Intergenerational Educational Mobility within Chile*

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May 2025

Abstract

I provide estimates of intergenerational mobility (IGM) in education at a disaggregated geographic level for Chile, a country with high school-level stratification by socioeconomic status and a decentralized administration of public schools. I document wide variation across municipalities. Relative mobility is correlated to the number of doctors, the number of students per teacher, and earnings inequality. Using a LASSO, I find that the share of students enrolled in public schools, the number of students per teacher, population density, and municipal budget are the strongest predictors of IGM. I also document within-country variability in how parental education is associated with other children's outcomes.

JEL-Codes: D63, I24, J62.
Keywords: *Socioeconomic mobility, Geography, Chile, Education.*

*I am grateful to Jonathan Conning, Christos Giannikos, Roy van der Weide, Núria Rodríguez-Planas, Wim Vijverberg, and the participants of the micro brown bag, the dissertation seminar at CUNY and the virtual WEAI 2021 Conference for useful comments. Pablo Vargas and Melanie Saavedra provided outstanding research assistance. Any views expressed in this paper are those of the authors and should not be attributed to the Inter-American Development Bank.

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I Introduction

How much of an individual's educational achievement is due to his or her parents' educational achievements? High persistence in educational outcomes across generations can lead to unrealized human capital potential and inefficient allocation of resources and talents that result in lower economic growth. Moreover, it can be a mechanism by which economic advantage is inherited, as education is linked to the capacity to generate income and wealth. Economists have made important progress in documenting the level of intergenerational mobility (IGM) in education (i.e., the relationship between educational outcomes of parents and children) for many countries (see Van der Weide et al. 2024).[1] However, the evidence at the country level can hide important variation within countries, as it has been shown by a growing literature (for example, Alesina et al. 2021, 2023, Asher et al. 2024, Card et al. 2022, Derenoncourt 2022, Hilger 2016, Feigenbaum 2018, Munoz 2024) that estimates IGM for small geographical units, extending the literature on IGM in income initiated by Chetty et al. (2014).

In this paper, I contribute to this literature in three ways. First, I estimate intergenerational mobility in education in Chile at the country, region, and municipality level using census data for a cohort born in the 1990s. I offer eight indicators that describe the association between children's and parents' years of schooling,[2] capturing different policy-relevant concerns and aspects of this association (e.g., how much more educated children with parents with an extra year of schooling tend to be, how likely are children from low-educated parents to be low-educated, how likely are children to surpass the education of their parents, etc.), therefore providing a broad view of IGM.[3] I provide these estimates in an online data appendix for future research. Second, I show how other children's outcomes, such as teenage pregnancy

[1]See Torche (2021) for a survey focused on developing countries.

[2]Throughout the paper, I will refer to the cohort of interest as "children," and I will refer to their parents or older relatives living in the same household as "parents". I will precisely define who will be considered as a parent in Section II.

[3]Deutscher & Mazumder (2023) provide a framework that highlights the key concepts and properties of different indicators of IGM.

and tertiary education attendance, are also associated with parental education at the country level and display wide variation within the country. Finally, I explore how the estimates of educational IGM are correlated with a rich set of variables related to income, geography, education, municipal budget, and other characteristics of the municipalities. Furthermore, I investigate by means of a lasso (least absolute shrinkage and selection operator), what correlates have the most predictive power over IGM at the level of municipality.

IGM literature for Chile. Previous studies have used different household and opinion surveys (see for example, Torche 2005, Hertz et al. 2007, Nunez & Miranda 2010, Narayan et al. 2018, Celhay et al. 2010, Celhay & Gallegos 2015, Sapelli 2016, Neidhöfer et al. 2018, Van der Weide et al. 2024, Celhay & Gallegos 2025) to document IGM in income, education, and other socioeconomic measures. However, they all have in common that the samples are not representative at the municipality level, so they focus on country-level estimates. Two exceptions are Celhay & Gallegos (2015) which also explores mobility at the regional level (the coarser administrative unit in which the country is divided), and Cortés Orihuela et al. (2023), which uses labor earnings in the formal sector from administrative records to estimate income mobility at the regional level and between municipalities (the smallest administrative unit) in the Metropolitan Region. More recently, Celhay & Gallegos (2025) analyze intergenerational mobility in education across three generations in six Latin American countries, including Chile. Their work highlights the relevance of multigenerational persistence and provides new evidence on long-term mobility in the region.

Institutional background. Chile is an interesting case study to analyze IGM at the subnational level. On the one hand, the country is one of the richest economies in the Latin American region and has shown significant progress in poverty reduction and income per capita growth in the last three decades. On the other hand, income inequality is relatively high for OECD standards, and previous research has documented high school-level stratification by socioeconomic status (Mizala & Torche 2012, Gutiérrez & Carrasco 2021), which has fueled some educational reforms in the last decade. In addition, the country is marked by the free-market reforms inherited from the military dictatorship (1973-1990). This includes a universal voucher system and decentralization of the administration of public schools, which are managed by municipalities.[4]

In terms of IGM at the country level, the best evidence available at a global scale (Narayan et al. 2018, Van der Weide et al. 2024) shows some interesting findings for Chile. Among the 148 countries for which there are estimates of educational mobility for the cohort born in the 1980s, the country ranks relatively low when a summary statistic of relative mobility, such as one minus the Pearson correlation coefficient between years of schooling of children and parents is used but somewhat more mobile according to one minus the regression coefficient between these two variables.[5] In contrast, the country seems much more mobile when we look at a measure of absolute mobility like the share of students with higher education than parents. However, when a measure that aims to capture directional mobility from the bottom to the top is considered (i.e., "rags to riches" or poverty to privilege rate as named in Narayan et al. 2018), then the country appears among the least mobile ones (see Figure A1 in the Appendix).[6]

The evolution across different cohorts for these indicators also show some interesting patterns when compared to simple averages by region as classified in Narayan et al. (2018).[7] Chile does not show much progress in most of the indicators relative to regional averages except for absolute mobility (share of students with higher education than parents) and relative mobility measured as $1 - \beta$. In contrast, relative mobility measured as $1 - \rho$ (independent of the marginal distributions of education) has remained at lower levels than all the regional averages for all the cohorts in the same way as the poverty to privilege ratio (or rags to riches).

[4] A recent reform started a process of centralization in 2018.

[5] The correlation coefficient can be transformed into the regression coefficient by multiplying it by the ratio of the standard deviation of child schooling to parent schooling. Therefore, differences between them are explained by changes in inequality across generations.

[6] Ranked 138 among the 148 available estimates.

[7] Figure A2 in the Appendix plots all these indicators across cohorts.

II Data and Methods

Data. I use individual-level data from the 2017 census of housing and population obtained from the National Institute of Statistics.[8] This statistical operation, which aimed to capture the total population of Chile, includes demographic details such as age, sex, education, household composition, as well as detailed geographical information.

Sample definition. The full-count census database contains information about 17,574,003 individuals. I keep people born in Chile aged between 21 and 25 years and drop those considered domestic service, living in collective housing, or in transit, which reduces the sample to 1,155,207 individuals, 568,231 men and 586,976 women.[9]

Education. The census data contains a variable reporting schooling, regardless of the track or kind of study. When I study how the educational attainment of children relates to the attainment of parents, I take the highest attainment among the individuals in the older generation.[10] Given the typical educational path in Chile, where students start first grade at the age of 6, the average student would be able to attain at most 15 years of schooling at the age of 21. To accommodate for this, the indicators are computed using years of schooling censored at 15 for both children and parents.[11]

Geography. Chile is divided into 16 regions, 56 provinces, and 346 communes or municipalities.[12] The data set contains information on where the interview was conducted and the place of birth in terms of these three administrative divisions. I use the latter to assign people to places and estimate IGM for the country, by region, and by municipality.

[8]The data can be accessed at https://www.ine.gob.cl/estadisticas/sociales/censos-de-poblacion-y-vivienda/censo-de-poblacion-y-vivienda.

[9]Van der Weide et al. (2024) use the same age range to estimate IGM in education using survey data for 39 countries.

[10]The results are qualitatively similar if I use the average rounded to the nearest integer instead of the maximum.

[11]Similar censoring of years of schooling is used in Neidhöfer et al. (2018) with survey data to compute IGM at the country level for 18 countries in Latin America. Figure A3 displays the distribution of educational attainment of parents and children.

[12]Chile does not have a commonly used designation of commuting zones, such as the one used in Chetty et al. (2014) for the United States. Many municipalities are within commuting distance in the country, particularly within the Metropolitan area. However, the estimates at the regional level for this specific case are close to what could be considered a commuting zone.

Linking individuals across generations. The data set enumerates individuals into households and contains a variable that describes the relationship of each individual with the head of the household. I use this variable to link individuals with their parents or older relatives according to Table 1. In addition, those living only with individuals not identified in the table are matched with other relatives, provided that these relatives are at least 15 years but less than 40 years older than them. In the end, I am able to match approximately 73% of the target sample using specific relationships to the head and an extra 6% using other relatives, reaching a final sample of 833,107 individuals (i.e., a coresidence rate of 79%).[13]

Table 1: Relationship to household head and identification of different generations

Relationship to the head	Generation	Relationship to the head	Generation
Grandparent	-2	Sibling	0
Parent	-1	Sibling-in-law	0
Parent-in-law	-1	Child	1
Head	0	Child-in-law	1
Spouse	0	Spouse/partner of child	1
Legal live-in partner	0	Grandchild	2
Partner	0	Others	Missing

Notes: Categories left missing are: Other relative, non-relative, domestic employee, person in collective housing, visitor, and homeless person.

Coresident sample and potential biases. The use of a sample that only includes individuals cohabiting with their parents is a relatively standard approach in the literature that uses census data and linked generations (see for example, Alesina et al. 2023, 2021, Card et al. 2022, Derenoncourt 2022, Dodin et al. 2024, Feigenbaum 2018, Abramitzky et al. 2021, Ager & Boustan 2021, Munoz 2024).[14] However, there is a potential concern that it may lead to bias in the estimates of IGM as individuals who reside with their parents may systematically differ from those not residing with them (see Emran et al. 2018, Francesconi & Nicoletti 2006).

[13]This closely follows the approach used in Alesina et al. (2021) to link generations with census data from Africa. In comparison, they link 69% of individuals aged 14-25 using specific relationships and 23.6% based on age.

[14]Recent work with survey data have also relied on coresident samples for a large number of countries (see Van der Weide et al. 2024).

Munoz & Siravegna (2023) show evidence suggesting that the bias from the coresidence restriction is relatively small for estimates of some indicators of mobility that use census data and in cases where the bias is larger, there is a low level of re-ranking when these estimates are used to rank economies across time and space by level of mobility relative to the ranking obtained with estimates that use retrospective information (i.e., surveys that ask all individuals for the level of education of their parents). Additional exercises with survey data are also done in Van der Weide et al. (2024), showing that the bias does not generate meaningful re-rankings.

To explore to what extent the estimates reported in the paper are affected by this issue, I compare my estimates of relative mobility (based on the regression coefficient as well as the one based on the correlation coefficient) at the country level with those obtained from recent literature that uses survey data with retrospective information. The estimates are very close, which suggests that the bias is negligible for this particular sample (Figure A4 in the Appendix). Moreover, I explore whether the average coresidence rate at the municipality level is associated with the level of intergenerational mobility and find null to negligible associations (Figure A5 in the Appendix). Similarly, I do not find evidence suggesting that the level of coresidence varies with the level of schooling reported by the children (Figure A6 in the Appendix).[15]

Measurement. I consider eight different indicators that relate to different aspects of educational IGM and for which the choice among them can be justified by the purpose of the analysis (Mazumder 2016, Corak 2020, Deutscher & Mazumder 2023). The first two are derived from a simple OLS regression that relates the educational attainment of children to the attainment of parents. Hence, these measures come from the following specification by municipality c (or country or region):

$$y_{ic}^{y} = \alpha_c + \beta_c y_{ic}^{o} + \epsilon_{ic} \tag{1}$$

[15] Coresidence rates decrease monotonically with age (see Figure A7 in the Appendix).

where y^y_{ic} is the educational attainment of individual i (using a sample of individuals with ages between 21-25), y^o_{ic} is the attainment of his/her parents or older relatives cohabiting in the same household, and the parameters of interest α_c and β_c are respectively used to measure absolute and relative mobility $(1 - \beta_c)$ for municipality of birth c (see Narayan et al. 2018, Torche 2021, for a discussion about the concepts of absolute and relative mobility in education). Given that the expected years of schooling of an individual according to equation 1 depends on the average years of schooling of parents in his/her municipality (in addition to the parameters α_c and β_c), I also compute average years of schooling of parents by municipality as the third indicator. The fourth measure relates to the concept of absolute mobility measured as the share of children attaining more years of schooling than their parents (including ties at 15). The fifth measure corresponds to Pearson's correlation coefficient between years of schooling of children and parents, which, in contrast to the regression coefficient, is not affected by the marginal distributions of educational attainment of parents and children. The last three indicators address directional mobility. First, upward IGM (or "rags to riches") is measured as the probability of children reaching the top quintile in the distribution of educational attainment of children in the country (approximately 15 years of schooling) if their parents were in the bottom quintile of educational attainment (approximately less than 10 years of schooling) of parents in the country.[16] Second, intergenerational low education is the probability of attainment in the bottom quintile of the children's distribution (approximately less than 12 years of schooling) when their parent's attainment is also in the bottom quintile of the parent's distribution (approximately less than 10 years of schooling). Finally, intergenerational high education, which is the probability of children's attainment in the top quintile (approximately more than 14 years of schooling) when their parents' attainment is in the top quintile (approximately more than 13 years of schooling).[17] The indicators are summarized in Table 2.

[16] The quintiles are defined by sorting individuals by attainment and solving ties randomly.

[17] I also compute these three indicators using quintiles of the distribution of educational attainment within the region or municipality instead of the country. I compare both alternatives in the Appendix.

Table 2: Indicators of Educational Intergenerational Mobility

Indicator		Description
Absolute mobility	α	OLS estimate of intercept in Eq. 1
Relative mobility (regression coefficient)	$1-\beta$	OLS estimate of slope in Eq. 1
Average education	$\bar{Y}$	Average years of schooling of parents
Above parent	$\bar{y}^{\geq}$	Share with higher schooling than parents
Relative mobility (correlation coefficient)	$1-\rho$	Pearson correlation coefficient
Rags to riches	$P_{1,5}$	Probability of top education conditional on parents in the bottom
Intergenerational low	$P_{1,1}$	Probability of bottom education conditional on parents in the bottom
Intergenerational high	$P_{5,5}$	Probability of top education conditional on parents in the top

Notes: Above parent considers ties at the maximum number of years of schooling in the data as children having higher education than parents. The subscripts in the last 3 rows refer to quintiles. Top and bottom refers to top quintile and bottom quintile.

