The intergenerational transmission of education

and equality of educational opportunity

in East and West Germany[1]

Regina T. Riphahn[a,*]

and

Parvati Trübswetter[b]

29 February 2012

Socialist societies often emphasized the abolition of traditional social classes. To achieve this objective, educational opportunities were at times "actively managed" and allocated to children of less educated parents. What happened to these patterns after the demise of socialist rule in Eastern Europe? We study the development of educational mobility after the fall of the iron curtain in East Germany and compare the relevance of parental educational background for secondary schooling in East and West Germany. Based on data from the German *Mikrozensus* we find that educational mobility is lower in East than in West Germany and that it has been falling in East Germany after unification. While the educational advantage of girls declined over time, having many siblings presents a more substantial disadvantage in East than in West Germany.

[a,*] Corresponding author. Department of Economics, University of Erlangen-Nuremberg, Lange Gasse 20, D-90403 Nuremberg, Germany, E-mail: Regina.Riphahn@wiso.uni-erlangen.de

[b] Institute for Employment Research, Nuremberg, Germany

1. Introduction

Intuitively, one might have expected that the liberation of Eastern European former socialist countries after 1990 contributed to enhanced opportunities and a richer set of individual career options. However, concomitant with the ensuing economic crises also educational opportunities dwindled: Hertz *et al.* (2009) discuss falling educational attainment and intergenerational mobility in Bulgaria as caused by the closure of public schools, rising out-of-pocket expenditures, and falling returns to education in times of high unemployment. For the Czech Republic, Mateju *et al.* (2003) show that social origin increasingly determines educational outcomes in the post-socialist period. The authors see funding problems together with rising income inequality at the origin of the increasingly elitist character of Czech higher education. Hazans *et al.* (2008) find that the impact of paternal education and income increased during transition in the Baltics. Thus, after a general increase in educational mobility in Eastern Europe up through the 1980s (Ganzeboom and Nieuwbeerta 1999) the post-socialist transformation appears to have reversed the trend.[2]

We study the development of educational mobility in East Germany after unification. The East German case is of special interest for at least two reasons: first, even though the East German economy experienced a substantial crisis after unification and unemployment was high,[3] funding for the East German education system was provided by transfers from West Germany. Thus, budget cuts as a cause of reduced educational opportunities should not be central here. Also, East Germans could migrate to West Germany where wages were high and unemployment comparatively low.[4] This

---

[2] For a discussion of Poland see Beblo and Lauer (2004) and for Hungary Varga (2006).
[3] Inofficial unemployment rates, counting open and hidden unemployment, reached 35 percent (SVR 1994).
[4] Hunt (2006) shows that the migration decision of young East Germans since unification has been sensitive to wages while older East Germans responded more strongly to source-region unemployment. This is confirmed by Fuchs-Schündeln and Schündeln (2009) who consider more recent data and separately evaluate the age and gender composition of migrants.

1

differentiates East Germany from other Eastern European countries. Second, after unification, the East German education system was modeled after its West German counterpart. This provides a benchmark in the evaluation of intergenerational educational mobility in East Germany.

We first compare intergenerational educational mobility patterns and educational persistence in East and West Germany at unification. The subsequent development then indicates the relevance of German educational institutions as determinants of intergenerational education transmission. Based on the prior literature and the institutional background described below we test four hypotheses: first, since communist countries made explicit efforts to raise educational attainment of the children of working class parents (cf. Hertz *et al.* 2007), we expect initially higher levels of educational mobility in East than in West Germany (H1). Second, as this enforced equity disappeared after the demise of communism we expect a decline in educational mobility in East Germany after unification (H2). Third, given the traditionally higher female labor force participation in East than in West Germany, we expect initially more gender equity in educational attainment in East than in West Germany (H3). As labor market opportunities dwindled for East German females (Hunt 2002) and improved for females in the West, female educational attainment may have converged over time (H4).

While intergenerational education transmission, its determinants, and development have been discussed frequently in empirical studies of the German education system, we found no study which specifically looked at the situation in East Germany.[5] Following the international literature we chose a descriptive approach to compare secondary education, mobility, and further correlates of educational choices in East and West Germany after

---

[5] Couch and Dunn (1997), Dustmann (2004), Heineck and Riphahn (2009), Henz and Maas (1995), Lauer (2003), Müller and Haun (1994), Riphahn and Schieferdecker (2012), and Tamm (2008) all exclusively use evidence from West Germany. Schnepf (2002) and Wößmann (2008) appear to consider East German observations in their PISA and TIMSS test data but do not evaluate East-West differences.

unification. We do not attempt to identify causal effects of "nature" (or genetic effects) and "nurture" (or behavioral effects) in the relationship between parent and child education.[6] Also, we do not focus on the relevance of specific institutions in the secondary education system.[7] We use data taken from the German *Mikrozensus* gathered between 1991 and 2004. This allows us to follow developments in educational choices and intergenerational education transmission over time for different subsamples.

This study contributes to the literature in three ways: first, we are the first to draw attention to differences in secondary education and mobility patterns between East and West Germany. Second, we can relate East German developments to those in other transition economies and provide evidence on changes in educational mobility over time. Finally, we approach educational opportunity from a variety of perspectives and describe, for instance, the correlation between child secondary education and gender, the number of siblings, and rural vs. urban residence over time and in East and West Germany.

This extends the analysis of Heineck and Riphahn (2009), who study intergenerational education correlation for the birth cohorts 1940-1978 in West Germany. They find substantial improvements in educational attainment but not in educational mobility. In fact, no group benefited more from the education expansion than children from advantaged backgrounds, namely those with few siblings, in urban areas, and with highly educated parents.

Changes in educational mobility over time have rarely been addressed in the literature. Among early sociological contributions are Blossfeld (1993), Müller and Haun (1994), and Henz and Maas (1995) on youth educational outcomes over time. Economic

---

[6] For studies pursuing this avenue see e.g. Black et al. (2005), Sacerdote (2002), or Plug and Vijverberg (2003).
[7] For studies on such school design issues see e.g. Bauer and Riphahn (2012), Hanushek and Woessmann (2006) and Woessmann (2010) on the relevance of tracking regimes, central exams, private schools and government spending, or Currie (2001) on the age at school entry or Deming and Dynarski (2008) on pre-school education.

analyses of intergenerational education mobility mostly neglect changes over time (e.g. Couch and Dunn (1997), Lauer (2003), or Dustmann (2004)). While these authors focus on the intergenerational correlation of track choices, others study intergenerational mobility based on test score outcomes instead (e.g. Woessmann (2008) or Schuetz *et al.* (2008)). While these analyses do not separate East and West Germany they show that parental background is more important for child education in Germany than in most other countries. Woessmann (2010) evaluates the impact of educational institutions on the equality of educational opportunities as of 2003 and finds no significant differences between East and West German states. Schuetz *et al.* (2008) list transition economies among the countries with low equality of educational opportunity.[8]

2. Institutional Background

2.1 Secondary Education in Former East and West Germany

Historically, secondary education in Germany has been organized in a threefold track system. This implies a hierarchical order in terms of academic reputation, financial returns to educational degrees, and subsequent educational opportunities.[9]

West German pupils start primary school at the age of 6. Typically, after four years they chose one out of three alternative secondary school tracks: Basic Schools (*Volksschule / Hauptschule*) last another 6 years and prepare for vocational training. Middle Schools (*Realschule / Mittelschule*) also provide 6 years of instruction and typically prepare pupils for training in white collar jobs. Only at Advanced School (upper secondary school, *Gymnasium*) education continues for an additional 8 or 9 years. The

---

[8] Out of a group of 54 countries ranked by inequality of opportunity (with 1 being the most unequal) we observe Hungary on position 4, Germany on 5, Macedonia on 7, the Slovak Republic on 8, Bulgaria 9, Lithuania 11, the Czech Republic 14, Slovenia 15, Russia 22, and Romania 24. Only Latvia (33) and Moldova (35) are in the bottom half of the distribution. This describes the very recent birth cohorts 1982 and 1986, which may explain the difference compared to the information presented by Hertz et al. (2007).

[9] For analyses of educational mobility in the similarly structured Swiss secondary school system see e.g. Bauer and Riphahn (2006) and (2007).

