Absolute Progress, Relative Persistence: Women's Intergenerational Educational Mobility in Turkiye

Elif Erbay

elif.satilmis@istanbul.edu.tr

Istanbul University

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Abstract

This paper documents intergenerational educational mobility among women in Turkiye, using four waves of the Turkish Demographic and Health Surveys (2003–2018) and birth cohorts from 1955 to 1995. Combining absolute mobility measures – bottom persistence and bottom-up mobility – with relative mobility measures – intergenerational regression and correlation coefficients – the analysis tracks how the mother-daughter schooling association evolved across cohorts and regions, with the 1997 compulsory schooling reform serving as a key institutional reference point. Three main findings emerge. First, post-reform cohorts display a marked divergence: absolute mobility improves substantially, yet relative mobility remains persistently low, indicating that parental background continues to govern daughters' relative position in the educational distribution. Second, bottom persistence does not converge to zero even among reform-exposed cohorts, indicating descriptive evidence of incomplete compliance and of constraints beyond the legal mandate. Third, regional maps show that gains were highly uneven, with weak upward mobility and persistent low attainment clustered in the east and southeast regions. Overall, educational expansion reduced extreme deprivation but did not equally weaken the role of family background in shaping women's educational outcomes.

Keywords: intergenerational mobility, education, women, developing country

JEL codes: I24, J16, J62

1 Introduction

Intergenerational educational mobility is a central indicator of equality of opportunity, capturing the extent to which children's educational outcomes remain tied to parental background (Brunori et al., 2025; Lindahl, 2024; Roemer, 2000). In low- and middle-income countries (LMICs), education takes on particular importance: it is both a principal channel of long-run inequality and one of the few dimensions of mobility that can be measured consistently using survey data with retrospective information on parents' schooling (Barro and Lee, 2013; Neidhofer, 2019; Torche, 2021). A sizable body of work documents that educational mobility in LMICs is generally low, uneven across gender, and regionally concentrated, with disadvantage clustering in poorer and less-developed areas.[1] Comparable patterns appear in cross-country evidence, where mobility gaps track levels of development and the quality of local institutions (Hertz et al., 2008; Hossain and Beretta, 2025; Narayan et al., 2018; Neidhofer et al., 2024; van der Weide et al., 2024).

Within this literature, Turkiye offers a revealing case. Over recent decades, the country has undergone substantial educational expansion alongside persistent regional disparities and historically large gender gaps in schooling (Asik et al., 2023; Dulger, 2001; Ozturk and Dayioglu, 2024; Pamuk, 2014). This combination makes Turkiye a useful setting for examining whether a nationally uniform schooling reform is associated with broad-based mobility gains or whether barriers remain concentrated among the groups that were initially most disadvantaged. This paper examines that question through the lens of the 1997 compulsory schooling reform, which extended mandatory schooling from five to eight

[1]The literature on intergenerational educational mobility in LMICs has been rapidly growing. On regional and subnational heterogeneity in mobility, see Alesina et al. (2021) for Africa, Fan et al. (2015), Hong and Gruijters (2024) for China, Munoz (2024), Neidhofer et al. (2018) for Latin America, and Leone (2022) for Brazil. On gender gaps in educational mobility, see Choudhary and Singh (2017), Fontep and Sen (2020), Emran and Shilpi (2015), and Leone (2021), who document that female transmission chains are both less studied and substantively distinct from male ones. For comprehensive surveys of the intergenerational mobility literature, see Narayan et al. (2018), Iversen et al. (2021), Lindahl (2024), and Blanden et al. (2023).

years. Existing work on Turkiye has established three relevant facts. First, the reform substantially increased educational attainment and narrowed urban–rural gaps, particularly for women, but it did not eliminate educational disparities (Caner et al., 2016; Kirdar et al., 2016). Second, intergenerational educational mobility in Turkiye remains low by international standards (Akarcay-Gurbuz and Polat, 2017; Aksu and Gonel, 2024; Bakis and Filiztekin, 2025; Tansel, 2015), and it is even more limited among women (Demirtas and Torul, 2024; Oztunali and Torul, 2022). Third, mobility varies systematically with regional development, and this gradient appears especially pronounced for women (Aydemir and Yazici, 2019). What remains less well understood is how intergenerational mobility evolved for the cohorts exposed to the reform, whether patterns were similar across alternative mobility measures, and how these patterns differed across regions of the country. Unlike recent work by De and Tumay (2026), which investigates the impact of education policy on upward educational mobility for women in Turkiye, this paper does not estimate the causal effect of the 1997 reform. Instead, it addresses these questions descriptively, using multiple mobility measures to document how women's intergenerational educational mobility changed over time and how these changes were distributed across the country.

To do so, I pool four waves of the Turkish Demographic and Health Surveys (TDHS 2003, 2008, 2013, and 2018), nationally representative repeated cross-sections that collect retrospective information on parental education. This feature is particularly valuable in LMIC settings, where linked parent–child administrative data are rarely available (Asher et al., 2024; Celhay and Gallegos, 2025; Emran and Shilpi, 2015). The design also allows observation of parents' schooling irrespective of co-residence, mitigating the co-residency bias that constrains studies relying on co-resident parents (Ahsan et al., 2025; Emran et al., 2018). The analysis focuses on mother–daughter mobility, a link that remains underexamined in the LMIC literature despite its importance (Choudhary and Singh,

2017; Minello and Tocchioni, 2024).[2] The sample covers birth cohorts from 1955 to 1995, spanning both pre-reform generations and the first cohorts fully exposed to the 1997 reform. For the regional analysis, I assign childhood region using reported place of residence at age 12 and construct mobility estimates at the NUTS-2 level.[3] I examine both absolute and relative mobility using four complementary measures: bottom persistence — the probability that a daughter remains low-educated given a low-educated mother, bottom-up mobility — the probability of reaching at least upper-secondary conditional on a low-educated mother, the intergenerational regression coefficient, and the intergenerational correlation coefficient. These measures align with the toolkit now standard in the mobility literature (Chetty et al., 2014; Narayan et al., 2018; Neidhofer et al., 2018). Throughout, the paper documents how the joint distribution of mothers' and daughters' schooling changes across cohorts and regions, without making causal claims about the reform itself. Reform timing is used solely as a cohort marker to organize the descriptive evidence, not as an identifying instrument.

The results reveal three patterns that are central to the paper. First, post-reform cohorts display a marked divergence between absolute and relative mobility. Absolute mobility improves substantially: daughters of low-educated mothers become much more likely to move beyond low education, consistent with the mechanical effect of raising the compulsory schooling floor. Relative mobility, however, changes far less. The intergenerational correlation in years of schooling remains high, indicating that parental background continues to shape daughters' relative position in the educational distribution. This divergence echoes patterns documented in other middle-income settings, where rising attainment at the bottom of the distribution does not necessarily translate into

[2]The main analysis focuses on the mother-daughter relationship to highlight women's intergenerational links in education. Following common practice in the mobility literature, the appendix also reports results using the highest-educated parent in the household.

[3]Childhood location is a theoretically central determinant of opportunity: a large literature documents that neighborhoods shape adult outcomes, particularly at young ages (Altonji and Mansfield, 2018; Chetty and Hendren, 2018; Chetty et al., 2016; Chyn, 2018; Damn and Dustmann, 2014; Wodtke, 2013).

weaker rank-based persistence (Narayan et al., 2018; Neidhofer et al., 2018). The pattern is substantively important for policy: reforms can raise attainment at the lower end of the distribution without loosening the broader relationship between family background and educational rank, and evaluations based on absolute indicators alone risk overstating progress on equality of opportunity (Narayan et al., 2018; Stuhler, 2018).

Second, bottom persistence does not fall to zero even among cohorts exposed to the reform. A non-negligible share of daughters with low-educated mothers remain at very low levels of schooling despite the legal mandate. I interpret this as descriptive evidence of incomplete compliance, consistent with the presence of constraints that extend beyond formal legislation. Candidate constraints most emphasized in the Turkiye and broader LMIC literature include household poverty, restrictive gender norms, weak local school access, and early marriage or labor-market pressures that compete with continued schooling (Barcellos et al., 2014; Caner et al., 2016; Erbay, 2025; Jayachandran, 2021; Jensen, 2010; Kırdar, 2009). This pattern is not presented here as a causal mechanism; rather, it motivates the paper's later discussion of why legal expansion alone may not have been sufficient for the most disadvantaged households.

