

Educational Expansion and Inequalities in Educational Opportunity: Long-Term Changes for East and West Germany

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Abstract

Using data on successive birth cohorts from the German Life History Study and the National Educational Panel Study, we analyse how the process of educational attainment of men and women from different educational origins has changed in the long run. Our results show that educational inequality is strongly declining at the first transition to upper secondary education across cohorts. However, it is constant or even slightly increasing at the transition to the traditional university. In addition, there are no origin-specific differences in the transition to university of applied science graduation. In other words, there is no unidirectional trend of change in inequalities of educational opportunities across all transitions.

Introduction

As most industrialized societies, Germany has experienced an enormous expansion of its secondary school and training system since World War II (Schneider, 1982; Blossfeld, 1985, 1989; Müller and Karle, 1993; Becker, 2003; Mayer *et al.*, 2009; Breen *et al.*, 2009, 2010; Hadjar and Berger, 2010; Becker and Müller, 2011; von Below *et al.*, 2013). In this process, many educational reforms have been implemented in the traditional German tripartite school system. In several of the Federal States (the ‘Bundesländer’) orientation stages (‘Orientierungsstufen’) were implemented at grades 5 and 6 to reduce the importance of early rigid selection (Tillmann, 2012). Some more inclusive comprehensive schools (‘Gesamtschulen’) were created, but they have been very controversial and did not really change the German tracking system (Tillmann, 2012). Compulsory

schooling was extended from 8 to 9 years, and in some Federal States even to 10 years of schooling. In various Federal States, the lower secondary school (‘Hauptschule’) and the middle school (‘Realschule’) were merged into one track, so that the resulting school system was partially transformed into a two-partite system (Tillmann, 2012). After German unification, the East German Federal States continued to have a bipartite school system (Riphahn and Trübswetter, 2011). Dead-end educational pathways such as vocational training were opened up by the creation of multiple new alternative routes to higher education such as ‘Fachoberschulen’, ‘Berufsoberschulen’, ‘Berufsfachschulen’, ‘Berufskollegs’, ‘Abendschulen’, ‘Technische Oberschulen’, ‘Fachakademien des öffentlichen Dienstes’, and ‘Berufsakademien’ each rewarding individuals’ vocational and work experiences (Schindler, 2013).

Since 2009, access to university was completely opened up to all students who have acquired vocational training and at least 3 years of work experience (Duong and Püttmann, 2014). At the same time, the proportion of students with traditional ‘Abitur’ who completed vocational training has steeply risen (see Jacob and Solga, in this volume). Altogether these reforms fundamentally changed the character of the old sharp divisions between academic and vocational/technical tracks in the German secondary school system and increased the proportion of young people in West and East Germany who have completed at least upper secondary education (Hillmert and Jacob, 2003; Becker and Hecken, 2009; Mayer and Schulze 2009; Becker *et al.*, 2010; Walden and Troltsch, 2011; Powell *et al.*, 2012; Solga and Becker, 2012).

Yet, not only the secondary school system has been transformed, but also the landscape of higher education has significantly changed in Germany. Until the 1970s, West German higher education mostly followed the completion of a gymnasium and the universities offered academic programs for the brightest and most affluent students. In the German Democratic Republic (GDR), admission to higher education was restricted (Rudder, 1997: p. 103; Riphahn and Trübswetter, 2011: p. 8; von Below *et al.*, 2013: p. 365). Today, more than 20 years after the German unification, more than 20% of the freshmen entering tertiary education do not come from the traditional gymnasium anymore but arrive via a great variety of alternative pathways in the secondary school system (Lörz, 2013; Scheller *et al.*, 2013). Thus, in the past four decades not only the participation rate in higher education has been quickly expanding in Germany but also the heterogeneity of college students has risen (Hillmert and Jacob, 2003; Maaz, 2006; Becker, 2009; Reimer and Pollak, 2010; Solga and Becker, 2012; Scheller *et al.*, 2013; see Jacob and Solga, in this volume). This development has been paralleled by an increasing vertical and horizontal differentiation of the institutions of higher education (e.g., by the expansion and creation of universities of applied science such as ‘Fachhochschulen’, ‘Berufsakademien’, and ‘Duale Hochschulen’). Finally, based on the ‘Bologna treaty’ (Powell *et al.*, 2012), new hierarchical tertiary degrees such as the Bachelor and Master were introduced into the German system of higher education (Heine, 2012).

Combining data on successive birth cohorts from the German Life History Study (GLHS) and the National Educational Panel Study (NEPS), we analyse how the process of educational attainment of men and women whose parents have different educational resources has changed in the long run. Compared with earlier research on this topic (Breen *et al.*, 2009, 2010), we study the

different mechanisms at work in the process of the universalization of upper secondary education and the expansion of higher education. We therefore estimate the so-called Mare model for the educational attainment process (Mare, 1981). Tracing the birth cohorts from 1919–1921 to 1978–1980 in West and East Germany, we are particularly interested to find out which of the educational origin groups could profit most from the additional opportunities provided by the expansion of educational transitions. Thus, compared with earlier work (see Klein *et al.*, 2009; Neugebauer *et al.*, 2013), our research covers an extraordinarily long historical period for West and East Germany. Finally, in comparison with former research, we distinguish at the transition to the tertiary level between completing university of applied science and traditional university.

The Processual Character of Educational Attainment over the Life Course

Given the increasing complexity and multitude of educational pathways in modern German secondary and tertiary education, one should ideally follow up successive cohorts of students through the great variety of trajectories in the changing educational system over time (Breen and Jonsson, 2000). This kind of follow-up analysis, however, required a large-scale longitudinal data set and can be achieved in some years based on the *prospective panels* of the NEPS Starting Cohorts 3, 4, and 5, which follow students up over longer time spans and collect detailed educational participation information in addition to competence measures. In this article, however, we only use *small retrospective cohort samples* from the GLHS (see the introduction to this special ESR issue by Mayer) and the NEPS adult cohort (Starting Cohort 6). The combination of these two databases allows us to analyse the educational attainment process over a historical period of more than 90 years. From the GLHS, we use data from the birth cohorts 1919–1921, 1929–1931, and 1939–1941 and from the NEPS adult cohort we include the birth cohorts 1947–1952, 1953–1957, 1958–1962, 1963–1967, 1968–1972, 1973–1977, and 1978–1980. From these cohorts, we only include German natives¹ who are older than 30 years to make sure that they have completed their first highest educational attainment. Based on the combined data set and using the ISCED classification (UNESCO, 2012), we concentrate our analysis on the broader educational attainment levels such as lower secondary education, upper secondary education, and graduation from university of applied science as well as traditional university. In Germany, primary and lower secondary education

have been attained by practically all students for many decades. Thus, the transitions between these two attainment levels are not included in our analysis.

