMALE DESCENDANTS



Probability of medium educational attainment condititional on high parental education - female descendants
 Probability of high educational attainment condititional on high parental education - female descendants



Dr(E=2|P=2) by Condox & C

Pr(F=3|P=3) by Gender & C



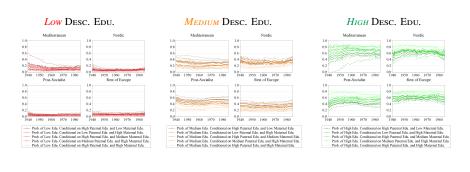
Parental Couple Composition

CONDITIONAL ON MEDIUM BETTER-PARENTAL EDUCATION



Parental Couple Composition (cont'd)

CONDITIONAL ON HIGH BETTER-PARENTAL EDUCATION



Mobility and Parental Finances

• European Values Survey (EVS) consolidated dataset

- data on descendants's and their paternal or maternal educational attainment (via ISCED categorization), gender, ... and their subjective (ordinal) evaluation of parental financial status when 14 years old (V363)
 - When you think about your parents when you were about 14 years old, could you say whether these statements correctly describe your parents?

```
My parent(s) had problems making ends meet:
1-ves: 2-to some extent: 3-a little bit: 4-no
```

```
    exclude descendants living with single-mothers when 14 years old, left with 39,201
observations
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- ► same 34 countries, clustered into the same 4 country groups over decades
- estimate how descendants's education prospects (conditional on same paternal education) vary over parental finances

Mobility and Parental Finances (cont'd)

CONDITIONAL ON Low PATERNAL EDUCATION



Mobility and Parental Finances (cont'd)

CONDITIONAL ON MEDIUM PATERNAL EDUCATION



Mobility and Parental Finances (cont'd)

CONDITIONAL ON HIGH PATERNAL EDUCATION



Intergenerational Mobility and Inequality

- Calculate within-cohort educational Gini coefficients via *years of schooling* of descendants, as in Thomas *et al.* (2002, *WB*)
- Estimate intergenerational educational elasticity via *cardinal & ordinal* educational measures for the "Educational Great Gatsby Curve" hypothesis, à la Krueger (2012, CAP) and Corak (2013, *JEP*)

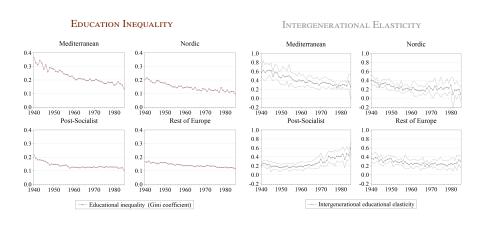
$$\log(E_{ict}) = \alpha_{ct} + \beta_{ct} \log(P_{ict}) + \epsilon_{ict}$$

 Propose set of "equality of educational opportunity" variables to address capture how de facto high education prospects of descendants vary over their parental education

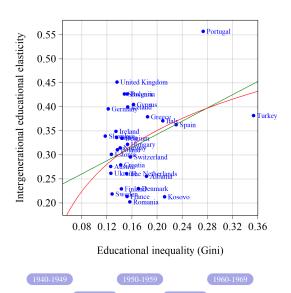
(I):
$$\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$$
 (II): $\mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$

(III):
$$\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$$
 (IV): $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$

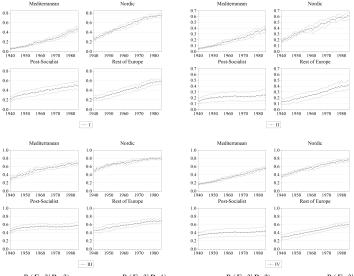
Education Inequality and Elasticity by Country Group



Educational Great Gatsby Curve



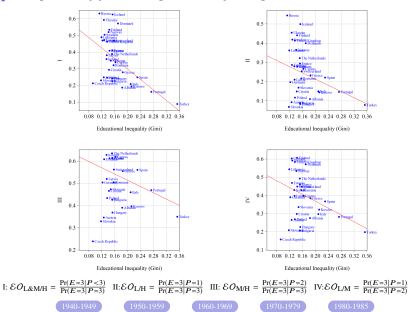
Evolution of Equality of Opportunity by Country Group



 $\text{II: } \mathcal{E} O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)} \quad \text{III: } \mathcal{E} O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)} \quad \text{III: } \mathcal{E} O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)} \quad \text{IV: } \mathcal{E} O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)} \quad \text{IV: } \mathcal{E} O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr($



Equality of Opportunity & Inequality



Conclusions

- We study intergenerational mobility in Europe thoroughly with both a cross-section and time-series perspective
 - ...document absolute and relative performances of countries and country groups with a standardized methodology
 - ... report on the presence of several dimensions of heterogeneities (along their with evolutions) overlooked in the earlier literature
- We find strong evidence on the link between education inequality and intergenerational transmission of education
 - ... more support for the "Great Gatsby" hypothesis
- Future research on
 - why we observe these patterns
 - connection between objective parental finances and intergenerational educational mobility to be illuminating

Educational Distributions

Table: Distribution of Parental Education

Table: Distribution of Descendants's Education

		Father		Mother			Better-Educated Parent			
Country	Country Group	Low	Medium	High	Low	Medium	High	Low	Medium	High
Albania	Mediterranean	0.73	0.23	0.04	0.85	0.14	0.02	0.70	0.26	0.04
Cyprus	Mediterranean	0.77	0.17	0.06	0.84	0.13	0.03	0.75	0.18	0.07
Greece	Mediterranean	0.84	0.10	0.06	0.89	0.08	0.03	0.81	0.11	0.07
Italy	Mediterranean	0.82	0.13	0.05	0.87	0.10	0.02	0.79	0.15	0.06
Portugal	Mediterranean	0.93	0.03	0.03	0.95	0.03	0.03	0.92	0.04	0.04
Spain	Mediterranean	0.85	0.06	0.09	0.92	0.04	0.04	0.83	0.07	0.10
Turkey	Mediterranean	0.93	0.05	0.02	0.98	0.02	0.00	0.93	0.05	0.02
Mediterranean		0.86	0.08	0.06	0.91	0.06	0.03	0.85	0.09	0.06
Denmark	Nordic	0.37	0.41	0.22	0.56	0.25	0.19	0.31	0.39	0.29
