Participation, equality of opportunity and returns to higher education in contemporary Europe

Gabriele Ballarino
University of Milan

Fabrizio Bernardi
European University Institute

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Motivation

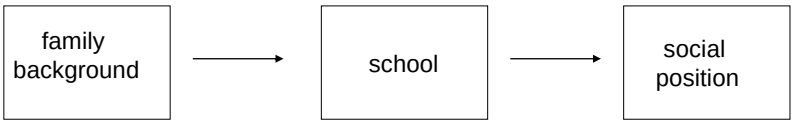
This work (in print in *European Societies*) studies the association between the participation to tertiary education (in Allmendinger's terms, vertical destratification of education), whose increase was one of the major processes of social change of the last decades, and two major goals of contemporary educational systems:

- promoting social cohesion and equality, giving to each individual the same opportunities to get an education (equality of educational opportunities)

- allocating individuals to occupations, by means of the occupational value of educational titles (efficiency of occupational allocation)

Motivation

- The relation between education and inequality can be summarized by two transitions: from social background to education and from education to occupation/social position (Kivinen et al. 2007).
- The two transitions work with two different logics: a logic of inclusion-equality of opportunity in the first transition, from family to school.



- A logic of selection-allocative efficiency in the second transition, from school to work.

Motivation

Building on evidence from previous research on both transitions, three different scenarios can be defined, relating participation to education to equality of educational opportunities (first transition) and to the occupational value of school titles (second transition).

Motivation: three scenarios

a. If with increasing participation to higher education also equality of opportunities increases (Arum *et al.* 2006; Breen *et al.* 2009; Ballarino *et al.* 2009), while the occupational values of the titles decreases (credential inflation: Collins 1979; Jackson *et al.* 2005), we have a *trade-off* scenario.

b. If equality of opportunities does not increase, despite increasing participation (Shavit & Blossfeld 1993; Shavit *et al.* 2007; Pfeffer 2008), and occupational returns to education decrease, we have a *worst-off* scenario.

c. If with increasing participation equality of opportunities increases and returns do not diminish (as it is according to SBTC theory, Acemoglu 2002), we have a *best-off* scenario.

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Inequality of opportunities (IEO)	Occupational value of titles (IOO)	Scenario
Decrease	**Decrease**	***Trade-off***
Equal	**Decrease**	***Worst-off***
Decrease	**Equal**	***Best-off***

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- We hypothesize that the first scenario describes better the ongoing changes in the relations between education and social stratification. This could have important implications for policies.
- For instance, it can provide a useful contrast with respect to a benchmark recently set by the EU commission, according to which the share of 30-34 year olds with tertiary educational attainment should be at least 40% by 2020.
- Another crucial implication could be that if the correlation between education and occupational outcomes declines, it is likely that other factors, as social origin itself, become more relevant in the placement of individuals into occupations.

Data

- We use two datasets: EU-SILC 2005 (module on intergenerational transmission of poverty) and ESS (5 waves 2002-2010). Two parallel analyses of independent datasets give more robustness to results.
- the 23 countries who appear on both datasets (see table).
- three cohorts of year of birth: 1946-55; 56-65; 66-75.
- Education: ISCED, coded into three: 0-2 (up to lower secondary); 3-4 (higher secondary and non tertiary post-secondary); 5-6 (tertiary).
- For ESS, we used the codings provided by Schneider (2010). Some differences among the two datasets appear (see tables), but we consider them as measurement errors, which should not affect our results.