Third, the regional maps show that improvements were far from uniform across the country. While absolute mobility rises in many regions, non-compliance and low upward mobility remain clustered in the east and southeast. This regional concentration is important for interpretation. It suggests that the limits of the reform were not the result of isolated household choices. Rather, the geography of low mobility aligns with broader structural disadvantages that have long differentiated these regions from the rest of the country — lower levels of socioeconomic development, weaker educational infrastructure, and less favorable conditions for girls' schooling (Alat and Alat, 2011; Asik et al., 2023; Aydemir and Yazici, 2019; Smits and Hosgor, 2006). The regional analysis therefore adds an inequality dimension that would be missed in national averages alone: it documents not only whether mobility improved, but where improvement remained limited

and where intergenerational disadvantage proved most persistent, aligning with a growing body of place-based evidence from other LMIC contexts (Alesina et al., 2021; Leone, 2022; Munoz, 2024; Neidhofer et al., 2018).

The paper contributes to the literature in four ways. First, consistent with the international shift toward place-based descriptions of opportunity (Chetty et al., 2014; Deutscher and Mazumder, 2020; Eriksen and Munk, 2020), it provides, to the best of my knowledge, the first systematic regional mapping of intergenerational educational mobility in Turkiye at NUTS-2 resolution, complementing existing work on national trends and cross-country development gradients (Aydemir and Yazici, 2019; Bakis and Filiztekin, 2025; Narayan et al., 2018; Oztunali and Torul, 2022). Second, it connects the intergenerational mobility and educational inequality literatures by showing that the consequences of educational expansion depend on the mobility metric used (Emran and Shilpi, 2021; Torche, 2021). In the Turkish case, the post-reform period delivers clear gains in absolute mobility but much weaker movement in relative mobility, underscoring that the two concepts capture distinct dimensions of equality of opportunity. Third, the paper extends the Turkiye mobility literature into the cohorts exposed to the 1997 reform. Existing work has documented long-run patterns of mobility and their association with regional development (Aksu and Gonel, 2024; Aydemir and Yazici, 2019; Bakis and Filiztekin, 2025; Oztunali and Torul, 2022; Tansel, 2015), but less is known about how the reform era appears when viewed through intergenerational mobility measures rather than attainment alone. By extending coverage into the post-reform generation, this paper characterizes what changed, and where change failed to materialize for the first cohorts exposed to the policy shift. Fourth, the focus on mother–daughter linkages addresses a recognized gap in the LMIC literature, where female mobility has received substantially less attention than male or mixed-gender ones, despite being especially informative in contexts of binding regional constraints (Ahsan et al., 2023; Choudhary and Singh, 2017; Emran and Shilpi, 2015; Fontep and Sen, 2020). More broadly, the findings speak

to a central question in the LMIC literature: whether expanding compulsory schooling is sufficient to weaken intergenerational inequality, or whether deeper structural barriers continue to reproduce disadvantage across generations.

The remainder of the paper proceeds as follows. Section 2 introduces the Turkish context. Section 3 describes the data, sample construction, and mobility measures. Section 4 presents national cohort trends, emphasizing the divergence between absolute and relative mobility and the evidence on incomplete compliance. Section 5 turns to regional heterogeneity and maps the clustering of low mobility and non-compliance across the country. Section 6 concludes.

2 Institutional Context

Turkiye's school system has long been organized as a uniform, highly centralized national system. Compulsory education is provided free of charge in state schools under the authority of the Ministry of National Education (MoNE), which oversees pre-primary, primary, lower secondary, and upper secondary schooling through a tiered structure of provincial and district directorates. This institutional arrangement is important for the present paper: because formal schooling rules are set nationally, regional variation in educational participation and attainment reflects differences in compliance, infrastructure, and socioeconomic conditions rather than in statutory requirements (Smits and Hosgor, 2006; Tansel, 2002).

Over recent decades, educational attainment in Turkiye has increased substantially, driven largely by successive compulsory schooling policies. The most consequential of these was the reform enacted in 1997. Prior to the reform, the education system followed a 5+3+3 structure: five years of compulsory primary schooling, followed by three years of lower secondary and three years of upper secondary, both non-compulsory. The first major margin of school exit therefore occurred at the end of grade 5.[4] Just before the re-

[4]In mangnitiude, the gross enrollment rate at the primary schooling is more than 90% level in 1990s.

form, lower-secondary enrollment remained limited, and educational disparities by gender and urban–rural residence were still pronounced (Kirdar et al., 2016). The 1997 education policy thus took place in a context where formal access to schooling had gradually expanded, but continuation beyond primary school was far from universal.[5]

The 1997 reform fundamentally changed this structure. Compulsory education was extended from five to eight years and reorganized as a single, uninterrupted cycle of basic education culminating in the completion of lower secondary school. Implementation began immediately in the 1997-1998 school year. It was accompanied by a large-scale basic education program that mobilized additional public resources for school construction and introduced measures to improve access, including transportation and boarding facilities for children in remote or sparsely populated areas (Dulger, 2001; Erbay and Usta, 2024).

In cohort terms, the reform affected children who were in grade 4 or below during the 1996-1997 school year, since those who would otherwise have entered grade 5 in 1997-1998 were now required to remain enrolled for an additional three years. Under the statutory school entry age of six, this corresponds broadly to birth cohorts born in 1987 or later. The cohort cutoff is not, however, perfectly sharp. Some children entered school later or earlier than the official age. Thus, cohorts close to the threshold should be interpreted with appropriate caution, and this paper treats cohorts born in 1985 or later as the post-reform group.[6]

[5]For instance, the gross enrollment rate at the lower secondary level stood at approximately 33% in 1996, the year immediately preceding the reform (Erbay, 2025).

[6]In this paper, the 1997 reform is treated as a major institutional discontinuity that separates women educated under a five-year compulsory schooling regime from those educated under an eight-year regime, rather than as a source of causal identification.

3 Data & Methodology

3.1 Data

This study pools four waves of the TDHS from 2003 to 2018, nationally representative repeated cross-sections that interview women aged 15–49 and collect detailed socioeconomic information alongside retrospective migration histories. A key advantage for intergenerational mobility research is that these waves record parental education retrospectively, so mothers' and fathers' schooling can be observed regardless of whether parents co-reside with the respondent. This mitigates the co-residency selection problem that arises when parental characteristics are only observable for adult children who still live with their parents (Emran et al., 2018; Neidhofer et al., 2018).

Education is recorded in different formats across generations. For daughters, the TDHS records both completed attainment (highest level/grade completed) and years of schooling. For parents, education is reported in six ordered categories: no education, incomplete primary, primary, lower secondary, upper secondary, and tertiary. I therefore harmonize these variables into two measures aligned with the mobility concepts used in this paper. For transition probability outcomes, I construct a common completed attainment measure for both generations with five categories: (i) no diploma (no education or incomplete primary), (ii) primary, (iii) lower secondary, (iv) upper secondary, and (v) tertiary. For relative mobility statistics, I place mothers and daughters on a common continuous scale by using daughters' years of schooling as recorded in the survey and mapping the six parental categories into standard grade-length equivalents following Tansel (2015).[7]

The analysis focuses on women aged at least 23 at the time of the interview to approximate completed schooling, excludes the 1954 cohort due to small sample sizes, and thus covers birth cohorts from 1955 to 1995. Pooling TDHS waves through 2018 allows the

[7]Parental education is reported in six categories. I assign 0, 2, 5, 8, 11, and 15 years of schooling to no education, incomplete primary, primary, lower secondary, upper secondary, and tertiary, respectively. This conversion provides a common continuous scale for intergenerational regression and correlation measures.

analysis to cover birth cohorts up to 1995, including cohorts whose schooling trajectories overlapped with major education reform – the 1997 extension of compulsory schooling. This in turn allows the paper to document mobility patterns for both pre-reform and post-reform generations within a harmonized measurement framework. Given the timing of the reform, cohorts born between 1985 and 1995 are classified as the post-reform group, while earlier cohorts constitute the pre-reform group. For the regional component, I further restrict the sample to women who resided in Turkiye at age 12, which allows childhood location to be defined coherently. After applying these restrictions, the eligible sample contains 26,561 women; 98.6% report maternal education, yielding a primary mother–daughter analysis sample of 26,189.[8] Because 99.5% report at least one parent's education, the "highest-educated parent" appendix sample is slightly larger (26,425).