These measures of intergenerational mobility capture different aspects of the association between children's and parents' educational outcomes. The first two indicators (absolute mobility α and relative mobility $1-\beta$) are derived from regression specifications and measure different dimensions of mobility: α represents the expected years of schooling for children whose parents have zero education, providing an anchor for absolute mobility, while $1-\beta$ reflects the degree to which parental education does not determine children's outcomes, with higher values indicating greater mobility. The average parental education ($\bar{Y}$) offers contextual information about the general educational level within each geographic unit. The proportion of children with more schooling than their parents ($\bar{y}^{\geq}$) is another absolute measure, reflecting upward movement regardless of position in the distribution. In contrast, $1-\rho$ is a pure relative mobility measure based on correlation that is invariant to changes in the marginal distributions of education. The final three indicators capture directional mobility through conditional probabilities: rags to riches $P_{1,5}$ measures upward mobility from the bottom to the top of the distribution; intergenerational low $P_{1,1}$ captures persistence at the bottom; and intergenerational high $P_{5,5}$ reflects persistence at the top. Together, these measures provide a comprehensive picture of intergenerational mobility, combining absolute benchmarks, relative positioning, and movement across key points in the educational distribution.

III Estimates of intergenerational mobility

In this section I document the level of IGM in Chile derived from my estimates. First, I go over country-level estimates for the eight indicators of IGM described in the previous section. I explore whether there is some evidence of heterogeneity by gender, urban status, and Indigenous population in absolute and relative mobility, and then I go over the estimates of mobility using other outcomes. Second, I document within-country mobility at the region level using the same eight indicators, describe and map the estimates at the municipality level, analyze the correlation patterns between these indicators, and finally explore within-country variation in the effect of parental education on alternative outcomes.

III.1 Country-level estimates

I first estimate intergenerational mobility in education at the country level[18], and then I explore some potential heterogeneity across sub-populations such as male versus female, urban versus rural, and Indigenous versus non-Indigenous people in some of the indicators. Moreover, I estimate the association between parental educational attainment and other children's outcomes, such as attending tertiary education and having a child while a teenager in the case of women.

IGM in education. Table 3 summarizes the level of educational IGM using the previously described indicators estimated at the country level with a sample that includes only children between the ages of 21 and 25. The most recent estimates of IGM (at least for a few of these indicators) at the country level available in the literature for Chile are for the cohort born in the 1980s and 1992-1995. Compared to the latter, I find slightly lower relative mobility as measured by $1-\beta$[19] but practically the same level when measured with the $1-\rho$ (0.64 vs. 0.62).[20] In addition, although not constructed in the same way, the indicators of

[18]Figure A3 in the Appendix displays the distribution of years of schooling for children and parents.

[19]For several cohorts, this difference is smaller than the discrepancy between mobility estimated using Latinobarometro and CASEN survey, as reported in Neidhöfer et al. (2018).

[20]Figure A4 in the Appendix shows the evolution over time of these indicators in the literature versus my

directional mobility ($P_{1,5}$, $P_{1,1}$, and $P_{5,5}$) show a consistent picture with respect to Narayan et al. (2018)'s results in terms of high-persistence at the top of the educational distribution and relatively low chances of reaching the top conditional on having parents at the bottom.

Table 3: IGM at country-level

Absolute mobility	α	9.576	Relative mobility	$1-\beta$	0.714
Average education	$\bar{Y}$	11.125	Above parents	$\bar{y}^{\geq}$	0.666
Relative mobility	$1-\rho$	0.642	Rags to riches	$P_{1,5}$	0.088
Intergenerational low	$P_{1,1}$	0.366	Intergenerational high	$P_{5,5}$	0.354

The table reports estimates of IGM (as described in Table 2) using a sample of individuals aged between 21 and 25 linked to parents or older relatives, as explained in section II.

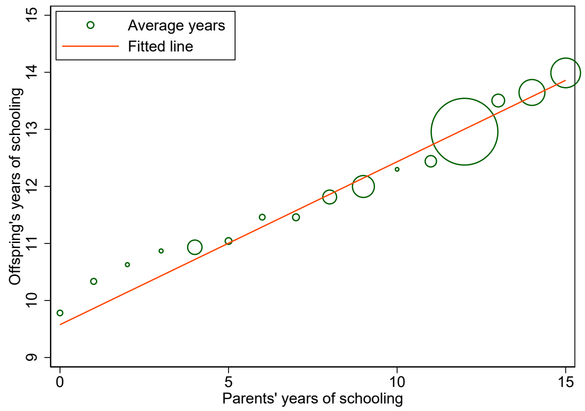
Figure 1a displays the average attainment conditional on parental education attainment, the relationship appears linear with a deviation only in the lowest level of parental education.[21] When this regression is estimated using sub-populations, I find higher absolute and relative mobility for women compared to men (see Figure 1b). In contrast, I do not find significant differences between rural and urban populations (see Figure 1c), and between Indigenous versus non-Indigenous populations (see Figure 1d). Nonetheless, this does not imply that the expected educational attainment between individuals in urban/rural or Indigenous/non-Indigenous is the same, as can be inferred by the differences in the marginal distributions of parental educational attainment. For example, the number of parents with at least 12 years of education is greater for urban (as well as for non-Indigenous) than rural (and respectively Indigenous population) populations (i.e., the size of the bubbles in Figure 1 is bigger). Table A2 in the Appendix reports the eight indicators computed by subgroup, confirming these findings and highlighting some other differences between groups in other indicators.

Other children's outcomes. I follow the seminal paper by Chetty et al. (2014) and analyze how family background is associated with two additional children's outcomes: the likelihood of attending tertiary education and the likelihood of having a child while a teenager in the

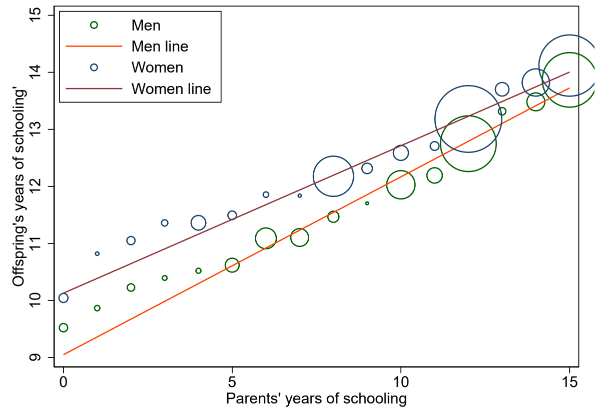
estimates.

[21] Figure A8 in the Appendix displays the transition matrix between children and parental years of schooling, each of them divided into quintiles according to their respective distribution of years of schooling.

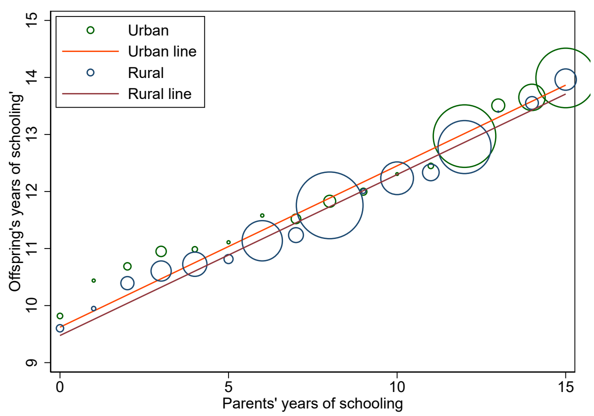
Figure 1: Country-level educational IGM



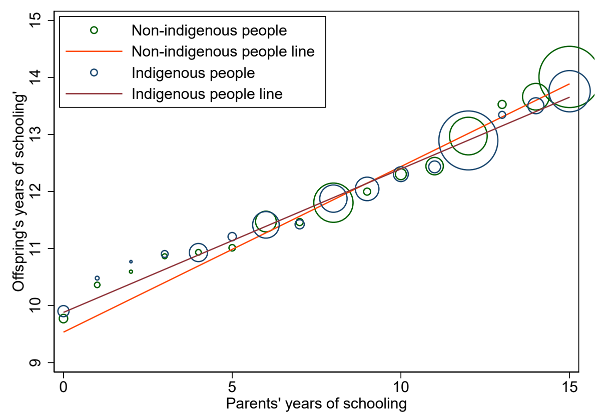
(a) All



(b) Gender



(c) Urban vs. rural



(d) Indigenous vs. non-indigenous population

Notes: The graphs display the average years of schooling of children for each level of schooling of the generation above (highest years of schooling among parents and older relatives living in the same household). The sample includes only individuals between the ages of 21 and 25. The size of the bubble varies according to the number of individuals.

case of women.[22] These outcomes are potentially very consequential in life trajectories, as the first one is positively associated with earnings and other indicators of well-being (Oreopoulos & Petronijevic 2013), while the second is negatively associated with income and some indicators of well-being (Fletcher & Wolfe 2009). Furthermore, these outcomes can be measured at earlier ages than our main outcome (i.e., years of schooling), reducing the magnitude of any potential coresidence bias, as coresidence rates decrease with age.

[22] I use the same econometric specification as in Equation 1 with a different dependent variable.

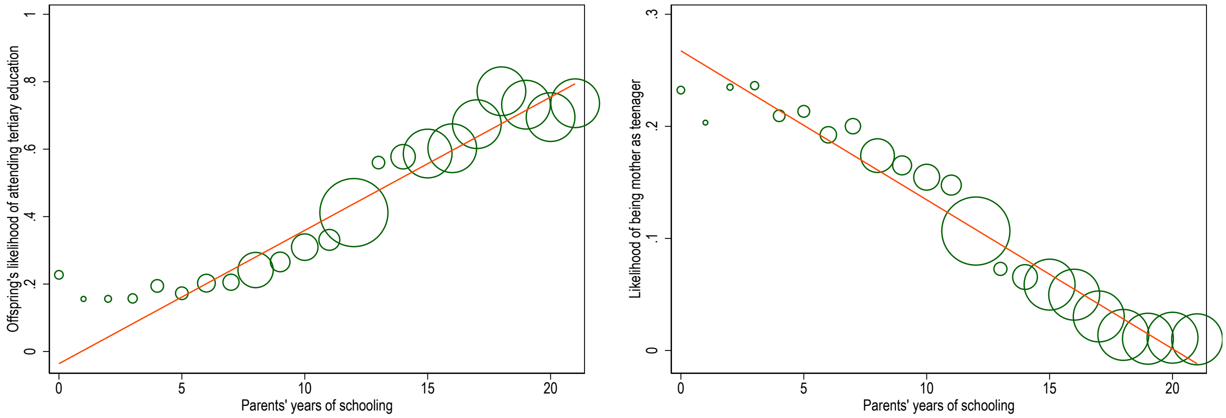
First, I estimate the probability of attending at least one year of tertiary education using a sample of individuals between the ages of 19 and 21. Figure A4c shows this likelihood for each parental educational attainment, finding a positive slope approximately equal to 0.046 with a somewhat prominent discontinuity at 12 years of schooling and a somewhat nonlinear relationship for low values of parents' years of schooling. This contrasts with the virtually linear relationship between parental income rank and college attendance documented for the US in Chetty et al. (2014). Despite these differences and other differences in terms of measurement and concepts, I find similar gaps. The gap in the likelihood of attending tertiary education for individuals with low-educated vs. highly-educated parents is around 60 percentage points while Chetty et al. (2014) documented a gap of 67.5 percentage points in the US for individuals with lowest-income vs. highest-income parents.

Second, I estimate the probability of becoming a mother as a teenager, defined as having a child for females between the ages of 15 and 19. Figure 2b shows this likelihood for each parental educational attainment, finding a negative relationship close to linear with a slope of -0.017. The gap between highly-educated and low-educated parents is around 20-25 percentage points (Chetty et al. 2014, documents a gap of 29.8 percentage points for highest-lowest parents' incomes).

III.2 Intergenerational mobility within Chile

Region-level estimates. Before presenting the most disaggregated estimates, Table 4 summarizes the eight measures of interest estimated for the 16 regions of Chile. Non-negligible differences can be found across regions in most of these dimensions. For example, the chances of reaching the top quintile of the educational distribution for children with parents at the bottom quintile (i.e., $P_{1,5}$) is more than 200% higher in the northern Arica y Parinacota region relative to Aysén region. Similarly, in terms of absolute mobility (i.e., α), there are regions with more than one year of difference, and relative mobility (i.e., $1-\beta$) is 17% higher

Figure 2: Other child's outcomes



(a) Tertiary education attendance

(b) Teenage birth (females only)

Notes: The first plot displays the likelihood of completing at least one year of tertiary education for each level of education of the generation above (highest years of schooling among parents and older relatives living in the same household). The second plot displays the likelihood of having a child as teenager for each level of education of the generation above. The samples include individuals with age between 19 and 21 (left) and 15 and 19 (right). The size of the bubble varies according to the number of individuals.

in Arica y Parinacota than in Metropolitana de Santiago or Los Rios. When I consider relative mobility measured with the correlation coefficient $(1-\rho)$, the level in Arica y Parinacota is approximately 30% higher than in the region with the lowest value (Araucanía).[23]

Municipality-level estimates. I document wide within-country variation. Relative mobility measured as $1-\beta$, excluding places with less than 50 individuals[24], ranges between 0.54 in Quemchi, a municipality located in the south of the country, and 0.97 in San Pedro de Atacama, a municipality located in the north. Non-negligible variation is found in all the indicators studied. Figure A10 in the Appendix shows the distributions of the municipality-level estimates for the eight measures and Table A3 of the Appendix similarly reports some descriptive statistics of these estimates. For all the indicators I can find municipalities with

[23]Table A4 in the Appendix reports the last three indicators of IGM using the distribution of educational attainment at the country level versus at the region level. There is heterogeneity in the direction of change, but for the three indicators, the range of variation decreases using the local distribution.

[24]Figure A9 in the Appendix displays the CDF of the sample size by municipality, showing that less than 5% of the municipalities have less than 50 observations.

