Educational expansion and the role of demographic factors: The case of West Germany

by

Maarten L. Buis[1], Bastian Mönkediek[2] and Steffen Hillmert[1]

maarten.buis@uni-tuebingen.de; b.monkediek@let.ru.nl; steffen.hillmert@uni-tuebingen.de

Motivation: A recurring populist fear is that some disadvantaged minority – for example the Irish, the Catholics, or the Muslims – is "out-breeding" the rest of the population, leading to a general decline of the society. A testable version of that fear is that the combination of differential fertility and inequality of educational opportunities would lead to a lowering of average levels of education in the next generation. In this article we investigate how demographic and social stratification processes in one cohort influence the distribution of education in subsequent cohorts within a Western society.

Abstract

In how far is the educational distribution in successive generations affected by parental differential fertility and social inequalities in educational attainment? For example, lower educated women are likely to have more children than higher educated women and the children of lower educated mothers are more likely to attain less education than the children of higher educated mothers. This may lead to a downward pressure on the average level of education in the next generation. The aim of this article is to quantify the role of these mechanisms for West Germany in the 20th century. This is done by simulating the distribution of education under different scenarios: a reference scenario in which all rates correspond to the empirically observed rates, a scenario that completely removes differential fertility, a scenario that completely removes inequality of educational opportunity, and a scenario that greatly increases the amount of differential fertility. The main finding is that the observed levels of inequality of educational opportunity and differential fertility are too small to result in a meaningful impact on the distribution of education in the subsequent generation. Both the first and the second scenario lead to only minor changes in the distribution of education compared with the reference scenario. However, in principle differential fertility could have a noticeable effect. This is illustrated by the results from the last scenario in which fertility of the lowest educated women is greatly increased. In such an extreme but not impossible society the average education would be considerably lower than in the reference scenario.

Keywords: Educational distribution; educational expansion; successive generations; differential fertility; educational inequality; West Germany; simulation

[1] University of Tübingen
[2] Radboud University, Nijmegen

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1. Introduction

In this article we investigate how demographic and social stratification processes in one cohort influence the distribution of education in subsequent cohorts.[*] In particular we are interested in the interaction of the following two processes: First, in many Western countries higher educated women tend to get fewer children, a process that is often referred to as differential fertility (Axinn and Barber 2001). Second, children from higher educated parents tend to attain higher levels of education, a process that is called Inequality of Educational Opportunity (IEO) (Breen and Jonsson 2005; Shavit and Blossfeld 1993). Together, these two processes should lead to a downward pressure on the average level of education. This mechanism is part of a recurring populist fear that some disadvantaged minority – for example the Irish, the Catholics, or the Muslims – is "out-breeding" the rest of the population, leading to a general decline of the society. Examples of this argument are Herrnstein and Murray (1994) or recently Sarrazin (2010).

While both differential fertility and IEO are well known – and for themselves well described – their joint impact on the education distribution has not been comprehensively studied. The empirical studies that exist mainly focus on the US case (Mare 1997; De La Croix and Doepke 2004) or developing countries (Mare and Maralani 2006). We follow a similar approach analyzing trends within the different societal context of West Germany. The West German case is interesting as it is known for high levels of inequality of educational opportunity (Breen, Luijkx, Müller and Pollak 2009b). So, if this mechanism is weak here, then it is probably weak everywhere else, too. The approach we follow is set apart from most other studies in social stratification research by taking a broader perspective on intergenerational social reproduction by combining fertility and inequality of educational opportunity. Rather than studying the conditional chances of education for particular cohorts of children, this approach investigates how the distribution of education in one generation is passed on to the next generation, which allows us to assess the relative contribution of various partial processes.

In the present article we address the following question: In how far is the educational distribution in successive generations affected by parental differential fertility and social inequalities in educational attainment? We analyze this question for the case of West Germany and focus on both a description of the proportions of persons in the different educational categories and the variability of that distribution. The article begins with a discussion of differential fertility and inequality of educational opportunity, followed by a description of the German context. After that the data and the methods are discussed. Then, the results are presented in detail. The article ends with conclusions.

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2. Differential fertility, educational chances and the composition of educational groups

2.1 Fertility differences between educational groups

A lot of empirical evidence exists on the negative relationship between education and fertility (Bongaarts 2003). From early descriptive and empirical studies (for example by Heron 1906; Pearl 1927) to the results from international comparative surveys that were conducted later, this finding has often been reproduced[3] (see Goldberg 1960; Duncan 1965; Bumpass 1969; Bongaarts 1978, 2003; Weinberger 1987; Martin 1995; Axinn and Barber 2001; United Nations 2004).

The explanations of this generally negative effect reach from (1) education directly influencing people's attitudes towards children and family size (Axinn and Barber 2001), as well as (2) people's norms, values and social roles (Kravdal and Rindfuss 2008), to (3) education influencing women's fertility behavior indirectly through related variables like labor force participation (Weinberger 1987), age at first marriage (Holsinger and Kasarda 1975) or use of contraceptives (United Nations 2004; Bongaarts 1978)[4]. Especially for women, having higher education leads to rising opportunity costs to having (several) children (Weinberger 1987). This is largely due to difficulties in combining career and family spheres (Kravdal and Rindfuss 2008). Fertility is normally postponed after people finished their educational careers (Kohler, Billari and Ortega 2002) because both education and raising children is time intensive. As a consequence, the time enrolled in education limits the time-span in which women are able to give birth to children. Furthermore better educated women are less likely to follow traditional fertility supporting role patterns, as they have better knowledge about other life course possibilities (Holsinger and Kasarda 1975; Rindfuss, Bumpass and St. John 1980) and about contraception (Martin 1995; United Nations 2004).

