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Widening ethnic schooling gap and Roma poverty
in post-communist Hungary

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ROMA CHILDREN IN THE TRANSFORMATIONAL RECESSION

WIDENING ETHNIC SCHOOLING GAP AND ROMA POVERTY

IN POST-COMMUNIST HUNGARY

BY

GÁBOR KERTESI – GÁBOR KÉZDI

Abstract

The Roma or “Gypsies” are Europe’s largest and poorest ethnic minority. Nearly 80 per cent of them live in the former communist countries of Central and Eastern Europe. The Roma – Non-Roma educational gap, always substantial but slowly closing in the communist years, widened again after the collapse of the communist system in Hungary. Using Hungarian Roma data from the mid-1990’s and a comparable national sample, we estimate multinomial probability models for dropping out after primary school (8th grade), continuing in vocational training school, or continuing in a secondary school with a maturity examination (necessary for college entrance). Our results indicate that long-term poverty of the Roma is strongly associated with their high drop-out rate after 8th grade. Roma poverty has increased considerably with the massive layoffs of unskilled workers since the mid-1980’s. We find that the younger a child is when his/her father is laid off the more likely he/she is to discontinue schooling after 8th grade. We conclude that the collapse of Roma employment has been in part responsible for the widening ethnic gap in education. Equal opportunities for the next Roma generation are therefore jeopardized unless policy helps overcoming the adverse effects of long-term poverty on schooling outcomes.

Keywords: Roma Minority, Education, Poverty, Hungary

JEL Classification: J15, I20, I30

KERTESI GÁBOR – KÉZDI GÁBOR

A FOGLALKOZTATÁSI VÁLSÁG GYERMEKEI:

SZÉLESEDŐ ETNIKAI ISKOLÁZTATÁSI SZAKADÉK ÉS ROMA SZEGÉNYSÉG

A POSZTSZOCIALISTA MAGYARORSZÁGON

Összefoglaló

A romák Európa legnagyobb és legszegényebb etnikai kisebbsége. Közel 80 százalékuk Közép- és Kelet-Európa egykori szocialista országaiban él. A rendkívül széles, de lassú csökkenésnek indult roma – nem roma iskoláztatási szakadék újra növekedni kezdett Magyarországon a rendszerváltás után. Az 1990-es évek közepén felvett roma és országosan reprezentatív mintákon multinomiális valószínűségi modelleket becsülünk, három kimenetellel: nem továbbtanulás a 8. általános után, továbbtanulás szakmunkásképzőbe (szakiskolába), illetve továbbtanulás érettségit adó középiskolába. Az eredmények azt igazolják, hogy a roma családok hosszútávú szegénysége nagymértékben felelős gyermekeik alacsonyabb továbbtanulási arányáért. A rendszerváltás során tömegekben szorultak ki a munkaerőpiacról az iskolázatlan munkavállalók, és így nagymértékben megnövekedett a hosszútávú szegénység a roma családok körében. Kimutatjuk, hogy egy roma család gyermeke annál kisebb valószínűséggel tanul tovább, minél fiatalabb volt akkor, amikor az apa elvesztette az állását és végleg kiszorult a munkaerőpiacról. Mindezek alapján levonjuk a következtetést, hogy a roma foglalkoztatás összeomlása legalábbis részben felelős a etnikai iskolázottsági szakadék növekedéséért. A következő roma generáció egyenlő esélyeit mindez nagymértékben veszélyezteti, amennyiben a társadalompolitika nem képes enyhíteni azokat a negatív hatásokat, amit a hosszútávú szegénység gyakorol a gyermekek iskolai fejlődésére.

Kulcsszavak: roma kisebbség, oktatás, szegénység, Magyarország

INTRODUCTION

The Roma or “Gypsies” are Europe’s largest and poorest ethnic minority. The size of the Roma population is notoriously hard to assess, but most estimates put it somewhere between 7 and 9 million [World Bank, 2003]. Nearly 80 per cent live in former communist countries of Central and Eastern Europe. Reliable figures for the well-being and social status are not available for the entire Roma population, but existing data indicate low education, poverty, poor health and social exclusion across all countries.

Most communist countries went through a Soviet-type modernization after World War II., involving an extensive use of unskilled labor. The fall of the communist system led to a deep recession and a transformation of labor demand. Demand for unskilled labor collapsed and has stayed low ever since. All that hit the Roma particularly hard. The more successful post-communist economies started to grow fast from the mid-1990’s but not even them have experienced an increase in demand for unskilled labor. Most unskilled people who lost their employment during the transition period have stayed unemployed or out of the labor force ever since.

Returns to education, especially tertiary, increased dramatically in post-communist economies. At the same time, tertiary education underwent a rapid expansion. In most post-communist educational systems, the so-called maturity degree (final exam after secondary school) is a gateway to tertiary education. Secondary education with maturity exam also expanded considerably.

But the education expansion left most young Roma behind. Many factors are likely to be responsible, including social exclusion and increased primary school segregation. In this study, we focus yet on another possible explanation: impoverishment due to the collapse of Roma employment. Jahoda, Lazarsfeld and Zeisel [1933], Elder [1974], and Conger and Elder [1994] present historical examples when massive and sudden impoverishment of a similar scale led to a significant decrease in the life chances of the next generation. We believe that a similar phenomenon must have played a role in the widening education gap between the Roma and the non-Roma in post-communist societies. This study is aimed at uncovering that effect in Hungary.

Using Hungarian Roma data from the mid-1990’s and a comparable national sample, we estimate multinomial probability models for finishing education after primary school (8th grade), continuing in vocational training school, or continuing in secondary school with a maturity examination (a necessary step towards college entrance). Our results show that the long-term poverty of Roma families substantially reduces their capacity to provide vocational and especially secondary education to their children.

Long-term poverty is found to be far more important than actual employment or commuting costs. We find evidence that the younger the children were when their fathers were laid off the more likely they are to discontinue schooling. Deeper poverty is the likely reason for that.

Thus the schooling gap can largely be attributed to the long-term poverty of Roma families. Roma poverty has increased considerably with the massive layoffs of unskilled workers since the mid-1980's. This fact and the evidence on the timing of the fathers' job loss support our main thesis: the transformation recession and structural changes in the labor market increased Roma poverty substantially, and that in turn contributed to the widening ethnic gap in education for the next generation. Equal opportunities for the next Roma generation are therefore jeopardized unless policy helps families or, perhaps, schools in overcoming the adverse effects of deep, long-term poverty on early childhood and schooling development.

The remainder of the paper is structured the following way. First, we show how post-communist transformation hit Roma employment in Hungary. Next, we present trends in education of the Roma in the national context, and point to the widening ethnic gap since the fall of communism. Third, we briefly review the theoretical and empirical literature to show that poverty and sudden impoverishment is likely to have a significant effect on children's education outcomes. The following two sections introduce the data and the measurement model, which are followed by our main results. The last part concludes.

TRANSFORMATION RECESSION AND THE COLLAPSE OF ROMA EMPLOYMENT

Integration of unskilled Roma into the mainstream economy was one of the few achievements of Communist Hungary. No doubt, integration was illusory: it was based on extensive use of unskilled labor, unprofitable even those days. Worldwide skill-biased technological change further devaluated unskilled labor. But integration under communism, however inferior, had been very real for Roma families. At the minimum, it provided stable employment for men and many women. All that disappeared with the collapse of the communist economy.

Figure 1 shows the magnitude of the changes. It graphs national and Roma employment rates from 1984 to 2003, for the cohort aged 20 to 39 in 1984. The Roma figures are based on detailed employment history data from the 1994 and 2003 Hungarian Roma Surveys. The national figures use consecutive, large, nationally representative, cross-sectional surveys.