Finland	Nordic	0.64	0.20	0.16	0.66	0.22	0.12	0.55	0.25	0.20
Iceland	Nordic	0.43	0.44	0.13	0.74	0.15	0.11	0.38	0.44	0.19
Norway	Nordic	0.45	0.34	0.21	0.56	0.29	0.15	0.37	0.37	0.26
Sweden	Nordic	0.62	0.19	0.19	0.63	0.21	0.16	0.53	0.23	0.24
Nordic		0.52	0.29	0.19	0.61	0.24	0.15	0.44	0.32	0.24
Bulgaria	Post-Socialist	0.59	0.32	0.10	0.62	0.29	0.09	0.56	0.32	0.13
Croatia	Post-Socialist	0.54	0.37	0.09	0.67	0.27	0.06	0.51	0.38	0.11
Czech Republic	Post-Socialist	0.16	0.75	0.09	0.28	0.67	0.05	0.12	0.77	0.11
Estonia	Post-Socialist	0.47	0.37	0.16	0.43	0.43	0.14	0.36	0.44	0.21
Hungary	Post-Socialist	0.44	0.47	0.09	0.63	0.32	0.06	0.41	0.48	0.11
Kosovo	Post-Socialist	0.75	0.22	0.04	0.93	0.06	0.01	0.75	0.21	0.04
Latvia	Post-Socialist	0.52	0.36	0.12	0.43	0.44	0.13	0.38	0.45	0.18
Lithuania	Post-Socialist	0.63	0.25	0.12	0.56	0.29	0.15	0.53	0.29	0.18
Poland	Post-Socialist	0.62	0.32	0.06	0.66	0.29	0.04	0.57	0.35	0.08
Romania	Post-Socialist	0.62	0.32	0.06	0.71	0.23	0.05	0.60	0.33	0.08
Russia	Post-Socialist	0.47	0.17	0.36	0.43	0.18	0.39	0.37	0.16	0.47
Slovakia	Post-Socialist	0.40	0.53	0.07	0.51	0.45	0.04	0.37	0.55	0.08
Slovenia	Post-Socialist	0.40	0.50	0.10	0.60	0.32	0.07	0.38	0.49	0.13
Ukraine	Post-Socialist	0.48	0.26	0.26	0.48	0.26	0.27	0.40	0.25	0.35
Post-Socialist		0.46	0.41	0.13	0.53	0.36	0.12	0.41	0.42	0.17
Austria	Rest of Europe	0.41	0.52	0.07	0.60	0.38	0.02	0.39	0.55	0.07
Belgium	Rest of Europe	0.57	0.26	0.17	0.66	0.23	0.12	0.51	0.28	0.21
France	Rest of Europe	0.62	0.27	0.11	0.72	0.21	0.07	0.57	0.30	0.13
Germany	Rest of Europe	0.10	0.64	0.26	0.33	0.59	0.08	0.09	0.64	0.27
Ireland	Rest of Europe	0.79	0.13	0.08	0.75	0.17	0.08	0.69	0.19	0.12
Netherlands	Rest of Europe	0.68	0.16	0.16	0.83	0.10	0.07	0.66	0.17	0.17
Switzerland	Rest of Europe	0.29	0.52	0.20	0.53	0.42	0.05	0.26	0.54	0.20
United Kingdom	Rest of Europe	0.70	0.11	0.20	0.77	0.07	0.16	0.65	0.11	0.24
Rest of Europe		0.51	0.33	0.16	0.64	0.28	0.08	0.46	0.35	0.19
All		0.55	0.31	0.14	0.64	0.27	0.10	0.50	0.33	0.17

		All descendants		Male descendants				nale descen	lants	
Country	Country Group	Low	Medium	High	Low	Medium	High	Low	Medium	High
Albania	Mediterranean	0.45	0.43	0.12	0.43	0.46	0.11	0.48	0.40	0.12
Cyprus	Mediterranean	0.27	0.42	0.31	0.22	0.46	0.33	0.32	0.38	0.30
Greece	Mediterranean	0.40	0.36	0.24	0.37	0.35	0.28	0.42	0.37	0.2
Italy	Mediterranean	0.44	0.40	0.15	0.44	0.41	0.16	0.45	0.40	0.13
Portugal	Mediterranean	0.71	0.16	0.13	0.69	0.18	0.13	0.73	0.14	0.1
Spain	Mediterranean	0.52	0.23	0.25	0.52	0.24	0.24	0.52	0.21	0.20
Turkey	Mediterranean	0.76	0.16	0.08	0.71	0.19	0.11	0.80	0.14	0.0
Mediterranean		0.54	0.26	0.20	0.51	0.28	0.21	0.56	0.25	0.19
Denmark	Nordic	0.15	0.37	0.47	0.15	0.43	0.42	0.16	0.31	0.5
Finland	Nordic	0.20	0.39	0.41	0.23	0.42	0.35	0.18	0.36	0.4
Iceland	Nordic	0.25	0.33	0.42	0.25	0.44	0.31	0.26	0.23	0.5
Norway	Nordic	0.12	0.45	0.43	0.12	0.48	0.41	0.13	0.41	0.4
Sweden	Nordic	0.16	0.46	0.38	0.17	0.51	0.32	0.15	0.42	0.4
Nordic		0.17	0.41	0.42	0.17	0.45	0.38	0.16	0.37	0.4
Bulgaria	Post-Socialist	0.23	0.53	0.24	0.22	0.59	0.20	0.24	0.48	0.2
Croatia	Post-Socialist	0.19	0.58	0.24	0.15	0.62	0.23	0.22	0.54	0.2
Czech Republic	Post-Socialist	0.07	0.80	0.14	0.05	0.81	0.14	0.08	0.78	0.1
Estonia	Post-Socialist	0.11	0.50	0.39	0.13	0.56	0.30	0.10	0.46	0.4
Hungary	Post-Socialist	0.21	0.59	0.20	0.17	0.66	0.16	0.25	0.53	0.2
Kosovo	Post-Socialist	0.48	0.44	0.07	0.28	0.62	0.10	0.66	0.29	0.0
Latvia	Post-Socialist	0.16	0.55	0.29	0.21	0.56	0.23	0.12	0.55	0.3
Lithuania	Post-Socialist	0.16	0.46	0.38	0.19	0.50	0.31	0.14	0.43	0.4
Poland	Post-Socialist	0.27	0.53	0.20	0.28	0.53	0.18	0.25	0.53	0.23
Romania	Post-Socialist	0.27	0.58	0.16	0.24	0.60	0.16	0.29	0.56	0.1
Russia	Post-Socialist	0.08	0.28	0.64	0.09	0.31	0.60	0.07	0.27	0.6
Slovakia	Post-Socialist	0.10	0.73	0.16	0.07	0.77	0.17	0.13	0.71	0.1
Slovenia	Post-Socialist	0.17	0.58	0.26	0.13	0.64	0.23	0.20	0.52	0.2
Ukraine	Post-Socialist	0.08	0.33	0.59	0.08	0.37	0.55	0.08	0.31	0.6
Post-Socialist		0.16	0.55	0.29	0.15	0.60	0.25	0.16	0.51	0.3
Austria	Rest of Europe	0.18	0.70	0.12	0.15	0.71	0.14	0.20	0.69	0.1
Belgium	Rest of Europe	0.24	0.38	0.38	0.24	0.41	0.35	0.24	0.35	0.4
France	Rest of Europe	0.21	0.45	0.34	0.18	0.49	0.33	0.23	0.42	0.3
Germany	Rest of Europe	0.06	0.61	0.34	0.04	0.55	0.41	0.08	0.66	0.2
Ireland	Rest of Europe	0.37	0.29	0.34	0.42	0.28	0.31	0.34	0.30	0.3
The Netherlands	Rest of Europe	0.35	0.32	0.33	0.32	0.32	0.36	0.38	0.32	0.30
Switzerland	Rest of Europe	0.12	0.55	0.33	0.07	0.50	0.43	0.17	0.59	0.2
United Kingdom	Rest of Europe	0.41	0.19	0.41	0.37	0.20	0.43	0.43	0.18	0.3
Rest of Europe		0.24	0.43	0.33	0.22	0.43	0.36	0.26	0.43	0.3
All		0.25	0.44	0.31	0.23	0.47	0.30	0.26	0.42	0.3



Descriptive Statistics by Country

Table: Descriptive Statistics by Country

		Years of Schooling Age							
Country	No of Obs.	Mean	Std. Dev.	Mean	Std. Dev.				