2.2 Reproduction of educational inequalities

As described in Breen and Jonsson's (2005) review of recent research on educational attainment and social mobility, the amount of literature on this topic is vast. The same is true for the number of theories which link chances of educational attainment with social origin[5] .

Empirically, there is strong evidence that children from higher educated parents are themselves more likely to attain higher levels of education, both as general result of international studies (Breen and Jonsson 2005; Breen, Luijkx, Müller and Pollak 2009a) and a finding for West Germany in particular (see Hillmert and Jacob 2003; Hillmert and Jacob 2010). There is however a discussion on whether these inequalities have remained constant over time or not (Shavit and Blossfeld 1993; Breen and Goldthorpe 1997; Pfeffer 2008; Breen, Luijkx, Müller and Pollak 2009b).

Various explanations have been proposed for this association. First, higher educated parents are more likely

[3] However, the effect of education on fertility is not the same in all societies. Under certain conditions this effect can even be positive (Kravdal and Rindfuss 2008). In some developing countries a U-shaped relationship has been found, but such conditions are hardly met in Western countries (Martin 1995).

[4] Overviews over the mechanisms through which education affects fertility are presented by Kasarda (1979) and Kravdal and Rindfuss (2008).

[5] Reviews of the development of social mobility research are also given by Ganzeboom, Treiman and Ultee (1991) and Treiman and Ganzeboom (2000).

to attain financial resources that can be used to pay for the education of their children. Education can be expensive not only because of direct costs (e.g., tuition, books or private tutoring) but also because of indirect costs (e.g., the forgone income from not working while in education). Financial resources may also be used to buy a supportive environment for the children's education, for example a home that is big enough so that all children have a quiet place where they can do their homework (De Graaf, de Graaf and Kraaykamp 2000; Murnane, Maynard and Ohls 1981). Second, higher educated parents are likely to have more cultural resources that can be used to help their children do well in school (Bourdieu 1973). These cultural resources lead the child to speak the "right" dialect or language, have a preference for (or at least familiarity with) high brow culture, and have "proper" manners. These characteristics can influence the educational success of the child, as they may be positively sanctioned by teachers, but also because they make school – especially on the higher levels – appear less alien, hence making it less likely that students self-select out of higher levels of education (Lareau 1987; De Graaf, de Graaf and Kraaykamp 2000). Third, children of higher educated parents are likely to aspire attaining higher levels of education, because they need those higher levels of education in order to avoid downward mobility, i.e. attaining less education than the parents (Breen and Goldthorpe 1997).

2.3 The German context

With respect to the context we focus on a description of the German educational system and two general trends: educational expansion and the baby boom in Germany.

The educational system in Germany is specific in a number of important respects[6]. First, an important feature of this system is its extensive vocational training system. Vocational training in Germany has traditionally been regarded as a strong alternative to higher education, as it prepares, and is required, for many different occupations, also on advanced levels. It may furthermore explain why – compared to other industrialized countries – only a relatively small proportion of a birth cohort enters tertiary education in Germany. At the same time the academic track is associated with a high degree of social selectivity (Mayer, Müller and Pollak 2007; Hillmert and Jacob 2010). Tertiary education takes comparatively long compared to other countries. At least until recently, German universities have often been regarded to be of equal quality (Schomburg 2000). Since the 1970s, tertiary education has followed essentially a two-tier model which differentiates between *Fachhochschulen* (polytechnic colleges) and universities. Differences regarding social selectivity have been found among students of universities and Fachhochschulen (Mayer, Müller and Pollak 2007).

Second, there is some variability between the German states ('Länder'). It is primarily the German states which are responsible for educational policy – though there are institutions to ensure cooperation and coordination between the different federal states (Führ 1997). The heterogeneity within the educational system is most obvious in the availability of certain school types during secondary education. However, the basic structures of the educational systems are standardized (Hillmert and Jacob 2010), and they have been relatively stable over time.

In Germany, four major parts of the educational system can be distinguished (Führ 1997): *Primary education* is compulsory for all German pupils ('Grundschule'). For *general secondary education* pupils are selected

[6] For a detailed historical overview on the development of the educational system in Germany see Führ (1997).

into different tracks. This stage is also compulsory for all pupils. The major tracks are: lower general secondary school (‘Hauptschule’), intermediate general secondary school (‘Realschule’), and upper general secondary school/grammar school (‘Gymnasium’). However, there are also some comprehensive schools (‘Gesamtschulen’) which combine different school tracks. After general secondary education (after nine to ten years of schooling) most students will enter some form of *vocational training*. Students within higher general secondary school can also choose to continue schooling in order to pass the ‘Abitur’ – which allows general access to the university or equivalents. In *tertiary education*, students who have attained an upper-level school leaving degree may start academic training at universities or ‘Fachhochschulen’.

Throughout this article, five levels of educational attainment will be distinguished:

– *'low'*: This category contains persons with lower or intermediate general secondary education (i.e., ‘Volks-/Hauptschule’ or ‘Realschule’) and no formal vocational training;

– *'lower voc'* consists of persons with lower-level general secondary education and non-academic vocational training;

– *'medium voc'* denotes a combination of intermediate general secondary qualifications and non-academic vocational training;

– *'high voc'* includes both persons with only upper general secondary school qualifications (‘Abitur’) and persons with a combination of upper general secondary schooling and non-academic vocational training;

– '*university*' contains all persons who have attained a tertiary degree.