Table 1: Descriptive Statistics

	A. Daughter			B. Mother		
	Mean	St. dev.	# of obs.	Mean	St. dev.	# of obs.
Years of schooling	6.64	4.39	26,189	2.24	3.04	26,189
Low educated (%)	64.75	47.78	26,189	94.45	22.90	26,189
High educated (%)	25.99	43.86	26,189	3.34	17.96	26,189
Age	35.38	7.45	26,189			

Notes: The sample is pooled from 2003, 2008, 2013, and 2018 TDHS. It includes mothers and their daughters who were born between 1955-1995, at least 23 at the survey year, resided in Turkiye at age 12. All statistics are calculated using sampling weights.

Table 1 reports summary statistics for daughters (Panel A) and mothers (Panel B). In the main sample, daughters are, on average, 35.4 years old at the interview, and have 6.64 years of schooling. Throughout the paper, "low education" denotes at most primary schooling, while "high education" refers to at least upper secondary education. Consistent with historically low attainment, 64.8% of daughters are low educated, and 26% are high educated. Maternal schooling is substantially lower: mothers, on average, have 2.2 years

[8]Transition probability estimates – bottom persistence and bottom-up mobility – that condition on low-educated mothers are computed on the corresponding subset of the mother–daughter sample.

of schooling. 94.5% have low education, whereas only 3.3% attain high education. Panel A in Appendix Figure A1 visualizes the mother-daughter transition matrix, which highlights both the pronounced left-skew in the maternal education distribution and the overall low attainment in this context.

To probe the role of parental human capital more broadly, I also construct an alternative parent–child pairing based on the highest-educated parent in the household. This definition is particularly relevant in Turkiye, where the historical gender gap implies that the highest-educated parent is most often the father. Within the highest-educated-parent sample, the father is more educated than the mother in 44.4% of households, while parents have the same attainment in 51.7%. Appendix Table A1 reports descriptives for this alternative sample. Daughters' characteristics are similar by construction, but the parental distribution shifts upward relative to mothers. Highest-educated parents have, on average, 4.4 years of schooling, 83.6% have at most primary schooling, and about 10% attain at least upper secondary education. Panel B in Appendix Figure A1 presents the corresponding transition matrix for the highest-educated-parent–daughter pairing and complements these descriptives.

3.2 Measuring Mobility

To characterize intergenerational educational mobility of women in Turkiye over four decades, I employ a complementary set of absolute and relative mobility metrics. Absolute mobility is measured using transition probabilities across discrete attainment thresholds (e.g., bottom persistence and bottom-up mobility). These measures capture changes at salient schooling margins and therefore closely track educational expansion (Neidhofer et al., 2018). Relative mobility summarizes the strength of the intergenerational association on a continuous scale and is more naturally interpreted as positional mobility – the degree to which a daughter's educational position remains linked to her mother's (Torche, 2021).

Throughout the main analysis, intergenerational links are defined at the mother-daughter level. An alternative specification based on the highest-educated parent (i.e., the maximum of mother's and father's reported education) is reported in the appendix to assess whether patterns are sensitive to using a broader measure of parental schooling. Each mobility measure is computed at two levels: for national time trends, by 5-year birth cohort b and for regional analysis, by 10-year cohort–region cells (c,r).

3.2.1 Transition Probabilities

Transition probabilities provide a transparent way to describe absolute mobility by comparing children's educational attainment across parental background groups (Alesina et al., 2021; Narayan et al., 2018). In particular, they summarize how the probability of remaining below, or moving beyond, a given schooling threshold varies with parental education. In this paper, I operationalize this idea using two complementary measures that focus on mobility from the bottom: **bottom persistence**, BP, which captures the likelihood of remaining below the threshold across generations, and **bottom-up mobility**, BM, which refers to the likelihood of surpassing the threshold among those born to low-educated mothers.

Using the cutoff s, attainment below s is treated as low education, and attainment above s as high education. First, for national time trends, I estimate over 5-year birth-cohort bins:

$$\begin{aligned} BP_b &= \Pr\left(y_{ib}^d < s \,\middle|\, y_{ib}^m < s\right), \\ BM_b &= \Pr\left(y_{ib}^d > s \,\middle|\, y_{ib}^m < s\right) \end{aligned} \tag{1}$$

where y_{ib}^d denotes the educational attainment of daughter i in birth cohort b, and y_{ib}^m refers to her mother's educational attainment.

Second, for the regional analysis, I estimate the same two measures by 10-year birth-cohort bins and childhood region:

$$
\begin{aligned}
BP_{cj} &= \Pr\left(y^d_{icj} < s \,\middle|\, y^m_{icj} < s\right), \\
BM_{cj} &= \Pr\left(y^d_{icj} > s \,\middle|\, y^m_{icj} < s\right)
\end{aligned}
\tag{2}
$$

where y^d_{icj} denotes the educational attainment of daughter i in birth cohort c who lived in region j during childhood, and y^m_{icj} indexes her mother's educational attainment.

Equation 1 therefore reports cohort-based transition probabilities over 5-year bins, whereas equation 2 reports cohort-region patterns over 10-year bins. *BP* is the probability that a daughter has low education conditional on her mother also having low education, summarizing intergenerational persistence at the bottom. *BM* is the probability that a daughter attains high education conditional on her mother having low education, representing upward movement out of disadvantaged educational background. Throughout, I set s to lower secondary education, a substantively meaningful threshold in Turkiye because lower secondary became part of compulsory schooling following the 1997 reform (Dulger, 2001).[9] With this definition, *BM* is naturally interpreted as attainment beyond the compulsory margin while *BP* refers to attainment below the compulsory threshold.

3.2.2 Relative Mobility

For relative mobility, I report two standard measures. The first is the **intergenerational regression coefficient**, β, which describes how many additional years of schooling daughters obtain, on average, when mothers have one more year of schooling. The second is the **intergenerational correlation coefficient**, r, which captures the tightness of the mother–daughter schooling relationship in standardized terms and is therefore less sensitive to changes in the dispersion of schooling across cohorts (Narayan et al., 2018; Neidhofer et al., 2018).

For national time trends, relative mobility is estimated separately for each 5-year birth-cohort bin b. The cohort-specific regression is:

[9] Additionally, as shown in Figure A1, a substantial share of both mothers and the highest-educated parents in the household attained less than lower-secondary education.

$$y_{ib}^{d} = \alpha_{ib} + \beta_b y_{ib}^{m} + \gamma_b X_{ib} + \varepsilon_{ib} \tag{3}$$

where y_{ib}^{d} and y_{ib}^{m} are the daughter i's and her mother's years of schooling, respectively, and X_{ib} includes survey-year fixed effects, and age at interview. The estimated slope β_b summarizes the change in daughters' schooling associated with a one-year increase in maternal schooling within cohort bin b. The corresponding correlation coefficient is obtained from the equation 4 linking regression and correlation coefficients:

$$r_b = \beta_b \frac{\sigma_b^m}{\sigma_b^d} \tag{4}$$

where σ_b^m and σ_b^d denote the within-bin standard deviations of maternal and daughter schooling. Correlation coefficient, r_b, rescales the regression coefficient by the relative dispersion of schooling across generations and therefore provides a unit-free measure of intergenerational persistence. The distinction matters in Turkiye because educational expansion shifts not only mean schooling but also the variance of schooling across cohorts; in such settings, the regression coefficient and correlation can display different time patterns even when the underlying rank association is stable.

To characterize regional dynamics, the same approach is implemented within cohort–region cells defined by childhood region j and 10-year birth-cohort bins c. The cohort–region regression is:

$$y_{icj}^{d} = \alpha_{icj} + \beta_{cj} y_{icj}^{m} + \gamma_{cj} X_{icj} + \varepsilon_{icj} \tag{5}$$

again including survey-year fixed effects, and age at interview in X_{icj}. The intergenerational regression coefficient, β_{cj}, summarizes relative persistence in schooling within cohort–region cell (c, j). The associated correlation coefficient is:

$$r_{cj} = \beta_{cj} \frac{\sigma_{cj}^m}{\sigma_{cj}^d} \tag{6}$$

where σ_{cj}^{m} and σ_{cj}^{d} are the within-cell standard deviations of maternal and daughter schooling. Using 10-year cohort bins for the regional analysis improves precision by increasing cell sizes while still allowing mobility patterns to be tracked over time across regions.

