European Sociological Review Advance Access published February 18, 2009

DOI:10.1093/esr/jcp001, available online at www.esr.oxfordjournals.org

Long-term Trends in Educational Inequality in Europe: Class Inequalities and Gender Differences[1]

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Using data for seven European countries we analyse trends among women in class differences in educational attainment over the first two-thirds of the 20th century. We also compare educational attainment between men and women; we ask whether class differences among the two sexes are similar or not; and whether trends in class differences over birth cohorts have differed between men and women. We find that, as expected, over the 20th century, inequalities between men and women in their educational attainment declined markedly. More importantly, changes in class inequalities in educational attainment have been similar for both men and women, although, in some countries, women displayed greater inequality at the start of the 20th century and have shown a somewhat greater rate of increase in equality. Patterns of class inequality were also largely similar for both sexes, though in some countries daughters of farmers and the petty-bourgeoisie did relatively better than their brothers. While some of these results reinforce what has long been believed, our central finding of a decline in class inequality in educational attainment for both men and women contradicts the 'persistent inequality' in education that earlier scholars claimed existed.

Introduction

In an earlier paper (Breen *et al.*, 2009), we found that class inequality in educational attainment among men declined over the 20th century in eight European countries. Now we extend this analysis to address three questions: (i) has the same trend of declining inequality in educational attainment been observed among women? (ii) how do men and women differ in the way in which class affects educational attainment, and (iii) how have such differences evolved over the course of the general decline of gender differences in educational attainment during the 20th century? Although the first question has been addressed in several single-country studies and in a comparative context (Shavit and Blossfeld, 1993), the second and third questions have seldom been addressed and never, so far as we are aware, in a comparative analysis.

Our earlier findings run counter to that of Blossfeld and Shavit (1993) who claimed 'persistent inequality' in education. Furthermore, a number of studies of single countries have found declining inequality in education. These countries include Germany (Müller and Haun, 1994; Henz and Maas, 1995; Mayer, Müller and Pollak, 2007), France (Vallet, 2004), Italy (Shavit and Westerbeek, 1998), Sweden (Erikson and Jonsson, 1996; Jonsson and Erikson, 2000), the Netherlands (Sieben, Huinink and de Graaf, 2001),

and Norway (Lindbekk, 1998). In our earlier paper, we set out the reasons why educational inequalities should have declined over the 20th century. Briefly they are as follows. We consider two sets of factors, those which influence educational performance (primary effects) and those which influence educational choices (secondary effects). The major point we made in respect of the former was that improving living conditions would make working class children less disadvantaged in terms of their health and nutrition. As for educational choices, reductions in the direct and indirect costs of education and the relative improvement in the financial resources of working class families increased the probability of their children being able to continue to higher levels of education. With the increase in the length of compulsory schooling the additional costs involved in reaching full secondary or tertiary education compared to compulsory minimum education have declined. Through postponing and reducing tracking, and introducing less demanding tracks of higher education, institutional reforms have improved the ability to anticipate future educational performance and reduced fears and risks of failure. At the same time, the decline of farming and other forms of self-employment and the transformation into service economies have led to an increase in the proportion of jobs in which education is essential. This should have led to a narrowing between classes in the importance they attach to education in gaining advantageous employment chances.

To a large extent we would expect these developments to apply equally to men and women, and therefore we should also expect similar trends in class inequality. However, the evolution of class inequalities for women has occurred together with a much stronger expansion of educational participation than for men: at the beginning of the 20th century women's educational participation and attainment was much lower than men's, but nowadays in many countries it is higher. These considerations lead to the other questions that we address. Are class disparities larger among women than among men in circumstances in which women are at a general educational disadvantage compared to men? Or, put the other way around, are women more disadvantaged, compared to men, in less well to do classes than in the better off classes,[2] and is this dependent on the general extent of gender disparities? The fact that gender disparities in education have strongly changed over time allows interesting tests of the question of whether class and gender disparities are interconnected or not and whether the rapid decline in gender inequality had implications for change or persistence in class-specific gender inequalities.

A large body of research attempts to understand why the earlier disadvantage of women in education has vanished and women outperform men in educational attainment in many countries (for a review of the literature, see Buchmann, DiPrete and McDaniel, 2008), but little is known about *gendered* class disparities, their variation between countries, and the extent of their change over time. We try to understand these issues in the light of the general account we developed in the earlier paper and have summarized above. Primary effects are likely to operate in the same way for girls and boys and are likely to have changed in the same way for both. Primary effects essentially derive from conditions in the home environment that affect cognitive development, learning and performance in schools. It is difficult to see why such class-specific conditions should affect girls in different ways than boys. In earlier times, when education for girls was seen as less important than for boys, and girls received less education, one could imagine that parents provided less educational support and motivation to girls and that this was more pronounced in working class than in middle class families. However, for these effects to be more than minor they would have had to extend beyond the disadvantages of working class compared to middle class children and the general disadvantage of girls compared to boys, and this seems doubtful. Stronger primary class disparities among girls than among boys are also unlikely, because, in general, girls perform somewhat better in schools than boys. Although some studies find a class-specific gender gap in reading scores—girls doing relatively better than boys only in economically disadvantaged families—(Hinshaw, 1992; Entwisle, Alexander and Olson, 2007; Buchmann, DiPrete, and McDaniel, 2008), other studies do not. For example, the extensive international student assessment programme, PISA, found large variations between classes in student performance but within countries it found no differences between men and women in this variation. Buchmann and DiPrete (2006) do not find significant gender-specific effects of family background on academic performance at any of the various stages in the US educational system which they analysed using NELS data. 'Rather the gender-specific effects of family background involved educational transitions net of performance and other covariates' (Buchmann and DiPrete, 2006: p. 533). Thus, the earlier substantial differences in educational participation and attainment are unlikely to derive from primary mechanisms, nor are differences in class effects between men and women.

Similarly, little difference between men and women should be expected for many of the secondary effects. Declining differences between men and women in the benefits of education have likely been the most important reason for the general narrowing of educational participation differences. With the increasing labour force participation of women investments in education become beneficial in much the same way for daughters as for sons. DiPrete and Buchmann (2006) extend and substantiate this argument when they explain the reversal in the gender gap in college completion from favouring men to favouring women. They show that the value of college completion for women depends not only on the increasing value of education in terms of labour market earnings but also on its impact on marriage chances, household standard of living, and insurance against income deprivation. In recent decades all these benefits have risen faster and now are higher for women than for men.

The literature contains some hypotheses about how differences in benefits might be expected to influence the patterns of class inequalities for men and women. In what one could call the hypotheses of 'weaker female educational inequality', Breen and Goldthorpe (1997) assume that class differences among women were previously less pronounced than among men because there were important non-educational mechanisms through which women could attain a better class position, mainly through the marriage market. But over the 20th century women's education has become a more important determinant of their own employment-based class position, and so Breen and Goldthorpe expect class inequalities in education among women to have become more like those among men.

Rather than assuming generally stronger or weaker class effects for one of the sexes the 'differential educational investment' hypothesis (Müller and Haun, 1994) assumes varying parental investments for girls and boys in specific classes, notably the class of farmers and other self-employed. Education is relatively less important here because most farms and businesses are passed on through inheritance. Because self-employment and running a farm or a firm has traditionally been men's business they have been, and remain, more likely than women to inherit. In turn, greater emphasis will be placed on the education of women, be it for reasons of equity or risk dispersion. Thus, daughters of the self-employed and farmers should be less educationally disadvantaged compared with their brothers than daughters in other classes.

