The Evolution of Intergenerational Educational Mobility in Turkey

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Outline

1. Introduction
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3. Data and Methodology
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Introduction

- Socioeconomic inequalities are a growing global concern, with education as a key driver
- Turkey has undergone rapid socioeconomic transformation since its foundation
  - Urbanization: from 75.8% rural in 1927 to 7.5% in 2017
  - Literacy: from 18.7% in 1935 to 95.3% in 2013
- Despite progress, educational inequalities persist in Turkey
- This study examines intergenerational educational mobility for cohorts born 1951–1985
  - How has mobility evolved over time, and what factors contributed to it?

Motivation

- Understanding educational mobility is crucial for addressing inequality and informing policy (Becker and Tomes, 1979, 1986)
- Limited empirical research exists on *intergenerational educational mobility in Turkey*
- Insights from this study can guide policies in Turkey and other developing countries undergoing similar transformations

Related Literature

- Historically focused on developed countries due to data availability (Hertz et al., 2007)
- Recent studies on developing countries: Van der Weide et al. (2024); Alesina et al. (2021); Neidhöfer et al. (2018); Narayan et al. (2018)
- Turkey-specific works rather limited:
  - Tansel (2002): Early study on educational transmission
  - Tansel (2016): Correlation persists over time, gender disparities noted
  - Akarçay-Gürbüz and Polat (2017): Two snapshots in 1990 and 2000 censuses
  - Aydemir and Yazıcı (2019): Regional variations and low mobility
- No earlier educational mobility study on Turkey with a *time-series perspective*

Summary of Findings

- Intergenerational Regression Coefficient $\hat{\beta}$: 0.61
- Intergenerational Correlation Coefficient $\hat{\rho}$: 0.49
  - …similar to Hungary, Austria, and Italy
- *U-Shaped Evolution:*
  - decline from 1951–1954 to 1965–1969 & increase from 1965–1969 to 1980–1985
- *Checchi et al. (2013) Decomposition:*
  - Main contributors: Descendants with illiterate, high school, or university graduate fathers.
  - Disproportionate university prospects for descendants with highly-educated fathers.
- *Hertz (2008) Decomposition:*
  - 91% of correlation due to within-subgroup correlations.
  - Urban males and females contribute 32% and 44%, respectively.
  - Rural males and females contribute 7% and 8%.
- *Gender & Urban-Rural Differences:*
  - Higher intergenerational correlation for females & higher probability of illiteracy for females with illiterate fathers
  - Higher mobility in urban areas & limited tertiary education opportunities in rural areas

Data and Methodology

- **Data:**
  - Turkish Statistical Institute's SILC ITD Module (2011).
  - Cohorts: 1951–1985.
  - Sample: 23,812 observations aged 25+, thereby having completed education
  - Education levels: Illiterate, Literate (no diploma), Primary, Middle, High School, University+.
  - Imputation: Years of schooling based on minimum required duration (Tansel, 2016).
- **Methodology:**
  - Intergenerational regression and correlation coefficients

$$E_{it} = \alpha_t + \beta_t P_{it} + u_{it} \text{ and } e_{it} = \gamma_t + \rho_t p_{it} + v_{it} \text{ where } \quad e_{it} \equiv E_{it}/\sigma_t^E \text{ and } p_{it} \equiv P_{it}/\sigma_t^P$$

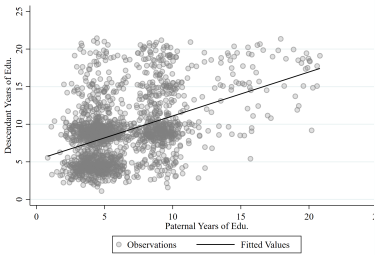
  - $\hat{\beta}_t, \hat{\rho}_t \in (0, 1)$: high values indicate low mobility and declining coefficients suggest improved intergenerational mobility (Becker and Tomes, 1979)
  - Decomposition methods by Checchi et al. (2013) and Hertz (2008) Decomposition Details ▷
  - Ordered logistic regressions Ologit Details ▷

