Socioeconomic Gradients in Test Scores across Latin American and the Caribbean

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In this paper we document gaps in math and reading achievement between children whose mothers have completed at least upper secondary education and those who have not, using test scores from third and sixth graders across multiple countries in LAC, in 2006 and 2013. There are substantial differences across countries in these gaps, and there are also differences in how they change over time. Interestingly, differences in these gaps are not correlated with differences in income inequality across countries. They are however strongly correlated with the levels of socio-economic segregation across schools in different countries.

KEYWORDS

Intergenerational Mobility, Inequality, Education, Human Capital

Gradientes socioeconómicos de resultados de exámenes a lo largo de América Latina y el Caribe

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En este trabajo documentamos brechas en el rendimiento en matemática y lengua entre niños cuyas madres completaron como mínimo la escuela secundaria superior y aquellas que no lo hicieron, utilizando resultados de exámenes de estudiantes de tercer y sexto grado en 2006 y 2013 a lo largo de múltiples países de América Latina y el Caribe. Estas brechas presentan diferencias sustanciales entre países, así como también se evidencian diferencias en la evolución de las mismas. La disparidad entre las brechas no se correlaciona con differencias en la desigualdad del ingreso a través de los países. Sin embargo, ésta si se encuentra fuertemente correlacionada con los niveles de segregación económica entre escuelas en diferentes países.

KEYWORDS

Movilidad intergeneracional, Desigualdad, Educación, Capital Humano

1 | INTRODUCTION

A large body of work documents substantial disparities in intra- and inter-generational inequality across countries. Countries in Latin America and the Caribbean (LAC) typically come out with some of the highest levels of inequality and some of the lowest levels of intergenerational transmission in the world (Ferreira and Schoch, 2020; Torche, 2021). This pattern is consistent with the Great Gatsby curve (e.g., Corak (2013)), which shows a negative correlation between intergenerational mobility and inequality across countries.

Human capital is often seen as an important mechanism underlying the intergenerational transmission of economic status (e.g., Becker and Tomes (1979, 1986)). This has inspired several researchers to examine cross-country differences in the intergenerational transmission of human capital, typically schooling. In a recent paper, Torche (2021) shows that as the result of schooling expansions, the intergenerational transmission of education has declined substantially in LAC, although it remains at very high levels.

In this paper, we examine socioeconomic gradients in test scores across LAC countries, using internationally standardized assessments in math and language, given to third and sixth graders in 2006 and 2013. Our analysis is focused only on LAC countries. We use the data collected by The Latin American Laboratory for Evaluation of the Quality of Education (LLECE) run by UNESCO Santiago to monitor the progress and learning of primary school students in Latin America. The LLECE data consists of comparable learning assessments students in grades 3 to 6 across countries in LAC, as well as information on students' families and home environments.

We show that, within the region, there are large disparities in socioeconomic gradients in learning across countries, as well as significant changes over time in these gradients. Our main measure of socioeconomic gaps in learning corresponds to average differences in ranks in the distribution of test scores between students whose mothers have and have not completed upper secondary schooling, typically called relative mobility.[1] As a complementary measure, we also look at differences across countries in the average performance of students whose mothers have not completed upper secondary schooling, which is sometimes called absolute mobility (although this term is most typically used to refer to the proportion of individuals whose outcomes, namely earnings, are better than those of their parents).

In 2006, the countries with the lowest levels of relative mobility were Argentina, Brazil, Chile and Peru. By 2013, mobility was much higher in Argentina, Brazil and Chile, although Peru remained one of the least mobile countries in LAC. In contrast, among the most mobile countries in 2006 are Nicaragua and the Dominican Republic (and Cuba, which is not observed in 2013), and they remain amongst the most mobile countries in LAC in 2013.

Interestingly, within LAC, those countries with the highest levels of inequality are not the ones with the highest socioeconomic gradients in test scores, in spite of the fact that, within LAC, countries with high cross sectional inequality are generally perceived to have the lowest levels of intergenerational mobility (Ferreira and Schoch, 2020).[2] This suggests that inequality alone is not likely to be an important factor in understanding what drives socioeconomic gaps in education achievement.

