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Income Equality, School Performance and Educational Mobility

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Income equality, school performance and educational mobility

Working Paper No. 2011 - 03

Income equality, school performance and educational mobility

by

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Abstract

Is income equality a precondition for higher school performance and higher educational mobility? Or is the opposite true? We test empirically whether school performance and intergenerational transmission of educational attainment is depending on income equality on the local level. Using Swiss data, we take advantage of an exogenous variation across 2740 local municipalities. Our results point to a beneficial effect of income inequality on school performance for children with middle educated parents. In contrast, children with poorly educated parents as well as children with highly educated parents perform worse in more unequal communities. However, the popular idea that societies with a more equal income distribution inevitably enhance the upward mobility of disadvantaged children cannot be confirmed.

JEL-Classification: I2, I21, I30, J24, D30, D31, D63

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1. Introduction

Government transfers for redistributive reasons constitute a growing share of the public budgets in virtually all developed countries. Today, the average OECD country spends about one fifth of the government budget for social transfers – in Switzerland this share accounts for almost 33% (see *EFV* 2010). An important justification for the political demand for redistribution is the claim to foster equal opportunities. There are two core indicators of a nation's ability to offer opportunity: the degree of inequality and intergenerational mobility (see *Hout* 2003).

Both indicators go hand in hand. For example, imagine two societies with the same income distribution. In the one society, there is high intergenerational mobility, i.e. children can succeed independent from the status of their parents. In the other society, the childrens' successes depend on parental status. For most of us, the latter is seen more inequitably than the former. This fact has direct effects on the public support for social transfers, because even if considerable inequality exists, people in an open society may believe that the outcome is fair and acceptable. *Alesina and La Ferrara* (2005) for example find that those who are looking for equal opportunities in an environment where effort and ability are determinants of success do not favor government redistribution.

There are opposing perspectives about the conjunction between income equality and educational mobility. One is that the more unequal a society, the easier for disadvantaged to succeed and the harder for the privileged to stay at their level. This is somehow a natural tendency, also called regress-to-the-mean (*Solon* 1999). However, it requires open access to all sorts of educational institutions for all citizens, regardless their background. The other perspective argues that unequal societies might reduce educational mobility due to segregation along income lines, resulting in adverse peer effects for children from low-income families (*Durlauf* 1996).

Although it seems obvious that inequality and intergenerational mobility depend on each other in some way, both indicators are separately analyzed in the literature most of the time by now. There is a large literature about inequality and its impact on health, crime, happiness and economic growth (from the large list, see i.e. *Judge et.al.* 1998, *Heathcote et.al.* 2010, *Dynan and Ravina* 2007, *Becker et.al.* 2005, *Burdett et.al.* 2003, *Benabou and Ok* 2001). Here, education plays a crucial role in reducing future inequalities (i.e. *O'Neill* 1995, *De Gregorio* 2002, *Bergh and Fink* 2009).

By contrast, there is less evidence about intergenerational mobility, mainly because of data limitations and reduced comparability across time and countries. Since the pathbreaking articles by *Becker and Tomes* (1979) and *Bowles* (1972) there is a growing literature on income mobility in different countries and on their cross-country differences (see i.e. *Solon* 1999,

2002, Björklund and Jäntti 1997, Jäntti *et al.* 2006, Bratsberg *et al.* 2007, Raaum *et al.* 2006, Blanden 2007, Lee and Solon 2009). Another possibility to get an idea of intergenerational mobility is to measure educational mobility (Blanden and Machin 2004, Bauer and Riphahn 2009, Chevalier 2009). This approach has the advantage that measurement errors are much less a problem than dealing with incomes (see Solon 2002). Recently, the literature started focusing on governmental, political and societal mechanisms as well as neighborhood effects which may influence the intergenerational mobility (Oreopoulos 2003, Mayer and Lopoo 2008, Ichino and Karabarbounis 2009; see Black and Devereux 2010 for an overview).

So far, there exist only few studies which analyze the direct dependency between inequality and intergenerational mobility empirically. Rodríguez *et al.* (2008) find a positive relationship between income inequality and income mobility. However, in this study, mobility is measured as the change of the income distribution in time, based on household equivalent incomes for 78 regions. In contrast, Andrew and Leigh (2009) investigate the inequality-mobility-relationship across different countries, proxying fathers' earnings with occupational data. They find a negative correlation between income inequality and mobility. Lefranc *et al.* 2008 find that inequality of opportunity is mostly driven by differences in mean income conditional on social origin, and differences in risk compensate the return element in most countries. Finally, Hassler *et al.* 2007 present some empirical evidence for both a positive as well as a negative relationship between inequality and intergenerational mobility, depending on cross-country patterns.

Our approach is in line with these studies and tries to bring some light into the question whether a society's income equality enhances or diminishes school performance and educational mobility. In contrast to the others, we focus on a single country which has the advantage to eliminate relevant cross-country heterogeneities in institutions, politics, or culture. We test empirically whether school performance and intergenerational educational mobility is depending on income inequality on the local level. Furthermore, our data allow finding different inequality-effects depending on parental education. Our results suggest that income inequality has some beneficial effects on school performance for children with middle educated parents. Children with poorly as well as highly educated parents are negatively affected by communal income inequality. Furthermore, children with highly educated parents have a higher downward mobility with increasing communal inequality compared to children with middle educated parents. Children from middle educated parents also have a higher upward mobility than children with highly educated parents. Children with poorly educated parents have a smaller probability to reach higher education but also a smaller probability for a low education compared to children with well educated parents.

2. Some casual observations

For our investigation we use the probably most well-known indicators for inequality and educational mobility: Gini-coefficients for measuring income inequality, intergenerational persistence between parent and child education for educational mobility. We analyse educational mobility for two reasons: First, both for economists and for sociologists education is seen as an important determinant of class (*Erikson and Goldthorpe 2002*). Second, educational characteristics are more stable than for example personal income, which can change over the time considerably (*Grawe 2006, Böhlmark and Lindquist 2006*). In contrast, the communal Gini-coefficients are quite stable over time and represent very well the long-run inequality of a community (*Peters and Jeitziner 2007*).

Intuitively, we would expect that educational opportunities are generally higher in more equal societies because income equality serves as a level playing field in a society. A simple descriptive comparison for different countries confirms this first intuition. Figure 1 describes the relationship between the Gini-coefficient for personal income of a specific country and the achievements in mathematical scores in the PISA 2003 test. The vertical axis shows the average score result of those children with a father, who completed lower secondary or second stage of basic education (ISCED 2), compared to those fathers that have reached first stage of tertiary education (ISCED 5). It becomes immediately obvious: the score results of children with low-skilled fathers are closer to those children with high-skilled fathers in countries with small Gini-coefficients (horizontal axis).

[Figure 1]

Let's consider another example. Figure 2 is about a similar cross-country comparison. The horizontal axis depicts the same country Gini-coefficients for personal income as in Figure 1. On the vertical axis we present the intergenerational educational mobility across different countries (measured as 1 minus the parent-child schooling correlation). The coefficients originate from *Hertz et. al. (2007)* and *Black and Devereux (2010)*. The simple comparison gives us an indication of how a country's inequality is correlated with parental influence on a child's education. Again, these observations amongst others confirm the common belief: income inequality hinders educational mobility.

[Figure 2]

One common problem with cross-country studies is to control adequately for important factors which might have an impact on income equality and intergenerational mobility. Often, institutional details of the social security systems or important country-specific cultural aspects that might have important effects on inequality are difficult to integrate in the empirical analyses. In addition, educational mobility depends on many determinants, primarily on par-

ents and their education which have to be taken into account. Of importance is also the quality of the educational provision, the availability of infrastructure, standard of health-care provisions or neighbourhood effects. Therefore, if we want to evaluate the impact of income equality on educational mobility adequately, we have to control for a large set of factors, too. Besides that, it is important that the correct government level is analysed which actually is politically responsible for the educational provision.

That's why our investigation is based on one country, only. We compare local municipalities in Switzerland across a specific point in time. This constitutes important homogeneity in the data while the municipalities possess enough autonomy to allow for educational peculiarities, which we can use in our analysis. All in all, we take advantage of exogenous variation in the political and educational regimes across 2740 local municipalities. Most important, we can make use of 28'032 individual observations, which explain the individual background in detail as well as a whole set of control variables that describe the institutional differences of the local municipalities.

3. Data and sample

For our empirical assessment we use the Swiss census of the year 2000. The census of 2000 covers the entire resident population of Switzerland and provides information on socio-demographic indicators such as family structure, education, occupation, religion, and language. For our purposes we need information on child and parent educational attainment in order to analyze educational mobility. Since the questionnaire does not ask individuals about the educational attainment of their parents, we can relate child to parent education only by matching co-resident parents and children using information on household composition. We focus on youth aged 17 because the majority of these teenagers still live in the parental household and because we can distinguish educational attainment and schooling choices most clearly at age 17. In order to allow for the correct identification of a youth's parent we drop those households from the sample where two household heads were of the same sex and restricted the sample to those 17 year old youths who indicated to be child of the head of household. This excludes youths who do not live with their parents. To match the "correct" parent to a child, it is required that the parents must be at least 14 years older than the child, the parents must indicate to have children, and the parent's variable "birthyear of child" must be identical to the child's year of birth. Finally, we consider only those youths for whom we have information on their current educational attainment (see *Bauer and Riphahn 2007*).

To have a sample as homogenous as possible, we include only natives for which place of birth, actual place of living and the place of living five years ago are identical. Natives are those young Swiss born for whom no parent was born abroad. This restrictive sample guarantees that we can cancel out cultural differences of the parents as reasons for educational mobility. From our sample we remove those observations, from which we do not have sufficient

information about their parents as well as in the case where no allocation to a local municipality was possible. All in all, we collected 28'032 persons with the age of 17 years, being Swiss and having an identical birth and residence place in 2000 as well as 5 years ago.¹

The Swiss educational system has a federalist structure. The division of responsibilities assigns political competence for basic education (primary school) as well as for the secondary level (Sekundarschule I and II) to the local municipalities and the cantons, whereby the municipalities are responsible for basic education and the first secondary level (Sekundarschule I). The cantons have a joint responsibility on the first secondary level (Sekundarschule I); but only the secondary school II (Sekundarschule II) falls completely in cantonal competence.

The Swiss education system differs strongly to those of most other countries (*OECD* 2010). In Switzerland, there is dominating a system of „dual education“, i.e. a mixture from occupation and education. In Switzerland children enter primary school typically between ages 5 and 7 and stay there for between 4 and 6 years. Subsequently, they move on to mandatory schools until they have completed 9 years of schooling. In some cantons mandatory schools differentiate pupils able to follow a basic or an advanced program. After the first 9 years, at the age of 14-16, pupils choose whether and how to continue their education. They can continue their general education at advanced schools which after about 3 years grant the degree required for university studies. The vast majority however takes up an apprenticeship which lasts between two and four years and prepares for a vocational career. Alternatively, there are a variety of vocational or general schools which either train for particular occupations or prepare for more specialized schools. These vocational schools are heterogeneous in requirements and organization.