An analysis of individual's or cohort's highest educational attainment level per se would abstract from the processual character of the educational attainment in the life course (Mare, 1981; Mayer, 1990). Education occurs over a number of years, and individuals and families make a sequence of decisions to continue or to drop out. The most important conceptual point here is that successive educational transitions between educational attainment levels have a different meaning for various origin families. Based on the status maintenance hypothesis (Breen and Goldthorpe, 1997), families have different minimum aspiration levels for their children's educational attainment. Hence, we expect that children from parents with upper secondary and tertiary education are more similar in their probabilities at the transition from lower secondary to upper secondary education because parents of both families want at least an upper secondary degree for their children. At the same time, we expect a greater gap in the transition probabilities to tertiary education between children from families with lower secondary and upper secondary education on the one hand and children from families with tertiary education on the other hand, because parents with tertiary education want their children to attain at least a degree of higher education too.

The expansion of the transition from lower secondary to upper secondary education is also based on a broad political consensus in Germany. The integration of lower social classes and migrants through better education into the dominant value system and the labour market is consistent with the rising qualification needs in the modern economy. This kind of integration into the educational system is also in agreement with the demands of the disadvantaged groups for more education (Shavit and Blossfeld, 1993). Thus, not only lower secondary but also upper secondary schooling can be expected to become *universal and therefore increasingly independent of social background*. At the same time, however, the middle class in the German society seeks to preserve the certificate-based selection and allocation in the academic job market. Thus, there is less political consensus with regard to the expansion of higher education; if new opportunities in higher education are created, it should be particularly the children from the dominant social groups who profit from them. In other words, the social meaning of the successive educational transitions in the life course and the mechanisms that determine the educational demands at different successive transitions vary for the origin families.

The relevant educational attainment levels² of the respondents in our empirical analysis are $Y = 1$ (lower secondary educational attainment), $Y = 2$ (upper secondary educational attainment), $Y = 3a$ (university of applied science graduation), and $Y = 3b$ (traditional university graduation). Thus, in our two-stage nested transition model (Mare, 1981), we are interested in the following three transitions: the transition from lower secondary educational attainment ($Y \geq 1$) to upper secondary educational attainment or tertiary education graduation ($Y \geq 2$) and from upper secondary educational attainment ($Y \geq 2$) to university of applied science graduation ($Y = 3a$) or university graduation ($Y = 3b$) (which are considered here as competing risks):

$$\Pr(Y \geq 2 \mid Y \geq 1) = \Pr(Y \geq 2) \quad (1)$$

and

$$\Pr(Y = 3a \mid Y \geq 2) \quad (2a)$$

or

$$\Pr(Y = 3b \mid Y \geq 2) \quad (2b)$$

In other words, in our analysis we are aggregating only *successful* school continuation transitions of individuals *in terms of stepwise educational attainments* for each cohort. If a student continues his/her educational career but does not complete the next educational attainment level, he/she counts as someone who did not make the transition. He/she is considered to be a drop-out with the lower educational attainment level. The focus on successful transitions is based on the importance of formal qualifications or certifications (diplomas, professional licenses, or academic degrees) in the German labour market [see signalling (Spence, 1973) and credential theory (Collins, 1979)].

Theoretical Models and Explanations

Parent's Education as the Key Variable for Children's Educational Attainment Process

Empirical studies have considered different resources of social origin for children's inequality of educational opportunity. They have analysed the importance of parental prestige (e.g., SIOPS, see Treiman, 1977), socioeconomic status (e.g., Magnitude Prestige Scale (MPS), see Wegener, 1988; ISEI, see Ganzeboom *et al.*, 1992; CAMSIS, see Prandy, 2000), social class (e.g., EGP class schema, Erikson *et al.*, 1979; Erikson and Goldthorpe, 1992; Bukodi and Goldthorpe, 2012) and education. More recent studies demonstrate that in relative terms, parents' education is the most powerful social origin

factor in the educational attainment process in modern societies (Ermisch and Francesconi, 2001; Mayer *et al.*, 2009; Bukodi and Goldthorpe, 2012; Buis, 2013; Baker, 2014). This is because families' economic obstacles for education, in particular for children from less advantaged families, have been strongly reduced by the improving economic living conditions over the last decades (Erikson and Jonsson, 1996a; Breen *et al.*, 2009) and the declining average family size (Blake, 1989). Breen *et al.* (2009) also point out that the relative economic costs of education strongly declined through the lengthening of minimum school duration.

Figure 1 traces out the implications of a set of causal mechanisms generating the associations between parental education and children's opportunities at successive educational transitions. Given the retrospective data from the GLHS and the NEPS, we limit our empirical analysis to the *total effect of parental education* on the educational transitions (shown as solid lines in Figure 1) rather than its various indirect effects mediated by different life course processes (shown as dashed lines in Figure 1). Because the background characteristics of parental class, occupational status, and income are causally and temporally subsequent to parent's educational attainment, the results of our approach reflect also these influences of parental education (Pfeffer, 2008: p. 544).

Mechanisms of Social Origin over the Educational Career

Based on the current state of educational research, our model in Figure 1 distinguishes four types of indirect effects of parental education on children's success at the two successive educational transitions: the primary effect I mediated by cognitive skills, the primary effect II mediated by noncognitive skills, the secondary effect mediated by educational choices, and the tertiary effect mediated by teachers and schools as 'middle class' institutions.

Inequalities in cognitive abilities generated in a child's formative years by differences in family background are often referred to as the primary effect of social origin on school success (see Boudon, 1974). The power of cognitive skills in predicting educational success in school and later in adult life is well documented in the literature (Almlund *et al.*, 2011). This effect is strongly determined by parents' educational resources because parents are the major agents shaping primary and, to a large extent, also secondary socialization processes. Their education is assumed to have a strong influence on the everyday life interactions with children, the parental nurturance of offspring, and the level of cognitive stimulation that is provided in the home environment. Better-educated parents are also more able to support their children in school by parental tutoring and homework assistance

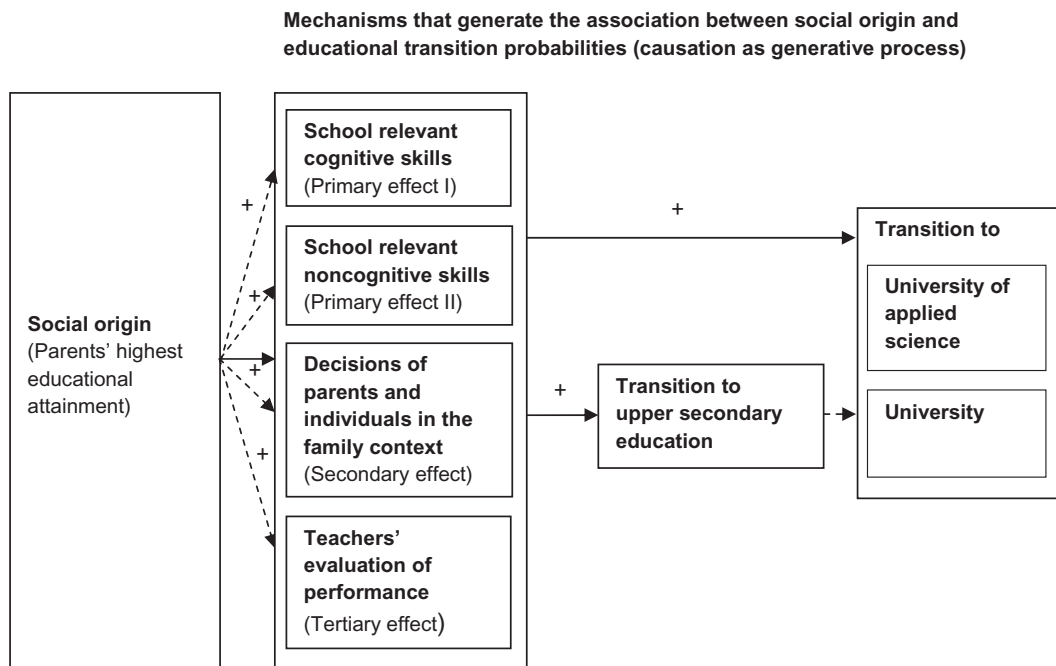


Figure 1. Causal model of the effects of parental education on educational transitions