4 National Cohort Trends

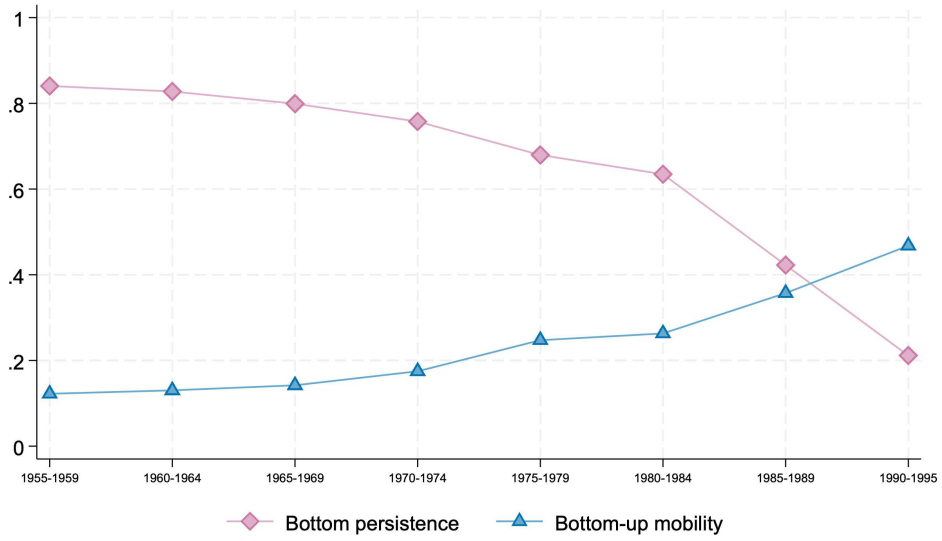
This section presents national cohort trends in two sets of mobility measures. Figure 1 reports 5-year cohort trends in transition probabilities, which capture absolute mobility, while Figure 2 presents cohort trends for relative mobility measures. These figures show how different dimensions of mobility evolved across cohorts, with particular attention to the cohorts exposed to the 1997 compulsory schooling reform.

Figure 1 plots cohort-specific transition probabilities for daughters born to low-educated mothers: bottom persistence, BP, and bottom-up mobility, BM. BP is high and fairly flat for early cohorts, remaining around 0.8 for those born between 1955 and 1969. It declines gradually gradually for cohorts born in the 1970s, and then falls sharply for those born after the mid-1980s, reaching around 0.2 by the 1990–1995 cohort. In parallel, BM rises steadily over time, with the increase becoming more pronounced for later cohorts. It approaches 0.5 by the 1990-1995 cohort. The timing of these shifts is consistent with the expansion of compulsory schooling in 1997, which raised the lower bound of required schooling from five to eight years and therefore mechanically reduced the share of daughters remaining below lower secondary education.

At the same time, the decline in BP is not matched one-for-one by an increase in BM. This suggests that much of the improvement occurred at the compulsory schooling margin: many daughters of low-educated mothers moved out of very low schooling, but a smaller share progressed beyond the compulsory threshold into higher levels of attainment. In that sense, the post-reform cohorts experienced a substantial improvement in absolute mobility, but this improvement was concentrated primarily in the reduction of extreme

educational deprivation rather than in a broad expansion into upper levels of schooling.

Figure 1: Transition Probabilities across Cohorts



Notes: The figure reports cohort-specific transition probabilities for daughters born 1955-1995 who are aged at least 23 at interview, resided in Turkiye at age 12, and whose mothers attained at most primary schooling. Each point is the weighted mean within 5-year birth-cohort bins, pooling all survey waves used in the analysis.

Other policy changes may also have affected the younger cohorts, specifically the 1990-1995 cohort, at higher schooling margins. For example, university expansion in the 2000s and the lifting of the headscarf ban may have supported continued schooling for some women (Caner et al., 2024). However, these later changes are less central to the transition-probability results presented here, which are defined around the lower-secondary threshold. Consistent with this interpretation, De and Tumay (2026) shows that the 1997 reform increased intergenerational educational mobility primarily at the high-school margin rather than at the college margin, and Figure A2 indicates that increases in college attainment among daughters of low-educated mothers are visible already for the 1985-1989 cohort. For the purposes of this paper, the main descriptive result is therefore not that the 1997 reform can be isolated causally, but that the strongest changes in absolute mobility occur precisely at the schooling margin most directly affected by the reform.

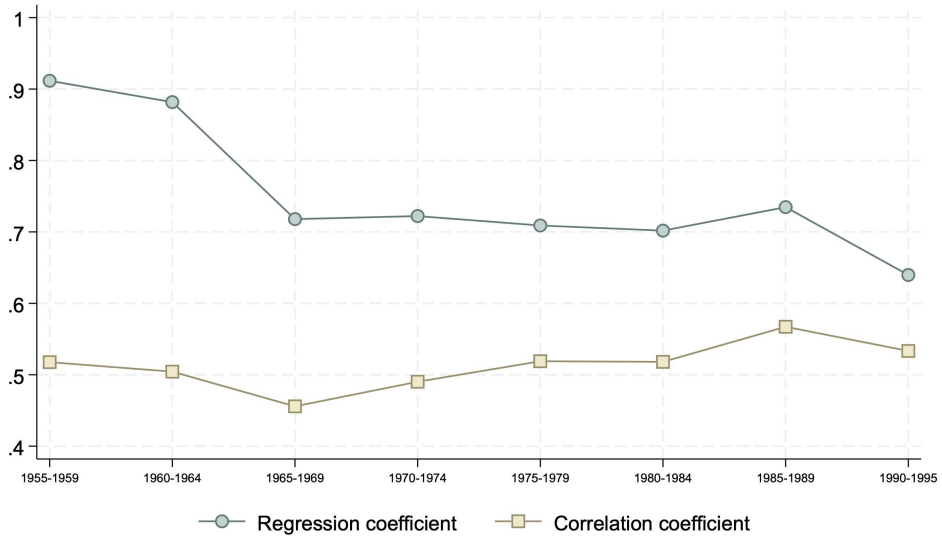
A second result from Figure 1 is that BP does not converge to zero, even among

the youngest cohorts. If compliance with the eight-year compulsory schooling law had been complete, one would expect BP to approach zero once fully exposed cohorts enter the sample. Yet this does not occur: even among the 1990-1995 cohort, roughly two in ten daughters of low-educated mothers still complete at most five years of schooling. This pattern is consistent with descriptive evidence of incomplete compliance, suggesting that the legal expansion of compulsory schooling was not sufficient to eliminate very low attainment among the most disadvantaged groups. Existing evidence for Turkiye points to several plausible constraints, including poverty, weak school access in disadvantaged areas, and other barriers to sustained enrollment despite formal eligibility (Alat and Alat, 2011; Erbay, 2025; Smits and Hosgor, 2006). Figure A3 further sharpens this interpretation by showing that persistence remains highest among reform-exposed daughters whose mothers never attended school. Among these daughters, BP is around 0.4, compared with roughly half that level for daughters of mothers who did not complete primary school and close to 0.05 for daughters of mothers who completed primary education. This suggests that the remaining non-compliance was not randomly distributed, it is actually concentrated among the most educationally disadvantaged households.

Figure A4 shows that the appendix sample based on the highest-educated parent yields nearly identical cohort profiles, although the improvement in both BP and BM is slightly weaker. This suggests that the main pattern in absolute mobility is not driven by the particular choice of mother-daughter pairing, but reflects a broader cohort-level change in educational attainment among disadvantaged families.

Figure 2 turns to relative mobility and summarizes cohort patterns in intergenerational persistence using two measures: (i) the intergenerational regression coefficient, β, and (ii) the intergenerational correlation coefficient, r. Primarily, both series indicate high persistence in Turkiye. β is close to 0.9 for the earliest cohorts and declines only gradually, remaining around 0.7 for later cohorts. r is even more stable, staying close to 0.5 across cohorts with only modest fluctuation. Jointly, these two measures suggest that

Figure 2: Relative Mobility across Cohorts



Notes: The figure reports cohort-specific measures of relative educational mobility for daughters born 1955-1995 who are aged at least 23 at interview, and resided in Turkiye at age 12. Each point corresponds to estimates computed separately within 5-year birth-cohort bins, netting out survey-wave fixed effects and age. Confidence intervals are calculated using the bootstrap.

although schooling expanded over time, family background continued to play a strong role in shaping daughters' relative position in the education distribution. The decline in β is consistent with some compression in schooling gaps as average attainment rises, but the relative stability of r indicates that rank-based persistence changed much less. This pattern also aligns with earlier work placing Turkiye among relatively low-mobility settings by international standards (Aydemir and Yazici, 2019; Bakis and Filiztekin, 2025; Oztunali and Torul, 2022).

Figure A5 presents the corresponding results for the highest-educated parent sample. The overall conclusion remains the same: low relative mobility in Turkiye. In this appendix sample, both β and r are somewhat more stable up to 1990, at around 0.65 and 0.55, respectively. Then, both decline more visibly for the 1990-1995 cohort. Even with this somewhat stronger decline, however, intergenerational persistence remains substantial, and the main insight remains unchanged.