In this study we compare youths based on their education at age 17, when we can determine which educational route they have taken. Based on the educational system described above, our outcome variable describes low, middle, and high educational attainment. The educational attainment of those who at age 17 have not completed mandatory education or who are not currently pursuing any continued education is considered to be low. Those who completed mandatory school and continue with vocational training or any school but advanced school have medium education. Only those pursuing advanced secondary schooling or who entered university already are considered to be highly educated (*Bauer and Riphahn* 2007).

Since the basic education of the primary school is decisive for the selection of who will be eligible for higher education, it is important to record the pupils on the local level at age 17. If there are effects of income equality on education mobility, we should observe them primarily at the local level of the primary school.

¹ Note, that our results are not sensitive to the sample selection. See Section 6 and Appendix 6A and 7A.

Educational mobility and income inequality may result due to different causes. Therefore, together with the data of the Swiss census 2000 we use various variables to capture the heterogeneity among municipalities and cantons. Educational correlation between parents and their children is possibly low if public schools of good quality are easily available for everybody. Income inequality depends on different factors, too. Together with the political-ideological regime, it can be the provision of public infrastructure, the cost of living, the tax burden, population density or the average per capita income of the municipality. For these and other variables we can control our estimates (see the Appendix for the complete description). We gathered these data from different cantonal and local sources. The majority of the data and the data on education originate from the *Federal Office for Statistics* (BfS) as well as of the *Swiss Conference of Cantonal Ministers of Education* (EDK).

Gini-coefficients for Switzerland are publicly available from the *Swiss Federal Finance Administration* (EFV). With the Gini-coefficients for personal income we have data on the local level for the year 1995 as well as for the year 2003. Both are equivalence data. In this paper, we use the 1995 since the children are classified according to performance criteria for different school levels at this time. The year 1995 is thus the point of time, in which the decision for educational mobility has been taken and should arguably have a causal effect on educational performance and mobility for the year 2000. We use the 2003 data primarily as controls. The Gini-coefficients are however correlated strongly with one another. The simple correlation between the Gini-coefficient of 1995 and 2003 is 0.84. Income inequality among the local municipalities does not change largely over this time-span (*see the descriptive statistics in table 1A of the appendix*).

4. Descriptive Statistics

Compared to cross country-studies in general, our sample is quite rich on control variables. First, we present the comparisons of educational mobility graphically. Since our dependent variable describes educational attainment as an ordered categorical outcome, we use a multinomial logit-model. The level of education (low, middle or high) is regressed on the education of parents. We calculated the probability of reaching the highest level of education for each observation. Since we do not integrate controls for the cantons as well as for the municipalities into our regression, the probability corresponds to an average national probability with a certain parental equipment. We take the calculated probabilities from the actual probability that the individual visits the highest education, i.e. 1 if the highest education is reached and 0 otherwise, $Y_i = [0/1] - Pr(j = \text{highest education})$.

For the local municipalities we compute the average difference between the prediction and the actual probability. For those pupils who reach the highest education, the value is positive and becomes larger the smaller the predicted probability. For those pupils who do not reach the highest education, the value is negative and becomes smaller the larger the predicted probability.

ity of reaching highest education. Hence, a municipality with many pupils with large and positive differences is an indication that the probability of reaching the highest education is higher in this local municipality than for the Swiss average.

Figure 3 shows that there exists a positive relationship between inequality and higher education, depending on parental education. We thus receive another impression than we had with Figures 1 and 2. With the data of our sample it seems that more unequal local municipalities promote more educational mobility.

[Figure 3]

Figure 3 additionally points to an important fact: The variation of income inequality is larger in our sample than it is in cross-countries samples. While the Gini-coefficients vary between 0.247 and 0.586 across countries (see *Black and Devereux* 2010), the variation across communities is substantially larger, i.e. between 0.176 and 0.739 (or between 0.176 and 0.551 if we exclude the outlier).

Table 1 shows the basic conditions of the 2740 local municipalities. The Table presents the parents education as well as the institutional variables for the education policy at the local level for municipalities whose Gini-coefficients belong to the lowest quartile as well as for those municipalities whose Gini-coefficients belong to the highest quartile. Column 3 shows the differences of the variables between these two groups. Interestingly, 1. quartile communities significantly differ in all variables to 4. quartile communities. The share of poorly educated parents is higher in municipalities with low Gini-coefficients. Accordingly, a higher share of middle to high educated parents is located in municipalities with high Gini-coefficients. However, per capita expenditures for primary education (on the cantonal level) are higher in more equal societies than in more unequal ones. Likewise the class sizes are smaller in municipalities with low Gini-coefficients. Finally, there are higher wages paid to teachers of the upper secondary school in municipalities with low Gini-coefficients compared to municipalities and cantons with higher Gini-coefficients. Otherwise, the remaining education variables are all larger in municipalities with high Gini-coefficients: total and per capita expenditures for elementary education as well as total education expenditures are generally higher. We have significantly more teachers and schools and the wages on the level of the primary school are higher as well.

Finally, the share of well educated citizens is higher in local municipalities and cantons with high Gini-coefficients. The share of the urban population is higher and the degree of fiscal decentralization is lower. The share of left-wing politicians is larger and the tax burden is lower. The cost of living and the average taxable income are higher in municipalities with high Gini-coefficients. Accordingly, local per capita income is also higher.

[Table 1]

Summing up, obviously more equal local municipalities differ in many aspects compared to more unequal ones. In our sample and in contrast to most cross-country studies, we can integrate a very large number of controls into our regressions in order to capture many facets of educational mobility and inequality.

5. Empirical strategy

In order to evaluate the relationship between local inequality and school performance as well as local inequality and educational mobility, we have to control for institutional, educational and regional factors. We model the educational attainment (Y) of child i as a function of parental education (PE_i), individual ($Individual_i$), regional ($Regional_i$), educational ($Educational_i$) and institutional characteristics ($Institutional_i$) as well as the communal Gini-coefficient ($GINI_i$). Finally, we consider interaction effects of parental education ($PE_i \times GINI_i$) in the model, and estimate the additional coefficients.

$$Y_i = a + b PE_i + c GINI_i + d Regional_i + e Educational_i + f Individual_i + g Institutional_i + h (PE_i \times GINI_i) + \varepsilon_i(1)$$

where a, b, c, d, e, f, g and h are coefficients and ε represents unobservable factors. Y is the categorical variable with three possible characteristics: (i) advanced secondary schooling, (ii) vocational training or any school that is not advanced, (iii) only compulsory school. We start the analysis by applying multivariate regressions to evaluate the determinants of the levels of child educational attainment, using a multinomial logit-regression. With our multinomial Logit-regressions we evaluate the relationship between income equality of the municipalities and the education success of the child with the coefficient c . The interaction effect h shows us the same success, this time depending on parental education.

In a next step, in order to interpret the magnitude of income equality for school performance and educational mobility, we predict the probability of low, middle and high educational attainment conditional on both parents being either in the high, medium, or low education category. Additionally, we group the municipalities into quartiles, conditional on their Gini-coefficients for personal income. The municipalities of the lowest group have the smallest income differences; those in the highest quartile the largest. The probabilities are then averaged by sub-sample. Finally, we calculate the changes in the intergenerational transmission of education and compare these conditional on the degree of inequality in the local communities.

6. Results

a. Multinomial Logit-regressions

We begin with the multinomial logit-estimations. Since we do not have an unambiguous theoretical model, which exactly describes the causal relationship between inequality and intergenerational mobility, we present several equations, in order to evaluate the empirical relevance and robustness. Table 2 shows 10 different regressions. Reference outcome is medium education. Regression 1 evaluates the impact of the Gini-coefficients including parent's education as well as all other individual characteristics. Regression 2 extends the estimation, in which additionally interaction terms $g (PE_i \times GINI_i)$ are inserted. Regression 1 and 2 are our baseline estimations, which we will extend gradually.

We divide our control variables into four sub-groups; (a) educational controls on the cantonal level, (b) cantonal institutional and regional effects, (c) local educational variables as well as (d) local institutional and regional controls. Regressions 3 - 10 examine the connection when these controls are differently combined. Regression 9 shows the results controlling for all 98 factors; regression 10, if additionally the interactions are integrated in the estimation. We present only the results of interest for our analysis, in particular the parents' education as well as the parameters of the Gini-coefficients.

On the local level, the relationship between the Gini-coefficient and the educational level of the children is always at least significant on the 5 per cent level. Thus, even if we control for all 98 variables, inequality seems a significant determinant of educational performance. Interestingly enough, the connection between the level of education and the Gini-coefficient is always positive, i.e. for both the low level of education (only mandatory education) as well as for the high level of education (High School). In our case, the influence of inequality seems to change the education level significantly in both directions.

[Table 2]

As was to be expected, the "apple does not fall far from the tree": the education of parents plays a substantial role for the education level of the children (i.e. *Black et al.* 2005; *Bauer and Riphahn* 2006). A low level of education of the father or the mother leads to a significantly lower level of education for their children. Put it differently, the educational level of a child is strongly correlated with the education of its parents.

b. Predictions

In a next step in order to interpret the magnitude of the intergenerational mobility and the variation across the local communities, we predict the probability of low, middle and high

educational attainment conditional on both parents being either in the high, middle, or low education category. The probabilities are then averaged by sub-sample. First, we presents the predictions based on estimations only with controls for parental education (*Table 3a*), then for the whole set of individual characteristics (*Table 3b*) and finally for all variables, i.e. controls for education, political environment and regional aspects (*Table 3c*). The predictions were provided for a municipality with a Gini-coefficient of the 1st, 2nd, 3rd and 4th quartile. The respective column 1 shows the predictions for all students. The respective column 2 shows the predictions for those who have poorly educated parents; Column 3 shows those with middle educated parents. Finally, the 4th column presents the results for those with highly educated parents.

[Table 3]

We start presenting the predictions for municipalities that reveal a Gini-coefficient corresponding to the 1st quartile. We begin with controlling for parents' education, only. The probability that a child has a low education level is 6.4 per cent. 74.18 per cent is the probability for a middle education and 19.42 per cent for highest education. As to be expected, the predictions for low education are higher for children with poorly educated parents (10.51 per cent). The appropriate probability for children with well educated parents is 2.53 per cent. Put it differently, the probability for these children is 80.51 per cent to visit highest education. For children with low educated parents, the probability is 5.35 per cent, only (18.96 per cent for children with middle educated parents).

We now focus on the development of the predictions across the quartiles. There is a trend that with increasing inequality children have a decreasing probability for a middle education. In the 1st quartile the probability is still about 74.18 per cent, and diminishes ever more. In the 4th quartile the probability is about 65.78 per cent. At the same time the probability increases that the child has either the lowest or the highest level of education. However, children with poorly educated parents have a lower probability to visit highest education. Here, the prediction is reduced from 5.35 per cent to 4.86 per cent. The tendency for children with middle and highly educated parents is vice versa. The probability of a high education increases from 18.96 per cent (respectively 80,51 per cent) to 24.98 per cent (respectively 83,38 per cent). At the same time, the probability of a low level of education also rises for both groups. For children with middle educated parents the probability increases from 2.53 per cent to 5.22 per cent, for children with highly educated parents from 4.24 per cent to 5.76 per cent.