Source: Authors' presentation.

(Pfeffer, 2008). Thus, the first theoretical assumption of our empirical analysis is that the higher the parental education, the higher the average academic achievement of children in school and the higher the transition probabilities from one educational level to the next in the educational system (see primary effect I in Figure 1).

Success at the various educational transitions is also determined by *noncognitive skills* (see primary effect II in Figure 1). In psychology, noncognitive skills are seen as personality variables such as metacompetencies, self-concept, self-direction, self-regulation, and social competences (Weinert *et al.*, 2011). Parent's education plays an absolutely central role for the development of children's noncognitive skills (Kohn and Slomczynski, 1990; Carneiro and Heckman, 2005; Almlund *et al.*, 2011). Parents can influence children's goals and perceptions as well as their self-concepts and choice options through information and experiences they provide or they can act as role models that shape children's view of how to behave in certain situations (Schoon and Eccles, 2014: p. 49). Children from higher educated families will also profit from a stronger academic climate at home. Over the life course, noncognitive skills become also increasingly important as students age and are forced to make own decisions and to regulate their own learning behaviour. Thus, the second theoretical assumption of our analysis is that the higher the parental education, the more they foster noncognitive skills supporting academic achievement of children in school and university and the higher the transition probabilities from one educational attainment level to the next (see Figure 1).

Children's educational attainment is also strongly affected by the so-called *secondary effect of social origin* (see Boudon, 1974) (see Figure 1). The secondary effect means that, even if we hold children's cognitive abilities constant, families with higher educational resources make different educational choices at the various educational transitions. They make cost-benefit considerations when they decide whether to give their children a better educational opportunity. The (subjectively) expected costs for higher educational transitions are higher for families with lower educational resources and the utilities and (subjective) success probabilities are lower for parents with lower educational resources (Boudon, 1974). Typically, families of lower educational origin value future higher educational attainment levels less (higher time preferences) and they opt also less for academically more challenging but economically more rewarding academic tracks (higher risk aversion) (Erikson and Jonsson, 1996b; Breen *et al.*, 2014).

Educated parents have also a better knowledge about the educational system and they have own experiences

with more demanding educational pathways (see Erikson and Jonsson, 1996b; Lucas, 1999). Hence, they are better able to consult, guide, and manoeuvre their children through the upper parts of the school system and the university. Their knowledge about the requirements and academic demands of the educational institutions will help them to reduce the uncertainty of educational decision making.

The status maintenance mechanism, described by Breen and Goldthorpe (1997: p. 283) for social class, should also be an important mechanism for the intergenerational transmission of educational attainment levels. Parents want their children to attain at least the same level of education they have achieved on their own. If children move down relative to their parents in terms of educational attainment, these losses loom larger (and are painful for families) than similar gains in educational attainment (Kahneman and Tversky, 1979). Thus, differently educated parents have varying minimum aspiration levels right from the beginning so that families do not consider children's absolute educational outcomes but they focus on the outcomes relative to their own educational degree.

Finally, our theoretical model in Figure 1 shows that parents' educational attainment levels are expected to have an impact on the probability of educational transitions via the *evaluations of students' performance by teachers and educational institutions*. There is plenty of empirical evidence that children from higher social origins—even if they have the same academic achievement levels or the same marks in school as children from lower educated families (see e.g., Dollmann, 2011)—get teachers' recommendations for demanding educational institutions more easily or have a higher probability to get admitted as a student by the next higher educational institution. There are several reasons for this advantage of children from higher social origins (Ditton, 2010): (i) Teachers in general attest children from better-educated families more school adequate noncognitive skills (Erikson and Jonsson, 1996b). Thus, as described by Bourdieu (1973), it seems that more highly educated parents equip their offspring with a better understanding of the school culture and the ability to act within it (cultural capital) as well as with the corresponding dispositions and perceptions (*habitus*). (ii) Teachers assume that better-educated parents are in general more able to provide support to their children, if necessary. So, they ascribe a higher success probability to these children's future school careers. And (iii) better-educated parents in general exert more pressure on teachers and educational institutions, if this should be necessary. Esser (2014) called these mechanisms the tertiary effect of

social origin (see Figure 1). Thus, the fourth theoretical assumption of our empirical analysis is that the higher the education of parents, the more favourable are the evaluations of children's performances by teachers and educational institutions and the higher the transition probabilities from one educational attainment level to the next.

The four supposed indirect effects of parental education on the educational transition probabilities in our theoretical model in Figure 1 clearly have all a positive sign and are complementary. Thus, from this perspective, it is theoretically possible to estimate only a model with the total effect of parental education on the transition probabilities summarizing the various positive indirect effects of parent's education on the two transition probabilities in Figure 1.

Changes in Origin-specific Educational Opportunities across Cohorts

There are several competing theories on changes in the inequality of educational opportunity in the process of educational expansion. First, there is the modernization theory, positing that educational expansion will lead to a *general decline in the inequality of educational opportunities among all groups across cohorts* (cf. for example, Lenski, 1966; Treiman, 1970). According to this theory, the educational system mainly expands in response to the functional requirements of modern societies. In the modernization process, all parents are increasingly better informed by mass media about the educational opportunities of their children so that the secondary effect of social origin is declining. In addition, the educational selection procedures become more rational and less ascriptive, which also leads to a declining tertiary effect of social origin. Educational opportunities are therefore increasingly dependent only on students' achievements (primary effect of social origin). However, also the primary effect is likely to decline in the modernization process if the German state increasingly invests in early childhood intervention programs, all-day schools, etc.