	1946-55			1956-65			1966-75		
	ESS	EU-SILC	diff.	ESS	EU-SILC	diff.	ESS	EU-SILC	diff.
Austria	0.10	0.18	-0.08	0.10	0.19	-0.09	0.12	0.23	-0.11
Belgium	0.29	0.31	-0.02	0.34	0.35	-0.01	0.43	0.46	-0.03
Czech Rep.	0.11	0.1	0.01	0.14	0.15	-0.01	0.12	0.14	-0.02
Germany	0.32	0.43	-0.11	0.32	0.42	-0.10	0.31	0.38	-0.07
Denmark	0.43	0.26	0.17	0.46	0.28	0.18	0.52	0.33	0.19
Estonia	0.34	0.29	0.05	0.39	0.29	0.10	0.38	0.29	0.09
Spain	0.15	0.17	-0.02	0.21	0.25	-0.04	0.31	0.38	-0.07
Finland	0.32	0.29	0.03	0.41	0.37	0.04	0.50	0.44	0.06
France	0.24	0.18	0.06	0.27	0.24	0.03	0.41	0.38	0.03
Greece	0.11	0.15	-0.04	0.13	0.22	-0.09	0.19	0.28	-0.09
Hungary	0.19	0.14	0.05	0.17	0.15	0.02	0.21	0.17	0.04
Ireland	0.27	0.18	0.09	0.35	0.23	0.12	0.48	0.38	0.10
Italy	0.10	0.12	-0.02	0.10	0.12	-0.02	0.16	0.17	-0.01
Luxembourg	0.18	0.16	0.02	0.18	0.15	0.03	0.29	0.26	0.03
Latvia	0.29	0.18	0.11	0.28	0.19	0.09	0.26	0.2	0.06
Netherlands	0.25	0.3	-0.05	0.28	0.33	-0.05	0.32	0.4	-0.08
Norway	0.37	0.28	0.09	0.38	0.3	0.08	0.50	0.38	0.12
Poland	0.12	0.11	0.01	0.14	0.13	0.01	0.22	0.22	0.00
Portugal	0.08	0.1	-0.02	0.09	0.12	-0.03	0.15	0.15	0.00
Sweden	0.30	0.29	0.01	0.31	0.28	0.03	0.37	0.37	0.00
Slovenia	0.19	0.07	0.12	0.25	0.13	0.12	0.28	0.19	0.09
Slovakia	0.16	0.16	0.00	0.17	0.17	0.00	0.17	0.17	0.00
Utd. Kingdom	0.27	0.29	-0.02	0.33	0.34	0.01	0.35	0.39	-0.04

Data

- Occupational returns to education are measured in two ways:

a) as prestige score (SIOPS: Ganzeboom-Treiman 1996)

b) as the probability to enter an occupation included in the service class (EGP I-II, as defined in Breen 2004)

- also in this case, ESS measures are better: occupation is coded as a 4-digit ISCO, while EUSILC has a 2-digit version.
- but numbers for EU-SILC are higher (see table)

	EU-SILC			ESS		
	1946-55	1956-65	1966-75	1946-55	1956-65	1966-75
Austria	1,473	1,743	1,499	895	1,414	947
Belgium	1,367	1,511	1,343	1,125	1,314	1,146
Czech Republic	1,588	1,200	1,321	1,618	1,253	1,334
Germany	3,698	4,835	2,978	1,996	2,565	1,841
Denmark	946	1,129	1,029	1,285	1,293	1,161
Estonia	1,114	1,380	1,172	713	803	853
Spain	4,106	5,125	4,661	1,122	1,444	1,549
Finland	2,227	1,943	1,546	1,799	1,562	1,328
France	2,485	2,547	2,476	1,246	1,203	1,283
Greece	1,784	1,833	1,842	877	1,043	1,161
Hungary	2,506	2,153	2,348	1,324	1,106	1,204
Ireland	1,279	1,413	960	1,087	1,006	1,090
Italy	7,334	7,820	7,759	441	494	441
Luxembourg	727	674	622	272	272	231
Latvia	885	1,100	1,040	177	257	255
Netherlands	1,410	1,611	1,595	1,459	1,584	1,510
Norway	933	1,039	1,060	1,385	1,470	1,405
Poland	6,712	6,582	5,398	1,410	1,417	1,250
Portugal	1,433	1,647	1,424	1,446	1,272	1,301
Sweden	848	827	843	727	629	687
Slovenia	1,262	1,186	1,220	972	1,020	950
Slovak Republic	2,181	2,327	1,783	805	753	778
United Kingdom	2,356	2,392	2,246	1,352	1,344	1,367