Tables 3b and 3c show the predictions when we control for all individual factors and when we additionally include all regional, institutional and educational factors. The results are very similar. The probabilities for upward as well as for downward mobility increase for all children (downward mobility from 7.25 per cent to 8.36 per cent, upward mobility from 20.53 per cent to 24.02 per cent). The downward probability for children with poorly educated parents

increases from 11 per cent to 15.4 per cent; at the same time with increasing inequality the probabilities for upward mobility are decreasing slightly, i.e. from 6.33 per cent to 5.94 per cent. Also, for the other two groups, the probability of downward mobility increases, i.e. from 5.53 per cent (and/or 4.18 per cent) to 6.39 per cent (and/or 8.38 per cent). Once again, the probability of downward mobility doubles for children with highly educated parents. The probability of upward mobility increases from 18.65 per cent (and/or 58.2 per cent) for the 1st quartile to 21.35 per cent (and/or 62.87 per cent) for the 4th quartile.

Table 4 shows the educational success between the 4th and 1st quartile of children with low, middle and high educated parents in direct comparison (probability 4th quartile / probability 1st quartile). For a value of 1, no change is present despite larger inequality. For a value of more than 1, the probability increases with larger inequality. For a value lower than 1 the probability decreases with increasing Gini-coefficients.

We again present the results for the estimations with controls for the parents' education, all individual factors as well as all available variables (Tables 4a, b, and c).

[Table 4]

For all three tables, it is obvious that the probability of a middle education decreases with increasing inequality. Both the probability of a low as well as the probability of a high education is increasing. When we only control for the parents education, the probability of a fall into the lowest level of education is 44 per cent higher in the 4th quartile compared to the 1st quartile. At the same time the predictions of high education increases, i.e. by approximately 29 per cent. When we look at the predictions conditional for parents' education, we find the largest increase at the lowest educational level, where children have either very well or very poorly educated parents. The downward probability doubles for children with highly educated parents, for children with low educated parents the prediction is about 80 per cent higher. The appropriate probability difference to achieve the highest education level is small. Children with poorly educated parents even have a negative probability. For children with highly educated parents, the probability rises by 3.6 per cent. Children from families with middle educated parents seem to have approximately equal probability-differences for a low or a high education (35,8 per cent respectable 31,8 per cent).

Of interest are also the significance levels. We determine these with a bootstrapping procedure. For the estimations with only the parents' education as controls, we see that low educated parents have a highly significant impact on the probability of reaching medium education as well as on the increase in the probability to fall into low education. For children with well educated parents, these probabilities are likewise significant, however on the 5 and/or 10 per cent level. For children with middle educated parents, the decrease for a middle education with increasing inequality is likewise highly significant.

As Tables 4b and 4c point out, the results do not change with the inclusion of further controls. We see a decrease in the medium level of education and an increase in all predictions both for the low level of education as well as for the high level of education. Also here, children with low educated parents form an exception: The probability of a middle as well as of a high level of education is decreasing (0.952 and/or 0.937). The increase of the probability to fall into the low education level with higher Gini-coefficients is always significant for children from low educated parents. In Table 5c with the inclusion of all controls, the downward mobility is still significant on the 95 per cent level. However, with the inclusion of all controls, the increased prediction for low education is no longer significant. Finally, children with highly educated parents show a significant increase for low education probability (90 per cent level). Likewise the probability for a middle education decreases.

Summing up: inequality at the local level increases the predictions for low as well as for high education programs. Children with middle educated parents seem to significantly attend higher programs. Losers of higher inequality are children from low educated parents. Their probability to fall into the lowest educational level rises with increasing Gini-coefficients. Finally, children from well educated parents can also rank among losers in more unequal municipalities. Their prediction for low education rises significantly with higher Gini-coefficients.

c. Educational mobility and inequality

How about the intergenerational educational mobility? Table 5 shows the changes of the predicted education of children with highly educated parents compared to those with middle and low educated parents. We present the results again for our baseline equation with parents' education, as well as with the other control variables that we have used before. Columns (1) and (2) show the results for the low education level, the columns (3) and (4) for the middle level of education. Finally, the columns (5) and (6) show the results for the high level of education.

The respective first columns of the educational levels show the relationship between the 4th quartile and the 1st quartile. Again, a value of 1 indicates no changes. If the value is higher than 1, children with highly educated parents have an appropriate education in municipalities with higher inequality compared to children with a medium or low education background. The respective 2nd columns show the differences. Here, if the value is positive, this means that children with highly educated parents have a higher probability to reach an appropriate education with increasing inequality. Table 5 (A) shows the estimation with only the parents' education.

[Table 5]

With increasing local inequality children with highly educated parents have a higher probability to reach a high as well as a low educational level compared to children with poorly educated parents. Accordingly, the probability to reach a middle education is smaller. Compared with children with middle educated parents, children with highly educated parents have a higher probability to fall into lower education programmes with increasing local inequality. At the same time, children with middle educated parents have a highly significant increased probability to reach the highest level of education. The probability of the downward mobility of children with highly educated parents increases compared to children with middle educated parents from the 1st quartile to the 4th quartile by approximately 50 per cent. At the same time, the probability to attend higher education decreases by approximately 22 per cent.

The results remain the same, if we control for other factors, too. With the predictions of Table 5 (C), and when all institutional and education variables are integrated, the downward mobility of children with highly educated parents remain significantly the same compared to children with middle educated parents with increasing Gini-coefficients. These children also show a significantly smaller probability to reach a middle educational level with increasing local inequality.

Summing up, with increasing local inequality, we have a higher probability of downward mobility for children with highly educated parents. At the same time, the probability becomes smaller for a middle education. Compared to children with low educated parents, the probability to attend higher education programs is increasing. Children from middle educated parents benefit most strongly from unequal municipalities. They have an increased probability to visit higher education. At the same time, the probability of downward mobility is significantly lower. Children from middle educated parents also have a higher upward mobility than children with highly educated parents. Children with poorly educated parents have a smaller probability to reach higher education but also a small probability for a low education compared to children with well educated parents.

d. Robustness-check

How robust are these results? Since the relationship between inequality and educational mobility is not clearly determined from a theoretical point of view, it is of importance to conduct some robustness checks. Already, Table 3 shows that the results do not change considerably even if we control for a subset of possible influences. Additionally, we have conducted the same estimations and predictions with the Gini-coefficients of the year 2003 (see appendix 2A – 5C). The results are almost identical to the Gini-coefficients of the year 1995. Furthermore, we estimated all models using all observations, i.e. additionally these individuals who moved from their communities since birth. This gives us 46'000 observations which are all native 17 years old children in Switzerland (see appendix 6A and 7A). These estimations are due to testify for selection bias. Again, the results are very similar.

7. Conclusions

It is probably one of the most popular ideas that income equality enhances intergenerational mobility. However, only few studies exist which examine the relationship between inequality and mobility. All these studies come to a similar conclusion that rising inequality enforces the correlation between parents' and their children's success and reduces intergenerational mobility.

Our paper provides empirical evidence that income equality does not necessarily enhance the upward education mobility of disadvantaged children. We analyze income inequality and educational mobility across 2740 local municipalities. The results show that the relationship is far from being linear for children with highly, middle and poorly educated parents. How do these children perform if they grow up in local municipalities with high income inequality compared to children who grow up in more equal municipalities?

Increasing inequalities decrease the probabilities to attend medium education programs for all children. Children with middle educated parents benefit most from increased income inequality. They have a highly significant increased probability to attend higher education programs. At the same time children with poorly as well as highly educated parents cannot benefit from income inequality. In contrast, both groups have a significantly increased probability to fall into a lower level of education when they grow up in municipalities with higher income inequalities. Furthermore, we report a significant upward mobility effect for children with middle educated parents compared those with highly educated parents.

Societies strongly differ in providing open access to educational institutions, in offering public schools of high quality for all citizens, in infrastructure and in their political environment. Our data allow controlling for a large set of relevant factors. Furthermore, other cultural and institutional heterogeneities can be ripped out focusing on a single country. We show that income equality is not necessarily a precondition for educational mobility. Even more, also the opposite can be true. Children with middle educated parents benefit from local municipalities with higher inequality while children with poorly and highly educated parents downgrade. The latter ones even more.

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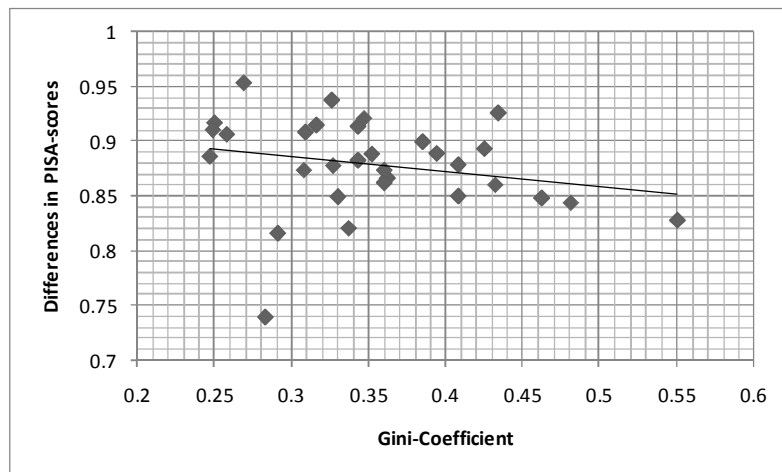
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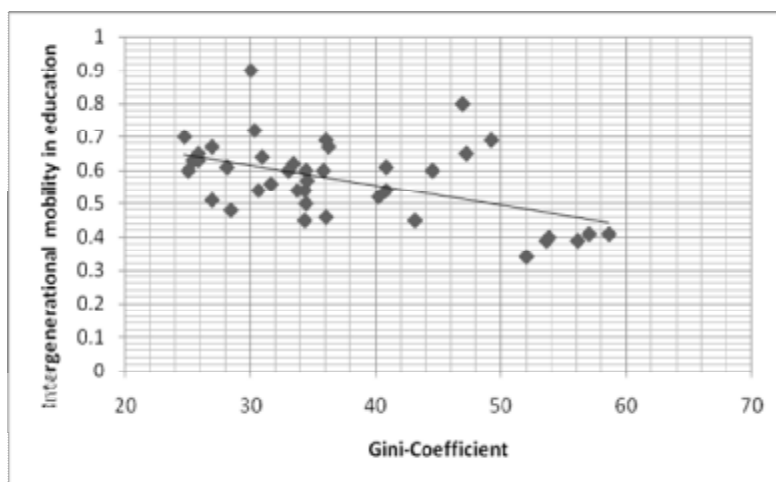
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Figure 1: Cross country comparison between Gini-coefficients and differences in mathematical test scores (PISA 2003), conditional on fathers' education.