Comparing the absolute and relative mobility patterns reveals the central finding of

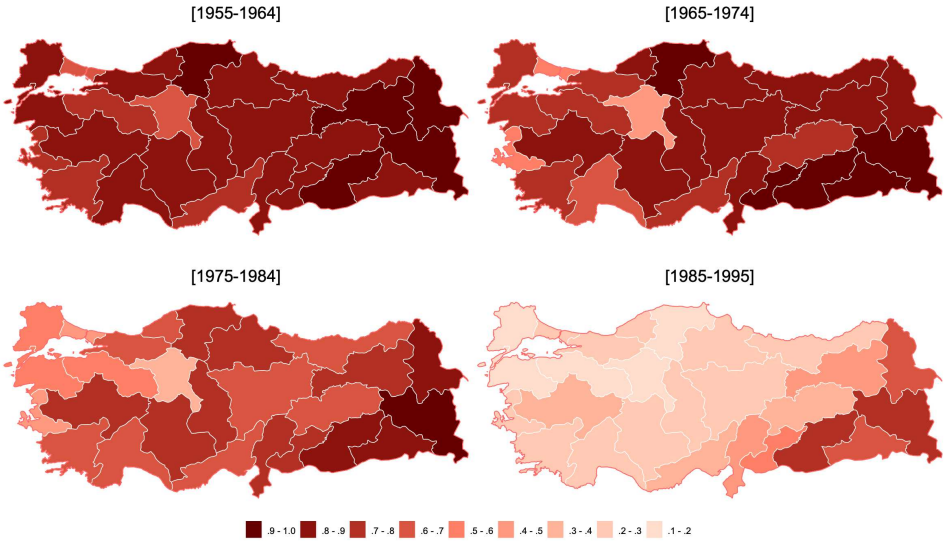
this section. Educational expansion in Turkiye is associated with large gains in absolute mobility: daughters of low-educated mothers become much less likely to remain below the lower-secondary threshold and more likely to move beyond it. Relative mobility, however, changes far less, especially when assessed through the intergenerational correlation coefficient. The divergent pattern carries a direct policy implication: educational expansion in Turkiye reduced extreme deprivation at the bottom of the distribution, but did not fully weaken the broader relationship between family background and daughters' educational position.[10]

5 Regional Heterogeneity

This section examines regional heterogeneity in women's intergenerational educational mobility in Turkiye across 10-year birth-cohort groups. I assign childhood region using the respondent's place of residence at age 12, which serves as a proxy for the local opportunity environment during formative schooling years. This choice is consistent with evidence that conditions experienced earlier in childhood are especially relevant for later-life outcomes and for intergenerational mobility (Aydemir and Yazici, 2019; Carneiro et al., 2013; Chetty and Hendren, 2018; Chetty et al., 2016). In this sense, the maps can be read as describing the "land of opportunity" for women in Turkiye, in the spirit of Chetty et al. (2014). Moreover, the regional maps complement the national cohort trends by showing not only whether mobility improved over time, but also where improvement remained limited.

[10]This divergence between absolute and relative mobility echoes patterns documented across other middle-income settings, where reforms that raise attainment at the floor do not necessarily weaken rank-based persistence (Narayan et al., 2018; Neidhofer et al., 2018).

Figure 3: Regional Distribution of Bottom Persistence

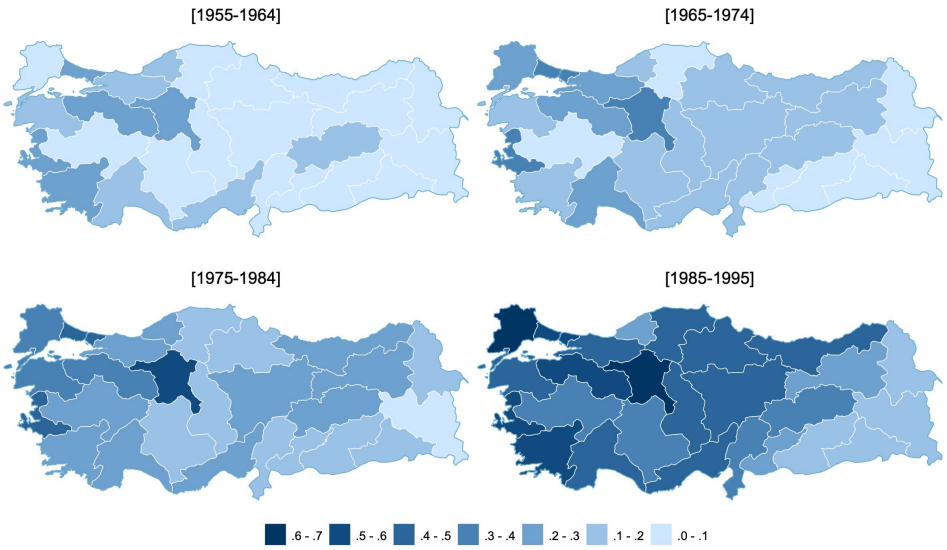


Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. All moments are computed using TDHS sampling weights. Darker shades indicate higher persistence, and bin cutoffs are held constant across cohorts for comparability.

Figures 3 and 4 first present the regional distribution of the two absolute mobility measures. For the 1955-64 and 1965-74 cohorts, BP is high across most of the country, while BM is correspondingly low. This pattern indicates that, for earlier cohorts, daughters from low-educated mothers were overwhelmingly concentrated at the lower end of the education distribution. Beginning with the 1975-84 cohort, BP starts to decline and BM to rise in many regions. These changes become much more pronounced for the 1985-95 cohort, when most regions display substantially lower persistence and higher upward mobility.

These improvements, however, are far from geographically uniform. By the youngest cohort, a clear cluster of disadvantage remains visible in the east and southeast, where BP stays elevated and BM remains comparatively limited. Thus, the maps show that the decline in very low attainment and the expansion of upward mobility were not shared equally across the country. This regional concentration is especially important because it mirrors the national result on incomplete compliance. Even among cohorts exposed to the

Figure 4: Regional Distribution of Bottom-up Mobility



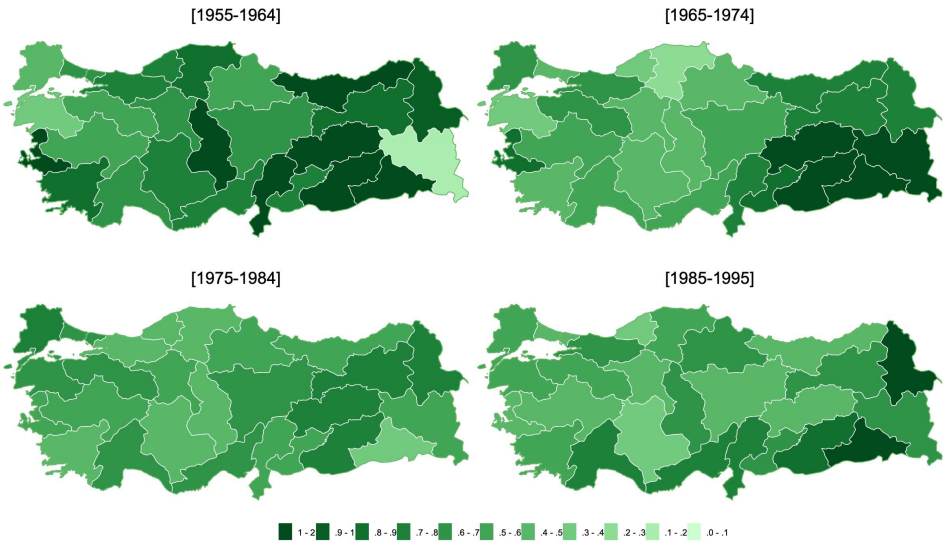
Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. All moments are computed using TDHS sampling weights. Darker shades indicate higher mobility, and bin cutoffs are held constant across cohorts for comparability.

expanded compulsory schooling regime, some regions continue to exhibit relatively high persistence at the bottom of the distribution. Descriptively, this suggests that the legal expansion of compulsory schooling did not translate into uniform mobility gains across regions.

Figures 5 and 6 turn to relative mobility. In contrast to the transition-probability maps, both β and r remain high across most regions and cohorts. The regression coefficient shows some variation over time, but in general it continues to indicate a strong mother-daughter association in schooling across the country. The regional pattern is therefore notably less dynamic than in the absolute mobility maps: while many regions experience substantial improvements in BP and BM, women's educational outcomes remain tightly tied to parental background nationwide.

