The Gender-gap Reversal in Tertiary Education and Its Implications for Inequality of Educational Opportunity in European Countries*

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Abstract: Tertiary education has expanded in European countries since 2000. One consequence of this expansion is the growth of the gender-gap reversal (GGR), in which proportion of women in tertiary education is increasing faster than that of men. This article deals with the historically new gender arrangement of tertiary education. It answers the question of whether GGR, as part of educational expansion, means different gender trends in inequality of educational opportunity (IEO) by educational origin in the tertiary education transition. The author analyzed European Social Survey (ESS) data on the 25–34 age group from 20 European countries over five rounds (2002, 2006, 2010, 2014 and 2018). A three-level (random) binary logistic regression model was used to cover individual variables by period by country. The results show that the recent educational expansion has slightly weakened the IEO in tertiary education transition and that it is significantly different for men and women. Gender is important in IEO in a time of GGR. The author discusses what the empirical results mean for the theory of maximally maintained inequality (MMI), which is used in social stratification research as a general explanation for persistent inequality in a time of educational expansion.

Keywords: gender-gap reversal, educational expansion, inequality of educational opportunity, European countries

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Introduction

The educational structures of European populations have undergone a significant change over the past 20 years. In 2000, the Bologna process was launched with the aim of increasing the proportion of people with tertiary education in EU countries. New educational institutions arose, new study fields emerged and the process of enrolling more people in university studies was initiated (Kogan, 2012). The result was that from 2000 to 2020, the average proportion of young people (aged 25–34) in EU countries who had attained tertiary education increased from 25% to 41% (Eurostat Statistics, 2022). This meant a slight decrease in the inequality of educational opportunity (IEO) by educational origin in this age group (cf. Katrňák & Hubatková, 2022). A concomitant process of this educational expansion was the change in the gender ratio in favour of women in some countries and the growth of gender-gap reversal (GGR) in other countries. Women's odds of transitioning to tertiary education have increased faster than men's, as has their probability of completing tertiary education. The numbers of women with completed tertiary education in the cohorts who have left the education system exceed those of men in all European countries.[1]

Some sociologists have formulated the consequences of GGR for events such as assortative mating (De Hauw et al., 2017; Esteve et al., 2012), marriage stability and divorce risks (Van Bavel et al., 2018), and the division of paid and unpaid work inside marriages (Van Bavel, 2012). Others have addressed the consequences of GGR for labour market outcomes, especially for gender gaps in income (Klesment & Van Bavel, 2017), labour market positions (Goldin et al., 2006), and living standards (DiPrete & Buchmann, 2006). This article analyzes the consequences of GGR for IEO by educational origin. The key questions of this article are as follows: Could GGR, as part of the recent expansion of tertiary education, also mean changes in IEO by gender in the transition to tertiary education? Does the change in the proportion of men and women in tertiary education in European countries lead to differences in trends in IEO by gender in access to this education?

The analysis of IEO is aimed at the tertiary education level in European countries for two reasons: first, because of its massive expansion in the last two decades (2000–2020) and second, because more than half of the contemporary IEO in completed education is generated at this educational level (Katrňák & Hubatková, 2022). Moreover, GGR at the tertiary education level is a completely new situation in the history of European education systems, creating conditions for a natural experiment (Dunning, 2012) to measure IEO. Due to the different expansion intensities for the two gender groups, it is possible to test sociological theories about the effects of educational expansion on the IEO for men and women separately ('persistent inequality' versus 'non-persistent inequality'). From the view-

[1] The same trend can be seen in many other countries (cf. Schofer & Meyer, 2005; Vincent-Lancrin, 2008). DiPrete and Buchmann (2013) wrote about a global GGR phenomenon.

point of 'persistent inequality' (Shavit & Blossfeld, 1993), which does not assume that expansion weakens IEO, it is expected that IEO would not change differently by gender because IEO should not change at all. From the viewpoint of 'non-persistent inequality' (Breen et al., 2009), according to which educational expansion weakens IEO, there is room for differential weakening of IEO by gender when there are differences in the pace of expansion by gender (Blossfeld et al., 2017).

In this article, I target a young age group (25–34 years) and analyze the data from five European Social Survey (ESS) rounds (2002, 2006, 2010, 2014 and 2018) for 20 European countries. I use a three-level (random effects) logit model in which the dependent variable is a binary for transition to tertiary education (1 'success', 0 'failure') and the key explanatory variables are gender and educational origin (controlling for parental educational heterogamy and parents' labour market position; level-1 of analysis). The tertiary education transition occurs in the context of periods (level-2 of analysis), for which I use the variable of educational expansion, and in the context of countries (level-3 of analysis). The analytical strategy is based on three two-way and one three-way model interactions between the three key explanatory variables. The two-way interactions are (1) educational origin and gender, which indicate gender differences in IEO; (2) educational expansion and gender, which indicate trends in GGR; and (3) educational expansion and educational origin, which indicate trends in IEO. The three-way interaction is among these three variables (origin effect by expansion by gender), which indicates whether expansion is associated with IEO changes differently for men and women.

The results show that gender and trends in GGR matter. Recent educational expansion has slightly weakened the IEO in the transition to tertiary education by educational origin in European countries. The probability of transition to tertiary education increases faster for lower educational origins than for higher ones. This probability is significantly differentiated by gender over educational expansion levels. These results are not consistent with 'persistent inequality' results (Shavit & Blossfeld, 1993) or with the theory of maximally maintained inequality (MMI; Raftery & Hout, 1993) that is used as a general explanation of persistent inequality.

Educational expansion and gender-gap reversal in European countries after 2000

While European systems of higher education have been expanding since at least the 1960s (Boliver, 2011; Haim & Shavit, 2013; Schofer & Meyer, 2005),[2] the expansion after 2000 is closely linked to structural changes brought by the Bologna

[2] In the late 1960s and the 1970s, the number of university students more than doubled in many Western European countries, which can be marked as the first educational expansion period (Trow, 1973).

process (Bologna Declaration, 1999; Keeling, 2006). The main objective of this process was to establish a single European higher education area within which national higher education systems would be mutually comparable and compatible. This end-state would be achieved through the adoption of comparable degrees and credit systems, as well as the adoption of three main study cycles: a widely accessible bachelor's cycle, a more selective master's cycle and a scientific doctoral cycle (i.e., ISCED97 levels 5 and 6; Bologna Declaration, 1999). Later additions included an emphasis on employability, lifelong learning, and – crucially – the reduction of IEO in access to higher education. All of these changes were in response to the need for highly educated people in European labour markets (Kogan, 2012). Tertiary education has progressively become a necessary entry-level qualification for obtaining a well-paid job, so more individuals are striving to attain it (Marginson, 2016).

In 2020, the average proportion of women with a tertiary education in the 20 analyzed countries was 50.6%; the average proportion of men was 37.6%. The number of women with tertiary education had increased (on average) by 1.9 times (about 24.5 percentage points) since 2000; men had increased by 1.7 times (about 15.3 percentage points). The fastest changes in the gender ratio in favour of women (from 2000 to 2020) occurred in Switzerland, the Czech Republic, Slovakia, Austria, Great Britain, and Germany – in countries where a GGR did not exist or was very low in 2000. No change or a slightly negative trend in the gender ratio in favour of women was seen in France, Finland, Estonia, Portugal and Slovenia – in countries where a GGR already existed in 2000 (cf. Table 1). In all countries, the change in the gender ratio was not due to stagnation or even a decline in men's tertiary education attainment. It was due to a faster increase in the educational attainment of women.