A competing hypothesis is put forward by the cultural reproduction theorists (see Collins, 1971; Bourdieu, 1973; Bowles and Gintis, 1976). They claim that educational certificates legitimize social inequality in the job market. A major function of educational credentials is to exclude members of lower social origins from attractive positions in the labour market. Reproduction theorists, however, recognize an inherent conflict between the selection and socialization functions of education. A major role of educational institutions is to integrate children from lower social origins

and ethnic minorities into the dominant value system of the society (see also Meyer *et al.*, 1977). Educational expansion in upper secondary school is consistent with the rising demands of disadvantaged groups for more education. In other words, in the process of educational expansion from below, not only the attainment of primary but also *lower and upper secondary schooling will become universal and increasingly independent of social background* (Shavit and Blossfeld, 1993). In this process, the better-educated families are always forerunners and the lower educated families are latecomers across cohorts. At the same time, the privileged groups want to maintain their advantages in the upper part of the inequality system. Hence, they preserve their privileges in the attainment of higher education. This is possible because of the persistence of primary, secondary, and tertiary effects of social background (see Figure 1). This means *that in the process of expansion of tertiary education the increases in the educational demands of children from higher educated families should always be greater than the increases of the demands of children from lower educated families*.

Raftery and Hout (1993) suggested a specific version of the reproduction theory regarding educational transitions. Their Maximally Maintained Inequality (MMI) hypothesis says that the effect of educational origin on making an educational transition declines across birth cohorts only when the privileged groups are already more or less saturated at a given transition. Therefore, *educational expansion only leads to an increase of educational opportunities for children from lower educational backgrounds (the latecomers), if basically all children from higher educational backgrounds are already making the transition (the forerunners)* (see Lucas, 2001). This means that in the process of educational expansion from below the educational transitions to lower secondary and upper secondary education is expected to become more universal across birth cohorts. Yet, when all origin groups are fairly saturated at a specific educational transition, the gains for children from the lower educated families are also to a large extent illusive. If almost everybody makes a transition, this is no special achievement anymore and the respective transition becomes a precondition for everyone. In other words, transition gains as already fairly universalized transitions lose their symbolic importance for educational inequality. If, however, the privileged children are not yet saturated at higher educational transitions, educational expansion will not necessarily lead to improved opportunities for disadvantaged children. Rather their opportunities might stay constant over time or even be severely reduced in the process of educational expansion. Again, this is owing to the primary,

secondary, and tertiary effects of social background (see Figure 1). Thus, as long as privileged educational families are not saturated, this will confine the transition probabilities of children from families with lower educational attainment. According to the MMI theory, *we therefore expect persistent or even growing differences in the transition rates to tertiary education between children from high, medium, and low educational backgrounds* as long as the children from higher educational origins are not yet saturated.

Finally, there is the theory of Effectively Maintained Inequality (EMI) by Lucas (2001). This theory posits also a strong competition between families of different social backgrounds at the higher educational transitions, but focuses on qualitative differences of education at a similar educational level. If new distinctions at the tertiary level are introduced, e.g., by the increasing differentiations between universities of applied science and traditional universities in Germany, it predicts that social background will matter for the kind of education received at the tertiary level (Lucas, 2009). *Students from more privileged backgrounds are avoiding the less prestigious universities of applied science and prefer the more prestigious traditional universities to preserve their advantages at the labour market.*

Gender-specific Mechanisms and Their Changes across Cohorts

The described basic mechanisms through which parental education influences the educational opportunities of children at various educational transitions can be assumed to be at work for both men and women (see Figure 1). However, theory and empirical research suggest that there are also important differences in the educational opportunities of men and women by birth cohort and social origin. In particular, there is evidence that in Germany—as in most modern societies—there are striking gains of women relative to men in education across cohorts for all social origins. Various theories have been offered to explain the change between men and women across cohorts in modern societies (see DiPrete and Buchmann, 2013; Becker, 2014; Schoon and Eccles, 2014). In the following, we will shortly discuss gender-specific mechanisms focusing on the main four theoretical dimensions of school success shown in Figure 1: (i) cognitive skills, (ii) noncognitive skills, (iii) evaluation of student's educational performance by teachers and institutions, and (iv) educational decisions of parents and individuals.

With regard to cognitive skills, large-scale assessments such as TIMSS and PISA suggest that women, compared

with men, have an edge in reading and some weaknesses in mathematics and science, but there is no strong trend in gender-specific 'academic abilities' that could possibly explain the striking gains of women in the educational arena in modern societies during the last decades (DiPrete and Buchmann, 2013). In terms of noncognitive skills, there seem to be at least three good reasons for girls' greater school success (DiPrete and Buchmann, 2013: pp. 101–112): (i) girls on average have an advantage relative to boys in terms of social behaviour in school: they show higher rates of conformity to the school culture and they have lower rates of disruptiveness, aggression, antisocial behaviour, or attention disorders; (ii) girls on average work harder in school and invest greater efforts in doing their homework; and (iii) girls on average express a stronger interest and enjoyment in school. Given these gender differences in noncognitive skills, it is not surprising that girls are better able to turn their small cognitive ability edge at the beginning of school into higher levels of cognitive growth during the school career (Matthew effect). Girls' more school-adequate noncognitive skills have also a strong impact on the evaluation of student's performance by teachers. Empirical studies demonstrate that girls typically get better grades in their courses in school relative to their performance level on standardized tests (DiPrete and Buchmann, 2013). In tracking systems such as the German one, where the recommendation of teachers is often a necessary prerequisite for the transition to upper secondary school, it has been shown that boys need higher academic skills than girls to receive a recommendation for the gymnasium (Bos *et al.*, 2007). Thus, teachers' evaluations of student's performance favour women in getting higher success rates at educational transitions.

These stylized empirical facts suggest that girls always have performed better in school than boys (DiPrete and Buchmann, 2013). Girls' better relative reading skills, their more school-adequate noncognitive skills, and their advantages to receive better grades for the same performance in school are very important factors behind the catch-up of females relative to males in most modern societies. However, they seem obviously not sufficient to explain the dramatic historical change in gender-specific educational participation. For example, the female advantages cannot explain why young women born in the 1950s or 1960s did not attain higher educational degrees than their male contemporaries in most modern societies. It is reasonable to assume that these women were often barred from going to upper secondary schools or university colleges. Thus, a declining educational gender-gap and perhaps its reversal in modern societies hinges on an additional theoretical explanation.

Educational expansion occurred during a historical period when gender roles in modern societies have been culturally transformed and the discrimination against women has been declining (DiPrete and Buchmann, 2013). One of the most important structural developments in contemporary societies has been the change in women's life course patterns (rising employment, declining fertility, and the changing use of time) and—at the same time—the relative stability of men's roles over the life course (even if there has been a slight change in the provider role)—and its impact on the educational decisions of parents and daughters. In the 1960s and 1970s, families in West Germany were still characterized by a 'male breadwinner'–'female homemaker' model and (marital) unions were comparatively stable (Trappe *et al.*, in this volume). At that time, girl's education was less important than boy's in terms of families' intergenerational status reproduction (Goldthorpe, 1983). With women's increasing labour force participation (see Blossfeld and Hakim, 1997), however, Germany has been experiencing a fundamental shift from a male breadwinner society towards a dual-earner society (Blossfeld and Drobnič, 2001). In dual-earner societies, the status of a family is not only determined by the economic position of the husband alone but by the job positions of both (marital or non-marital) partners. Women's rising gainful employment in occupationally gender-segregated labour markets of modern service societies (see, for example, Steinmetz, 2013) means that each younger cohort of women has to seek employment in skilled service and administrative jobs as well as in the semi-professions and professions. In these types of jobs, formal education is a particularly important prerequisite for job access. In other words, across birth cohorts, the value of women's educational investments in the early life has strongly increased and parents' rising investments in girls' educational attainments can be viewed as a highly adaptive family strategy. These higher educational investments make women also less vulnerable with regard to higher union instabilities. In comparison, men's adult roles as breadwinners have not changed so much across cohorts (Blossfeld and Drobnič, 2001). After entering the labour market, they are still expected to work full-time until retirement. Based on the upgrading of skills in the labour market, men's educational attainment has also become more important over time. Thus, both women's and men's demand for education is rising across cohorts. However, based on the high level of occupational gender-segregation in the German labour market (Steinmetz, 2013), a considerable proportion of men still seeks employment in blue-collar jobs and technical occupations, where secondary