Table 4: Region-level estimates of IGM Statistics

Region	α	$1-\beta$	$\bar{Y}$	$\bar{y}^{\geq}$	$1-\rho$	$P_{1,5}$	$P_{1,1}$	$P_{5,5}$
Tarapacá	9.66	0.74	11.53	0.60	0.70	0.10	0.37	0.32
Antofagasta	9.25	0.71	11.61	0.57	0.68	0.08	0.40	0.31
Atacama	9.54	0.73	10.99	0.62	0.68	0.07	0.40	0.29
Coquimbo	9.44	0.72	10.53	0.65	0.66	0.07	0.38	0.32
Valparaíso	9.61	0.72	11.23	0.65	0.68	0.09	0.35	0.34
Libertador General Bernardo O'Higgins	10.06	0.76	9.95	0.71	0.71	0.10	0.34	0.31
Maule	9.75	0.73	9.84	0.73	0.67	0.09	0.36	0.32
Biobío	10.12	0.74	10.65	0.74	0.66	0.11	0.33	0.37
Araucanía	9.58	0.71	9.88	0.75	0.61	0.07	0.38	0.37
Los Lagos	9.35	0.71	9.77	0.71	0.65	0.07	0.41	0.31
Aysén del General Carlos Ibáñez del Campo	9.38	0.76	9.59	0.65	0.73	0.05	0.44	0.23
Magallanes y de la Antártica Chilena	10.36	0.77	11.33	0.66	0.72	0.10	0.30	0.30
Metropolitana de Santiago	9.38	0.70	11.33	0.64	0.65	0.09	0.37	0.36
Los Ríos	9.46	0.70	10.18	0.72	0.62	0.06	0.38	0.34
Arica y Parinacota	10.76	0.82	11.49	0.61	0.79	0.14	0.28	0.31
Ñuble	10.02	0.74	9.86	0.76	0.68	0.11	0.33	0.36

Notes: The table reports region-level estimates of absolute mobility, relative mobility $(1-\beta)$, average parents' education, the share of children with higher education than parents, relative mobility $(1-\rho)$, rags to riches, intergenerational low, and intergenerational high, respectively. A description of the measures can be found in Table 2. Rows are sorted by the official designated number that each region used to have until 2018.

levels at least 100% greater than others, in some cases several times greater.

The measures of mobility based on conditional probabilities derived from quintiles of educational attainment are constructed using the distribution of attainment at the country level for children and similarly for parents. Similar measures could be constructed using the distribution of attainment by municipality. In this case, moving from the bottom to the top may require a higher number of years of schooling in some places compared to others and capture a different aspect of mobility. As an additional exercise, I compute those measures and find that $P_{1,5}$ measures constructed in both ways are highly correlated while $P_{1,1}$ is to a lesser degree while in contrast, $P_{5,5}$ is not correlated (see Figure A11 in the Appendix.).

Figure 3 maps relative mobility $(1-\beta)$ across the country. There are some regions with clusters of municipalities showing relatively similar levels of IGM, such as the northern regions and more heterogeneity in the center of the country. Figure A15 in the Appendix plots relative mobility dividing the map of the country into three parts, a northern region less the metropolitan region, the metropolitan region, and a southern region. These three regions have municipalities with relatively low and high levels of intergenerational educational mobility. However, in this map the variety in IGM levels of the metropolitan region (where the highest share of the population lives) can be appreciated in more detail.

Correlations among different measures of IGM. Table 5 presents the Pearson correlation coefficients between the eight mobility statistics computed at the municipality level. I find the strongest positive correlation to be between absolute and relative mobility, both measured with $1-\beta$ and $1-\rho$. These three measures are at the same time positively correlated to above parents and rags to riches, especially absolute mobility. Intergenerational low is negatively correlated with the other six indicators.

Table 5: Correlation among IGM statistics

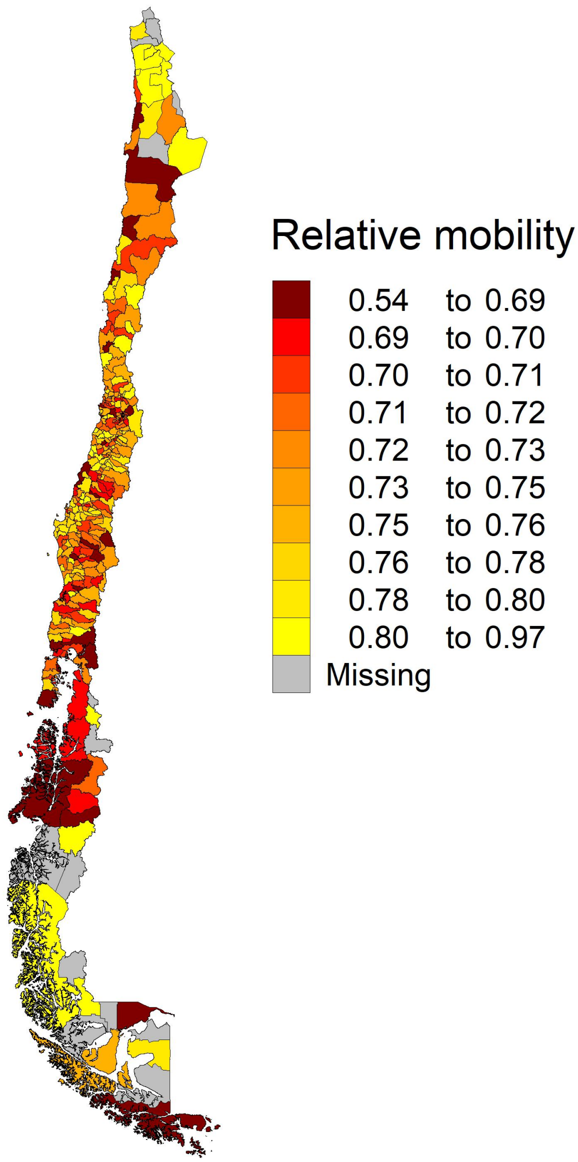
	α	$1-\beta$	$\bar{Y}$	$\bar{y}^{\geq}$	$1-\rho$	$P_{1,5}$	$P_{1,1}$	$P_{5,5}$
Absolute mobility (α)	1							
Relative mobility ($1-\beta$)	0.912***	1						
Average education ($\bar{Y}$)	-0.0175	-0.146**	1					
Above parents ($\bar{y}^{\geq}$)	0.268***	0.139*	-0.716***	1				
Relative mobility ($1-\rho$)	0.713***	0.874***	-0.0917	-0.0128	1			
Rags to riches ($P_{1,5}$)	0.478***	0.259***	0.296***	0.0604	0.228***	1		
Intergenerational low ($P_{1,1}$)	-0.730***	-0.517***	-0.207***	-0.166**	-0.380***	-0.537***	1	
Intergenerational high ($P_{5,5}$)	-0.00472	-0.141*	0.0369	0.233***	-0.140*	0.236***	-0.0715	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Other outcomes within Chile. I estimate the relationship between parental education and the two alternative outcomes described in the previous section: the likelihood of attending at least one year of tertiary education, and the likelihood of being a mother as a teenager for females.

Table 6 reports these estimates at the regional-level. There is significant variation across regions in the effect of an additional year of parental schooling on the chances of attending tertiary education. Araucania shows the strongest effect (0.044), which suggest that the gap between individuals with uneducated parents and those with highly educated ones (21 years) in the chances of attending tertiary education is approximately 92 percentage points

Figure 3: Intergenerational educational $(1-\beta)$ mobility within Chile



Notes: The map plots relative IGM measured as one minus the regression coefficient (by municipality) between children's years of schooling (using individuals aged between 21 and 25) against parents' years of schooling. Educational attainment is censored at 15. Municipalities with less than 50 individuals are left as missing (Figure A9 in the Appendix displays the CDF of the sample size by municipality). Figure A15 in the Appendix displays a version of the map dividing Chile into three areas.

(21×0.044). A caveat to note is that this calculation may overestimate the effect in light of the non-linearity observed at the national level in Figure A4c for lower levels of parental education. If I assume that the effect is null in the first 5 years of education, then the gap is approximately 70 percentage points. On the other extreme, Aysén region shows the smallest average effect (0.019).

Similarly, the effect of an extra year of parents' schooling on teenage birth rates varies significantly across regions. The effect of one year goes from a fall in the likelihood of a teenage birth equal to 0.8 percentage points in Ñuble to 1.6 percentage in Antofagasta or Coquimbo. This last effect implies a gap between uneducated and highly educated parents of approximately 33.6 percentage points, which again is meaningful but may be an overestimation due to non-linearities.

Table 6: Parental education effect on other outcomes

Region	Tertiary education	Teenage birth
Tarapacá	0.038	-0.013
Antofagasta	0.038	-0.016
Atacama	0.042	-0.012
Coquimbo	0.040	-0.016
Valparaíso	0.042	-0.014
Libertador General Bernardo O'Higgins	0.028	-0.010
Maule	0.034	-0.012
Biobío	0.039	-0.013
Araucanía	0.044	-0.013
Los Lagos	0.035	-0.014
Aysén del General Carlos Ibáñez del Campo	0.019	-0.015
Magallanes y de la Antártica Chilena	0.033	-0.009
Metropolitana de Santiago	0.043	-0.015
Los Ríos	0.039	-0.013
Arica y Parinacota	0.026	-0.012
Ñuble	0.037	-0.008

Notes: The table reports the association between an extra year of parents' schooling and the likelihood of completing at least one year of tertiary education, as well as the likelihood of having a child as teenager for females (computed using an OLS regression). The samples include individuals aged between 19 and 21 (left) and 15 and 19 (right). Rows are sorted by the official designated number that each region used to have until 2018.

IV Correlates of IGM within Chile

In this section, I examine whether intergenerational educational mobility at the municipality level is correlated with a broad set of variables, including income distribution, educational characteristics, municipal budgets, geographic factors, and other local attributes. Understanding these relationships is crucial to identifying the main factors that contribute to the persistence of educational outcomes across generations. Given the large number of potential predictors, the analysis follows a two-step approach. First, I investigate the correlations between IGM and selected key variables that the literature and theoretical frameworks suggest as particularly relevant. Second, I apply a LASSO (Least Absolute Shrinkage and Selection Operator) regression to identify the strongest predictors of mobility. This method performs a selection of correlates based on their predictive strength.

The selection of correlates follows considerations of data availability and is based on previous research, particularly Alesina et al. (2021), Chetty et al. (2014) and Van der Weide et al. (2024). An important caveat is that this analysis should not be interpreted as causal. The sole purpose is to document stylized facts that can later be used to theoretically model or estimate empirically the mechanisms behind local differences in intergenerational mobility.

IV.1 Bivariate associations

This section explores the bivariate relationship between indicators of IGM and a broad set of variables, including income inequality, governance, public investment, education, and health services, among others. The focus is on relative mobility measured as one minus the regression coefficient for simplicity and because it is arguably the most widely used indicator. However, a summary table with results for the remaining indicators can be found in the Appendix (Table A5). The definition of the correlates and their data sources are listed in the Appendix (see Table A1). To allow for a lag between the contextual environment and the observed level of mobility, all variables are measured in the year 2010.[25]

[25] The exception in terms of year of measurement is population, which is computed using Census 2017.

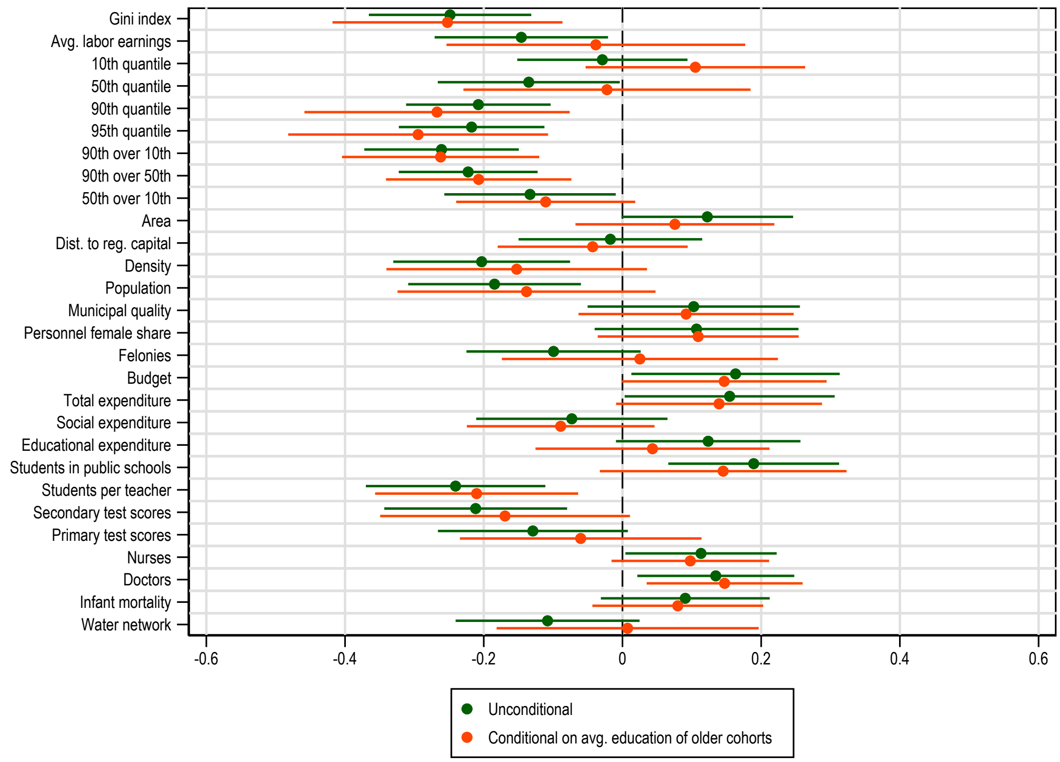
Figure 4 reports the coefficients from regressions with relative mobility (standardized to have mean 0 and variance 1) as the dependent variable and a given correlate (standardized to have mean 0 and variance 1) as the independent variable, which are labeled as unconditional, and then the same regression controlling for average education of the older cohorts.[26] This analysis provides an initial understanding of how these factors relate to IGM before applying a selection method based on their predictive ability. The unconditional estimates provide a descriptive perspective on the raw correlations between mobility and each variable, while the conditional estimates help isolate the effect above and beyond the average educational attainment of parents.

Income distribution. Higher levels of inequality are often associated with lower mobility, as economic advantages and disadvantages persist across generations (Corak 2013). I include indicators such as the Gini index, specific income quantiles (10th, 50th, 90th, 95th), and income ratios (90/10, 90/50, 50/10) to capture different dimensions of inequality. The hypothesis is that greater income disparity, particularly between the richest and poorest households, limits access to high-quality education and economic opportunities, thereby reducing mobility.

I find that the Gini index, 90th quantile, 95th quantile, 90/10 ratio, and 90/50 ratio are all negatively and significantly correlated with relative mobility at the 5% level. These results suggest that in Chile, higher intergenerational mobility in education is more strongly associated with lower levels of income inequality in the upper half of the income distribution. This contrasts with findings from Corak (2020), which show that in Canada, mobility in income is more associated with inequality in the lower half of the income distribution. However, these results align with country-level evidence reported by Narayan et al. (2018), showing that income inequality is positively associated with intergenerational persistence in education, meaning it is negatively associated with relative mobility. These findings suggest that the well-documented relationship between inequality and mobility at the international level may

[26]Following the approach used in Alesina et al. (2021).

