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Abstract

This study examines the effect of parental job loss on children's completion of secondary school and the mediating role of home environment in that effect. It uses rich survey data from Hungary on adolescents age 14 through 21, with detailed measures of parental employment and home environment. The study replicates the average negative effect found in the literature. No effect is found for families with a history of providing a cognitively stimulating home environment, but the negative effect is strong for other families. Home environment matters more than initial income in mediating the effect. The results highlight the protective nature of a cognitively stimulating home environment.

Szülői állásvesztés, középiskolai lemorzsolódás és a stimuláló otthoni környezet mérséklő hatása

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Összefoglaló

Tanulmányunkban a 2008-as gazdasági válság középiskolai lemorzsolódásra gyakorolt hatását vizsgáljuk a Tárki Életpálya-felvétel paneladataira – a szülők esetében a 2006 és 2010 közötti évekre kiterjedő, havi frekvenciájú, részletes foglalkoztatási adatokra, a gyerekek esetében pedig a teljes középiskolai pályafutást átfogó iskolai adatokra – támaszkodva. A munkaerőpiaci és gazdasági sokkokkal foglalkozó szakirodalom jelentős részével összhangban a mi adatainkon is egyértelműen kimutatható, hogy az állásukat vesztett szülők családjaiban megnő a középiskolás tanulók iskolai lemorzsolódása. Az átlagos hatás mögött azonban nagy mértékű heterogenitás figyelhető meg a családok otthoni nevelési környezetének minőségétől függően. Az otthoni környezet mérésére a nemzetközi szakirodalomban sztenderdnek számító szintetikus mutatót, a HOME-indexet használtuk. A nevelési környezet tekintetében mutatkozó különbségek a családok válság előtti jövedelemkülönbségeinél jelentősebb mértékben befolyásolták a gyerekek középiskolai lemorzsolódási esélyeit. Amíg a szülői állásvesztés nem járt lemorzsolódási következményekkel azokban a családokban, amelyek stimuláló környezetet biztosítottak a gyermekeik kognitív fejlődésére, addig erős lemorzsolódást figyelhettünk meg azokban a családokban, amelyek nevelési gyakorlatát nem jellemezte ez a moderáló tényező.

Tárgyszavak: állásvesztés, otthoni környezet, középiskolai lemorzsolódás

JEL kódok: J60, I20

1. Introduction

Job loss of parents is known to have negative effects on student outcomes in the US (Flanagan and Eccles 1993; Kalil and Ziol-Guest 2005, 2008; Kalil and Wightman 2011; Stevens and Schaller 2011; Johnson et al. 2012; Brand and Simon Thomas 2014; Hilger 2016), Canada (Coelli 2011), Norway (Rege et al. 2011), the UK (Gregg et al. 2012), as well as Hungary (Kertesi and Kezdi 2007). But the negative average effect hides substantial heterogeneity, and this heterogeneity is not well understood (see, e.g., the conflicting results on the mediating role of initial family income in Kalil & Wightman (2011), Stevens & Schaller (2011), and Brand & Thomas (2014).

It is also known that children that grow up in better home environments and experience better parenting perform substantially better in school, even when comparing families with the same income (Linver et al. 2002; Yeung et al. 2002; Davis-Kean 2005; Todd and Wolpin 2007; Kalil 2015). Joining these two strands of literature we hypothesize that home environment mediates the effect of parental job loss on student outcomes: a history of a good home environment may provide protection against bad educational outcomes when economic distress hits a family.

We use rich longitudinal survey data to examine the heterogeneity of the effect of parental job loss by household income and home environment at the same time. We analyze the question in Hungary, a middle-income country where secondary education is financed by the government, and where over 90 percent of the analyzed cohort completes some sort of secondary school. Our data is especially well suited to analyze our research question. It has monthly information on parental employment as well as detailed measures of family income and home environment, the latter two measured before the time of the potential job loss. The field period of the survey included the economic recession of 2008–2010, thus inducing substantial variation in parental employment during the secondary school years of adolescents, even in families from the upper half of the income distribution and the home environment distribution.

First, we estimate the effect of parents experiencing a decline in employment on the probability that their child completes secondary school by age 21. Monthly employment data on parents allows us to differentiate large declines in employment duration from smaller declines. We define a large decline as a 25 percent or higher drop in the fraction of months employed in a regular job compared to the reference period averaged across the two parents. The effect of a large decline is a 4 percentage point decrease in the probability of completing secondary school by age 21, from a 93 percent baseline probability. This is a strong association that amounts to a 50 percent increase in the dropout probability. The association is of similar sign, but smaller, for a small decline

in parental employment. The estimated association is likely to be a causal effect, as supported by additional evidence of regressions with pretreatment outcomes. While we do not observe the source of job loss and thus cannot look at plant closures or other exogenous sources of variation, we control for a rich set of covariates and provide additional evidence that provide a strong support for causal interpretation. Our identification strategy follows Stevens and Schaller (2011) and Coelli (2011).

Second, we show significant interaction of the effect with baseline household income and baseline home environment. Our measure of income takes into account income, expenditures, home value and size, and the history of financial distress. Our measure of home environment is an adaptation of the cognitive stimulation subscale of the HOME inventory (Home Observation Measurement of the Environment—Short Form) designed for children 10–14 years of age (Bradley et al. 2000). We find a remarkably strong effect of parental job loss on adolescents in the lower half of the home environment distribution in non-poor families. A large decline in parental employment leads to a ten percentage point decline in the school completion rate, compared to a 91 percent baseline completion probability in this group. The effect is smaller for adolescents in the lower part of the home environment distribution in poor families. We find virtually no effect in families from the upper half of the home environment distribution.

All of our results are conditional on a rich set of other covariates, and the results of "placebo" regressions with pretreatment outcomes support their causal interpretation. They are also robust to alternative definitions of permanent income and alternative functional forms. The difference of the effect by home environment is strongest when home environment is measured by items related to parental investment in human capital (as opposed to measures that are closer proxies of permanent income or measures of behavior).

We consider two interpretations of our results that are not mutually exclusive. First, families may be very different in their preferences toward investment in the human capital of their children. Parents with stronger preferences for such investment may keep up with their investment in the education of their children even if they experience a large decline in their employment and severe economic distress as a result. Parents with weaker preferences may cut back on such investments that may lead to an increase in the propensity of their children to drop out of secondary school. Second, a history of a cognitively stimulating home environment may endow children with skills that help them maintain their educational outcomes even if their parents decrease the investment in their human capital due to the economic distress caused by their job loss.