Research design

- On each dataset, we run 2 two step analyses for IEO and IOO (as Pfeffer 2008; Arum *et al* 2007 for IEO; Shavit and Müller 1998 for IOO),
- First, at the individual level we compute social origin effects on educational attainment and education effects on labour market outcomes, by means of regressions on individual data for each specific cohort-country clusters.
- Second, at the macro level we examine the association between the uncovered effects and an aggregate measure of participation in tertiary education for each cohort by country cluster.

Research design

- For IOE we consider 3 birth cohorts: 46-55; 56-65; 66-75. With 24 countries, this gives 72 (24*3) country cohort clusters. For each one we run a regression (linear probability model):

$$t_{ik} = \alpha + p_{2ik}\delta_{2k} + p_{3ik}\delta_{3k} + g_{ik}\gamma_k + u_{ik}$$

  - controlling for gender (g), we look at the effect of parental secondary (p_2) and tertiary (p_3) education on the probability to get a tertiary educational title (t), for each individual i of the country cohort cluster k.
  - we then retrieve δ_{3k} for the second step analysis, as our measure of IEO.

Research design

- In the second step, we analyse the gross association between the coefficients measuring IEO and overall participation in higher education:

$$d_{3k} = \omega + T_k\lambda_k + \varepsilon_k$$

- here, d_{3k} is our country- (and cohort-) specific measure for IEO, T_k is participation to HE.
- λ_k measures the association between participation and inequality. T_k has been rescaled to vary between 0 and 1, so the constant expresses the expected advantage in access to tertiary education when participation is at the minimal value observed, and by adding λ_k one gets the expected advantage when participation is at its observed maximum.

Reshaped data set: pooled cohort analysis for IEO

	EU-SILC		ESS	
	IEO	% tertiary	IEO	% tertiary
Austria	0.51	0.18	0.43	0.10
Austria	0.37	0.19	0.40	0.10
Austria	0.43	0.23	0.51	0.12
Belgium	0.52	0.31	0.47	0.29
Belgium	0.56	0.35	0.52	0.34
Belgium	0.51	0.46	0.53	0.43
Czech Republic	0.45	0.10	0.46	0.11
Czech Republic	0.46	0.15	0.45	0.14
Czech Republic	0.42	0.14	0.38	0.12
Germany	0.38	0.43	0.42	0.32
Germany	0.32	0.42	0.35	0.32
Germany	0.33	0.38	0.40	0.31
Denmark	0.40	0.26	0.42	0.43
Denmark	0.33	0.28	0.44	0.46
Denmark	0.36	0.33	0.39	0.52
Estonia	0.49	0.29	0.36	0.34
Estonia	0.36	0.29	0.42	0.39
Estonia	0.43	0.29	0.50	0.38

Research design

- following the procedure proposed by Brunello and Cappellari (2005), our second-step estimate is based on weighted least squares, with weights proportional to the inverse of the squared standard errors for d_{3k} estimated in the first stage, in order to account that the dependent variable has been generated from an estimation.

Research design

- In order to look at change over time, we pool within-country *change-scores* in attendance rates and in the δ_{3k} coefficients expressing IEO.
- We then estimate a first differences model:

$$\Delta d_{3k} = \omega + \Delta T_k \xi_k + \tau_k$$

- We regress changes in the 46 δ_{3k} coefficients between two subsequent cohorts of a given country on the corresponding differences in attendance rates in the same two cohorts.