Many factors have contributed to this shift in the gender ratio. From a historical point of view, these factors include changes in the labour market, marriage and family lives (DiPrete & Buchmann, 2013). These changes produce greater opportunities and incentives for women to obtain more education. The economic and social rewards for higher education increase more greatly for women than for men, so women are motivated to achieve higher education. Women's participation in the labour force increases because labour markets demand specific occupations requiring higher education. Higher education for women means greater insurance against poverty, a higher standard of living and the probability of a better match in family life. Parental incentives directed at children by gender have been equalized inside families, and because girls perform better than boys at university (higher level of preparedness, differences in school-related attitudes, and lower dropout rate), gender differences occur not only in enrolment in higher education but also in the likelihood of completion (DiPrete & Buchmann, 2013). The combination of all these factors led first to closing the gender gap and then to GGR in higher education in advanced countries. The educational expansion in European countries since 2000 has accelerated this process and made it more obvious.

Table 1. The ratio of women to men with tertiary education (ISCED11 5–8 levels) for 25–34 age group by years and countries

Country	Code	Year						Difference in ratios 2000–2020
		2000	2004	2008	2012	2016	2020	
Switzerland	CH	0.51	0.62	0.84	0.97	1.00	1.09	*2.15*
Czechia	CZ	0.97	1.03	1.25	1.41	1.47	1.55	*1.59*
Slovakia	SK	1.08	1.15	1.33	1.53	1.61	1.68	*1.55*
Austria	AT	0.90	0.96	1.08	1.14	1.19	1.23	*1.35*
Great Britain	GB	0.92	1.03	1.09	1.11	1.10	1.15	*1.26*
Germany	DE	0.87	0.97	1.08	1.16	1.06	1.07	*1.24*
Denmark	DK	1.19	1.20	1.23	1.60	1.36	1.42	*1.20*
Italy	IT	1.29	1.45	1.58	1.57	1.63	1.53	*1.18*
Netherlands	NL	1.02	1.09	1.15	1.19	1.25	1.20	*1.18*
Belgium	BE	1.18	1.25	1.34	1.40	1.34	1.38	*1.17*
Norway	NO	1.29	1.35	1.48	1.46	1.40	1.45	*1.13*
Spain	ES	1.20	1.26	1.30	1.32	1.34	1.30	*1.08*
Poland	PL	1.52	1.43	1.51	1.55	1.58	1.61	*1.06*
Hungary	HU	1.38	1.38	1.43	1.48	1.50	1.44	*1.04*
Ireland	IE	1.11	1.22	1.34	1.29	1.28	1.14	*1.03*
France	FR	1.17	1.18	1.24	1.23	1.24	1.15	*0.98*
Finland	FI	1.52	1.62	1.67	1.60	1.47	1.45	*0.95*
Estonia	EE	1.83	1.64	1.40	1.74	1.68	1.73	*0.95*
Portugal	PT	1.57	1.70	1.77	1.46	1.59	1.42	*0.90*
Slovenia	SI	1.93	1.94	1.71	1.80	1.72	1.58	*0.82*
mean		*1.17*	*1.23*	*1.31*	*1.37*	*1.36*	*1.35*	*1.15*

Source: Eurostat statistics (2022).

Note: The ratio is computed as the proportion of women vs. proportion of men with tertiary education. Countries are sorted from the highest to the lowest ratio difference between years 2020 and 2000 (last column in the table).

Should we expect a change in IEO by gender during a time of GGR?

The decline of the gender gap in educational attainment in the 20th century has been documented in many social stratification studies (cf. Breen, 2004; Breen & Müller, 2020; Erikson & Goldthorpe, 1992; Shavit & Blossfeld, 1993). These studies referred to various periods of the 20th century in different countries. They did not relate to specific educational expansions and they did not measure the direct effect of particular educational expansions on IEO by family background (social or educational origin). They assumed that educational systems expanded evolutionarily during the 20th century (the shift of an increasingly large population towards higher levels of education), and they analyzed the changes in IEO against the background of this expansion.

The findings of these studies can be summarized in two general conclusions. According to the first and prevalent one (Breen & Jonsson, 2005), the expansion of the educational system in most countries does little to help economically and socially disadvantaged groups to gain degrees and qualifications. The IEO remains more or less stable regardless of educational expansion (cf. Alon, 2009; Blossfeld et al., 2015; Boliver, 2011; Haim & Shavit, 2013; Hannum & Buchmann, 2005; Raftery & Hout, 1993; Shavit, 2011; Shavit & Blossfeld, 1993; Triventi, 2013). According to the second conclusion, educational expansion widens the proportion of people with higher levels of education from different family backgrounds. There is a negative relationship between expansion and IEO, although this does not necessarily occur with the same intensity in all countries (cf. Ballarino et al., 2009; Bernardi & Ballarino, 2016; Blossfeld et al., 2017; Breen et al., 2009; Brown, 1995; Katrňák & Hubatková, 2022; Liu et al., 2016; Thélot & Vallet, 2000).[3]

The first conclusion about 'persistent inequality' (Shavit & Blossfeld, 1993) is explained by the theory of MMI (Raftery & Hout, 1993). MMI was originally formulated for Irish society. It acquired wider support through an over-cohort comparative analysis of trends in IEO in 13 countries (cf. Shavit & Blossfeld, 1993). According to this theory, educational opportunities are primarily used by higher social classes rather than by lower social classes. This is because the demand for higher education is more widespread among higher social classes. Even if access to higher education increases, class inequalities in education (measured as the odds ratios of educational transitions) are maintained because students from lower-class backgrounds lack the appropriate knowledge and skills to navigate the educational system towards successful transitions to higher education levels.

[3] These two conclusions (no-relationship and negative relationship) can be joined by a third conclusion about a positive relationship between educational expansion and IEO (cf. Haim & Shavit, 2013; Halsey et al., 1980). This can happen when there is a different 'reaction' to educational expansion according to family origin (higher social classes 'react' faster than lower classes and take most of the advantages connected with expanded educational stages). Because this conclusion is not widely empirically supported in social stratification research (cf. Erikson & Jonsson, 1996), I do not address it further in this text.

When the demand for higher education is 'saturated' for the upper classes, then the educational opportunity window also opens to the lower classes and IEO begins to decrease.

The second conclusion about the negative relationship between IEO and educational expansion can be called 'non-persistent inequality' (Breen et al., 2009). It lacks a consistent explanatory theory such as MMI in the case of the first conclusion. Some factors have been identified as contributing to declining IEO during times of educational expansion. These include structural factors, such as vertical and horizontal differentiations of higher education in degrees, tracks and study fields (Reimer & Jacob, 2011); the increase of homogeneity on unobserved variables in population education transitioning (Katrňák & Hubatková, 2022); a change in meritocratic selection and in competition at expanded educational levels (Alon, 2009, 2014; Treiman et al., 2003); a change in the perception of educational failure risks (Ballarino et al., 2009; Ballarino & Schadee, 2010; Erikson & Jonsson, 1996); and the equalization of living conditions and levelling of educational barriers – especially the costs of education (Erikson & Jonsson, 1996; Jonsson, 1993).

When studies about 'persistent' and 'non-persistent' inequality have measured trends in IEO for men and women separately, they have not shown that these trends lead to a systematically different change in IEO by gender. In these studies, class inequalities in IEO have been identified as more important and surpassing gender differences. From the standpoint of 'persistent inequality', this conclusion is logical, because this theory does not assume a relationship between educational expansion and IEO changes. Even though the proportion of women with completed higher education increases faster than that of men (which means that women's opportunities for enrolment and study at higher education levels are increasing), this does not mean that a faster decrease in IEO for women than for men should be expected on the basis of this theory. From the standpoint of 'non-persistent inequality', this conclusion is inconsistent with the result that educational expansion weakens the IEO. If educational opportunities increase for women faster than for men, there should also be a faster decrease in IEO for them.[4]

Studies in the Netherlands (De Graaf & Ganzeboom, 1993), Sweden (Jonsson, 1993), Great Britain, Germany (Jonsson et al., 1996), and the United States (Buchmann & DiPrete, 2006) did not find systematic different decreases of IEO by gender across birth cohorts in the 20th century. Gender differences in IEO were only identified in earlier cohorts, but across cohorts, they converged. This 'earlier' gender equalization is understood in terms of women's changing attitudes and ambitions in regard to education, and not by changes in educational systems themselves (cf. Bukodi & Goldthorpe, 2019). Breen et al. (2010) analyzed seven

[4] Using PIAAC data from 22 countries, Blossfeld et al. (2017) showed the relationship between the pace of educational expansion and the decrease of IEO. More rapid educational expansion leads to greater decrease of IEO and vice versa.