2. Data and method

This study examines the effect of parental job loss on the completion of secondary school in Hungary. Primary and secondary school combined is 12 years long in Hungary; for most tracks this means 8 years of primary school and 4 years of secondary school, whereas for the most selective academic tracks the 12 years are split into 4+8 or 6+6 years between primary and secondary. For the cohorts in our sample education was compulsory until the age of 18. With the earliest school starting at the age of six and with no grades failed, students would turn 18 in their twelfth grade. Compliance with the compulsory schooling age was far from perfect (Adamecz-Völgyi 2016).

We use data from the first six waves of the Hungarian Life Course Survey (HLCS). The HLCS is a panel survey that follows 10,000 youths who were in the eighth grade in the spring of 2006. The survey sampled eighth grade students who participated in the Hungarian National Assessment of Basic Competences (NABC) as well as special needs students who did not participate in the regular NABC but completed a simplified version of the reading comprehension test. Students with lower test scores and students with special needs are overrepresented in the sample, and we use sampling weights throughout the analysis to restore national representativeness. The first wave of the HLCS was conducted in the fall of 2006 when the typical respondent was 15 years old, and the sixth wave was conducted in the summer of 2012 when the typical respondent was 21 years old.

In this analysis we restrict the sample to the adolescents who participated in the sixth wave of the survey, had valid information on the employment of their parents through all survey waves, had their family unchanged, and were not early dropouts. Table A1 in the appendix shows the number of observations and average values for important variables in the population represented by the HLCS, the baseline HLCS sample and the final sample through the various steps of sample selection. Although attrition in the survey is non-negligible, the final sample is still broadly representative of the initial population in terms of test scores, parental education, parental employment and the affluence of their town of residence.

Our analysis examines the effect of parental job loss. Parental job loss is computed from the monthly employment history of the parents for the year preceding each interview, and indicates whether the parent was employed in a regular job, worked irregularly, was unemployed, or out of the labor force. We measure employment change as the change in the fraction of months employed in regular jobs between two time periods, September 2006 to August 2008 and September 2008 to August 2010. By coincidence, the economic recession of 2008 started around the time when dropping out

of secondary school became a potential issue for the respondents of our survey: the modal respondent age was 17 in January 2009. In what follows we shall call the September 2006 to August 2008 time period as the "before-recession period" and the September 2008 to August 2010 time period as the "recession period". Figure A1 in the appendix shows that the unemployment rate of the population aged 35–59 (the parents' generation) was around six percent in the before-recession period and increased substantially in the recession period, reaching nine percent by the end of our sample period.

Our main right-hand-side variables are two binary indicators: whether parental employment decreased to a large extent and whether parental employment decreased to a small extent (unchanged or increased parental employment is the reference category). According to table 1, 24 percent of the families experienced a decline in parental employment. Of this 24 percent, 14 percent experienced a large decline, with an average decrease of 41 percent, which translates to 5 months per year for both parents. Ten percent experienced a smaller decline. These figures are based on averages computed across the mother and the father in two-parent families. It turns out that the average employment changes for mothers and fathers are similar.

Table 1.

Parental job loss before the recession and during the recession

Parental employment	Fraction	Average fraction of months employed			Number of observations
		Before recession	During recession	Change	
Large decline	0.15	0.84	0.43	-0.41	695
Small decline	0.11	0.81	0.68	-0.12	502
No decline	0.75	0.81	0.87	0.06	3,568
Total	1.00	0.82	0.79	-0.03	4,765

Notes: Parental employment is measured as the fraction of months employed in a regular job, averaged across the mother and the father in two-parent families. Before recession: Sept. 2006 to Aug. 2008; during recession: Sept. 2008 to Aug. 2010. Large decline: parental employment declined by 25 percent of months or more; small decline is between 0 and 25 percent. All figures, except the numbers of observations, are weighted with sampling weights.

The figures indicate some mean reversion. Parental employment was higher before the crisis among families with a large decline in parental employment and smaller in the other two groups. We control for mean reversion in our analysis by entering pre-recession employment in all models; neglecting mean reversion does not change the results.

Our dependent variable is whether the adolescent respondent completed secondary school. This variable is operationalized as having a secondary degree in the last survey wave of 2012. According to this measure, 91 percent had a secondary school degree. Of the 9 percent without a degree, 3 percent were still enrolled in secondary school, and the remaining 6 percent had dropped out. We included all 4,765 students in the main analysis and treated all 9 percent without a degree as dropouts. For a robustness check we redid the entire analysis without the 3 percent still in school and arrived at very similar results.

Our analysis focuses on the role of family income and home environment in mediating the effect of parental job loss on whether adolescents complete secondary school. Our preferred measure of family income approximates permanent income prior to potential job loss by combining five variables: total household income referring to 2007, total household expenditure referring to 2006 and 2007; the estimated value of the home in 2007; the size of home in 2007; the extent to which the household experienced economic hardship starting with the birth of the child through 2006. The income and expenditure measures are converted into per capita terms using an equivalence scale (OECD-modified scale), and the size of home is divided by household size. We created the percentile rank of each measure separately and then took an average of these percentile rankings to create our measure of permanent family income before the potential job loss. This average rank measure of permanent income is distributed in a more bell-shaped than uniform manner but covers a wide range from 2 to 98 percent, with a mean of 59 percent. Appendix table 2 shows more details of the permanent income measure and its components in the entire sample as well as in the subsamples that we define below.

Our preferred measure of the extent to which the home environment offers cognitive stimuli is the cognitive subscale of the synthetic HOME index, created from 13 binary variables measured in the first survey wave when the adolescents entered secondary school. These 13 variables, together with 14 binary variables measuring the emotional stability of the home environment, were adapted from the National Longitudinal Study of Youth 1979 (NLSY79; see Bradley et al., 2000). Our data adapted the items themselves as well as the rules of imputation and the construction of the two indices (cognitive and emotional) from the NLSY79. Table A3 in the appendix shows the mean for each item of the cognitively stimulating home environment index in the entire sample, as well as in the four subsamples defined below.