Descriptive Statistics

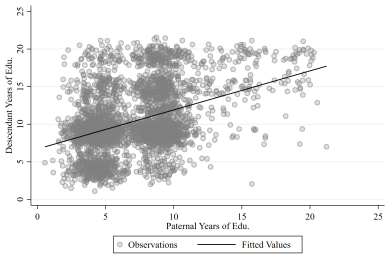
Cohort	Sons		Daughters		Paternal Years		Sample
	Mean	Std. D.	Mean	Std. D.	Mean	Std. D.	Share
1951–1954	6.59	3.96	3.75	3.93	2.47	3.13	0.07
1955–1959	7.21	4.04	4.48	4.15	2.71	3.05	0.11
1960–1964	7.11	3.66	4.92	3.87	2.93	2.92	0.13
1965–1969	7.63	3.97	5.57	3.94	3.38	3.10	0.14
1970–1974	7.95	3.95	6.02	3.94	3.92	3.28	0.17
1975–1979	8.48	3.92	6.01	4.23	4.65	3.52	0.17
1980–1985	8.96	4.02	7.65	4.60	5.15	3.57	0.21
Whole Sample	7.93	4.02	5.98	4.33	3.87	3.41	1.00

Intergenerational Educational Mobility

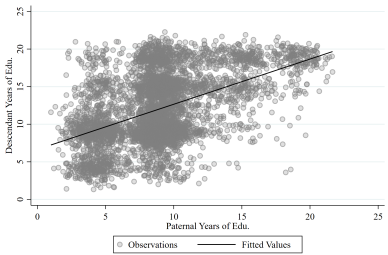
1950-54



1965-69



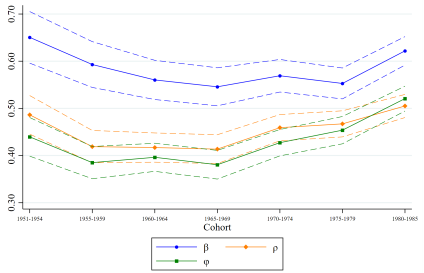
1980-85



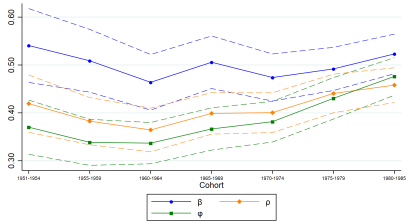
- Early cohorts (1951–1954): Steeper slope due to low paternal education.
- Middle cohorts (1965–1969): Flatter slope, improved outcomes for low-educated fathers.
- Later cohorts (1980–1985): Steeper again, driven by university prospects.

Evolution of Mobility

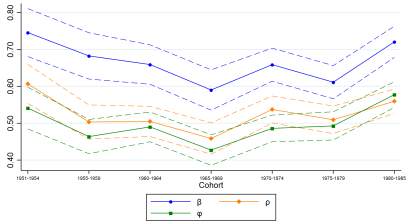
Overall Population



Males



Females



Evolution of Mobility

- Measures (regression β, correlation ρ) exhibit a U-shape over 1951–1985.
- $\hat{\beta}$: 0.65 (1951–1954) $\rightarrow$ 0.55 (1965–1969) $\rightarrow$ 0.62 (1980–1985).
- $\hat{\rho}$: Consistently lower due to higher variance in descendant education.
- Turkey's $\hat{\beta} = 0.61$, $\rho = 0.49$:
  - Comparable to Hungary, Austria, Italy (Hertz et al., 2007; Schneebaum et al., 2015).
  - Low mobility relative to developed countries.
  - Consistent with prior estimates: 0.45 (Tansel, 2016), 0.56 (Aydemir and Yazıcı, 2019).
- This U-shape reflects asymmetric educational improvements:
  - Early cohorts (1951-1969): Improved mobility for descendants with low-educated fathers.
  - Later cohorts (1969-1985): Increased correlation due to university prospects for descendants with highly-educated fathers.

Decomposition of ρ by Paternal Education

Table: Decomposition of the intergenerational educational correlation coefficient (ρ_t).