European countries over cohorts born between 1900 and 1965 and confirmed these findings. Gender differences in IEO were identified in earlier cohorts in some countries, but they were not systematic or consistent. The trend towards a general decline of IEO rather than no change ('persistent inequality') is much more regular than differences in this trend over gender, according to Breen et al. (2010).

Based on these studies, I assume that regardless of whether IEO remains stable or declines during educational expansion, it does not happen significantly differently for women and men, although there is GGR at the expanded tertiary education level. Thus, although the assumption about the relationship between educational expansion and IEO is twofold ('persistent' and 'non-persistent' trends), this relationship should not differ by gender. The hypothesis asserts that IEO is 'persistent' or 'non-persistent' regardless of gender at the time of recent tertiary education expansion. This hypothesis was tested in the analysis.

Data and analyzed variables

To answer the question of whether the GGR trend in tertiary education in European countries also means IEO gender differences in the transition to this education, I used ESS data from 2002, 2006, 2010, 2014 and 2018. I analyzed 20 European countries, aiming for respondents aged 25–34 years. These young respondents are the most strongly influenced by education expansion. A comparison of the same age group over the educational expansion period is much more reliable than a comparison of all survey respondents. The numbers of respondents in the ESS data by country and year are listed in Table A1 in the Appendix.[5]

The respondent's *completed tertiary education* is a key variable. In the ESS data, the highest level of a respondent's education is measured by the harmonized categorical variable ISCED (cf. Schneider, 2013). I collapsed this variable into four categories (primary, lower secondary, upper secondary and tertiary education). These categories retrospectively delimit transitions from one educational level to the next (Mare, 1980, 1981). For the population exposed to tertiary education transition (upper secondary and tertiary education attained), I created a dummy variable: 0 – did not transition, and 1 – transitioned to tertiary education (56.4% of respondents did not transition and 43.6% transitioned on average over countries and ages 25–34 in ESS data).[6]

[5] Appendix is available online at https://doi.org/10.13060/csr.2024.008. For 2002, I used the Integrated file edition 6.6 round 1; for 2006, the Integrated file edition 3.7 round 3; for 2010, the Integrated file edition 3.4 round 5; for 2014, the Integrated file edition 2.2 round 7; and for 2018, the Integrated file edition 3.0 round 9. As not all countries took part in all ESS rounds, the closest available year was used to replace any missing year. This applied to four countries: the Czech Republic, Italy, Estonia, and Slovakia.

[6] Respondents who had attained only primary and lower secondary education were excluded from the analysis, because they are structurally excluded from 'the risk' of tertiary education transition.

There are four individual-level explanatory variables. The first is *gender* (a dummy variable: 0 – man, 1 – woman). The second variable is *educational origin*, defined as the highest level of parental education. Like a respondent's education, the father's and mother's highest education is measured in the ESS data by the categorical variable ISCED. I transformed this variable into one continuous variable, ISLED (international standard level of education; cf. Schröder & Ganzeboom, 2014), for the father and mother separately and then indicated educational origin by the higher of these two values.[7] I used continuous ISLED for educational origin because the variability of this explanatory variable in level-1 can be more reliably analyzed by a contextual variable (levels of educational expansion). I worked with a standardized ISLED variable (z-scores: mean = 0, SD = 1, ages 25–34, standardization around the grand mean of this variable in the data).

Besides these two key explanatory variables, in the transition to tertiary education, I controlled for *parental educational heterogamy* and *parents' higher social origin.* To construct parental educational heterogamy, I used a harmonized categorical of the father's and mother's highest levels of education (in ESS data: primary, lower secondary, upper secondary, and tertiary education). Because I indicate educational origin by the more highly educated parent, I was able to create a heterogamy variable by combining these four categories of both parents: 0 – the same education of parents (homogamy); 1 – father's lower education; and 2 – mother's lower education (for more about combining parental variables into one, cf. Thaning & Hällsten, 2020, and especially with respect to the gender of parents, cf. Ballarino et al., 2021). To identify parents' social origins, I used variables capturing the father's and mother's occupations when the respondent was 14 years old. I created three categories differentiating three basic types of occupations in European labour markets: (0) semi-routine and routine manual and service occupations; (1) technical, craft occupations and farmers; and (2) professional, clerical and intermediate occupations, managers and administrators. Because the analysis compares countries at different time points, I used ESS post-stratification weights including design weights (variable *pspwght* in ESS data).

The data has a hierarchical structure: on level-1 there are individuals; these individuals are nested in years at level-2, then nested in countries at level-3 (together, 100 contexts are created by five years in 20 countries). Because of this country–year structure (Schmidt-Catran & Fairbrother, 2016),[8] I analyzed the data with multilevel (random regression) models (cf. Kreft & Leeuw, 1998; Gelman & Hill, 2006).

[7] The ISLED variable is absent from the original ESS dataset. However, this variable may be easily imputed using a prepared syntax (cf. Harry Ganzeboom website: http://www.harryganzeboom.nl/ISLED/isled_56.txt).

[8] These data can be labelled as 'comparative longitudinal survey data' (CLSD). The data are drawn from multiple waves of comparative surveys inside individual countries, meaning that they are comparative over countries as well as longitudinally inside countries (cf. Fairbrother, 2014).

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.	Categories
Individual variables (level-1)					
Tertiary education transition	0.44	0.50	0	1	0) no; 1) yes
Gender	0.53	0.50	0	1	0) man; 1) woman
Educational origin	0.00	1.00	−1.69	2.16	highest parents' ISLED standardized
Parents' educational heterogamy	0.58	0.82	0	2	0) the same education (homogamy); 1) father's lower education; 2) mother's lower education
Occupational origin	1.05	0.84	0	2	0) semi-routine and routine manual and service occupations; 1) technical, craft occupations and farmers; 2) professionals, clerical and intermediate occupations, managers and administrators
Contextual variables (level-2)					
Educational expansion	0.00	9.55	−16.70	21.35	grand mean centering
Contextual levels					
Period (level-2)	–	–	1	5	
Country (level-3)	–	–	1	20	

Recent *educational expansion* is a macro time-varying variable. It is measured by the proportions of people aged 25–34 with tertiary education (indicated by ISCED11, levels 5 to 8) in each period and country (together, 100 numbers given by 5 periods in 20 countries). Respondents in the 25–34 age group in the 2002 ESS data were born in 1968–1977 and passed into tertiary education in 1987–1996.[9] Respondents aged 25–34 in the 2006 ESS data passed into tertiary education in

[9] The time windows defining ESS respondents' passing to tertiary education were computed as follows: ESS round year minus age 25–34 plus age of 6, which I consider the general age for beginning primary education, and the most common duration of each educational level: primary education 6 years, lower secondary 3 years, and upper secondary 4 years (cf. UIS, 2012).