Like most industrial countries, West Germany experienced a significant educational expansion. Figure 1 presents the development in the distribution of educational attainment for the cohorts born between 1925 and 1978 and separately for males and females. This distribution plays a double role in this article: On the one hand the female cohorts born between 1925 and 1945 are the “input”, that is, this is the educational distribution of the (potential) mothers. On the other hand the cohorts born since 1940[7] are the “output”, that is, the distribution of the education of the subsequent generation, which is the phenomenon we want to explain.

- Figure 1 here -

The main development for the cohorts of (potential) mothers happened among the low educated. Slightly more than 55% of the women born in 1925 ended up with low education as their highest achieved level of education. This proportion increased to about 65% for the women born in 1930, and then quickly decreased to about 30% for women born in 1945. The initial increase corresponds to the cohorts that received their education during the (pre-War) Nazi period. Especially women were affected as higher education for women was regarded by the regime as distracting women from their ‘natural tasks’ of bearing and caring for children (Herrlitz, Hopf, Titze, and Cloer 2005; Bock 1983). The cohorts born after 1930 have followed the general

[7] Throughout this article we will assume that women are fertile between the ages 15 till 45, so 1940 is the earliest year in which a child could be born.

pattern found in most industrialized nations, which is that the gap in attained education between men and women has rapidly decreased (Hout and DiPrete 2006). The decrease in the proportion of women with lower education was mainly compensated by an increase in the proportion of women with lower and middle vocational education.

Educational expansion continued during the next generation, but was now mainly driven by an increase in the proportion of people with Abitur. Only 8% of the women born in 1940 and 18% of the men born in 1940 had Abitur. These percentages increased to 45% for both men and women born in 1977. An interesting aspect of that increase is that, even though Abitur gives access to university, a substantial proportion of students combined Abitur with vocational education. For the cohort born in 1977, 36% of the men with Abitur and 41% of the women with Abitur attained a vocational degree[8]. This development reflects the strong alternative to higher education that is provided by vocational training in Germany.

The cohorts of (potential) mothers used in this article are also special with respect to their fertility: these are the mothers of the "baby-boomers". This can be seen in Figure 2. It shows low fertility in the oldest cohorts, (by German standards) exceptionally high fertility in the cohorts born around 1935, and the return to low fertility in the youngest cohorts. Even though the total fertility of the oldest and youngest cohorts is approximately the same, there are still substantial differences between these cohorts, as can be seen in Figure 3. The oldest cohort postponed fertility as they started their fertile years during the Second World War and the subsequent uncertain period following it. The cohorts born around 1935 were responsible for producing the exceptional 'baby-boom'. Two important factors explaining this were the positive economic development ('economic boom') improving families' economic situation and allowing for more children and the increasing marriage rates that were also supported by the economic boom (Bean 1983; Sprague 1988; Glass 1968). Full employment, together with increasing wages for males (Sprague 1988), lead to a situation in which it was easier for women to become homemakers[9]. Combined with a younger age at first marriage – and marriage becoming more universal – this development supported higher fertility rates as women were much earlier in their life course and longer exposed to a period of potential childbearing (Bean 1983; Glass 1968) while following traditional role models (Lesthaeghe & Surkyn 1988). The youngest cohort of women again got their children earlier, but at the same time stopped earlier. The net effect of this was the so-called "baby bust". Reasons for this phenomenon were the increasing women's labor force participation, combined with changing norms towards individualism and liberalization, and the availability of improved contraceptives allowing for better fertility control (Watkins 1987).

- Figure 2 here -

[8] This difference between men and women reflects a disadvantage for men in this cohort, as it is caused by the higher proportion of men with only Abitur and no further degree (10% for men and 5% for women).

[9] It has to be acknowledged that female labor force participation increased continuously in Western-Germany in the post-war period; due to the rebuild efforts in Germany and probably the shortage of male workforce (Alwin, Braun & Scott 1992: 14). In most cases, women working was also approved; with the exception when there were small children (until school age) in the family (Alwin, Braun & Scott 1992: 18-19).

- Figure 3 here -

3. Data and methods

The challenge with the research question of this article is that it requires data on a cohort of women and the education of their offspring, while the typical design for most surveys in Germany is to take a cohort of offspring and collect information on the education of their parents. The way we solve this problem is to create a simulated dataset based on empirical data. The simplest form of such a simulated dataset would be to estimate from the empirical data the distribution of education of women, the fertility of women conditional on education and education of the offspring conditional on the education of the mother. The simulation would start by creating a dataset of women, assign them an education based on the empirical proportions, assign them children conditional on their education based on the empirical fertility rates, and assign the children an education based on the empirical conditional probabilities. The actual simulation is a bit more complicated as it also includes the father and his education and the effect of the number of siblings on the education of the offspring.

The role of empirical data in this form of analysis is that they are used to create a set of tables of conditional probabilities, which are then used as input for the simulation. In this article we use a combined dataset created out of 14 different surveys in West Germany (see table 1). The relevant information was harmonized among all of the datasets and combined. As we are only interested in people who have already finished their educational career, we dropped the information for respondents who were younger than 30 years. In order to reduce the effect of selective mortality, the same applies to persons older than 75 years.