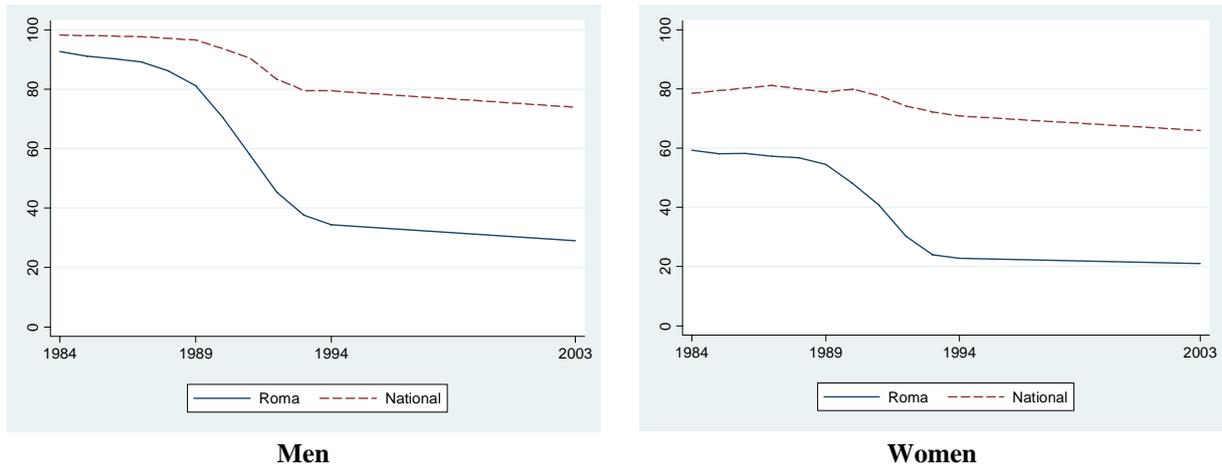


Figure 1.
Roma and National employment rates by gender
Following the cohort whose members were 20 to 39 years old in 1984

Sources. Roma figures: employment history data from the 1994 and 2003 Hungarian Roma Surveys. National figures: consecutive large nationally representative cross-sectional surveys (the Labor Force Surveys from 1992 on). See Kertesi [2005] for more details.

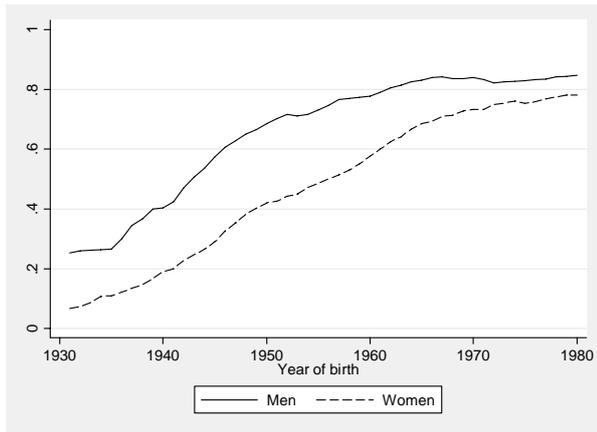
Communist Hungary saw virtually full employment for prime age men, including the Roma. Employment of the 20 to 39 year old male Roma started to decrease already in the mid-1980's, and it collapsed between 1989 and 1994, hardly reaching a mere 30 per cent. It has stabilized at around that level. On the other hand national employment of the 20 to 39 year old male cohort remained close to 100 per cent until 1989, and it dropped to 80 per cent by 1994. The corresponding figures for Roma females show a similar pattern. Roma women had been less attached to the labor market even in the 1980's (60 percent compared to the national average of 80 per cent), but their employment dropped a lot more as well (to 20 per cent compared to the national average of 70 per cent). The difference in employment trends was due mainly to lower Roma education levels but regional and occupational differences as well as discrimination also played a role. Post-transition Roma employment has not only been low in level but also quite unstable. Kertesi [2004, 2005] provides evidence that Roma employment spells are substantially shorter than average even when compared to low-educated national employment durations. The large share of seasonal work and locally organized public employment also account for the instability of Roma employment.

EDUCATION OUTCOMES OF THE ROMA

The Hungarian educational system shares many common elements with other post-communist countries. Primary education lasts 8 years, schooling is compulsory until the age of 16, with the slowest students not being able to finish more than 8 grades by then. Primary school may be followed by either a 4-year secondary school with a comprehensive exam (“maturity”) at the end, or a 2 or 3-year vocational training school without such exam. Maturity exam is a necessary admission criteria into tertiary education of any kind. In what follows, we restrict the label “secondary schools” to those institutions, which - in contrast to vocational training schools - offer a maturity exam at the end.

Figure 2 shows primary, vocational training, and secondary educational attainment trends in Hungary since World War II. The graphs show degrees completed for the adult population, by year of birth, separately for Roma and the entire population. The Roma figures are based on two cross-sectional surveys, the 1993 and 2003 targeted representative Hungarian Roma Surveys. The national average figures were constructed similarly, from cross-sectional data (the 1993 and 2003 Labor Force Surveys).¹ Hungarian national surveys do not contain ethnic markers so Roma figures are compared to national averages here. Naturally, that comparison shows smaller differences than a more meaningful Roma versus non-Roma comparison would. Reconstructing historical trends from cross-sectional data has its drawbacks, primarily because of education-related mortality, but they are still useful for placing Roma developments into the national context.

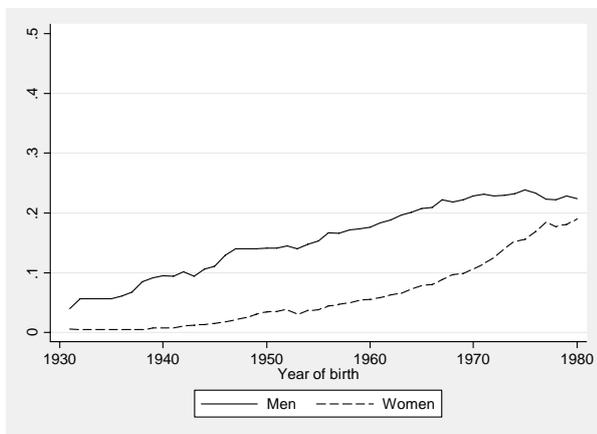
¹ We used the 1993 surveys for estimating the educational attainment for the 1930-1940 birth cohorts; combined sample of the 1993 and 2003 surveys for the 1941-1970 cohort; and 2003 data for the 1971-1980 cohorts. The graphs show moving-average smoothed time series (with a ± 5 year window).



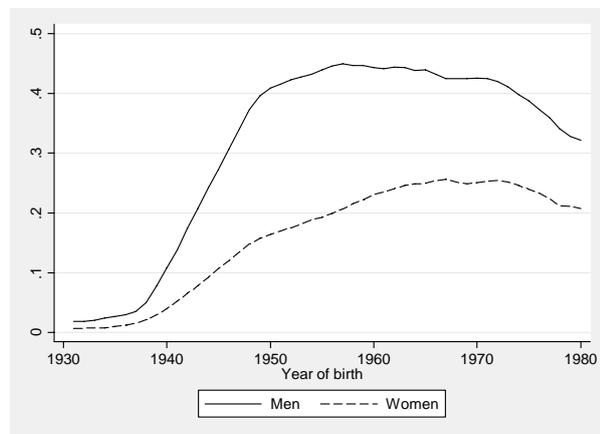
Roma: primary school



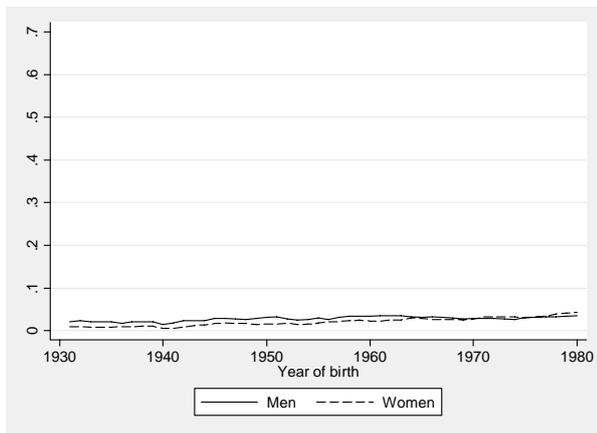
National: primary school



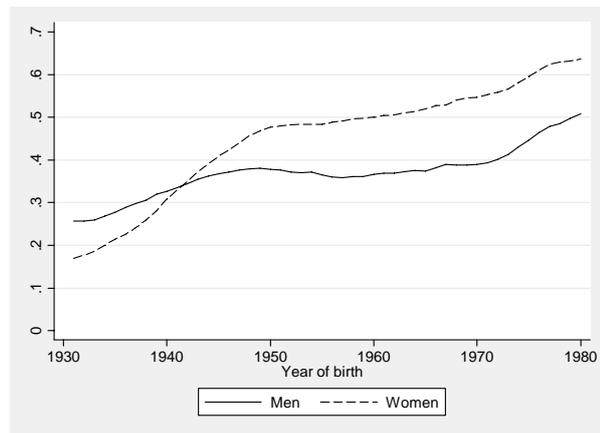
Roma: vocational school



National: vocational school



Roma: secondary school maturity exam



National: secondary school maturity exam

Figure 2.
Educational attainment of the adult population, by year of birth
(Roma and National)

Sources: Roma: Hungarian Roma Surveys of 1993 and 2003, and Hungarian Labor Force Surveys of 1993/4 and 2003/4. Educational attainment rates of the 1930-1940 cohorts are computed from the 1993 surveys; those of the 1941-70 cohorts were computed as an average of the 1993 and 2003 surveys; those of the 1971-80 cohorts were computed from the 2003 surveys. The figures show smoothed series by taking ± 5 -year moving averages (appropriately adjusted at the endpoints).