Albania	790	10.62	3.61	49.33	12.79				
Austria	5411	12.67	3.09	46.47	11.61				
Belgium	7010	13.20	3.66	46.80	12.04				
Bulgaria	6026	11.72	3.34	50.58	12.68				
Croatia	1914	12.05	3.41	47.72	13.15				
Cyprus	2937	12.02	3.97	47.12	12.99				
Czech Republic	8786	12.83	2.36	47.83	12.65				
Denmark	7170	13.91	4.52	48.50	12.21				
Estonia	5536	13.52	3.18	47.10	12.75				
Finland	9423	13.77	3.99	48.17	12.53				
France	7796	13.06	3.85	47.27	12.32				
Germany	12483	14.13	3.24	48.36	11.92				
Greece	5887	11.42	4.22	45.62	12.18				
Hungary	6587	12.50	3.57	46.40	12.32				
Iceland	804	14.62	4.15	46.61	12.15				
Ireland	9025	13.59	3.55	47.87	12.75				
Italy	2378	11.94	4.77	45.98	11.82				
Kosovo	732	9.93	3.70	47.20	11.92				
Latvia	1958	12.91	3.29	45.72	12.40				
Lithuania	3804	13.09	3.00	51.56	12.85				
The Netherlands	8665	13.84	4.01	47.64	12.13				
Norway	7542	13.96	3.67	46.70	11.88				
Poland	8011	12.59	3.32	45.71	12.25				
Portugal	8008	8.17	4.82	48.82	12.95				
Romania	2752	11.74	3.64	45.70	12.16				
Russia	6142	13.03	2.69	46.35	12.54				
Slovakia	6029	12.93	2.96	47.12	12.51				
Slovenia	5740	12.32	3.51	46.27	12.47				
Spain	7998	12.44	5.40	45.98	12.34				
Sweden	5223	13.51	3.34	48.97	13.03				
Switzerland	6524	11.71	3.56	47.05	12.10				
Turkey	3002	6.41	4.17	41.46	11.85				
Ukraine	5800	12.53	3.01	47.26	12.72				
United Kingdom	8469	13.59	3.57	47.80	12.59				
All	196362	12.70	3.97	47.35	12.47				

Back

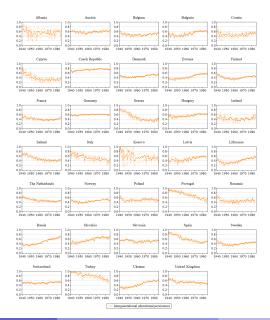
Descriptive Statistics by Country Group

Table: Descriptive Statistics by Country Group

		Years of Schooling		Age	
Country Group	Number of Obs.	Mean	Std. Dev.	Mean	Std. Dev.
Mediterranean	31000	10.34	5.16	46.40	12.63
Nordic	30162	13.82	3.95	47.98	12.40
Post-Socialist	69817	12.61	3.19	47.31	12.65
Rest of Europe	65383	13.36	3.64	47.54	12.22

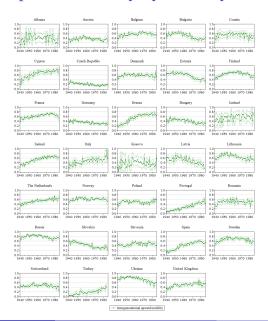


Evolution of Persistence by Country



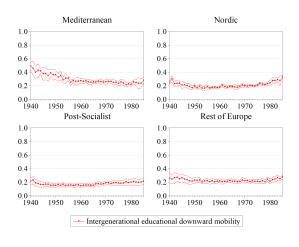


Evolution of Upward Mobility by Country Group



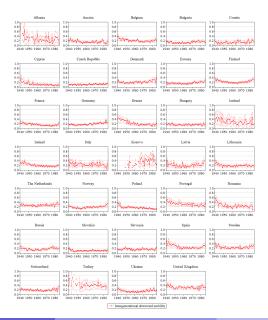


Evolution of Downward Mobility by Country



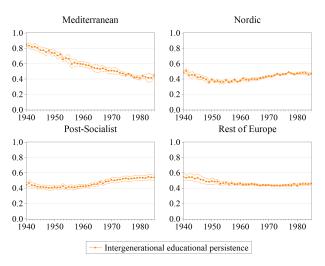


Evolution of Downward Mobility by Country



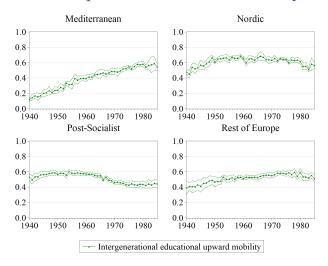


Intergenerational Educational Persistence



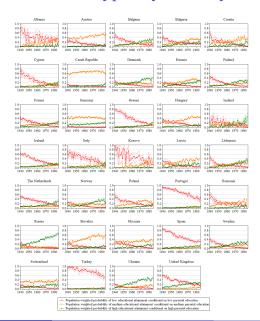


Intergenerational Upward Educational Mobility



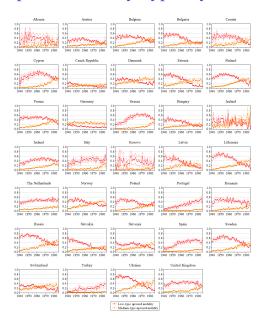


Evolution of Persistence Types by Country



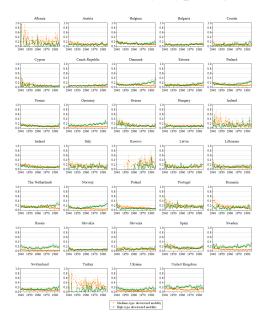


Evolution of Upward Mobility Types by Country



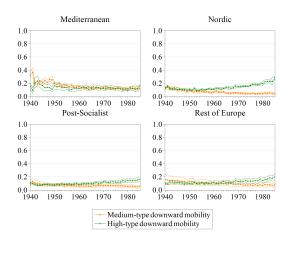


Evolution of Downward Mobility Types by Country



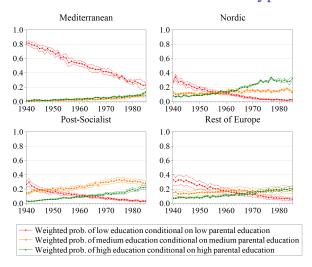


Evolution of Downward Mobility Types by Country Group



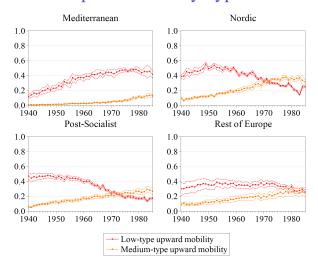


Intergenerational Educational Persistence Types



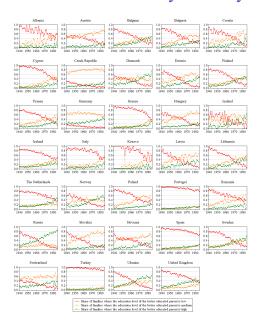


Intergenerational Upward Mobility Types



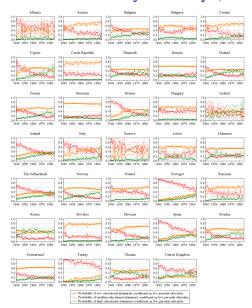


Share of *Better-Educated* Parents by Country



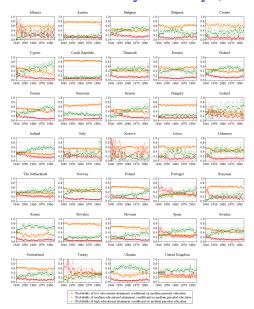


Conditional Transition Prob. by Country (*Low* P. Edu.)