Many studies have documented the decline of gender inequalities in educational attainment (Shavit and Blossfeld, 1993; Müller and Haun, 1994; Erikson and Jonsson, 1996; Vallet, 2004; Buchmann and DiPrete, 2006; and others), but only a few compare trends in class inequality among men and women. Their results differ and gender differences in class effects are rarely tested systematically. While for the Netherlands De Graaf and Ganzeboom (1993) found results consistent with Breen and Goldthorpe's (1997) hypothesis of earlier smaller class effects for women than men, Vallet (2004) found that in France class disparities initially were stronger among women than among men but over time they converged. Jonsson (1993) found the same for Sweden. At higher levels of education, class inequality among women tended to be larger than among men for cohorts born at the beginning of the last century, but later declined to the men's level or even below. Comparing Great Britain, Sweden, and the UK, Jonsson, Mills and Müller (1996) confirm the result for Sweden, but find little systematic difference between genders in class effects in Germany and Great Britain. Concentrating on the role of both parents' education in the United States, Buchmann and DiPrete (2006) find no difference in sons' and daughters' chances of college attainment and no change across cohorts if both parents themselves have college education. However, when fathers are either absent or have less than college education, sons' and daughters' education differs and has changed over time. In earlier cohorts (born 1938–1965) daughters in such families received less education than sons while, in more recent cohorts, daughters outperform their brothers, especially in achieving a college degree once college has been entered. A stronger association between educational attainment and parents' education among daughters than sons in earlier cohorts has been reversed in more recent cohorts.

As to the differential investment hypothesis, empirical tests would involve a comparison of men's and women's educational attainment and class mobility. To our knowledge, no study has systematically investigated all the relevant elements. However, among those nations included in the CASMIN (Comparative Analysis of Social Mobility in Industrial Nations) project[3] Erikson and Goldthorpe (1992) find supporting evidence for the mobility part of the hypothesis when comparing men's class mobility through employment with women's marriage mobility. While daughters of farm and petty-bourgeoisie background are less likely to inherit the parental firm or farm 'they show a clearly stronger tendency to marry into the service class than do their 'brothers' to enter this class via

employment' (Erikson and Goldthorpe, 1992, pp. 59–60).[4] Women's higher propensity to marry into the service class may be achieved through surpassing their brothers' education. For Germany, Müller and Haun (1994) provide earlier evidence on this part of the story: Over a series of cohorts in the 20th century, the only gender difference in class effects on education occurs as a result of petty-bourgeoisie daughters exceeding petty-bourgeoisie sons in transitions to, and achievement of, higher levels of education.

In what follows we pursue these issues. We first examine whether class inequality in educational attainment has declined in similar ways among women as among men. Then we address the differences in the pattern and extent of class inequality among both genders and its change over time.

Data

We use data from seven European countries: Germany, France, Italy, Britain, Sweden, Poland, and the Netherlands. In our earlier analysis of trends among men we also included Ireland, but the Irish data lack information on women. The data were originally assembled for a comparative analysis of social mobility in Europe (Breen, 2004) and they comprise 117 national surveys collected between 1970 and 2002. Each country provides rather different numbers of surveys (up to a maximum of 35 from the Netherlands). In Sweden, for example, there is a survey for every year from 1976 to 1999, whereas the analyses for Italy are based on only two surveys and for Poland on three. The surveys which we use are listed in Table 1 of Breen *et al.* (2009). We analyse data for women and men aged 30–69 except in Great Britain where the age range is 30–59 in some surveys and 30–49 in others. We adopt 30 as the lower age limit to ensure that everyone in the samples will have attained their highest level of education. We take 69 as an upper limit to try to minimize the possible impact of differential mortality.

Variables

Highest level of educational attainment is measured using the CASMIN educational schema (Braun and Müller, 1997). We have amalgamated categories 1a, b and c, and also 2a and b, giving us five educational categories:

1abc (compulsory education with or without elementary vocational education),
2ab (secondary intermediate education, vocational or general),
2c (full secondary education),
3a (lower tertiary education), and
3b (higher tertiary).[5]

We have only four educational categories in the Italian and Polish data, where no distinction has been made between 3a and 3b. The CASMIN schema seeks to capture distinctions both in the level of education and in its type, and so the five levels we identify are not sequentially ordered in any simple way. In some countries lower tertiary education can be accessed directly from secondary intermediate education, while, in most countries, higher tertiary is not usually entered after lower tertiary.

Class origins are based on the occupation of the father and are categorized using the seven-class version of the EGP class schema (Erikson and Goldthorpe, 1992, ch. 2):

I (upper service),
II (lower service),
IIIa (higher grade routine non-manual),
IVab (the self-employed and small employers),
IVc (farmers),

Table 1 Sample sizes for cohorts by country, for women

Country	Cohort					
	1908–1924	1925–1934	1935–1944	1945–1954	1955–1964	Total
Germany	3,092	3,276	5,280	4,132	2,910	18,690
France	7,123	8,456	8,336	7,790	2,461	34,166
Italy	0	843	1,144	1,371	884	4,242
Great Britain	7,338	9,820	25,927	22,694	5,931	71,710
Sweden	8,199	8,530	11,247	10,479	4,143	42,598
Poland	6,578	8,532	7,968	1,093	806	24,977
Netherlands	2,078	3,190	4,193	5,366	3,597	18,424
Total	34,408	42,647	64,095	52,925	20,732	214,807

V + VI (skilled manual workers, technicians and supervisors), and
VIIab + IIIb (semi-skilled and unskilled manual, agricultural, and lower grade routine non-manual workers).

In Britain and Poland we can identify only six classes. In both countries we cannot distinguish I and II, while, in Britain, members of IVa are included in I + II (Goldthorpe and Mills, 2004). Furthermore, in Poland, we cannot split class III so here IIIb is included with IIIa rather than with VIIab. To make the schema comparable across countries we combine classes I, II and IVa and classes IIIa and IIIb when the focus is on comparisons between countries.

Although the data we use come from cross-sectional surveys, we analyse change over five birth cohorts covering the two-thirds of the 20th century and defined as follows: 1908–1924, 1925–1934, 1935–1944, 1945–1954, and 1955–1964. Survey defines the 5-year interval in which the data were collected: 1970–1974, 1975–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, and 2000–2004.[6]

The resulting table of class origins by educational attainment by cohort by survey is of dimensions $7 \times 5 \times 5 \times 7 = 1225$; though not all of these combinations are observed because not all cohorts are observed in all periods. We also omitted all those observations of cohort by survey in which the table of origins by education was extremely sparse. All the omitted cells were treated as structural zeroes.[7]

Table 1 shows the resulting sample sizes. These vary quite considerably and this will obviously affect our ability to detect statistically significant trends. The sample size for Italy is particularly small and one consequence of this is that we omit the oldest cohort in Italy from our subsequent analyses.

Changes in Educational Attainment and Class Origins

Figure 1 shows the two most noticeable features of educational change in the 20th century: the massive increase in educational attainment, and the decline of female disadvantage. In the first column of graphs we see that, for both men and women, the proportions of those attaining only primary education have declined in all countries. Conversely, as columns two and three show, attainment of at least upper secondary or tertiary education has increased in all countries (figures for lower secondary education are not shown). Countries differ in the extent of gender inequality and its change over time, but the figure shows that from the oldest to the youngest cohort the over-representation of women in the lowest category has everywhere declined. In the youngest cohort, more men than women have only primary education in all countries except Italy and the UK, while in France, Poland and Sweden more women than men obtain upper secondary or tertiary education. In the remaining countries more men than women still reach the highest level of education. However, our youngest cohort was born 1955–1964 and so we have no information on cohorts born in the final quarter of the 20th century.

The fourth column of graphs in Figure 1 presents the largest *class* difference in attainment of tertiary education—these are between classes I and VII + IIIb (except in Poland where we use class IVc). Comparing these with the graphs in the third column it is quite clear that these class differences always have been, and continue to be, much greater than the gender gap in access to tertiary education.