Nationwide primary school completion rate has been above 97 per cent for all cohorts born after 1950. The Roma approached that slowly, with males born after 1960 reaching 80 per cent. Females got up to the same rate 20 years later. In order to meet the increasing demand for skilled blue-collar workers, vocational training expanded dramatically in Hungary, especially among men. The ratio of vocational training degrees among men reached a 40 per cent national average for the 1950 cohort. Roma men took part in the expansion as well, albeit with a delay and at a smaller scale: the relevant ratio for them peaked at 20 per cent 20 years later. Cohorts born after the mid-1970's experienced a downward trend in the national average of vocational training as demand for blue-collar workers dropped sharply from the late 1980's. The mirror image of that decrease shows in the more valuable secondary education rates. Starting from around 1990, when cohorts born in the mid 1970 have finished primary school, national average secondary school rates started to increase. Roma education rates did not follow this pattern, neither the decrease in vocational training nor the increase in secondary education.

Secondary schooling rates are the ones that show the most dramatic differences. Throughout most of the communist era, 40 per cent of men and 50 per cent of women reached the maturity level in Hungarian education. The corresponding rates for the Roma stayed negligible for the whole period.

Since the fall of communism primary school completion rates continued to converge but the gap in further education has widened. Ironically, by the time the Roma achieved virtually full primary school completion it lost its market value. Table 1 shows education and enrollment rates in 1993 and 2003.² The figures show a significant, 18 percentage point increase in completed primary school rates for the Roma (part of which is due to earlier completion). At the same time, their overall vocational and secondary education decreased by 4 percentage points (18 percentage points if we condition on completed primary school). This slight decrease is in contrast to the national average rates that increased by 5 percentage points, so that 92 per cent – i.e. virtually all non-Roma – continued in some school.

² In order to be able to focus on continuing studies and thus condition on completed primary schooling, the table shows schooling of the 16-17 years old. Since Roma children still tend to start primary school later and finish it slower, the Roma rates were computed for the 17-18 years old.

Table 1.
Schooling rates of the 16-17 year old (Roma: 17-18 years old) population
in 1993 and 2003 (per cent)

Population, year of observation	From the whole cohort				From those who completed primary school		
	Completes primary school	Continues studies in			Continues studies in		
		Vocational school	Secondary school	Total	Vocational school	Secondary school	Total
Roma population							
1993	68	33	9	42	49	13	62
2003	86	24	14	38	28	16	44
change	+18	-9	+5	-4	-21	+3	-18
National average							
1993	96	39	48	87	41	50	91
2003	96	12	80	92	13	83	96
change	0	-27	+32	+5	-28	+33	+5
Roma – national difference in changes	+18	+18	-27	-9	7	-30	-23

Note: The category of continuing studies covers those who studied in vocational or secondary schools or completed any of those. Continuing rates are underestimated by dropout rates.

Sources: Hungarian Roma Surveys of 1993 and 2003, and Hungarian Labor Force Surveys of 1993/4 and 2003/ 4.

The widening educational gap is even more striking if we look at secondary education with the perspective of a maturity exam. Much of vocational education became obsolete with the fall of the communist economy and the labor-intensive technology it tended to use. As a result, national vocational education rates dropped by 27 percentage points. Increased enrollment into secondary schools with maturity more than compensated for this drop, producing a 32 percentage point increase at the national level. Roma vocational education dropped as well, although to a smaller extent. Roma secondary school enrollment, however, did not increase enough to compensate for that. As a result, by 2003, still a mere 14 per cent of the young Roma continued education towards a maturity degree, compared to an 80 per cent national average (16 versus 83 per cent conditional on primary school completion). Thus between 1993 and 2003 the gap between vocational and more valued secondary schooling widened by an additional 27 percentage points.

We can sum up these trends the following way. Roma education caught up slowly after World War II, and reached more than 80 per cent of national primary schooling and 50 per cent of national vocational schooling rates. However, their integration did not extend to secondary and tertiary education. By the second half of the 1980's, even the increasing trends stopped. After the fall of communism, secondary (and also tertiary) education experienced a dramatic expansion. But all that left the Roma behind.

Both supply and demand factors may have played a role. The echo of the Hungarian baby boom reached vocational and secondary schools by that time, and the school system did not respond to increasing demand by an appropriate expansion. This resulted in overcrowding, which probably pushed the most vulnerable groups out of vocational and secondary schools. Cohort size has decreased considerably since, which led to the increase of national enrollment rates. But the Roma did not follow the upward trend. It is likely, therefore, that demand factors played a role as well, perhaps even in the late 1980's.

The majority of Roma parents lost their jobs and slipped into long-term unemployment and poverty between 1984 and 1993. Most of them have remained poor ever since, without much hope to rise to their pre-1990's relative (and absolute) level of well-being. Their labor market attachment, if any, has been unstable. Long-term poverty and instability reduces the capacity of families to invest into their children's schooling and hampers child development in more subtle ways, as well. It is quite likely, therefore, that the widening educational gap between young Roma and their peers is at least partly due to the collapse of Roma employment. In this study, we aim at uncovering that link. Before turning to the specific Roma situation, we shortly overview the literature on how long-term poverty affects child development and schooling outcomes.

WHAT DO WE KNOW IN GENERAL ABOUT POVERTY AND CHILDREN'S OUTCOMES?

Whether children continue their education after primary school and in what kind of school, depends on many factors. In the present study, we concentrate on the role of parental education, the parents' labor market attachment, and long-term family income. These affect the eventual education of children through many complicated and sometimes hidden pathways, summarized by Figure 3.

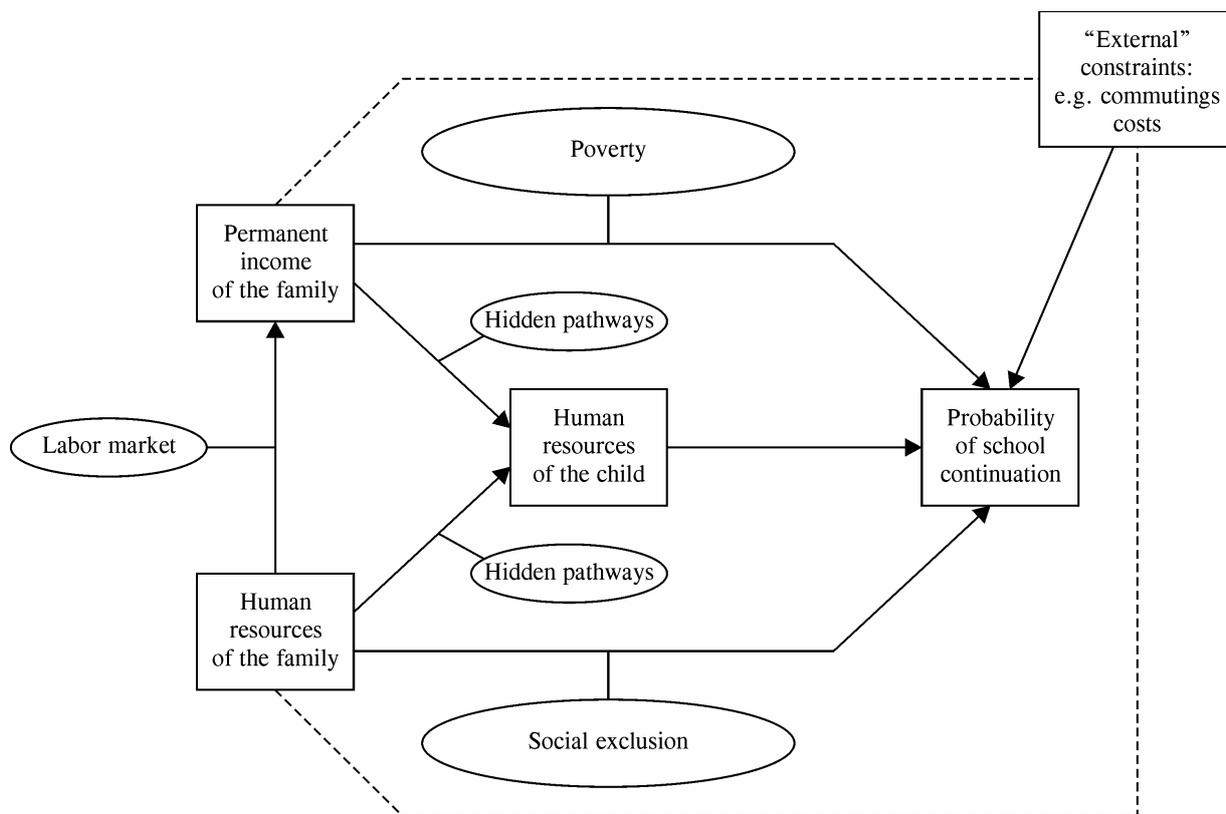


Figure 3.
Determinants of school continuation

A possibly important channel not considered in this study is social exclusion. Less educated people and, particularly, less educated Roma people are outside social networks of the mainstream society. Social exclusion leads to lower expected value of schooling, less information about schools, more difficulties in dealing with school officials, etc. In post-communist Hungary, families are free to choose primary schools and do not have to pay tuition. This fact, together with declining average school quality have increased inequality in schooling services, most likely biased against the Roma (see Kertesi and Kézdi [2005]). In fact, increased primary school segregation may be a very important factor in widening the post-primary educational gap. In this study, however, we focus on the effect of long-term poverty, income instability and sudden impoverishment.