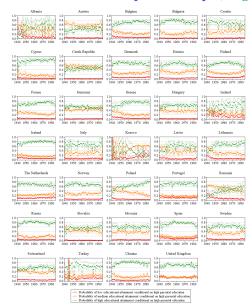


Conditional Transition Prob. by Country (*Medium* P. Edu.)



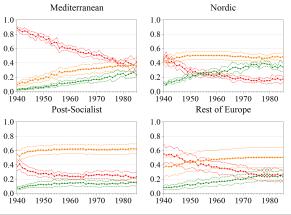


Conditional Transition Prob. by Country (*High* P. Edu.)





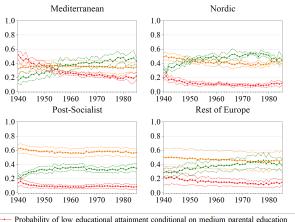
Cond. Transition Prob. by Country Group (*Low* P. Edu.)



Probability of low educational attainment conditional on low parental education
 Probability of medium educational attainment conditional on low parental education
 Probability of high educational attainment conditional on low parental education



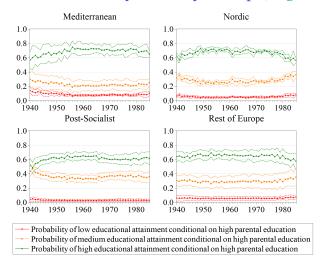
Cond. Transition Prob. by Country Group (*Medium* P. Edu.)



Probability of low educational attainment conditional on medium parental education
 Probability of medium educational attainment conditional on medium parental education
 Probability of high educational attainment conditional on medium parental education

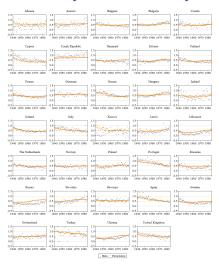


Cond. Transition Prob. by Country Group (*High* P. Edu.)



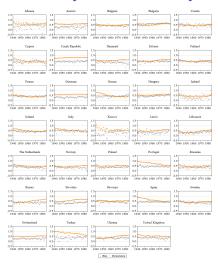


Intergenerational Mobility Coefficient by Country



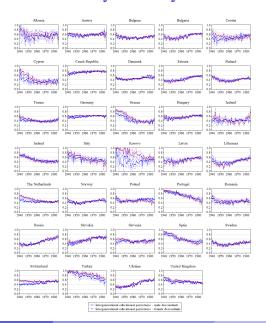


Intergenerational Mobility Correlation by Country



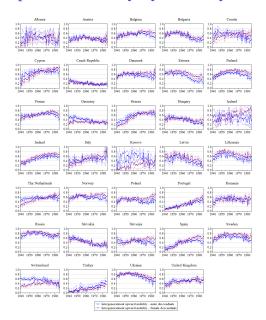


Evolution of Persistence by Country and Gender



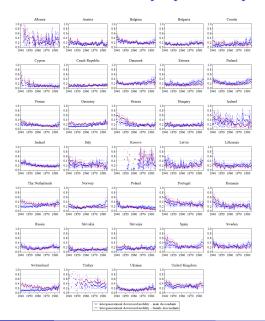


Evolution of Upward Mobility by Country and Gender



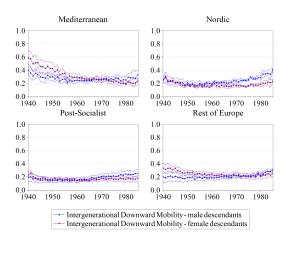


Evolution of Downward Mobility by Country and Gender



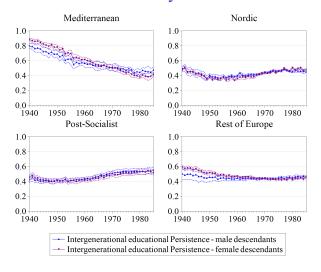


Evolution of Downward Mobility by Country and Gender



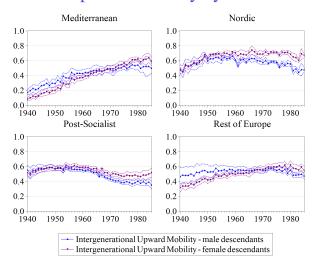


Intergenerational Persistence by Gender



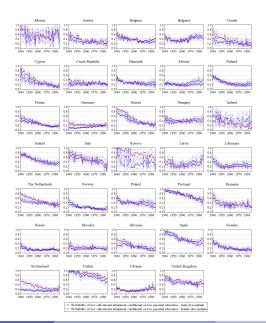


Intergenerational Upward Mobility by Gender



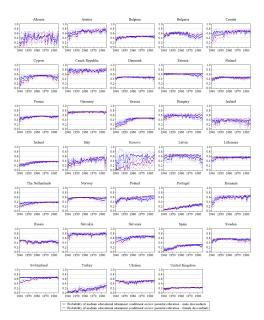


Low Edu. Prob. Cond. on Low P. Edu.



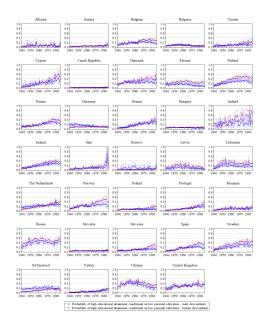


Medium Edu. Prob. Cond. on Low P. Edu.



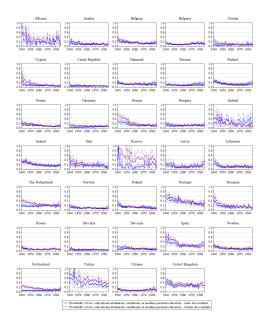


High Edu. Prob. Cond. on Low P. Edu.



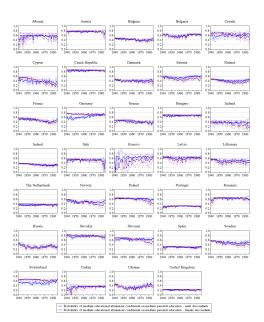


Low Edu. Prob. Cond. on Medium P. Edu.



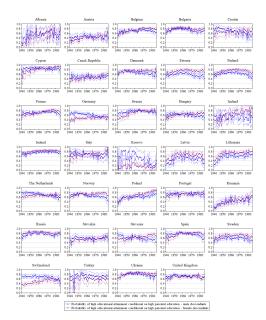


Medium Edu. Prob. Cond. on Medium P. Edu.



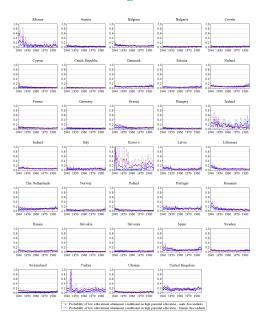


High Edu. Prob. Cond. on Medium P. Edu.



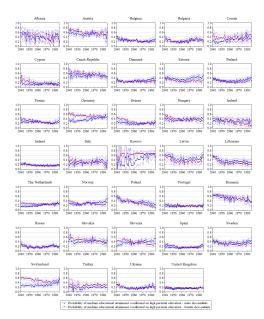


Low Edu. Prob. Cond. on High P. Edu.



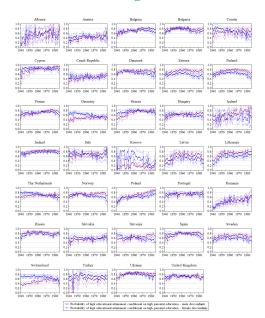


Medium Edu. Prob. Cond. on High P. Edu.