We also find that some countries experience substantial changes in socioeconomic gradients in test scores, or achievement mobility, even within the short period we examine, from 2006 to 2013. Colombia and Uruguay are among the countries experiences some of the largest decreases in mobility, while Argentina, Brazil and Chile experience the largest increase in mobility between these two years.

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[1] In order to compute ranks we take all students in the sample, regardless of country, and then calculate their percentile in the distribution of test scores in the whole sample. We have separate ranks for math and reading.

[2] This is consistent with similar findings from Europe, as shown in Carneiro et al. (2021).

Our goal in this paper is essentially to describe cross country and over time differences in socioeconomic gaps in learning. There are several reasons why it is important to document cross country differences in mobility. One is obviously benchmarking, as countries can compare themselves to each other. Perhaps more important, cross country differences in mobility can help us learn about the determinants of intergenerational mobility.

In the next section we describe the Data we use, which comes from the Latin American Laboratory for Evaluation of the Quality of Education (LLECE). Then we discuss the measures of socioeconomic gaps in learning that we focus on in this paper. We proceed by presenting our findings about the levels in changes in socioeconomic gradient in test scores in LAC. We finally conclude with a summary of our findings and a description of our future research on this topic.

2 | DATA

The Latin American Laboratory for Evaluation of the Quality of Education (Laboratorio Latinoamericano de Evaluacion de la Calidad de la Educacion) or LLECE in short is an initiative run by UNESCO Santiago which monitors the progress and learning of primary school students in Latin America. One of its initiatives is to give comparable learning assessments students in grades 3 to 6 across countries in LAC. It conducted 3 testing waves so far: PERCE (1997), SERCE (2006), TERCE (2013). A fourth wave, ERCE, was delayed due to COVID-19.

Tests are structured to measure life-skills (as UNESCO recommends), and thus designed to take into account the knowledge, skills, and abilities that Latin American students should learn to become active members of society. Similarly to PISA, they measure competence in reading and writing, mathematics and natural sciences (in some countries, for 6th grade only). Unfortunately not all of these waves produced results which are comparable, which forces to drop PERCE from the analysis in this paper.[3] This leaves us with SERCE and TERCE, which are comparable. In the following paragraphs, we will discuss in more detail each wave of the LLECE tests.

2.1 | SERCE data

SERCE evaluated the learning of 100,752 third-grade and 95,288 sixth-grade students from 16 Latin American countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Uruguay and the Mexican state of Nuevo Leon. Additionally, SERCE collected information

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[3]The PERCE study was conducted in 13 countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Honduras, Mexico, Paraguay, Peru, Dominican Republic and Venezuela) and it evaluated mathematics and language in the third and fourth grades of primary education. The primary goal of PERCE was to help answer the following questions related to public education in Latin America: (What do students learn? What is the level at which the students learned the aspects of language and mathematics? What skills have they developed as a result of their learning? When (in which grade/point in their life) does the learning happen?) The sample was obtained using stratification among two dimensions: demographic (/large urban/urban/rural schools) and administrative (public/private schools). Sampling begun on a per school level, with each school having a probability of selection proportional to its size. After a school was selected into the sample, 20 students were randomly selected from both 3rd and 4th grade to take part in PERCE. This yielded a total of 54,589 students taking the PERCE language test and 54,417 students taking the PERCE mathematics test. PERCE also employed different sample exclusion restrictions for each country (a detailed overview can be found in Table 6 of the PERCE technical report). Unfortunately, the results of PERCE are not comparable to those in later waves (SERCE, TERCE, ERCE) since PERCE used different sampling methods, and calculated students' test results differently than later waves. PERCE is therefore not object of this study.