- Table 1 here -

This data is used to create the following four tables of conditional probabilities:

1) The distribution of education of women conditional on cohort
2) The probability of giving birth in a year conditional on cohort, age and education
3) The probability of a women having a partner with a given education conditional on cohort and education
4) The probability of a child attaining a given education conditional on father's and mother's education, the number of siblings and the child's year of birth

Notice that in this model the father' characteristics play a role in influencing the child's education, but fertility decisions are only influenced by the characteristics of the (potential) mother. The main reason for that were data limitations. Table 2 gives an overview over the different statistical models that were used for estimating these conditional probabilities. The simulation model will later combine these empirical conditional probabilities into a new simulated dataset that will represent a sample of women and the education of their offspring.

- Table 2 here -

To evaluate the effect of differential fertility as well as educational inequality, we compare simulated distributions of education in different scenarios. The simulation based on the observed associations in the different model parts is used as the reference. We compare it with three counter-factional scenarios: C1 – a scenario without differential fertility, C2 – a scenario without educational inequality, and C3 – a scenario with greatly increased differences in fertility.
We will look at both the distribution of education and a measure of the variability in that distribution, the entropy.

4. Results

4.1. Differential fertility and IEO

The two key mechanisms we use for explaining the distribution of education in the subsequent generation are Inequality of Educational Opportunity and differential fertility. The empirical estimates of these phenomena and their trends are shown in figures 4 and 5, respectively. These estimates will in turn be used as the key inputs for our simulation study.

- Figures 4 and 5 here -

Figure 4 shows how the education of the offspring depends on the education of the mother. One can see that for each educational category the probability of attaining that category tends to be highest for children with mothers who have attained education in the same category. For example, children of mothers with only basic education are more likely to attain only basic education compared with children of mothers with any other level of education.

Figure 5 shows how the expected number of children a woman has depends on her education. The general pattern in this figure is that higher educated women tend to have fewer children. Especially Low education stands out in this respect. In all cohort women with only basic education had by far the highest average number of children. This is important because within the cohorts that are studied about half the women fall into that category.

4.2 Consequences of differential fertility and IEO on the distribution of education

To study the impact of both differential fertility and educational inequality on the development of the educational distribution, we run a simulation model including various counter-factual scenarios. Figure 6 presents summary statistics for the distribution of children's education in the different scenarios. It shows the mean level of education based on a scaling of education that assigns basic education a value of 1, lower vocational education a value of 2, etc. The variability of the distribution is represented by the entropy. Since education is measured in 5 categories, the variability is maximal if each category contains 20% of the children, leading to an entropy of 2.32[10].

[10] $5 \times -0.2 \times \log_2(0.2)$

- Figure 6 here -

As expected, both the average level of education and the variability of the distribution increase over time. The latter is mainly due to the decrease in primary education. There was little variability among the children of the oldest cohort of (potential) mothers, because nearly half of them ended up in low education. This proportion has declined to about 30% among the children of the youngest cohort of (potential) mothers, thus leaving much more room for children to differ from one another. However, the main finding is that reducing either differential fertility or IEO would have only a minor impact on the distribution of education in the subsequent generation. As expected, decreasing differential fertility or IEO would increase the average level of education and the variability of the distribution, but only by a small amount. This means that the empirical levels of differential fertility and IEO have not been large enough to have a meaningful impact on the distribution of education in the next generation. It is not impossible for phenomena like differential fertility to have an impact on this distribution, but this would require extreme differences within a society. The final scenario is an example of such a society. In this scenario, the fertility rate of women with basic education is doubled. Basic education was still a fairly common educational category for the cohorts that are being studied here. The consequence of a doubling of the fertility rate is that women in this category would have on average between 4 and 5 children while all other women on average only between 1.5 and 2 children. None of these numbers are impossible by global standards, but they do represent rather extreme differences within a society. However, this scenario illustrates that in principle very high fertility among a sizable group of disadvantaged women can noticeably lower the average level of education in the subsequent generation.

- Figure 7 here -

Finally, figure 7 gives a more detailed representation of the distribution of education in the different scenarios. Interesting here is that removing the mechanism of IEO tends to increase the average level of education mainly by reducing the proportion of children with low education and by increasing the proportions of children with lower and middle vocational education, while removing the mechanism of differential fertility increases the average level of education both through decreasing the proportion of children with low education and increasing the proportions of children in the ‘higher vocational’ and ‘university’ categories. Comparing the empirical trend with the counterfactual scenarios suggests that in the German context IEO primarily reduces the average level of education by increasing the proportion of students with Low education. This is an indication that it is the disadvantage faced by people with parents with low education that had the strongest effect on the distribution of education. The influence of differential fertility appears to be more balanced over the educational categories. Both the increase in the proportion of disadvantaged children and the decrease in the proportion of advantaged children caused by differential fertility seems to influence the distribution of education.

5. Conclusion

This article started with the question: In how far is the educational distribution in successive generations affected by parental differential fertility and social inequalities in educational attainment? The idea was that there are two well known empirical regularities: First, lower educated parents tend to have more children than higher educated parents. Second, the children of lower educated parents tend to attain lower levels of education than the children of higher educated parents. Taken together these two regularities should result in a downward pressure on the average level of education. The aim of this article has been to quantify this downward pressure. The quantification was done by simulating the distribution of education for the children of different cohorts of mothers, using various empirical and counter-factual scenarios.