First, let's look at the direct channels. Poverty reduces families' ability to educate their children because of both direct and indirect costs. Virtually all vocational and secondary schools are tuition-free in Hungary as in most European and post-communist countries, but books, equipment and commuting are all costly. The latter can be particularly important for families living in small villages with no vocational or secondary school.

However, the opportunity costs of education are probably more important. Children in schools do not produce any income and cannot help the family in other ways either. Families in deep, long-term poverty need all additional resources, and even an uneducated 16-20 year-old can generate some revenue if from unstable employment, the informal economy, or simply by helping out in family activities such as subsistence farming.

Secondly, let's consider the indirect channels or hidden pathways through which human and material resources of the family affect education opportunities. By the time they get to the end of 8th grade, children from poor families have typically accumulated enormous disadvantages. Even if their families did not face the direct effects of poverty and social exclusion, their children would have significantly lower chances to go to good schools - if to any schools.

Human capital theory (Becker [1965], Leibowitz [1973], Becker-Tomes [1986], Haveman and Wolfe [1995], Mayer [1997], Mulligan [1997]) emphasizes the role of parental human and material resources on the investment in their children's development in schools. On the other hand, Loury [1977, 2002] argues that human capital theory is incomplete and needs to be augmented in order to incorporate other mechanisms. One such line is family stress theory (Elder [1974], Lempers et al. [1989], McLoyd [1990], Conger et al. [1992, 1993]). It emphasizes the hidden pathways through which job and income losses lead to mental stress, which in turn severely hampers child development. Human capital and family stress theories have some competing elements but, in most respects, they complement each other. Taking elements from both sheds light on what happens to the children when their family slips into long-term poverty. Jahoda, Lazarsfeld and Zeisel [1971/2002] and Elder [1974] demonstrate the significant negative effects of the Great Depression, while Conger and Elder [1994] show similar results of the collapse of U.S. Midwest farming in the 1980's.

We do not aim at reviewing all the mechanisms the literature has established, partly because our data are not rich enough to look at them separately. Instead, we just give a short list of four of the most important results. Health and nutrition are the first. Poor and stressed mothers tend to give birth to children with lower weight and more health problems, and poor families are less able to provide appropriate nutrition (Brooks-Gunn and Duncan [1997]). Secondly, mental stress of parents can have other, more direct negative effects through depression, inadequate coping, undermining family roles etc. Parents who lose their jobs and slip into long-term unemployment are more exposed to mental stress (Elder, Nguyen, and Caspi [1985], McLoyd [1990], Conger et al. [1992, 1993]). Thirdly, poor and less educated parents tend to provide less warmth and positive attitude, lower level of adequate parental involvement and

practices, and less stimulating environment for their children (McLoyd [1990], Bolger, Patterson and Thompson [1995], Brody, Flor and Gibson [1999], Bradley and Corwyn [2002]). Fourthly, a rich and stimulating physical environment seems very important for child development. One of the most important consequences of long-term poverty is the inability of families to provide such an environment (Duncan and Brooks-Gunn [1997], McLoyd [1998], Phillips et al. [1998], Brooks-Gunn, Britto and Brady [1999], Linver, Brooks-Gunn, and Kohen [2002]).

All theories and the international evidence suggest that the collapse of Roma employment must have hampered the next generation's education opportunities. They also suggest that it has a long-term effect as opposed to current employment and income status that are important in deciding whether and where Roma children continue schooling after primary school (8th grade). In the remainder of the paper we aim at establishing that relationship. We also try to test whether the collapse of Roma employment further decreased children's chances from an already low level. We expect more severe effect the younger the children were when their parents lost their stable employment.

DATA

Our data are from Hungary from the mid-1990's. As we look at continuing education after 8th grade, the data cannot capture the full effect of the collapse of Roma employment: most children of the transformation recession did not reach 8th grade by the mid-1990's. Unfortunately, no Roma dataset is available from later years. Our data cannot distinguish all the different channels of parental human capital, poverty and job loss, but it contains a few very useful proxies about permanent income, neighborhood characteristics and geographic isolation.

We perform the analysis on two datasets: a Roma and a comparable national sample of families. The unit of the analysis is the family because it is the effect of family background variables that we are interested in. Both samples consist of families with young (aged 15-25) people who have completed primary school (and therefore can in principle continue in vocational or secondary school) and live with their parent(s). We restrict our sample to those young people who live with their parent(s) in order to have enough information about family background. The dependent variables of interest are, first, whether some children in the family continued their studies after 8th grade in any type of school, and second, whether some of them continued in secondary schools with a potential maturity exam. By the category of continued schooling we consider all who were either enrolled in the school or have completed it. Note that we miss most of the early dropouts as they most likely show up in our data as not

enrolled. In fact this is an advantage: from the viewpoint of later career, dropping out early is little different from not enrolling at all.

The Roma sample is based on the Hungarian Roma Survey of 1993/4 [Kemény, Havas and Kertesi, 1995]. The survey consists of 2200 households and is nationally representative for the Hungarian Roma population. Since very few young Roma continue their education after primary school, we had to supplement the representative sample with a targeted sample of Roma students who studied in vocational school, secondary school, or college. When collecting the supplementary data set in 1996, registries of national and regional funds supporting Roma students were used. Of course, the combined sample is in itself non-representative and therefore appropriate weights were used to restore the initial distribution of the original representative Roma sample, by geography and educational status of the young target group.

The national sample complements the Roma sample and is based on the 1997 Quarter 2 Hungarian Labor Force Survey. It contains all families with young people aged 15-25 who had completed primary school and lived with their family. The reason for using such a late complementary national sample is that it is the 1997 Labor Force Survey that contained questions about when people (the parents) lost their job if they were unemployed or out of the labor force at the time of the survey. This information will be crucial for our analysis.

All models in this paper attempt to explain the probability of three complementary events: whether (0) no child in the family continued schooling after having finished primary school (8th grade); (1) some continued their studies in a three-year vocational school but none in secondary school; or (2) some continued their studies in a secondary school that offers a maturity exam at the end. Recall that the sample is restricted to families with children who have the potential to continue education, i.e. families with at least one child who completed primary school.

We proxy current income with the employment status of the parents as neither the Labor Force Survey nor the supplementary Roma subsample has income and earnings data. Family structure is measured with the number of dependent children and the presence of the father. We shall see that the number of children and, somewhat surprisingly, the presence of the father as well are proxies for the per capita resources of the family. They are therefore related to long-term income. We measure geographic isolation with the type of residence (city, small town, and village). We also distinguish particularly isolated villages from the rest, using geographic distance and public transportation data compiled by János Köllő [1997]. In 1993, 25 per cent of all villages were considered as isolated, as they were far from and not appropriately connected to towns. The Roma sample also

allows us to look at the effect of residential segregation: whether the neighborhood is mostly Roma and whether it is a “Roma settlement” (a closed neighborhood with low-quality housing inhabited by Roma only).

The Roma sample contains two measures of the physical environment that surrounds the children. The interviewers classified the apartment into poor or non-poor apartments, and/or derelict or tidy apartments. We use the first dummy as a proxy for long-term poverty. The content of the second one is probably more complicated and has many elements, which we are unable to disentangle in this study. The two measures are not correlated: one third of the poor apartments and almost half of the non-poor ones are run-down. Some families may live in derelict (or disordered) apartments for reasons unrelated to poverty. Others, however, might have entered the last phase of long-term unemployment and poverty as described in Jahoda et al. [1971/2002], when everything, even the closest physical environment starts falling apart. We can therefore expect parental care to be at its lowest level in families who live in apartments that are classified both poor and disordered. Therefore, in order to fully characterize the relationship between poverty, derelict apartments and educational outcomes, we also enter the interaction of the two dummies. Note that classification was based on the subjective judgment of interviewers, which introduces measurement error into the proxy variables. Measurement error is likely to reduce the estimated effects in absolute value: the true effects of poverty are probably even stronger than what we estimate.

Summary statistics of these variables are in Table 2.