The correlation coefficient reinforces this conclusion even more clearly. Because it is standardized, it is less sensitive than the regression coefficient to changes in the overall schooling distribution and therefore provides a cleaner measure of relative persistence.

Figure 5: Regional Distribution of Regression Coefficient

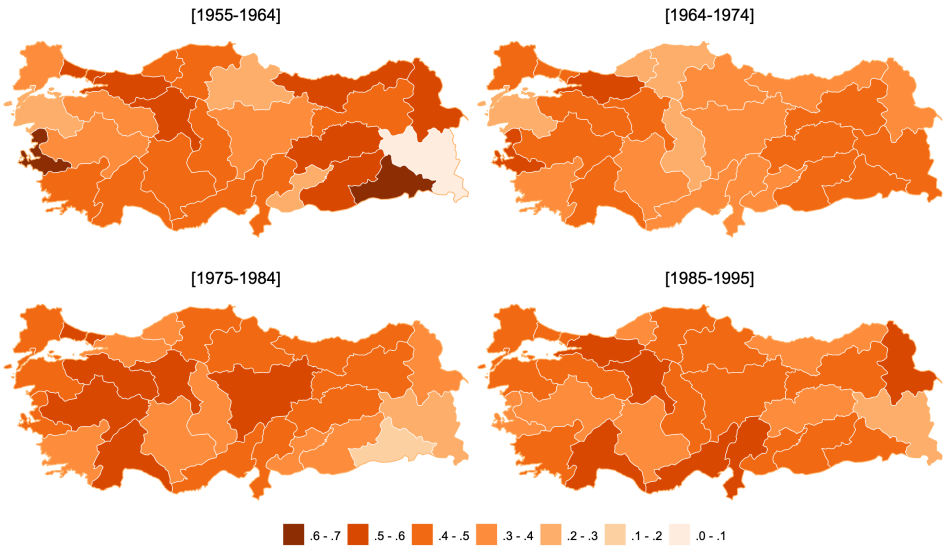


Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. Darker shades indicate lower mobility, and bin cutoffs are held constant across cohorts for comparability.

Across cohorts, the correlation remains high in most regions, with limited evidence of a sharp break for the reform-exposed cohort. This is important for interpretation. It indicates that educational expansion improved attainment at the lower end of the distribution, but did not fundamentally alter daughters' relative position in the education hierarchy. In other words, regional gains in absolute mobility did not translate into equally large reductions in relative mobility (Bloome et al., 2018; Pfeffer and Hertel, 2015).

Figures A6- A9 reproduces all four maps using the highest-educated parent sample and show the same broad picture. Although some magnitudes differ, the main findings are unchanged: absolute mobility improves across cohorts but remains geographically uneven, and relative mobility continues to display substantial persistence across regions. The regional patterns are therefore robust to the definition of whether parental background is defined using mothers only or the highest-educated parent in the household.

Figure 6: Regional Distribution of Correlation Coefficient



Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. Darker shades indicate lower mobility, and bin cutoffs are held constant across cohorts for comparability.

Taken together, the regional maps add an inequality dimension that is not visible in national averages alone. They show that mobility gains were real, but also highly uneven across the country. Absolute mobility improved in many regions, yet non-compliance and weak upward mobility remained concentrated in the east and southeast. At the same time, relative mobility stayed high across most of the country, indicating that parental background continued to shape daughters' educational position even where attainment levels increased. This geography of low mobility is more consistent with persistent structural disadvantages such as infrastructure deficits, local labor market conditions, and entrenched gender norms than with isolated household-level choices (Aydemir and Yazici, 2019; Erbay, 2025; Smits and Hosgor, 2006; UNICEF, 2023). Thereby, the regional analysis strengthens the paper's broader conclusion: educational expansion in Turkiye reduced extreme deprivation, but it did not eliminate the concentrated barriers that continue to reproduce intergenerational disadvantage for women.

6 Conclusion

This paper documents patterns of intergenerational educational mobility among women using four waves of the TDHS, covering birth cohorts from 1955 to 1995. Combining absolute mobility measures – bottom persistence and bottom-up mobility – with relative measures based on the intergenerational regression and correlation coefficients, the analysis traces how the association between mothers' and daughters' schooling evolved across cohorts and regions, with particular attention to the institutional break introduced by the 1997 compulsory schooling reform. Three findings stand out.

The first is a marked divergence between absolute and relative mobility for post-reform cohorts. Absolute mobility improves substantially: daughters of low-educated mothers became more likely to surpass the lower-secondary threshold after 1997, consistent with the mechanical effect of raising the compulsory schooling floor. Relative mobility, however, changes far less. It remains high across cohorts, indicating that maternal background continues to shape daughters' relative position in the educational distribution even as attainment at the bottom rises. This divergence is not unique to Turkiye. It echoes patterns documented across other middle-income settings where rising attainment at the floor does not automatically translate into weaker rank-based persistence (Narayan et al., 2018; Neidhofer et al., 2018). It also speaks directly to a broader point in the equality of opportunity literature: evaluations that rely on absolute indicators alone risk overstating genuine progress, because they cannot distinguish distributional shifts from reductions in background dependence (Pfeffer and Hertel, 2015; Stuhler, 2018). Thus, the Turkish case reinforces the importance of jointly examining absolute and relative mobility when assessing the distributional consequences of education policy.

The second finding concerns the limits of legislative reform in the absence of adequate supporting conditions. Bottom persistence does not converge to zero even among cohorts fully exposed to the eight-year compulsory schooling mandate. Roughly two in ten daughters of low-educated mothers still complete at most primary schooling despite

the reform. This incomplete compliance is not randomly distributed. It is especially pronounced among daughters whose mothers had no formal schooling at all, which indicates that the expansion of compulsory schooling did not eliminate very low attainment among the most disadvantaged families. This pattern suggests that formal changes in schooling rules were not, by themselves, sufficient to remove all barriers faced by disadvantaged girls (Barcellos et al., 2014; Erbay, 2025; Jayachandran, 2021; Jensen, 2010; Kırdar, 2009).

The third finding comes from the regional maps. They show that the gains/limitations in mobility were not spatially uniform. Bottom persistence declines and bottom-up mobility rises across much of the country, but weak upward mobility and signs of non-compliance remain clustered in the east and southeast. At the same time, the relative mobility maps show a different pattern: intergenerational persistence remains high across most regions and is much less sharply differentiated geographically. The regional analysis therefore adds an inequality dimension that national averages alone cannot capture. It shows not only where the failure to escape the bottom remained concentrated, but also that strong dependence of daughters' schooling on parental background continued to characterize much of the country. This combination points to a layered structure of disadvantage: some barriers are regionally concentrated and especially visible at the lower end of the distribution, while broader intergenerational persistence remains a nationwide feature of women's educational attainment. In that sense, the Turkish case is consistent with a growing place-based literature showing that mobility is shaped both by local opportunity conditions and by persistent family-level inequalities (Alesina et al., 2021; Leone, 2022; Neidhofer et al., 2018).

Finally, several limitations temper interpretation and point to natural extensions. First, the analysis is restricted to women, reflecting both the thematic focus of the survey and the particular importance of female mobility in the Turkish context. Whether the patterns documented here extend to sons remains an open question. Second, the analy-

sis is descriptive and does not identify any causal mechanisms behind cohort or regional differences. The maps should therefore be interpreted as an "atlas" of where mobility is high or low rather than a decomposition of why. The 1997 policy is treated as an institutional break that structures the cohort comparison rather than as a source of exogenous variation. Third, childhood place is proxied by residence at age 12, which is conceptually motivated by evidence that early-life environments have durable effects, but it can still be subject to measurement error and selective migration that may attenuate or distort regional comparisons. Region-by-cohort estimates also involve inevitable precision tradeoffs, and converting mothers' categorical schooling to years can introduce additional noise into the relative mobility statistics. Future work could (i) connect regional mobility patterns to time-varying measures of school supply/quality and local economic conditions, (ii) exploit sharper quasi-experimental variation in cohort-by-region exposure to policy changes, and (iii) extend outcomes beyond schooling to labor-market and family-formation outcomes to assess whether the documented geography of educational opportunity translates into broader gendered life-course mobility.