We created four subsamples in terms of permanent income and cognitively stimulating home environment, cutting the sample into two by each measure at its median value. We label the lower half of the permanent income distribution as "poor"

and the upper half as "non-poor", indicating where the average household in each group would fall in the income distribution of richer countries such as the US or Canada. We simply label the two groups of cognitively stimulating home environment as "low home" vs. "high home".

Table 2 shows the number of observations as well as the sample average for the measure permanent income, the measure of cognitively stimulating home environment, two cardinal measures of income (income in 2007 and whether the household experienced any economic hardship in the past), as well as the measures of parental job loss (large decline in employment, small decline, no decline). Permanent income and home environment are positively, but imperfectly, correlated. Average ranking in permanent income is 30 percentage points higher among the non-poor, and the average home index is more than one standard deviation higher in the upper home environment category. The subsamples along the main diagonal of the 2x2 matrix of income and home environment (poor-low, non-poor-high) have more observations, but the off-diagonal subsamples have close to 800 observations in each. Mean income is almost twice as high among the non-poor, and almost one third of the poor experienced economic hardship compared to 7 to 8 percent of the non-poor. The measures of income and home index differ within their own categories by the other variable, reflecting their positive correlation, but the differences are small. More of the poor families experienced a large decline in parental employment than the non-poor families, but the difference is not very large, most likely as the result of the recession.

Our dataset allows us to control for a remarkably rich set of covariates. These covariates are all predetermined for parental job loss and are measured in the first two survey waves, prior to "treatment". The first set of variables includes the permanent income measure and the cognitive and emotional home environment measures (percentiles); the parents' employment in the two years prior to the treatment period (in months); the complete employment history of the parents going back to the birth of the child (fraction of years in employment); basic demographics including gender, whether it is a single-parent family, whether the parents identified as Roma, year of birth of the child, what level of education the parents wanted for their child when they were 15 years old, whether child has fair or poor health at age 15, self-esteem of the child at age 15 (a short, 5-item version of the Rosenberg scale), education of the parents, and month of the round 6 interview. The second set of covariates covers educational outcomes prior to treatment: standardized test scores in reading and mathematics in grade 8, whether the respondent was classified as a student with special educational needs in grade 8, whether the respondent was enrolled in a low-tier (vocational) secondary school in grade 9, their GPA at the end of grade 8. Summary statistics of these variables in the entire sample and

the four subsamples are shown in table A4 of the appendix.

Table 2.

Secondary school completion, decline in parental employment, income and home environment—mean values by subsample

	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Observations	4,765	1,584	795	795	1,591
Permanent income (average percentile rank)	51	33	39	62	67
Cognitive home index (standardized)	53	24	71	30	76
Yearly income per capita 2006 (USD, PPP)	9,658	6,738	7,628	10,835	12,507
Experienced economic hardship age 0-15	0.17	0.31	0.24	0.08	0.07
Change of parental employment					
Experienced large decline	0.14	0.17	0.14	0.15	0.10
Experienced small decline	0.11	0.14	0.13	0.10	0.07
Experienced no decline	0.76	0.69	0.73	0.75	0.83
Total	1.00	1.00	1.00	1.00	1.00

Notes: Poor vs. non-poor: permanent income below vs. above the median. Low vs. high home: below vs. above the cognitive HOME subscale. Permanent income: average percentile rank of six measures: per capita income in 2007 (OECD-2 equivalence scale), per capita expenditures in 2006 and 2007 (OECD-2 equivalence scale), value and size of home in 2007, frequency of economic hardship age 0–15. Cognitively stimulating home environment: the cognitive subscale of the HOME-S index for adolescents. See the definition for the decline in parental employment below table 1. Yearly income per capita in USD is measured at the OECD-2 equivalence scale and is calculated at the purchasing power parity exchange rate of 2010. The binary variable of whether the family experienced economic hardship is one if any economic hardship is reported for any of the time periods from the birth of the child through age 15. All figures, except the number of observations, are weighted with sampling weights.

3. Results

We want to uncover the effect of a decline in parents' employment on the probability of adolescents' completion of secondary school. We compare the completion rate of adolescents whose parents experienced a large decrease in their employment, and whose parents experienced a small employment, separately, to the completion rate of adolescents whose parents did not experience a decrease in their employment. We use observational data without claiming exogenous variation in parental job loss. The source of parental job loss is not known in our data, preventing us from looking at plant closures or other, arguably exogenous changes. Instead, we condition on a large set of covariates

to address the selection of parents into job loss, making use of the rich information in the data. We then provide evidence that conditioning on the covariates controls for selection. This identification strategy and the supporting evidence follow the analysis of Stevens and Schaller (2011) and Coelli (2011).

3.1 Main results

We estimate the causal effect in a linear probability model with the binary school completion variable as the dependent variable and the two indicators of large and small decline in parental employment as the main explanatory variables (with no decline being the reference category). One may think of this as a difference-in-differences regression. The main explanatory variables are explicit indicators of differences. The dependent variable is the indicator of successful completion of secondary school, the pretreatment value of which is zero by definition (nobody completes secondary school before grade 10). We include pre-recession employment to control for mean reversion, as well as all control variables in the regression.

The coefficients of main interest are on the indicator variables of large decline in parental employment and small decline. To interpret the magnitudes, recall that the fraction of months employed decreased by 40 percent among those who experienced a large decline, and by 10 percent among those who experienced a small decline.

Whether our estimates show causal effects is a main issue in our analysis. Reverse causality is unlikely to be a concern as our measure of the change in parental employment precedes our measure of potential dropping out of secondary school. However, selection into declining parental employment may create severe omitted variables bias. Parents with unstable job prospects may be overrepresented among those who experience a job loss. Families with such parents are likely different from other families in many ways that may be related to their children's dropout probability even without an actual job loss. Arguably, they transmit skills and attitudes and provide environments that decrease the chances of their children's success in school and beyond. A failure to control for those differences would lead to an estimate of the effect of a parental job loss that is stronger than the true effect. We argue that the exceptionally rich set of control variables captures the entire selection, and we present corroborating evidence in the next section.

Table 3.