A crucial point in our argument is that the massive layoff of low-skilled parents led to a severe deterioration of physical and psychical environment of Roma children, which in turn significantly decreased their chances of continuing their studies after primary school. In the national sample and the representative Roma subsample we know the year when the father had lost his job if he was not working at the time of the interview. We use a restricted sample of young people living with non-employed fathers to see if an earlier job-loss led to lower vocational and/or secondary school probabilities.

Table 2.
Descriptive Statistics of the Roma and National samples (family level)

<i>Variable</i>	<i>Roma sample</i>			<i>National sample</i>		
	Mean	St.Dev	Obs.	Mean	St.Dev	Obs.
No one continues after 8 th grade	0.665	0.472	1514	0.087	0.281	5629
Some continue in vocational school	0.260	0.439	1514	0.278	0.448	5629
Some continue in secondary school with potential maturity exam	0.075	0.263	1514	0.635	0.481	5629
Parental educ. 0-7 grades	0.363	0.481	1514	0.018	0.132	5629
Parental educ. 8 grades	0.473	0.499	1514	0.221	0.415	5629
Parental educ. voc. School	0.136	0.343	1514	0.259	0.438	5629
Parental educ. sec. school	0.026	0.158	1514	0.330	0.470	5629
Parental educ. College	0.002	0.049	1514	0.172	0.377	5629
Working parent	0.359	0.480	1514	0.823	0.382	5629
Apartment poor	0.820	0.384	1514			
Apartment disordered	0.371	0.483	1514			
Apartment poor & disordered	0.282	0.450	1514			
0-2 children in family	0.345	0.475	1514	0.902	0.298	5629
3 children in family	0.245	0.430	1514	0.069	0.254	5629
4 children in family	0.194	0.396	1514	0.018	0.133	5629
5 or more children in family	0.215	0.411	1514	0.011	0.103	5629
Father lives with family	0.816	0.388	1514	0.811	0.392	5629
Parental age	43.8	8.1	1514	47.3	6.5	5629
Segregated Roma neighborhood	0.314	0.464	1514			
Roma settlement	0.219	0.414	1514			
Budapest	0.067	0.250	1514	0.189	0.392	5629
Other city	0.099	0.298	1514	0.168	0.374	5629
Small town	0.188	0.391	1514	0.297	0.457	5629
Village, not isolated	0.411	0.492	1514	0.280	0.449	5629
Village, isolated	0.236	0.425	1514	0.058	0.234	5629

Sources. Roma sample: Hungarian Roma Survey of 1993/4. and supplementary sample of 1996. National sample: Hungarian Labor Force Survey, 1997. Q2. All samples consist of families of young people potentially continuing their education after primary school (completed primary school, age 15 to 25), living with their parent(s).

We estimate probability models on restricted samples of young people born between 1972 and 1979 who lived with their father by the time of the interview. Another restriction was that we considered families in which the father was non-employed and lost his job when the child was 6-17 years old. Note that the observed data are timed too early for capturing early childhood effects: young children in the late 1980's – early 1990's were not yet 15 years old in our samples. Therefore, if poverty matters in early childhood as well, the actual effects of the duration of parental unemployment are most likely much stronger than what we can estimate. Summary statistics of the restricted Roma and national samples are in Table 3.

Table 3.
Descriptive Statistics of the subsample of non-employed fathers.
Roma and National sample

Variable	Roma sample			National sample		
	Mean	St.Dev	Obs.	Mean	St.Dev	Obs.
Dropout	.682	.466	337	.222	.416	654
Continues in vocational school	.290	.454	337	.351	.478	654
Continues in secondary school	.028	.166	337	.427	.495	654
Child's age when father lost his job	13.6	2.7	337	14.2	2.7	654
Child's age in year of observation	17.8	1.6	337	20.2	1.9	654
Father's education max. 0-7 grades	.405	.492	337	.086	.281	654
Father's education max. 8 grades	.460	.499	337	.309	.462	654
Father's education max. vocational school	.103	.305	337	.338	.473	654
Father's education higher	.018	.135	337	.207	.405	654
Apartment poor	.908	.290	337	–	–	–
Apartment disordered	.414	.493	337	–	–	–
Apartment poor & disordered	.335	.473	337	–	–	–

Sources. Roma sample: Hungarian Roma Survey of 1993/4. National sample: Hungarian Labor Force Survey, 1997. Q2. All samples consist of young people potentially continuing their education after primary school (with a potentially completed primary school), born between 1972-1979 who live with their fathers, and whose fathers lost their jobs when the child was 6-17 years old.

MEASUREMENT MODEL

In the empirical analysis we shall look at schooling decisions of the families. For simplicity's sake, let the measurement model be set up by assuming that each family has only one child. We concentrate on three educational outcomes: the child (0) discontinues studies after 8th grade, (1) continues studies in vocational school, or (2) continues studies in secondary school towards a maturity degree. The problem calls for a multinomial probability model. We can approximate the expected value of each alternative in a linear fashion:

$$(1) \quad V_{si} = \alpha_s' x_i + \eta_{si}, \quad s = 0,1,2.$$

In (1), i denotes the child, and V_{si} is the expected value of alternative s . The expected value is an indirect utility that contains the constraints as well, e.g. direct costs, permanent income, primary school grades, etc. Each V_{si} is decomposed into two terms: x_i denotes the observable characteristics of child i (and of her family), whereas η_{si} denotes unobservable characteristics that may be unique to alternative s . Family i will choose (or can afford) the alternative that gives the highest possible V , and this choice will manifest in observed outcomes:

(2) i stops her studies if	$V_{0i} \geq V_{1i}$ and $V_{0i} \geq V_{2i}$
i continues in vocational school (without maturity) if	$V_{0i} < V_{1i}$ and $V_{1i} \geq V_{2i}$
i continues in secondary school towards maturity if	$V_{0i} < V_{2i}$ and $V_{1i} < V_{2i}$

The simplest multinomial probability model, often used in the empirical literature is McFadden's multinomial („conditional”) logit. It is however based on assumptions that are unlikely to be satisfied in our case. The logit specification assumes that unobservables are uncorrelated across alternatives, i.e. $Corr(\eta_s, \eta_{s'}) = 0, s \neq s'$. In other words, it assumes that unobserved factors such as primary school grades that affect one outcome do not affect others.³ Instead of the logit specification, therefore, we have to use an alternative model. The simplest is the linear probability model (LPM):

$$\begin{aligned}
 (3a) \quad \Pr(S_i = 0 | x_i) &= \Pr(V_{0i} \geq V_{1i} \ \& \ V_{0i} \geq V_{2i} | x_i) \\
 &= \Pr\left[(\alpha_0 - \alpha_1)' x_i \geq \eta_{1i} - \eta_{0i} \ \& \ (\alpha_0 - \alpha_2)' x_i \geq \eta_{2i} - \eta_{0i}\right] \\
 &= \beta_0' x_i + u_{0i}
 \end{aligned}$$

$$\begin{aligned}
 (3b) \quad \Pr(S_i = 1 | x_i) &= \Pr(V_{0i} < V_{1i} \ \& \ V_{1i} \geq V_{2i} | x_i) \\
 &= \Pr\left[(\alpha_0 - \alpha_1)' x_i < \eta_{1i} - \eta_{0i} \ \& \ (\alpha_1 - \alpha_2)' x_i \geq \eta_{2i} - \eta_{1i}\right] \\
 &= \beta_1' x_i + u_{1i}
 \end{aligned}$$

$$\begin{aligned}
 (3c) \quad \Pr(S_i = 2 | x_i) &= \Pr(V_{0i} < V_{2i} \ \& \ V_{1i} < V_{2i} | x_i) \\
 &= \Pr\left[(\alpha_0 - \alpha_2)' x_i < \eta_{2i} - \eta_{0i} \ \& \ (\alpha_1 - \alpha_2)' x_i < \eta_{2i} - \eta_{1i}\right] \\
 &= \beta_2' x_i + u_{2i}
 \end{aligned}$$

If vector x_i of the observed characteristics contains solely dummy variables that are exhaustive and mutually exclusive, there is no better model than LPM (these are also called saturated models). An example is when

³ This assumption is known as the Independence of Irrelevant Axiom. One of its consequences is the well-known blue bus – red bus problem, see [McFadden, 2001], or Wooldridge [2002, pp. 501-502]. When an additional alternative arises, the logit model predicts switching probabilities from existing alternatives to the new one to depend only on the original probabilities. If, for example, a new school type would become available that does not allow for a maturity examination at the end, we would expect it to attract applicants who would have otherwise chosen vocational schools. At the same time, however, the logit model would predict that the same proportion would choose the new alternative from the originally vocational school applicants, secondary school applicants, and also from those who would discontinue their studies. This highlights the unattractive assumption of uncorrelated unobservables.