Advanced School degree (*Abitur*) is required for university admission. Thus educational choices taken at the end of primary school are important, even though the educational system increasingly offers ways to correct past tracking choices. The regulations which govern the transition from primary to secondary school vary by federal state: some states restrictively allow only pupils with the best grades to enter Advanced School while others are more flexible.

The education system in East Germany before unification differed in a number of respects (see **Figure 1**). First, children entered primary school typically at the age of 6 or 7 years. In most cases they had already attended Kindergarten for about three years which conferred some first elements of instruction.[10] Second, there was no ability-based tracking, everybody attended *Polytechnische Oberschule* (POS). Those who dropped out after grade 8 or 9 are considered to have an education that is equivalent to the West German Basic School. Finishing POS after grade 10 is considered to be equivalent to the West German Middle School. As a third difference only around 10 percent of each East German birth cohort was admitted to *Erweiterte Oberschule* (EOS), where pupils could attain the *Abitur* which granted eligibility to tertiary education.[11] For some birth cohorts EOS pupils were separated already after grade 9 from POS, for other birth cohorts that happened after grade 10. Finally, East German pupils attained their *Abitur* degree after 12 years in school compared to 13 years in West Germany.

Figure 2 depicts the distribution of completed secondary school degrees for the birth cohorts 1935 through 1970 who completed secondary school in East and West Germany prior to reunification. Three differences stand out: (a) the cohort share attaining

---

[10] For details on early childcare in East and West Germany see Felfe and Lalive (2011).

[11] Those, who did not commence EOS education, could attain a "restricted *Abitur*" by combining an apprenticeship with additional schooling in a three year program (BmA, *Berufsausbildung mit Abitur*). The "restricted *Abitur*" allowed them to take up studies in fields related to their apprenticeship. They took a year longer to the *Abitur* than through the EOS pathway. In addition, the system provided for alternative routes to tertiary education by means of vocational schools, which, however, only few individuals took.

the *Abitur* is higher in the West. (b) The socialist education system generated little heterogeneity as the vast majority of the population leaves school with the POS degree.[12] (c) In East Germany, the number of individuals indicating that they left school with a basic school certificate dropped to below twenty percent already for the birth cohort of 1950.[13]

2.2 The Transition Process

After unification, the East German school system took over West German institutions. Already prior to formal unification on Oct. 3, 1990 numerous meetings between East and West German educational policy bodies had prepared the re-organization of the East German institutional framework (Fuchs 1997). Since conservative parties won the first free East German election of March 18, 1990 and also ruled in West Germany at the time, the unification treaty and preparatory measures where shaped by their ideas. The treaty copied the West German educational governance rules to the East and assigned the responsibility for education policies to federal states. Meanwhile, East German education policy had to solve practical problems which related, e.g., to ideology-based instruction, teaching materials, local school governance and choice of headmasters, or foreign language instruction (i.e. English vs. Russian). The first state elections in East Germany took place October 14, 1990. In most regions the conservatives then established the tracked West German secondary education system. Only in the state of Brandenburg social democrats with a preference for a more comprehensive school system dominated.

Most East German school laws were passed in the mid 1990s. All five East German states established Advanced Schools (*Gymnasien*), which prepared for the *Abitur*

---

[12] Unfortunately, the data do not provide details on the number of grades after which the POS degree was conferred. Thus we cannot measure the population share leaving after grade 8 vs. grade 10, i.e. with basic versus middle school equivalent degrees.

[13] It is not obvious why East German birth cohorts at all indicate Basic School degrees after POS had been introduced in 1959. One explanation may be that these individuals had migrated to the East from West Germany, where they had obtained a Basic School degree. Alternatively, individuals may have considered the value of their POS degree as comparable to a traditional basic school degree, when asked in the survey. Below we test the robustness of our results when we give up the distinction between Basic School and POS degrees for East Germany.

degree. In most states basic and middle schools were combined in one. Overall, all states copied the dominant "hierarchical" position of Advanced Schools in the secondary school system. Therefore it is meaningful to investigate the correlates of Advanced School attendance in East and West Germany.

2.3   Aggregate Statistics

This section briefly describes the East and West German secondary school quality from an aggregate perspective (for details see Riphahn and Trübswetter 2011). A comparison of the development of expenditures per pupil yields that average school expenditures per pupil are similar and now even higher in East than in West Germany. Thus, to the extent that expenditures can serve as an indicator, average quality should not differ substantially between the two regions. To gauge average distance to Advanced Schools as a proxy for individual travelling costs, we calculated the number of Advanced Schools in a given state relative to the state area: in East German states there are on average about 6 Advanced Schools in 1000 square-kilometers, compared to more than 10 in the West. Thus, ceteris paribus and on average the individual cost of reaching an Advanced School might be higher in East than in West Germany. Finally, we find increasing numbers of students per teacher in Advanced School in the West and declining numbers in the East. This indicates high educational quality in East Germany, which is supported by student competence tests (PISA-Konsortium 2005).

3.   Data and Descriptive Evidence

3.1   Data Issues

Our analysis is based on data from the German *Mikrozensus,* an annual survey, which collects data on one percent of the German resident population with mandatory participation. The *Mikrozensus* data are particularly useful to study regional educational

mobility over time: first, we need information on the education of parents and their children. Both are available in the *Mikrozensus* when we focus on the secondary school attendance of 17 years olds, who typically still live in the parental household.[14] At age 17 we can match the information of children and parents in a given household to describe the intergenerational education transmission. A second advantage of the *Mikrozensus* is its size which allows us to consider region- and gender-specific subsamples of 17 years olds. Third, the *Mikrozensus* used identical questionnaires over a long time and can thus be used for comparisons over time. The cross-sectional nature of the survey is no restriction because we do not need the panel dimension to study the educational situation of 17 years olds (for a similar application of the data see Hanel and Riphahn 2012).

Lengerer *et al.* (2007) harmonized parts of the *Mikrozensus* data for the survey years 1962-2004. We use these harmonized data for the years 1991, 1993, 1995, 2000, and 2004.[15] East Germany is covered since 1991, the first year of our East-West comparison. We inspect the situation every four to five years. However, as the adjustment process in East Germany might have been concentrated in the first years after unification we add the survey of 1993 to our sample (the data for 1992 and 1994 are not available).

We study the resident population of East and West Germany over time, when migration occurred in both directions. The literature investigating migration flows agrees that those migrating from East to West were higher educated, younger, less likely to be married, and better qualified in unobservable ways than those who stayed in East Germany.[16] Given that we focus on educational mobility in East Germany over time rather

---

[14] Rübenach and Weinmann (2008) show that as of 2007 about 98 percent of male and 95 percent of female 17 years olds still live with their parents.
[15] The 2004 survey is the last one available in harmonized format and which is collected during one single survey week. If we were to use more recent data the education measure might be affected by the modifications in data collection.
[16] See e.g. Brücker and Trübswetter (2007), Hunt (2006), Fuchs-Schündeln and Schündeln (2009), Uhlig (2008) and studies cited there.

than among those residing in East Germany at unification migration does not invalidate our results but may instead contribute to explain them.

We consider those 17 years olds with information on at least one parent. The data identify married parents with their children as one family. If both parents live with their child but are not married, only one of them is coded to live in a family with the child. The other parent is not identified as such in the data but instead is considered a separate family in the same household. In these cases, our single parent indicator mistakenly captures situations where a non-married parent lives in the same household.[17]

We only consider German citizens to avoid measurement problems with foreign schooling degrees. We drop 75 observations of youths with missing information on their current education. Our sample holds 17,439 observations of 17 years old youths for West and 5,794 observations for East Germany (see **Table 1**).

Our dependent variable describes whether an individual attends Advanced School. **Figure 3** describes male and female Advanced School attendance in East and West Germany over time. The cohort share attending Advanced School in East Germany is initially much below that observed in West Germany but catches up rapidly. In both regions of the country the share of females attending Advanced School is above males'. While East German females reach the Advanced School participation rates of their western peers, Advanced School participation among East German males remains below western levels throughout.