1991–2000, respondents in the 2010 ESS data in 1995–2004, respondents in the 2014 ESS data in 1999–2008, and respondents in the 2018 ESS data in 2003–2012. For each of the years' windows of tertiary transition, I computed the average proportion of people who completed their tertiary education according to the Eurostat statistics (2022). I used the differences in these average proportions of completed tertiary education to measure the trends in educational expansion (how much tertiary education was available) in the analyzed periods and countries (level-2 of the analysis). Table A2 in the Appendix presents these average proportions. I standardized these values by grand mean centring in the analysis (cf. Gelman & Hill, 2006; Kreft et al., 1995; Raudenbush & Bryk, 2002).

Table 2 presents the descriptive statistics of all analyzed variables and the description of their categories.

Methods and statistical analysis

With regard to the hierarchical structure of the data and the binary dependent variable (failure or success in tertiary transition), I used three-level (random) logistic regression models (Gelman & Hill, 2006; Rabe-Hesketh & Skrondal, 2012). Using the random component in these models, I was able to analyze the direct effects of educational expansion (identified at period levels) on the variability of educational origin and gender on tertiary education transition over periods in countries. The specification of the three-level random-intercept logit model for passing tertiary educational transitions is as follows:

$$\mathrm{E}(y_{ijk} = 1 \mid \mathbf{x}_{ijk}, \zeta^{(2)}_{jk}, \zeta^{(3)}_{k}) = \hat{p}_{ijk} = \Lambda(\beta_0 + \beta_1 x_{1ijk} + \ldots + \beta_6 x_{6ijk} + \beta_7 x_{7,jk} + \zeta^{(2)}_{jk}, \zeta^{(3)}_{k}) \quad (1)$$

where $\Lambda(\cdot)$ denotes the cumulative logistic distribution function $\Lambda(\cdot) = \frac{\mathrm{e}^{(\cdot)}}{1+\mathrm{e}^{(\cdot)}}$ and y_{ijk} is the expected value of 1 (success in transition) with respect to observed variables. This is the conditional probability $\hat{p}_{ijk}$ that respondent i nested in period j nested in country k passes tertiary transition if they are exposed to this transition. $\mathbf{x}_{ijk} = (x_{1ijk}, \ldots, x_{6ijk}, x_{7jk})'$ is a vector containing all level-1 covariates (x_{1ijk} = gender – woman; x_{2ijk} = educational origin; x_{3ijk} = parental educational heterogamy – father's lower education; x_{4ijk} = parental educational heterogamy – mother's lower education; x_{5ijk} = occupational origin – technical and craft occupations; x_{6ijk} = occupational origin – professional and administrative occupations, and level-2 covariate (x_{7jk} = educational expansion) with estimated intercept β_0 and parameters $\beta_0 \cdots \beta_7$. $\zeta^{(2)}_{jk}$ is a random intercept varying over periods (level-2) and $\zeta^{(3)}_{k}$ is a random intercept varying over countries (level-3).

Table 3 presents the estimated random logistic regression models.[10] I began with the null random intercept model M0, in which no covariates were consid-

[10] All models are estimated using the Stata command *melogit*. I will provide the do-file with data on request.

Table 3. Random logistic regression models for tertiary education transition in age group 25–34 – first part

	Variable	Levels	M0	M1	M2	M3	M4
Individual level	Gender	*man*		*ref.*	*ref.*	*ref.*	*ref.*
		woman		0.446***	0.446***	0.455***	0.446***
				(0.030)	(0.030)	(0.041)	(0.040)
	Edu origin		0.572***	0.569***	0.606***	0.579***	
			(0.019)	(0.020)	(0.032)	(0.035)	
	Parents' heterogamy	*homogamy*		*ref.*	*ref.*	*ref.*	*ref.*
		father's education lower		−0.190***	−0.191***	−0.213***	−0.218***
				(0.044)	(0.044)	(0.045)	(0.045)
		mother's education lower		−0.255***	−0.251***	−0.264***	−0.270***
				(0.040)	(0.040)	(0.041)	(0.041)
	Occupation origin	*manual/service occup.*		*ref.*	*ref.*	*ref.*	*ref.*
		technical/craft occup.		0.265***	0.263***	0.261***	0.259***
				(0.039)	(0.039)	(0.040)	(0.040)
		professionals/ admin.		0.687***	0.686***	0.662***	0.657***
				(0.042)	(0.042)	(0.042)	(0.042)
	Constant		−0.205	−0.677***	−0.693***	−0.683***	−0.670***
			(0.132)	(0.145)	(0.117)	(0.119)	(0.119)

Table 3. Random logistic regression models for tertiary education transition in age group 25–34 – second part

	Variable	Levels	M0	M1	M2	M3	M4
Contextual level	Educational expansion			0.028***	0.022***	0.022***	
					(0.006)	(0.007)	(0.007)
Interactions	Gender*Edu origin					0.074**	
							(0.033)
	Gender*Edu expansion					0.009**	
							(0.004)
	Edu origin*Edu expansion					−0.008**	
							(0.003)
	Gender*Edu origin*Edu Expansion					0.003	
							(0.003)

Table 3. Random logistic regression models for tertiary education transition in age group 25–34 – third part

	Variable	Levels	M0	M1	M2	M3	M4
Random effects parameters	Country variation constant	0.318***	0.367***	0.228***	0.239***	0.241***	
	Period variation constant	0.134***	0.117***	0.100***	0.0742*	0,072	
	Period variation Gender				0.074***	0.064***	
	Period variation Edu origin				0.057***	0.053***	
	ICC Country		0,084	0,097	0,063		
	ICC Period/ Country		0,121	0,128	0,091		
LL Model			−14,263.9	−13,043.9	−13,034.2	−12,972.0	−12,963.5
BIC			28,558	26,178	26,168	26,094	26,016
AIC			28,534	26,106	26,089	25,974	25,965
N (respondents)			21,270	21,270	21,270	21,270	21,270

Note: Number of contexts 100 (5 periods by 20 countries). standard errors in parentheses. ***p < 0.01. **p < 0.05. *p < 0.1

ered (x_{1ijk},...,x_{7jk} = 0 in Equation 1). The intercept indicates the average odds (in periods and over countries) for respondents to pass a tertiary transition. It was 0.82(exp(−0.205)). The intercept country variance is higher than the intercept period variance, which indicates that the odds of tertiary transition differ more between countries than between periods inside the countries.

In model M1, the individual-level factors are added to the null model M0 (x_{1ijk},...,x_{6ijk} in Equation 1). The LL statistics improved considerably, and the likelihood-ratio (LR) test (comparing models M0 and M1) indicated that individual variables significantly increased the model fit to the data. Women had higher odds than men of tertiary transition: 1.56 times greater (exp(0.446)), which means about 56% (100*[exp(0.446)−1]). Educational origin positively influenced the transition to tertiary education. Better educated parents use their cultural, economic and social advantages to help their offspring attain the highest educational level possible (e.g. Blau & Duncan, 1967; Breen, 2004; Breen & Müller, 2020; Erikson & Goldthorpe, 1992). Because educational origin is a standardized variable (z-scores), it must be interpreted in changes given by standard deviation (SD). For instance, if educational origin increases by 1SD, the odds of tertiary transition increase by 1.77 times (exp(0.572)).

Tertiary education transition is also influenced by parental educational heterogamy. A lower education level of one parent generally weakens the odds of transition compared to parental homogamy. Nevertheless, the gender of the parents must be considered. In our case, the father's lower education weakened the tertiary transition by about 17% (100*[exp(−0.190)−1]) and the mother's lower education by about 23% (100*[exp(−0.255)−1]) in comparison with parental homogamy.

Higher categories of social origin strengthen the odds of tertiary transition. Technical and craft occupations increase the odds by about 30% (100*[exp(0.265)−1]), and professionals, intermediate occupations, managers and administrators increase the odds by about 99% (100*[exp(0.687)−1]) compared to semi-routine, routine manual and service occupations. Because the effects of all these individual variables do not change significantly across the other (more complex) models (M2, M3 and M4), we consider them as invariant across all estimated models.