Our main finding is that the observed levels of both inequality of educational opportunity and differential fertility are too small to result in a meaningful impact on the distribution of education in the subsequent generation. The first counter-factual scenario that completely removes inequality of educational opportunities leads to only minor changes in the distribution of education, and the same applies to the second scenario that completely removes the mechanism of differential fertility. However, differential fertility can in principle have a noticeable effect. This was illustrated by the results from a third counter-factual scenario in which the amount of differential fertility was greatly increased. In that case, the average level of education would be considerable lower than in the scenario based on the empirically observed rates. Societal conditions of that kind are certainly extreme – but not impossible.

The implication of this study is that speculations by Herrnstein and Murray (1994) and Sarrazin (2010) concerning the demise of countries due to excess fertility of disadvantaged groups are grossly exaggerated. The mechanism does exist, but its effect is so small that it has little practical relevance. This mechanism is just too weak to lead to major changes in a society. The main reason for that is that this is an indirect effect, a combination of IEO and differential fertility. The difficulty with that is that there is a lot of “leakage” when combining two effects. So even though the effects of IEO and differential fertility are, by social science standards, large, their combined influence on the distribution of education is small.

Future directions for this type of study include comparing these developments among different countries in order to see if these findings are specific to the West German case. Another direction for research is to investigate the effects of other demographic processes like social homogamy. This mechanism is likely to increase educational inequality as children with two highly educated parents have a “double advantage” while people with two parents with low education suffer a “double disadvantage”.

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Table 1: Datasets used for the analysis (data on West Germany)

No.	Name	Year/waves	Sample design	N (full sample)	N (used for analysis)
01	Allbus *(combined file)*	1982-2008	ADM sample design, Random sample	51.416	28.725
02	Das sexuelle Verhalten des Mannes/der Frau	1970, 1973	Multi-stage stratified random sample	4.577	3.332
03	German Alterssurvey	1996, 1998 and 2001/02	Stratified random sample	7.922	3.221
04	German Familiensurvey	1988, 1994 and 2000	ADM sample design, Random sample	18.441	12.302
05	International Social Justice Project	1996 and 2000	ADM sample design	4.865	3.540
06	Life History Study	1981/83, 1985/86, 1987/88, 1989, 1998/99	ADM sample design, Stratified random sample	7.922	6.298
07	Lebensführung älterer Menschen	1993	Quota-sample	4.130	2.195
08	Microcensus	1996, 2000, 2004 and 2008	Stratified cluster sampling	1.996.699	953.629
09	Microcensus trend file	1978, 1982, 1987 and 1991	Stratified cluster sampling	1.726.595	820.846
10	Pairfam	2008	Multi-stage-random-sample	12.402	2.806
11	Politische Ideologie II	1990 and 1991	Multi-stage stratified random sample	3.007	2.323
12	Volks- und Berufszählung	1970 and 1987	Stratified cluster sampling	9.354.012	4.800.225
13	Wohlfahrtssurvey	1978 and 1998	Multi-stage stratified random sample	5.054	3.003
14	ZUMA Standard Demographie	1976 – 1982 (excluding surveys already listed)	Multi-stage stratified random sample	16.010	11.990

Table 2: Overview over the statistical models applied

Model part	Statistical model to derive probabilities	Dependent variable	Independent variables	Comments
Respondent's (i.e., mother's) education	Row percentages of the conditional tables	Respondent's education	Year of birth	
Partner existent?	Row percentages of the conditional tables	Indicator variable of having a partner	Year of birth, respondent's education	
Partner's education	Multinomial logit model	Partner's education	Year of birth, respondent's education	Year of birth included in form of cubic splines
Fertility behavior	Binary logit model	Indicator of giving birth	Respondent's age and education, separately by each year of birth	Respondent's age included in form of cubic splines, raked weights (distribution of education and age-specific fertility rates corresponds with the population)
Children's education	Multinomial and binary logit models (transition models)	Children's education	Year of birth, respondent's education, (her) partner's education	