qualifications in terms of apprenticeships and vocational training are often quite sufficient. Thus, for many males the incentive to attain higher formal education seems to be smaller than for women. In summary, we expect that the female advantages in academic performance in school together with the changing incentives of parents to give their daughters a better education has increased women's rate of educational attainment across cohorts. Hence, women are expected to catch up with men or even outperform men at higher educational attainments across cohorts.

In addition, we expect that the rate at which this change happens is different for women from different educational origins. Since better-educated parents tend to hold more gender-egalitarian attitudes and values, their sons and daughters should have received more similar educational opportunities in the past. We therefore expect that the differences between men and women from better-educated parents are smaller than for lower-educated families among the older birth cohorts. In other words, we predict better-educated families to be forerunners in terms of modern gender-role orientations and educational participation in modern societies and lower-educated families to be latecomers in this respect.

Data and Methods

For our analyses of the educational transitions from lower secondary to upper secondary educational attainment and from upper secondary educational attainment to university of applied science or traditional university graduation, we use data from the GLHS (see Brückner and Mayer, 1998; Mayer, 2008) and the NEPS (see Blossfeld *et al.*, 2011). Both data sets provide detailed retrospective life history data for a series of birth cohorts born in West and East Germany. We do not include migrants in our analyses, because the GLHS does only include native-born Germans. From the GLHS we use the 1919–1921 (only West Germans), 1929–1931 (West and East Germans), and 1939–1941 (West and East Germans) birth cohorts; and from the NEPS we utilize data for West and East Germans from the birth cohorts 1947–1952, 1953–1957, 1958–1962, 1963–1967, 1968–1972, 1973–1977, and 1978–1980. We restrict our sample to respondents aged 30 years or above who have already completed their highest level of education. Our sample includes 13,152 respondents. A total of 3,863 (1,743 men and 2,120 women) are from the GLHS and 9,289 (4,498 men and 4,791 women) are from the NEPS.

Regarding the dependent variable, we distinguish four different educational attainments: (i) *lower*

secondary education (these are respondents who have either no educational degree, or who have only completed 'Hauptschule' or 'Realschule' or in the GDR have only attained 'Polytechnische Schule' (POS) until grade 8, 9, or 10); (ii) *upper secondary education* (these are respondents who have completed 'Hauptschule' or 'Realschule' or in the GDR have attained POS until grade 8, 9, or 10 and have in addition completed vocational training or who have an 'Abitur' with or without vocational training); (iii) *university of applied science graduation*; and (iv) *university graduation*. For the analyses of education transitions between these attainment levels we are using logistic regression models. Our explanatory variables are:

1. *Cohort trend*: We include a trend variable and distinguish 10 birth cohorts (i) 1919–1921 (only in the analyses for West Germany); (ii) 1929–1931; (iii) 1939–1948; (iv) 1949–1950; (v) 1951–1953; (vi) 1954–1958; (vii) 1959–1963; (viii) 1964–1970; (ix) 1971–1977, and (x) 1978–1980. We tested this trend variable in all models against the full set of birth cohort dummy variables and found that the trend variable excellently represented the monotonic changes across cohorts in West and East Germany.³ Thus, we use the more parsimonious specification.
2. *Parental education*: We applied the dominance approach and assigned the highest educational level of mother and father to the origin level of the family. We use two different sets of dummy variables. An extended version created from four attainment levels: (i) lower secondary education, (ii) upper secondary education, (iii) university of applied science education, and (iv) university education; and a reduced version created from the following three attainment levels: (i) lower secondary education, (ii) upper secondary education, and (iii) tertiary education.
3. *Gender*: We include a dummy variable indicating gender ('1' indicating females and '0' indicating males (ref.)).
4. *Cohort trend *parental education interactions*. We include interactions between the cohort trend variable and dummy variables for parental education.
5. *Cohort trend *gender interactions*. We include interactions between the cohort trend variable and the gender dummy variable.

We do not present the usual odds ratios in our empirical analyses because the magnitude of the regression coefficients is confounded with residual variation (Long, 1997). Instead, we compute for each of the educational transitions predicted probability plots for the various

origin groups (with 95% confidence intervals) that are not affected by this kind of identification problem (see Hanmer and Kalkan, 2013).

Results

We start our analysis with a description of the expansion of the educational transitions in West and East Germany. Figure 2 presents the *changes in the overall transition probabilities* (and their 95% confidence intervals) from lower secondary education to upper secondary education (upper panel in Figure 2), from upper secondary education to university of applied science graduation (middle panel in Figure 2), and from upper secondary education to traditional university graduation (lower panel in Figure 2) for the birth cohorts 1919–1921 to 1978–1980. Regarding the first transition from lower secondary to upper secondary educational attainment (upper panel in Figure 2), we observe great differences in the overall transition probabilities between West and East Germany for the older birth cohorts. Based on the GLHS, the development in West Germany can be observed from the birth cohort 1919–1921 and in East Germany from the birth cohort 1929–1931. East Germany started from a lower transition level but clearly expanded much faster than West Germany, so that the East Germans catch-up and even slightly surpass the West Germans in the transition to upper secondary educational attainment across cohorts (Mayer *et al.*, 2009).⁴ In both parts of Germany the first transition has been fairly saturated from about the birth cohort 1954–1958 onwards.

If we look at the transitions from upper secondary education to university of applied science and to traditional university (estimated as competing risks), we see that both transition probabilities are somewhat lower in West Germany for the older birth cohorts (see the middle and lower panel in Figure 2). The change in the transition rate to university of applied science graduation and traditional university graduation in East Germany is quite flat. This reflects the more restricted access to tertiary education in the GDR (see also Riphahn and Trübswetter, 2011). Across birth cohorts, the university of applied science and traditional university graduation rates increased monotonically in West Germany. The slopes in West Germany are rising more steeply after the birth cohort 1964–1970. This was the time when the West German educational system has been characterized by a strong educational expansion. The overall picture is one of impressive educational expansion at the first transition in East and West Germany and a weaker expansion at the two second transitions in West Germany. It is

clear that the educational system has universalized step by step from the bottom up in both parts of Germany. Only a very small proportion of individuals from the youngest birth cohorts does not attain upper secondary education. These are people who have not even completed vocational training.