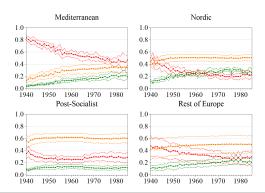


High Edu. Prob. Cond. on High P. Edu.





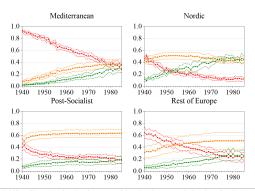
Cond. Tran. Prob. on Low P. E. for Male Desc.



Probability of low educational attainment conditional on low parental education - male descendants
 Probability of medium educational attainment conditional on low parental education - male descendants
 Probability of high educational attainment conditional on low parental education - male descendants



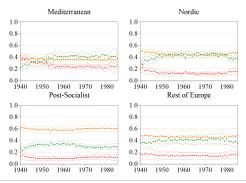
Cond. Tran. Prob. on Low P. E. for Female Desc.



Probability of low educational attainment conditional on low parental education - female descendants
 Probability of medium educational attainment conditional on low parental education - female descendants
 Probability of high educational attainment conditional on low parental education - female descendants



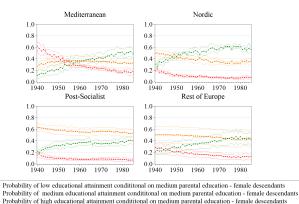
Cond. Tran. Prob. on *Medium* P. E. for *Male* Desc.



Probability of low educational attainment conditional on medium parental education - male descendants
 Probability of medium educational attainment conditional on medium parental education - male descendants
 Probability of high educational attainment conditional on medium parental education - male descendants

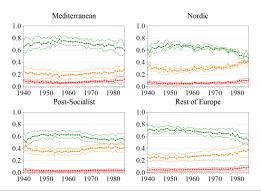


Cond. Tran. Prob. on *Medium* P. E. for *Female* Desc.





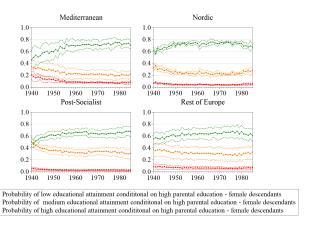
Cond. Tran. Prob. on High P. E. for Male Desc.



Probability of low educational attainment conditional on high parental education - male descendants
 Probability of medium educational attainment conditional on high parental education - male descendants
 Probability of high educational attainment conditional on high parental education - male descendants

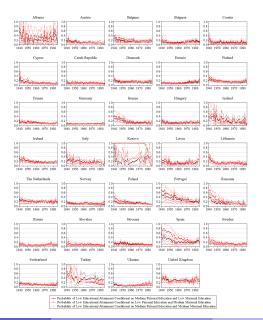


Cond. Tran. Prob. on High P. E. for Female Desc.



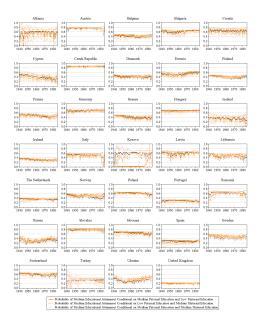


Low Edu. Prob. Cond. on Medium P. Edu. by P. Couple



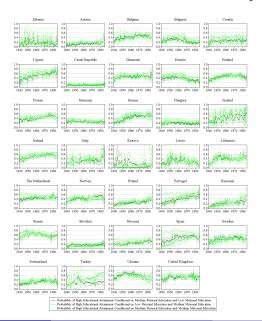


Medium Edu. Prob. Cond. on Medium P. Edu. by P. Couple



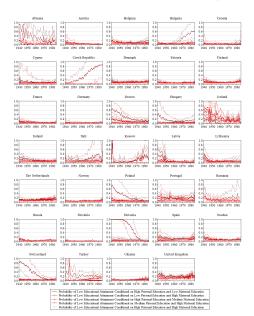


High Edu. Prob. Cond. on Medium P. Edu. by P. Couple



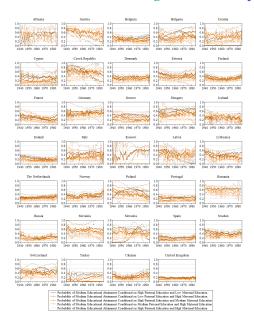


Low Edu. Prob. Cond. on High P. Edu. by P. Couple



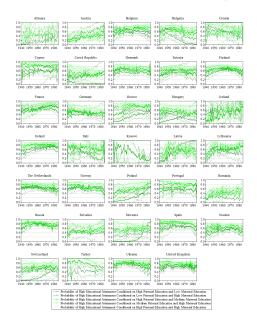


Medium Edu. Prob. Cond. on High P. Edu. by P. Couple



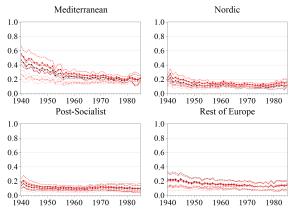


High Edu. Prob. Cond. on High P. Edu. by P. Couple





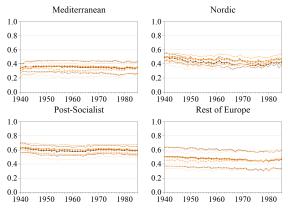
Cond. Trans. Prob. by Country Group: Pr(E = 1|P = 2)



Prob. of Low Edu. Conditional on Medium Paternal Edu. and Low Maternal Edu.
 Prob. of Low Edu. Conditional on Low Paternal Edu. and Medium Maternal Edu.
 Prob. of Low Edu. Conditional on Medium Paternal Edu. and Medium Maternal Edu.



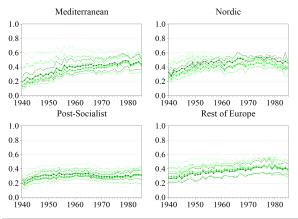
Cond. Trans. Prob. by Country Group: Pr(E = 2|P = 2)



Prob. of Medium Edu. Conditional on Medium Paternal Edu. and Low Maternal Edu.
 Prob. of Medium Edu. Conditional on Low Paternal Edu. and Medium Maternal Edu.
 Prob. of Medium Edu. Conditional on Medium Paternal Edu. and Medium Maternal Edu.



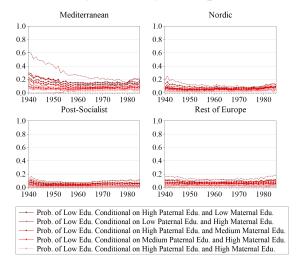
Cond. Trans. Prob. by Country Group: Pr(E = 3|P = 2)



Prob. of High Edu. Conditional on Medium Paternal Edu. and Low Maternal Edu.
 Prob. of High Edu. Conditional on Low Paternal Edu. and Medium Maternal Edu.
 Prob. of High Edu. Conditional on Medium Paternal Edu. and Medium Maternal Edu.