Family Type	1951–1954		1955–1959		1960–1964		1965–1969	
	$r_t(P)$	$\frac{r_t(P)}{\rho_t}$	$r_t(P)$	$\frac{r_t(P)}{\rho_t}$	$r_t(P)$	$\frac{r_t(P)}{\rho_t}$	$r_t(P)$	$\frac{r_t(P)}{\rho_t}$
$P=1$	0.13	26%	0.12	30%	0.15	36%	0.12	30%
$P=2$	0.02	3%	0.01	2%	0.01	3%	0.03	8%
$P=3$	0.09	18%	0.06	13%	0.07	16%	0.04	10%
$P=4$	0.03	6%	0.05	12%	0.05	12%	0.03	8%
$P=5$	0.11	22%	0.08	20%	0.07	17%	0.08	20%
$P=6$	0.12	25%	0.10	23%	0.07	16%	0.10	24%
ρ_t	0.49		0.42		0.42		0.41	
	1970–1974		1975–1979		1980–1985		Whole Sample	
$P=1$	0.14	31%	0.13	29%	0.14	27%	0.15	31%
$P=2$	0.03	8%	0.04	9%	0.06	11%	0.04	8%
$P=3$	0.01	3%	0.00	0%	0.00	0%	0.02	4%
$P=4$	0.04	9%	0.03	6%	0.03	5%	0.04	8%
$P=5$	0.10	22%	0.10	22%	0.12	23%	0.11	22%
$P=6$	0.12	27%	0.16	34%	0.17	33%	0.13	27%
ρ_t	0.46		0.47		0.50		0.49	

$r_t(P)$ and $r_t(P)/\rho_t$ correspond to the absolute and relative contribution of the families with P paternal education to ρ_t respectively. Family type describes the education profile of the father, where 1 stands for illiteracy, 2 for being literate without any diploma, 3 for being a primary school graduate, 4 for being a middle school graduate, 5 for being a high school graduate, and 6 for some university education and beyond. According to this notation, the family type characterized by $P=3$ corresponds to a family with a primary school graduate father. See Table B.6 for a further breakdown of ρ showing the effects of the evolution of the joint distribution of descendant and paternal education.

Decomposition of ρ by Paternal Education (*cont'd*)

- Key contributors to ρ following Checchi et al. (2013):
  - Descendants with illiterate fathers: 30% average contribution, stable over time.
  - Descendants with high school or university graduate fathers: Increased from 47% (1951-1954) to 56% (1980-1985).
  - Descendants with illiterate fathers showed declining illiteracy (from 31% to 15%) and rising primary school graduation (from 46% to 56%).
- Implications: Low mobility in Turkey driven by disadvantages for low-educated fathers and advantages for highly-educated fathers.

Cohort	Family Type (P)	$r_t(P)$	$\frac{r_t(P)}{\rho}$
1951-1954	$P = 1$ (Illiterate)	0.13	26%
	$P = 5$ (High School)	0.11	22%
	$P = 6$ (University)	0.12	25%
1980-1985	$P = 1$ (Illiterate)	0.14	27%
	$P = 5$ (High School)	0.12	23%
	$P = 6$ (University)	0.17	33%

Decomposition of ρ by Urbanization and Gender

Table: Decomposition of country-wide intergenerational educational correlation coefficient (ρ_t) with respect to urbanization and gender across cohorts à la Hertz (2008).

Cohort	$s_t^{u,m}$	$\rho_t^{u,m}$	$A_t^{u,m}$	$B_t^{u,m}$	$\frac{s_t^{u,m}A_t^{u,m}}{\rho_t}$	$\frac{s_t^{u,m}B_t^{u,m}}{\rho_t}$	$s_t^{u,f}$	$\rho_t^{u,f}$	$A_t^{u,f}$	$B_t^{u,f}$	$\frac{s_t^{u,f}A_t^{u,f}}{\rho_t}$	$\frac{s_t^{u,f}B_t^{u,f}}{\rho_t}$
1951–1954	0.33	0.40	0.42	0.08	28%	5%	0.31	0.60	0.68	−0.02	43%	−1%
1955–1959	0.34	0.38	0.39	0.06	32%	5%	0.33	0.51	0.56	−0.02	45%	−2%
1960–1964	0.36	0.35	0.35	0.03	30%	3%	0.36	0.50	0.54	−0.02	47%	−2%
1965–1969	0.37	0.40	0.42	0.04	37%	3%	0.35	0.47	0.48	−0.01	41%	−1%
1970–1974	0.36	0.38	0.40	0.05	31%	3%	0.37	0.55	0.56	−0.01	45%	0%
1975–1979	0.38	0.45	0.43	0.03	35%	2%	0.37	0.50	0.53	0.00	42%	0%
1980–1985	0.36	0.46	0.44	0.03	31%	2%	0.37	0.55	0.59	0.00	43%	0%
Cohort	$s_t^{r,m}$	$\rho_t^{r,m}$	$A_t^{r,m}$	$B_t^{r,m}$	$\frac{s_t^{r,m}A_t^{r,m}}{\rho_t}$	$\frac{s_t^{r,m}B_t^{r,m}}{\rho_t}$	$s_t^{r,f}$	$\rho_t^{r,f}$	$A_t^{r,f}$	$B_t^{r,f}$	$\frac{s_t^{r,f}A_t^{r,f}}{\rho_t}$	$\frac{s_t^{r,f}B_t^{r,f}}{\rho_t}$
1951–1954	0.18	0.36	0.20	0.00	7%	0%	0.19	0.51	0.26	0.20	10%	8%
1955–1959	0.16	0.24	0.14	0.01	5%	1%	0.16	0.33	0.19	0.19	7%	7%
1960–1964	0.13	0.31	0.20	0.00	6%	0%	0.15	0.38	0.22	0.22	8%	8%
1965–1969	0.15	0.32	0.22	0.03	8%	1%	0.13	0.35	0.23	0.12	7%	4%
1970–1974	0.14	0.37	0.27	0.03	8%	1%	0.14	0.45	0.29	0.13	9%	4%
1975–1979	0.12	0.34	0.25	0.03	7%	1%	0.13	0.42	0.29	0.23	8%	6%
1980–1985	0.13	0.36	0.27	0.05	7%	1%	0.13	0.50	0.39	0.19	10%	5%