Our most important explanatory variable describes parental education. If the education of two parents is available, we use the higher of the two available schooling degrees. Parental education is coded using indicators of missing information (including no

---

[17] If the youth lives with one divorced parent this is coded as a single parent family. If the divorced parent remarries and the new partner joins the household we consider the new step-parent as a parent.

degree), low, middle, or high education.[18] Low education characterizes parents with a Basic School degree. Middle education is coded for parents with Middle School degree or a *Polytechnische Oberschule* (POS) degree from East Germany, and high education describes parents with Advanced School degrees (*Abitur*). **Figure 4** characterizes the distribution of parental educational background over time in East and West. The shift in parental educational attainment to higher categories reflects the educational expansion of recent decades. Over the entire period the share of East German parents with an Advanced School degree is similar to that of West German parents (see **Table 2**).[19] Certainly, East and West German parents with a given educational level did not receive identical instruction as the educational systems differed in many dimensions. However, in both societies educational degrees were indicators of social status, a requirement for academic training, and - at least in West Germany - typically conferred based on ability. Krueger and Pischke (1995) find very similar returns to years of schooling in East and in West Germany and Orlowski and Riphahn (2009) show considerable returns to education in East Germany even in the market economy of the early 2000s. This evidence is suggestive of a correlation between education and ability in East Germany as well. Therefore it is meaningful to compare outcomes for East and West German parents with similar levels of formal education.

As additional control variables we consider youth gender and the age of the older parent, assuming, that older parents are more settled and can afford to invest more time and money in their children. We control for whether there is a single father or a single

---

[18] We prefer to keep youths without parental education information in the sample in order to avoid region- or year-specific, potentially endogenous sample selection that may result if these observations are dropped.
[19] Over all survey years the share of parents with an Advanced School degree is similar in East and West Germany, which contrasts with the evidence on aggregate Advanced School attainment in **Figure 2**. Two factors may explain this contrast: first, East German parents are younger than their West German counterparts, such that rising educational attainment in West Germany appears in a lagged fashion. Second, the correlation between educational attainment and fertility may differ between East and West. If those with higher education have fewer children in the West but not in the East, we obtain the observed result.

mother, the number of siblings living in the household (zero being the reference). Federal state fixed effects are included to account for different schooling systems. The indicator for urban (vs. rural) residence describes whether an individual lives in a town with more than 20,000 inhabitants (for details see **Table 2**).

3.2   Descriptive Evidence on Education Mobility

Table 3 presents a transition matrix for East and West Germany across all survey years and confirms the strong intergenerational educational correlation in East and West Germany: the probability for a 17 years old to attend Advanced School in West Germany increases by 200 percent (to a factor 3) if at least one parent holds an Advanced School rather than a basic school degree (see bottom row). This amounts to even 243 percent (or factor 3.43) in East Germany. The absolute differences in the probability of attending Advanced School are similar in East and West Germany and reach a 40 percentage points advantage for children of high vs. low educated parents.

Next, we investigate how the conditional probabilities of Advanced School attendance developed in the two regions over time (see **Table 4**). We consider both, the relative and absolute difference in the probability to attend Advanced School for different parental education outcomes. In 1991 three out of four measures of intergenerational mobility indicate a slightly higher mobility in East than in West Germany confirming hypothesis H1. Among West Germans (see Panel A) the relative advantage of children with high vs. low educated parents declined from a factor of 3.41 in 1991 to 3.06 in 2004. This development is paralleled by a decline in absolute differences over time. Thus, the disadvantage of children of parents with basic school education declined but they are still only one third as likely to attend Advanced School compared to children of highly educated parents. At the same time, the relative and absolute difference in the probability

of attending Advanced School for children of highly educated parents compared to children of parents with a middle school degree stayed about constant.

Even though Advanced School attendance in East Germany increased from 21 to 34 percent over time (see Panel B) the evidence does not indicate a trend towards higher mobility there: three out of four immobility indicators increased over time, at times even substantially. This suggests that relative and absolute educational enrollment probabilities now depend more on parental background than they did immediately after unification, which matches hypotheses two (H2). The distribution of educational opportunity has become more unequal.[20] The bottom rows in **Table 4** show that the share of parents with Advanced School degrees in East Germany increased only slightly over time and did not yet reach recent West German levels.

4.   Multivariate Analysis

The descriptive statistics yielded similar patterns for the correlation between parent and child education in East and West Germany in 1991 and declining mobility in East Germany since. Next, we use multivariate Probit regressions to estimate the correlation between parental characteristics and child Advanced School attendance, conditioning on potentially relevant covariates.

As a first step we investigate the average correlation between parental education (PE), individual and household characteristics (X), and child Advanced School enrollment (AS) for East and West Germans. As we are interested in differences between East and West Germany, we consider interaction terms for East German observations (East):

$$\Pr(AS_i = 1) = \Phi(\beta_0 + \beta_1 PE_i + \beta_2 X_i + \gamma_1 PE_i East_i + \gamma_2 X_i East_i + \beta_3 FE_i).$$

---

[20] The unusual increase in the probability of Advanced School attendance among children of East German basic school educated parents in 2000 is likely connected to the decline in the total number of parents with basic education (cf. **Figure 2.2** and **Figure 4**) in East Germany from about 17 percent of the parents in 1991 to about 4 percent of the parents in 2004. With fewer observations the resulting shares are less stable.

Here i indicates the individual youth, Φ represents the cumulative standard normal distribution function, β and γ are parameters to be estimated. FE stands for a vector of year and state fixed effects. This specification allows us to test whether correlation patterns differ significantly between East and West Germany.

Results of the probit estimation are presented in **Table 5.** The coefficient estimates in column 1 describe West German patterns, those in column 2 indicate deviations for East German 17 years olds from West German patterns. The results suggest that a number of correlations are significantly different for East and West Germany. In particular, the coefficient vector γ_1 for the East German interaction of parental education is jointly significant at the one percent level: the disadvantage of children of parents with only middle school education appears to be substantially larger in East compared to West Germany. Surprisingly, men differ more strongly from women in the East. Urban residence seems to be helpful for educational enrollment in the West. In both regions, children with one sibling have the highest probability of attending Advanced School with slightly larger disadvantages for children from larger families in the East than in the West. The federal state fixed effects suggest that advanced school graduation rates are generally higher in East than West Germany.

Since the interpretation of interaction terms in nonlinear models is somewhat involved (Ai and Norton 2003), we calculated predicted probabilities of Advanced School attendance at sample characteristics separately by parental education for both regions and averaged across survey years. The predictions at the bottom of **Table 5** are close to the aggregate figures in **Table 3** and show that the probability to attend Advanced School increases with parental schooling.

Besides investigating average differences, we are interested in changes over time. To measure such developments in the most flexible way we re-estimate the probit model

separately by region and survey year in step two of our analysis. We generated average predicted annual probabilities for child Advanced School attendance at the observed characteristics of the year- and region-specific sample. **Table 6** shows the predicted annual probabilities by parental education for the 17 years olds between 1991 and 2004 in East and West (see rows numbered 1-3 in Panels A and B). Our first hypothesis (H1) predicted higher initial educational mobility in East than in West Germany. The predictions presented in the column for 1991 do not support this expectation: while general Advanced School attendance remained about constant in West Germany (see row labeled "Average") we see an increase in the East by more than 60 percent from 21 to 34 percent. The children of highly educated parents residing in the East appear to have caught up with their counterparts in West Germany as about 60 percent attend Advanced School since 1995. However, the predicted average Advanced School attendance rates among children of parents with basic and middle school degrees in the East are still significantly below those in West Germany: in 2004, 14 and 27 percent attended Advanced School in East Germany compared to 21 and 39 percent in West Germany. The falling relative and absolute differences (see bottom rows of Panel A, **Table 6**) indicate that educational mobility increased over time in the West. In the East, the differences in Advanced School attendance by parental educational background are not all statistically significant. However, the general patterns show that they grew over time (see the last two columns). The multivariate results thus confirm that educational mobility declined in East Germany and is now below that in West Germany, confirming H2.