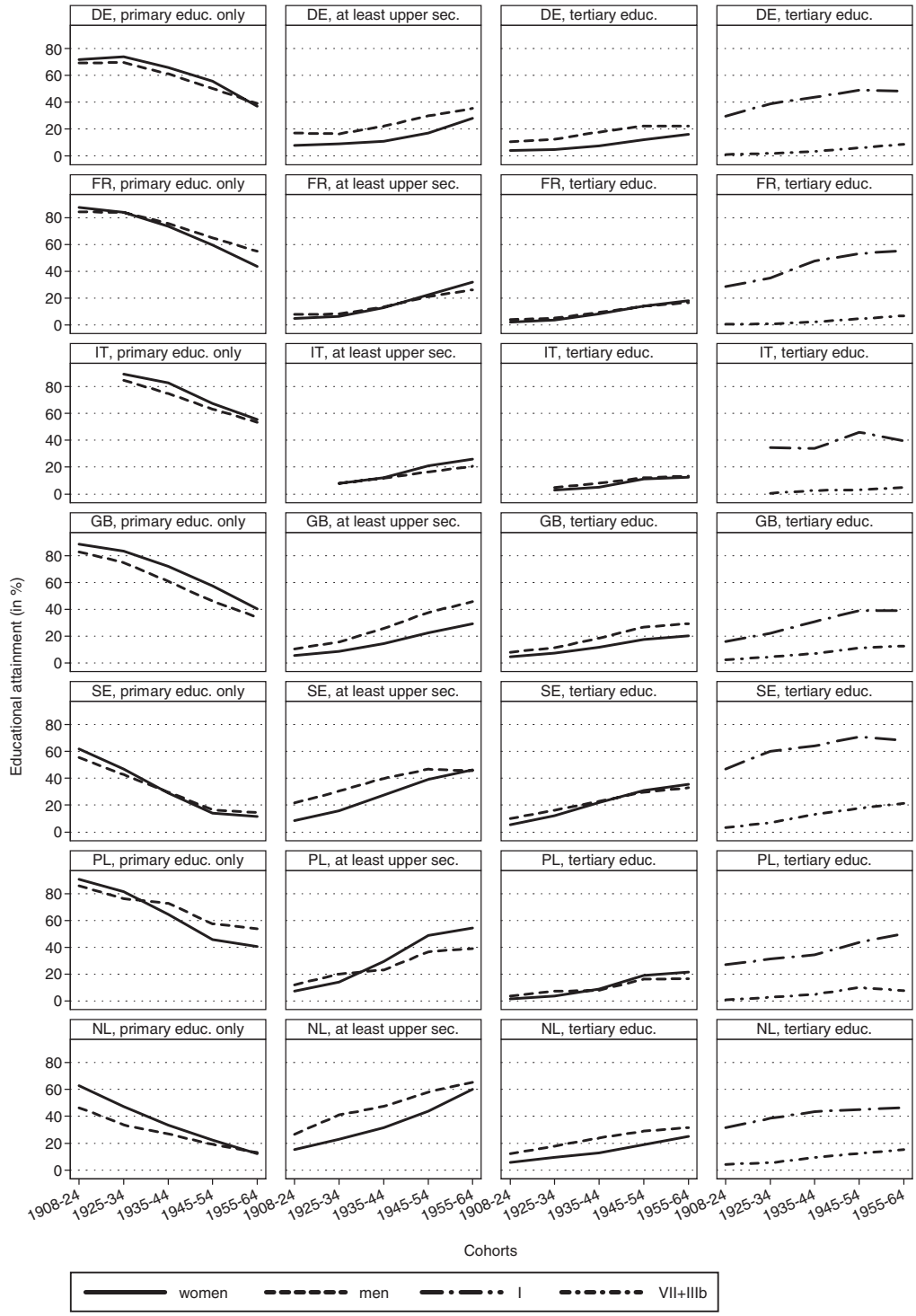
During the course of the 20th century the class structures of European nations underwent major change, with a shift away from farming and unskilled occupations towards skilled jobs and white-collar jobs. Some aspects of this shift are shown in Figure 2, which reports the shares of the upper middle classes I + II + IVa, the intermediate classes IIIab + IVb, the farm class IVc and working class V + VI + VIIab in the origins of the oldest and youngest cohorts in each country. The decline of the farm class and growth of the service class are evident everywhere and the working class has grown or remained stable everywhere except Britain.

Trends in Educational Inequality Among Women

To analyse trends in educational inequality we use the ordered logit model, which has several desirable properties for this purpose (Breen *et al.*, 2009). Letting Y denote level of educational attainment using the CASMIN categories and $i = 1, \ldots, I$ and $j = 1, \ldots, J$ index class origins and education, respectively, $k = 1, \ldots, K$ cohorts and $l = 1, \ldots, L$ survey periods, our basic model is

$$\ln\left[\frac{Y < j|i,k,l}{Y \geq j|i,k,l}\right] \equiv \eta_{ijkl} = t_{jkl} - \beta_{ik} - \varphi_{il} \qquad (1)$$

That is to say, the log of the odds of failing to reach a given educational level is a function of a set of $J-1$ thresholds, t_i and a set of social origin effects, β_i. Both of these are allowed to differ across cohorts (hence the



For Poland, we present results for class IVc instead of class VII, as this class has the lowest participation rates in tertiary education.
Class I is class I+II+IVa in Great Britain and class I+II in Poland.

Figure 1 Proportion of women and men reaching primary, at least upper secondary, and tertiary education (panels 1–3); proportion of class I and VII + IIIb offspring with tertiary education (panel 4), by country and cohort

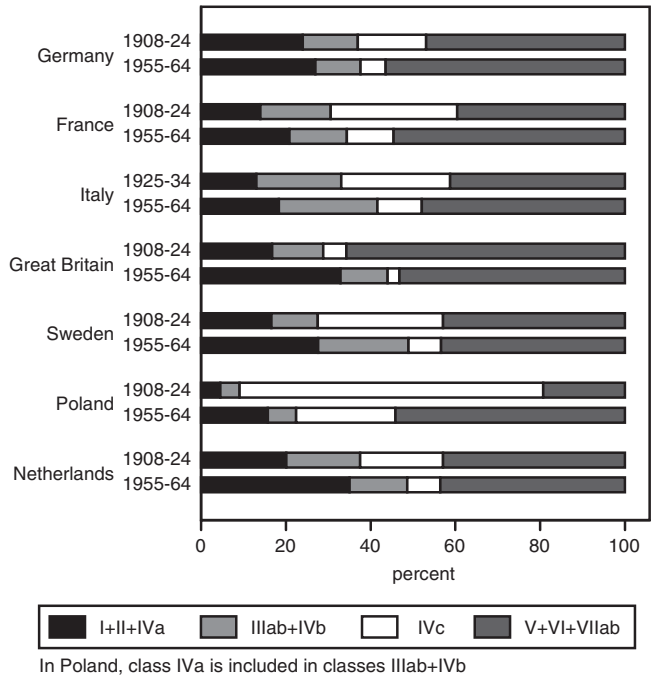


Figure 2 Proportions of various origin classes for first and last cohort by country (marginal distributions), for women

k subscript on both) and the thresholds also differ over survey periods (denoted by the l subscript). We set $\beta_1 = 0$ to identify the model, and so if $\beta_i > 0$ (for $i = 2, \ldots, I$) the log odds of failing to exceed a given educational threshold are lower than those of class I, while if $\beta_i < 0$ they are greater. Simple algebra shows that the β_i ($i = 2, \ldots, 7$) are estimates of the log odds ratio of failing to reach a given educational level comparing class i ($i = 2, \ldots, 7$) with class 1. The model also includes a set of effects, φ_{il}, which refers to the impact of class origins in each survey period in which a given observation was collected. We control for class effects over surveys in our model precisely because observations from the same cohort may be taken from different surveys and we want to remove this source of variation from our data. In other words we are guarding against the possibility of confounding variation over survey periods with change over birth cohorts. The effects of survey period are of no substantive interest and in any case show no systematic patterns and are frequently not statistically significant: whether we include them or not makes little difference to our findings about trends over cohorts.