For gender $i \in \{m(ale), f(emale)\}$ born in $j \in \{u(rban), r(ural)\}$, $s_t^{i,j}$ and $\rho_t^{i,j}$ correspond to the share of such individuals and their within-group intergenerational educational correlation coefficient in cohort t. $A_t^{i,j}$ stands for the product of the standard deviation of paternal and descendant education of subgroup (i, j), relative to the product of their sample counterparts, while $B_t^{i,j}$ corresponds to the multiplication of the dispersion of paternal education in subgroup (i, j) around its sample mean.

Decomposition of ρ by Urbanization and Gender (*cont'd*)

- Decomposing ρ by gender and urbanization Hertz (2008):
  - Average contributions (whole sample):
    - Urban males: 31%, Urban females: 45%
    - Rural males: 7%, Rural females: 8%
  - 93% of ρ stems from within-group correlations, 7% from deviations of subgroup averages from population means.
  - Higher correlations for females (vs. males) and urban (vs. rural) descendants due to:
    - Higher illiteracy probability for females with illiterate fathers.
    - Limited tertiary education opportunities in rural areas.
- Stable contributions over time despite rapid urbanization and educational changes.

Subgroup	Average Contribution	Within-Group Share
Urban Males	31%	93%
Urban Females	45%	93%
Rural Males	7%	93%
Rural Females	8%	93%

Decomposition of ρ by Subgroups (Urban/Rural, Male/Female)

Table: Decomposition of the within-subgroup intergenerational educational correlation coefficients (ρ_t^j) à la Checchi, Fiorio, and Leonardi (2013).

		Urban Males						Urban Females					
Family Type	Cohort	50–54	55–59	60–64	65–69	70–74	75–79	50–54	55–59	60–64	65–69	70–74	75–79
$P=1$		0.13	0.11	0.14	0.10	0.12	0.13	0.14	0.15	0.16	0.14	0.16	0.12
$P=2$		0.01	0.01	0.00	0.05	0.02	0.03	0.05	0.03	0.04	0.04	0.06	0.06
$P=3$		0.05	0.03	0.03	0.03	0.00	0.00	0.06	0.05	0.05	0.03	0.01	0.00
$P=4$		0.01	0.05	0.03	0.02	0.02	0.02	0.04	0.05	0.07	0.06	0.07	0.02
$P=5$		0.06	0.08	0.07	0.08	0.09	0.10	0.16	0.11	0.09	0.08	0.12	0.11
$P=6$		0.13	0.10	0.08	0.11	0.13	0.17	0.16	0.13	0.08	0.11	0.14	0.18
	$\rho_t^{u,m}=\sum_{P=1}^{6} r_t^{u,m}(P)$	0.40	0.38	0.35	0.40	0.38	0.45	0.60	0.51	0.50	0.47	0.55	0.50