As the basic school outcome among East German parents might reflect measurement error - this track was abolished as early as 1959 - we performed a robustness test: instead of estimating the correlation between basic and middle school educated parents separately we combined the categories and redid the analysis. The results are

presented in Panels C and D of **Table 6**. They confirm increasing educational mobility in West Germany. In East Germany the relative difference declined somewhat between 1991 and 2004 but the absolute difference in predicted Advanced School attendance probabilities increased over time. These results are slightly more ambiguous than those in Panel B, however they do not yield improvements in educational mobility in East Germany. Overall the children of well educated parents quickly caught up with West German education patterns, while the children of parents with lower education in East Germany did not.[21]

Equality of educational opportunity is limited if parental educational background has strong effects on child education. Similarly, educational opportunity may be unequally distributed with respect to students' gender, family size, and rural residence. In step three of our analysis we evaluate the correlation of these outcomes with Advanced School attendance in East and West Germany over time in **Tables 7.1-7.3**. Again, predictions were generated based on separate estimations by region and year. Generally, women are significantly more likely to attend Advanced School than men and the advantage of females in the East exceeds that of females in West Germany, as predicted by hypothesis H3. This difference has increased in relative and absolute terms over time in West Germany, while it declined in the East (see **Table 7.1**). This matches hypotheses H4. In the East boys caught up more than girls, in the West attendance rates increased only for girls (see rightmost columns of **Table 7.1**).

The association of the number of siblings with educational enrollment indicates that family time and budget constraints may still be binding. Generally, the literature does not focus on the educational success of single children. Instead, the relevance of

---

[21] This suggests that the impact of East-West differences in parental ability sorting across educational degrees is limited. One might expect parents with less than Advanced School degrees in East Germany to possess more unobserved ability than their West German counterparts. Apparently they did not succeed in passing this advantage on to their offspring by way of higher quality schooling.

constraints is typically identified by comparing the impact of one versus more siblings. This is why we compare predicted outcomes for families with at least two ("One sibling") versus families with more children ("More than one sibling") (see **Table 7.2**). Overall, having just one sibling appears to be correlated with a slightly higher probability of attending Advanced School. While the relative disadvantage of children from large families decreased somewhat in West Germany since 1991 (see bottom rows of panel West), it has increased strongly in the East from no difference in 1991 to a 32 percent higher probability of Advanced School attendance in small families in 2004. This ratio is significantly different from one. The probability of attending Advanced School in West Germany increased most for those with many siblings and in the East it increased most for single children. These opposite developments support the notion that social mobility improved over time in the West while it declined in East Germany.

Finally, we inspect whether children growing up in the countryside are disadvantaged in their Advanced School attendance compared to those being raised in urban areas, e.g. due to higher cost of transportation (cf. Riphahn and Heineck 2009). Average predicted probabilities in **Table 7.3** show slight disadvantages for rural children, which are significant only in relative terms. This difference stayed about constant in West Germany and disappeared in the East by 2004. [22]

5.   Conclusions

This is the first study to investigate educational mobility in East and West Germany after unification. Our empirical analysis is based on the German *Mikrozensus* (1991-2004) and measures the correlation between child secondary school track choice at

---

[22] The only definition of rural origin that could be used in all *Mikrozensus* surveys refers to communities with fewer than 20,000 inhabitants. In contrast, Heineck and Riphahn (2009) applied subjective information, where about one third of the respondents indicated that they grew up in the countryside.

age 17 and parental education. We compare schooling outcomes and educational mobility in East and West and evaluate developments over time.

Prior to unification, the East German secondary schools provided access to Advanced School for only about 10 percent of any birth cohort, which compares to almost 30 percent in West Germany. Consequently, as of 1991, the probability of holding an Advanced School degree and of attending Advanced School was much lower in East than in West Germany. However, already in 1993, the cohort share of East German 17 years olds attending Advanced School had almost reached West German levels. We hypothesize that (i) educational mobility is initially higher in East than in West Germany, (ii) it declined in East Germany over time, (iii) females are initially better off in the East than in the West, and, (iv), this relative advantage disappears over time.

We apply multivariate probit analyses to test these hypotheses and to determine the correlation of parental education and the probability that a 17 years old attends Advanced School. Parental education is correlated with child education and the correlation patterns differ significantly between East and West. We estimated our model separately for each survey year and region and study the development of the association between parent and child education over time. The evidence does not support the hypothesis that initial mobility was higher in East than in West Germany. However, the results confirm that intergenerational mobility declined in East Germany after unification.

In separate estimations we evaluated the correlation of youth educational choices with gender, family size, and rural vs. urban origin to determine the extent of equal opportunities in East and West and the developments over time. Most recently, gender-related patterns converged to an almost identical educational advantage for females in both regions, which matches the predictions of our hypotheses. Additionally, we find that children with one sibling enjoy advantages compared to those with more than one sibling

in both regions of the country. Whereas this advantage declined in West Germany it increased in the East suggesting again that equality of opportunity is declining.

We compare the resident population in East and West Germany without consideration to the fact that demographic developments differed in the two regions. Overall, the conversion to the West German secondary school system did not improve equality of access to Advanced School education for East German youths. This confirms trends observed in other transition economies (see e.g. Hertz *et al.* 2009, Mateju *et al.* 2003, or Hazans *et al.* 2008). However, while shifts to greater inequality in other transition economies might be due to economic crises and thus transitory, this does not hold for East Germany, where budget cuts were not a driving force of the development. Instead, the results call for further research into the institutional determinants of intergenerational mobility in the German secondary school system.

References

Ai, Chunrong and Edward C. Norton, 2003, Interaction terms in logit and probit models, Economics Letters 80, 123-129.

Bauer, Philipp and Regina T. Riphahn, 2006, Timing of school tracking as a determinant of intergenerational transmission of education, Economics Letters 91, 90-97.

Bauer, Philipp and Regina T. Riphahn, 2007, Heterogeneity in the Intergenerational Transmission of Educational Attainment: Evidence from Switzerland on Natives and Second Generation Immigrants, Journal of Population Economics 20(1), 121-148.

Bauer, Philipp and Regina T. Riphahn, 2012, Institutional Determinants of Intergenerational Education Transmission - Comparing Alternative Mechanisms for Natives and Immigrants, LASER Discussion Paper No. 60, University of Erlangen-Nuremberg.

Beblo, Miriam and Charlotte Lauer, 2004, Do family resources matter? Educational attainment during transition in Poland, Economics of Transition 12(3), 537-558.

Black, Sandra E., Paul J. Devereux, and Kjell G. Salvanes, 2005, Why the Apple Doesn't Fall Far: Understanding Intergenerational Transmission of Human Capital, American Economic Review 95(1), 437-449.

Blossfeld, Hans-Peter, 1993, Changes in Educational Opportunities in the Federal Republic of Germany. A Longitudinal Study of Cohorts Born Between 1916 and 1965, in: Shavit, Yossi and Hans-Peter Blossfeld (eds.), 1993, Persistent Inequality. Changing Educational Attainment in Thirteen Countries, Westview Press: Boulder *et al.*, 51-74.

Brücker, Herbert and Parvati Trübswetter, 2007, Do the best go west? An analysis of the self-selection of East-West migrants in Germany, Empirica 34, 371-395.

Couch, Kenneth A. and Thomas A. Dunn, 1997, Intergenerational Correlations in Labor Market Status. A Comparison of the United States and Germany, Journal of Human Resources 32(1), 210-232.

Currie, Janet, 2001, Early Childhood Education Programs, Journal of Economic Perspectives 15, 213-238.

Deming, D. and S. Dynarski, 2008, The Lengthening of Childhood, Journal of Economic Perspectives 22, 71-92.

Dustmann, Christian, 2004, Parental background, secondary school track choice, and wages, Oxford Economic Papers 56, 209-230.

Felfe, Christina and Rafael Lalive, 2011, How does early childcare affect child development? Learning from the German unification, mimeo, University of St. Gallen, Switzerland.

Fuchs, Hans-Werner, 1997, Bildung und Wissenschaft seit der Wende. Zur Transformation des ostdeutschen Bildungssystems, Leske+Budrich, Opladen.

Fuchs-Schündeln, Nicola and Matthias Schündeln, 2009, Who stays, who goes, and who returns? East-West migration within Germany since reunification, Economics of Transition 17(4), 703-738.

Ganzeboom, Harry B.G. and Paul Nieuwbeerta, 1999, Access to education in six Eastern European countries between 1940 and 1985. Results of a cross-national survey, Communist and Post-Communist Studies 32, 339-357.

Hanel, Barbara and Regina T. Riphahn, 2012, The Employment of Mothers - Recent Developments and their Determinants in East and West Germany, Jahrbücher für Nationalökonomik und Statistik (Journal of Economics and Statistics) 232(2), 146-176.