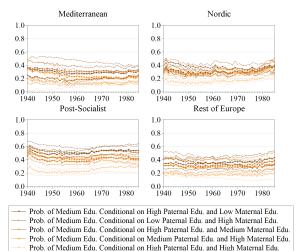


Cond. Trans. Prob. by Country Group: Pr(E = 1|P = 3)



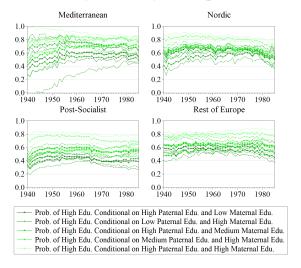


Cond. Trans. Prob. by Country Group: Pr(E = 2|P = 3)



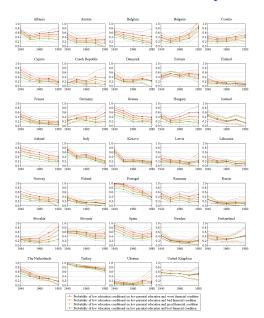


Cond. Trans. Prob. by Country Group: Pr(E = 3|P = 3)



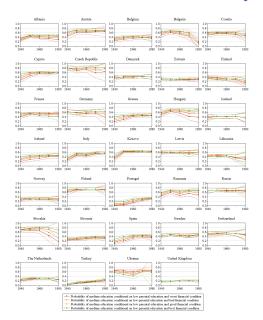


Low Edu. Prob. Cond. on Low P. Edu. by P. Finance



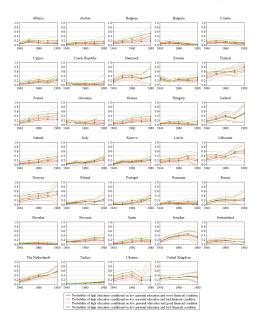


Medium Edu. Prob. Cond. on Low P. Edu. by P. Finance



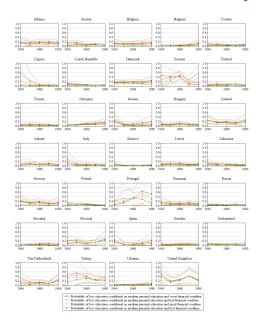


High Edu. Prob. Cond. on Low P. Edu. by P. Finance



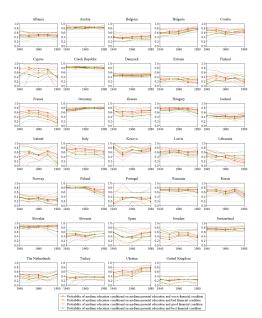


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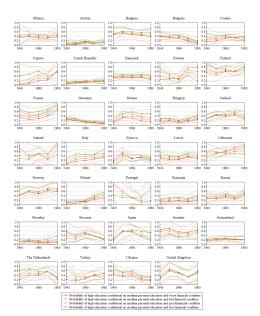


Medium Edu. Prob. Cond. on Medium P. Edu. by P. Finance



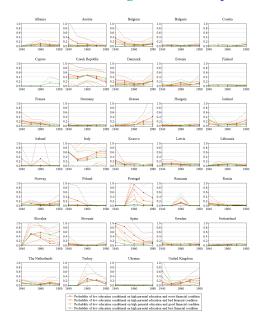


High Edu. Prob. Cond. on Medium P. Edu. by P. Finance



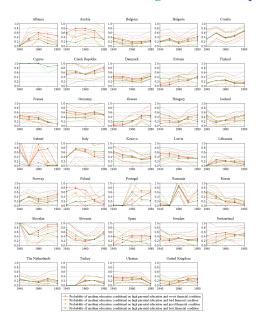


Low Edu. Prob. Cond. on High P. Edu. by P. Finance



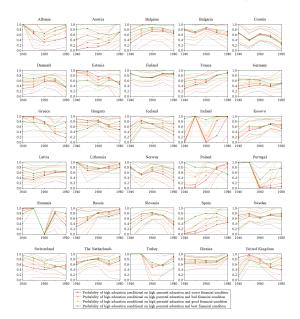


Medium Edu. Prob. Cond. on High P. Edu. by P. Finance



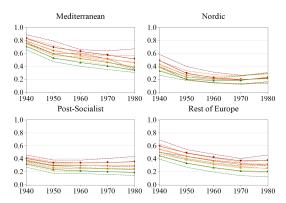


High Edu. Prob. Cond. on High P. Edu. by P. Finance





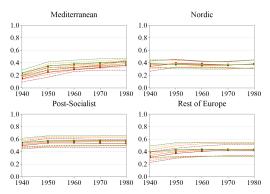
Cond. Trans. Prob. by Country Group: Pr(E = 1|P = 1)



Probability of low education conditional on low parental education and worst financial condition
 Probability of low education conditional on low parental education and bad financial condition
 Probability of low education conditional on low parental education and good financial condition
 Probability of low education conditional on low parental education and best financial condition



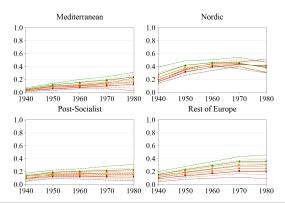
Cond. Trans. Prob. by Country Group: Pr(E = 2|P = 1)



Probability of medium education conditional on low parental education and worst financial condition
 Probability of medium education conditional on low parental education and bad financial condition
 Probability of medium education conditional on low parental education and good financial condition
 Probability of medium education conditional on low parental education and best financial condition



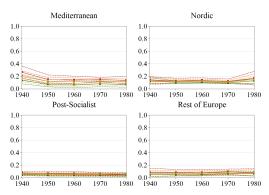
Cond. Trans. Prob. by Country Group: Pr(E = 3|P = 1)



Probability of high education conditional on low parental education and worst financial condition
 Probability of high education conditional on low parental education and bad financial condition
 Probability of high education conditional on low parental education and good financial condition
 Probability of high education conditional on low parental education and best financial condition



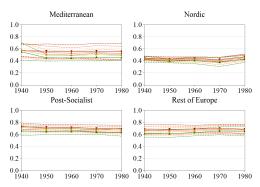
Cond. Trans. Prob. by Country Group: Pr(E = 1|P = 2)



Probability of low education conditional on medium parental education and worst financial condition
 Probability of low education conditional on medium parental education and bad financial condition
 Probability of low education conditional on medium parental education and good financial condition
 Probability of low education conditional on medium parental education and best financial condition



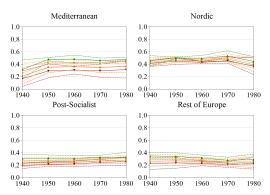
Cond. Trans. Prob. by Country Group: Pr(E = 2|P = 2)



Probability of medium education conditional on medium parental education and worst financial condition
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 Probability of medium education conditional on medium parental education and best financial condition



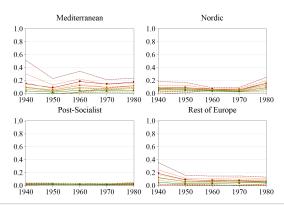
Cond. Trans. Prob. by Country Group: Pr(E = 3|P = 2)



Probability of high education conditional on medium parental education and worst financial condition
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 Probability of high education conditional on medium parental education and best financial condition



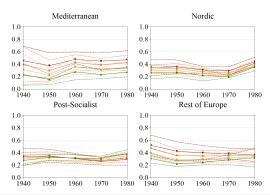
Cond. Trans. Prob. by Country Group: Pr(E = 1|P = 3)



Probability of low education conditional on high parental education and worst financial condition
 Probability of low education conditional on high parental education and bad financial condition
 Probability of low education conditional on high parental education and good financial condition
 Probability of low education conditional on high parental education and best financial condition



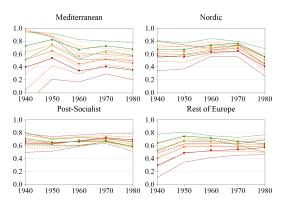
Cond. Trans. Prob. by Country Group: Pr(E = 2|P = 3)