Parental job loss and completion of secondary school

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.047[+]	-0.027	-0.104**	0.002
	(0.013)	(0.026)	(0.023)	(0.036)	(0.012)
Small decline in parental employment	-0.018	-0.017	-0.020	-0.025	-0.019
	(0.017)	(0.031)	(0.026)	(0.047)	(0.029)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,535	788	802	1,640
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes: Linear probability model estimates, weighted by sampling weights.
Robust standard errors in parentheses. [+] p <0.10 * p < 0.05, ** p < 0.01
Dependent variable: completed secondary school by wave 6 (median age 21).
Explanatory variables: large decline in parental employment and small decline in parental employment—binary variables indicating whether the fraction of months employed by mother and father (averaged) decreased by at least 25 percent or 1 to 25 percent from the pre-recession period (Sept. 2006 to Aug. 2008) to the mid-recession period (Sept. 2008 to Aug. 2010). Pre-recession employment of the parents (the fraction of months employed between Sept. 2006 and Aug. 2008). Cognitively stimulating home environment score and emotionally supportive home environment score, the cognitive and emotional subscales of the HOME-SV inventory. Parental employment between birth of child and 2006 (fraction of months in employment). Respondent is female; no mother; no father; one parent Roma; two parents Roma; year of birth 1991 or 1992 (reference: 1990 or earlier); aspired to achieve high school education (in 2006); aspired to achieve college education (in 2006); health fair or poor (in 2006); Rosenberg self-esteem score in 2006 (standardized); mother's education 0–8 grades, vocational school, college (reference: high school); father's education 0–8 grades, vocational school, college (reference: high school); month of interview (June, July, August, reference May); standardized mathematics and reading test score in grade 8 (2006) and binary indicators for missing values; whether student had special educational needs in grade 8 (2006) and binary indicator for missing values; GPA in grade 8 (2006) and binary indicators for missing values; whether enrolled in low-tier (vocational) secondary school in grade 9 and binary indicator for missing values.
Poor vs. non-poor households: below vs. above the permanent income measure median.
Low vs. high home households: below vs. above the cognitively stimulating home environment score median.
Baseline completion probability: fraction completed secondary school by wave 6 (median age 21) among respondents whose parents did not experience a decline in employment.

In the total sample adolescents whose parents experienced a large decline in employment were almost four percentage point less likely to complete secondary school than students whose parents did not experience a decline in their employment. The magnitude is substantial: the four percent difference is more than half of the 7 percent probability of not completing secondary school without a decline in parental

employment (corresponding to the 93 percent baseline completion rate). The difference is half as large, two percentage points, and statistically not significant, for adolescents whose parents experienced a small employment decline. These differences are conditional on all covariates in the regression. We show evidence below that support the causal interpretation of the estimates.

This estimated average effects conceal substantial heterogeneity. The effect of parental job loss is small and statistically not significant for adolescents in families with above-median home environment score. That is true for poor families (effect estimate -0.03), and, especially, non-poor families (effect estimate 0.00).

At the same time, the effect is very strong for adolescents in non-poor families in a less cognitively stimulating home environment. Adolescents in this group with parents who experienced a large employment decline were ten percentage point less likely to complete secondary school than students whose parents did not experience a decline in their employment with the same income, home environment and other covariates. This magnitude is large, and is to be compared to a 92 percent baseline completion rate in this group (an eight percent dropout rate). The difference is smaller, five percentage points, but and statistically significant on the 10 percent level in poor families with low home scores.

The estimated average effect size, more than 50 percent relative to the baseline dropout rate, is somewhat larger than the effects established in the literature. Using data from the US, Kalil and Wightman (2011) estimate that a parental job loss in childhood leads to a 10 percentage point decrease in the probability of college attendance by age 21, compared to a 50 percent baseline, which corresponds to a 20 percent effect size. Stevens and Schaller (2011) estimate that a parental job loss leads to a 1 percentage point increase in the grade retention rate in the subsequent few years, a 15 percent effect size. The difference from what is found in the literature may be due to the fact that households in Hungary are of an inferior home environment, on average, than households in the US.

Taken as causal estimates, these results suggest that parental job loss increases the propensity for dropping out of secondary school *only* in families that do not provide a cognitively stimulating home environment for their children. One interpretation of this finding is that a cognitively stimulating home environment provides a protective factor against dropping out of secondary school during times of economic distress. Another interpretation is that families that provide such an environment put a high priority on their children's academic success even during times of economic distress.

We can only speculate why the effect is greater in non-poor families. Possibly, the effect on secondary school completion is strongest for families whose children

considered enrolling in higher education because the effect of parental job loss has a large effect on its affordability. Having realized that higher education is not an option, children in such families may be more likely to change their behavior and, eventually, drop out of secondary school than children for whom higher education never was an option. Children with plans for higher education were more likely to live in non-poor families, hence the stronger effect on them. Alternatively, it may be due to the stronger stigmatizing effect of job loss among more affluent families, as hypothesized by Brand and Thomas (2014) who found stronger effects in families where parents were particularly unlikely to lose their jobs.

3.2 Results supporting causal interpretation

Selection of families into parental job loss is obviously not random. The economic crisis of 2008 led to more job losses among families with a lower propensity to experience such events than in normal times. Nevertheless, one cannot rule out selection that is correlated with child outcomes. Our strategy of identifying causal effects rests on the assumption that the rich set of covariates controls for selection.

To evaluate whether the covariates adequately control for selection we estimated regressions with pretreatment educational outcomes as dependent variables. These outcomes could not have been affected by subsequent changes in the employment of the parents but may be related to selection. If our covariates control for nonrandom selection, the coefficients should be zero on both indicators measuring large and small decline in parental employment. If, however, our covariates do not control for selection in an adequate way, these regressions should show significant associations, and the associations should be stronger for large employment decline. The pretreatment outcomes are the following: whether the student completed the first two years of secondary school, standardized test scores in reading and mathematics in grade 8, GPA in grade 8, whether the student has special educational needs in grade 8, and whether the student enrolled in a low-tier (vocational) secondary school in grade 9 (as opposed to a higher-tier professional or academic high school).

Table 4 shows the main results related to whether the student completed the first two years of secondary school. In effect, this outcome captures early dropouts. Note that early dropouts are not in the main sample of our analysis; therefore, the higher the number of observations in table 4. The results of the other pretreatment regressions are in tables A5 through A9 in the appendix. The regressions and the structure of the tables are analogous to those reported in table 3 above except the covariates do not include the pretreatment variable if it is the dependent variable of the placebo regression.

Table 4.