Research design

- For IOO we just look at the younger birth cohort (66-75), because otherwise we could not control for career effects. For each of the 24 country cohort clusters, we estimate the model:

$$y_{ik} = \alpha + x_{2ik}\beta_{2k} + x_{3ik}\beta_{3k} + g_{ik}\pi_k + \varphi_{ik}$$

- controlling for gender (g), we look at the effect of having achieved secondary (x_{2ik}) and tertiary (x_{3ik}) education on occupation (y_{ik}). Occupation is measured in two ways:
- a) the prestige score associated to the occupation (OLS regression)
- b) the probability of being in the service class (linear probability model)

Research design

- We also control for the demand for highly qualified employment (S), measured as the proportion employed in the professional and managerial class - EGP I and II- in the same cohort by country cluster.
- Our main concern with this model is with the β_{3k} coefficients, that express the returns to tertiary education (measured as prestige score or as probability to enter a service class occupation), when compared to those to compulsory education in each cohort and country cluster *k*;
- as above, we then retrieve β_{3k} for the second step analysis, as our measure of IOO.

Research design

- In the second step, we analyse the gross association between the coefficients measuring IOO and overall participation in higher education:

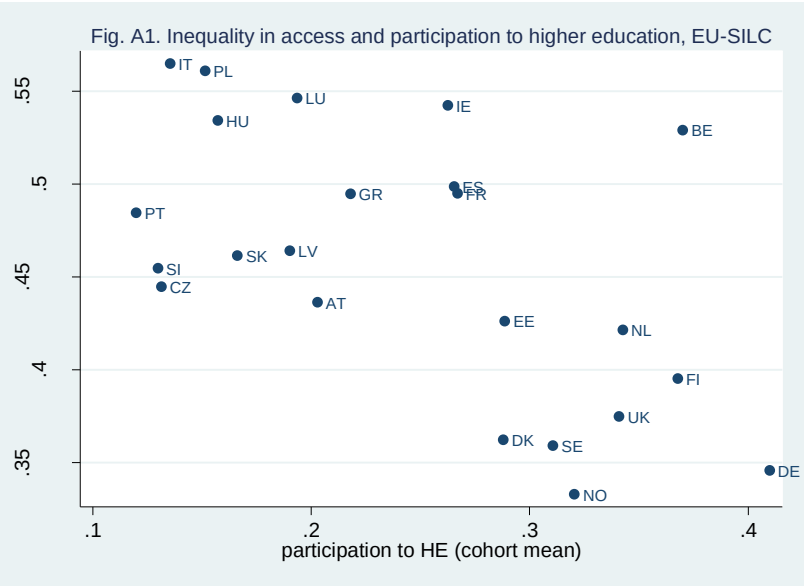
$$b_{3k} = \omega + T_k \vartheta_k + \upsilon_k$$

- here, b_{3k} is our country- (and cohort-) specific measure for IOO, T_k is, as above, participation to HE, and was rescaled to vary between 0 and 1.
- The θ_k coefficient measures the association between participation and returns to tertiary education. That is, the expected change in the quality of occupation (measured as prestige or probability to enter the service class) for those with tertiary education, when the observed participation goes from minimum to maximum.

Research design

- Our synthetic measures of inequality are the δ_{3k} and β_{3k} which are estimated by linear probability models, i.e. they are absolute measures of inequality, instead of relative measures, such as the odds ratios. There are, however, three reasons for this:
- More attention should in general be paid to explain absolute measures of social mobility and inequality, as closer to observed social phenomena (Breen 2004).
- The direct comparison of coefficients or odds ratios from logistic regression across cohorts or countries is inappropriate (Mood 2010).
- The key reason for using relative measures is that are insensitive to variation of the marginal distributions. But we are actually interested in how variations in the distribution of tertiary education affects IEO and IOO, so we do not want to control for changes in the margins.