Figure 4: Correlates of relative mobility $(1 - \beta)$ at the municipality-level



Notes: The figure reports the coefficients from regressions with relative mobility at the municipality level measured as one minus the regression coefficient (standardized to have mean 0 and variance 1) as the dependent variable and a given correlate (standardized to have mean 0 and variance 1) as the independent variable (in green, labeled as unconditional), and the coefficients from the same regression controlling for average education of the older cohorts (in orange). 95% confidence intervals are included.

also hold within countries (see Figure A13 in the Appendix).[27]

To complement this analysis, I also examine the relationship between relative mobility and inequality in education among parents (individuals aged 40–60 at the time of the Census). This exercise is equivalent to constructing a "Great Gatsby curve" for education within Chile, and I find a negative relationship between educational inequality and mobility. This suggests that the relationship documented across countries by the Narayan et al. (2018) also holds within countries (see Figure A14 in the Appendix).

[27]It is worth noting that the administrative dataset used to construct measures of income inequality, which comes from the unemployment insurance system, only considers the formal sector. This could lead to an underestimation of income inequality, as informal workers are excluded.

Demographic and geographic characteristics. Spatial and demographic factors can influence mobility by affecting access to education, labor markets, and public services. I consider variables such as population size, density, municipality area, and distance to the regional capital. The hypothesis is that larger and more urbanized municipalities, or those closer to economic centers, may offer better educational resources and job opportunities, leading to higher mobility. However, none of these demographic variables exhibit a statistically significant relationship with mobility. This suggests that within-country variations in population distribution and geography do not play as strong a role in educational mobility.

Institutional and governance quality. The quality of local governance and institutional strength may affect mobility by influencing the efficiency of public service delivery. I include indicators such as municipal governance quality, female representation in the public sector, and felonies. The hypothesis is that better governance and lower crime levels may create an environment more conducive to higher intergenerational mobility. I do not find a significant relationship between these governance indicators and mobility. This may indicate that variations in local government performance across Chile are not substantial enough to drive differences in mobility outcomes.

Public spending and social infrastructure. Public investment in education and social services can mitigate economic disadvantages and enhance mobility. I analyze municipal budgets, total public expenditure, social expenditure, and educational expenditure. The hypothesis is that higher public spending, particularly on education, should be positively associated with mobility, as it can reduce barriers in access to schools.

None of the expenditure variables show a statistically significant correlation with mobility, which suggests that the overall level of public investment alone may not be sufficient to drive mobility. A possibility is that what matters more may be the efficiency and targeting of educational resources rather than total spending. Further analysis is needed to explore whether certain types of educational investment (e.g., early childhood programs, teacher training) are more effective in promoting mobility.

Education system characteristics. The education system plays a fundamental role in shaping intergenerational mobility, as access to quality schooling can mitigate socioeconomic disadvantages. I analyze indicators such as the share of students in public schools, student-to-teacher ratios, and standardized test scores (primary and secondary). The hypothesis is that smaller student-to-teacher ratios and higher test scores should be positively associated with mobility, as they reflect better learning environments and stronger educational outcomes. Additionally, a higher share of students in public schools could be linked to either higher or lower mobility depending on the quality of public education relative to private alternatives. Consistent with the expectations, I find that the log of students per teacher is negatively and significantly correlated with mobility at the 5% level, suggesting that overcrowded classrooms hinder educational progression.[28] This result aligns with prior evidence showing that smaller class sizes improve student performance, particularly for disadvantaged groups.

Health and basic services. Health infrastructure and basic services can play a crucial role in early childhood development, which in turn influences long-term educational and economic outcomes. I examine indicators such as the number of doctors and nurses per capita, infant mortality rates, and access to water services. The hypothesis is that better healthcare access and lower infant mortality rates should be positively associated with mobility, as healthier early-life conditions contribute to better learning and cognitive development. Additionally, access to clean water may reduce health-related school absences, further supporting educational progress.

Consistent with the hypothesis, I find that the number of doctors per capita is positively and significantly correlated with mobility at the 5% level. This supports the view that access to healthcare contributes to better childhood development and long-term educational outcomes.[29]

[28] Secondary test scores are also negatively correlated but marginally insignificant at the 5% when conditioning on average education of older cohorts.

[29] Budget availability, total expenditure, and number of nurses are also positively correlated but only marginally insignificant at the 5% level.

IV.2 Identifying Key Predictors of Mobility Using LASSO

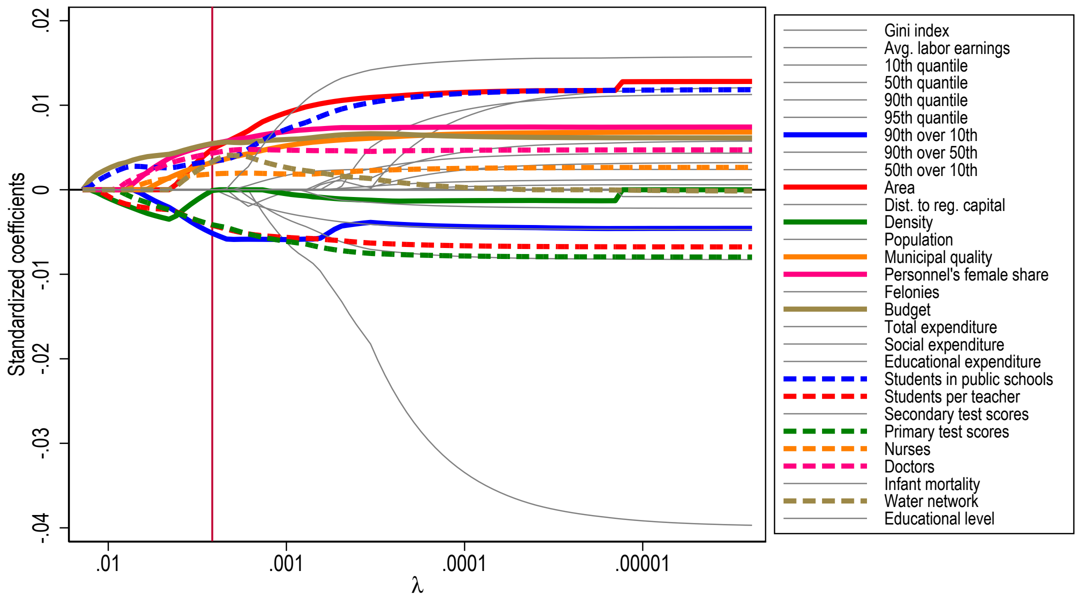
To identify the most relevant predictors of intergenerational mobility (measured as one minus the regression coefficient), we estimate a least absolute shrinkage and selection operator (LASSO) regression.[30] This regularization technique selects variables by shrinking some coefficients to zero while retaining those with the strongest predictive power. A key advantage of LASSO is its ability to handle high-dimensional data by filtering out less relevant predictors. However, an important consideration is that differences in measurement error across variables may influence the selection process. Some variables may be retained not only because of their predictive strength but also because they are measured with greater precision.

Figure 5 presents the full coefficient paths from the LASSO estimation, allowing the penalization parameter λ to range from 0 (corresponding to an OLS model where all variables are included) to infinity (where all coefficients shrink to zero). The optimal value of λ is indicated by the vertical red line, highlighting the set of correlates that remain nonzero after regularization. The results show that the strongest predictors of relative mobility include the 90/10 earnings ratio, municipality area, population density, municipal quality, personnel's female share, municipal budget, share of students in public schools, student-to-teacher ratio, primary test scores, number of nurses, number of doctors, and water network coverage.

Among these, the four most influential predictors are the share of students enrolled in public schools, municipal budget, population density, and student-to-teacher ratio. The first two variables exhibit positive coefficients, suggesting that a higher proportion of students in public schools and greater municipal spending are associated with higher mobility. In contrast, population density and student-to-teacher ratios display negative coefficients, indicating that mobility tends to be lower in more densely populated areas and in municipalities where classrooms are more crowded. These findings reinforce the role of education system

[30] Results for all the indicators are available in Table A6 of the Appendix.

Figure 5: Coefficient paths from LASSO estimates for relative mobility $(1-\beta)$ at the municipality-level



Notes: The figure presents the full coefficient paths from the LASSO estimation, allowing the penalization parameter λ to range from 0 (corresponding to an OLS model where all variables are included) to infinity (where all coefficients shrink to zero). The optimal value of λ is indicated by the vertical red line, highlighting the set of correlates that remain nonzero after regularization.

characteristics and local government resources in shaping mobility outcomes.

Compared to the bivariate analysis in Figure 4, several variables that are significantly associated with IGM in the bivariate analysis, such as some of the income inequality indicators, are not kept based on their predictive power, except for the ratio 90/10. Conversely, other correlates such as municipal budget and school enrollment composition, which were not among the strongest correlates in the bivariate analysis, emerge as important predictors once accounting for interactions between variables.

Interestingly, the strongest predictors of intergenerational mobility identified in the LASSO analysis closely mirror the three core dimensions of the Human Development Index: income, health, and education. This alignment suggests that mobility outcomes may reflect broader patterns of human development at the local level. Future work could explore more explicitly the connections between intergenerational mobility and composite development measures (e.g., Durlauf et al. 2022).

Overall, these results suggest an important role for education system characteristics, local government capacity, and urbanization dynamics in shaping intergenerational mobility in Chile. Moreover, when the bivariate analysis and the LASSO selection are taken together, income inequality, the number of students per teacher, and the number of doctors are the correlates that stand out in both exercises.

V Final remarks

In this paper, I examine intergenerational educational mobility in Chile using full-count census microdata from a cohort born in the 1990s. I investigate intergenerational mobility in education using 8 indicators that relate to different aspects of the association between children's and parents' education, as well as the association between parents' education and other outcomes such as teenage birth or the ability to attend tertiary education.

I generate estimates at the municipality, regional, and country level. I document important within-country heterogeneity in intergenerational mobility as well as the association of parents' education with other outcomes. Using the municipality level estimates, I show that IGM is correlated with (and can be predicted with) labor earnings inequality, the number of doctors in the municipality, and the students per teacher ratio.

Although each of the eight indicators captures a distinct facet of educational mobility, I find that they offer a largely consistent view of the patterns observed within Chile. Relative mobility estimates based on regression $(1-\beta)$ and correlation $(1-\rho)$ are positively associated across municipalities and identify similar spatial patterns. The consistency extends to absolute mobility (α, $\bar{y}^{\geq}$), which tends to be higher in the same areas where relative mobility is also elevated. The directional measures ($P_{1,5}$, $P_{1,1}$, $P_{5,5}$) complement this picture, with low upward mobility from the bottom and high persistence at the top confirming that educational advantages and disadvantages are transmitted across generations.

Taken together, the evidence points to a country with moderate to low intergenerational educational mobility, depending on the metric. Chile performs reasonably well on absolute mobility (more than two-thirds of the cohort surpass their parents' education) but performs less well in relative and directional mobility, especially when assessed by correlation or the probability of moving from the bottom to the top of the distribution. This asymmetry highlights a key challenge: general educational gains do not necessarily translate into equality of opportunity for all. Structural inequalities, such as socioeconomic stratification in the school system and disparities in public service provision, appear to limit upward mobility for the most disadvantaged.

These findings open avenues for future research. One direction could be to explore how intergenerational mobility patterns documented in this article vary if local labor markets or commuting zones are considered rather than municipalities. Similarly, it could evaluate whether local patterns in coresidence rates impact the geographical variation in IGM.

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Appendices

The appendix provides additional tables and figures, and other relevant information.

Table A1 lists the set of correlates that I use together with a short description and data sources.

Table A2 reports all the indicators computed by sub-populations (male vs. female, indigenous vs. non-indigenous, and urban vs. rural).

Table A3 reports some descriptive statistics of the estimates of IGM at the level of municipality.

Figure A1 plots different measures of intergenerational mobility in education at country-level highlighting where Chile falls relative to Latin America and the Caribbean and the world.

Figure A2 plots different measures of intergenerational mobility in education for Chile compared to simple averages of regions for five different cohorts.

Figure A3 displays an histogram with the distributions of educational attainment of parents and children.

Figure A4 displays the evolution of mobility across birth cohorts in recent literature versus my estimate.

Figure A5 plots the average coresidence rate against IGM indicators at the municipality level.

Figure A6 plots the average coresidence rate by level of education.

Figure A7 plots the average coresidence rate by age.

Figure A8 displays the transition probabilities between educational attainment of parents and children (classified into three categories).

Figure A9 shows the cumulative distribution of the sample size by municipality.

Figure A10 displays the distribution of all the measures at municipality-level.

Figure A11 displays scatter plots comparing indicators of mobility (that use quintiles) using country level distribution of educational attainment vs. local distribution.

Figure A15 maps the level of educational intergenerational mobility at the municipality level separating the country into north, metropolitan region, and south.

Figure A12 reports the results of the correlations with a set of variables using all the measures of IGM.

Figure A13 shows a binscatter plot between relative mobility and income inequality measured with the Gini coefficient at the municipality level.

Figure A14 shows a binscatter plot between relative mobility in education and educational inequality measured with the standard deviation of years of schooling at the municipality level.

Table A1: Covariates

Label	Source	Description
Gini Index	UID	Gini Index
Average earnings	UID	Average earnings in the formal sector
10th quantile	UID	10th percentile of earnings in the formal sector
50th quantile	UID	50th percentile of earnings in the formal sector
90th quantile	UID	90th percentile of earnings in the formal sector
95th quantile	UID	95th percentile of earnings in the formal sector
Ratio 90-10	UID	Ratio 90th to 10th percentile of earnings in the formal sector
Ratio 90-50	UID	Ratio 90th to 50th percentile of earnings in the formal sector
Ratio 50-10	UID	Ratio 50th to 10th percentile of earnings in the formal sector
Area	SINIM	Log of the total surface of municipality
Distance to regional capital	SINIM	Log of the distance between the municipality and the regional capital
Population density per km2	SINIM	Log of population density per km2 by municipality
Population	SINIM	Log of municipality's estimated population in June 2012
Municipal professionalization	SINIM	Share of college educated workers in the municipality
Female Share in Municipality	SINIM	Share of female workers over the total workers in personnel of the municipality
Crimes	CEAD	Log of the number of crimes with greater social connotation
Budget availability	SINIM	Log of municipality's budget availability per capita
Total expenditure	SINIM	Log of municipality's total expenditure per capita
Social expenditure	SINIM	Log of the municipality's total expenditure in the social programs area per capita
Education expenditure	SINIM	Log of the municipality's total expenditure education programs
Students in public schools	ACE	Number of students enrolled in public schools over total enrollment
Students per teacher	SINIM	Log of students per teacher ratio in the municipal education system
Standarized test - secondary	ACE	Average score between math and language in SIMCE taken in high school
Standarized test - primary	ACE	Average score between math and language in SIMCE taken in 4th grade
Nurses by 100K inhabitants	SINIM	Log of number of nurses by 100.000 inhabitants within the municipality
Doctors by 100K inhabitants	SINIM	Log of number of doctors by 100.000 inhabitants within the municipality
Infant mortality rate	SINIM	Number of children under 1 year of age who die for every 1.000 live births
Water network	SINIM	Percentage of homes connected to drinking water network in the municipality
Parental education	Census	Average education of individual older than 24 but younger than 66

Unemployment insurance database (UID) can be accessed at:
https://www.spensiones.cl/apps/bdp/index.php.
National system of municipal information (SINIM) can be accessed at:
http://datos.sinim.gov.cl/datos_municipales.php.
Center for crime studies and analysis (CEAD) can be accessed at:
http://cead.spd.gov.cl/estadisticas-delictuales/.
Research unit, education quality agency data (ACE) can be accessed at:
https://informacionestadistica.agenciaeducacion.cl/#/bases.
Census 2017 data can be requested from the National Institute of Statistics at:
https://www.ine.cl.