Parental job loss and whether student completed the first two years of secondary school, a pretreatment outcome

Dependent variable: completed two years of secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.001	-0.002	-0.003	0.006	0.001
	(0.005)	(0.011)	(0.009)	(0.003)	(0.001)
Small decline in parental employment	0.008[+]	0.016	0.002	0.010[+]	-0.001
	(0.005)	(0.013)	(0.006)	(0.006)	(0.001)
Other covariates	YES	YES	YES	YES	YES
Observations	4,850	1,607	794	807	1,642
Baseline probability of completed two years	0.99	0.96	1.00	0.99	0.99

Notes: Linear probability model estimates, weighted by sampling weights.
Robust standard errors in parentheses. [+] $p < 0.10$* $p < 0.05$, ** $p < 0.01$
Sample contains adolescents who dropped out of secondary school in the first two years (main analysis sample does not include them).
Dependent variable: binary indicator of whether student completed two years of secondary school.
Explanatory variables, other covariates and subsample definitions: see notes to Table 3.
Baseline probability: fraction enrolled in low-tier secondary school among respondents whose parents did not experience a subsequent decline in employment.

None of the associations between completing the first two years of secondary school and subsequent decline in parental employment are significant at the five percent level. The point estimates are also very small and do not show the same pattern as in main results in table 3. The few point estimates that are significant at 10 percent are in fact positive, for small declines, which is inconsistent with negative selection. While few students do not complete the first two years of secondary school, many of the covariates have statistically significant predictive power, including permanent income, gender, birth year, family structure, ethnicity, and prior educational aspirations. Therefore, the null results with respect to subsequent decline in parental employment indicate that selection into declining parental employment is captured by the other covariates.

Similarly, the associations with the other pretreatment outcomes are not statistically significant except for a very few that are, again, of the "wrong" sign; the point estimates are all small, and do not show patterns similar to the main results in table 3 in general (tables A5-A9 in the Appendix). For example, the sign of the coefficient estimates in the non-poor low-home group, with the strongest association between parental job loss and dropping out, vary across the dependent variables. Some seem to indicate that

selection into subsequent parental decline is positive (lower likelihood of low-tier enrollment, lower probability of special educational needs in grade 8), others seem to suggest negative selection (lower GPA in grade 8), and sometimes the direction of selection is different for large and small employment declines (test scores).

Taken together these results suggest that our main estimates reflect causal effects. The association between parental job loss and completion of secondary school shows the effect of parental job loss. When we control for all conditioning variables, selection is unlikely to be an issue.

3.3. Robustness checks

The main results hold across several robustness checks. First, we estimated the regressions on the sample of adolescents not including those still in secondary school. The results in table A10 are very similar to those in table 3 with a somewhat smaller effect of a large employment decline among non-poor families with a below-median home environment and a somewhat larger and statistically significant effect for poor families with a below-median home environment.

Second, we re-estimated the regression as a logit (results in table A11 in the appendix). The relative magnitudes of the coefficient estimates and their statistical significance is the same as in the linear regression presented in table 3.

Third, we estimated six versions of the regressions in poor versus non-poor groups, defined by one of the six components of our permanent income measure groups instead of the composite measure itself (results in tables A12 through A17 in the appendix). The results for each component are qualitatively similar to the main results. When income or expenditure is used the results are also quantitatively very similar to the main results. When the value and size of the home, or the history of economic hardship are used, the effect magnitudes are smaller. For the last two measures the point estimates are stronger in the poor and low-home environment group than in the non-poor and low-home environment group, but the confidence intervals overlap.

Fourth, we estimated three versions of the regressions replacing the composite measure of cognitively stimulating home environment by a sub-measure that contains similar items as the variable used to create the subsamples (results in tables A18 through A20 in the appendix). The first of the three sub-measures contains the items that are closest to measuring permanent income (whether the apartment is light, whether the neighborhood is safe). The second contains items that measure parental investments in the human capital of children (number of books belonging to the adolescent child, whether they participate in extra-curricular activities, was in a museum, attended a concert or theater with the family, whether the family has a musical instrument, and

whether it subscribes to a newspaper). The third measure contains items related to behavior (whether the adolescent child reads for fun, whether they are encouraged to have a hobby, whether the family talks about what they see on TV, and whether the family is neat and clean).

The results are strongest for the parental investment component. These results replicate our main results with somewhat stronger and statistically more significant estimates. The results with groups using the other two measures (related to permanent income and family behavior) are qualitatively similar, but weaker and statistically not significant. These results are consistent with our interpretation of the main results. Parental job loss leads to dropping out of secondary school mostly in families with a relatively low priority assigned to human capital investment in their children. Adolescents in families with the same income that invest more in the human capital of their children seem to be substantially more protected from the negative consequences of parental job loss.

We investigated the effect a decline in the mother's employment separately from the father's employment decline (results in table A21 in the appendix). Our results suggest that the employment decline of the father is more important than the employment decline of the mother. Both show the same pattern (largest effects in non-poor low-home families), and the difference between the two is small and not statistically significant. A large decline in the employment of the father decreases the probability of completing secondary school by 3 percentage points in our sample, while a large decline in the employment of the mother leads to a 2 percentage point decline. Only the former is significant at the 5 percent level, but the confidence intervals overlap to a large extent. For adolescents from non-poor families with a low quality home environment, a large decline in the father's employment decreases the completion rate by 9 percentage points, compared to a 4 percentage points effect for a large decline in the mother's employment (the former is significant at the 5 percent level, the latter is not). Taken together, the robustness checks strengthen the conclusion of our main analysis.

4. Discussion and conclusion

We have documented that a decline in parental employment leads to a substantial increase in dropping out of secondary school even in a country with government-financed secondary education. However, we have shown that this effect strongly depends on the home environment provided by the families prior to the potential job loss of the parents. Parental job loss does not affect the dropout probability of children in families that have a history of providing a cognitively stimulating home environment for their

children. In contrast, it has a strong effect in families with a history of providing a less stimulating home environment, and the effect is the strongest in non-poor families.