Hanushek, Eric. A. and Ludger Woessmann, 2006, Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence Across Countries, Economic Journal 116, C63-C76.

Hazans, Mihails, Ija Trapeznikova, and Olga Rastrigina, 2008, Ethnic and parental effects on schooling outcomes before and during the transition: evidence from the Baltic countries, Journal of Population Economics 21(3), 719-749.

Heineck, Guido and Regina T. Riphahn, 2009, Intergenerational Transmission of Educational Attainment in Germany – The Last Five Decades, Jahrbücher für Nationalökonomik und Statistik (Journal of Economics and Statistics) 229(1), 36-60.

Henz, Ursula and Ineke Maas, 1995, Chancengleichheit durch die Bildungsexpansion?, Kölner Zeitschrift für Soziologie und Sozialpsychologie 47(4), 605-633.

Hertz, Tom, Tamara Jayasundera, Patrizio Piraino, Sibel Selcuk, Nicole Smith, and Alina Verashchagina, 2007, The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends, The B.E. Journal of Economic Analysis & Policy. Advances 7(2), Article 10.

Hertz, Tom, Mieke Meurs, and Sibel Selcuk, 2009, The decline in intergenerational mobility in Post-Socialism: Evidence from the Bulgarian Case, World Development 37(3), 739-752.

Hunt, Jennifer, 2002, The Transition in East Germany: When Is a Ten-Point Fall in the Gender Wage Gap Bad News?, Journal of Labor Economics 20(1), 148-169.

Hunt, Jennifer, 2006, Staunching Emigration from East Germany: Age and the Determinants of Migration, Journal of the European Economic Association 4(5), 1014-1037.

Krueger, Alan B. and Jörn-Steffen Pischke, 1995, A comparative analysis of East and West German labor markets: Before and after unification, in Freeman, R. B. and Katz, L. F. (eds), Differences and Changes in Wage Structures, Chicago, IL: University of Chicago Press, 405-445.

Lauer, Charlotte, 2003, Family background, cohort and education: A French-German comparison based on a multivariate ordered probit model of educational attainment, Labour Economics 10(2), 231-251.

Lengerer, Andrea, Julia Schroedter, Tobias Hubert and Christof Wolf (eds.), 2007, Harmonisierung der Mikrozensen 1962 - 2004. ZUMA-Methodenbericht 2007/06, http://www.gesis.org/Publikationen/Berichte/ZUMA_Methodenberichte/documents/pdfs/2007/07_06_lengerer.pdf (29.6.2008)

Mateju, Petr, Blanka Rehakova, and Natalie Simonova, 2003, Transition to University under Communism and after Its Demise. The Role of Socio-Economic Background in the Transition between Secondary and Tertiary Education in the Czech Republic 1948-1998, Czech Sociological Review 39(2), 301-324.

Müller, Walter and Dietmar Haun, 1994, Bildungsungleichheit im sozialen Wandel?, Kölner Zeitschrift für Soziologie und Sozialpsychologie 46(1), 1-42.

Orlowski, Robert and Regina T. Riphahn, 2009, The East German wage structure after transition, Economics of Transition 17(1), 1-31.

PISA-Konsortium, 2005, PISA 2003: Ergebnisse des zweiten Ländervergleichs, Zusammenfassung, (http://www.ipn.uni-kiel.de/pisa/PISA2003_E_Zusammenfassung.pdf, accessed Sept 6, 2010).

Plug, Erik and Wim Vijverberg, 2003, Schooling, Family Background, and Adoption: Is It Nature or Is It Nurture, Journal of Political Economy 111(3), 611-641.

Riphahn, Regina T. and Florian Schieferdecker, 2012, The Transition to Tertiary Education and Parental Background over Time, Journal of Population Economics 25(2), 635-675.

Riphahn, Regina T. and Parvati Trübswetter, 2011, The intergenerational transmission of educational attainment in East and West Germany, *IAB Discussion Paper* 4/2011, Institute for Employment Research, Nuremberg, Germany.

Rübenach, Stefan P. and Julia Weinmann, 2008, Haushalte und Lebensformen der Bevölkerung. Ergebnisse des Mikrozensus 2007, Wirtschaft und Statistik 9/2008, 772-783.

Sacerdote, Bruce, 2002, The Nature and Nurture of Economic Outcomes, American Economic Review 92(2), 344-348.

Schnepf, Sylke Viola, 2002, A Sorting Hat that Fails? The Transition from Primary to Secondary School in Germany, Innocenti Working Paper No. 92, UNICEF Innocenti Research Center, Florence.

Schuetz, Gabriela, Heinrich W. Ursprung, and Ludger Woessmann, 2008, Education Policy and Equality of Opportunity, Kyklos 61(2), 279-308.

SVR (Sachverständigenrates zur Begutachtung der gesamtwirtschaftlichen Entwicklung), 1994, Jahresgutachten 1994/95: Den Aufschwung sichern, Arbeitsplätze schaffen, Deutscher Bundestag 13. Wahlperiode, Drucksache 13-26.

Tamm, Marcus, 2008, Does Money Buy Higher Schooling? Evidence from Secondary School Track Choice in Germany, Economics of Education Review 27, 536-545.

Uhlig, Harald, 2008, The slow decline in East Germany, Journal of Comparative Economics 36(4), 517-541.

Varga, Julia, 2006, The Role of Labour Market Expectations and Admission Probabilities in Students' Application Decisions on Higher Education: The Case of Hungary, Education Economics 14(3), 309-327.

Woessmann, Ludger, 2008, How equal are educational opportunities? Family background and student achievement in Europe and the United States, Zeitschrift für Betriebswirtschaft 78(1), 45-70

Woessmann, Ludger, 2010, Institutional Determinants of School Efficiency and Equity: German States as a Microcosm for OECD Countries, Jahrbücher für Nationalökonomie und Statistik (Journal of Economics and Statistics) 230(2), 234-270.

Figure 1   Traditional secondary school systems in East and West Germany prior to unification

Age	Grade	West			Grade	East
4						Kindergarten
5						
6	1	Primary School			1	
7	2				1	
8	3				2	P.O.S.
9	4				3	
10	5	Basic School	Middle School	Advanced School	4	
11	6				5	
12	7				6	
13	8				7	
14	9				8	
15	10				9	
16	11				10	
17	12				11	EOS
18	13				12	EOS / BmA
19						
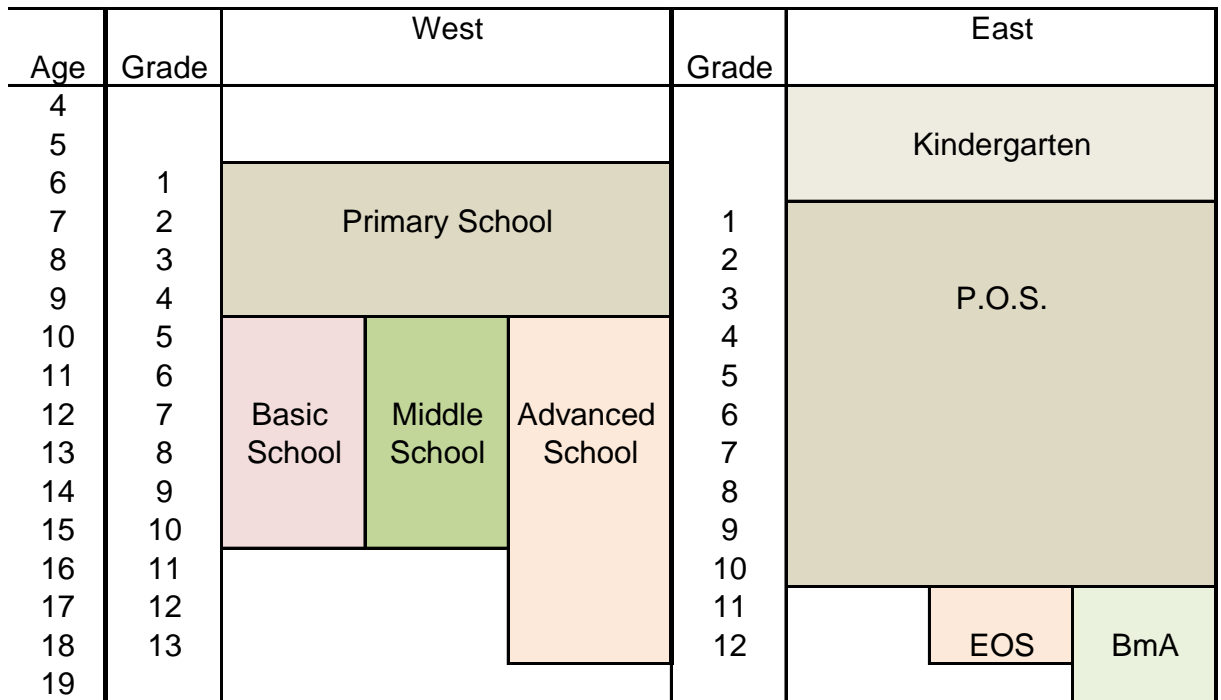
Source: Own presentation.