Table A2: IGM at country-level for subgroups

	Male	Female	Non-indigenous	Indigenous	Urban	Rural
α	9.049	10.129	9.535	9.881	9.622	9.476
β	0.688	0.742	0.710	0.748	0.717	0.718
$\bar{Y}$	11.126	11.123	11.260	10.247	11.336	9.203
$\bar{y}^{\geq}$	0.628	0.707	0.663	0.690	0.657	0.754
ρ	0.624	0.658	0.640	0.676	0.652	0.649
P_{15}	0.068	0.108	0.089	0.082	0.092	0.071
P_{11}	0.419	0.310	0.365	0.367	0.359	0.390
P_{55}	0.331	0.378	0.357	0.306	0.353	0.358

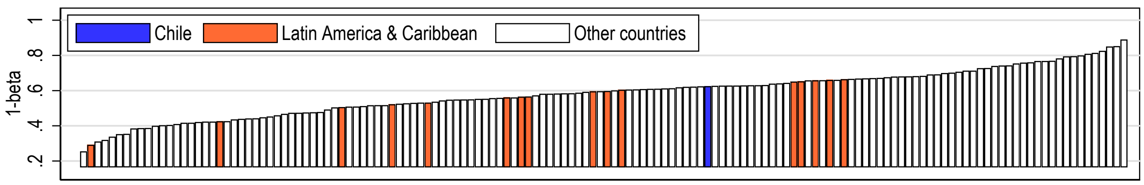
The table reports country-level estimates of absolute mobility, relative mobility $(1-\beta)$, average parents' education, share of children with higher education than parents, relative mobility $(1-\rho)$, rags to riches, intergenerational low, and intergenerational high, respectively, all computed by subgroup. A description of the measures can be found in Table 2.

Table A3: Descriptive statistics of IGM at municipality-level

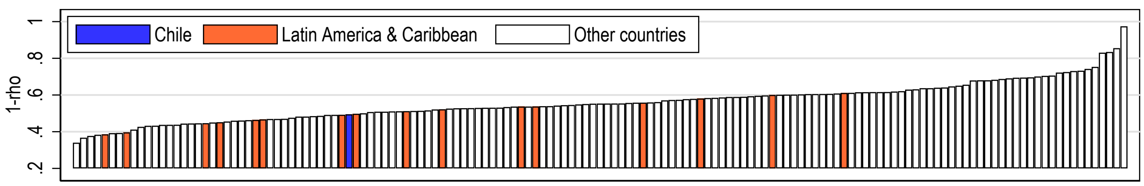
	Mean	SD	Min	Max	N
α	9.79	0.66	7.16	11.73	330
$1-\beta$	0.74	0.05	0.54	0.97	330
$\bar{Y}$	10.00	1.19	6.13	14.50	330
$\bar{y}^{\geq}$	0.71	0.07	0.48	0.90	330
$1-\rho$	0.68	0.06	0.50	0.96	330
P_{15}	0.09	0.03	0.02	0.22	312
P_{11}	0.36	0.06	0.09	0.57	313
P_{55}	0.33	0.05	0.10	0.46	190

The table reports descriptive statistics of estimates of absolute mobility, relative mobility $(1-\beta)$, average parents' education, share of children with higher education than parents, relative mobility $(1-\rho)$, rags to riches, intergenerational low, and intergenerational high, respectively, all of them at the municipality-level. I omit estimates with less than 50 observations. A description of the measures can be found in Table 2.

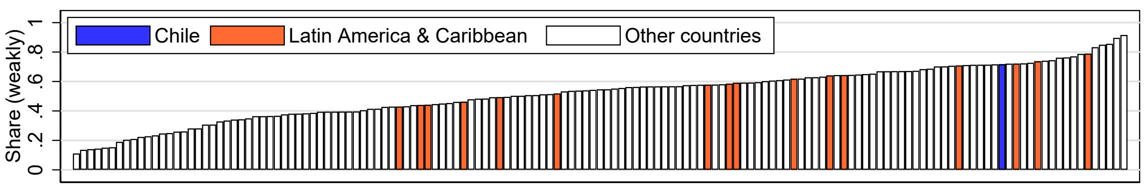
Figure A1: Chile relative to the world in terms of educational IGM



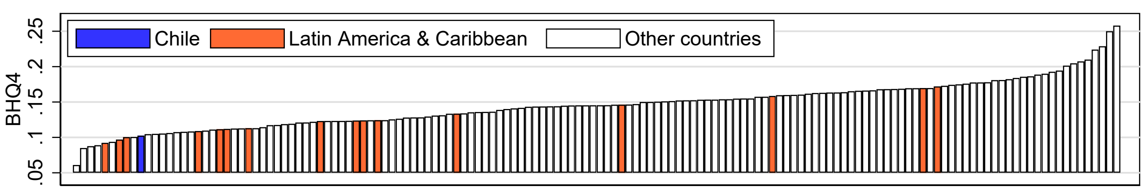
(a) Relative mobility $(1-\beta)$



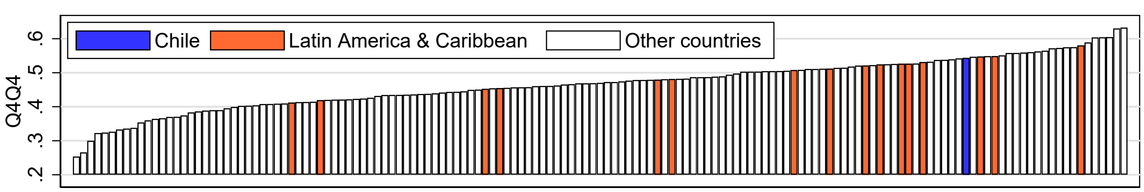
(b) Relative mobility $(1-\rho)$



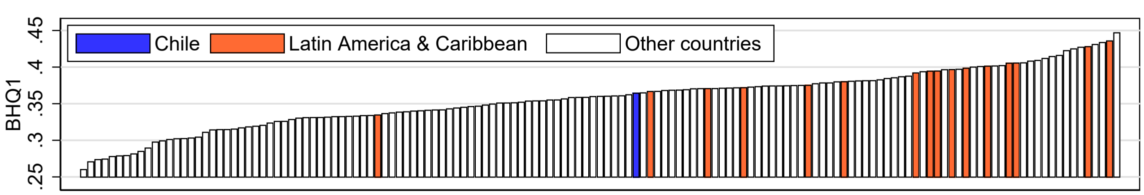
(c) Share of students with higher education than parents (share)



(d) Directional IGM - Probability child from bottom half ends up in Q4 (BHQ4)



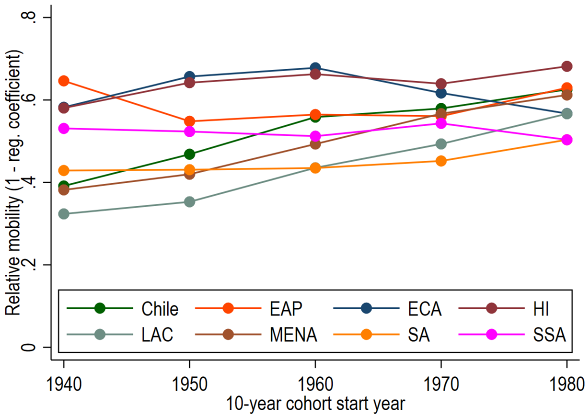
(e) Directional IGM - Probability child from Q4 ends up in Q4 (Q4Q4)



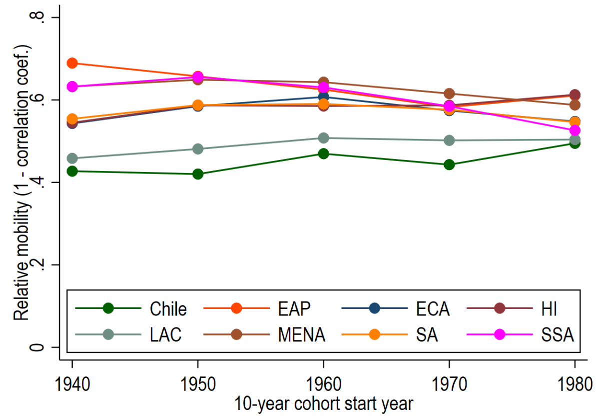
(f) Directional IGM - Probability child from bottom half ends up in Q1 (BHQ1)

Source: Elaboration by the author with data from Narayan et al. (2018).

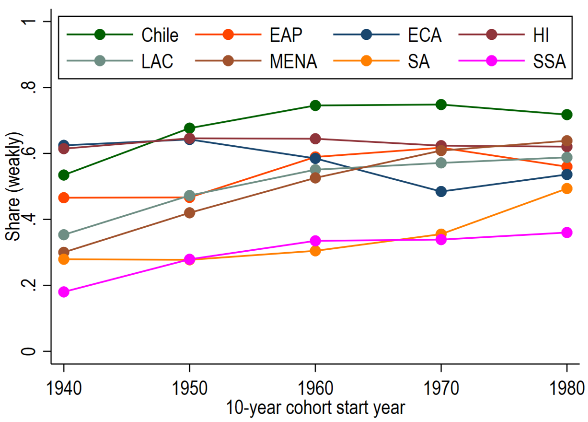
Figure A2: Mobility in Chile versus average by region for five cohorts



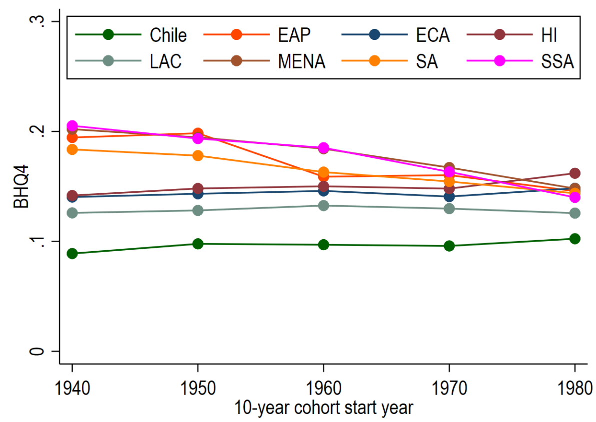
(a) Relative mobility $(1 - \beta)$



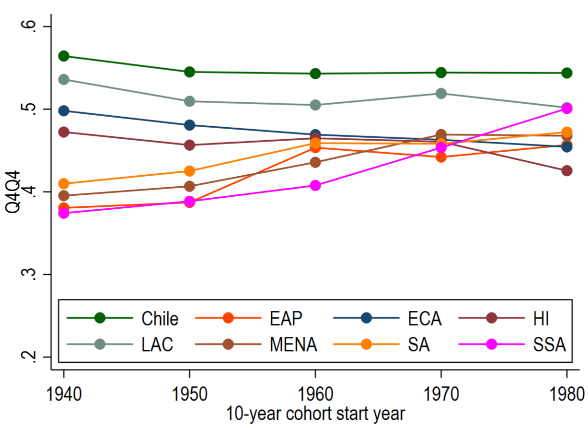
(b) Relative mobility $(1 - \rho)$



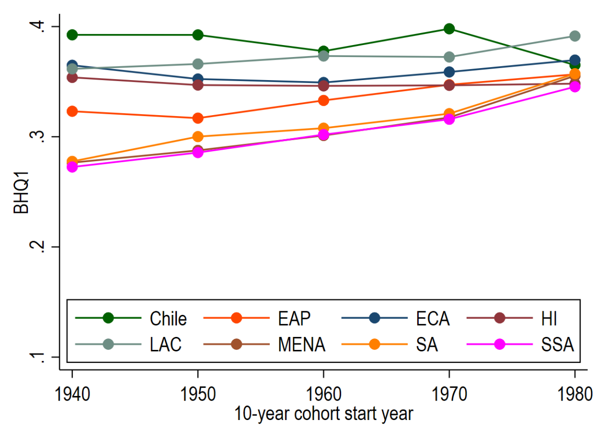
(c) Share with higher education than parents



(d) Prob. child from bottom half ends up in Q4



(e) Probability child from Q4 ends up in Q4



(f) Prob. child from bottom half ends up in Q1

Source: Elaboration by the author with data from Narayan et al. (2018). Regional averages are unweighted. Regions are EAP: East Asia & Pacific; ECA: Europe and Central Asia; HI: High income; LAC: Latin America and the Caribbean; MENA: Middle East and North Africa; SA: South Asia; SSA: Sub-saharian Africa.