		Rural Males						Rural Females					
Family Type	Cohort	50–54	55–59	60–64	65–69	70–74	75–79	50–54	55–59	60–64	65–69	70–74	75–79
$P=1$		0.08	0.08	0.14	0.10	0.15	0.08	0.12	0.11	0.15	0.16	0.17	0.17
$P=2$		0.01	0.00	-0.01	0.02	0.01	0.03	0.00	0.00	-0.01	0.00	0.02	0.03
$P=3$		0.15	0.08	0.14	0.08	0.06	0.01	0.17	0.17	0.19	0.09	0.06	0.07
$P=4$		0.00	0.03	0.02	0.02	0.03	0.03	0.02	0.01	0.05	0.04	0.08	0.03
$P=5$		0.04	0.03	0.01	0.07	0.05	0.09	0.18	0.00	0.00	0.04	0.08	0.05
$P=6$		0.08	0.03	0.00	0.00	0.08	0.09	0.02	0.03	0.00	0.02	0.05	0.07
	$\rho_t^{r,m}=\sum_{P=1}^{6} r_t^{r,m}(P)$	0.35	0.24	0.30	0.32	0.37	0.33	0.51	0.33	0.38	0.35	0.45	0.42

Decomposition of ρ by Subgroups (Urban/Rural, Male/Female) (*cont'd*)

- Decomposing ρ using Checchi et al. (2013) across gender and urbanization:
  - Urban areas: Higher absolute contributions from descendants with high school/university graduate fathers (0.08/0.13) vs. rural (0.05/0.06).
  - Rural areas: Similar contributions from descendants with illiterate fathers in urban/rural settings.
  - Gender disparities:
    - Females with illiterate fathers: Higher illiteracy probability, increasing their contribution to ρ.
    - Urban females with high school/university graduate fathers: Higher contribution due to lower average years of schooling, amplifying the dispersion term (a) in (3).
- These findings highlight persistent heterogeneities in Turkey's educational mobility.

Subgroup	Paternal Education	Absolute Contribution
Urban (High School)	HS Graduate Father	0.08
Urban (University)	Univ. Graduate Father	0.13
Rural (High School)	HS Graduate Father	0.05
Rural (University)	Univ. Graduate Father	0.06

Conclusions

- This paper studies Turkey's intergenerational educational mobility (1951–1985 cohorts) using 2011 *SILC ITD* data
- Turkey shows **low mobility**, with $\hat{\beta} = 0.61$ and $\hat{\rho} = 0.49$ forming a *U-shape* over time
- Early cohorts gained from better prospects for low-educated fathers' descendants; later cohorts saw university access favor those with highly-educated fathers
- Decompositions reveal low mobility driven by disadvantages (low paternal education) and advantages (high paternal education), with **91%** of ρ from within-group effects, led by urban areas
- This study pioneers a detailed evolution analysis and novel decompositions, offering insights for developing economies
- Future research could probe *causal drivers* and links to economic development

Thank You!

Questions?

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References I

Akarçay-Gürbüz, A. and Polat, S. (2017). Schooling opportunities and intergenerational educational mobility in turkey: An iv estimation using census data. *The Journal of Development Studies*, 53(9):1396–1413.

Alesina, A., Hohmann, S., Michalopoulos, S., and Papaioannou, E. (2021). Intergenerational mobility in africa. *Econometrica*, 89(1):1–35.

Aydemir, A. B. and Yazıcı, H. (2019). Intergenerational education mobility and the level of development. *European Economic Review*, 116:160–185.

Becker, G. S. and Tomes, N. (1979). An equilibrium theory of the distribution of income and intergenerational mobility. *The Journal of Political Economy*, pages 1153–1189.

Becker, G. S. and Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of labor economics*, 4(3, Part 2):S1–S39.

Checchi, D., Fiorio, C. V., and Leonardi, M. (2013). Intergenerational persistence of educational attainment in italy. *Economics Letters*, 118(1):229 – 232.

Hertz, T. (2008). A group-specific measure of intergenerational persistence. *Economics Letters*, 100(3):415–417.

Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., and Verashchagina, A. (2007). The inheritance of educational inequality: International comparisons and fifty-year trends. *The BE Journal of Economic Analysis & Policy*, 7(2).

Narayan, A., Van der Weide, R., Cojocaru, A., Lakner, C., Redaelli, S., Mahler, D. G., Ramasubbaiah, R. G. N., and Thewissen, S. (2018). *Fair progress?: Economic mobility across generations around the world*. World Bank Publications.