Figure 2 Cohort shares of secondary school degrees in East- and West Germany - as completed at unification (cohorts 1935-1970)
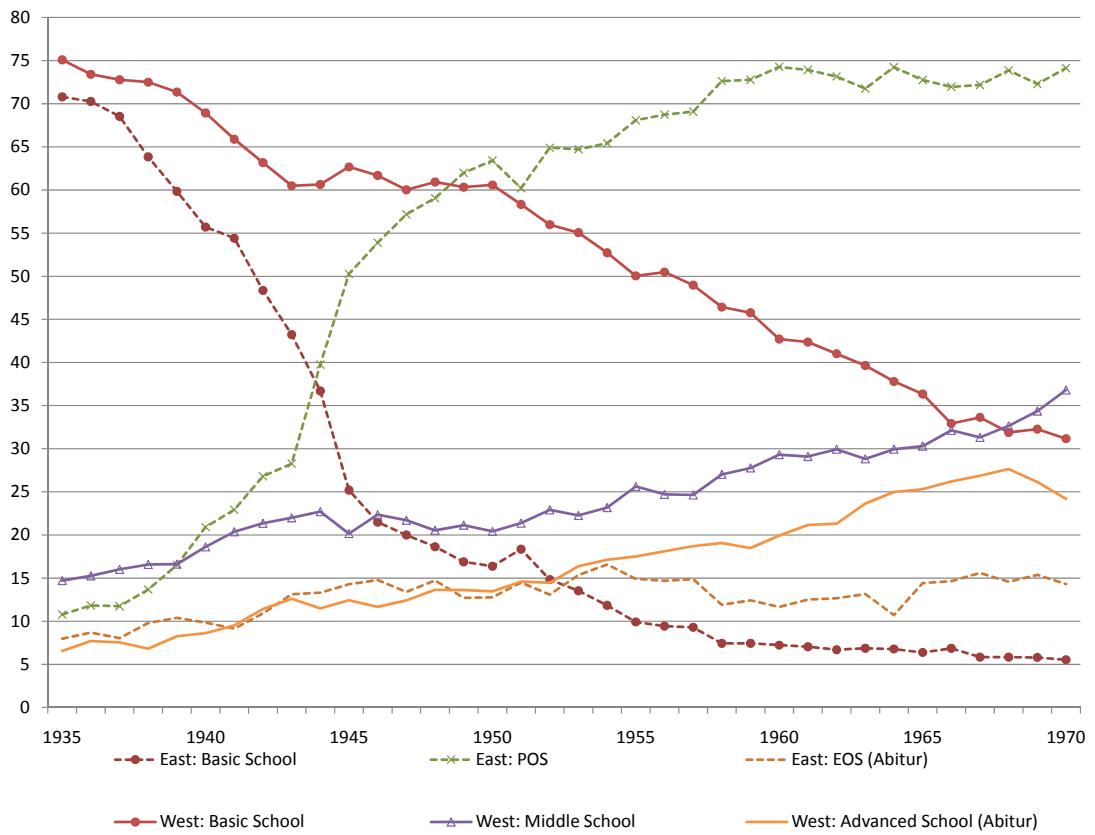
Notes: The shares do not add up to 100 percent per cohort as those without degrees (less than 5 percent), those with Middle School degrees (mostly less than 5 percent) and those with polytechnic-eligibility (less than 5 percent) were omitted to enhance clarity.

Source: *Mikrozensus 1991*

Figure 3   Share of 17 years olds in advanced school by region and year
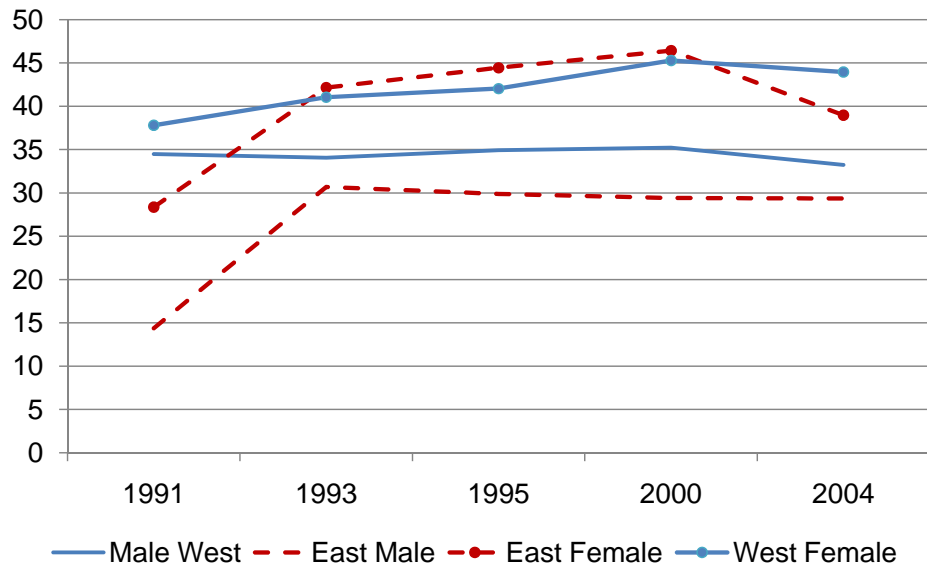
Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Figure 4   Parental educational attainment over time in East and West Germany by survey year

(a)   West Germany
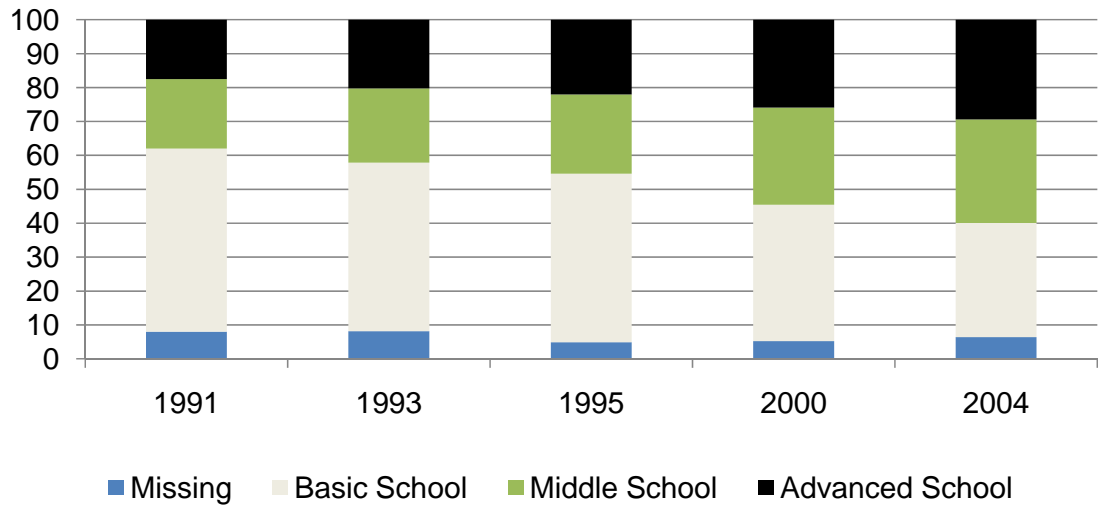
(b)   East Germany
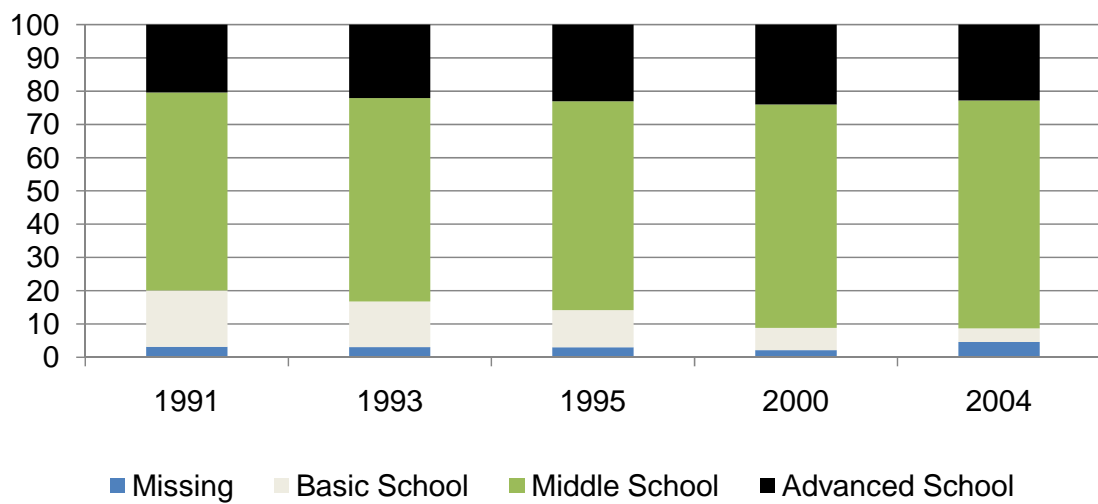
Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 1   Sample sizes of 17 years olds in East and West Germany over time