mutually exclusive dummies of parental education are the only right-hand side variables. In a more general case, with some x being continuous or non-exclusive dummies, LPM cannot be the best approximation (e.g. it can lead to predicted probabilities that are negative or greater than one). However, there are clear advantages of LPM even for us in that case. First, contrary to the logit, cross-equation correlation of unobservables is unrestricted. Second, LPM is easy to estimate. Third, unlike nonlinear probability models, LPM can use sampling weights. This matters as both the Roma and the national samples use sampling weights.⁴ Fourth, estimated parameters themselves have a clear interpretation: they are the partial effects of the variables on the appropriate probabilities, the effects we would like to estimate⁵:

$$(4) \quad \beta_{0k} = \frac{\partial \Pr(S_i = 0 | x_i)}{\partial x_{ki}}, \quad \beta_{1k} = \frac{\partial \Pr(S_i = 1 | x_i)}{\partial x_{ki}}, \quad \beta_{2k} = \frac{\partial \Pr(S_i = 2 | x_i)}{\partial x_{ki}} .$$

for continuous x_i , and

$$(5) \quad \begin{aligned} \beta_{0k} &= \Pr(S_i = 0 | x_{ki} = 1, x_{li}) - \Pr(S_i = 0 | x_{ki} = 0, x_{li}) \\ \beta_{1k} &= \Pr(S_i = 1 | x_{ki} = 1, x_{li}) - \Pr(S_i = 1 | x_{ki} = 0, x_{li}) . \\ \beta_{2k} &= \Pr(S_i = 2 | x_{ki} = 1, x_{li}) - \Pr(S_i = 2 | x_{ki} = 0, x_{li}) \end{aligned}$$

for dummy x_{ki} variables.

For all the above reasons, we prefer the linear probability model. For robustness checks, all models were re-estimated by unweighted multinomial logit as well. The logit results are qualitatively similar to the LPM results and are available from the authors upon request.

⁴ In the combined Roma sample, most of the S=1 and 2 observations come from a non-representative sample and are weighted to match the representative sample probabilities. This sampling scheme is called choice-based sampling, and it is often used when one wants to analyze the probability of rare events. As Manski and Lerman [1977] showed, conventional unweighted maximum likelihood estimators are inconsistent in such samples, with the exception of logit with choice-specific constants. However, as our samples have weights besides the choice-based combination, the ability to use sampling weights is still an advantage. Moreover, as mentioned above, the independence assumption behind the logit makes it quite unattractive for our purpose.

⁵ Linear probability models are in most cases quite good at approximating partial effects on probabilities even if the true model is nonlinear, such as logit or probit, see Wooldridge [2002, p.455.]

Equations in (3a) – (3c) define the system of probability equations we estimate. The sum of the three probabilities on the left-hand side is 1. Therefore, the regression constants add up to 1 and the slope parameters to 0 across equations. Unobservables are heteroskedastic in linear probability models by construction, therefore we allow for heteroskedasticity when we estimate the standard errors. Finally, note that since R^2 is not a particularly meaningful statistic in linear probability models, we shall not report them.

The above models assumed that each family has only one child. In order to deal with multiple children, the dependent variable in the estimated models are: whether ($S=0$) no child in the family continued schooling after having finished primary school (8th grade); ($S=1$) some continued their studies in a three-year vocational school but none in secondary school; or ($S=2$) some continued their studies in a secondary school that offers a maturity exam.

RESULTS

Table 4 contains the main results. Three factors emerge as quantitatively important predictors of Roma schooling: parental education, number of children, and permanent physical environment proxied by the quality of the apartment.

Recall that our data have imperfect measures for income and no measures that can directly capture the different channels of parental human capital and income. As a result, parental education is quite naturally a very strong predictor. The highest parental education of the reference family is completed primary school (8 grades). Less educated Roma families are 13 percent more likely to have no children studying after primary school. The very few Roma families with college educated parents are 27 per cent less likely to have such children. Except for the well-educated families, the relevant margin seems to be the ability to send children to vocational schools or have them drop out. The national figures are qualitatively similar, with one important exception: vocational versus secondary school is a relevant margin even at lower parental schooling levels. Also recall that most Hungarian families have parents with vocational or secondary education, while parents in more than 80 per cent of Roma families are less educated.

Table 4.
Estimated effects on probability of school continuation.
Roma and National samples.

	Roma sample			National sample		
	All children stopped at 8 th grade	Some cont. in vocational school	Some cont. in secondary school	All children stopped at 8 th grade	Some cont. in vocational school	Some cont. in secondary school
Parental educ. 0-7 grades	0.128 (4.5)**	-0.095 (3.6)**	-0.033 (4.1)**	0.277 (5.1)**	-0.073 (1.3)	-0.205 (5.8)**
Parental educ. 8 grades	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>
Parental educ. voc. school	-0.159 (3.9)**	0.113 (2.9)**	0.046 (2.8)**	-0.115 (7.4)**	-0.043 (1.9)	0.158 (7.3)**
Parental educ. sec. school	-0.114 (1.5)	0.009 (0.1)	0.105 (2.3)*	-0.165 (11.6)**	-0.286 (14.5)**	0.451 (23.0)**
Parental educ. college	-0.269 (3.7)**	-0.267 (1.6)	0.536 (4.5)**	-0.185 (12.5)**	-0.395 (19.1)**	0.580 (28.2)**
Working parent	0.014 (0.5)	-0.019 (0.7)	0.006 (0.6)	-0.065 (4.1)**	0.013 (0.6)	0.052 (2.6)*
Apartment poor	0.440 (10.8)**	-0.183 (4.3)**	-0.256 (8.4)**	n.a.	n.a.	n.a.
Apartment disordered	0.483 (8.6)**	-0.194 (3.4)**	-0.288 (9.2)**	n.a.	n.a.	n.a.
Apartment poor & disordered	-0.338 (5.5)**	0.069 (1.1)	0.269 (8.3)**	n.a.	n.a.	n.a.
0-2 children in family	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>
3 children in family	0.087 (2.6)**	-0.061 (1.9)	-0.026 (2.0)*	0.014 (0.8)	-0.023 (0.9)	0.010 (0.4)
4 children in family	0.137 (3.9)**	-0.067 (2.0)*	-0.070 (6.2)**	0.034 (1.0)	0.032 (0.6)	-0.066 (1.3)
5 or more children in family	0.205 (6.1)**	-0.136 (4.2)**	-0.069 (6.6)**	0.082 (1.1)	0.029 (0.4)	-0.111 (1.5)
Father lives with family	0.109 (3.2)**	-0.090 (2.8)**	-0.019 (1.6)	0.021 (1.8)	0.008 (0.5)	-0.029 (1.6)
Parental age	0.003 (1.8)	-0.002 (1.4)	-0.001 (1.5)	0.001 (1.3)	-0.001 (0.5)	-0.000 (0.4)
Segreg. Roma neighborhood	0.008 (0.3)	0.007 (0.2)	-0.015 (1.6)	n.a.	n.a.	n.a.
Roma settlement	0.037 (1.1)	-0.039 (1.3)	0.002 (0.2)	n.a.	n.a.	n.a.
Budapest	0.014 (0.3)	-0.042 (1.0)	0.028 (1.4)	0.014 (1.0)	-0.064 (3.1)**	0.049 (2.3)*
Other city	0.043 (1.1)	-0.032 (0.9)	-0.011 (0.8)	-0.002 (0.2)	-0.087 (4.4)**	0.089 (4.4)**
Small town	-0.079 (2.4)*	0.079 (2.6)*	-0.000 (0.0)	-0.007 (0.7)	-0.010 (0.6)	0.017 (1.0)
Village, not isolated	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>
Village, isolated	-0.079 (2.4)*	0.079 (2.5)*	-0.001 (0.1)	0.001 (0.1)	-0.058 (2.2)*	0.057 (2.3)*
Constant	-0.090 (1.1)	0.690 (8.3)**	0.399 (10.0)**	0.187 (4.5)**	0.496 (8.0)**	0.318 (5.2)**
Observations	1514	1514	1514	5629	5629	5629

Estimates of linear probability models (dependent variable: all children in the family dropped out of school after 8th grade; at least one child continued schooling in vocational training school but none in secondary school; at least one child continued schooling in secondary school).

Heteroskedasticity robust t-statistics in parentheses. *significant at 5%; **significant at 1%.

Sources. Roma sample: Hungarian Roma Survey of 1993/4. and Supplementary sample of 1996. National sample: Hungarian Labor Force Survey, 1997. Q2. All samples consist of young people potentially continuing their education after primary school (completed primary school, age 15 to 25, living with their parents).