Probability of medium education conditional on high parental education and worst financial condition
 Probability of medium education conditional on high parental education and bad financial condition
 Probability of medium education conditional on high parental education and good financial condition
 Probability of medium education conditional on high parental education and best financial condition



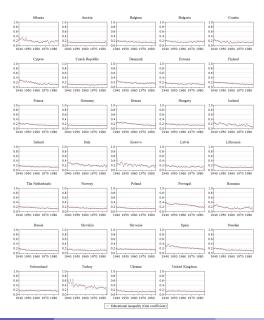
Cond. Trans. Prob. by Country Group: Pr(E = 3|P = 3)



- Probability of high education conditional on high parental education and worst financial condition
- Probability of high education conditional on high parental education and bad financial condition
 Probability of high education conditional on high parental education and good financial condition
- -- Probability of high education conditional on high parental education and best financial condition

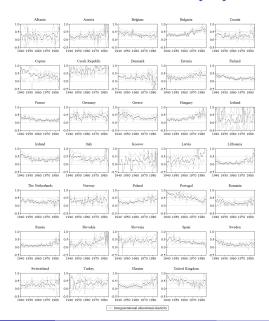


Educational Inequality by Country



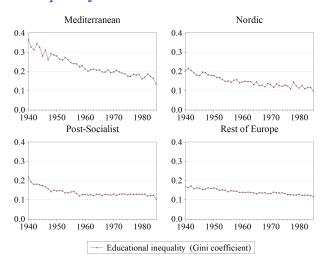


Intergenerational Educational Elasticity by Country



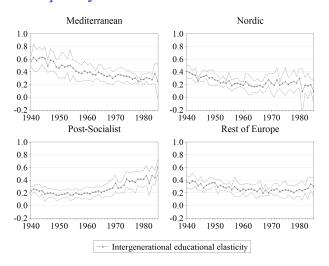


Education Inequality



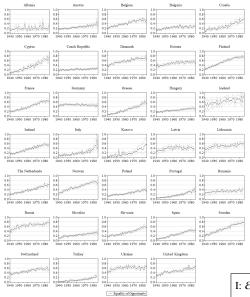


Education Inequality



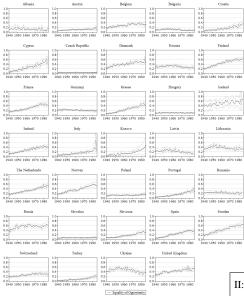


Equality of Opportunity (I) by Country

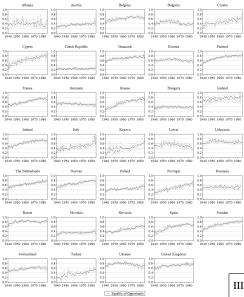


I: $\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$

Equality of Opportunity (II) by Country

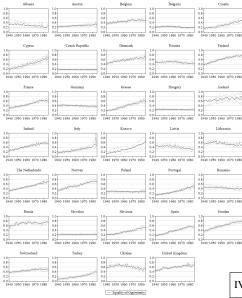


Equality of Opportunity (III) by Country



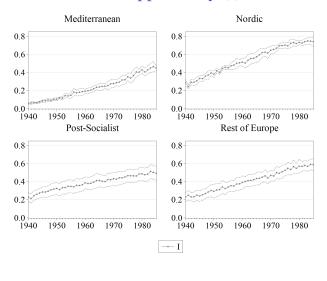
III: $\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$

Equality of Opportunity (IV) by Country



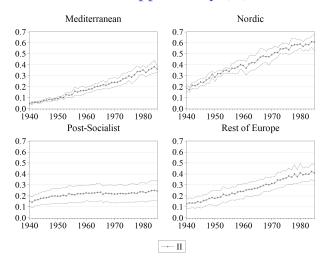
IV: $\mathcal{E}O_{L/M} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$

Equality of Educational Opportunity (I)



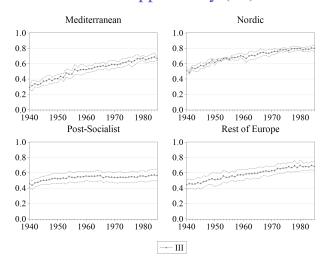


Equality of Educational Opportunity (II)



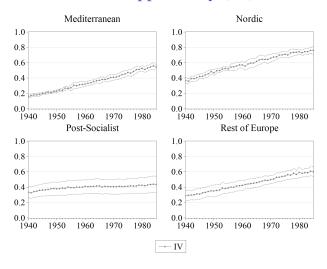


Equality of Educational Opportunity (III)



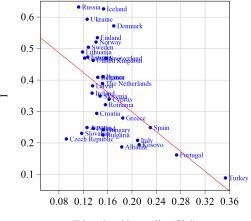


Equality of Educational Opportunity (IV)





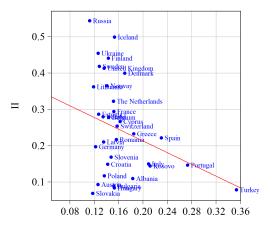
Great Gatsby via Equality of Educational Opportunity (I)



Educational Inequality (Gini)



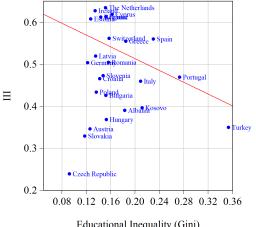
Great Gatsby via Equality of Educational Opportunity (II)



Educational Inequality (Gini)



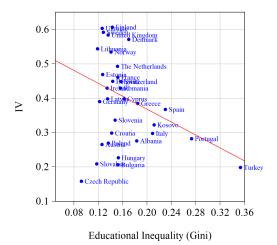
Great Gatsby via Equality of Educational Opportunity (III)



Educational Inequality (Gini)

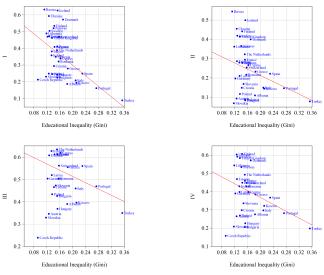


Great Gatsby via Equality of Educational Opportunity (IV)



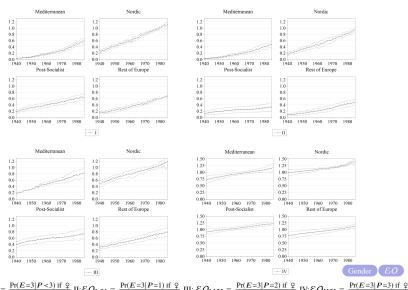
Back

Equality of Opportunity & Inequality



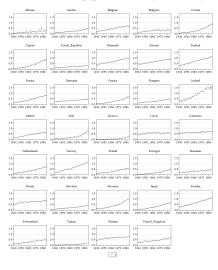
 $\text{II: } \mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)} \quad \text{III: } \mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)} \quad \text{III: } \mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)} \quad \text{IV: } \mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)} \quad \text{IV: } \mathcal{E}O_{\text{L/M}} = \frac$

Equality of Opportunity by Gender



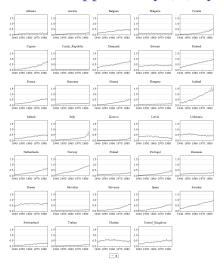
 $\text{I: } \mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P=3) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ II: } \mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ III: } \mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \circlearrowleft}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac{\Pr(E=3|P=3) \text{ if } \sigma}{\Pr(E=3|P=3) \text{ if } \sigma} \text{ IV: } \mathcal{E}O_{\text{H/H}} = \frac$

Equality of Educational Opportunity (I) by Gender



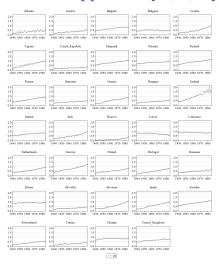


Equality of Educational Opportunity (II) by Gender



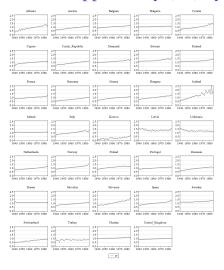


Equality of Educational Opportunity (III) by Gender





Equality of Educational Opportunity (IV) by Gender





Generalized Ordered Logit

- The standard ordered logit methodology implicitly assumes that parental education has a proportional effect on:
 - The odds of high educational attainment relative to the odds of below high educational attainment
 - 2 The odds of above low educational attainment relative to the odds of low educational attainment
- In other words, when parental education increases the probability of medium educational attainment and high educational attainment increase at the same percentage.