Model M2 adds a level-2 variable to model M1, which is the educational expansion (x_{7jk} in Equation 1). The effect of this variable is positive, significant and almost invariant in the other estimated models (M3 and M4). Educational expansion – the quantitative increase of tertiary education – increases the odds of passing to this level of education. LL statistics improved after including this variable in the analysis, and the LR test of the nested model M1 in M2 indicates that educational expansion significantly increased the model fit to the data.

Models M1 and M2 assume that the effects of key explanatory variables (educational origin and gender) are constant over periods (levels of educational expansion). I tested the hypothesis about 'persistent' and 'non-persistent' trends in IEO by gender and educational expansion via model interactions between edu-

cational origin, gender and educational expansion. To do this, it is necessary to allow educational origin and gender to vary randomly across periods. Model M3 is therefore the random effect model that contains the period variability of gender and educational origin (the $\zeta^{(2)}_{jk} x_{1ijk} + \zeta^{(2)}_{k} x_{2ijk}$ term is added to Equation 1). This variability could then be modelled by a contextual variable: educational expansion. In model M4, I added four interactions: (1) the two-way interaction between gender and educational origin (the term $\beta_8 x_{21ijk} x_{2ijk}$ is added to Equation 1); (2) the two-way cross-level interaction between gender and educational expansion (the $\beta_9 x_{1ijk} x_{7jk}$ term is added to Equation 1); (3) the two-way cross-level interaction between educational origin and educational expansion (the term $\beta_{10} x_{2ijk} x_{7jk}$ is added to Equation 1); and (4) the three-way cross-level interaction between gender, educational origin, and educational expansion (the term $\beta_{11} x_{2ijk} x_{7jk}$ is added to Equation 1). The last interaction indicates the differences in the educational origin effect on tertiary transition over expansion levels for men and women (for the complete equation for model M4, see the Appendix).[11]

The interaction between gender and educational origin is positive (0.074) and significant (p<.5). There are two possible interpretations of this interaction. The first is that gender gaps differ by educational origin. This means that educational origin influences disparities between men and women in tertiary education transition differently (different gendered parental investments by educational origin; cf. Breen et al., 2010). The second interpretation is that the effect of educational origin varies by gender. This means that tertiary transition depends on parental origin, but this relationship is differentiated by gender (higher educational origin advantages are more frequently utilized by women than men compared to those with lower educational origins).[12]

The interaction parameter between gender and educational expansion is positive (0.009) and significant (p<.5). Recent educational expansion in European countries has been gendered. It influences women more than men in transitioning to tertiary education. Because women have higher chances for this transition (positive model parameter for gender), educational expansion does not mean gender equalization at this education level (cf. Shavit & Blossfeld, 1996) but disequalization or strengthening of GGR. Women are no longer approaching men; they are moving away from them.

Even though the expansion of tertiary education increases the probability of transition to tertiary education (positive and significant parameter 0.022), the interaction between educational expansion and educational origin was negative (–0.008) and significant (p<.05). In other words, IEO decreased over expansion levels, which does not correspond with the thesis about 'persistent inequality' in

[11] In a hierarchical approach, all these interactions are necessary when a three-way interaction is part of the statistical model (e.g. Powers & Xie, 2012).

[12] All two-way interactions can be interpreted from the perspective of both interacting variables, because formally it is one parameter in a statistical model. Nevertheless, both interpretations are not meaningful in all cases.

times of educational expansion (Shavit & Blossfeld, 1993). This does not mean, however, that the relationship between educational origin and tertiary education transition has ceased to exist. It is still relatively strong, and the last educational expansion weakened it only partially (cf. Katrňák & Hubatková, 2022).

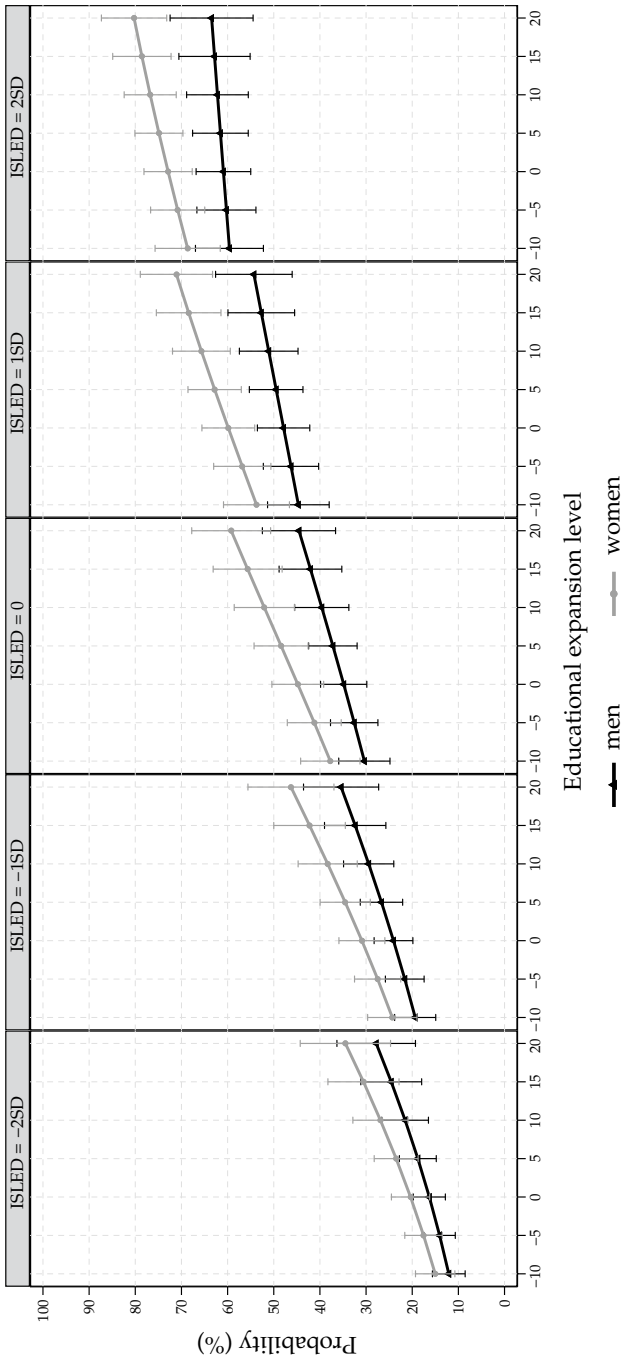
The final three-way interaction answers the key research question. This interaction was positive (0.003) but not significant. However, the no-significance model of this interaction is not appropriate for making inferences or conclusions about the differences between men and women by educational origin and educational expansion (Mitchell, 2021). Both these findings (positivity and non-significance) must be examined in more detail.

The positivity of the three-way interaction indicates that recent educational expansion decreased IEO differently by gender. Not only did more women complete a tertiary transition because of this expansion (GGR), but IEO decreased for them with higher intensity than for men. To better illustrate this three-way interaction, I estimated the conditional probability of tertiary education transition by educational origin levels (SD of average ISLED) and over levels of educational expansion for men and women separately (cf. Equation 1).[13] Figure 1 shows that this probability increased from the lower to the higher educational origin and that educational expansion raised it. In higher educational origins (1SD and 2SD of ISLED), this increase was not as steep as it was for lower origins (−2SD and −1SD of ISLED). The distance between men and women in this trend increased over levels of educational expansion, and in higher educational origins, significantly. For instance, for average educational origin (ISLED = 0), the probability of passing tertiary transition for women increased from 40% to 65% over expansion levels, which corresponds to the probability of men from the highest educational origin (ISLED = 2SD) in average educational expansion (0). In this case, the probability connected with women increased so that one educational origin category (indicated as 1SD) was overcome.