Our study informs the growing literature on the effect of recessions on student outcomes (see Kalil 2013). While recessions may reduce the opportunity costs of staying in school, thus reducing the dropout rate (Betts and McFarland 1995; Long 2015; Adamopoulou and Tanzi 2017), they also increase financial distress for families that experience a job loss, thereby potentially leading to negative income effects on investment in the education of their children, thus increasing the dropout rate. Our results highlight the potential heterogeneity of such effects. Children in families that provided a favorable home environment experienced a substantially weaker negative effect. As the home environment is imperfectly correlated with income, even with permanent income, our results may help explain and reconcile some of the conflicting evidence in the literature.

From a broader perspective, our results are also relevant for the long-term consequences of parental investment in the human capital of children throughout the entire childhood (Becker and Tomes 1986; Yeung et al. 2002; Carneiro and Heckman 2003; Todd and Wolpin 2007). The mediating effect of home environment is consistent with the fact that parental investments may have the largest impact if they are consistently high throughout childhood. Our results strengthen the case for helping families create home environments that enhance the cognitive development of children; such environments appear to be important buffers against the negative shocks from parental job loss.

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Appendix

The sampling frame, the baseline sample and the analysis sample. Cohort: 8th grade students in May 2006

Dataset	N	Mean income in town [a]	Mean reading test score [b]	Fraction low educated mother [c]	Mean # employed parents in family [d]
Total student population	119,363	652	-	-	-
NABC reading test data	109,906	650	-0.08	-	-
NABC background survey	92,588	650	-0.08	0.18	1.5
Agreed to participate in HLCS	37,027	607	-0.14	0.24	1.4
Baseline HLCS sample [e]	10,022	630	-0.11	0.23	1.4
Wave 6. participants [e]	6,974	621	-0.07	0.22	1.4
Non-missing parental employment [e]	5,648	619	-0.02	0.19	1.5
Unchanged family [e]	4,997	630	0.07	0.11	1.5
Non-missing HOME scores [e]	4,850	632	0.07	0.11	1.5
Not early dropout [e]	4,765	635	0.09	0.11	1.5

Notes. NABC: National Assessment of Basic Competences; administrative data (http://edecon.mtakti.hu/?q=node/15). HLCS: Hungarian Life Course Survey (http://edecon.mtakti.hu/?q=node/16).

[a] Income per capita in '000 HUF 2006 (1 HUF was approximately 200 USD in 2006). Total income from personal income tax records, divided by total population, in the city/town/village of residence if reported residence in NABC family background survey; city/town/village of school otherwise. Source: TSTAR aggregate statistics (http://adatbank.krtk.mta.hu/adatbazisok tstar) merged to NABC administrative data.

[b] Standardized to have zero mean and unit standard deviation in the population of non-special education students. In 2006 special education 8th-grade students took an adapted version of the reading test so they can receive a background information questionnaire and can be included in the sampling frame of the HLCS. Their test results are included in the overall mean, leading to a negative mean in the population. Source: NABC.

[c] 0 to 8 grades of education. Source: NABC family background questionnaire.

[d] Between 0 (no employed parents) and 2 (two employed parents). Source: NABC family background questionnaire.

[e] Weighted by sampling weights.

Items of the permanent income measure (percentile rankings). Mean values

	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Per capita (equivalent) family income in 2006	52	28	36	65	73
Per capita (equivalent) family expenditures in 2005	52	29	37	66	73
Per capita (equivalent) family expenditures in 2006	52	32	35	65	70
Value of home in 2007	54	30	44	64	73
Size of home (per capita) in 2007	52	38	40	64	64
How rarely the family experienced economic hardship (when child was age 0-15)	44	39	42	48	48
Mean of items	51	33	39	62	66

Notes: Poor vs. non-poor: permanent income below vs. above the median (permanent income is defined as the average percentile rank of six measures; see notes to Table 2 for more details). Low vs. high home: below vs. above the cognitive HOME subscale. All figures are sample means weighted by sampling weights. The last item (rare hardship) has the maximum percentile ranking of 51 as over 50 percent of the families reported to have not experienced hardship.

Items of the cognitive HOME index. Mean values

	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Child has 20 books or more	0.75	0.47	0.89	0.66	0.94
Musical instrument at home child can use	0.33	0.12	0.47	0.13	0.52
Family gets a newspaper	0.36	0.20	0.50	0.24	0.47
Child reads for enjoyment	0.50	0.26	0.68	0.28	0.68
Child encouraged to have hobby	0.86	0.70	0.94	0.79	0.97
Child participates in extra-curricular activities	0.47	0.25	0.59	0.27	0.66
Child taken to museum last year	0.49	0.16	0.64	0.23	0.78
Child taken to musical or drama performance last year	0.48	0.15	0.66	0.16	0.77
When watching TV, parent discusses program with child	0.73	0.60	0.84	0.57	0.86
Home is not dark	0.90	0.72	0.97	0.91	0.99
Home is reasonably clean	0.93	0.82	1.00	0.93	0.99
Home is minimally cluttered	0.92	0.80	0.98	0.92	0.99
Neighborhood is safe	0.96	0.92	0.99	0.96	0.99
Mean of items	0.67	0.47	0.78	0.54	0.82
Average percentile ranking	53	24	71	30	76

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Summary statistics of the control variables