Neidhöfer, G., Serrano, J., and Gasparini, L. (2018). Educational inequality and intergenerational mobility in latin america: A new database. *Journal of Development Economics*, 134:329–349.

References II

Schneebaum, A., Rumplmaier, B., and Altzinger, W. (2015). Gender in intergenerational educational persistence across time and place. *Empirica*, 42(2):413–445.

Tansel, A. (2002). Determinants of school attainment of boys and girls in turkey: individual, household and community factors. *Economics of education review*, 21(5):455–470.

Tansel, A. (2016). Intergenerational educational mobility in turkey. *IZA Discussion Paper No. 9590*.

Van der Weide, R., Lakner, C., Mahler, D. G., Narayan, A., and Gupta, R. (2024). Intergenerational mobility around the world: A new database. *Journal of Development Economics*, 166:103167.

Intergenerational Correlation Coefficient Decomposition

- Checchi et al. (2013) quantify factors affecting the empirical evolution of intergenerational correlation coefficient, ρ, specifically examining:
  - Distribution of parental education (p),
  - Distribution of descendant education (e),
  - Conditional distribution of descendant education on parental education.
- **Absolute Contribution (ρ_t):** The absolute contribution to ρ_t for families with parental education p and descendant education e is given by:

$$\rho_t = \sum_p \sum_e \frac{(p-\overline{p})(\bar{e}-\bar{e})}{\sigma_p \sigma_e} g_e(e|p) f(p) = \sum_p \sum_e \tau(p,e),$$

where:
  - $f(p)$: Distribution function of parental education,
  - $g_e(e|p)$: Distribution of descendant education conditional on parental education,
  - $\tau(p,e)$: Absolute contribution to ρ_t for families with p and e (Hertz, 2008)
- **Within-Group Correlation (ρ_t):** Expressed as a function of within-group correlation coefficients of different parts of society and the deviation of parental and descendant education from population means:

$$\rho_t = \sum_{j \in J} s_t^j \frac{\rho_t^j \sigma_{p,t}^j \sigma_{e,t}^j}{\sigma_{p,t} \sigma_{e,t}} \left(\frac{(\bar{p}_t - \bar{p}_t^j)(\bar{e}_t - \bar{e}_t^j)}{N_t^j} \right) / B_t^j,$$

where:
  - $\bar{p}_t$ and $\bar{e}_t$: Average parental and descendant education, respectively,
  - s_t^j: Share of group j within a cohort,
  - ρ_t^j: Within-group intergenerational educational correlation coefficient for group j,
  - $\sigma_{p,t}^j, \sigma_{e,t}^j$: Standard deviations for parental and descendant education within group j.
- **Interpretation:** This decomposition quantifies how much of the correlation stems from within-subgroup intergenerational mobility dynamics and between-subgroup dynamics, respectively. It highlights socioeconomic and demographic factors strongly associated with mobility estimates but does not unveil causal determinants. Back ▷

Ordered Logistic Regressions on Educational Attainment

- We conduct ordered logistic (`logit`) regressions to investigate the role of parental education, in conjunction with other explanatory variables, on the likelihood of attaining higher levels of education.
- **Model Specification:** The probability that an individual's education level c_{it} is at or above the k-th highest level of education is modeled as:

$$\frac{\text{Prob}(c_{it} \geq k)}{1 - \text{Prob}(c_{it} \geq k)} = e^{\sum_{j=1}^{J} \mu_k^{p_j} p_{it}^j + X_{it}},$$

  where:
  - c_{it}: Education level of individual i of cohort t,
  - k: The k-th highest level of education,
  - p_{it}^j: Dummy variable indicating whether individual i's parental education is equal to j (where $j \in E \subseteq \{1, 2, \dots\}$),
  - X_{it}: Vector containing information about other independent variables of interest, namely the descendant's gender, degree of urbanization of the (current) place of residence, and a subjective measure of the descendant's household's financial conditions when he or she was 14 years old,
  - $\mu_k^{p_j}$: Coefficient associated with parental education level j for the k-th education level.
- **Interpretation:** This model assesses how parental education and additional socioeconomic factors (e.g., gender, urbanization, household financial conditions) influence the likelihood of achieving higher educational attainment, controlling for cohort effects. Back ▷