Fit statistics for the ordered logit are reported in Table 2. In column 1 we report the goodness of fit of a simpler model than equation (1) in which class origin effects are held constant over cohorts:

$$\ln\left[\frac{Y < j \mid i,k,l}{Y \geq j \mid i,k,l}\right] \equiv \eta_{ijkl} = t_{jkl} - \beta_i - \varphi_{il} \qquad (2)$$

In column 2 we report the fit of the model shown in equation (1). The difference between these two is a test of whether class inequalities are constant over cohorts, and the likelihood ratio chi-square value for this test is reported in column 3. These show significant ($P < 0.05$) change in all cases. For comparison we also present, in columns 4 through 6, the goodness of fit and tests of the same models excluding survey period effects. The parameter estimates from the model reported in column 2 are shown in Figure 3 (for corresponding figures for men see Breen *et al.*, 2009: figure 4).

In Figure 3 each line refers to a class origin and shows how the coefficients for that class evolve over cohorts, with class I always acting as the reference category (classes I + II in Poland and I + II + IVa in Britain) and having a coefficient of zero. An overall decline in class differences in educational attainment is evident in the narrower spread of the coefficients for

Table 2 Model fits for ordered logit models, for women by country with and without controlling for survey effects (G^2, *df*, sig.)

	Controlling for survey effects			Not controlling for survey effects		
	Free thresholds, constant *b*	Free thresholds, free *b*	Difference between models	Free thresholds, constant *b*	Free thresholds, free *b*	Difference between models
Germany	707.7	572.8	134.9	288.9	124.7	164.2
	492	468	24	114	90	24
	0.000	0.001	0.000	0.000	0.009	0.000
France	489.8	395.0	94.8	348.2	145.2	203.0
	336	312	24	114	90	24
	0.000	0.001	0.000	0.000	0.000	0.000
Italy	170.161	133.2	36.9	111.6	76.3	35.3
	114	96	18	66	48	18
	0.001	0.007	0.005	0.000	0.006	0.009
Great Britain	579.4	543.6	35.8	389.4	316.6	72.8
	295	275	20	95	75	20
	0.000	0.000	0.016	0.000	0.000	0.000
Sweden	711.6	569.9	141.7	358.7	159.3	199.5
	474	450	24	84	60	24
	0.000	0.000	0.000	0.000	0.000	0.000
Poland	327.5	153.0	174.5	493.0	157.3	335.7
	138	118	20	95	75	20
	0.000	0.017	0.000	0.000	0.000	0.000
Netherlands	701.5	620.7	80.8	242.6	143.4	99.2
	540	516	24	114	90	24
	0.000	0.001	0.000	0.000	0.000	0.000

the classes in the youngest compared with the oldest cohort. Trends among men and women in a given country are very similar. Focusing on women we see that the working class, and especially unskilled workers (class VII) made considerable gains everywhere. If we consider unskilled German workers, we see, from the first graph in Figure 3, that in the oldest cohort their log odds of exceeding any given educational level were 4.5 less than those for women from class I. But in the youngest cohort this gap had declined to ~2.5. With the exception of Great Britain large gains were also achieved by children from farm origins. Considerable decline in inequality is not only observed for Sweden and the Netherlands but for the most disadvantaged classes for Germany and Italy as well. The decline is smallest in the UK. In Poland inequalities increase in the two youngest cohorts though without reaching the level of inequality existing in the oldest cohorts. In a few countries we see lines crossing each other: this is true for farmers in Germany, France, Sweden and the Netherlands, indicating that in these countries farm daughters make larger gains than daughters of other backgrounds. Conversely, in Poland, farm daughters have clearly constituted the most disadvantaged class throughout the century.

From column 1 of Table 2 it can be seen that the ordered logit fails to fit the data in several countries. Too much weight should not be attached to this; in several countries a large sample makes it difficult to find a model that fits the data according to a likelihood ratio test and a conventional critical value like 0.05. The important question is whether the deviations of the data from the model would lead us to revise our conclusions about trends. To examine this question we fitted models which relax the assumption of parallel slopes where this is necessary to achieve a good fit to the data.[8] In these models threshold-specific β parameters are estimated for those classes for which the odds between levels are not constant. Results are available from the authors on request. Most of the deviations are small in size and usually they are found in the older cohorts in ways that strengthen rather than weaken the conclusion of inequalities declining over time. In summary, we can say that trends in educational inequality among women are very similar to those we found for men.

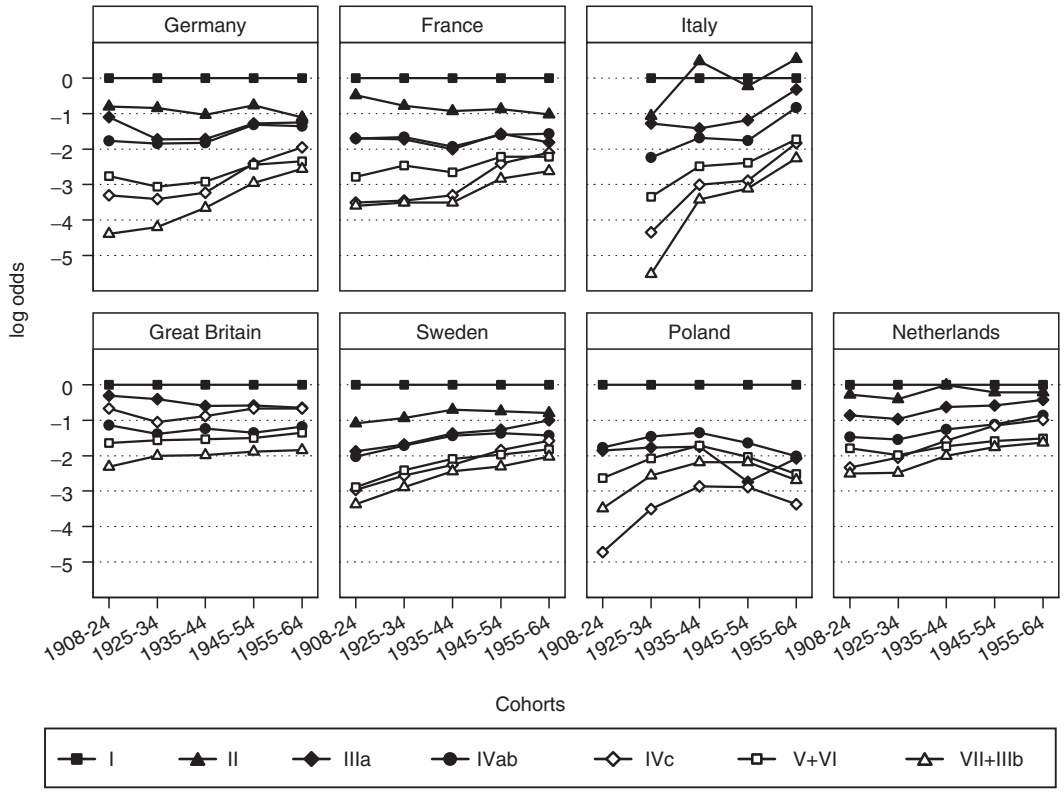


Figure 3 Ordered logit models for educational attainment in seven countries for women; class origin effects over cohorts, controlled for survey effects

In contrast to the conclusions drawn by some earlier studies—notably Shavit and Blossfeld (1993), we do not find persistent inequality: rather, we find a general tendency for class inequalities in educational attainment to decline over the course of the 20th century.

To make cross-national comparisons of the extent of educational inequality among women we replicate the analysis of Figure 3 with the six-class schema described in the data section. We also made the educational categories consistent across countries, though this was not strictly necessary because, if the ordered logit is a good fit to the data, estimates of its parameters will be invariant to the number of educational categories used (though their standard errors will not). The Italian and Polish data have only four educational categories and so we reduced the number of educational categories in every country by combining 3a and 3b (lower and upper tertiary education).