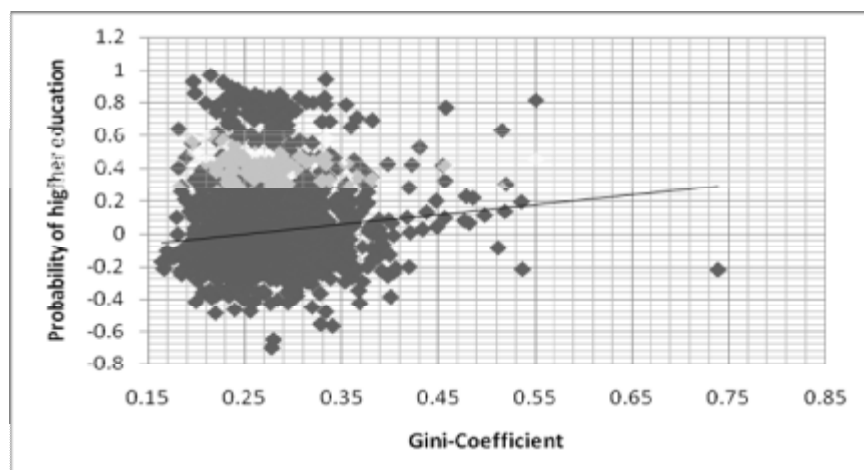
Source: PISA (2003), UN (2010), own calculations

Figure 2: Cross country comparison between Gini-coefficients and intergenerational income persistence



Source: Hertz *et. al.* (2007) and Black and Devereux (2010), UN (2010)

Figure 3: A comparison across Swiss communities between Gini-coefficients for personal income (1995) and intergenerational educational transmission



Source: BfS, Swiss census 2000

Table 1 A descriptive comparison between characteristics from 1. and 4. Quartile Communities

	Communities		
	Mean 1. Quartile	Mean 4. Quartile	Difference
Father Low (0/1)	0.145	0.069	-0.076 ***
Father Medium (0/1) (Reference)	0.686	0.585	-0.101 ***
Father High (0/1)	0.045	0.138	0.093 ***
Mother Low (0/1)	0.279	0.143	-0.136 ***
Mother Medium (0/1) (Reference)	0.639	0.723	0.084 ***
Mother High (0/1)	0.023	0.075	0.052 ***
Expenditure elementary school: per capita (cantonal)	889.082	823.749	-65.332 ***
Expenditure elementary school: total (cantonal)	419299	548860	129561 ***
Expenditure on education per capita (cantonal)	2518	2692	173 ***
Average teacher salary: primary school (cantonal)	84202	89822	5620 ***
Average teacher salary: Secondary school (indexed, cantonal)	96.495	95.538	-0.957 ***
Teacher per 100 inhabitants (cantonal)	1.150	1.199	0.049 ***
Class size: primary school (log) (cantonal)	2.980	2.991	0.011 ***
Class size: primary school (cantonal)	19.707	19.920	0.213 ***
Class size secondary school (cantonal)	19.079	18.772	-0.307 ***
Population share of people with higher degree (cantonal)	0.086	0.106	0.020 ***
Population share of people with university degree (cantonal)	0.043	0.056	0.013 ***
Share in cantonal parliament of left politicians (cantonal)	0.276	0.302	0.026 ***
Index98 (cantonal)	3.706	3.502	-0.204 ***
Degree of decentralization (cantonal)	0.538	0.537	-0.001 ***
Tax burden (cantonal)	108	97	-11 ***

No. Of communities (cantonal)	201	188	-13	***
Degree of urbanization (cantonal)	0.326	0.852	0.526	***
Gini: cantonal equivalent 1995;	0.276	0.300	0.024	***
Gini: communal equivalent 1995	0.228	0.321	0.092	***
Gini: communal equivalent 2003	0.233	0.327	0.094	***
Population Density (communal)	0.003	0.019	0.015	***
Class size (communal)	19.483	19.412	-0.071	-
Total expenditure on education, social affairs and health per capita (communal)	3483.185	3830.459	347.274	***
Total expenditure on education (communal)	10914	176209	165295	***
Numbers of grammar schools per 1000 inhabitants (communal)	1.455	28.723	27.268	***
Communal revenues per capita	3813	8084	4271	***
Numbers of employees in education, social affairs and health (communal)	701	15475	14774	***
Number of parties, divided by the cube root of seats (communal)	2.085	2.061	-0.024	-
Taxable income (communal)	24204	32060	7856	***
Living costs (communal)	1252	1398	145	***
Unemployment rate (communal)	2.438	2.276	-0.162	**

Source: Swiss Census 2000, BfS. Note: ***, **, and *represent statistical significance of the differences in means at the 1, 5, and 10 percent level, respectively. – indicates no significant differences.

Table 2: Multinomial regression: dependent variable: child education (28'032 observations) (low, middle and high educational track): 2740 local communities

	Regression 1				Regression 2				Regression 3				Regression 4				Regression 5			
	Low		High		Low		High		Low		High		Low		High		Low		High	
Intercept	-3.074	***	-4.351	***	-2.893	***	-4.218	***	67.591		88.140		59.102		93.285		0.257		-7.121	**
	(0.467)		(0.381)		(0.497)		(0.39)		(90.23)		(64.001)		(90.716)		(64.166)		(4.072)		(2.82)	
Gini - Communal inequality																				
Gini: communal equivalent 1995	3.971	***	2.773	***	3.353	***	2.266	***	2.420	***	2.664	***	1.885	**	1.990	***	2.618	***	2.480	***
	(0.557)		(0.393)		(0.845)		(0.51)		(0.68)		(0.461)		(0.956)		(0.566)		(0.733)		(0.496)	
Parental education																				
Father Low (0/1)	0.315	***	-0.758	***	0.151		-0.058		0.342	***	-0.773	***	0.116		-0.143		0.331	***	-0.768	***
	(0.086)		(0.091)		(0.504)		(0.571)		(0.087)		(0.092)		(0.526)		(0.559)		(0.087)		(0.092)	
Father High (0/1)	0.492	***	1.222	***	-0.008		1.061	***	0.439	***	1.157	***	-0.134		0.838	**	0.410	***	1.151	***
	(0.119)		(0.063)		(0.644)		(0.364)		(0.121)		(0.064)		(0.67)		(0.368)		(0.12)		(0.064)	
Father Missing (0/1)	0.488		0.658	*	0.812		-0.113		0.541		0.944	***	1.022	*	0.176		0.593		0.910	**
	(0.427)		(0.353)		(0.574)		(0.466)		(0.432)		(0.36)		(0.596)		(0.474)		(0.43)		(0.358)	
Father No Response (0/1)	0.438	**	-0.373	*	-0.021		-2.164	*	0.410	**	-0.381	*	-0.167		-1.940		0.415	**	-0.331	
	(0.173)		(0.222)		(1.214)		(1.31)		(0.176)		(0.231)		(1.282)		(1.35)		(0.175)		(0.227)	
Mother Low (0/1)	0.346	***	-0.537	***	-0.067		-0.537		0.381	***	-0.588	***	-0.004		-0.849	**	0.359	***	-0.564	***
	(0.066)		(0.057)		(0.388)		(0.361)		(0.067)		(0.058)		(0.41)		(0.358)		(0.067)		(0.058)	
Mother High (0/1)	0.687	***	1.199	***	-0.745		1.172	**	0.622	***	1.069	***	-0.942		0.908	*	0.616	***	1.080	***
	(0.138)		(0.08)		(0.754)		(0.49)		(0.14)		(0.082)		(0.78)		(0.488)		(0.14)		(0.082)	
Mother Missing (0/1)	0.299		1.284	***	-0.221		0.593		0.330		1.609	***	-0.122		1.020		0.322		1.523	***
	(0.336)		(0.267)		(0.741)		(0.629)		(0.342)		(0.273)		(0.767)		(0.634)		(0.34)		(0.271)	
Mother No Response (0/1)	0.978	***	-0.754	***	0.768		-1.326		1.006	***	-0.842	***	1.053		-0.940		0.999	***	-0.783	***
	(0.131)		(0.185)		(0.948)		(1.217)		(0.133)		(0.193)		(0.988)		(1.216)		(0.133)		(0.188)	
Interaction - Gini * Parental education																				
Gini: cantonal equivalent 1995 * Father low					0.622		-2.652						0.855		-2.390					
					(1.839)		(2.134)						(1.921)		(2.09)					
Gini: cantonal equivalent 1995 * Father high					1.707		0.572						1.955		1.125					
					(2.166)		(1.26)						(2.253)		(1.271)					
Gini: cantonal equivalent 1995 * Father non response					1.767		6.520						2.194		5.711					
					(4.449)		(4.648)						(4.698)		(4.835)					
Gini: cantonal equivalent 1995 * Father missing					-1.198		2.721	**					-1.740		2.717	**				
					(1.405)		(1.095)						(1.494)		(1.11)					
Gini: cantonal equivalent 1995 * Father low					1.500		0.000						1.397		0.971					
					(1.403)		(1.328)						(1.481)		(1.317)					
Gini: cantonal equivalent 1995 * Father high					4.888	*	0.108						5.332	**	0.579					
					(2.516)		(1.695)						(2.601)		(1.69)					
Gini: cantonal equivalent 1995 * Father non response					0.735		2.140						-0.220		0.399					
					(3.454)		(4.364)						(3.6)		(4.387)					
Gini: cantonal equivalent 1995 * Father missing					1.909		2.486						1.649		2.119					
					(2.388)		(2.051)						(2.483)		(2.064)					
Other individual or parental characteristics		yes				yes				yes				yes				yes		
(30 effects)																				
Cantonal educational characteristics										yes				yes						
(17 effects)																				
Cantonal institutional or regional characteristics										yes				yes				yes		
(20 effects)																				
Communal educational characteristics																				
(13 control variables)																				
Communal institutional or regional characteristics																		yes		
(16 effects)																				

Source: Own calculations using Swiss Census 2000, *BfS*, *EFV* and *EDK*. Note: Standard errors in parentheses. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively. Low indicates the lowest education level; high indicates the highest education level.