The effects of poverty are striking. Remarkably, our imperfect and noisy proxies estimate a substantial effect of long-term poverty on Roma schooling, even after controlling for parental education. Living in an apartment that is assessed poor by an outside observer is associated with a 44 per cent increase in the probability of not sending children to any school after 8th grade. Living in a derelict apartment in itself increases that probability by 48 per cent: an equally strong effect (the two do not differ significantly) with many possible interpretations. Living in an apartment that is both poor and derelict increases dropout probability by a striking 58 per cent (.440+.483-.338=.585). The effect of long-term poverty on dropout probability is considerably larger than that of parental education in itself. It is even larger, by a third (14 percentage points), when long-term poverty is coupled with derelict physical environment, possibly because in these families apathy has already set in, as it is so well documented by Jahoda et al. [1971/2002].⁶ Poverty and neglect increase dropout rate at the expense of both vocational and secondary schooling.

The number of children in the family can also be interpreted as a measure of permanent, per capita income: the more children a family raises the less is available to each, holding other things constant. Four children in a Roma family (almost 20 per cent of Roma families have four children in our data) increase the probability of no schooling for any of them by 14 per cent. Five or more children (another 20 per cent of Roma families) increase this probability by more than 20 per cent. Figures 4 and 5 help assessing the magnitude of the effects of poverty and number of children by parental education.

Per capita permanent income is more important than parental education per se. Discontinuing education after 8th grade is 44 per cent more likely in Roma families who live in poverty than in those who don't, other things being equal. Similarly, discontinuing education in families with 5 or more children is 20 higher than in families with a few children only, again, other things being equal. Moreover, the two are correlated: poor families tend to have more children and parents tend to have less education. The above effects are, therefore, cumulative. The relatively well educated non-poor Roma families with at most 2 children are more than 95 per cent less likely to have their children drop out after 8th grade than the poor Roma families with many children.

⁶ Jahoda et al. (1971/2002) classify unemployed families into four types, based on their "attitude". "The fourth attitude, finally, differs from the others by the absence of an ordered household. Apathetic and indolent, these families let things take their course without making any attempt to salvage something from the collapse. (...) Home and children are dirty and neglected, the mental outlook is not desperate but simply indifferent." page 54.

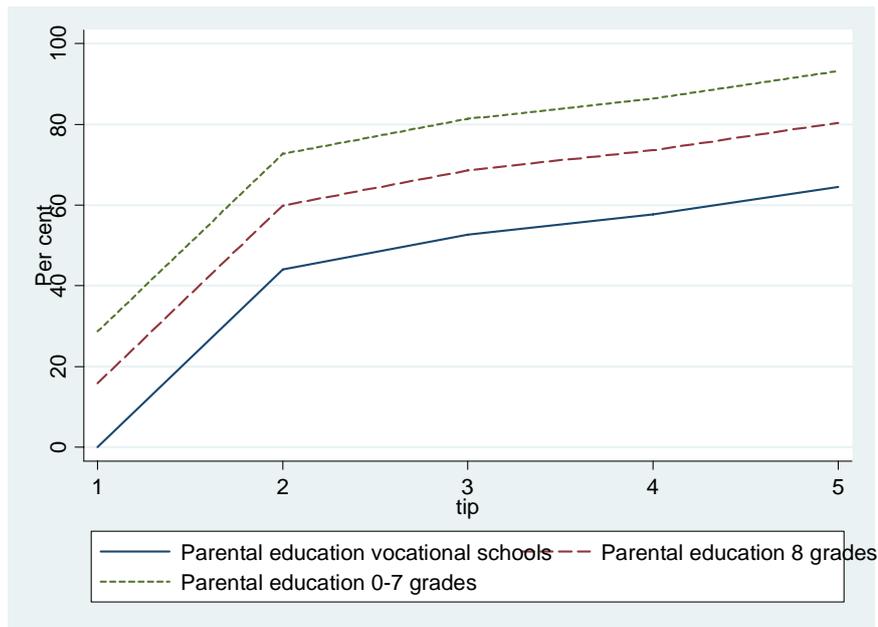
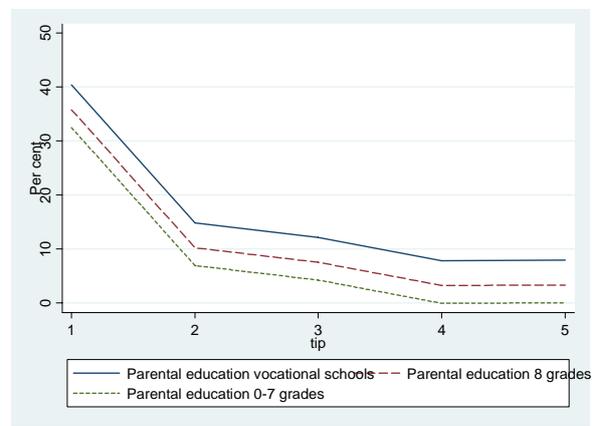
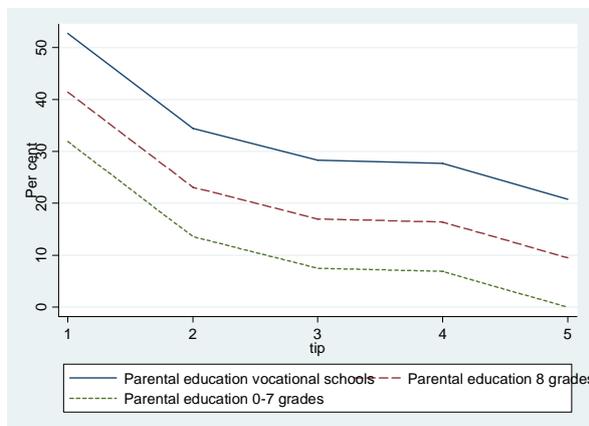


Figure 4.

Degrees of poverty and the probability of no children studying after primary school (8th grade). Hungarian Roma families

1 = non-poor family, 0-2 children; 2 = poor family, 0-2 children; 3 = poor family, 3 children; 4 = poor family, 4 children; 5 = poor family, 5 or more children

All effects compared to the reference group: non-poor family, 0-2 children, parents with vocational school education. Poor family: one that lives in poor apartment. Calculations based on the estimated partial effects in Table 4.



Some children in vocational school, none in secondary school

Some children in secondary school

Figure 5.

Degrees of poverty and the probability of continuing education after primary school (8th grade). Hungarian Roma families

1 = non-poor family, 0-2 children; 2 = poor family, 0-2 children; 3 = poor family, 3 children; 4 = poor family, 4 children; 5 = poor family, 5 or more children

All effects compared to the reference group: poor family, 5+ children, parents with 0-7 grades of education. Poor family: one that lives in poor apartment. Calculations based on the estimated partial effects in Table 4.

Figure 5 shows the mirror image of these effects. By construction, the sum of the curves in the two panels of Figure 5 adds up to the negative of those in Figure 4. What is interesting here is how those effects are distributed

across school types. The effect of poverty is similar for vocational training schools and secondary schools: poverty reduces the probability of continuing education by 20-25 per cent in both cases. However, the effects of the number of children and especially of parental education are stronger on continuing in vocational training schools. The latter reiterates the notion that vocational training school is a more relevant margin for most Roma. At the same time, the former (similar estimated effects of our poverty proxy) is consistent with the importance of long-term poverty in child development. If poverty affects children at an earlier age, its harms accumulate over time and by the time they reach 8th grade this may result in a low achievement that prevents them from continuing their studies in any kind of secondary school.

The presence of the father seems to be just another aspect of family size and therefore measures per capita resources. After controlling for parental employment and permanent income, having a father present in a Roma family actually decreases the school continuation chances of the children. It seems that he is just one more person in the family to use resources. It is a fact that Roma families are no more unstable than the national average (Table 2): the father lives with four out of five families in each sample.

Note that the national sample does not have measures for apartment quality. The number of children is also a much weaker predictor there. The vast majority of Hungarian families raise three children at most anyway, while the negative consequences of family size seem to start taking effect at larger numbers.

According to our estimates, current parental employment is a weak predictor, especially for the Roma. We interpret this result as the importance of permanent income relative to current one. It is poverty in early childhood and early school years that affects child development; actual income at or after the time when the schooling decision is made is less important. The fact that current employment has no significant effect on the Roma underlines again how unstable their employment is: those who happened to be employed when the data was collected possibly did not have significantly more resources than those who were unemployed.

Regional disadvantages seem to matter less than other family factors. Residential segregation does not reduce Roma families' ability to educate their children significantly after controlling for family resources. In the national sample, families in smaller towns and villages prefer slightly more to send their children to vocational schools than to more valuable secondary schools. Region, however does not play any role as to they send their children to any school or none at all. Even more surprisingly, growing up in a small and isolated village does not hamper educational outcomes in itself. The effects in the Roma sample are even weaker and less conclusive.