The confidence intervals presented in Figure 1 do not concern the differences between men and women in the probability of passing tertiary transition; they relate to the estimated parameters of model M4 and their difference from 0. I tested these differences using the statistical procedure *contrast* (Mitchell, 2021) for all combinations of categories of educational origin and expansion levels shown in Figure 1. The lowest gender differences were in low levels of educational expansion combined with a low level of educational origin. Together with the growth of educational expansion and increasing educational origins, gender differences also grew. All these differences are statistically significant (cf. Table A3 in the Ap-

[13] These are margins estimated from model M4, which are specified for *educational origin* (ISLED) from −2 SD to 2 SD (standard deviations), levels of *educational expansion* from −10% to 20%, *parental homogamy* and *manual and service occupations*. Stata command: margin *gender*, at(*edu_origin* = (−2(1)2) *expansion* = (−10 −5 0 5 10 15 20) *heterogamy* = 0 *occup_origin* = 0).

Figure 1. Probability of passing tertiary education transition by educational origin (ISLED) and levels of educational expansion for men and women



Note: Expansion level 0 is average expansion in %. ISLED 0 is standardized average ISLED. SD is standard deviation. Whiskers denote 95% confidence interval.

pendix). Reversed gender inequality destroys educational origin inequality with the help of educational expansion. Based on this, I reject both the assumption about the 'persistent inequality' of IEO in times of educational expansion (Shavit & Blossfeld, 1993) and the assumption about no gender-specific effect of educational expansion in IEO (Breen et al., 2010).

Consequences of empirical results for MMI theory

What do these results add to explanations of the relationship between educational expansion and IEO? In the theoretical part of this text, I introduced two conclusions about this relationship: a non-relationship or 'persistent' trend in IEO and a negative relationship or 'non-persistent' trend in IEO. I have assumed that these two conclusions are valid regardless of gender. The persistent trend in IEO has been explained by the theory of MMI (Raftery & Hout, 1993). If MMI is a universal theory, then it should be applied equally to both men and women. This means that the probabilities (or odds ratios) of transitioning to tertiary education do not change differently by gender (net of educational origin), even though enrolment is higher for women than for men. The results do not support this conclusion and call the universality of MMI theory (from the perspective of gender) into question.

By leaving out what is missing from MMI theory and has been elaborated elsewhere (cf. Breen & Jonsson, 2000; Lucas, 2001),[14] a weak point emerges in the concept of 'saturation'. According to MMI, the effect of educational expansion reaches the lower classes (and IEO measured as odds ratios starts to decline) after the saturation of higher social classes in transitions to educational stages. However, the theory does not indicate what the saturation level is, and one can only make assumptions about when saturation is reached. If it is 100%, it is empirically rare, especially at the tertiary level of education, that the demand for this level of education can be completely saturated for higher social classes. Therefore, there is only hypothetical space for the decrease in IEO. MMI should be confirmed in all cases in which IEO does not decline. Paradoxically, a vague definition of the saturation point makes it possible to confirm MMI even in situations when IEO declines. If the decrease in IEO is empirically measured, the MMI makes it possible to say that saturation has already occurred, which does not mean rejecting it.

[14] MMI is criticized for aiming only at quantitative (vertical) differences in education – whether there is a transition to a certain level of education or not. It means that MMI does not consider qualitative (horizontal) dimensions in IEO. The point is that the decline of IEO in one (vertical) dimension can lead to the increase of IEO in the other (horizontal) dimension (cf. a special issue of *American Behavioral Scientist* about Effectively Maintained Inequality [EMI], Lucas & Byrne, 2017).

Because of the vagueness of the saturation concept, it is difficult to evaluate and reject the MMI theory empirically. Lucas (2009) suggested aiming at the internal logic of MMI and testing it from the point of coherence. Lucas's formal analysis shows that MMI is tautological or internally inconsistent, depending on the scenario. In terms of tautology, the visible pattern in the empirical data is not explained by the mechanism that generates it. MMI only states that transition rates and IEO (as measured by odds ratios) remain constant unless forced to change by increasing enrolments. This is a different way of expressing what is seen in the data and includes both 'no change' and 'decline' in IEO. In terms of inconsistency, the MMI assumes that 'a margin-free measure of association is not margin-free' (Lucas, 2009, p. 471), because it claims that the relative measures (odds ratios) should begin to change due to the change of absolute measures (in marginal distributions).

The data analysis presented here adds an alternative approach to this formal analysis, aimed at conditions in which MMI should be valid. Even though MMI does not say anything about gender, as a universal theory, it should be valid regardless of whether it considers gender or any other social group (e.g. defined by ethnicity, age, geography or time criterion). Because the data analysis does not confirm this expectation, this theory should not be considered a universal theory for explaining the relationship between IEO and educational expansion. However, it is possible that MMI is still valid as an idiosyncratic theory. In this case, it could be applicable to specific social groups, regions or times, or it could be valid with some specific deviations or corrections (for more on this, cf. Shavit et al., 2007).

Conclusion

Several studies have shown that the recent educational expansion (since 2000) in European countries is not gender equal. Women benefit from it much more than men. Their odds of educational transitions increase, which leads to gender-gap reversal (GGR) in tertiary education. In this text, I started with this fact and analyzed whether the increasing proportion of women in tertiary education compared to men leads to differences in transitional IEO by educational origin. I formulated two assumptions. In the first, IEO does not change; in the second, IEO weakens in times of educational expansion. I further hypothesized that both these assumptions would hold equally for men and women, although their proportions increased differently in tertiary education after 2000 (a hypothesis that I tested empirically). The analysis yielded two basic results. First, IEO was 'non-persistent': the probability of transitioning to tertiary education increased faster for those from lower educational origins than from higher ones. The effect of educational origin has not ceased to exist in European countries. It is still alive; the last educational expansion weakened it only slightly. Second, IEO decreased more for women than for men; women's probability of transitioning to tertiary education increased significantly faster than men's probability. This gender-specific effect was especially valid for those with higher educational origins.

This text brings gender and GGR to the long-term analyzed relationship between IEO and educational expansion in social stratification research (Shavit et al., 2007). According to Shavit and Blossfeld (1996), class and gender equalizations in expanding tertiary education levels are competing processes. These authors stated that when women approach men at this educational level, gender and family origin interact; through this interaction, the education level may not accommodate the increasing demand of people from lower social classes. My results show that slight educational origin equalization occurs during times of increasing GGR, meaning when gender inequality (albeit reversed) increases. In the estimated statistical models, educational origin equalization was controlled for in gender, and gender differences were controlled for in the educational origin effect. It is possible that the gender effect would block educational origin equalization in a situation in which women were closer to men and educational systems had expanded 'evolutionarily' since the mid-20th century. However, the analyzed data are beyond this situation. The recent educational expansion in European countries is 'revolutionarily' fast, and women have moved away from men. The positive interaction between gender and educational expansion must therefore be interpreted so that the GGR (dis-equalization) is a part of educational origin equalization (lowering of IEO). Decreasing origin inequality is compensated for by increasing reversed gender inequality.

Empirical analyses of IEO over time and across countries are important for the economic, political and social development of each society. A low IEO by family origin means strong economic progress, political stability and societal fairness (Bukodi & Goldthorpe, 2019; Van de Werhorst, 2014). Educational expansion is then understood as a social policy instrument by which IEO can be changed. The theory of maximally maintained inequality (MMI) nevertheless implies the opposite. From its perspective, educational reforms that are carried out with the aim of decreasing IEO by increasing the proportion of students in higher education levels seem pointless. Because the analyzed data allowed it, the analytical approach and results have been framed as an empirical test of conditions under which the MMI theory should apply. The results indicate that MMI should not be considered a universal theory. It is not valid when both educational origin and gender are considered over levels of educational expansion. In addition to the theoretical ambiguity associated with MMI's key concept of 'saturation', and after a formal test showing that MMI asserts either a tautology or a contradiction (Lucas, 2009), this analysis is the next challenge to MMI theory as a prominent explanation of 'persistent' IEO in times of educational expansion.