Table 2: Multinomial regression: dependent variable: child education (28'032 observations) (low, middle and high educational track): 2740 local communities (*continued*)

	Regression 6			Regression 7			Regression 8			Regression 9			Regression 10		
	Low		High	Low		High	Low		High	Low		High	Low		High
Intercept	0.141 (4.082)		-6.434 (2.839)	**	-11.573 (5.893)	*	-15.598 (4.223)	***	-11.743 (5.906)	**	-15.315 (4.229)	***	34.097 (92.004)		86.147 (65.949)
Gini - Communal inequality															
Gini: communal equivalent 1995	2.789 (0.857)	***	1.909 (0.551)	***	2.374 (0.652)	***	2.635 (0.436)	***	2.677 (0.787)	***	1.963 (0.504)	***	2.372 (0.766)	***	2.686 (0.515)
Parental education															
Father Low (0/1)	0.351 (0.471)		-0.486 (0.505)		0.295 (0.087)	***	-0.782 (0.092)	***	0.335 (0.466)		-0.481 (0.506)		0.338 (0.087)	***	-0.775 (0.092)
Father High (0/1)	-0.120 (0.651)		0.559 (0.36)		0.438 (0.121)	***	1.172 (0.064)	***	0.057 (0.642)		0.544 (0.362)		0.425 (0.121)	***	1.150 (0.065)
Father Missing (0/1)	1.207 (0.581)	**	0.159 (0.463)		0.539 (0.431)		0.936 (0.36)	***	1.237 (0.575)	**	0.149 (0.464)		0.565 (0.433)		0.985 (0.36)
Father No Response (0/1)	1.549 (1.375)		-1.199 (1.596)		0.393 (0.175)	**	-0.394 (0.229)	*	1.543 (1.356)		-0.911 (1.65)		0.403 (0.177)	**	-0.386 (0.231)
Mother Low (0/1)	0.400 (0.367)		-1.034 (0.31)	***	0.352 (0.067)	***	-0.574 (0.058)	***	0.382 (0.357)		-0.995 (0.309)	***	0.378 (0.067)	***	-0.586 (0.058)
Mother High (0/1)	-1.090 (0.706)		1.103 (0.467)	**	0.618 (0.14)	***	1.081 (0.082)	***	-0.971 (0.702)	**	1.011 (0.471)	**	0.615 (0.14)	***	1.068 (0.082)
Mother Missing (0/1)	0.321 (0.708)		1.259 (0.575)	**	0.372 (0.34)		1.590 (0.273)	***	0.430 (0.7)		1.354 (0.572)	**	0.336 (0.342)		1.601 (0.273)
Mother No Response (0/1)	1.311 (0.89)		-0.555 (1.051)		1.004 (0.132)	***	-0.819 (0.193)	***	1.161 (0.873)		-0.654 (1.084)		1.008 (0.133)	***	-0.837 (0.193)
Interaction - Gini * Parental education															
Gini: cantonal equivalent 1995 * Father low	-0.058 (1.491)		-0.908 (1.604)						-0.119 (1.473)		-0.972 (1.606)				0.048 (1.513)
Gini: cantonal equivalent 1995 * Father high	1.576 (1.895)		1.789 (1.07)	*					1.135 (1.867)		1.900 (1.076)	*			1.485 (1.88)
Gini: cantonal equivalent 1995 * Father non response	-3.723 (4.476)		2.767 (5.039)						-3.764 (4.41)		1.654 (5.243)				-3.458 (4.497)
Gini: cantonal equivalent 1995 * Father missing	-1.888 (1.235)		2.302 (0.918)	**					-2.152 (1.208)	*	2.423 (0.913)	***			-1.642 (1.241)
Gini: cantonal equivalent 1995 * Father low	-0.132 (1.149)		1.492 (0.967)						-0.099 (1.118)		1.333 (0.965)				-0.070 (1.164)
Gini: cantonal equivalent 1995 * Father high	4.965 (2.007)	**	-0.051 (1.387)						4.633 (1.998)	**	0.222 (1.399)				4.635 (2.006)
Gini: cantonal equivalent 1995 * Father non response	-1.018 (2.806)		-0.739 (3.236)						-0.520 (2.748)		-0.541 (3.347)				-0.764 (2.802)
Gini: cantonal equivalent 1995 * Father missing	-0.006 (1.942)		0.796 (1.571)						-0.178 (1.91)		0.698 (1.557)				0.217 (1.94)
Other individual or parental characteristics (30 effects)		yes				yes				yes				yes	
Cantonal educational characteristics (17 effects)						yes				yes				yes	
Cantonal institutional or regional characteristics (20 effects)		yes											yes		yes
Communal educational characteristics (13 control variables)						yes				yes				yes	
Communal institutional or regional characteristics (16 effects)		yes											yes		yes

Source: Own calculations using Swiss Census 2000, *Bfs*, *EFV* and *EDK*. Note: Standard errors in parentheses. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively. Low indicates the lowest education level; high indicates the highest education level.

Table 3: Mean Predictions of the Three Main Models

(a) Parental education only

Child / Parents	Gini 95 equivalent: 1. Quartile				Gini 95 equivalent: 2. Quartile				Gini 95 equivalent: 3. Quartile				Gini 95 equivalent: 4. Quartile			
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Low education level	6.40% (0.166)	8.90% *** (0.008)	4.24% *** (0.002)	2.53% *** (0.007)	7.06% (0.189)	10.51% *** (0.007)	4.61% *** (0.002)	3.08% *** (0.006)	7.60% (0.205)	11.89% *** (0.007)	4.90% *** (0.002)	3.55% *** (0.006)	9.22% (0.243)	16.48% *** (0.014)	5.76% *** (0.003)	5.22% *** (0.007)
Medium education level	74.18% *** (0.181)	85.75% *** (0.01)	76.80% *** (0.006)	16.96% *** (0.024)	72.14% *** (0.193)	84.24% *** (0.008)	74.96% *** (0.004)	15.35% *** (0.016)	70.53% *** (0.202)	82.95% *** (0.008)	73.51% *** (0.004)	14.21% *** (0.011)	65.78% *** (0.218)	78.65% *** (0.015)	69.26% *** (0.007)	11.41% *** (0.012)
High education level	19.42% (0.163)	5.35% *** (0.007)	18.96% *** (0.005)	80.51% *** (0.025)	20.80% (0.169)	5.24% *** (0.005)	20.43% *** (0.004)	81.58% *** (0.017)	21.87% (0.174)	5.15% *** (0.004)	21.59% *** (0.003)	82.24% *** (0.013)	24.99% (0.183)	4.86% *** (0.007)	24.98% *** (0.006)	83.38% *** (0.014)

(b) Parental education and individual characteristics

Child / Parents	Gini 95 equivalent: 1. Quartile				Gini 95 equivalent: 2. Quartile				Gini 95 equivalent: 3. Quartile				Gini 95 equivalent: 4. Quartile			
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Low education level	6.59% (0.17)	9.70% ** (0.048)	5.15% * (0.028)	3.94% (0.03)	7.16% (0.192)	11.09% ** (0.053)	5.55% * (0.03)	4.87% (0.034)	7.62% (0.208)	12.25% ** (0.057)	5.87% * (0.031)	5.68% (0.039)	9.01% (0.246)	15.95% ** (0.068)	6.83% * (0.035)	8.59% (0.056)
Medium education level	72.94% *** (0.202)	83.71% *** (0.074)	76.47% *** (0.111)	30.80% ** (0.148)	71.46% *** (0.212)	82.49% *** (0.076)	75.26% *** (0.114)	28.92% ** (0.14)	70.30% *** (0.218)	81.47% *** (0.078)	74.32% *** (0.116)	27.52% ** (0.134)	66.93% *** (0.231)	78.16% *** (0.085)	71.62% *** (0.121)	23.70% ** (0.12)
High education level	20.47% (0.189)	6.59% (0.049)	18.39% * (0.108)	65.26% *** (0.16)	21.38% (0.192)	6.42% (0.046)	19.19% * (0.111)	66.21% *** (0.157)	22.08% (0.194)	6.28% (0.045)	19.81% * (0.113)	66.80% *** (0.155)	24.06% (0.198)	5.88% (0.042)	21.55% * (0.119)	67.72% *** (0.152)

(c) Parental education, individual characteristics, regional, educational and institutional factors

Child / Parents	Gini 95 equivalent: 1. Quartile				Gini 95 equivalent: 2. Quartile				Gini 95 equivalent: 3. Quartile				Gini 95 equivalent: 4. Quartile			
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Low education level	7.25% (0.201)	11.00% * (0.062)	5.53% (0.034)	4.18% (0.035)	7.52% (0.22)	12.03% * (0.066)	5.74% * (0.035)	5.05% (0.039)	7.74% (0.233)	12.86% * (0.068)	5.91% * (0.035)	5.81% (0.044)	8.36% (0.265)	15.40% ** (0.077)	6.39% * (0.038)	8.38% (0.061)
Medium education level	72.22% *** (0.212)	82.67% *** (0.093)	75.82% *** (0.137)	37.62% ** (0.189)	71.07% *** (0.219)	81.73% *** (0.094)	74.92% *** (0.139)	35.28% * (0.183)	70.18% *** (0.223)	80.97% *** (0.095)	74.22% *** (0.141)	33.52% * (0.178)	67.62% *** (0.23)	78.67% *** (0.1)	72.25% *** (0.146)	28.74% * (0.162)
High education level	20.53% (0.198)	6.33% (0.06)	18.65% (0.133)	58.20% *** (0.202)	21.40% (0.202)	6.24% (0.058)	19.34% (0.136)	59.67% *** (0.199)	22.08% (0.205)	6.16% (0.057)	19.87% (0.138)	60.68% *** (0.197)	24.02% (0.212)	5.94% (0.055)	21.35% (0.144)	62.87% *** (0.193)

The values show the probabilities that children of parents with low, middle, and high education pursue a low, middle, or high secondary track, Standard errors are in parentheses, the. ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. The standard errors are calculated using the bootstrapping method.

Table 4: Mean Predictions of the Three Main Models*(a) Parental education only*

	Gini 95: 1. Quartile				Gini 95: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Child / Parents		(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)
Low education level	6.40% (0.166)	8.90% *** (0.008)	4.24% *** (0.002)	2.53% *** (0.007)	9.22% (0.243)	16.48% *** (0.014)	5.76% *** (0.003)	5.22% *** (0.007)	144.13% (0.35)	185.17% *** (0.25)	135.79% *** (0.113)	205.88% * (0.607)
Medium education level	74.18% *** (0.181)	85.75% *** (0.01)	76.80% *** (0.006)	16.96% *** (0.024)	65.78% *** (0.218)	78.65% *** (0.015)	69.26% *** (0.007)	11.41% *** (0.012)	88.68% (0.193)	91.73% *** (0.023)	90.19% *** (0.013)	67.25% ** (0.133)
High education level	19.42% (0.163)	5.35% *** (0.007)	18.96% *** (0.005)	80.51% *** (0.025)	24.99% (0.183)	4.86% *** (0.007)	24.98% *** (0.006)	83.38% *** (0.014)	128.68% (0.24)	90.89% (0.205)	131.76% *** (0.056)	103.56% (0.04)

(b) Parental education and individual characteristics

	Gini 95: 1. Quartile				Gini 95: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low	middle	high	all	low	middle	high	all	low	middle	high
Child / Parents		(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)
Low education level	6.59% (0.17)	9.70% ** (0.048)	5.15% * (0.028)	3.94% (0.03)	9.01% (0.246)	15.95% ** (0.068)	6.83% * (0.035)	8.59% (0.056)	1.368 (0.38)	1.645 *** (0.242)	1.326 *** (0.118)	2.178 * (0.677)
Medium education level	72.94% *** (0.202)	83.71% *** (0.074)	76.47% *** (0.111)	30.80% ** (0.148)	66.93% *** (0.231)	78.16% *** (0.085)	71.62% *** (0.121)	23.70% ** (0.12)	0.918 (0.194)	0.934 * (0.039)	0.937 ** (0.03)	0.769 * (0.129)
High education level	20.47% (0.189)	6.59% (0.049)	18.39% * (0.108)	65.26% *** (0.16)	24.06% (0.198)	5.88% (0.042)	21.55% * (0.119)	67.72% *** (0.152)	1.175 (0.233)	0.893 (0.205)	1.172 *** (0.063)	1.038 (0.095)

(c) Parental education, individual characteristics, regional, educational and institutional factors

	Gini 95: 1. Quartile				Gini 95: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low	middle	high	all	low	middle	high	all	low	middle	high
Child / Parents		(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)
Low education level	7.25% (0.201)	11.00% * (0.062)	5.53% (0.034)	4.18% (0.035)	8.36% (0.265)	15.40% ** (0.077)	6.39% * (0.038)	8.38% (0.061)	1.153 (0.369)	1.400 ** (0.2)	1.157 (0.12)	2.006 * (0.601)
Medium education level	72.22% *** (0.212)	82.67% *** (0.093)	75.82% *** (0.137)	37.62% ** (0.189)	67.62% *** (0.23)	78.67% *** (0.1)	72.25% *** (0.146)	28.74% *** (0.162)	0.936 (0.197)	0.952 (0.038)	0.953 ** (0.023)	0.764 ** (0.12)
High education level	20.53% (0.198)	6.33% (0.06)	18.65% (0.133)	58.20% *** (0.202)	24.02% (0.212)	5.94% (0.055)	21.35% (0.144)	62.87% (0.193)	1.170 (0.253)	0.937 (0.206)	1.145 *** (0.048)	1.080 (0.135)

The values show the probabilities that children of parents with low, middle, and high education pursue a low, middle, or high secondary track, Standard errors are in parentheses, the. ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. The standard errors are calculated using the bootstrapping method.