Small towns are slightly better than non-isolated villages, and, surprisingly, so are isolated villages. The magnitudes are very small. Naturally, families in small and remote villages tend to be poorer and less educated. Therefore, these estimates do not necessarily mean that commuting costs are not important. More likely, they suggest that poverty constrains educational outcomes well before commuting costs start to matter.⁷

These results underline the importance of long-term poverty in children's educational outcomes. The main thesis of this paper claims that the collapse of Roma employment in the late 1980's and early 1990's increased Roma poverty significantly and that in turn prevented their children from joining national trends of schooling expansion. In the remainder of this section, we show some micro evidence that parents' job loss directly reduces the schooling chances of children.

In order to uncover such effects, we look at children of non-employed fathers and relate the age of the child at the time of the job loss to the child's subsequent educational outcome. We estimate multinomial probability models as before, only on a restricted sample of individuals who live with their non-employed father. We also restrict to those fathers who lost their jobs when the child was six to seventeen years old (see Table 3 for the descriptive statistics). Recall that our data are from the mid-1990's and is therefore unable to capture the effect of massive layoffs and impoverishment after 1989 on early childhood development. Note however, that firm downsizing and gradual layoff of the unskilled in Hungary already started in the mid-1980's (Köllő [1998]). As Figure 1 and also Kertesi [2004, 2005] show, more than 10 per cent of Roma men lost their jobs between 1984 and 1989. That explains why so many of our 1993/4 teen-agers had their fathers lose their jobs while they were in their early teens. Our data cannot trace the effects of early childhood poverty as a result of the father's job loss because even the youngest Roma in our sample were at or above 6 in 1984. Moreover, the majority of children in the sample have fathers who lost their jobs when they were above 10 (the mean in the Roma sample is 13.6, in the national sample 14.2, see Table 3). The coefficient of interest is therefore identified mostly from job losses of a few years before versus at the completion of 8th grade or later.

⁷ Besides the distance from vocational and secondary schools, smaller and more isolated villages are also less likely to be racially segregated. There are very few Hungarian villages inhabited by Roma only, but primary school segregation is far stronger than residential segregation. All available evidence [Kertesi and Kézdi, 2005] suggest that the system of free school choice resulted in extremely strong school segregation in the cities. If school segregation hurts the Roma, it hurts them particularly in cities, which may explain the surprising result that school continuation chances are not worse and not better in small villages.

We estimate three models for both the Roma and the national sample. In the first one, the child's age when the father lost his job is entered along with the child's age at the time of the survey. In the second one, parental education is also controlled for, and in the third one apartment quality measures are entered as additional controls in the Roma sample. The size of the samples does not allow for more detailed analysis but the results are qualitatively similar if the number of children and other controls are also entered. Table 5 shows the results.

Table 5
Probability of school continuation and the child's age when her father lost his job

	Roma sample			National sample		
	Stopped at 8 th grade	Cont. in vocational school	Cont. in secondary school	Stopped at 8 th grade	Cont. in vocational school	Cont. in secondary school
	<i>Panel A. Other controls: own age</i>					
Child's age when father lost his job	-0.034 (3.53)**	0.029 (3.07)**	0.005 (1.63)	-0.020 (3.47)**	0.005 (0.82)	0.015 (2.33)*
	<i>Panel B. Other controls: own age and parental education</i>					
Child's age when father lost his job	-0.024 (2.52)*	0.022 (2.27)*	0.002 (0.99)	-0.012 (2.15)*	0.007 (1.16)	0.004 (0.76)
	<i>Panel C. Other controls: own age, parental education, apartment</i>					
Child's age when father lost his job	-0.026 (2.81)**	0.024 (2.52)*	0.003 (1.17)	n.a.	n.a.	n.a.
Observations	337	337	337	654	654	654

Estimates of linear probability models (dependent variable: child dropped out of school after 8th grade; child continued schooling in vocational training school; child continued schooling in secondary school).

Heteroskedasticity robust t-statistics in parentheses. *significant at 5%; **significant at 1%.

Sources. Roma sample: Hungarian Roma Survey of 1993/4. National sample: Hungarian Labor Force Survey, 1997. Q2. All samples consist of young people potentially continuing their education after primary school (with a potentially completed primary school), born between 1972-1979 who live with their non-employed fathers, and whose fathers lost their jobs when the child was 6-17 years old.

When nothing is controlled for (apart from current age), our estimates indicate a substantial effect of the child's age when the father lost his job on the child's later schooling. The younger the child was when his/her father lost his job the higher the likelihood is of his/her dropping out of school after 8th grade. The magnitude is a significant 3.4 percentage point increase for one year of age difference. If a Roma father loses his job when his child is 10 years old, the child is 17 per cent more likely to give up studying at 8th grade than if he loses his job when the child is 15 years old. Compare this to the estimated 11 percentage point effect of having parents with a secondary degree relative to parents with 8 grades. The relationship is statistically significant in the national sample with a somewhat smaller

magnitude of 2 percentage points. Again, the margin for the Roma is at the vocational school while it is at the secondary school for the non-Roma.

A possible interpretation of this result is that the less productive fathers were laid off earlier and their children would have been less successful in school even if the fathers could have kept their jobs. While one cannot rule this out, the results in panel B support another interpretation. Even after the father's education is controlled for, the coefficients stay significant, although they decrease. Moreover, things do not change when the permanent income proxies (apartment quality and orderliness) are also entered. If we could control for permanent income, this result would imply that educational outcomes are affected not only by the level, but also the length of poverty. The younger the child was when the family slipped into poverty the longer the time the family has spent in poverty.

The estimates also suggest that earlier development (in primary schools) is substantially affected by poverty, and that in turn leads to a higher dropout rate after 8th grade. Of course, our proxies are far from being perfect. All the necessary qualifications therefore apply. With all that kept in mind, the results of Table 5 support the fact that the collapse of Roma employment had a strong negative effect on Roma children's educational outcomes. The younger the children the stronger the harms are.

CONCLUSIONS

The Roma – non-Roma educational gap has increased considerably in post-communist Hungary. While the majority of young Hungarians take part in the expanded secondary education with a good chance for college admission, most Roma still give up studying after 8th grade. And most of those who do not stop, usually continue their studies on a substantially less valuable vocational track.

The transformational recession, in which two thirds of Roma men lost their job was followed by the increase of the ethnic education gap. Much but not all of the job losses can be explained by the undereducation of the Roma. Demand for unskilled labor has stayed low ever since and thus Roma employment did not recover. Roma employment is not only very low in Hungary but also very unstable.

In this paper, we claim that widening ethnic gap in schooling is to a large extent the result of the collapse of Roma employment. Using Hungarian Roma and nationally representative data, we find strong support for our thesis.

Theory and international evidence suggest that long-term poverty and unstable employment have strong negative effects on child development and thus schooling outcomes. In line with this, our results show that long-term poverty substantially increases the likelihood of dropping out of school after the 8th grade. Even the crude proxies for permanent income show a very large effect, even larger than the estimated effect of parental education. We show that current parental employment and commuting costs do not have a significant effect, partly because of the unstable nature of Roma employment, but more importantly because the disadvantages cumulate through early childhood and primary school. By the time schooling decisions are made after 8th grade, children from poor Roma families cannot continue their studies in valuable secondary schools even if their parents are currently employed and happen to live next door to a good secondary school.

All that gives strong but indirect support to our main thesis. A closer look at the timing of the non-employed fathers' layoff and their children's schooling outcomes provides additional and more direct support. The younger the child was when the father lost his job the more likely the child drops out after 8th grade. Since by age 15 school continuation outcomes have already been shaped by earlier factors, children who were young enough when their parents were hit by the collapse of employment in the late 1980's – early 1990's can expect lower schooling outcomes than the older cohorts. Children of the transformational recession with low-skilled parents face low schooling prospects.

Education is a key to Roma integration into the economy and society. But improving schooling of the next Roma generation is hard without balancing the effects of long-term poverty on early childhood and early schooling development. All that echoes the post-civil rights African-American experience. Equal opportunities at secondary or tertiary level are not enough to overcome the large and increasing gap in education, because its roots lie in earlier child development. Empowering Roma families is probably the best way but it may be infeasible to the necessary extent. Intervention in schools may be more realistic but it needs to address the direct and hidden pathways through which poverty affects educational outcomes. In line with the recent literature (e.g. Carneiro, Heckman and Masterov [2005]), our results also suggest that such interventions are more likely to work if they focus on earlier child development as opposed to easing credit constraints.

The vast majority of the European Roma lives in post-communist Central and Eastern European countries. Those countries are similar to Hungary: they went through a transformational recession and experienced a permanent drop in the demand for low-skilled labor. Hungary is, on the other hand, somewhat richer than most. If poverty of Roma parents prevents the next generation to catch up with secondary and tertiary education in Hungary, its consequences are probably just as severe elsewhere.

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