	Total sample		Poor low home	Poor high home	Non-poor low home	Non-poor high home
	Mean	St.D..				
Parental employment before potential job loss (fraction of months)	0.51	0.18	0.33	0.39	0.61	0.66
Cognitive home environment pct/100	0.53	0.28	0.24	0.70	0.30	0.76
Emotional home environment pct/100	0.48	0.29	0.41	0.50	0.44	0.53
Fraction yrs parents employed since birth of child	0.82	0.16	0.80	0.81	0.83	0.84
Female	0.47	0.50	0.47	0.51	0.39	0.49
Has no mother	0.02	0.13	0.03	0.02	0.02	0.01
Has no father	0.17	0.38	0.22	0.20	0.18	0.13
One parent Roma	0.03	0.17	0.07	0.02	0.01	0.00
Two parents Roma	0.03	0.16	0.07	0.02	0.01	0.00
Born in 1991	0.67	0.47	0.62	0.67	0.72	0.69
Born in 1992	0.27	0.45	0.27	0.29	0.24	0.28
Parents want high-school degree for child when age 15	0.26	0.44	0.43	0.24	0.32	0.11
Parents want college degree for child when age 15	0.66	0.48	0.38	0.70	0.59	0.86
Health of child fair (age 15)	0.08	0.28	0.12	0.09	0.09	0.05
Self-esteem measure (stdized)	0.03	0.98	0.15	0.13	0.01	0.13
Mother's education 0-8 grades	0.11	0.31	0.26	0.09	0.07	0.02
Mother's education vocational	0.24	0.43	0.32	0.32	0.29	0.12
Mother's education college	0.22	0.41	0.02	0.12	0.12	0.45
Father's education 0-8 grades	0.10	0.31	0.25	0.09	0.07	0.02
Father's education vocational	0.37	0.48	0.43	0.40	0.47	0.28
Father's education college	0.14	0.34	0.01	0.08	0.08	0.28
Wave 6 interview June	0.39	0.49	0.37	0.38	0.45	0.39
Wave 6 interview July	0.31	0.46	0.34	0.34	0.27	0.30
Wave 6 interview August	0.04	0.19	0.05	0.04	0.02	0.04
Mathematics test score grade 8	0.13	1.00	0.35	0.09	0.01	0.56
Reading test score grade 8	0.09	0.98	0.42	0.13	0.11	0.53
Special educational needs grade 8	0.05	0.21	0.08	0.03	0.04	0.03
Grade point average grade 8	3.72	0.75	3.44	3.74	3.56	3.99
Enrolled in low-tier secondary school	0.20	0.40	0.40	0.15	0.23	0.05
Missing maths test score	0.04	0.19	0.07	0.03	0.03	0.02
Missing GPA	0.09	0.29	0.13	0.09	0.09	0.07
Missing whether low-tier school	0.00	0.05	0.01	0.00	0.00	0.00
Numberofobservations	4,765		1,535	788	802	1,640

Notes. Poor vs. non-poor: permanent income below vs. above the median (permanent income is defined as the average percentile rank of six measures; see notes to Table 2 for more details). Low vs. high home: below vs. above the cognitive HOME subscale. All figures are sample means weighted by sampling weights. Reference categories: born before 1991; aspiration below secondary school; mother's , father's education secondary school with maturity degree; Interview in May or earlier

The association of parental job loss with mathematics test score in grade 8, a pre-treatment outcome

Dependent variable: mathematics score in grade 8	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.030	-0.040	-0.136[+]	0.047	-0.000
	(0.032)	(0.047)	(0.069)	(0.078)	(0.068)
Small decline in parental employment	0.010	-0.046	0.034	0.037	0.039
	(0.035)	(0.059)	(0.074)	(0.090)	(0.073)
Other covariates	YES	YES	YES	YES	YES
Observations	4,449	1,371	741	755	1,582
Baseline average score	0.19	-0.35	0.13	0.03	0.59

Notes. Linear regression estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses. [+] p <0.10 * p < 0.05, ** p < 0.01

The association of parental job loss with reading test score in grade 8, a pre-treatment outcome

Dependent variable: reading score in grade 8	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	0.020	0.024	0.013	-0.012	0.052
	(0.029)	(0.044)	(0.067)	(0.076)	(0.058)
Small decline in parental employment	-0.003	0.029	-0.014	-0.004	-0.037
	(0.032)	(0.056)	(0.071)	(0.083)	(0.059)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,535	788	802	1,640
Baseline average score	0.14	-0.39	0.16	-0.09	0.55

Notes. Linear regression estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses. [+] p <0.10 * p < 0.05, ** p < 0.01

The association of parental job loss with GPA in grade 8, a pre-treatment outcome

Dependent variable: GPA in grade 8 (1 to 5)	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.025	0.026	0.050	-0.104	-0.055
	(0.031)	(0.056)	(0.063)	(0.091)	(0.049)
Small decline in parental employment	0.052	0.170*	-0.027	0.067	-0.004
	(0.038)	(0.072)	(0.069)	(0.108)	(0.057)
Other covariates	YES	YES	YES	YES	YES
Observations	4,243	1,303	715	719	1,506
Baseline average GPA in grade 8	3.75	3.39	3.75	3.56	4.03

Notes. Linear regression estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses. $^+$ p <0.10 * p < 0.05, ** p < 0.01

The association of parental job loss with whether the student was of special educational need in grade 8, a pre-treatment outcome

Dependent variable: enrolled in low-tier secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.001	0.008	0.006	-0.006	-0.008*
	(0.004)	(0.010)	(0.008)	(0.007)	(0.003)
Small decline in parental employment	-0.002	0.008	-0.007	-0.015*	-0.003
	(0.003)	(0.008)	(0.004)	(0.005)	(0.007)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,535	788	802	1,640
Baseline probability of special educatoinal need in grade 8	0.04	0.08	0.03	0.05	0.03

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses. $^+$ p <0.10 * p < 0.05, ** p < 0.01

The association of parental job loss with whether the student enrolled in low-tier secondary school, a pre-treatment outcome

Dependent variable: enrolled in low-tier secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	0.009	0.008	0.037	-0.038	0.007
	(0.014)	(0.028)	(0.030)	(0.031)	(0.015)
Small decline in parental employment	0.005	0.034	0.004	-0.058	0.013
	(0.017)	(0.032)	(0.034)	(0.041)	(0.024)
Other covariates	YES	YES	YES	YES	YES
Observations	4,750	1,524	788	802	1,636
Baseline probability of low-tier enrollment	0.17	0.38	0.14	0.23	0.04

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses. $^{+}$ p <0.10 * p < 0.05, ** p < 0.01

Parental job loss and completion of secondary school. Estimates without those still in school

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.040**	-0.046^{+}	-0.024	-0.100**	0.004
	(0.012)	(0.025)	(0.019)	(0.033)	(0.004)
Small decline in parental employment	0.005	0.011	-0.011	-0.010	0.006
	(0.014)	(0.030)	(0.022)	(0.045)	(0.006)
Other covariates	YES	YES	YES	YES	YES
Observations	4,584	1,449	769	761	1,605
Baseline completion probability	0.99	0.96	1.00	0.99	1.00

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses. $^{+}$ p <0.10 * p < 0.05, ** p < 0.01

Parental job loss and completion of secondary school. Logit parameter estimates

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.507***	-0.371*	-0.674	-1.049***	-0.121
	(0.157)	(0.202)	(0.528)	(0.358)	(0.566)
Small decline in parental employment	-0.366*	-0.247	-1.036	-0.251	-0.477
	(0.210)	(0.244)	(0.636)	(0.526)	(0.721)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,535	722	802	1,639
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Logit estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Standard errors in parentheses. $^+$ p <0.10 * p < 0.05, ** p < 0.01

The effect of parental job loss on completion of secondary school. Poor vs. non-poor defined using income in 2006.