The question now arises to which extent *men and women from different educational backgrounds* could benefit from the rising educational opportunities at the various educational transitions across birth cohorts. In order to answer this question, we have estimated logistic regression models for the first and

the two destination-specific second transitions (to university of applied science and traditional university graduation). We plot the predicted probabilities and their 95% confidence bands. We compare the patterns for men and women in West and East Germany (see Figures 3–5).

The origin-specific transition probabilities from lower secondary to upper secondary educational attainment for men and women in West (the two plots on the left side) and East Germany (the two plots on the right side) are shown in Figure 3. Men from parents with tertiary education in West and East Germany are clearly

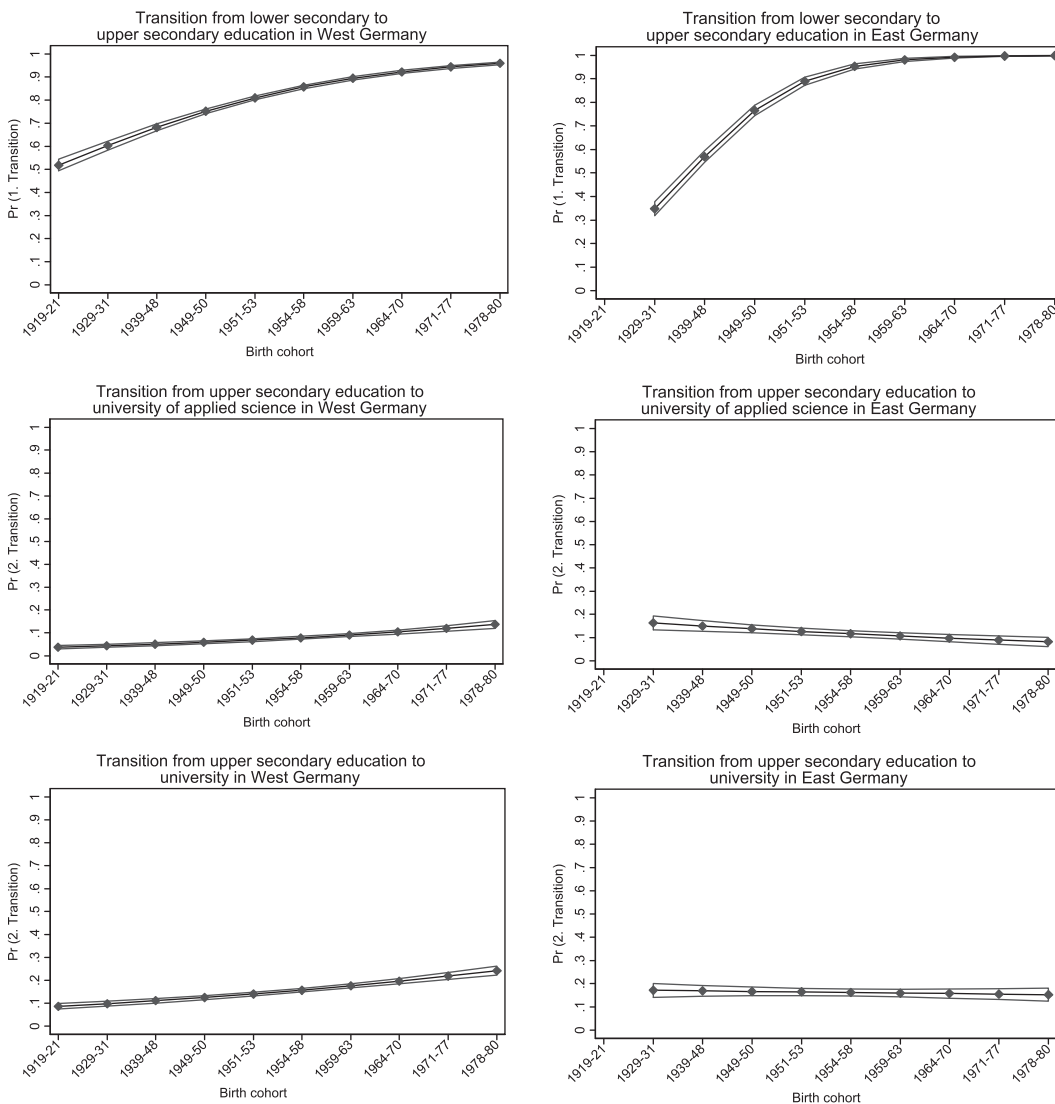


Figure 2. Changes in overall transition probabilities in West and East Germany (95% CI)
 Source: Authors' calculations based on the GLHS and NEPS data.

the forerunners at this transition. Since the proportion of successful men from this privileged background exceeded 80% in the oldest birth cohort (1929–1931), they can be considered as already fairly saturated at the beginning of the observation window in West and East Germany.⁵ Men from families with upper secondary education in West Germany do not differ much from men from families with tertiary education. In East Germany men from parents with upper secondary education are a little delayed in this transition. However, they catch up and are saturated already from the birth cohort 1951 onwards. In East and West Germany, the latecomers are the children from parents with lower secondary education. However, among the younger birth cohorts, they eventually also reach the saturation level in both parts of Germany. In other words, the gaps between the different origin groups have been strongly decreasing across cohorts in East and West Germany. This result is in agreement with Klein *et al.* (2009) and Breen *et al.* (2009, 2010). This pattern is in line with the predictions of the modernization theory, the cultural reproduction theory, and the MMI hypothesis (Treiman, 1970; Collins, 1971; Bourdieu, 1973; Bowles and Gintis, 1976; Raftery and Hout, 1993) that children from lower educated families can particularly profit from educational expansion at the lower educational transition. Hence, children from families with lower secondary education are less and less excluded in the process of educational expansion and can remarkably improve their educational opportunities at the first educational hurdle. If we compare the changes for men and women in East and West Germany at the first transition (see Figure 3), it is clear that women start from lower transition probabilities at the beginning of the

observation window and then they gradually catch up with the males. The early phase of this catch-up process in terms of vocational training was already described by Mayer (1980). The gains are particularly strong for women from parents with lower secondary education in West and East Germany. Yet among the youngest birth cohort, the West German women from these disadvantaged families could not catch up completely with men from the same origin families and with children from other higher educated families.

With the universalization of upper secondary education, however, the social value of the upper secondary attainment level is also changing. Attaining at least upper secondary education has become a widely shared and common experience for most young people in Germany today. When upper secondary education is getting nearly universal among the younger generations, it becomes a kind of necessary condition for every young individual. Reaching upper secondary educational attainment is then nothing special anymore. The few who do not (or are not able) to make the transition to this new minimum educational attainment level are, of course, becoming increasingly disadvantaged and left behind outsiders (see Jacob and Solga, in this volume). In other words, the impressive educational gains of men and women from lower secondary education at the transition to upper secondary education carry an elusive flavour. With regard to their parents they have clearly achieved a nominally higher educational attainment. But in the process of universalization of education from below there has also been a decline of the social value of this educational attainment level over time, so that among the young generation the relative gains across cohorts seem to disappear.