- To circumvent this issue, we also apply the generalized ordered logit methodology (Peterson and Harell, 1990 Applied Statistics; Lall et al., 2002 Statistical Methods in Medical Research; Williams, 2006 Stata Journal) which allows an increase in parental education to affect the probability of medium and high educational attainment heterogeneously.





Generalized Ordered Logit

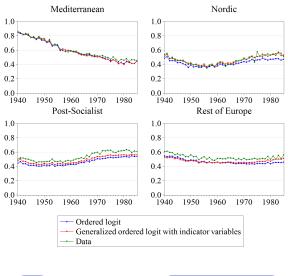
• Peterson and Harell (1990)'s description of a general ordered logit model:

$$Pr(Y_i \geq j | X_i) = \frac{1}{1 + exp(-\alpha_j - X_i' - T_i'\gamma_j)}$$

- T_i : a vector containing the values of observations for variables that violate the proportional odds assumption.
- γ_j : a vector of regression coefficients for variables that violate the proportional odds assumption.



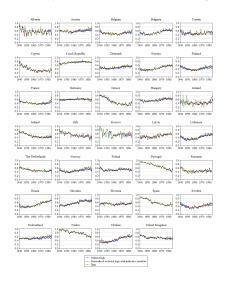
Persistence by Country Groups - Generalized Ologit





Persistence Gologit by Country

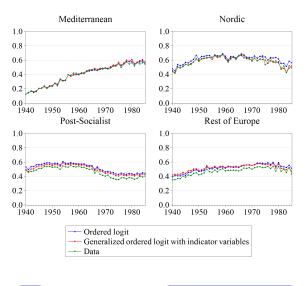
Persistence by Country - Generalized Ologit





Persistence Gologit by Country Groups

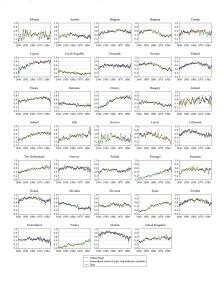
Upward Mobility by Country Groups - Generalized Ologit





Upward Mobility Gologit by Country

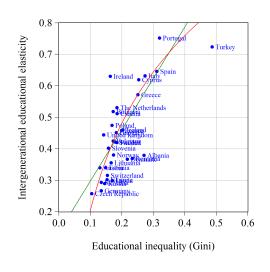
Upward Mobility by Country - Generalized Ologit





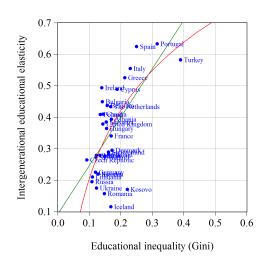
Upward Mobility Gologit by Country Groups

Great Gatsby Curve (1940-1949)



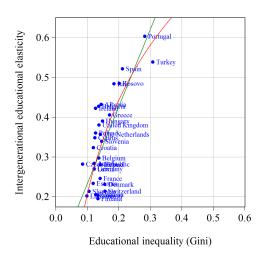


Great Gatsby Curve (1950-1959)



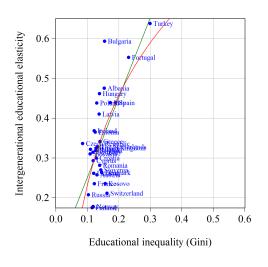


Great Gatsby Curve (1960-1969)



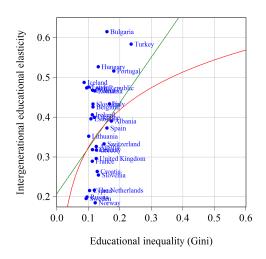


Great Gatsby Curve (1970-1979)



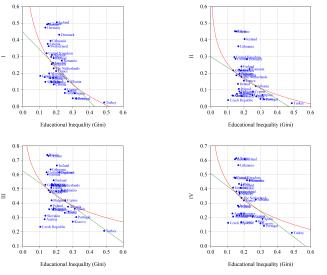


Great Gatsby Curve (1980-1985)



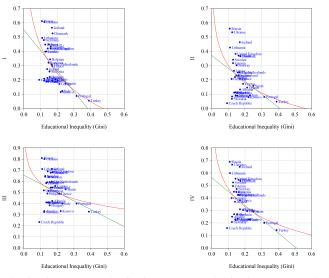


Equality of Opportunity & Inequality (1940-1949)



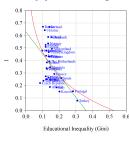
I:
$$\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$$
 II: $\mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$ III: $\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$

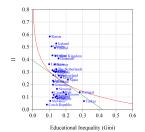
Equality of Opportunity & Inequality (1950-1959)

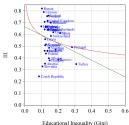


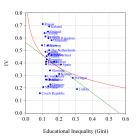
I:
$$\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$$
 II: $\mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$ III: $\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$

Equality of Opportunity & Inequality (1960-1969)



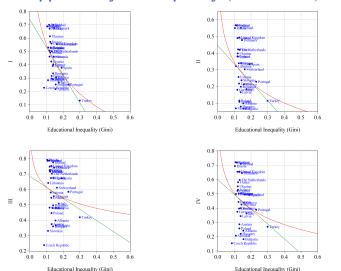






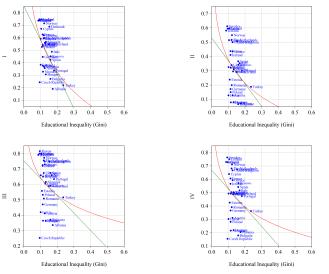
I:
$$\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$$
 II: $\mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$ III: $\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$

Equality of Opportunity & Inequality (1970-1979)



I:
$$\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$$
 II: $\mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$ III: $\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=2)}$

Equality of Opportunity & Inequality (1980-1985)



I:
$$\mathcal{E}O_{\text{L\&M/H}} = \frac{\Pr(E=3|P<3)}{\Pr(E=3|P=3)}$$
 II: $\mathcal{E}O_{\text{L/H}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$ III: $\mathcal{E}O_{\text{M/H}} = \frac{\Pr(E=3|P=2)}{\Pr(E=3|P=3)}$ IV: $\mathcal{E}O_{\text{L/M}} = \frac{\Pr(E=3|P=1)}{\Pr(E=3|P=3)}$