	West			East		
	All	**Men**	**Women**	**All**	**Men**	**Women**
1991	3,399	1,764	1,635	1,051	529	522
1993	3,287	1,706	1,581	1,019	528	491
1995	3,336	1,749	1,587	1,314	693	621
2000	3,598	1,882	1,716	1,235	636	599
2004	3,819	1,965	1,854	1,175	613	562
Total	17,439	9,066	8,373	5,794	2,999	2,795

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 2   Descriptive statistics

	West Mean (Std. Dev.)	East Mean (Std. Dev.)
Dependent Variable:		
Advanced School Attendance	0.38	0.33
Highest parental education		
Missing	0.07	0.03
Basic School	0.45	0.10
Middle School	0.25	0.64
Advanced School	0.23	0.23
Additional explanatory variables		
Male	0.52	0.52
Urban	0.53	0.45
Age of older parent	47.04 (5.86)	43.89 (5.30)
No mother in family	0.05	0.04
No father in family	0.16	0.20
No sibling	0.50	0.51
One sibling	0.35	0.38
Two and more siblings	0.15	0.11
Calendar Year		
1991	0.19	0.18
1993	0.19	0.18
1995	0.19	0.23
2000	0.21	0.21
2004	0.22	0.20
Federal State		
Schleswig-Holstein	0.04	
Hamburg	0.02	
Niedersachsen	0.12	
Bremen	0.01	
Nordrhein-Westfahlen	0.26	
Hessen	0.09	
Rheinland-Pfalz	0.06	
Baden-Württemberg	0.16	
Bayern	0.20	
Saarland	0.02	
Berlin	0.02	0.07
Brandenburg		0.17
Mecklenburg-Vorpommern		0.13
Sachsen		0.29
Sachsen-Anhalt		0.16
Thüringen		0.17
Number of observations	17439	5794

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 3   Average transition matrix by region across all survey years

	Child Advanced School Attendance	
	West	East
Parental Education		
1 Missing	36.0	25.7
2 Basic School	22.0	17.1
3 Middle School	41.9	27.6
4 Advanced School	65.8	58.7
All Parents:	38.2	33.7
Ratio: row 4 / row 2	3.00	3.43

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 4　　　Observed advanced school enrollment ratios – by region and over time

	1991	1993	1995	2000	2004
A - West					
Overall share children advanced school	0.36	0.37	0.38	0.40	0.38
1 P(child advanced I parent basic)	0.21	0.20	0.23	0.26	0.20
2 P(child advanced I parent middle)	0.46	0.46	0.44	0.39	0.38
3 P(child advanced I parent advanced)	0.71	0.69	0.66	0.65	0.61
Relative Difference 3 / 1	**3.41**	**3.41**	**2.87**	**2.53**	**3.06**
Absolute Difference 3 - 1	**0.50**	**0.49**	**0.43**	**0.39**	**0.41**
Relative Difference 3 / 2	**1.55**	**1.50**	**1.49**	**1.66**	**1.62**
Absolute Difference 3 - 2	**0.25**	**0.23**	**0.22**	**0.26**	**0.24**
B - East					
Overall share children advanced school	0.21	0.36	0.37	0.38	0.34
1 P(child advanced I parent basic)	0.12	0.18	0.16	0.29	0.15
2 P(child advanced I parent middle)	0.17	0.31	0.31	0.30	0.27
3 P(child advanced I parent advanced)	0.42	0.64	0.63	0.61	0.60
Relative Difference 3 / 1	**3.36**	**3.58**	**3.83**	**2.12**	**4.14**
Absolute Difference 3 - 1	**0.29**	**0.46**	**0.46**	**0.32**	**0.46**
Relative Difference 3 / 2	**2.43**	**2.03**	**2.00**	**2.04**	**2.26**
Absolute Difference 3 - 2	**0.24**	**0.33**	**0.31**	**0.31**	**0.34**
West - Share parents advanced school	0.18	0.20	0.22	0.26	0.29
East - Share parents advanced school	0.20	0.22	0.23	0.24	0.23

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 5   Probit estimation results – fully interacted model for east and west

	Coefficients	Interactions	Average Marginal Effects	Interactions
	West **(t-value)**	**East** **(t-value)**	**West** **(z-value)**	**East** **(z-value)**
Parental Education				
missing	-0.747**	-0.103	-0.284**	-0.316**
	(-17.03)	(0.89)	(17.78)	(9.13)
basic school	-1.156**	-0.078	-0.419**	-0.417**
	(43.38)	(1.00)	(46.21)	(20.72)
middle school	-0.562**	-0.206**	-0.215**	-0.291**
	(19.73)	(4.16)	(20.17)	(18.53)
advanced school	reference	reference	reference	reference
Individual and Household Characteristics				
male	-0.224**	-0.167**	-0.075**	-0.131**
	(11.02)	(4.09)	(11.04)	(11.20)
urban residence	0.074**	-0.043	0.025**	0.007
	(3.19)	(0.99)	(3.19)	(0.53)
age of oldest parent	0.022**	-0.004*	0.007**	0.004**
	(11.63)	(2.14)	(11.75)	(3.37)
single father household	-0.057	0.067	-0.019	0.001
	(1.19)	(0.63)	(1.20)	(0.03)
single mother household	-0.056*	0.052	-0.018+	-0.007
	(1.90)	(0.96)	(1.91)	(0.45)
no siblings	reference	reference	reference	reference
one sibling	0.050*	0.012	0.017*	0.013
	(2.11)	(0.27)	(2.11)	(0.96)
two or more siblings	-0.027	-0.025	-0.009	-0.025
	(0.87)	(0.37)	(0.87)	(1.26)
Federal state fixed effects				
Schleswig-Holstein	-0.080		-0.026	
	(0.67)		(-0.67)	
Hamburg	0.056		0.018	
	(0.44)		(0.44)	
Lower Saxony	0.053		0.017	
	(0.47)		(0.47)	
Bremen	0.254		0.086	
	(1.58)		(1.57)	
Northrhine-Westfalia	0.141		0.047	
	(1.3)		(1.31)	
Hesse	0.171		0.057	
	(1.52)		(1.53)	
Rhineland-Palatinate	0.070		0.023	
	(0.61)		(0.61)	
Baden-Wuerttemberg	0.039		0.013	
	(0.35)		(0.35)	
Bavaria	-0.217+		-0.068	
	(1.96)		(-1.92)	
Saarland	0.263*		0.089	
	(1.97)		(1.97)	
Berlin		0.182*		0.061
		(2.13)		(2.17)
Brandenburg		0.375**		0.128
		(5.75)		(5.82)
Saxony		0.051		0.017
		(0.84)		(0.85)
Saxony-Anhalt		0.137*		0.046
		(2.05)		(2.05)
Thuringia		0.180**		0.060
		(2.73)		(2.74)
Mecklenburg-Vorpommern	reference	reference	reference	reference
Year fixed effects	yes	yes	yes	yes
Predicted Probability of Youth Advanced School Attendance				
Parent basic school	0.22	0.17		
Parent middle school	0.43	0.28		
Parent advanced school	0.64	0.57		

Notes: The estimation was performed using 23,233 observations. The log likelihood amounts to -13,558.568. +, * and ** indicate statistical significance at the 10, 5 and 1 percent level. The reference state for the federal state fixed effects is Mecklenburg-Vorpommern, the most northern state in East Germany. We present asymptotic t-values based on heteroskedasticity robust standard errors. Predicted probabilities were generated at observed sample characteristics and averaged over time. Average marginal effects are presented for East and West Germany.