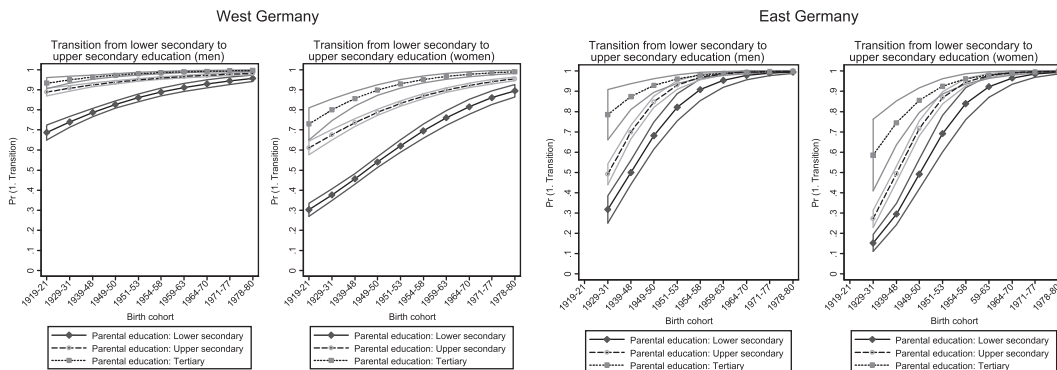


Figure 3. Changes in origin-specific probabilities for the transition from lower to upper secondary education for men and women in East and West Germany (95% CI)

Source: Authors' calculations based on the GLHS and NEPS data.

Now, we analyse to which extent men and women from the different educational origin groups profit from the *expansion of higher education*. It is important to note that only students who have successfully made the first transition to upper secondary education are at risk for the second transition. The probability of the second transition is therefore a conditional probability. We analyse the competing transitions to university of applied science and traditional university graduation (see Figures 4 and 5). This institutional differentiation is important because the majority of students who come via the alternative educational pathways in the secondary school system enters into the university of applied science.

We first look at the transition from upper secondary education to university of applied science graduation for men and women in West and East Germany (see Figure 4). The transition probabilities to university of applied science graduation for West Germany are shown in the two plots on the left side and for East Germany in the two plots on the right side in Figure 4. In general, universities of applied science seem to be more popular in East than in West Germany. In West Germany, men have a higher probability than women to graduate from universities of applied science. In East Germany it seems that women have a small edge compared with men in the graduation from universities of applied science. However, these differences are hard to interpret since the confidence bands are very wide. Figure 4 reveals the important result that the educational origin of the family does in fact not play any major role at this transition. The confidence intervals for the various origin-specific transition probabilities overlap for men and women in East and West Germany. Thus, universities of applied science clearly provide more equality of educational opportunities at the tertiary level than traditional

universities (see Figure 5 below). The universities of applied science seem to be less attractive for children from parents with a traditional university degree. This is in agreement with the EMI hypothesis by Lucas (2009). If there are qualitative differences at a similar educational level, the families of higher educational origin opt against the less prestigious universities of applied science and prefer the more prestigious traditional universities in order to preserve their advantages at the labour market.

In a final step, we analyse the transition from upper secondary education to traditional university graduation (see Figure 5). While universities of applied science are less selective with regard to social origin, there are big differences among origin groups for traditional universities. This is true for men and women in East and West Germany. Across all birth cohorts, we observe a big gap in the transition probabilities for children from parents who have graduated from the traditional university or the university of applied science on the one side and children from parents with lower and upper secondary education on the other. Children from parents with tertiary education are significantly much more likely to make this transition. This is even the case for the youngest cohorts in our observation window. This finding supports the status maintenance hypothesis (Breen and Goldthorpe, 1997) that especially children from parents with tertiary education should have a high likelihood to graduate from traditional university since these parents want their children to attain at least a similar educational level as they have got themselves. It is interesting that the probability to graduate from traditional university is in general increasing in West Germany and slightly decreasing in East Germany for all origin groups (see also Figure 2). However, the differences between

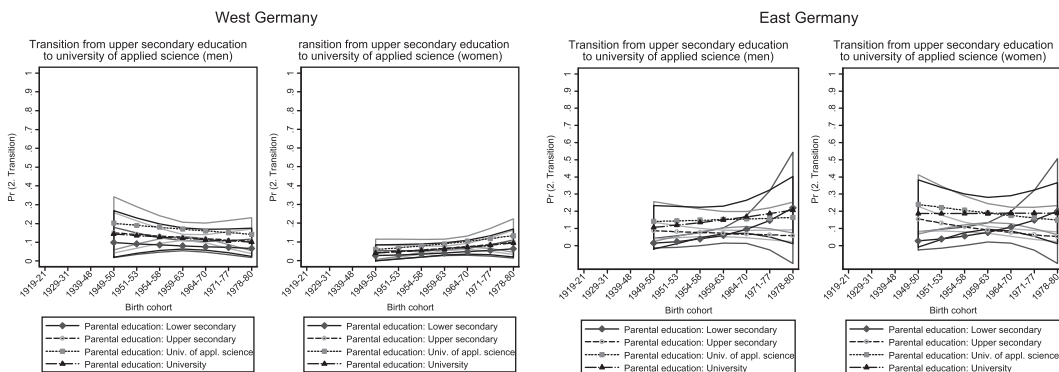


Figure 4. Changes in origin-specific probabilities in the transition to upper secondary education to university of applied science graduation for men and women in East and West Germany (95% CI)
 Source: Authors' calculations based on the GLHS and NEPS data.

the various origin groups are fairly constant or even slightly increasing, in particular in West Germany. These findings are in accordance with the cultural reproduction theory (Bowles and Gintis, 1976), the MMI hypothesis (Raftery and Hout, 1993), and the EMI hypothesis (Lucas, 2001, 2009), which claim that privileged families preserve or even extend their advantages in the graduation of traditional universities—at least as long as they are not saturated. Until the 1970s, men and women from parents with lower and upper secondary education still differed significantly in their transition probabilities in West Germany. Since then, these differences between the two origin groups disappeared completely. The same is true for children from parents who graduated from universities of applied science and traditional universities in West Germany. The differences in the transition probabilities between these two groups disappeared over time. This means that today in West Germany there is a kind of polarization in the graduation from traditional university between children from families with lower and upper secondary education on the one side and children from parents who graduated from the university of applied science or the traditional university on the other side.

In the historical period of the GDR, the differences in the graduation from traditional universities between the various origin groups have been less pronounced in East Germany, in particular, with regard to the opportunities of children from parents with lower secondary education. After the German unification, the opportunities of children from parents with lower secondary education to graduate from traditional university have strongly declined. It seems that in the transformation from the socialist to the capitalist system, the children from parents with lower secondary education are the losers in terms of

opportunities to graduate from traditional university. Therefore, the opportunities of children from parents with lower secondary education differ markedly between East and West Germany for the youngest cohort.