Results 1a



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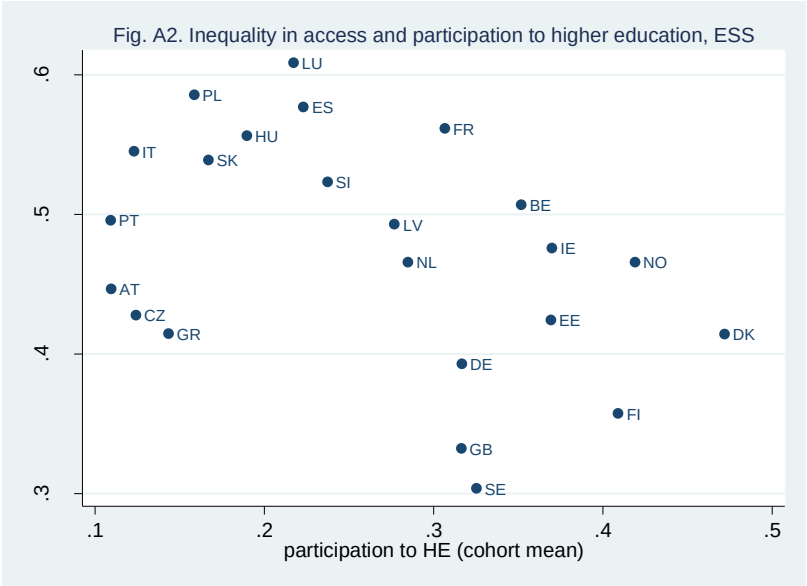
Results 1a



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Results 1a:

participation to HE and equality of opportunities

	EU-SILC	ESS
correlation	-.32	-.35
Sig.	.00	.00
regression		
constant	.50	.56
Size of tertiary education (λ_k)	**-.12**	**-.16**
Sig.	.016	.022
R^2	.10	.12
obs	69	69

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Results 1b:

change in participation to HE and in equality of opportunities, first-order differences model

	EU-SILC	ESS
constant	.05	-.04
Change in tertiary education (ξ_k)	**-.90**	**.11**
Sig.	.20	.80
R^2	.07	.00
obs	46	46

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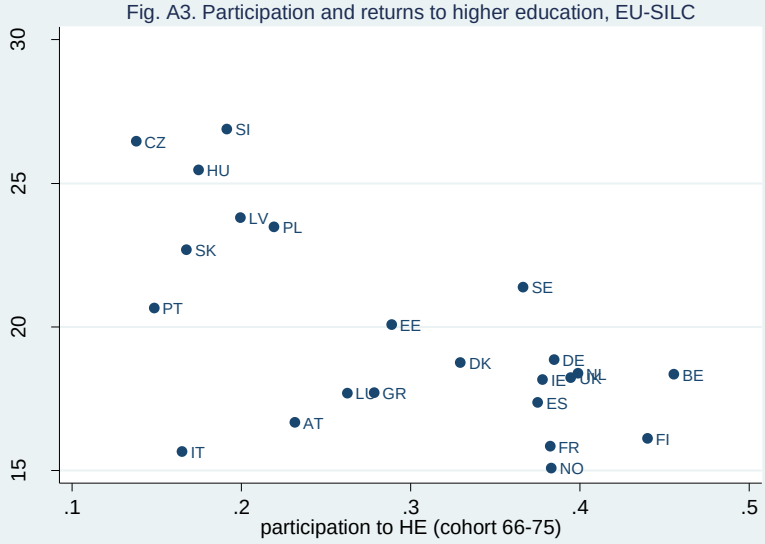
Results 2a