Figure A3: Histogram of education

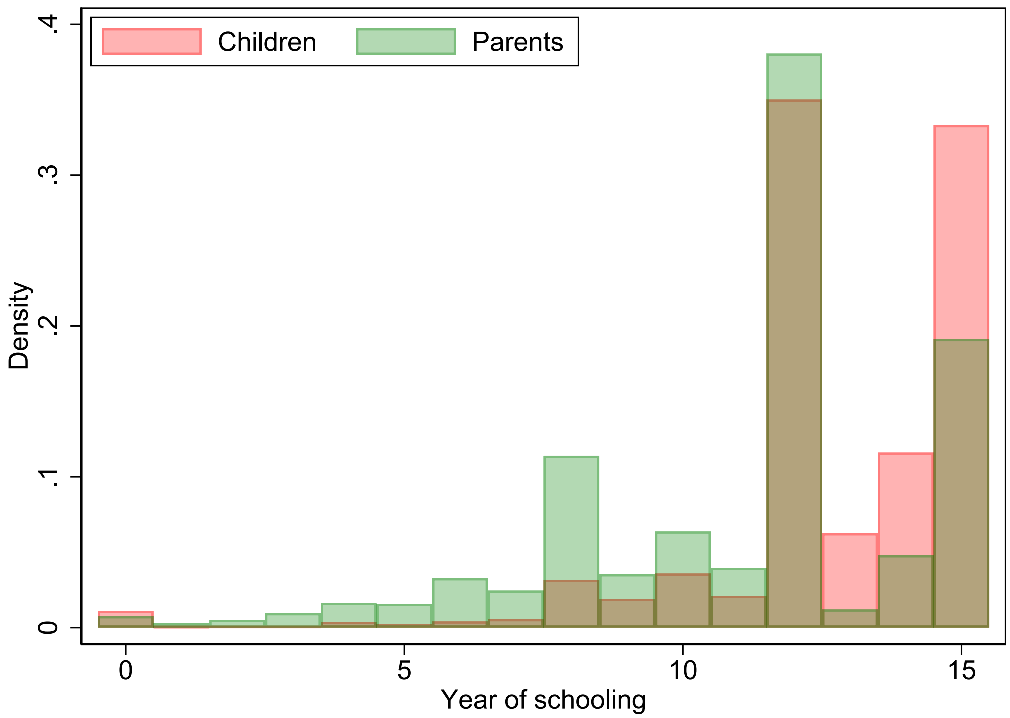
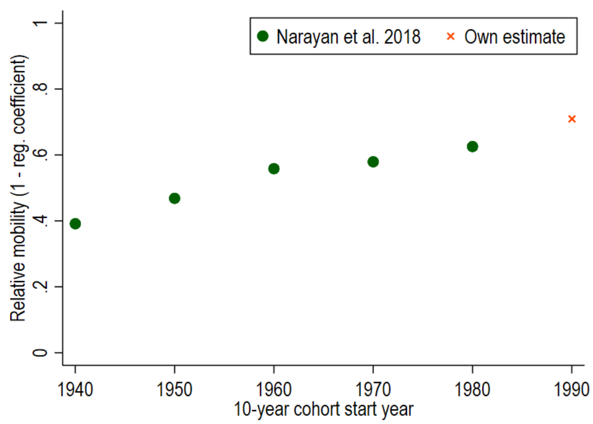
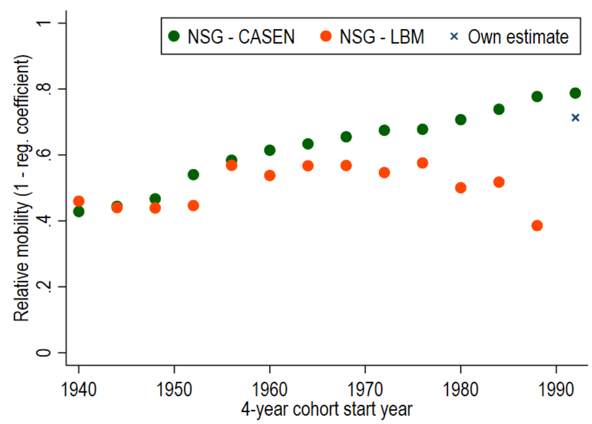


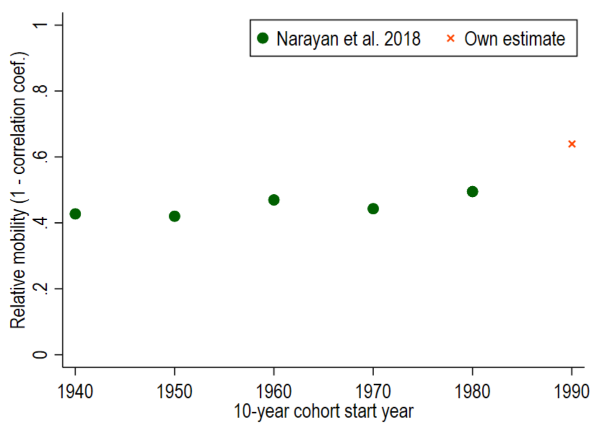
Figure A4: Own estimates versus recent literature at the country level



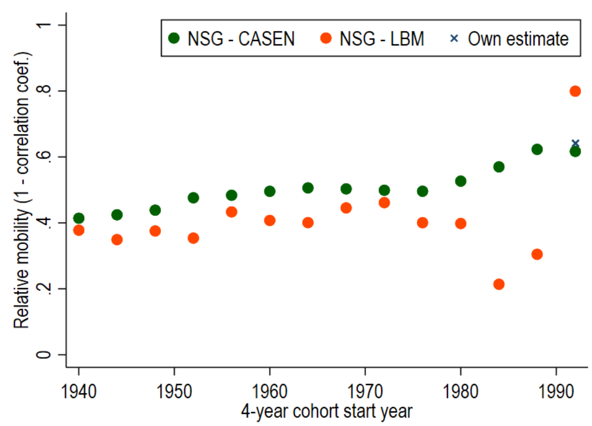
(a) Relative mobility $(1-\beta)$ from Narayan et al. (2018) and own estimate.



(b) Relative mobility $(1-\beta)$ from Neidhöfer et al. (2018) and own estimate.



(c) Relative mobility $(1-\rho)$ from Narayan et al. (2018) and own estimate.



(d) Relative mobility $(1-\rho)$ from Neidhöfer et al. (2018) and own estimate.

The figure shows estimates of intergenerational educational mobility obtained from regressing children years of schooling against parents' years of schooling, and the Pearson correlation coefficient between the same two variables. Narayan et al. (2018) uses CASEN survey while Neidhöfer et al. (2018) also uses Latinobarometro survey (LBM). The former uses 10-year cohorts, the latter uses 4-year cohorts (the most recent one is 1992-1995), and my estimate uses individuals approximately born between years 1991-1995. The last four cohorts using LBM survey contain smaller samples (831, 413, 179, and 24 observations), and hence are somewhat unreliable.