The developments for men and women are very similar in West and East Germany. However, in the observation window, the change in the transition probabilities is somehow stronger for women than for men. So that women gradually catch up with males from their origin groups.

Summary and Conclusion

In the process of educational expansion and reforms, the character of the old sharp divisions between academic and vocational/technical tracks in the German secondary school system has strongly declined and the proportion of young people who have completed at least upper secondary education has impressively risen. Also the enrolment in higher education has quickly grown in West Germany and turned the former elite tertiary education of the 1950s into institutions of mass education. In East Germany, higher education has not expanded, because access to tertiary education was restricted in the GDR. Using life course data from the GLHS and the NEPS, we analysed how the educational attainment of men and women from families with various educational backgrounds has been changed by the bottom-up universalization of education in secondary school and by the increasing differentiation of higher education in West and East Germany. In particular, we were interested to understand which of the educational origin groups could profit most from the additional opportunities provided by the expanding upper secondary and tertiary education over time. We adopted a life course perspective to

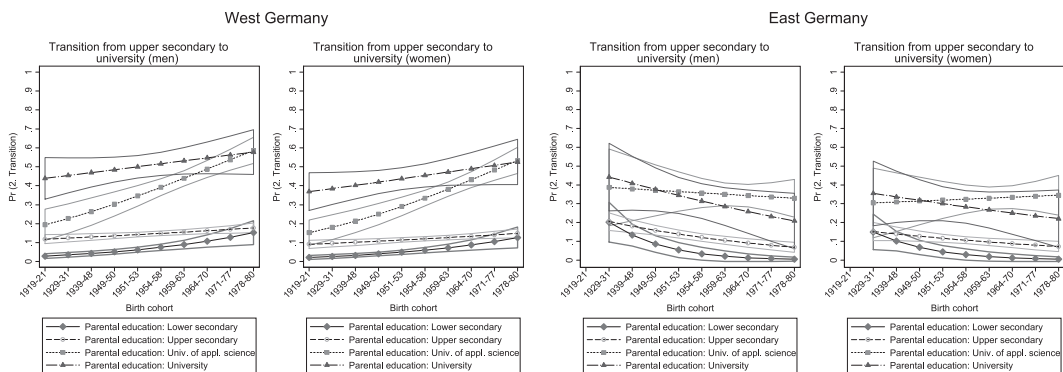


Figure 5. Changes in origin-specific probabilities from upper secondary education to traditional university graduation for men and women in East and West Germany (95% CI)

Source: Authors' calculations based on the GLHS and NEPS data.

get a better understanding of the processual nature of educational attainment (Mare, 1981) and looked at two important successive transitions in the educational career of young people: the transition from lower secondary to upper secondary educational attainment and from upper secondary educational attainment to tertiary graduation (at universities of applied science and traditional universities).

Our empirical findings for the first educational transition to upper secondary education suggest the following three theoretical conclusions: (i) In Germany there has been a strongly declining educational inequality across cohorts. Since this decline took place in a context where children from more privileged educational families have been fairly saturated, this empirical evidence supports not only the modernization and the cultural reproduction theories but also the MMI hypothesis. (ii) One can conclude that in particular women from lower educational origins are the big winners of the expansion of the first educational transition in Germany (see Mayer, 1980). These gains of women from families with lower secondary education occurred in a historical period when gender roles in modern societies have been culturally transformed and women's labour force participation has increased. Hence, the value of educational investments for women from families with lower secondary education has strongly risen and parents seem to increasingly view these investments in girls' better education as a promising family strategy. (iii) With the universalization of upper secondary education, the impressive educational gains of men and women from lower secondary education at the transition to upper secondary education carry an elusive flavour. From a life course perspective, however, the substantial reduction in origin-specific educational inequalities in reaching the upper secondary educational level can lead to more equality in the attainment of higher education, if the transition to tertiary education does not get more equal with regard to social origin.

Our empirical findings for the second transition to university of applied science graduation and traditional university can be summarized as follows: (i) Social origin is not important for the transition from upper secondary education to university of applied science graduation. Universities of applied science clearly provide more equality of educational opportunities at the tertiary level than traditional universities. This is because children from higher educational origin opt against the less prestigious universities of applied science and prefer the more prestigious traditional universities to preserve their advantages at the labour market. (ii) The probability to graduate from traditional university

is in general increasing in West Germany and slightly decreasing in East Germany for all origin groups. (iii) However, the differences between the various origin groups are fairly constant or even slightly increasing, in particular in West Germany. These empirical evidences are in agreement with the cultural reproduction theory and the MMI hypothesis. (iv) Children from parents with tertiary education did not only have the best opportunities to complete upper secondary education but, if they had attained the upper secondary education, they also had the greatest chances to graduate from traditional university. In other words, the very favourable transition probabilities multiply for them over their educational career and produce the highest proportion of traditional university graduates among all families. The success of children from families with tertiary education is partly based on their higher academic performance and more school-appropriate noncognitive skills and partly due to the specific educational choices of these students and their parents. (v) The changes in the transitions to traditional university graduation for men and women are very similar in West and East Germany. However, women gradually catch up with males from their origin groups.

Taken together, the changes in educational inequality at the two transitions are contradictory in Germany. While educational inequality is strongly declining at the first transition to upper secondary education across cohorts, it is constant or even slightly increasing at the transition to the traditional university. In addition, there are no origin-specific differences in the transition to university of applied science graduation. In other words, there is no unidirectional trend of change in inequalities of educational opportunities across all transitions. We acknowledge that our long-term cohort comparison has also a limitation. A potential problem is that even if educational reforms in Germany have increasingly blurred the divisions between academic and vocational/technical tracks in the secondary school system for the younger birth cohorts, this was not so much the case for the older cohorts. However, since we are particularly interested in the origin-specific educational opportunities of the younger birth cohorts in the process of educational reforms, we have opted for an educational classification that is often used by the OECD in its international comparisons. Further research is needed to describe and analyse in more detail the variety of changes in the educational system and their consequences for educational inequality. Our theoretical model in Figure 1 suggests that we need in particular better longitudinal data on (i) the informal and formal learning environments in the family and within the various institutional settings, (ii) the development of cognitive

and noncognitive competences, and (iii) the educational decision making processes over the life course. Prospective panel data such as the NEPS are therefore promising for the study of causal relationships between competence development, educational decision making, and educational participation over the life course.

Notes

- 1 Based on the combined data set we cannot analyse migrants, since the GLHS data set does only include information on German respondents.
- 2 The educational attainment levels are defined in the 'Data and Methods' section.
- 3 Only the birth cohort 1929–1931 is an outlier (see Mayer *et al.*, 2009).
- 4 The great differences between West and East Germany might also be due to the migration of skilled people from East to West Germany before the erection of the German wall.
- 5 The question when a group is saturated on a specific transition is of course debatable. We follow Hout (2006: p. 239) who suggested a threshold of 80%.

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