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.038	-0.002	-0.124**	-0.003
	(0.013)	(0.027)	(0.022)	(0.036)	(0.013)
Small decline in parental employment	-0.018	-0.023	-0.002	-0.030	-0.029
	(0.017)	(0.032)	(0.020)	(0.043)	(0.030)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,445	747	934	1,639
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Low vs. high home: see notes to table 2. Robust standard errors in parentheses. $^+$ p <0.10 * p < 0.05, ** p < 0.01

The effect of parental job loss on completion of secondary school. Poor vs. non-poor defined using expenditure in 2005.

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.057[+]	-0.001	-0.103**	-0.006
	(0.013)	(0.031)	(0.021)	(0.030)	(0.012)
Small decline in parental employment	-0.018	-0.015	-0.061	-0.023	-0.002
	(0.017)	(0.037)	(0.044)	(0.030)	(0.018)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,330	669	1,049	1,717
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Low vs. high home: see notes to table 2. Robust standard errors in parentheses. [+] $p < 0.10$ * $p < 0.05$, ** $p < 0.01$

The effect of parental job loss on completion of secondary school. Poor vs. non-poor defined using expenditure in 2006.

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.038	-0.002	-0.119**	-0.006
	(0.013)	(0.029)	(0.020)	(0.033)	(0.013)
Small decline in parental employment	-0.018	0.011	-0.044	-0.064	-0.008
	(0.017)	(0.035)	(0.046)	(0.039)	(0.019)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,332	851	1,047	1,535
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Low vs. high home: see notes to table 2. Robust standard errors in parentheses. [+] $p < 0.10$ * $p < 0.05$, ** $p < 0.01$

The effect of parental job loss on completion of secondary school. Poor vs. non-poor defined using home value in 2006.

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.051+	-0.073*	-0.097**	0.018*
	(0.013)	(0.031)	(0.038)	(0.030)	(0.009)
Small decline in parental employment	-0.018	0.002	0.006	-0.049	-0.028
	(0.017)	(0.033)	(0.030)	(0.040)	(0.026)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,119	523	1,260	1,863
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Low vs. high home: see notes to table 2. Robust standard errors in parentheses. + p <0.10 * p < 0.05, ** p < 0.01

The effect of parental job loss on completion of secondary school. Poor vs. non-poor defined using home size in 2006.

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.078**	-0.028	-0.071*	0.021*
	(0.013)	(0.029)	(0.022)	(0.033)	(0.008)
Small decline in parental employment	-0.018	-0.021	-0.009	-0.036	-0.028
	(0.017)	(0.033)	(0.021)	(0.040)	(0.035)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,309	992	1,070	1,394
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Low vs. high home: see notes to table 2. Robust standard errors in parentheses. + p <0.10 * p < 0.05, ** p < 0.01

The effect of parental job loss on completion of secondary school. Poor vs. non-poor defined using history of economic hardship

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.094[+]	0.040*	-0.072**	-0.009
	(0.013)	(0.050)	(0.023)	(0.024)	(0.012)
Small decline in parental employment	-0.018	-0.052	-0.043	-0.015	-0.016
	(0.017)	(0.059)	(0.051)	(0.029)	(0.023)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	535	274	1,844	2,112
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Low vs. high home: see notes to table 2. Robust standard errors in parentheses. [+] $p < 0.10$ * $p < 0.05$, ** $p < 0.01$

The effect of parental job loss on completion of secondary school. Low vs. high home environment defined using measures closest to permanent income

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.024	-0.035[+]	-0.083	-0.032*
	(0.013)	(0.052)	(0.020)	(0.076)	(0.016)
Small decline in parental employment	-0.018	0.016	-0.028	-0.001	-0.021
	(0.017)	(0.049)	(0.024)	(0.062)	(0.027)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	494	1,829	134	2,308
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor: see notes to table 2. Robust standard errors in parentheses. [+] $p < 0.10$ * $p < 0.05$, ** $p < 0.01$

The effect of parental job loss on completion of secondary school. Low vs. high home environment defined using measures of human capital investment

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.059*	-0.020	-0.105**	0.002
	(0.013)	(0.027)	(0.022)	(0.035)	(0.013)
Small decline in parental employment	-0.018	-0.029	-0.017	-0.011	-0.033
	(0.017)	(0.031)	(0.028)	(0.043)	(0.031)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,458	865	778	1,664
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor: see notes to table 2. Robust standard errors in parentheses. $^+$ p <0.10 * p < 0.05, ** p < 0.01

The effect of parental job loss on completion of secondary school. Low vs. high home environment defined using measures of behavior

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in parental employment	-0.041**	-0.046	-0.032	-0.064	-0.028$^+$
	(0.013)	(0.036)	(0.022)	(0.043)	(0.016)
Small decline in parental employment	-0.018	0.004	-0.033	-0.071	-0.006
	(0.017)	(0.042)	(0.024)	(0.062)	(0.026)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	903	1,420	447	1,995
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor: see notes to table 2. Robust standard errors in parentheses. $^+$ p <0.10 * p < 0.05, ** p < 0.01

Job loss of mother, job loss of father and completion of secondary school.

Dependent variable: completed secondary school	Total sample	Poor low home	Poor high home	Non-poor low home	Non-poor high home
Large decline in mother's employment	-0.023	-0.015	-0.043	-0.044	0.013
	(0.014)	(0.026)	(0.029)	(0.039)	(0.010)
Large decline in father's employment	-0.029*	-0.052	0.017	-0.093*	0.007
	(0.014)	(0.034)	(0.020)	(0.042)	(0.012)
Other covariates	YES	YES	YES	YES	YES
Observations	4,765	1,535	788	802	1,640
Baseline completion probability	0.93	0.83	0.96	0.92	0.98

Notes. Linear probability model estimates, weighted by sampling weights. Poor vs. non-poor, and low vs. high home: see notes to table 2. Robust standard errors in parentheses.
[+] $p < 0.10$ * $p < 0.05$, ** $p < 0.01$

Male and female unemployment rate of people of age 35 to 59 in Hungary.