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 6 Development of predicted advanced school attendance probabilities over time

	All Years (Std.Err.)	1991 (Std.Err.)	1995 (Std.Err.)	2004 (Std.Err.)	Rel. Diff. 2004 / 1991	Abs. Diff. 2004 - 1991
A - West						
Average	0.38	0.36	0.38	0.38	1.06	0.02
1 Parent basic school	0.22	0.21	0.24	0.21	0.97	-0.01
2 Parent middle school	0.43	0.46	0.45	0.39	0.83	-0.08
3 Parent advanced school	0.64	0.69	0.64	0.60	0.87	-0.09
Relative Difference 3 / 1	2.91	3.24	2.67	2.90	0.90	-0.34
	(.547)	(.702)	(.743)	(.738)		
Absolute Difference 3 - 1	0.42	0.48	0.40	0.39	0.81	-0.09
	(.022)	(.029)	(.044)	(.038)		
Relative Difference 3 / 2	1.49	1.48	1.42	1.55	1.04	0.06
	(.134)	(.172)	(.187)	(.196)		
Absolute Difference 3 - 2	0.21	0.22	0.19	0.21	0.94	-0.01
	(.015)	(.035)	(.035)	(.025)		
B - East						
Average	0.33	0.21	0.37	0.34	1.62	0.13
1 Parent basic school	0.16	0.10	0.14	0.14	1.38	0.04
2 Parent middle school	0.28	0.18	0.33	0.27	1.48	0.09
3 Parent advanced school	0.57	0.41	0.60	0.61	1.49	0.20
Relative Difference 3 / 1	3.56	3.94	4.33	4.28	1.08	0.33
	(1.094)	(2.298)	(2.256)	(3.756)		
Absolute Difference 3 - 1	0.40	0.30	0.46	0.47	1.57	0.17
	(.055)	(.083)	(.063)	(.088)		
Relative Difference 3 / 2	2.04	2.24	1.84	2.27	1.01	0.02
	(.394)	(.540)	(.376)	(.565)		
Absolute Difference 3 - 2	0.29	0.23	0.27	0.34	1.51	0.11
	(.034)	(.062)	(.044)	(.047)		
C - West (joint category: parents with basic or middle school degrees)						
1 Parent basic / middle school	0.30	0.28	0.31	0.29	1.04	0.01
2 Parent advanced school	0.64	0.69	0.64	0.60	0.87	-0.09
Relative Difference 2 / 1	2.13	2.46	2.06	2.07	0.84	-0.40
	(.331)	(.544)	(.470)	(.391)		
Absolute Difference 2 - 1	0.34	0.41	0.33	0.31	0.76	-0.10
	(.016)	(.034)	(.039)	(.029)		
D - East (joint category: parents with basic or middle school degrees)						
1 Parent basic / middle school	0.27	0.16	0.30	0.26	1.61	0.10
2 Parent advanced school	0.57	0.41	0.61	0.61	1.49	0.20
Relative Difference 2 / 1	2.11	2.51	2.05	2.32	0.92	-0.19
	(.519)	(.748)	(.496)	(.626)		
Absolute Difference 2 - 1	0.30	0.25	0.31	0.35	1.41	0.10
	(.037)	(.066)	(.041)	(.046)		

Notes: The predicted probabilities are generated in separate estimations of the specification as presented in Table 5 by year and region (east vs. west). The predicted values in the column labeled average were generated in the joint estimation over all five years of data. The standard errors for the absolute and relative differences are obtained via bootstrap with 100 replications.

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.

Table 7   Development of predicted advanced school attendance probabilities by gender, number of siblings, and urban vs. rural residence

7.1   Gender differences

	Average (Std.Err.)	1991 (Std.Err.)	1995 (Std.Err.)	2004 (Std.Err.)	Rel. Diff. 2004 / 1991	Abs. Diff. 2004 - 1991
West						
1 Female	0.42	0.38	0.42	0.44	1.16	0.06
2 Male	0.35	0.34	0.35	0.33	0.97	-0.01
Relative Difference 1 / 2	1.20	1.12	1.20	1.33	1.19	0.22
	(.101)	(.071)	(.100)	(.175)		
Absolute Difference 1 - 2	0.07	0.04	0.07	0.11	2.75	0.07
	(.014)	(.016)	(.020)	(.025)		
East						
1 Female	0.40	0.28	0.44	0.39	1.39	0.11
2 Male	0.27	0.14	0.30	0.30	2.14	0.16
Relative Difference 1 / 2	1.48	2.00	1.47	1.30	0.65	-0.70
	(.272)	(.549)	(.371)	(.278)		
Absolute Difference 1 - 2	0.13	0.14	0.14	0.09	0.64	-0.05
	(.031)	(.052)	(.043)	(.034)		

7.2   Difference by number of siblings

	Average (Std.Err.)	1991 (Std.Err.)	1995 (Std.Err.)	2004 (Std.Err.)	Rel. Diff. 2004 / 1991	Abs. Diff. 2004 - 1991
West						
1 No siblings	0.38	0.35	0.36	0.38	1.09	0.03
2 One sibling	0.39	0.38	0.42	0.40	1.05	0.02
3 More than one sibling	0.37	0.34	0.36	0.38	1.12	0.04
Relative Difference 2 / 3	1.05	1.12	1.17	1.05	0.94	-0.07
	(.042)	(.103)	(.112)	(.076)		
Absolute Difference 2 - 3	0.02	0.04	0.06	0.02	0.50	-0.02
	(.011)	(.028)	(.030)	(.020)		
East						
1 No siblings	0.33	0.22	0.35	0.36	1.64	0.14
2 One sibling	0.35	0.21	0.40	0.33	1.57	0.12
3 More than one sibling	0.31	0.21	0.35	0.25	1.19	0.04
Relative Difference 2 / 3	1.13	1.00	1.14	1.32	1.32	0.32
	(.102)	(.258)	(.217)	(.556)		
Absolute Difference 2 - 3	0.04	0.00	0.05	0.08		0.08
	(.023)	(.048)	(.039)	(.056)		

7.3   Difference by urban vs. rural residence

	Average (Std.Err.)	1991 (Std.Err.)	1995 (Std.Err.)	2004 (Std.Err.)	Rel. Diff. 2004 / 1991	Abs. Diff. 2004 - 1991
West						
1 Rural	0.37	0.33	0.38	0.37	1.12	0.04
2 Urban	0.39	0.39	0.39	0.40	1.03	0.01
Relative Difference 1 / 2	0.95	0.85	0.97	0.93	1.09	0.08
	(.030)	(.079)	(.054)	(.064)		
Absolute Difference 1 - 2	-0.02	-0.06	-0.01	-0.03	0.50	0.03
	(.010)	(.021)	(.018)	(.018)		
East						
1 Rural	0.33	0.21	0.35	0.34	1.62	0.13
2 Urban	0.34	0.22	0.38	0.34	1.55	0.12
Relative Difference 1 / 2	0.97	0.95	0.92	1.00	1.05	0.05
	(.046)	(.139)	(.103)	(.133)		
Absolute Difference 1 - 2	-0.01	-0.01	-0.03	0.00	0.00	0.01
	(.012)	(.029)	(.025)	(.028)		

Notes: see Table 6.

Source: *Mikrozensus* samples 1991, 1993, 1995, 2000, and 2004 and own calculations.