Figure A5: Average coresidence rate vs. IGM indicators at the municipality level

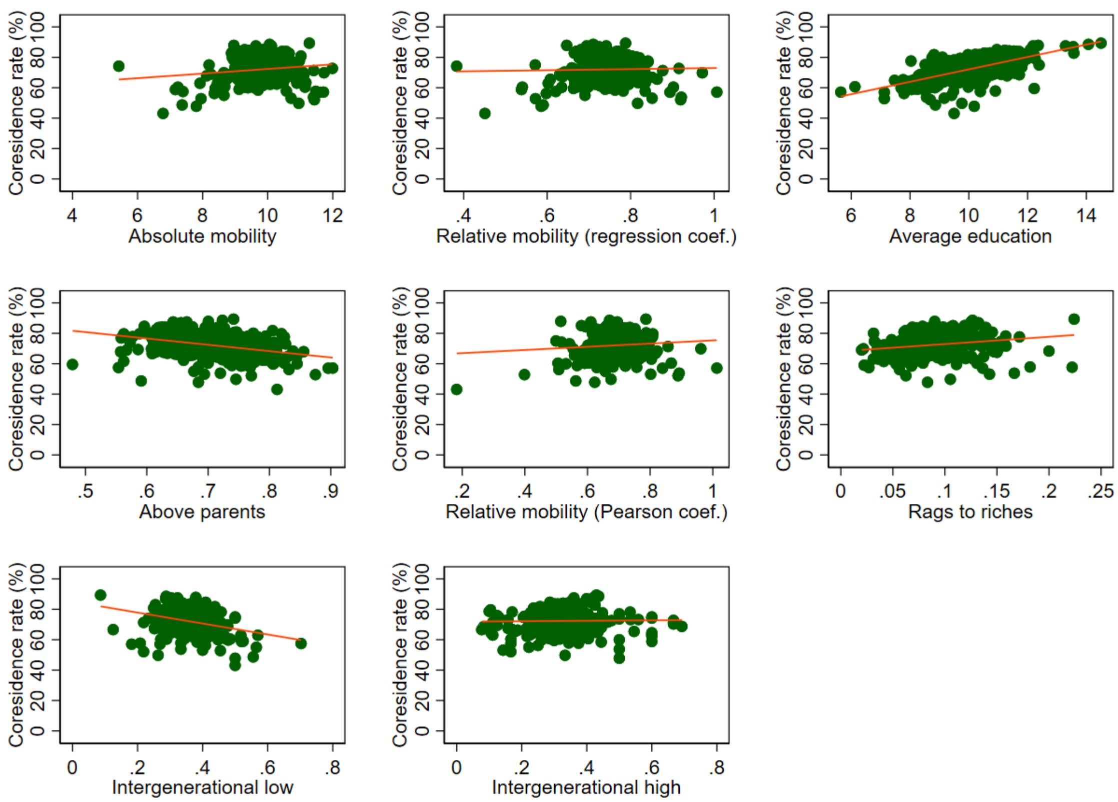


Figure A6: Average coresidence rate by level of education

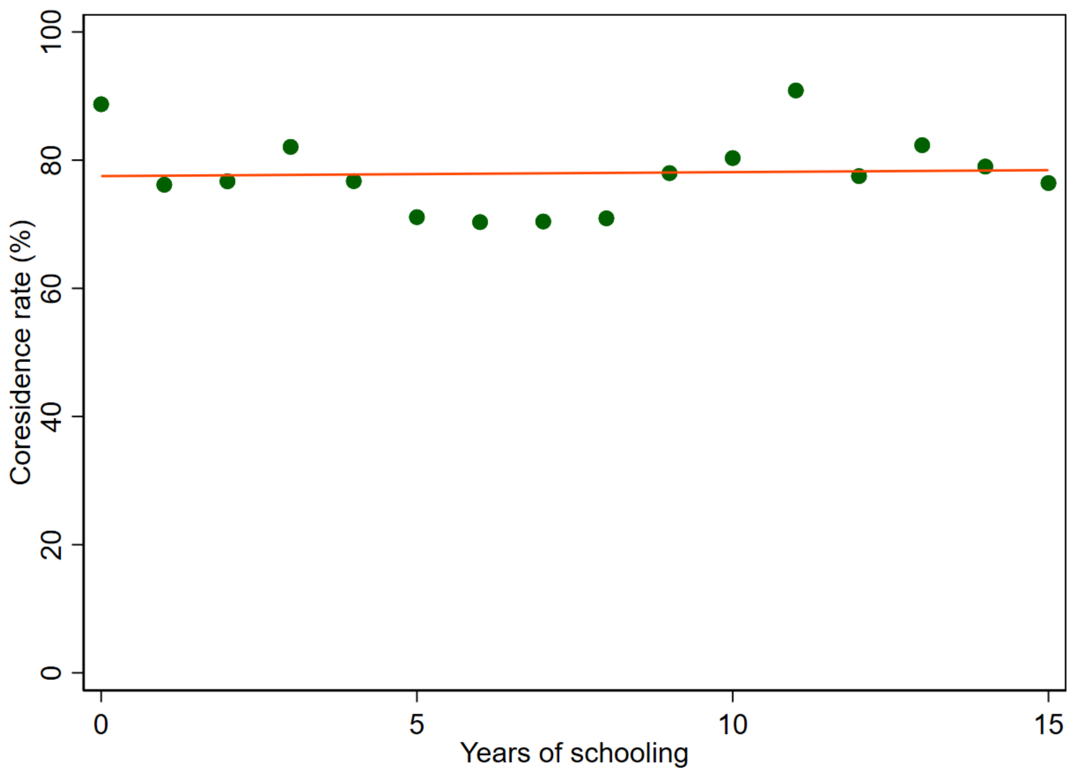


Figure A7: Average coresidence rate by age

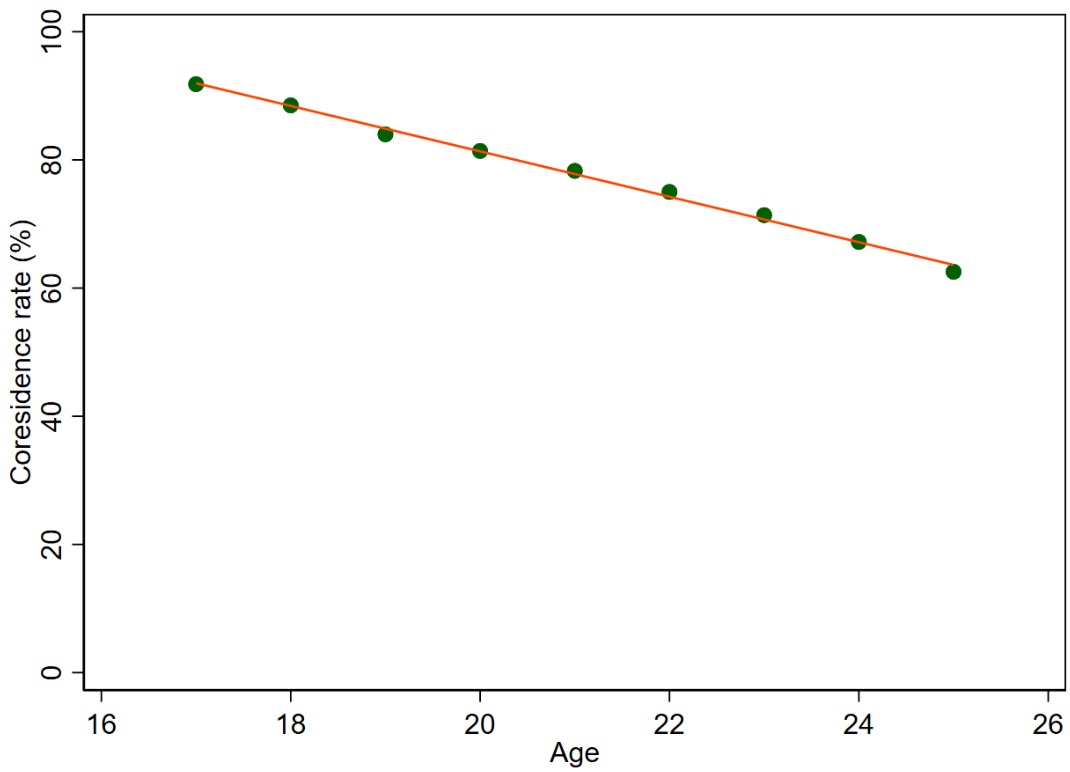


Figure A8: Transition probabilities at the country-level

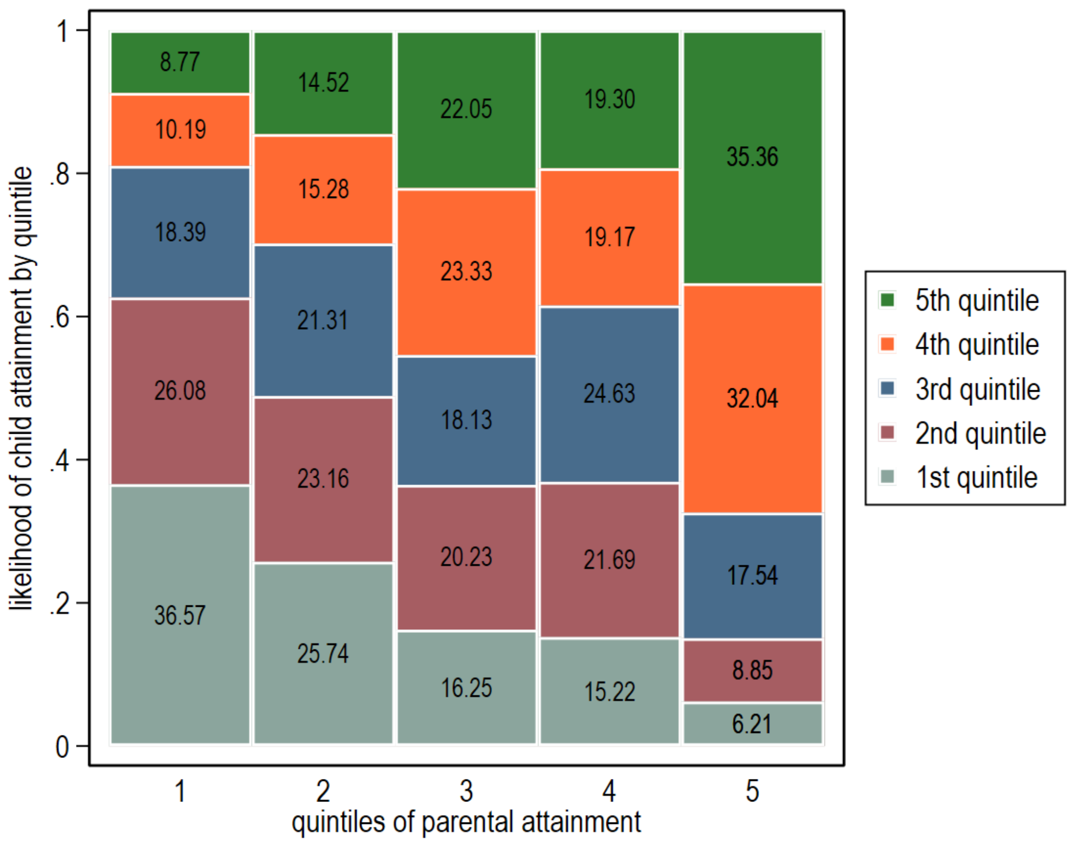


Figure A9: Cumulative distribution of the sample size at the municipality level

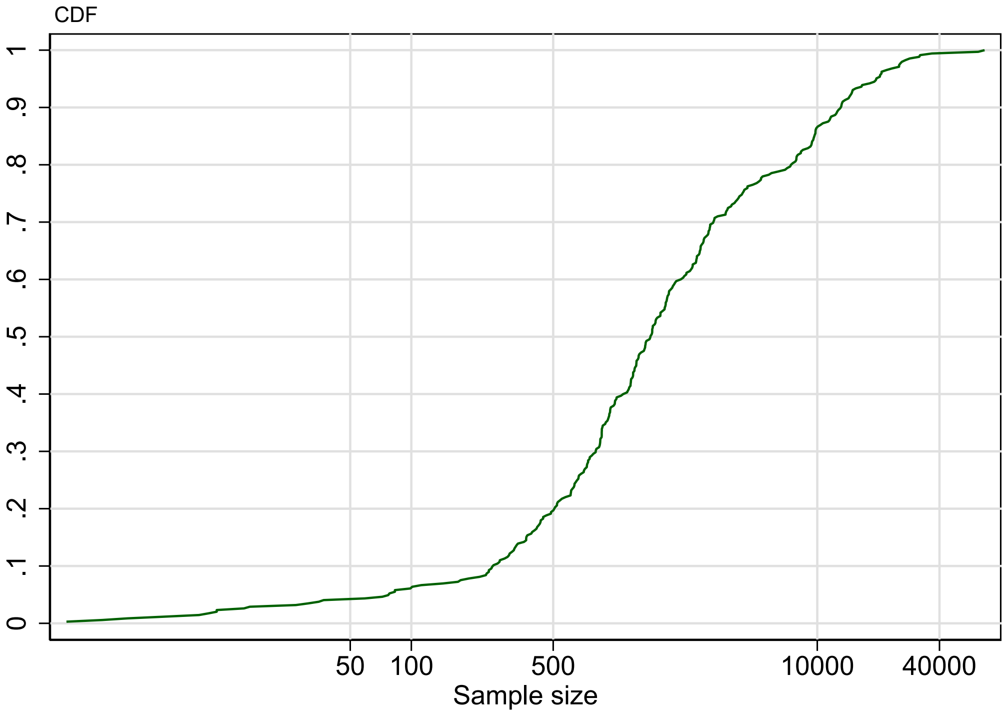
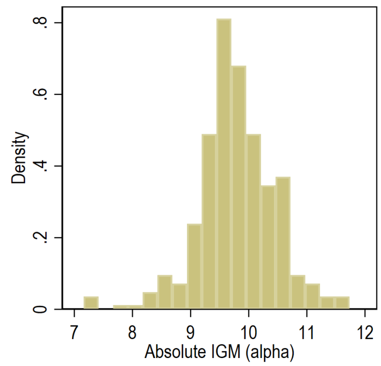
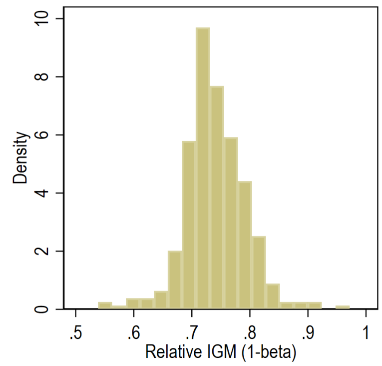


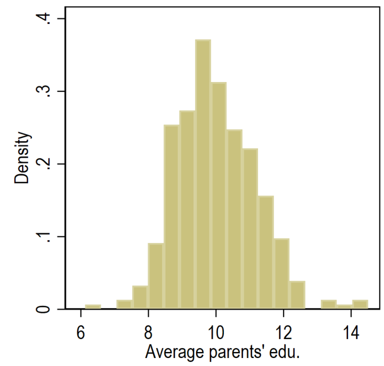
Figure A10: Distribution of municipality-level estimates



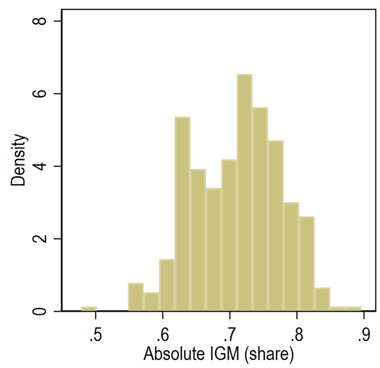
(a) Absolute IGM (α)



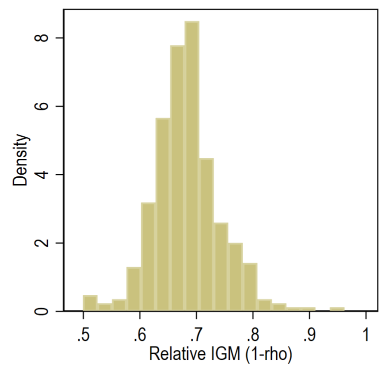
(b) Relative IGM ($1 - \beta$)



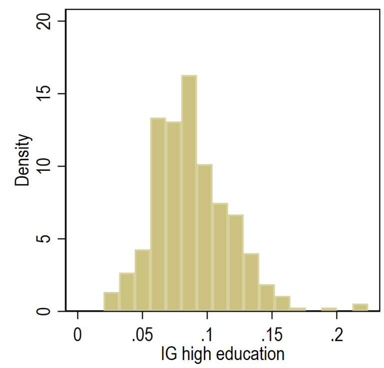
(c) Average education ($\bar{Y}$)



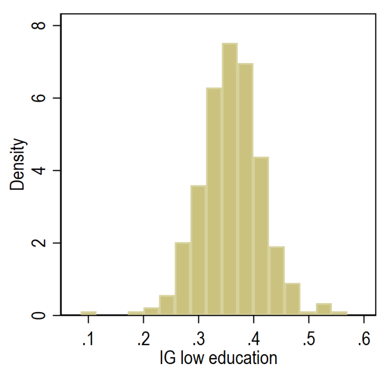
(d) Above parent ($\bar{y}^{\geq}$)



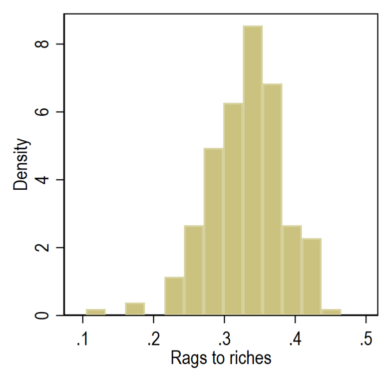
(e) Relative IGM ($1 - \rho$)



(f) Rags to riches ($P_{1,5}$)



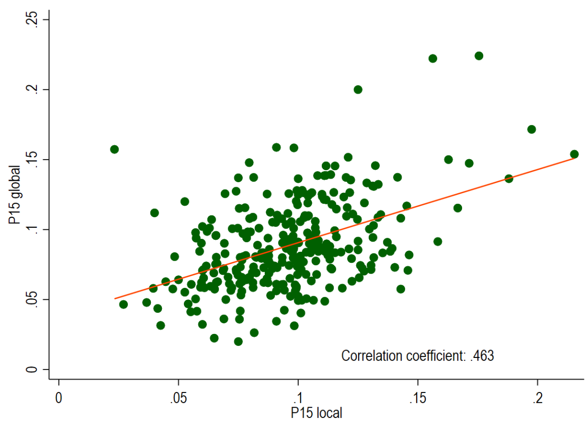
(g) Intergenerational low ($P_{1,1}$)



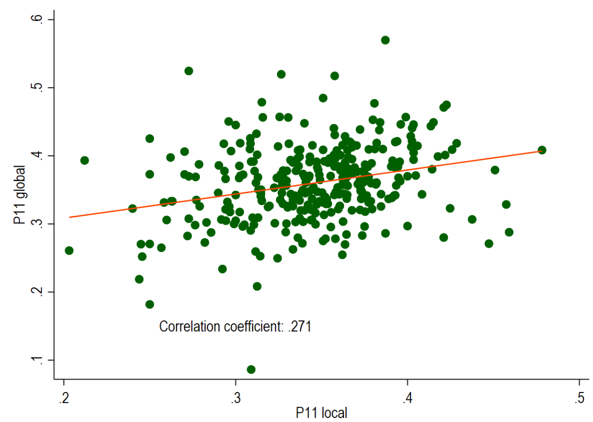
(h) Intergenerational high ($P_{5,5}$)

These histograms show the distribution of the municipality-level estimates estimated with a sample of individuals of age 21-25 omitting municipalities with less than 50 individuals. For details about the indicators see Table 2.

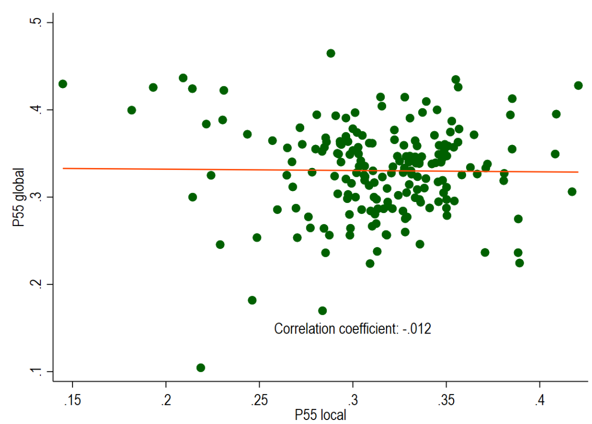
Figure A11: Comparison of indicators using country level distribution of educational attainment vs. local distribution



(a) Rags to riches ($P_{1,5}$)



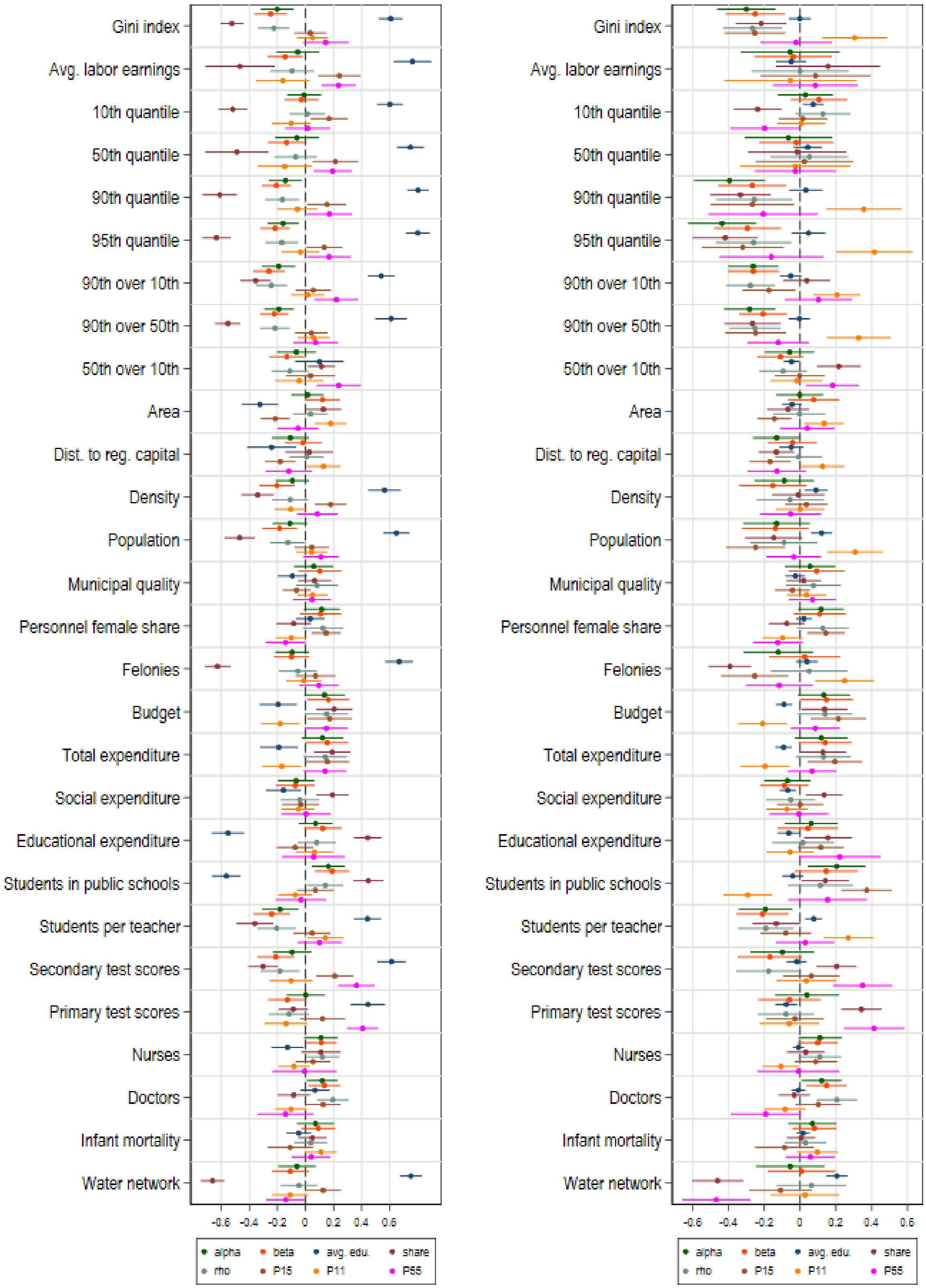
(b) Intergenerational low ($P_{1,1}$)



(c) Intergenerational high ($P_{5,5}$)

The figure compares estimates of rags to riches, intergenerational low, and intergenerational high measures computed using quintiles based on country-level educational attainment versus municipality-level attainment (denoted local). Each uses a sample of individuals of age 21-25 omitting municipalities with less than 50 individuals. For details about the indicators see Table 2.