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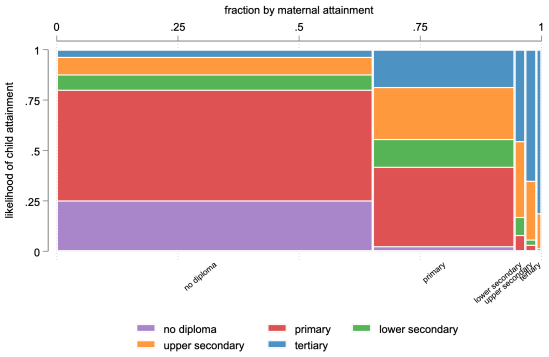
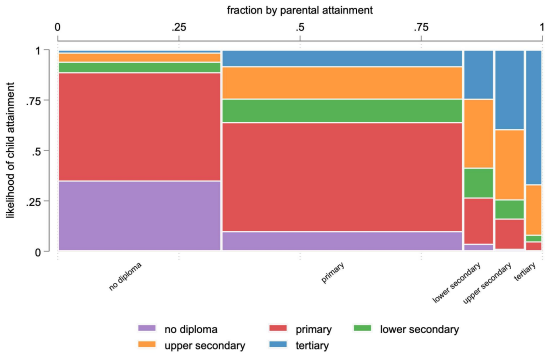
Appendix

Figure A1: Transition Matrices

(a) Daughter - Mother

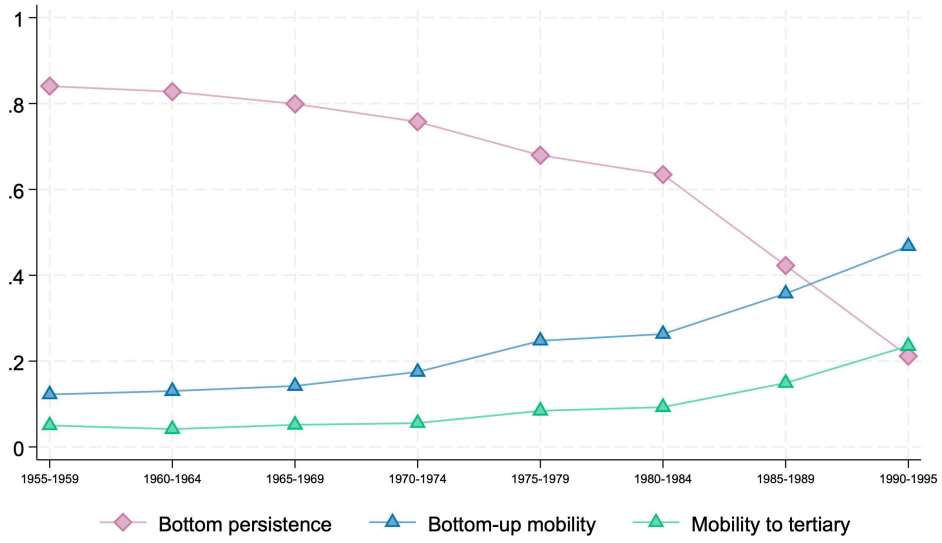


(b) Daughter - Highest-educated parent



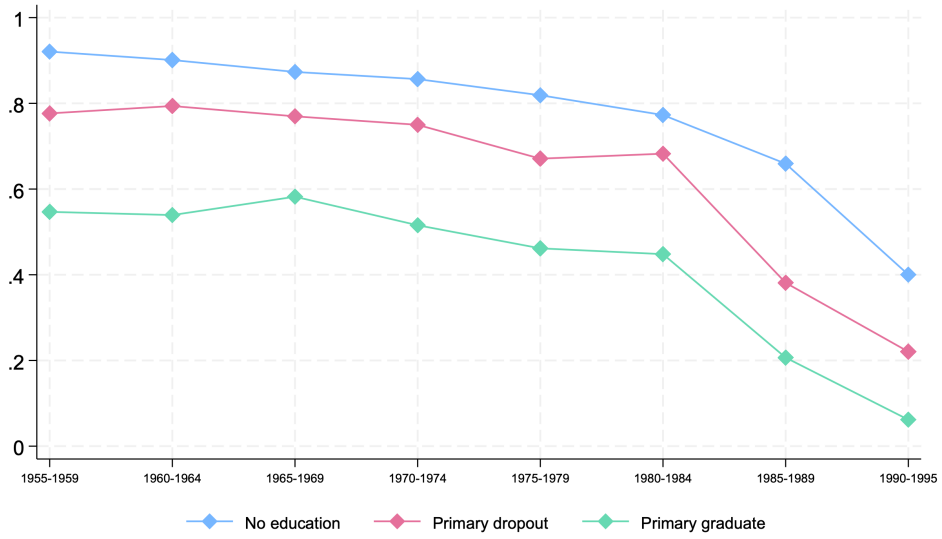
Notes: Both samples are pooled from 2003, 2008, 2013, and 2018 TDHS. Panel A includes mothers and their daughters while Panel B consists of the highest-educated parents and their daughters in the household. In both samples, daughters were born between 1955-1995, at least 23 at the survey year, resided in Turkiye at age 12. All statistics are calculated using sampling weights.

Figure A2: Transition Probabilities across Cohorts with Mobility to Tertiary



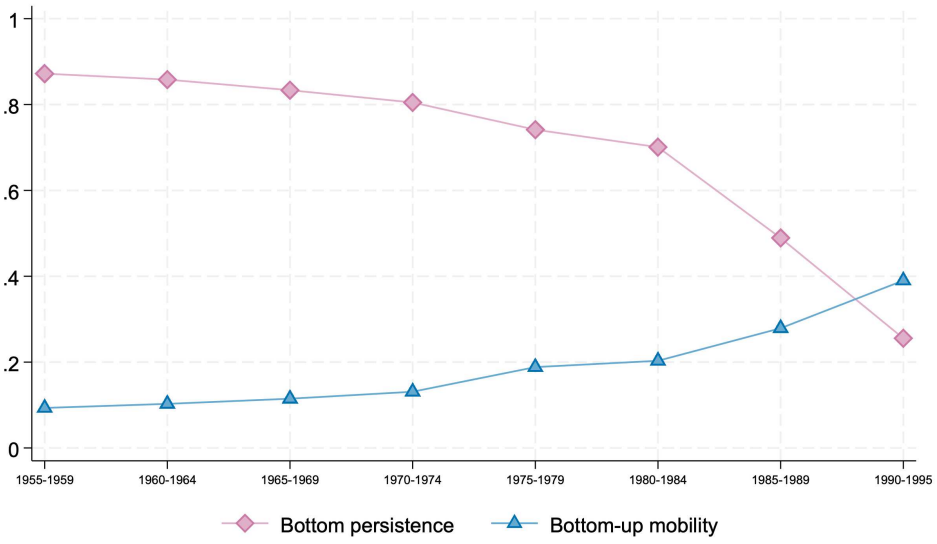
Notes: The figure reports cohort-specific transition probabilities for daughters born 1955-1995 who are aged at least 23 at interview, resided in Turkiye at age 12, and whose mothers attained at most primary schooling. Each point is the weighted mean within 5-year birth-cohort bins, pooling all survey waves used in the analysis. Bottom persistence is the probability of attaining at most primary schooling conditional on having a low-educated mother. Bottom-up mobility is the probability of attaining at least upper secondary schooling conditional on having a low-educated mother. Mobility to tertiary is the probability of attaining at least tertiary education conditional on having a low-educated mother.

Figure A3: Bottom Persistence by Maternal Education



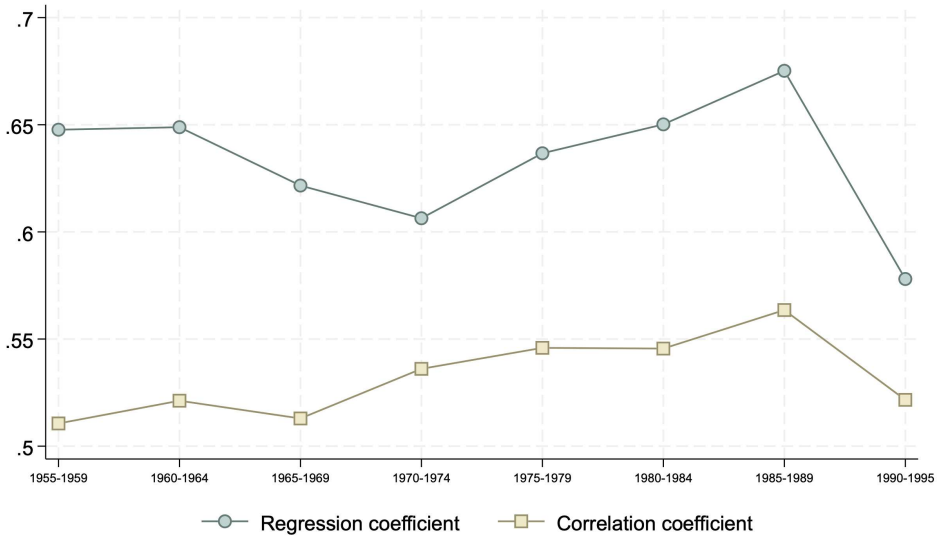
Notes: The figure reports cohort-specific transition probabilities for daughters born 1955-1995 who are aged at least 23 at interview, resided in Turkiye at age 12, and whose mothers attained at most primary schooling. Each point is the weighted mean within 5-year birth-cohort bins, pooling all survey waves used in the analysis.