Table 5: Changes in the Predictions across Gini-coefficients*(a) Parental education only*

Parents / Child	Low education level		Medium education level		High education level	
	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile
Education: high / low	1.112 (0.37)	0.032 (0.101)	0.733 * (0.145)	-0.053 * (0.031)	1.139 (0.272)	2.098 (3.711)
Education: high / middle	1.516 * (0.292)	0.308 * (0.171)	0.746 * (0.15)	-0.056 * (0.031)	0.786 *** (0.049)	-0.909 *** (0.24)

(b) Parental education and individual characteristics

Parents / Child	Low education level		Medium education level		High education level	
	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile
Education: high / low	1.324 (0.453)	0.132 (0.19)	0.824 (0.138)	-0.065 (0.057)	1.162 (0.301)	1.605 (4.272)
Education: high / middle	1.642 * (0.354)	0.492 * (0.278)	0.821 * (0.104)	-0.072 * (0.042)	0.885 * (0.066)	-0.407 (0.48)

(c) Parental education, individual characteristics, regional, educational and institutional factors

Parents / Child	Low education level		Medium education level		High education level	
	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile
Education: high / low	1.433 (0.543)	0.165 (0.221)	0.803 * (0.106)	-0.090 * (0.051)	1.153 (0.314)	1.405 (5.026)
Education: high / middle	1.734 * (0.434)	0.555 * (0.319)	0.802 * (0.114)	-0.098 * (0.055)	0.944 (0.117)	-0.176 (0.56)

Standard errors are in parentheses. ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. The standard errors are calculated using the bootstrapping method.

Appendix

Table 1A Descriptive Statistics on Explanatory Variables

	Communities	
	Mean	Std. Dev.
No. Observations	28032	
<u>Individual and familial Characteristics</u>		
-		
Child education	2.147	0.531
Father Low (0/1)	0.100	0.300
Father Medium (0/1) (Reference)	0.654	0.476
Father High (0/1)	0.083	0.276
Father Missing (0/1)	0.151	0.358
Father No Response (0/1)	0.011	0.106
Mother Low (0/1)	0.205	0.404
Mother Medium (0/1) (Reference)	0.692	0.462
Mother High (0/1)	0.042	0.200
Mother Missing (0/1)	0.043	0.202
Mother No Response (0/1)	0.018	0.133
Father Occ. Position: Unemployed (0/1) (Reference)	0.004	0.066
Father Occ. Position: No training (0/1)	0.033	0.178
Father Occ. Position: Low qualified blue collar (0/1)	0.083	0.276
Father Occ. Position: Low qualified white collar (0/1)	0.073	0.260
Father Occ. Position: Intermediate level occup. (0/1)	0.179	0.383
Father Occ. Position: Other self employed (0/1)	0.191	0.393
Father Occ. Position: Academic / upper mngmt. (0/1)	0.099	0.298
Father Occ. Position: Qualified self employed (0/1)	0.019	0.136
Father Occ. Position: Top management (0/1)	0.031	0.172
Father Occ. Position: Not employed (0/1)	0.019	0.135
Father Occ. Position Other (0/1)	0.120	0.325
Father Occ. Position Missing (0/1)	0.151	0.358
Mother Occ. Position: Unemployed (0/1) (Reference)	0.013	0.114
Mother Occ. Position: No training (0/1)	0.077	0.266
Mother Occ. Position: Low qualified blue collar (0/1)	0.021	0.144
Mother Occ. Position: Low qualified white collar (0/1)	0.220	0.414
Mother Occ. Position: Intermediate level occup. (0/1)	0.097	0.295
Mother Occ. Position: Other self employed (0/1)	0.063	0.242
Mother Occ. Position: Academic / upper mngmt.(0/1)	0.019	0.137
Mother Occ. Position: Qualified self employed (0/1)	0.003	0.057
Mother Occ. Position: Top management (0/1)	0.005	0.067
Mother Occ. Position: Not employed (0/1)	0.234	0.423
Mother Occ. Position: Other (0/1)	0.207	0.405
Mother Occ. Position Missing (0/1)	0.043	0.202

Source: Swiss Census 2000, BfS, EDK, EFV

Table 1A Descriptive Statistics on Explanatory Variables (*continued*)

	Communities	
	Mean	Std. Dev.
Father Age	41.389	18.016
Mother Age	43.673	10.182
Female (0/1)	0.477	0.499
Religion: Christian (0/1) (Reference)	0.926	0.261
Religion: Jewish (0/1)	0.001	0.038
Religion: Islamic (0/1)	0.003	0.054
Religion: Other or no denomination (0/1)	0.058	0.234
Religion: No response (0/1)	0.011	0.105
No Siblings (0/1) (Reference)	0.061	0.239
One Sibling (0/1)	0.443	0.497
Two Siblings (0/1)	0.317	0.465
Three or more Siblings (0/1)	0.179	0.384
Cantonal Characteristics		
<i>Cantonal school characteristics</i>		
Expenditure elementary school: per capita (cantonal)	835	324
Expenditure elementary school: total (cantonal)	489144	380171
Expenditure on education per capita (cantonal)	2615.797	287.977
Average teacher salary: primary school (cantonal)	87781	9371
Average teacher salary: primary school: missing (cantonal)	0.008	0.088
Average teacher salary: Secondary school (indexed, cantonal)	96.237	7.685
Teacher per 100 inhabitants (cantonal)	1.189	0.251
Class size: primary school (cantonal)	19.876	0.783
Class size secondary school (cantonal)	18.934	0.967
Population share of people with higher degree (cantonal)	0.095	0.032
Population share of people with university degree (cantonal)	0.048	0.020
Share in cantonal parliament of left politicians (cantonal)	0.291	0.113
<i>Cantonal institutional and regional characteristics</i>		
Index (cantonal)	3.654	1.266
Degree of decentralization (cantonal)	0.537	0.070
Tax burden (cantonal)	103.161	17.965
No. Of communities (cantonal)	188.018	125.817
Population (cantonal)	537086	375023

Source: Swiss Census 2000, BfS, EDK, EFV

Table 1A Descriptive Statistics on Explanatory Variables (*continued*)

	Communities	
	Mean	Std. Dev.
German speaking region (0/1)	0.779	0.415
French speaking region (0/1)	0.197	0.398
Italian speaking region (0/1)	0.024	0.153
Region 1 = VD, VS, GE (0/1)	0.132	0.339
Region 2 = BE, FR, SO, NE, JU (0/1)	0.261	0.439
Region 3 = BS, BL, AG (0/1)	0.124	0.330
Region 4 = ZH (0/1)	0.144	0.351
Region 5 = GL, SH, AR, AI, SG, GR, TG (0/1)	0.187	0.390
Region 6 = LU, UR, SZ, OW, NW, ZG (0/1)	0.128	0.334
Region 7 = TI (0/1)	0.024	0.153
Communal Characteristics		
Communal inequality		
Gini: communal 2003	0.318	0.049
Gini: communal equivalent 1995	0.265	0.049
Gini: communal equivalent 2003	0.274	0.040
<i>Communal school characteristics</i>		
Total expenditure on education, social affairs and health per capita (communal)	3733.281	940.567
Total expenditure on education, social affairs and health per capita: missing (communal)	0.662	0.473
Total expenditure on education (communal)	129278	243046
Total expenditure on education: missing (communal)	0.662	0.473
Numbers of grammar schools per 1000 inhabitants (communal)	21.008	19.010
Numbers of grammar schools per 1000 inhabitants: missing (communal)	0.713	0.452
Numbers of employees in education, social affairs and health (communal)	8023	13245
Numbers of employees in education, social affairs and health: missing (communal)	0.662	0.473
Class size (communal)	19.637	1.150
Class size: missing (communal)	0.662	0.473

Source: Swiss Census 2000, BfS, EDK, EFV

Table 1A Descriptive Statistics on Explanatory Variables (*continued*)

	Communities	
	Mean	Std. Dev.
Communal institutional characteristics		
Communal revenues per capita	7265	4544
Communal revenues per capita: missing values	0.663	0.473
Number of parties, divided by the cube root of seats (communal)	2.055	0.389
Number of parties, divided by the cube root of seats: missing (communal)	0.662	0.473
Taxable income (communal)	28892	7144
Taxable income: missing values (communal)	0.662	0.473
Living costs (communal)	1327	166
Living costs: missing values (communal)	0.662	0.473
Unemployment rate (communal)	2	1
Unemployment rate: missing values (communal)	0.672	0.469
Communal regional characteristics		
Population Density (communal)	0.010	0.015
Degree of urbanization (communal)	0.612	0.487

Source: Swiss Census 2000, BfS, EDK, EFV

Table 2A Multinomial regression: dependent variable: child education (low, middle and high educational track): Communities: Gini 2003