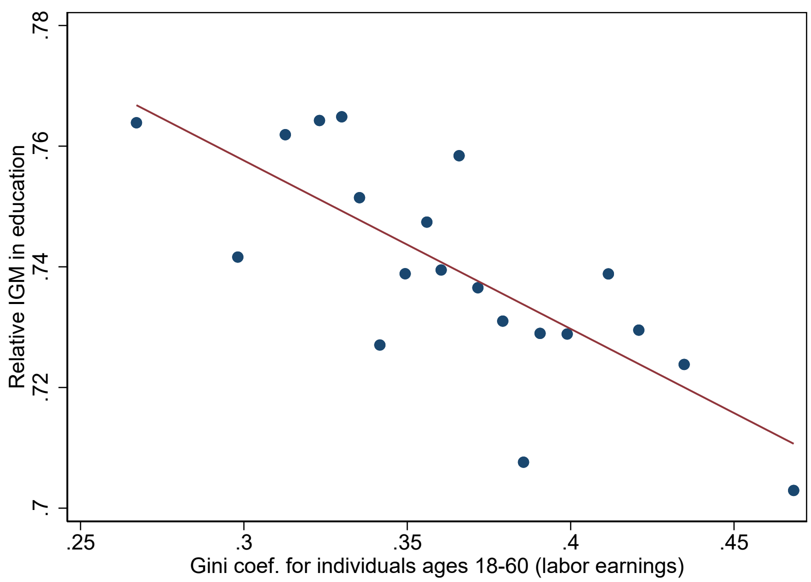
Figure A12: Correlates of the IGM at the municipality-level (all the indicators)



(a) Unconditional

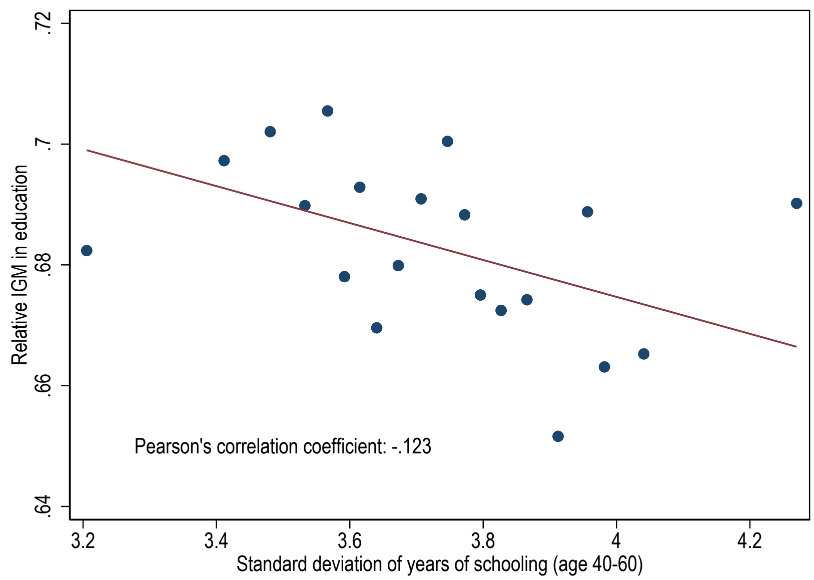
(b) Conditional on education of old cohorts

Figure A13: Intergenerational mobility in education vs. income inequality



Notes: The figure shows a binscatter plot between relative IGM (measured as one minus the regression coefficient between child's years of schooling against parents' years of schooling) and the Gini coefficient computed using labor earnings in 2010 of individuals ages 18-60. Educational attainment is censored at 15 and the sample includes individuals with age between 21 and 25. Municipalities with less than 50 observations are not included.

Figure A14: Intergenerational mobility in education vs. inequality in education



Notes: The figure shows a binscatter plot between relative IGM (measured as one minus the Pearson correlation coefficient between child's years of schooling against parents' years of schooling) and the standard deviation of years of schooling computed using individuals ages 40-60 that are used as parents. Educational attainment is censored at 15. Municipalities with less than 50 observations are not included.

Table A4: Region-level estimates of IGM Statistics

Region	$P_{1,5}$	$P_{1,5}^{local}$	$P_{1,1}$	$P_{1,1}^{local}$	$P_{5,5}$	$P_{5,5}^{local}$
Tarapacá	0.10	0.11	0.37	0.33	0.32	0.31
Antofagasta	0.08	0.10	0.40	0.36	0.31	0.33
Atacama	0.07	0.10	0.40	0.34	0.29	0.36
Coquimbo	0.07	0.08	0.38	0.34	0.32	0.31
Valparaíso	0.09	0.10	0.35	0.36	0.34	0.33
Libertador General Bernardo O'Higgins	0.10	0.10	0.34	0.34	0.31	0.31
Maule	0.09	0.09	0.36	0.37	0.32	0.31
Biobío	0.11	0.09	0.33	0.36	0.37	0.32
Araucanía	0.07	0.07	0.38	0.39	0.37	0.36
Los Lagos	0.07	0.08	0.41	0.38	0.31	0.32
Aysén del General Carlos Ibáñez del Campo	0.05	0.09	0.44	0.35	0.23	0.32
Magallanes y de la Antártica Chilena	0.10	0.10	0.30	0.31	0.30	0.33
Metropolitana de Santiago	0.09	0.09	0.37	0.36	0.36	0.36
Los Ríos	0.06	0.06	0.38	0.37	0.34	0.35
Arica y Parinacota	0.14	0.14	0.28	0.30	0.31	0.32
Ñuble	0.11	0.09	0.33	0.35	0.36	0.27

The table reports region-level estimates of rags to riches, intergenerational low, and intergenerational high (a description of the measures can be found in Table 2). It compares measures that assign individuals into quintiles using the distribution of educational attainment at the country level with measures that use the distribution of each region (those with the superscript "local").

Table A5: Correlates of intergenerational mobility. All the indicators.

	Relative mobility $(1-\beta)$	Absolute mobility (α)	Average education $(\bar{Y})$	Relative mobility $(1-\rho)$	Above parents $(\bar{y}^{\geq})$	Rags to riches $P_{(1,5)}$	Intergen. low $P_{(1,1)}$	Intergen. high $P_{(5,5)}$
Gini index	$\otimes$	$\otimes$	$\times$	$\otimes$	$\otimes$	$\circ$		
Avg. labor earnings	$\times$		$\times$		$\times$	$\times$		$\times$
10th quantile			$\otimes$		$\otimes$	$\times$		$\circ$
50th quantile	$\times$		$\times$		$\times$	$\times$		$\times$
90th quantile	$\otimes$	$\otimes$	$\times$	$\otimes$	$\otimes$	$\otimes$		$\times$
95th quantile	$\otimes$	$\otimes$	$\times$	$\otimes$	$\otimes$	$\otimes$		$\times$
90th over 10th	$\otimes$	$\otimes$	$\times$	$\otimes$	$\times$	$\circ$		$\times$
90th over 50th	$\otimes$	$\otimes$	$\times$	$\otimes$	$\otimes$			
50th over 10th	$\times$		$\otimes$		$\otimes$	$\times$		$\circ$
Area			$\times$			$\otimes$	$\otimes$	
Dist. to reg. capital			$\times$		$\circ$	$\otimes$	$\otimes$	
Density	$\times$		$\otimes$		$\times$			
Population	$\times$		$\otimes$	$\times$	$\times$	$\circ$		
Municipal quality (prof)								
Personnel female share						$\otimes$		
Felonies			$\times$		$\otimes$	$\circ$		
Budget	$\times$		$\otimes$		$\otimes$	$\times$	$\times$	
Total expenditure	$\times$		$\otimes$		$\times$			
Social expenditure			$\otimes$		$\otimes$			
Educational expenditure			$\times$		$\otimes$			
Students in public schools	$\times$	$\otimes$	$\times$	$\times$	$\otimes$	$\circ$		
Students per teacher	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\times$	$\times$		
Secondary test scores	$\times$		$\times$	$\times$	$\times$	$\otimes$		$\otimes$
Primary test scores			$\otimes$		$\circ$			$\times$
Nurses	$\times$		$\times$	$\times$				
Doctors	$\otimes$	$\otimes$		$\otimes$		$\times$		
Infant mortality								
Water network			$\otimes$		$\otimes$			$\times$

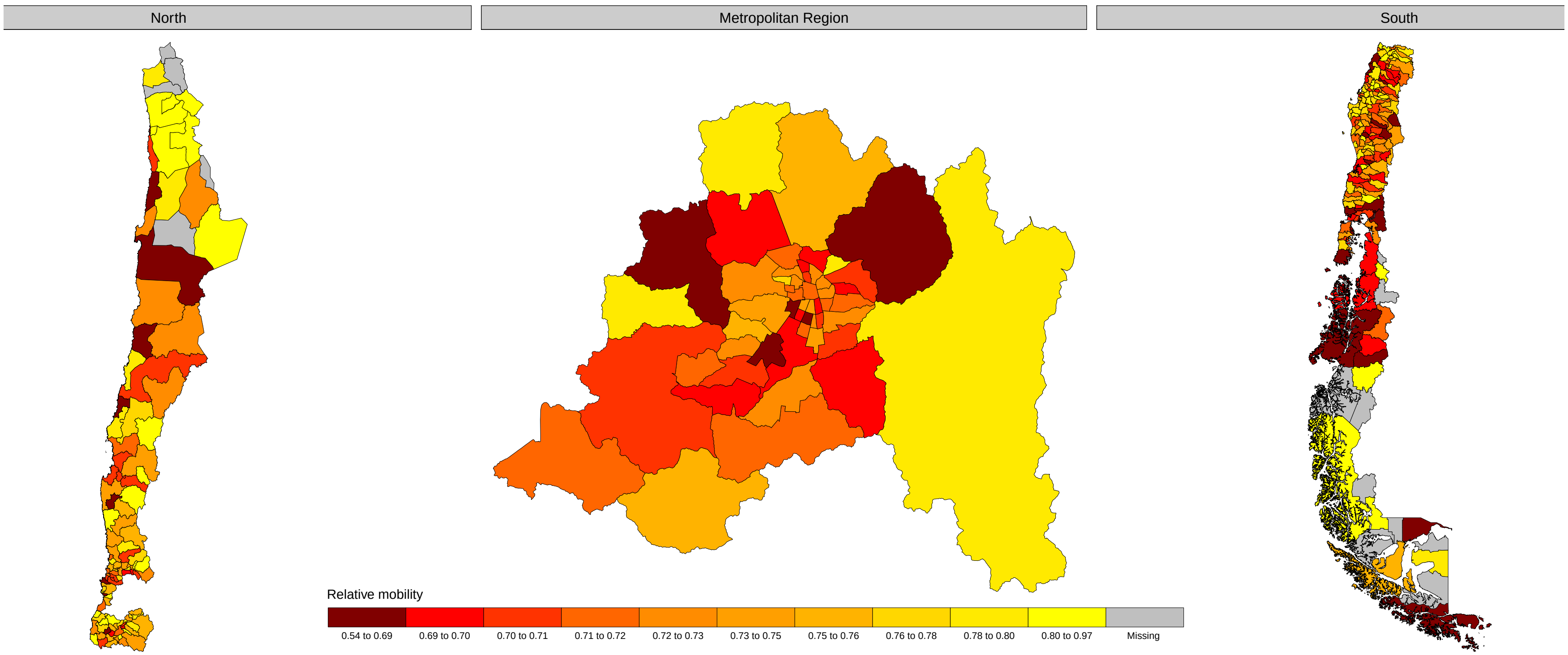
Notes: The table reports the statistical significance (at the 5% level) of the coefficients from regressions with an indicator of intergenerational mobility at the municipality level (standardized to have mean 0 and variance 1) as the dependent variable and a given correlate (standardized to have mean 0 and variance 1) as the independent variable (labeled as unconditional model), and the coefficients from the same regression controlling for average education of the older cohorts (labeled as conditional model). $\times$ if statistically significant in unconditional model. $\circ$ if statistically significant in conditional model. $\otimes$ if statistically significant in both models.

Table A6: LASSO variable selection across IGM indicators

	Relative mobility $(1-\beta)$	Absolute mobility (α)	Average education $(\bar{Y})$	Relative mobility $(1-\rho)$	Above parents $(\bar{y}^{\geq})$	Rags to riches $P_{(1,5)}$	Intergen. low $P_{(1,1)}$	Intergen. high $P_{(5,5)}$
Gini index						×		
Avg. labor earnings								
10th quantile								
50th quantile					×	×		×
90th quantile								
95th quantile								
90th over 10th	×	×		×	×			
90th over 50th				×				
50th over 10th					×			
Area	×			×	×	×	×	×
Dist. to reg. capital		×			×	×		×
Density	×		×			×		×
Population			×					
Municipal quality (prof)	×	×		×	×	×		
Personnel female share	×	×		×	×	×		
Felonies					×	×		×
Budget	×	×		×		×		
Total expenditure								
Social expenditure				×	×	×		
Educational expenditure						×		
Students in public schools	×	×		×	×	×		
Students per teacher	×	×		×				
Secondary test scores					×	×		×
Primary test scores	×			×	×			
Nurses	×	×		×	×	×		
Doctors	×	×		×		×		
Infant mortality					×	×		
Water network	×	×	×	×	×			

Notes: The table presents the variables selected with a LASSO estimation using the optimal value of λ, highlighting the set of correlates that remain nonzero after regularization for each indicator of intergenerational mobility.

Figure A15: Intergenerational educational mobility within Chile



(a) Relative mobility by municipality - Chile, 2017

Notes: The map plots relative IGM measured as one minus the regression coefficient (by municipality) between child's years of schooling (using age between 21 and 25) against parents' years of schooling. Educational attainment is censored at 15. Municipalities with less than 50 observations are left as missing.