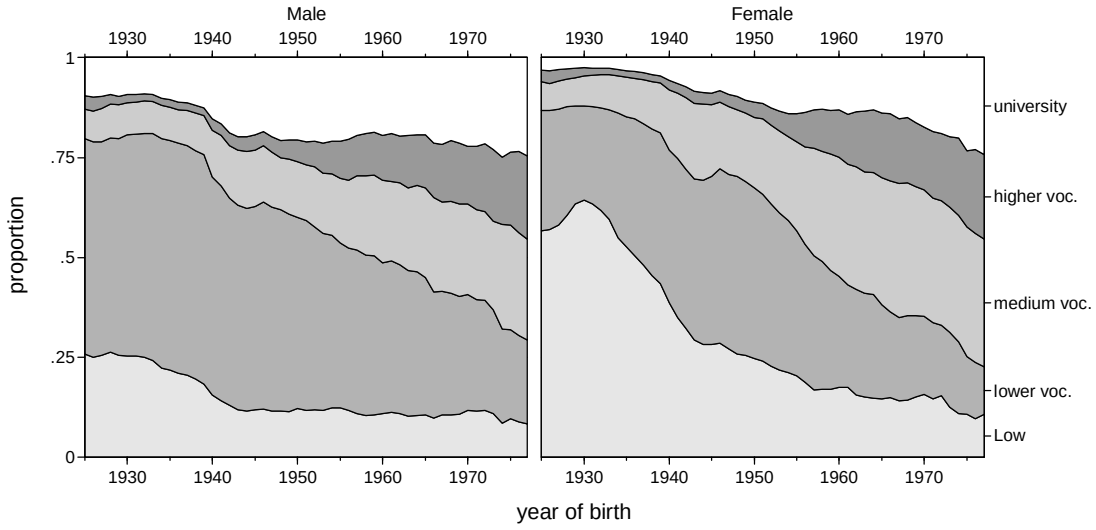

Figure 1: Educational attainment, by birth cohort

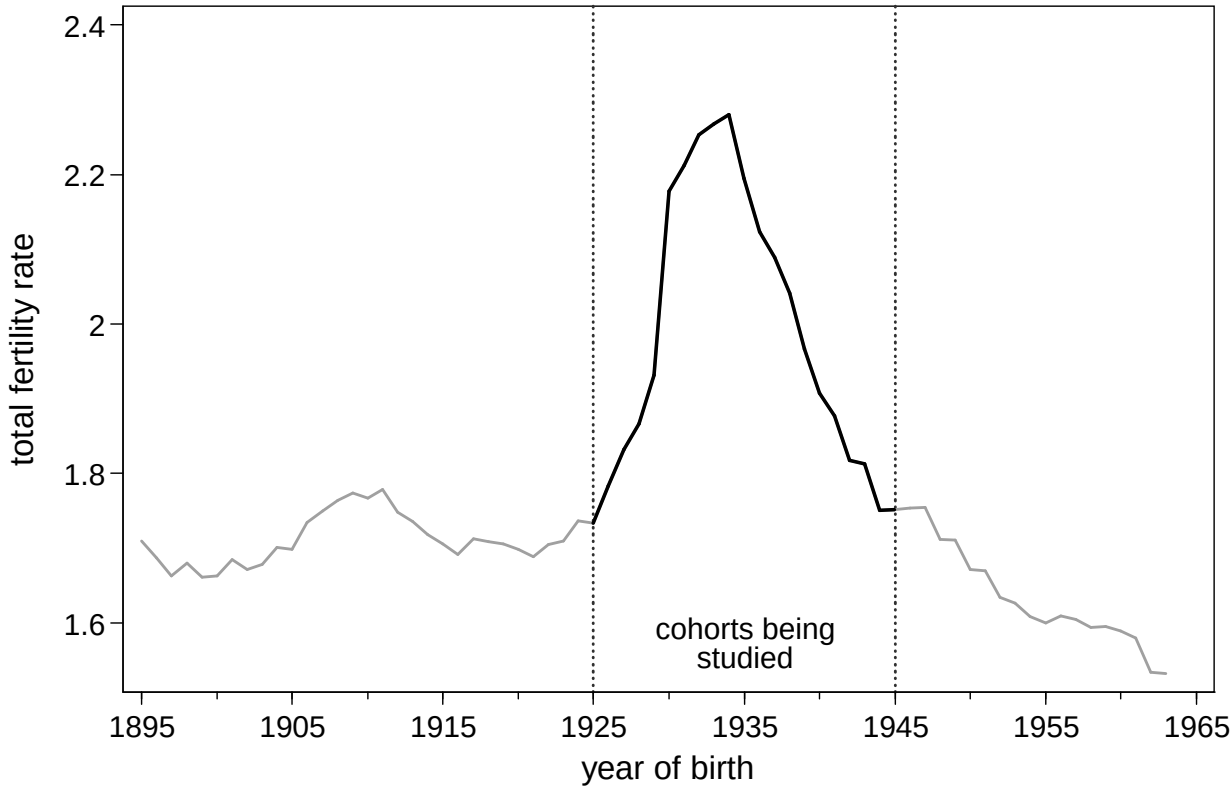

Figure 2: Average number of children (Total fertility rate) by cohort

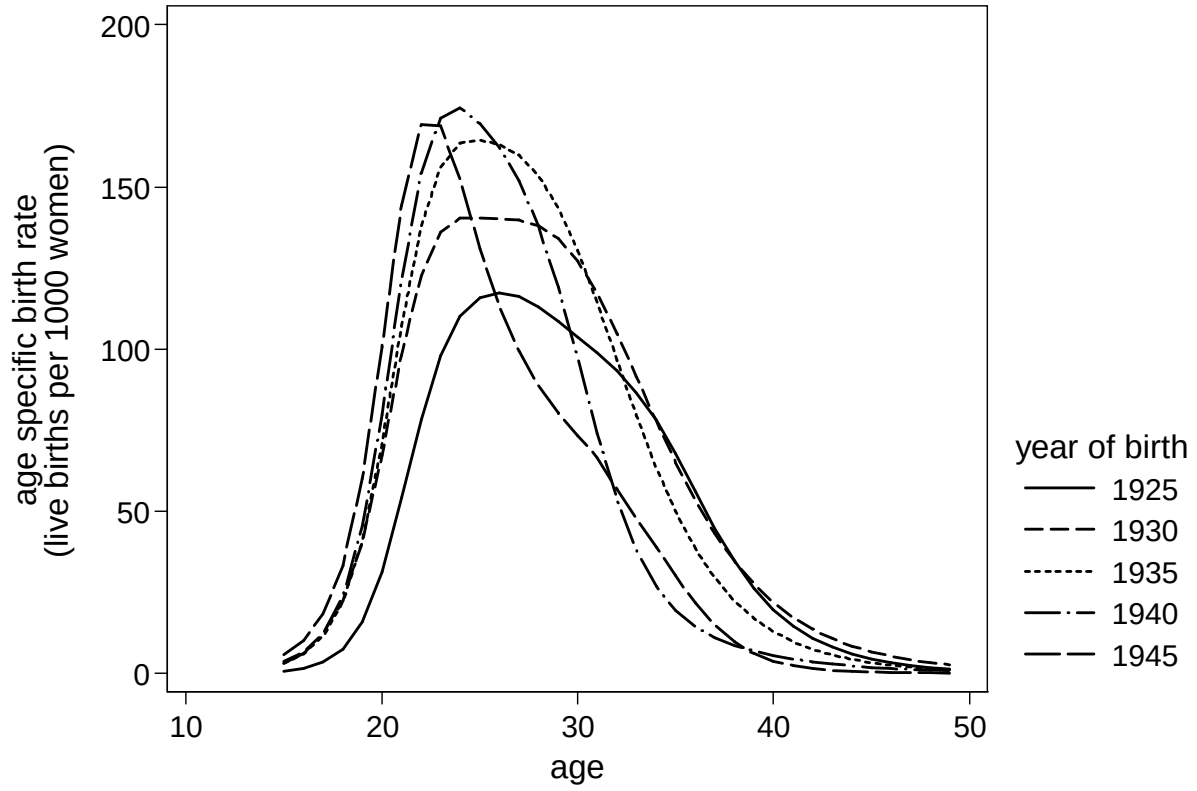

Figure 3: Age specific birth rates for different cohorts