	Regression 1			Regression 2			Regression 3			Regression 4			Regression 5		
	Low		High	Low		High	Low		High	Low		High	Low		High
Intercept	-2.711 *** (0.458)		-4.266 *** (0.375)	-2.607 *** (0.475)		-4.097 *** (0.381)	86.493 (89.925)		106.015 (63.839)	86.039 (90.149)		104.754 (63.972)	0.062 (4.088)		-7.307 ** (2.823)
Gini - Communal inequality															
Gini 2003 - Communal equivalent inequality	2.589 *** (0.447)		2.529 *** (0.31)	2.196 *** (0.669)		1.864 *** (0.4)	1.425 ** (0.574)		1.612 *** (0.379)	1.246 (0.778)		0.917 ** (0.46)	1.582 ** (0.629)		1.675 *** (0.419)
Parental education															
Father Low (0/1)	0.315 *** (0.086)		-0.755 *** (0.091)	0.172 (0.375)		-0.592 (0.415)	0.342 *** (0.087)		-0.774 *** (0.092)	0.226 (0.396)		-0.553 (0.426)	0.331 *** (0.087)		-0.768 *** (0.092)
Father High (0/1)	0.502 *** (0.119)		1.222 *** (0.063)	0.092 (0.533)		0.744 ** (0.307)	0.445 *** (0.12)		1.163 *** (0.064)	0.092 (0.557)		0.603 * (0.308)	0.415 *** (0.12)		1.155 *** (0.064)
Father Missing (0/1)	0.520 (0.427)		0.661 * (0.353)	0.626 (0.524)		-0.071 (0.428)	0.553 (0.432)		0.962 *** (0.36)	0.971 * (0.544)		0.283 (0.437)	0.606 (0.43)		0.925 ** (0.358)
Father No Response (0/1)	0.452 *** (0.173)		-0.354 (0.222)	0.676 (1.108)		-1.445 (1.336)	0.413 ** (0.176)		-0.369 (0.231)	1.029 (1.161)		-1.032 (1.407)	0.417 ** (0.175)		-0.320 (0.226)
Mother Low (0/1)	0.338 *** (0.066)		-0.538 *** (0.057)	0.189 (0.294)		-0.809 *** (0.257)	0.379 *** (0.067)		-0.591 *** (0.058)	0.236 (0.314)		-0.979 *** (0.262)	0.356 *** (0.067)		-0.567 *** (0.058)
Mother High (0/1)	0.690 *** (0.138)		1.196 *** (0.08)	-0.710 (0.606)		1.147 *** (0.409)	0.627 *** (0.14)		1.075 *** (0.082)	-0.851 (0.628)		0.984 ** (0.406)	0.621 *** (0.14)		1.084 *** (0.082)
Mother Missing (0/1)	0.317 (0.336)		1.279 *** (0.267)	0.192 (0.592)		0.987 ** (0.49)	0.333 (0.342)		1.609 *** (0.273)	0.206 (0.618)		1.381 *** (0.502)	0.326 (0.34)		1.523 *** (0.271)
Mother No Response (0/1)	0.963 *** (0.131)		-0.760 *** (0.185)	1.027 (0.731)		-0.888 (0.9)	1.001 *** (0.133)		-0.846 *** (0.193)	1.125 (0.764)		-0.705 (0.918)	0.995 *** (0.133)		-0.787 *** (0.188)
Interaction - Gini * Parental education															
Gini: cantonal equivalent 2003 * Father low				0.566 (1.41)		-0.642 (1.577)				0.464 (1.492)		-0.864 (1.622)			
Gini: cantonal equivalent 2003 * Father high				1.480 (1.829)		1.727 (1.081)				1.263 (1.912)		2.020 * (1.084)			
Gini: cantonal equivalent 2003 * Father non response				-0.873 (4.305)		4.211 (5.036)				-2.417 (4.523)		2.540 (5.349)			
Gini: cantonal equivalent 2003 * Father missing				-0.361 (1.152)		2.680 *** (0.899)				-1.515 (1.245)		2.484 *** (0.923)			
Gini: cantonal equivalent 2003 * Father low				0.563 (1.09)		1.035 (0.958)				0.541 (1.17)		1.481 (0.975)			
Gini: cantonal equivalent 2003 * Father high				4.827 (2.027)	**	0.189 (1.44)				5.088 (2.097)	**	0.346 (1.429)			
Gini: cantonal equivalent 2003 * Father non response				-0.268 (2.742)		0.468 (3.293)				-0.506 (2.875)		-0.554 (3.359)			
Gini: cantonal equivalent 2003 * Father missing				0.470 (1.823)		1.054 (1.518)				0.476 (1.925)		0.830 (1.557)			
Other individual or parental characteristics (30 effects)		yes			yes			yes			yes			yes	
Cantonal educational characteristics (17 effects)								yes			yes				
Cantonal institutional or regional characteristics (20 effects)								yes			yes			yes	
Communal educational characteristics (13 control variables)															
Communal institutional or regional characteristics (16 effects)														yes	

Source: Own calculations using Swiss Census 2000, *BfS*, *EFV* and *EDK*. Note: Standard errors in parentheses. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively.

Table 2A Multinomial regression: dependent variable: child education (low, middle and high educational track): Communities: Gini 2003 (*continued*)

	Regression 6				Regression 7				Regression 8				Regression 9				Regression 10			
	Low		High		Low		High		Low		High		Low		High		Low		High	
Intercept	-0.062		-6.589	**	-10.999	*	-15.687	***	-11.065	*	-15.424	***	49.399		100.039		51.026		99.966	
	(4.1)		(2.843)		(5.914)		(4.232)		(5.927)		(4.237)		(91.786)		(65.88)		(91.992)		(66.029)	
Gini - Communal inequality																				
Gini 2003 - Communal equivalent inequality	1.413	*	1.086	**	1.056	*	1.892	***	0.767		1.186	***	1.483	**	1.695	***	1.288		1.026	**
	(0.823)		(0.491)		(0.548)		(0.355)		(0.761)		(0.438)		(0.662)		(0.436)		(0.848)		(0.506)	
Parental education																				
Father Low (0/1)	0.248		-0.513		0.294	***	-0.782	***	0.167		-0.555		0.338	***	-0.776	***	0.238		-0.532	
	(0.393)		(0.43)		(0.087)		(0.092)		(0.392)		(0.426)		(0.087)		(0.092)		(0.4)		(0.43)	
Father High (0/1)	-0.043		0.622	**	0.444	***	1.175	***	-0.009		0.576	*	0.429	***	1.154	***	0.015		0.572	*
	(0.561)		(0.306)		(0.121)		(0.064)		(0.559)		(0.309)		(0.121)		(0.065)		(0.56)		(0.308)	
Father Missing (0/1)	1.055	*	0.250		0.561		0.954	***	0.988	*	0.217		0.574		1.000	***	0.980	*	0.271	
	(0.544)		(0.436)		(0.431)		(0.36)		(0.542)		(0.437)		(0.433)		(0.36)		(0.548)		(0.438)	
Father No Response (0/1)	1.087		-1.370		0.395	**	-0.378	*	0.978		-1.156		0.406	**	-0.374		1.007		-1.069	
	(1.167)		(1.357)		(0.176)		(0.229)		(1.153)		(1.4)		(0.177)		(0.23)		(1.172)		(1.413)	
Mother Low (0/1)	0.214		-0.923	***	0.346	***	-0.578	***	0.125		-0.904	***	0.376	***	-0.589	***	0.223		-0.965	***
	(0.313)		(0.263)		(0.067)		(0.058)		(0.31)		(0.261)		(0.067)		(0.058)		(0.318)		(0.264)	
Mother High (0/1)	-0.948		1.067	***	0.624	***	1.084	***	-0.958		0.957	**	0.619	***	1.073	***	-0.849		0.938	**
	(0.628)		(0.403)		(0.14)		(0.082)		(0.63)		(0.408)		(0.14)		(0.082)		(0.627)		(0.407)	
Mother Missing (0/1)	0.259		1.258	**	0.383		1.591	***	0.258		1.344	***	0.338		1.600	***	0.215		1.343	***
	(0.621)		(0.502)		(0.34)		(0.273)		(0.619)		(0.499)		(0.342)		(0.273)		(0.624)		(0.503)	
Mother No Response (0/1)	1.257		-0.617		0.997	***	-0.826	***	1.083		-0.675		1.004	***	-0.841	***	1.215		-0.704	
	(0.766)		(0.897)		(0.132)		(0.193)		(0.753)		(0.921)		(0.134)		(0.193)		(0.767)		(0.923)	
Interaction - Gini * Parental education																				
Gini: cantonal equivalent 2003 * Father low	0.332		-0.997						0.513		-0.888						0.402		-0.954	
	(1.48)		(1.639)						(1.475)		(1.619)						(1.506)		(1.637)	
Gini: cantonal equivalent 2003 * Father high	1.626		1.922	*					1.618		2.165	**					1.477		2.105	*
	(1.927)		(1.078)						(1.919)		(1.09)						(1.919)		(1.085)	
Gini: cantonal equivalent 2003 * Father non response	-2.642		4.026						-2.286		2.993						-2.367		2.666	
	(4.553)		(5.115)						(4.493)		(5.322)						(4.566)		(5.37)	
Gini: cantonal equivalent 2003 * Father missing	-1.634		2.462	***					-1.553		2.697	***					-1.470		2.670	***
	(1.256)		(0.923)						(1.243)		(0.919)						(1.265)		(0.929)	
Gini: cantonal equivalent 2003 * Father low	0.534		1.357						0.835		1.242						0.579		1.432	
	(1.163)		(0.981)						(1.152)		(0.974)						(1.184)		(0.983)	
Gini: cantonal equivalent 2003 * Father high	5.391	**	0.084						5.461	***	0.474						5.054	**	0.501	
	(2.095)		(1.418)						(2.103)		(1.435)						(2.095)		(1.432)	
Gini: cantonal equivalent 2003 * Father non response	-1.037		-0.668						-0.369		-0.590						-0.838		-0.542	
	(2.882)		(3.275)						(2.83)		(3.374)						(2.883)		(3.379)	
Gini: cantonal equivalent 2003 * Father missing	0.247		0.965						0.475		0.892						0.458		0.932	
	(1.944)		(1.564)						(1.932)		(1.547)						(1.949)		(1.562)	
Other individual or parental characteristics (30 effects)		yes				yes				yes				yes				yes		
Cantonal educational characteristics (17 effects)						yes				yes				yes				yes		
Cantonal institutional or regional characteristics (20 effects)		yes												yes				yes		
Communal educational characteristics (13 control variables)						yes				yes				yes				yes		
Communal institutional or regional characteristics (16 effects)		yes												yes				yes		

Source: Own calculations using Swiss Census 2000, *BfS*, *EFV* and *EDK*. Note: Standard errors in parentheses. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively.