The β coefficients from the ordered logit models estimated on these data are shown in Figure 4. Unlike Figure 3, we can use Figure 4 to make comparisons between countries, as well as over cohorts. The pattern of results is similar to that of Figure 3, but because the reference category for all countries is now defined more broadly (classes I, II, and IVa combined) the class disparities become smaller everywhere except Britain and Poland, and the differences between countries appear much smaller. In the oldest cohort, class-differences were large in Germany, Italy, and Poland, and small in Sweden and the Netherlands, with France and Britain occupying an intermediate position. The marked weakening of class inequalities in Germany and France has led to a considerable convergence of inequalities in the youngest cohort. Only in Poland do inequalities remain substantially larger than elsewhere but this is mainly due to the very poor position of women from farming origins

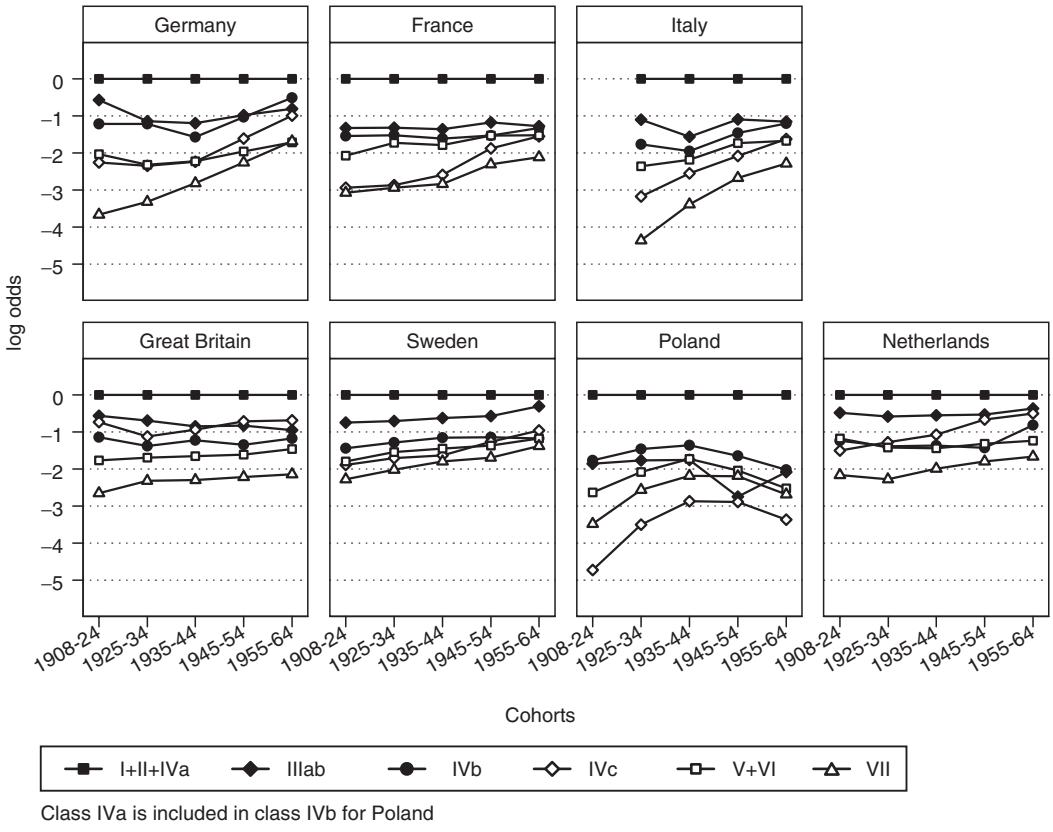


Figure 4 Ordered logit models for educational attainment in seven countries for women, class origin effects over cohorts, controlled for survey effects using identical measures for class and education in each country

and the reversal of the trend of declining inequality among the two youngest cohorts.

Assessing the Degree of Change

We computed two measures to assess the degree of educational inequality in different countries and its change over time in a parsimonious and understandable way. The first is the equally weighted mean of the ordered logit coefficients in each cohort. Because all the coefficients for classes II to VII are less than zero, their mean reflects the average inequality between classes (which would not be true if they were not bounded by zero). A larger negative mean implies greater class differences, while a mean of zero would imply no class inequalities. The second measure is the mean of the coefficients in each cohort, but this time weighted by the proportion of each cohort in the social class to which the coefficient applies. In this case the impact of a coefficient on the calculation of the mean will depend on the relative size of the class to which it applies. So this measure can be seen as capturing overall 'welfare' in so far as it comprises a sum of disadvantages, each of which is weighted by the proportion of the population who suffer that particular degree of disadvantage.

Figure 5 shows these statistics, derived from the cross-nationally comparable data used to generate Figure 4, thus they are also valid for comparisons between countries. Both measures demonstrate that the decline in class inequality has been large. Between the oldest and youngest cohorts the equally weighted mean of the coefficients declined by 30 per cent or more in all countries except Britain (7 per cent decline) and Poland (13 per cent). According to the proportionally weighted mean the decline is larger in all countries except Germany. Notably, we see clearer trends towards greater equality, even in the UK and

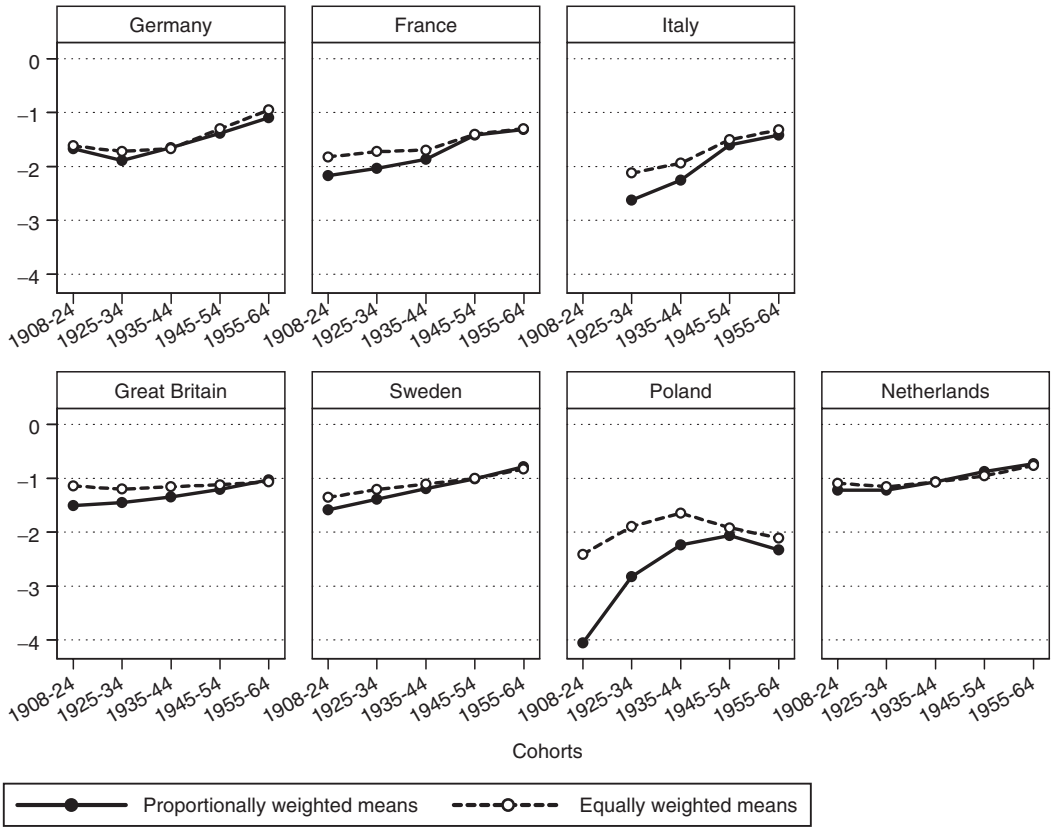


Figure 5 Equally weighted and proportionally weighted means of ordered logit coefficients, taken from the model with identical measures for class and education (Figure 4)