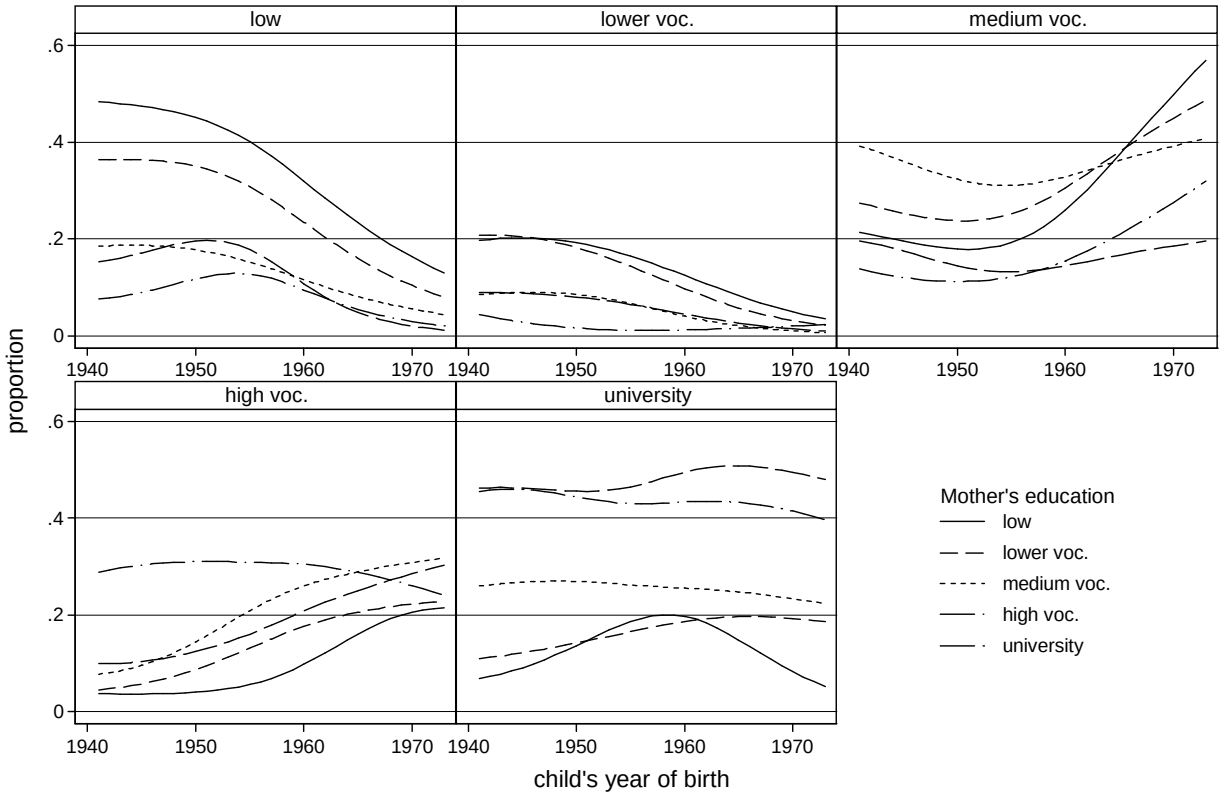

Figure 4: Proportion in each level of education conditional on mother's education (father's education = middle voc., women, 1-2 siblings)

Figure 5: Average number of children (Total fertility rate) by education and birth cohort