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References

Alon, S. (2009). The evolution of class inequality in higher education: Competition, exclusion and adaptation. , , 731–755. https://doi.org/10.1177/000312240907400503
Alon, S. (2014). Continuing to build a theory of inequality in higher education: Claims, evidence, and future directions. ,, 817–824. https://doi.org/10.1177/0003122414534438
Ballarino, G., & Schadee, M. (2010). Allocation and distribution: A discussion of the educational transition model, with reference to the Italian case. *Research in Social Stratification and Mobility*, *28*, 45–58. https://doi.org/10.1016/j.rssm.2009.12.005
Ballarino, G., Bernardi, F., Requena, M., & Schadee, H. (2009). Persistent inequalities? Expansion of education and class inequality in Italy and Spain. *European Sociological Review*, *25*, 123–138. https://doi.org/10.1093/esr/jcn031
Ballarino, G., Meraviglia, C., & Panichella, N. (2021). Both parents matter. Family–based educational inequality in Italy over the second half of the 20th century. *Research in Social Stratification and Mobility*, *73*, 1–15. https://doi.org/10.1016/j.rssm.2021.100597
Bernardi, F., & Ballarino, G. (Eds.). (2016). *Education, Occupation and Social Origin: A Comparative Analysis of the Transmission of Socio-economic Inequalities*. Edward Elgar Publishing. https://doi.org/10.4337/9781785360459
Blau, P. M., & Duncan, O.D. (1967). *The American Occupational Structure*. John Wiley & Sons.
Blossfeld, P. N., Blossfeld, G. J., & Blossfeld, H. P. (2015). Educational expansion and inequalities in educational opportunity: Long–term changes for East and West Germany. *European Sociological Review*, *31*, 144–160. https://doi.org/10.1093/esr/jcv017
Blossfeld, P. N., Blossfeld, G. J., & Blossfeld, H. P. (2017). The speed of educational expansion and changes in inequality of educational opportunity. In T. Eckert & B. Gniewosz (Eds.), *Bildungsgerechtigkeit* (pp. 77–92). Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-15003-7_6
Boliver, V. (2011). Expansion, differentiation, and the persistence of social class inequalities in British higher education. *Higher Education*, *61*, 229–242. https://doi.org/10.1007/s10734-010-9374-y
Bologna Declaration. (1999). Retrieved December 27, 2022, from http://www.ehea.info/page-ministerial-conference-bologna-1999
Breen, R. (Ed.). (2004). *Social Mobility in Europe*. Oxford University Press. https://doi.org/10.1093/0199258457.001.0001
Breen, R., & Jonsson, J. O. (2000). Analyzing educational careers: A multinominal transition model. *American Sociological Review*, *65*, 754–772. https://doi.org/10.1177/000312240006500507
Breen, R., & Jonsson, J. O. (2005). Inequality of opportunity in comparative perspective: Recent research on educational attainment and social mobility. *Annual Review of Sociology*, *31*, 223–243. https://doi.org/10.1146/annurev.soc.31.041304.122232
Breen, R., Luijkx, R., Müller, W., & Pollak, R. (2009). Nonpersistent inequality in educational attainment: Evidence from eight European countries. *American Journal of Sociology*, *114*, 1475–1521. https://doi.org/10.1086/595951
Breen, R., Luijkx, R., Müller, W., & Pollak, R. (2010). Long-term trends in educational inequality in Europe: Class inequalities and gender differences. *European Sociological Review*, *26*, 31–48. https://doi.org/10.1093/esr/jcp001
Breen, R., & Müller, W. (Ed.). (2020). *Education and Intergenerational Social Mobility in Europe and the United States*. Stanford University Press. https://doi.org/10.11126/stanford/9781503610163.001.0001
Brown, P. (1995). Cultural capital and social exclusion: Some observations on recent

trends in education, employment and the labour market. *Work, Employment and Society*, *9*, 29–51. https://doi.org/10.1177/095001709591002
Buchmann, C., & DiPrete, T. A. (2006). The growing female advantage in college completion: The role of family background and academic achievement. *American Sociological Review*, *71*, 515–541. https://doi.org/10.1177/000312240607100401
Bukodi, E., & Goldthorpe, J. H. (2019). *Social Mobility and Education in Britain: Research, Politics and Policy.* Cambridge University Press. https://doi.org/10.1017/9781108567404
De Graaf, P., & Ganzeboom, H. B. G. (1993). Family background and educational attainment in the Netherlands for the 1891–1960 birth cohorts. In Y. Shavit & H. P. Blossfeld (Eds.). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries* (pp. 75–99). Westview Press.
De Hauw, Y., Grow, A., & Van Bavel, J. (2017). The reversed gender gap in education and assortative mating in Europe. European Journal of Population, *33*, 445–474. https://doi.org/10.1007/s10680-016-9407-z
DiPrete, T. A., & Buchmann, C. (2006). Gender-specific trends in the value of education and the emerging gender gap in college completion. *Demography*, *43*, 1–24. https://doi.org/10.1353/dem.2006.0003
DiPrete, T. A., & Buchmann, C. (2013). *The Rise of Women. The Growing Gender Gap in Education and What It Means for American Schools*. Russell Sage Foundation.
Dunning, T. (2012). *Natural Experiments in the Social Sciences. A design-based Approach*. Cambridge University Press. https://doi.org/10.1017/CBO9781139084444
Erikson, R., & Goldthorpe, J. H. (1992). *The Constant Flux: A Study of Class Mobility in Industrial Societies.* Clarendon Press.
Erikson, R., & Jonsson, J. O. (1996). Explaining class inequality in education: The Swedish test case. In R. Erikson & J. O. Jonsson (Eds.). Can Education Be Equalized? The Swedish Case in Comparative Perspective (pp. 1–63). Westview Press.
Esteve, A., García-Román, J., & Permanyer, I. (2012). The gender-gap reversal in education and its effect on union formation: The end of hypergamy? *Population and Development Review*, *38*, 535–546. https://doi.org/10.1111/j.1728-4457.2012.00515.x
Eurostat Statistics. (2022). Retrieved December 27, 2022, from https://ec.europa.eu/eurostat/databrowser/explore/all/all_themes
Fairbrother, M. (2014). Two multilevel modeling techniques for analyzing comparative longitudinal survey datasets. *Political Science Research and Methods*, *2*, 119–140. https://doi.org/10.1017/psrm.2013.24
Gelman, A., & Hill, J. (2006). Data Analysis Using Regression and Multilevel/hierarchical Models. Cambridge University Press. https://doi.org/10.1017/CBO9780511790942
Goldin, C., Katz, L. F., & Kuziemko, I. (2006). The homecoming of American college women: The reversal of the college gender gap. *Journal of Economic Perspectives*, *20*, 133–156. https://doi.org/10.1257/jep.20.4.133
Haim, E. B., & Shavit, Y. (2013). Expansion and inequality of educational opportunity: A comparative study. *Research in Social Stratification and Mobility*, *31*, 22–31. https://doi.org/10.1016/j.rssm.2012.10.001
Halsey, A., Heat, A. F., & Ridge, J. M. (1980). *Origins and Destinations: Family, Class and Education in Modern Britain.* Clarendon Press.
Hannum, E., & Buchmann, C. (2005). Global educational expansion and socio-economic development: An assessment of findings from the social sciences. *World Development*, *33*, 333–354. https://doi.org/10.1016/j.worlddev.2004.10.001
Jonsson, J. O. (1993). Persisting inequalities in Sweden. In Y. Shavit & H. P. Blossfeld (Eds.). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries* (pp. 101–32). Westview Press.