Poland, where inequality now declines by more than 30 per cent. The explanation for the difference between the equally and proportionally weighted means can be found in Figures 2 and 3. It is the size and decline in size of the class of farmers, whose children are usually among the educationally most disadvantaged, which is mainly responsible for the difference. In Poland, where the contrast between the two measures is largest, farm daughters (class IVc) were very disadvantaged, their position initially improved, but then worsened again. However, over the course of the 20th century, the share of those from farm origins declined hugely (from 72 per cent to 23 per cent). So, although farmers continued to be disadvantaged, the impact of their disadvantage on our overall measure of welfare was much reduced. Germany and the Netherlands, where both measures hardly differ, had the smallest class of farmers. In Britain, the line showing the equally weighted mean is flat, indicating little change in the average of the ordered logit coefficients. The steeper slope of the proportionally weighted mean reflects the decline in the relative size of the most disadvantaged classes in Britain, notably classes, V, VI, and VII.

Taking Figures 4 and 5 together, it appears that trends and cross-national differences in class inequalities in educational attainment among women are very similar to those found among men (Breen *et al.*, 2009).

Comparisons between Men and Women

Now we turn to the extent and nature of gender differences in class inequality, and the question of whether or not class inequalities among women evolved in a different way to those among men. Earlier we referred to two relevant hypotheses. The hypothesis of 'weaker female educational inequality' implies that class differences in the early 20th century were less among women but that they have increased

more, or diminished less, than among men, so leading to some convergence. The 'selective investment' hypothesis claims that gender differences in class inequality are largely due to the greater investment in daughters' education among farmers and the petty-bourgeoisie. It may also imply that males and females follow different paths of change in class inequality to the extent that the differential treatment of sons and daughters in these classes disappears.

To address these questions we need models in which we simultaneously take into account

(i) changes in educational inequalities between men and women;
(ii) differences in class inequalities between the sexes; and
(iii) changes over time in class-related educational inequalities that may follow different trends according to gender.

Therefore, we henceforth work with a combined data set for men and women and our starting point, and most general model, is one in which the thresholds are allowed to vary by cohort, sex, and survey, and in which the effects of class origins vary over both gender and cohort. Letting $m = 1, 2$ index gender we can write this model as:

$$\ln\left[\frac{Y<j \mid i,k,l,m}{Y\geq j \mid i,k,l,m}\right] \equiv \eta_{ijklm} = t_{jklm} - \beta_{ikm} - \varphi_{il} - \psi_{lm} \tag{3}$$

Once again, the φ_{il} parameters are of no substantive interest; nor are the ψ_{lm} parameters that allow gender differences in educational attainment to vary across surveys. A less general model allows there to be a gender difference in class inequality which is constant over cohorts (denoted as γ) combined with class inequalities declining over cohorts in the same way for men and women, as follows:

$$\ln\left[\frac{Y<j \mid i,k,l,m}{Y\geq j \mid i,k,l,m}\right] \equiv \eta_{ijklm} = t_{jklm} - \beta_{ik} - \gamma_{im} - \varphi_{il} - \psi_{lm} \tag{4}$$

It should be borne in mind that gender differences in educational attainment are captured in the threshold parameters, which are specific to all cohort × gender × survey period combinations.

We found that for all countries, gender differences in educational attainment changed over time. We also found that class inequalities differ according to gender. However, these gender differences in class inequalities did not change over cohorts—except in Italy and Poland[9]—notwithstanding the fact that, as we saw earlier, overall class inequalities in educational attainment declined. That is to say, except in Italy and Poland, there was no significant three-way interaction between class inequality in educational attainment, cohort and gender and so model (4) is preferred over the more general model (3), and we now use the parameters of this model to address points (i) to (iii) listed above.

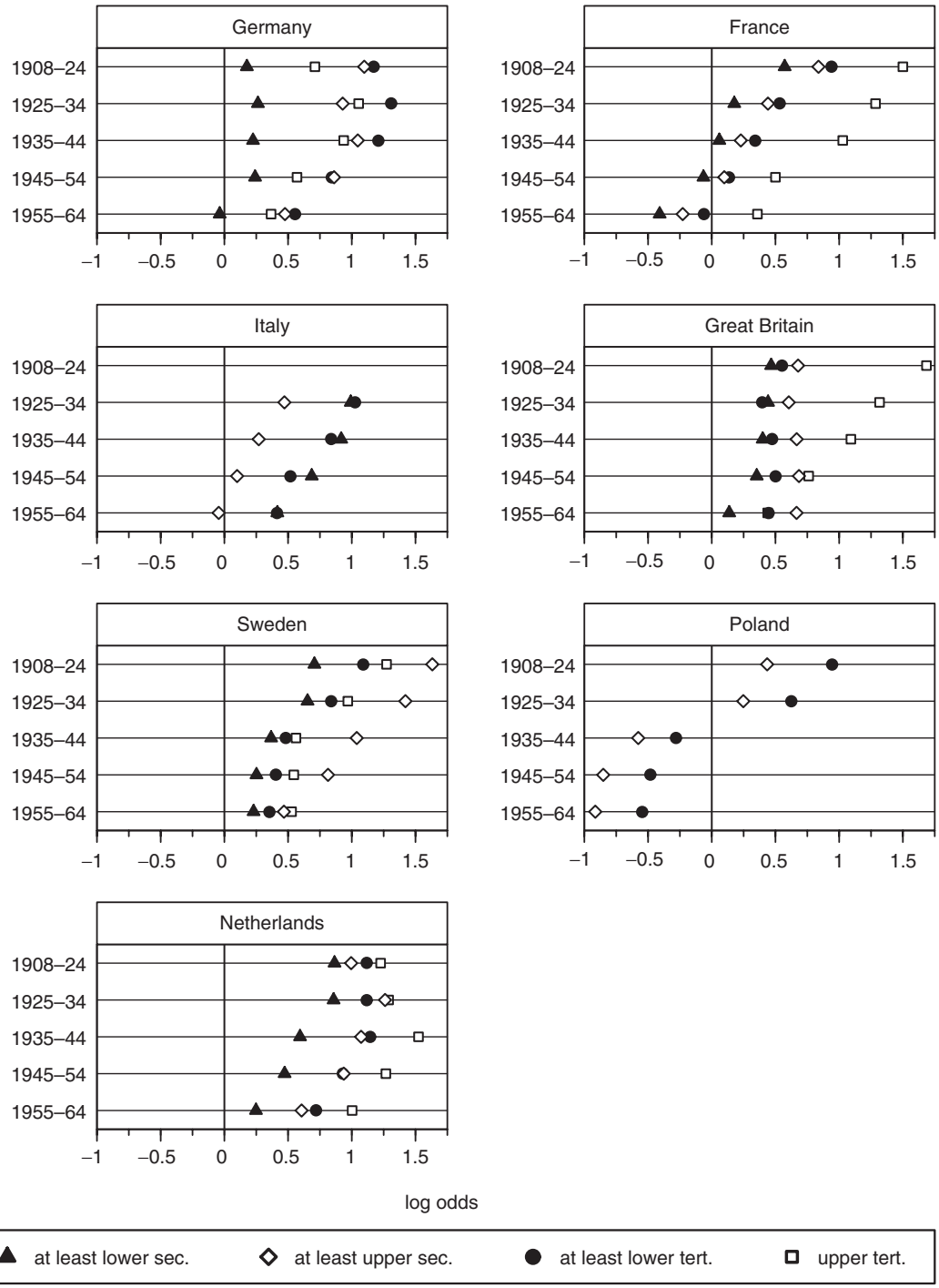
Gender Differences in Educational Attainment