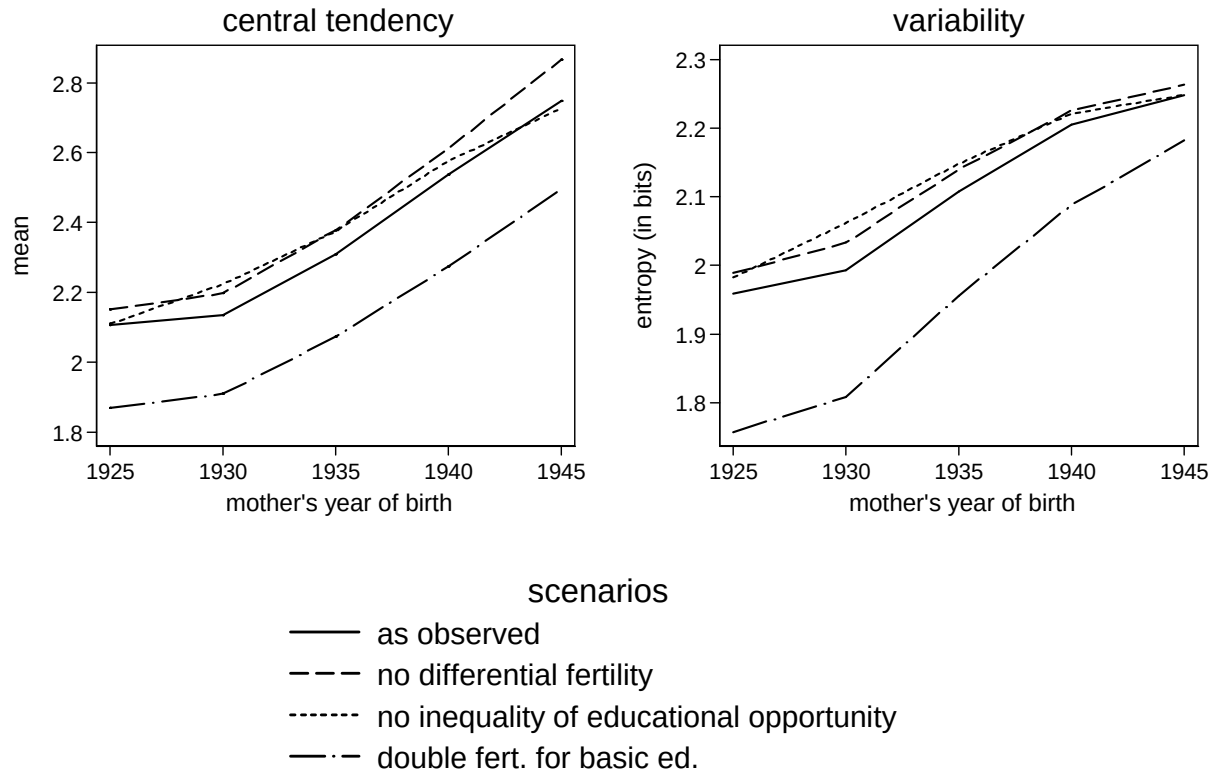

Figure 6: Trends in central tendency and variability in the distribution of education under different scenarios

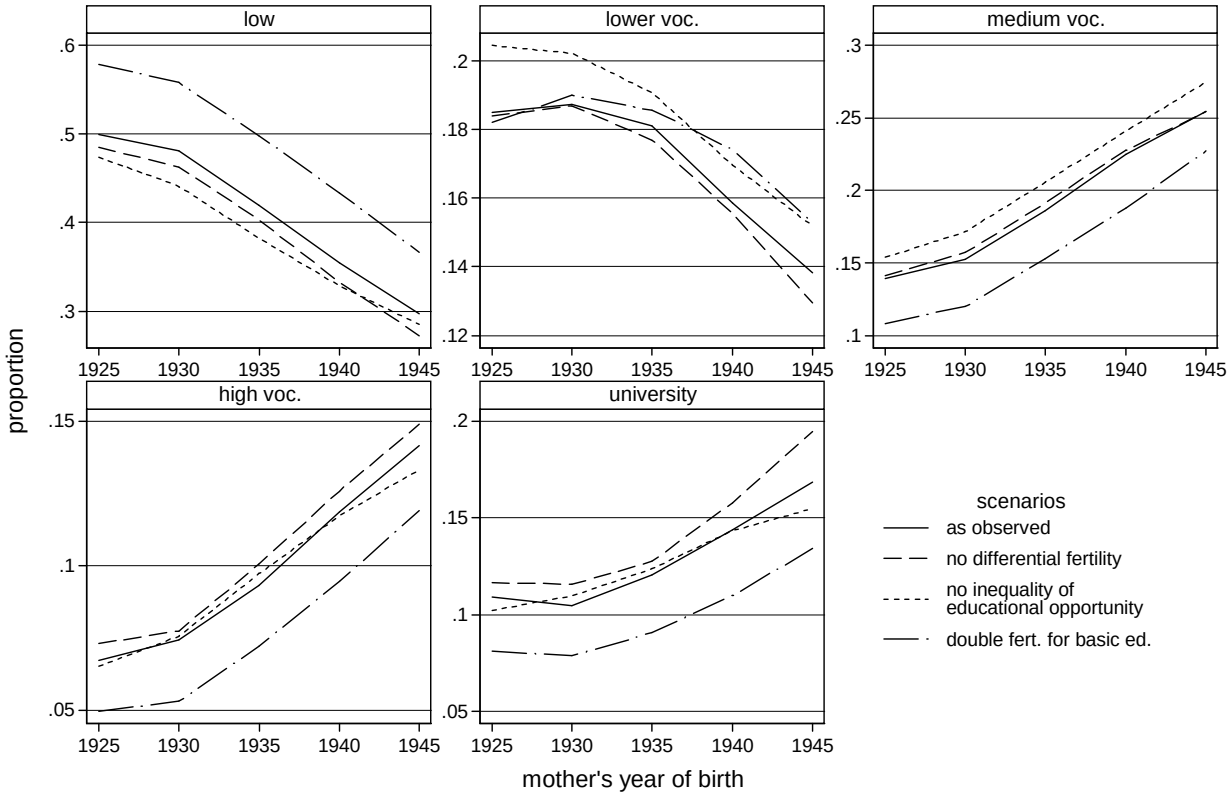

Figure 7: Trends in the distribution of educational attainment under different scenarios