Figure A4: Transition Probabilities across Cohorts with Highest-educated Parent



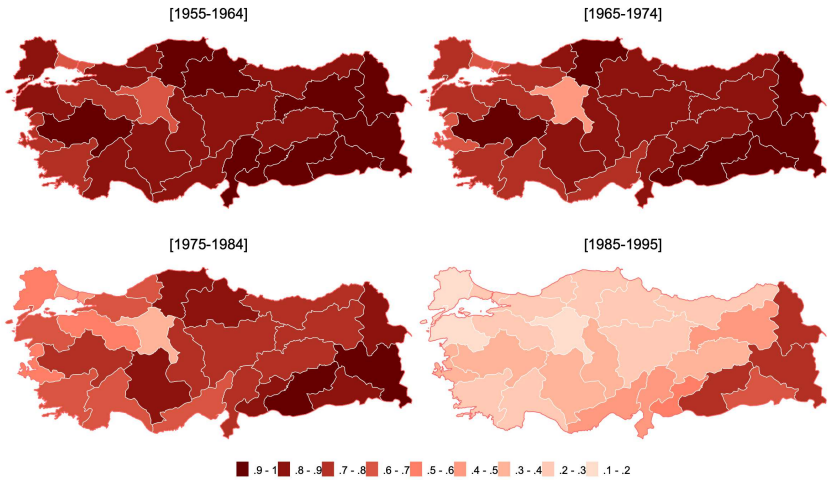
Notes: The figure reports cohort-specific transition probabilities for daughters born 1955-1995 who are aged at least 23 at interview, resided in Turkiye at age 12, and whose parents attained at most primary schooling. Each point is the weighted mean within 5-year birth-cohort bins, pooling all survey waves used in the analysis.

Figure A5: Relative Mobility across Cohorts with Highest-educated Parent



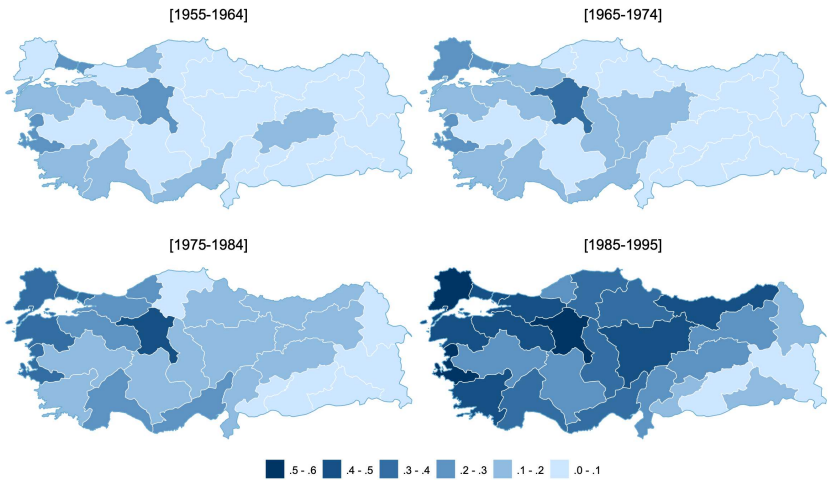
Notes: The figure reports cohort-specific measures of relative intergenerational educational mobility for daughters born 1955-1995 who are aged at least 23 at interview, and resided in Turkiye at age 12. Each point corresponds to estimates computed separately within 5-year birth-cohort bins, netting out survey-wave fixed effects and age. Confidence intervals are calculated using the bootstrap.

Figure A6: Regional Distribution of Bottom Persistence with Highest-educated Parent



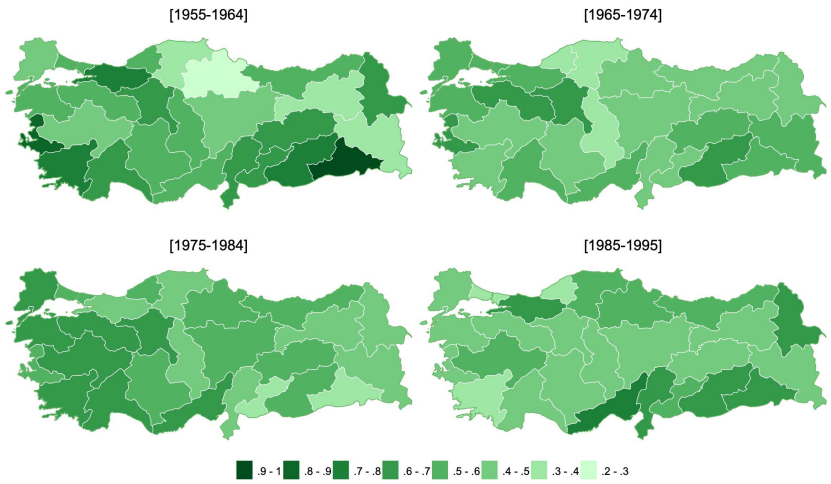
Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. All moments are computed using TDHS sampling weights. Darker shades indicate higher values, and bin cutoffs are held constant across cohorts for comparability.

Figure A7: Regional Distribution of Bottom-up Mobility with Highest-educated Parent



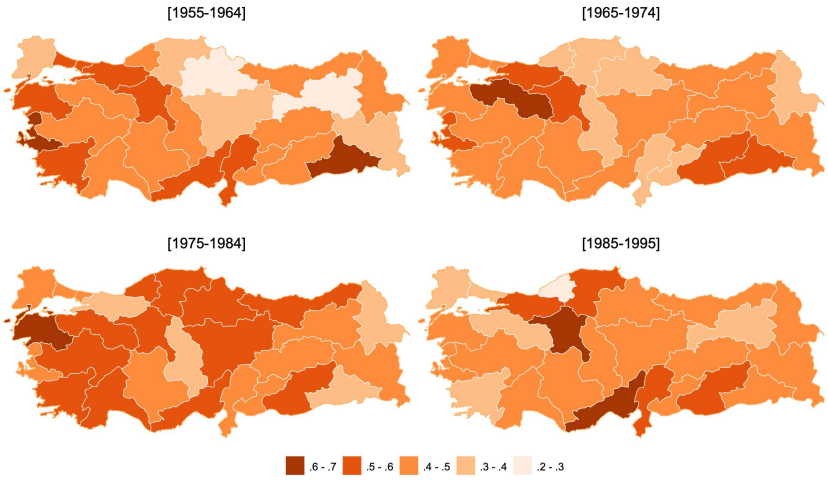
Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. All moments are computed using TDHS sampling weights. Darker shades indicate higher values, and bin cutoffs are held constant across cohorts for comparability.

Figure A8: Regional Distribution of Regression Coefficient with Highest-educated Parent



Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. Darker shades indicate lower mobility, and bin cutoffs are held constant across cohorts for comparability.

Figure A9: Regional Distribution of Correlation Coefficient with Highest-educated Parent



Notes: Each panel reports region-by-cohort estimates for 10-year birth-cohort bins. Individuals are assigned to regions using place of residence at age 12 and regions correspond to NUTS-2 statistical regions. Darker shades indicate lower mobility, and bin cutoffs are held constant across cohorts for comparability.

Table A1: Descriptive Statistics: Daughters and Highest-educated Parent

	A. Daughter			B. Highest-Educated Parent		
	Mean	St. dev.	# of obs.	Mean	St. dev.	# of obs.
Years of schooling	6.64	4.38	26,425	4.40	3.65	26,425
Low educated (%)	64.86	47.74	26,425	83.64	36.99	26,425
High educated (%)	25.90	43.81	26,425	9.95	29.94	26,425
Age	35.39	7.46	26,425			

Notes: The sample is pooled from 2003, 2008, 2013, and 2018 TDHS. It includes the hightest-educated parents in the household and their daughters who were born between 1955-1995, at least 23 at the survey year, resided in Turkiye at age 12. All statistics are calculated using sampling weights.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- supplementary.pdf