As we noted, gender differences in educational attainment are captured in the threshold parameters of the model. We can see this if we fix class origins at class I, and write the log of the ratio of the cumulative odds for men and women:

$$\begin{aligned}\ln\theta_{1,j,k,l,1;1,j,k,l,2} &= \eta_{1,j,k,l,1} - \eta_{1,j,k,l,2} \\ &= \begin{pmatrix} t_{jkl1} - \beta_{1k} - \gamma_{11} - \varphi_{1l} - \psi_{l1} \\ -(t_{jkl2} - \beta_{1k} - \gamma_{12} - \varphi_{1l} - \psi_{l2}) \end{pmatrix} \\ &= t_{jkl1} - t_{jkl2} + \gamma_{12} - \gamma_{11} + \psi_{l2} - \psi_{l1}\end{aligned} \tag{5}$$

And since we normalize the coefficient estimates by setting $\beta_{1k} = \gamma_{1m} = 0$ (because class I is the reference category) this reduces to the difference in the thresholds between men and women, $t_{jkl1} - t_{jkl2}$ plus the difference between men and women in survey period effects, ψ. Within a survey period the difference between a given threshold for men and women captures the gender inequality in the odds of exceeding that particular educational level among those originating in class I. However, threshold estimates are specific to cohort and survey period, and, since variation over survey period is of no substantive interest, we estimate the threshold values for a given cohort by taking the average of the survey period thresholds in which that cohort is represented.[10] These values are displayed in Figure 6.

In Figure 6 the four symbols represent differences between men and women in their log odds of exceeding each of the four educational thresholds. Positive values show that men have a better chance of exceeding that threshold, negative values that women do. The panel for France provides a nice illustration. In the oldest cohort, gender inequalities favoured men, and they grew larger as one progressed through the educational system. But these inequalities were smaller in the 1925–1934 cohort and smaller again in the 1935–1944 cohort (all the points shrank towards zero). This trend favouring women continued, and so, by the 1955–1964 cohort, women were more likely to reach lower or upper secondary education, men and women



Positive values indicate higher odds for men to exceed the threshold, i.e. men are more likely to hold at least a given degree. Educational levels 3a and 3b are merged in Italy and Poland, levels 1c and 2ab are merged in Sweden. In Italy, the first cohort is omitted from the analysis; in Poland, we only show two thresholds distinguishing between attainment of at least upper secondary education and of at least lower tertiary education.

Figure 6 Differences in the threshold effects between men and women (in log odds) in each cohort for the reference class I

were equally likely to reach lower tertiary, and men were still more likely than women to attain higher tertiary education.

All the countries show a decline in male advantage over the course of the 20th century, though the details vary. In Britain, there were initially fairly modest male advantages in reaching all levels of education except for upper tertiary where the advantage was pronounced. This advantage steadily eroded in later birth cohorts, so that in the youngest cohort, men enjoy a relatively small advantage over women in the odds of reaching any educational level above primary. In Germany the initially large advantages of men in the odds of reaching at least upper secondary or lower tertiary education did not start to decline until the post-war cohorts, but by the 1955–1964 cohort they had just about disappeared and, in the case of lower secondary education, had been replaced by a minor female advantage. Italy, Poland, and Sweden show a monotonic decline in male advantage, while in the Netherlands the pattern is more complex but with, nevertheless, a monotonic decline in inequalities from the 1935–1944 cohort onwards.

France and the Netherlands show a pattern of (mostly) increasing female disadvantage as one moves to higher educational levels. In other countries, the extent of gender inequality varies in ways that are not always easy to understand. In Germany, for instance, gender disparities tend to be largest for lower tertiary degrees, while in Great Britain, lower tertiary degrees are less gendered than attainments at the upper secondary level. Institutional variation in the kind of courses offered at the various levels of education and the relative attractiveness of these courses to men and women are the most likely reasons for the differences observed between the countries. In Germany, the lower tertiary degrees offered at the Fachhochschule are strongly oriented towards engineering and overwhelmingly attract men. Thus women with tertiary entrance qualifications opt for studies at the university rather than at the Fachhochschule. In Great Britain, in contrast, lower tertiary qualifications can often be accessed without general Upper Secondary A-level qualifications and they include many 'female specialties' like nursing and care occupations (which in Germany are often offered in the vocational tracks of secondary education).

Differences in Class Inequalities between the Sexes

The preceding description of trends applies to gender inequality within all classes, and not just between men and women from class I; but the magnitude of the gender gap differs between classes. Referring again to equation (5), gender differences measured by the log of the male/female odds ratio of exceeding the jth educational threshold are given by $t_{jkl1} - t_{jkl2} + \gamma_{i2} - \gamma_{i1}$ where i denotes a specific class origin and 1 denotes men, 2 women. Given $i =$ class I we saw that this difference reduces to the difference in the threshold parameters because our normalization sets the γ parameters for class I to zero. But for all other class origins these parameters are relevant. However, our normalization also sets the γ parameters for men to zero. So the inequality between men and women in any class other than class I is equal to the inequality in class I raised or lowered in the ith origin class (for $i = 2, \ldots, 7$) by an amount given by γ_{i2}; that is, the gender difference in class i. This applies equally to all thresholds. These quantities are shown in Figure 7.

Figure 7 shows the size of the gender gap relative to the gap in class I. Here values greater than zero show that inequalities between men and women in that class favour men to a greater extent than in class I. Likewise, negative values show that gender inequalities in the particular class favour women to a greater extent than they do in class I. So, in all countries except Poland, gender inequalities in educational attainment among people from class IVc (farmers) origins tend to favour women to the same or a greater extent than is the case in class I. And in all countries except Great Britain, the same holds for class IVab. If we do not compare to class I but to any other class, then there is a rather general pattern that class-based educational disadvantage in farm and petty-bourgeoisie families is smaller for women than for men (except among Polish farmers).

Gender-specific Changes over Time in Class Inequalities

Italy and Poland are the only countries where we found that the trend over cohorts in class inequality differed between men and women, or, in other words, where the three way interaction between cohort, class origins and gender was statistically significant. In both countries inequalities were much greater among women than men in the older cohorts and inequalities declined more rapidly among women. In the case of Italy, class differences among women in the youngest cohort are slightly less than among men (though the difference is slight), while in Poland, inequalities seem much the same in the two sexes.

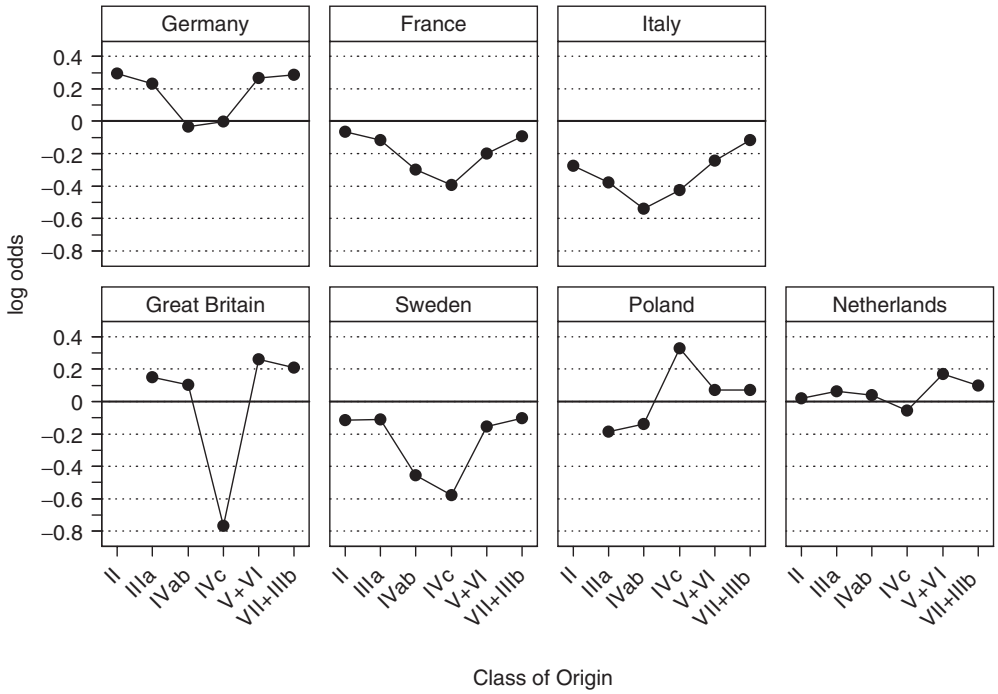


Figure 7 Differences in origin effects between men and women relative to differences between men and women in class I (in log-odds)