Table 3A Mean Predictions of the Three Main Models: Gini 2003

(a) Parental education only

Child / Parents	Gini 03 equivalent: 1. Quartile				Gini 03 equivalent: 2. Quartile				Gini 03 equivalent: 3. Quartile				Gini 03 equivalent: 4. Quartile			
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Low education level	6.88% (0.138)	10.14% *** (0.008)	4.49% *** (0.002)	2.84% *** (0.007)	7.28% (0.156)	11.07% *** (0.007)	4.72% *** (0.002)	3.24% *** (0.006)	7.62% (0.17)	11.91% *** (0.007)	4.91% *** (0.002)	3.61% *** (0.006)	8.82% (0.213)	15.06% *** (0.013)	5.58% *** (0.003)	5.09% *** (0.007)
Medium education level	73.57% *** (0.147)	85.18% *** (0.009)	76.01% *** (0.005)	17.88% *** (0.023)	72.00% *** (0.156)	84.02% *** (0.008)	74.69% *** (0.004)	16.12% *** (0.016)	70.64% *** (0.162)	82.98% *** (0.008)	73.53% *** (0.004)	14.75% *** (0.012)	65.91% *** (0.176)	79.16% *** (0.014)	69.49% *** (0.006)	10.88% *** (0.011)
High education level	19.55% (0.155)	4.68% *** (0.005)	19.49% *** (0.005)	79.28% *** (0.024)	20.72% (0.161)	4.91% *** (0.004)	20.60% *** (0.004)	80.63% *** (0.017)	21.73% (0.167)	5.11% *** (0.017)	21.56% *** (0.003)	81.64% *** (0.013)	25.27% (0.181)	5.78% *** (0.007)	24.92% *** (0.006)	84.03% *** (0.013)

(b) Parental education and individual characteristics

Child / Parents	Gini 03 equivalent: 1. Quartile				Gini 03 equivalent: 2. Quartile				Gini 03 equivalent: 3. Quartile				Gini 03 equivalent: 4. Quartile			
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Low education level	7.07% (0.146)	10.74% ** (0.052)	5.40% * (0.029)	4.37% (0.03)	7.38% (0.162)	11.51% ** (0.054)	5.64% * (0.03)	5.05% (0.034)	7.66% (0.176)	12.19% ** (0.056)	5.84% * (0.031)	5.69% (0.038)	8.61% (0.219)	14.68% ** (0.064)	6.56% * (0.034)	8.29% (0.055)
Medium education level	72.52% *** (0.179)	83.48% *** (0.072)	75.99% *** (0.112)	32.06% ** (0.149)	71.38% *** (0.184)	82.46% *** (0.075)	75.14% *** (0.114)	29.98% ** (0.142)	70.39% *** (0.189)	81.56% *** (0.077)	74.40% *** (0.116)	28.26% ** (0.137)	67.01% *** (0.199)	78.34% *** (0.086)	71.89% *** (0.121)	22.91% * (0.118)
High education level	20.42% (0.184)	5.78% (0.042)	18.61% * (0.108)	63.57% *** (0.162)	21.24% (0.188)	6.03% (0.044)	19.23% * (0.111)	64.98% *** (0.158)	21.95% (0.191)	6.25% (0.045)	19.76% * (0.113)	66.05% *** (0.156)	24.38% (0.2)	6.98% (0.05)	21.56% * (0.119)	68.81% *** (0.149)

(c) Parental education, individual characteristics, regional, educational and institutional factors

Child / Parents	Gini 03 equivalent: 1. Quartile				Gini 03 equivalent: 2. Quartile				Gini 03 equivalent: 3. Quartile				Gini 03 equivalent: 4. Quartile			
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Low education level	7.55% (0.179)	11.93% * (0.067)	5.64% (0.035)	4.34% (0.035)	7.66% (0.193)	12.45% * (0.068)	5.78% (0.035)	5.03% (0.039)	7.76% (0.205)	12.90% * (0.069)	5.90% * (0.036)	5.69% (0.043)	8.11% (0.241)	14.49% * (0.074)	6.30% * (0.038)	8.39% (0.062)
Medium education level	71.05% *** (0.194)	82.02% *** (0.094)	74.73% *** (0.141)	36.73% * (0.188)	70.51% *** (0.197)	81.44% *** (0.095)	74.40% *** (0.142)	35.02% * (0.183)	70.05% *** (0.2)	80.94% *** (0.096)	74.12% *** (0.143)	33.58% * (0.179)	68.46% *** (0.208)	79.20% *** (0.101)	73.18% *** (0.145)	28.86% * (0.164)
High education level	21.40% (0.196)	6.05% (0.057)	19.62% (0.138)	58.93% *** (0.201)	21.83% (0.199)	6.11% (0.057)	19.82% (0.139)	59.95% *** (0.199)	22.20% (0.201)	6.16% (0.057)	19.98% (0.139)	60.73% *** (0.198)	23.43% (0.208)	6.31% (0.058)	20.52% (0.142)	62.75% *** (0.195)

Table 4A: Mean Predictions of the Three Main Models (Gini 2003)

(a) Parental education only

Child / Parents	Gini 03: 1. Quartile				Gini 03: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
	(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)	
Low education level	6.88% (0.138)	10.14% *** (0.008)	4.49% *** (0.002)	4.18% *** (0.035)	8.82% (0.213)	15.06% *** (0.013)	5.58% *** (0.003)	5.09% (0.007)	1.153 (0.369)	1.400 ** (0.2)	1.157 (0.12)	2.006 * (0.601)
Medium education level	73.57% *** (0.147)	85.18% *** (0.009)	76.01% *** (0.005)	37.62% *** (0.189)	65.91% *** (0.176)	79.16% *** (0.014)	69.49% *** (0.006)	10.88% *** (0.011)	0.936 (0.197)	0.952 (0.038)	0.953 ** (0.023)	0.764 ** (0.12)
High education level	19.55% (0.155)	4.68% *** (0.005)	19.49% *** (0.005)	58.20% *** (0.202)	25.27% (0.181)	5.78% *** (0.007)	24.92% *** (0.006)	84.03% (0.013)	1.170 (0.253)	0.937 (0.206)	1.145 *** (0.048)	1.080 (0.135)

(b) Parental education and individual characteristics

Child / Parents	Gini 03: 1. Quartile				Gini 03: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
	(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)	
Low education level	7.07% (0.146)	10.74% ** (0.052)	5.40% * (0.029)	4.18% (0.035)	8.61% (0.219)	14.68% ** (0.064)	6.56% * (0.034)	8.29% (0.055)	1.153 (0.369)	1.400 ** (0.2)	1.157 (0.12)	2.006 * (0.601)
Medium education level	72.52% *** (0.179)	83.48% *** (0.072)	75.99% *** (0.112)	37.62% ** (0.189)	67.01% *** (0.199)	78.34% *** (0.086)	71.89% *** (0.121)	22.91% *** (0.118)	0.936 (0.197)	0.952 (0.038)	0.953 ** (0.023)	0.764 ** (0.12)
High education level	20.42% (0.184)	5.78% (0.042)	18.61% * (0.108)	58.20% *** (0.202)	24.38% (0.2)	6.98% (0.05)	21.56% * (0.119)	68.81% (0.149)	1.170 (0.253)	0.937 (0.206)	1.145 *** (0.048)	1.080 (0.135)

(c) Parental education, individual characteristics, regional, educational and institutional factors

Child / Parents	Gini 03: 1. Quartile				Gini 03: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
	(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)	
Low education level	7.55% (0.179)	11.93% * (0.067)	5.64% (0.035)	4.18% (0.035)	8.11% (0.241)	14.49% * (0.074)	6.30% * (0.038)	8.39% (0.062)	1.153 (0.369)	1.400 ** (0.2)	1.157 (0.12)	2.006 * (0.601)
Medium education level	71.05% *** (0.194)	82.02% *** (0.094)	74.73% *** (0.141)	37.62% * (0.189)	68.46% *** (0.208)	79.20% *** (0.101)	73.18% *** (0.145)	28.86% *** (0.164)	0.936 (0.197)	0.952 (0.038)	0.953 ** (0.023)	0.764 ** (0.12)
High education level	21.40% (0.196)	6.05% (0.057)	19.62% (0.138)	58.20% *** (0.202)	23.43% (0.208)	6.31% (0.058)	20.52% (0.142)	62.75% (0.195)	1.170 (0.253)	0.937 (0.206)	1.145 *** (0.048)	1.080 (0.135)

Table 5A: Changes in the Predictions across Ginis (Gini 2003)

(a) Parental education only

Parents / Child	Low education level			Medium education level			High education level		
	4. / 1. Quartile	4. - 1. Quartile		4. / 1. Quartile	4. - 1. Quartile		4. / 1. Quartile	4. - 1. Quartile	
Education: high / low	1.206 (0.354)	0.058 (0.086)		0.655 *** (0.12)	-0.072 ** (0.034)		0.858 (0.147)	-2.399 (2.564)	
Education: high / middle	1.441 (0.405)	0.279 (0.194)		0.666 *** (0.123)	-0.079 ** (0.038)		0.829 *** (0.043)	-0.696 *** (0.198)	

(b) Parental education and individual characteristics

Parents / Child	Low education level			Medium education level			High education level		
	4. / 1. Quartile	4. - 1. Quartile		4. / 1. Quartile	4. - 1. Quartile		4. / 1. Quartile	4. - 1. Quartile	
Education: high / low	1.388 (0.433)	0.158 (0.187)		0.761 ** (0.118)	-0.092 (0.058)		0.896 (0.178)	-1.143 (2.862)	
Education: high / middle	1.563 (0.459)	0.455 (0.356)		0.755 ** (0.117)	-0.103 * (0.06)		0.934 (0.087)	-0.225 (0.419)	

(c) Parental education, individual characteristics, regional, educational and institutional factors

Parents / Child	Low education level			Medium education level			High education level		
	4. / 1. Quartile	4. - 1. Quartile		4. / 1. Quartile	4. - 1. Quartile		4. / 1. Quartile	4. - 1. Quartile	
Education: high / low	1.592 (0.561)	0.215 (0.22)		0.814 (0.12)	-0.083 (0.059)		1.021 (0.228)	0.208 (3.783)	
Education: high / middle	1.732 * (0.42)	0.562 * (0.33)		0.802 * (0.118)	-0.097 * (0.058)		1.018 (0.115)	0.055 (0.543)	

Table 6A: Mean Predictions of the Three Main Models (Gini 1995): All observations
Parental education, individual characteristics, regional, educational and institutional factors

	Gini 95: 1. Quartile				Gini 95: 4. Quartile				4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile	4. vs. 1. Quartile
	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated	all	low educated	middle educated	high educated
Child / Parents		(1)	(2)	(3)		(4)	(5)	(6)		(4) / (1)	(5) / (2)	(6) / (3)
Low education level	7.96% (0.143)	11.23% * (0.064)	5.72% (0.037)	5.41% (0.042)	9.34% (0.184)	16.16% ** (0.08)	7.21% * (0.043)	8.01% (0.056)	1.173 (0.261)	1.439 ** (0.187)	1.260 *** (0.098)	1.480 (0.314)
Medium education level	71.23% *** (0.177)	82.49% *** (0.082)	75.43% *** (0.117)	35.88% ** (0.154)	65.52% *** (0.2)	77.81% *** (0.093)	70.19% *** (0.128)	31.44% *** (0.139)	0.920 (0.106)	0.943 (0.037)	0.931 (0.034)	0.876 (0.085)
High education level	20.81% (0.158)	6.28% (0.049)	18.84% (0.114)	58.71% *** (0.173)	25.14% (0.167)	6.03% (0.047)	22.59% * (0.128)	60.55% (0.168)	1.208 (0.146)	0.959 ** (0.174)	1.199 *** (0.062)	1.031 (0.072)

Table 7A: Changes in the Predictions across Ginis (Gini 2003): All observations
Parental education, individual characteristics, regional, educational and institutional factors

Parents / Child	Low education level		Medium education level		High education level	
	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile	4. / 1. Quartile	4. - 1. Quartile
Education: high / low	1.028 (0.264)	0.014 (0.134)	0.929 (0.092)	-0.031 (0.038)	1.075 (0.223)	0.700 (3.026)
Education: high / middle	1.174 (0.264)	0.165 (0.226)	0.942 (0.094)	-0.028 (0.042)	0.860 ** (0.065)	-0.436 (0.377)