Fig. A3. Participation and returns to higher education, EU-SILC



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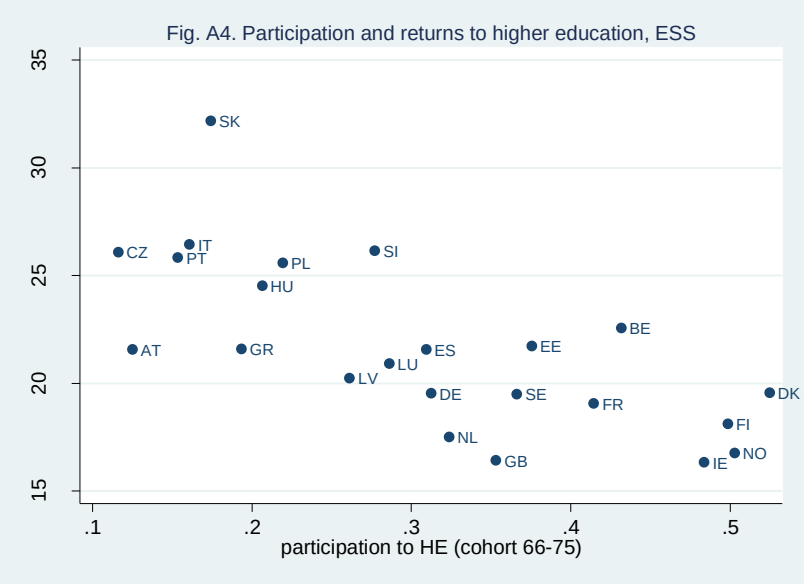
Results 2b



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Results 2a:

participation to HE and occupational returns (prestige score)

	EU-SILC	ESS	EU-SILC	ESS
correlation	-.77	-.70		
Sig.	.000	.000		
regressions:	model 1		model 2	
Constant	23.6	27.7	23.3	27.9
Size of tertiary education (θ_k)	**-8.6**	**-11.1**	**-9.0**	**-10.0**
Sig.	.00	.00	.00	.03
Size of service class (σ)			.70	-1.5
Sig.			.84	.70
R^2	.59	.48	.59	.49
Obs	23	23	23	23

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Results 2b:

participation to HE and occupational returns (access to service class)

	EU-SILC	ESS	EU-SILC	ESS
correlation	-.58	-.45		
Sig.	.00	.00		
regressions:	model 1		model 2	
Constant	.73	.71	.73	.70
Size of tertiary education (θ_k)	**-.22**	**-.13**	**-.21**	**-.20**
Sig.	.00	.01	.02	.02
Size of service class (σ)			-.002	.10
Sig.			.98	.26
R^2	.33	.20	.33	.24
Obs	23	23	23	23

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robustness checks

- We have performed the following sensitivity checks to test the robustness of our findings:

a) estimate all models including the category 4 (post upper secondary, non tertiary education) of ISCED 97 into tertiary education;

b) estimate second step models without the weights based on the standard error of the first step equation;

c) perform the analysis of returns using higher secondary as the reference category;

d) perform the analysis of returns to education separately for men and women, to avoid sample selection bias among women;

e) analyse return to education in terms of employment probabilities, also separately for genders;

f) control for the family background in the analysis of returns to education.

Conclusion: scenarios

- the *trade-off* scenario is clearly the most supported by empirical evidence.
- where there is more participation to higher education (vertical destratification), there is more equality of educational opportunities, but there are also diminishing occupational returns to education (credential inflation).
- this is a cross-sectional finding: one could ask for a more stringent test on the dynamics of educational expansion and its consequences for IOE and IOO. with the data at hand, this is not possible.
- however, this is the basic picture of the association between the size of tertiary education and inequality in educational outcome and returns in contemporary EU.

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Conclusion: implications

- a large participation to tertiary education is associated to equalization of educational inequality, as progressive policy-makers have been stating since long.
- however, their trust in the opening up of tertiary education as a means to introduce a more meritocratic allocation of individuals to occupational positions seems to have a weak empirical basis.
- we think that some discussion should take place about policy statements as the ET 2020 by the EU commission, setting a benchmark of 40% tertiary educated in the 30-34 population of each country.
- it is by no means certain that this kind of investment will have the equalization outcomes expected.

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Conclusion: implications

- on the contrary, something different from what the policy makers envisage could happen. For instance, a general decrease of the occupational value of tertiary titles could be associated with:
- a strengthening of the differences among titles and their holders (their horizontal stratification): titles released from élite universities, or degrees in some fields, would become much more valuable than the average ones.
- an increase of the occupational value of non-cognitive skills, not trasmitted via education, but in the realm of the family, thus reinforcing the intergenerational reproduction of existing inequalities.

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