In both countries women born into farm labouring and farmer families were particularly disadvantaged in the older cohorts when compared with men born into such families but this disadvantage has gradually disappeared. One possible explanation of this is that, at the start of the 20th century, the Italian and Polish class structures were dominated by farming. In the oldest Italian cohort, 26 per cent of women came from the farm class, IVc, and a further 14 per cent from the farm labourer class, VIIb. The comparable figures for Poland were 72 per cent and 4 per cent. Under these conditions, women of class IVc and VIIb origins were very likely to marry a farmer or farm worker, and this was a marriage strategy that did not call for investment in formal education. As the size of the agricultural sector rapidly declined over the century, so the pattern of female class differences in educational attainment came to resemble that found in other countries.[11]

To summarize this part of our analysis: Women's disadvantage in educational attainment has declined in all countries, and, in some cases, has been reversed. We have shown that this trend is common across all social classes and took place in all countries. We did not find a pattern of generally higher or lower class disparities in educational attainment for one of the sexes. However, in most of the countries we did find evidence of less educational disadvantage among petty-bourgeoisie and farmers' daughters than among their brothers and this supports the hypothesis of differential investment that we outlined earlier. In most of the countries this differential advantage of daughters compared to sons is stable across cohorts; but in Italy and Poland much larger class inequalities among women declined more rapidly than did inequalities among men, and so here we find a pattern of convergence rather than the constant gender differences in class inequality that we find elsewhere.

Conclusions and Discussion

Trends in educational inequality among women are very similar to those we found for men: class-based

educational inequality declined in all of the countries we were able to investigate. That we could not find any systematic difference between men and women in the timing of declining inequality speaks for a high degree of similarity for both men and women in the mechanisms and processes responsible for class-based inequality and its change over time. The claim of basic similarity in class-based inequality gains further support from the observation that for both sexes countries differ in similar ways in the extent of inequality. The same set of countries (Germany, France, Italy, Poland) show relatively more inequality, while in Great Britain, Sweden, and the Netherlands inequalities are less.

These basic similarities notwithstanding, there is some variation in class-based educational inequality by gender, especially in the classes of business (IVab) and farm owners (IVc) in which the class disadvantage for daughters tends to be smaller than for sons. This pattern of educational advantage for girls in the self-employed classes is remarkably stable or even strengthens over time. Seen together with findings from intergenerational class mobility in employment position and marriage, the results are consistent with the hypotheses of differential parental investment in the education of sons and daughters. While sons are more likely to inherit, daughters receive more education, be it to improve their chances on the marriage market (more likely in earlier cohorts) or to advance their own employment opportunities. This finding underlines the usefulness of the class approach for the study of educational inequality: specific resources possessed by parents in different classes may lead to different plans for the future of girls and boys, resulting in gender-specific family investments in education.

It is no surprise to find that gender differences in educational attainment have declined. We have shown that this decline occurred in all classes in highly similar ways. In all countries and in all classes, men's and women's level of educational attainment has become more similar. However, this does not mean that in all countries gender differences were the same nor that they changed in the same way. Gender disparities in educational attainment vary between countries in their overall extent, in the educational levels at which gender differences occur, and in their development over time. Even at the end of our observation window, countries still vary in the degree and shape of gender disparities in educational attainment.

Initially we posed the question of whether class and gender disparities are interconnected or not and whether the rapid decline in gender inequality had implications for change or persistence in class-specific gender inequalities. We have found that although class and gender inequalities have declined, gender differentials in class inequalities have remained constant. So the answer to the question is that the overall decline in gender inequality seems to have had no implications for the pattern of gender differences within classes. Class inequalities reflect differences that exist between families (for example in the distribution of educationally relevant resources), while gender inequalities concern the differential treatment of boys and girls within families (how families choose to distribute the resources they possess). It seems that, as far as the latter is concerned, although boys and girls are treated more equally than hitherto, differentials in the treatment of the sexes that are specific to classes have remained rather stable and gender inequalities continue to be conditioned by social class.

Notes

1. This article is part of work pursued within the 6th EU Framework Network of Excellence 'Economic Change, Quality of Life & Social Cohesion (EQUALSOC)'. Earlier versions were presented at the meeting of Research Committee 28 of the ISA, Brno, 24–27 May 2007 and at a conference on 'Expected and Unexpected Consequences of the Educational expansion', 8–13 July 2007 in Monte Verità, Ascona Switzerland. We are grateful for comments made at these meetings. We are grateful to the following people who made the data used here available to us: Louis-André Vallet (France), Maurizio Pisati and Antonio Schizzerotto (Italy), John Goldthorpe and Colin Mills (Great Britain), Jan O. Jonsson (Sweden), Bogdan Mach (Poland), Péter Róbert and Erzsébet Bukodi (Hungary), Harry Ganzeboom (Netherlands).
2. It is important to be aware that asking whether gender gaps differ by class is equivalent to asking whether class differences differ by gender. We find that an interaction between gender and class exists; the interaction can be interpreted in either of these ways because formally they are the same.
3. England and Wales, France, Northern Ireland, Scotland, Republic of Ireland, West Germany, Sweden, Poland and Hungary.
4. For similar findings for Germany, see Handl (1988, pp. 119–122).

5. Higher tertiary education, 3b, means the successful completion (with examination) of a traditional, academically oriented university education. Lower tertiary education, 3a, is usually characterized by a shorter length of study and more practically oriented study programs (e.g. technical college diplomas, social worker or non-university teaching certificates).
6. In our previous article we addressed the question of whether the association between class origins and educational attainment, which is the major focus of our investigations, showed significant variation over the different surveys in which the same cohort was observed. For the eight countries we analysed we were satisfied that this was not the case among men. We replicated this part of the analysis for women and found that, in a small number of cohorts in some countries the association between origins and education differed significantly over surveys. But we also found that our conclusions about temporal trends were in fact invariant to which particular survey or group of surveys we chose to represent the association in the particular cohort.
7. Because of heavy losses in WWII and consequent small number of cases we did not include respondents born before 1915 in Germany's first cohort. Germany's first cohort thus only includes respondents born 1915–1924.
8. We estimated these models in Stata with *gologit2* (Williams, 2006). We would like to thank Richard Williams for providing this ado-file and his helpful support.
9. Model details and goodness-of-fit statistics can be obtained from the authors on request.
10. In fact we did this by estimating a model in which we set $t_{jklm} = \tau_{jkm} + \delta_{jl}$ where the δ_{jl} are the survey period-specific deviations around the thresholds for each cohort × sex combination. This gives rise to the model $\eta_{ijklm} = \tau_{jkm} + \delta_{jl} - \beta_{ik} - \gamma_{im} - \varphi_{il} - \psi_{lm}$. This specification yielded as good a fit to the data as that shown in models (4) and (5), where each combination of cohort × sex × survey period has its own set of thresholds.
11. The results of the models on which this discussion is based are available on request from the authors.

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Manuscript received: September 2008