Jonsson, J. O., Mills, C., & Müller, W. (1996). A half century of increasing educational openness? Social class, gender and educational attainment in Sweden, Germany and Britain. In R. Erikson & J. O. Jonsson (Eds.). *Can Education Be Equalized? The Swedish Case in Comparative Perspective* (pp. 183–206). Westview Press.
Katrňák, T., & Hubatková, B. (2022). Transitional inequality offset: Educational expansion and inequality of educational opportunity in European countries between 2000 and 2018. *European Sociological Review* (in print). https://doi.org/10.1093/esr/jcac003
Keeling, R. (2006). The Bologna Process and the Lisbon Research Agenda: The European Commission's expanding role in higher education discourse. *European Journal of Education*, *41*, 203–223. https://doi.org/10.1111/j.1465-3435.2006.00256.x
Klesment, M., & Van Bavel, J. (2017). The reversal of the gender gap in education, motherhood, and women as main earners in Europe. *European Sociological Review*, *33*, 465–481.
Kogan, I. (2012). Tertiary education landscape and labour market chances of the highly educated in Central and Eastern Europe. *European Sociological Review*, *28*, 701–703. https://doi.org/10.1093/esr/jcs062
Kreft, I., & De Leeuw, J. (1998). *Introducing Multilevel Modelling*. Sage. https://doi.org/10.4135/9781849209366
Kreft, G. G., Leeuw, J., & Aiken, L. S. (1995). The effect of different forms of centering in hierarchical linear models. *Multivariate Behavioral Research*, *30*, 1–21. https://doi.org/10.1207/s15327906mbr3001_1
Liu, Y., Green, A., & Pensiero, N. (2016). Expansion of higher education and inequality of opportunities: A cross-national analysis. *Journal of Higher Education Policy and Management*, *38*, 242–263. https://doi.org/10.1080/1360080X.2016.1174407
Lucas, S. (2001). Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American Journal of Sociology*, *106*, 1642–1690. https://doi.org/10.1086/321300
Lucas, S. (2009). Stratification theory, socioeconomic background, and educational attainment: A formal analysis. *Rational and Society*, *21*, 459–511. https://doi.org/10.1177/1043463109348987
Lucas, S., & Byrne, D. (2017). Effectively maintained inequality in education: An introduction. *American Behavioral Scientist*, *61*, 3–7. https://doi.org/10.1177/0002764216682992
Marginson, S. (2016). High participation systems of higher education. *The Journal of Higher Education*, *87*, 243–271. https://doi.org/10.1353/jhe.2016.0007
Mare, R. D. (1980). Social background and school continuation decisions. *Journal of the American Statistical Association*, *75*, 295–305. https://doi.org/10.1080/01621459.1980.10477466
Mare, R. D. (1981). Change and stability in educational stratification. *American Sociological Review, 46,* 72–87. https://doi.org/10.2307/2095027
Mitchell, M. (2021). Interpreting and visualizing regression models using Stata. Stata Press.
Powers, D. A., & Xie, Y. (2012). *Statistical Methods for Categorical Data Analysis*. Emerald Publishing.
Rabe-Hesketh, S., & Skrondal, A. (2012). *Multilevel and Longitudinal Modelling Using Stata (Volume I, Volume II).* Stata Press.
Raftery, A. E., & Hout, M. (1993). Maximally maintained inequality: Expansion, reform, and opportunity in Irish education, 1921–75. *Sociology of Education*, *66*, 41–62. https://doi.org/10.2307/2112784
Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods.* Sage.

Reimer, D., & Jacob, M. (2011). Differentiation in higher education and its consequences for social inequality: Introduction to a special issue. *Higher Education*, *61*, 223–227. https://doi.org/10.1007/s10734-010-9373-z
Schneider, S. L. (2013). The international standard classification of education 2011. In G. E. Birkelund (Ed.). *Class and Stratification Analysis* (pp. 365–379). Emerald Group Publishing Limited. https://doi.org/10.1108/S0195-6310(2013)0000030017
Schofer, E., & Meyer, J. W. (2005). The worldwide expansion of higher education in the twentieth century. *American Sociological Review*, *70*, 898–920. https://doi.org/10.1177/000312240507000602
Schröder, H., & Ganzeboom, H. B. G. (2014). Measuring and modelling level of education in European societies. *European Sociological Review*, *30*, 119–136. https://doi.org/10.1093/esr/jct026
Shavit, Y. (2011). Another look at persistent inequality in Israeli education (Working Papers 27). AlmaLaurea Inter-University Consortium. Retrieved December 27, 2022, from http://www2.almalaurea.it/universita/pubblicazioni/wp/pdf/wp27.pdf
Shavit, Y., & Blossfeld, H. P. (1993). *Persistent inequality: Changing Educational Attainment in Thirteen Countries.* Social Inequality Series. Westview Press.
Shavit, Y., & Blossfeld, H. P. (1996). Equalizing educational opportunity: Do gender and class compete? In R. Erikson & J. O. Jonsson (Eds.). *Can Education Be Equalized? The Swedish Case in Comparative Perspective* (pp. 233–253). Westview Press.
Shavit, Y., Yaish, M., & Bar-Haim, E. (2007). The persistence of persistent inequality. In S. Sheer, R. Pollak, G. Otte, & M. Gangl (Eds.). *From Origin to Destination* (pp. 37–57). Campus.
Schmidt-Catran, A. W., & Fairbrother, M. (2016). The random effects in multilevel models: Getting them wrong and getting them right. *European Sociological Review*, *32*, 23–38. https://doi.org/10.1093/esr/jcv090
Thaning, M., & Hällsten, M. (2020). The end of dominance? Evaluating measures of socio-economic background in stratification research. *European Sociological Review*, *36*, 533–547. https://doi.org/10.1093/esr/jcaa009
Thélot, C., & Vallet, L. A. (2000). La réduction des inégalités sociales devant lécole depuis le début du siècle. *Économie et statistique*, *334*, 3–32. https://doi.org/10.3406/estat.2000.7526
Treiman, D. J., Ganzeboom, H. B. G., & Rijken, S. (2003). Educational expansion and educational achievement in comparative perspective. *UCLA CCPR Population Working Papers*.
Triventi, M. (2013). Stratification in higher education and its relationship with social inequality: A comparative study of 11 European countries. *European Sociological Review*, *29*, 489–502. https://doi.org/10.1093/esr/jcr092
Trow, M. (1973). *Problems in the Transition from Elite to Mass Higher Education*. Carnegie Commission on Higher Education.
UIS. (2012). *International Standard Classification of Education ISCED 2011*. Retrieved December 27, 2022, from http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf
Van Bavel, J. (2012). The reversal of gender inequality in education, union formation and fertility in Europe. *Vienna Yearbook of Population Research*, *10*, 127–154. https://doi.org/10.1553/populationyearbook2012s127
Van Bavel, J., Schwartz, C. R., & Esteve, A. (2018). The reversal of the gender gap in education and its consequences for family life. *Annual Review of Sociology*, *44*, 341–360. https://doi.org/10.1146/annurev-soc-073117-041215
Van de Werhorst, H. G. (2014). Changing societies and four tasks of schooling: Challenges

for strongly differentiated educational systems. *International Review of Education*, *60*, 123–144. https://doi.org/10.1007/s11159-014-9410-8
Vincent-Lancrin, S. (2008). The reversal of gender inequalities in higher education: An ongoing trend. *Higher Education to 2030: Demography*, *1*, 265–298. https://doi.org/10.1787/9789264040663-11-en