TABLE 1 Participation of Latin American countries in LLECE surveys from 1997 to 2019

Country	PERCE (1997)	SERCE (2006)	TERCE (2013)	ERCE (2019)
Argentina	✓	✓	✓	✓
Bolivia	✓			✓
Brazil	✓	✓	✓	✓
Chile	✓	✓	✓	✓
Colombia	✓	✓	✓	✓
Costa Rica	✓	✓	✓	✓
Cuba	✓	✓		✓
Dominican Republic	✓	✓	✓	✓
Ecuador		✓	✓	✓
El Salvador		✓		✓
Guatemala		✓	✓	✓
Honduras	✓		✓	✓
Mexico	✓	✓	✓	✓
Nicaragua		✓	✓	✓
Panama		✓	✓	✓
Paraguay	✓	✓	✓	✓
Peru	✓	✓	✓	✓
Uruguay		✓	✓	✓
Venezuela	✓			

Source: https://es.unesco.org/fieldoffice/santiago/projects/llece. ERCE was postponed due to Covid.

about students, their families, their teachers, and their schools, which allows us to uncover which student, family and school factors are most associated with learning.

The sampling universe was defined at the country-level for each participating country. Then, the sample was divided into three parts: rural schools, public urban schools and private urban schools (except for Cuba where private education is banned). Given that there were around 20 million students in 3rd and 6th grade at the time SERCE was conducted, representative samples were drawn. The sampling unit was the school (i.e.: once a school was selected for a grade into the sample, all 3rd and 6th grade classes in that school took part in the test). The sampling frame for each country was made up of schools that have classes for 3rd and 6th grade students. To enhance the representativeness of the sample, a priori stratification was used with the following three categories: type of school management and geographic area, school size, relationship between 3rd and 6th grade enrolment.

SERCE employed many exclusion restrictions based on school characteristics. Special schools (those exclusively for students with special needs), adult education and alternative education which is not formal or not in person was not included in the sampling as they are not part of the examined universe. For cost effectiveness reasons, schools with less than 6 people enrolled or schools where less than 50% of the class was expected to show up on the day of the test were excluded from the sample. To ensure compliance, once a school was selected, information about effective attendance was requested from the national education bodies. If the school did not pass the criteria above, a replacement was drawn from the sample to take the test instead. Students with mother tongue other than Spanish or Portuguese and those who were taught for less than 2 years in Spanish or Portuguese were also excluded from taking the test. 3rd graders in schools offering tuition in an indigenous language were also excluded. Finally, schools where less than 50% of the test takers regularly attend classes are also excluded.

The SERCE testing was done using pen and paper, the format of questions varied depending on the subject. For example, no questions used open-ended response in the reading evaluation, but some mathematics or natural science questions required students to

structure their own answers. Depending on the subject area, a total of 66 to 96 questions were divided into six blocks. Then, two of these blocks were selected into a booklet. Students received one of these booklets (each containing 22-32 questions) and had 60 minutes to solve the exercises in the booklet.

The SERCE databases include several variables on different factors, as we can see in Table 2.

TABLE 2   Overview of data contained in SERCE databases

Factor	Variables
Student characteristics	Sex, age, mother tongue, preschool education, school entry age, grade repetition, work, reading habits, attitude towards evaluated areas and school
Family characteristics	Parental education, home living conditions, utilities at home, index of asset possessions at home, floor at home, educational materials and number of books
School teacher/director characteristics	Gender, age, years of experience, training, teaching area, information about position (appointment, hours, contract type etc.), perception of salary, professional development, satisfaction with school, desire to be relocated, number of books at home, computer usage
School characteristics	Location (rural/urban), number of students and teachers, language of instruction, teaching resources available (textbooks, computers, library etc.), public/private/mixed management, autonomy, presence of school council
Factors associated with the educational process	Time of learning, length of classes, number of teaching hours per week and subject, curriculum coverage, type of text and exercises that students use, class assignment, etc.) conflicts and discipline in the classroom, parental involvement (school council, teacher knowledge etc.)

Source: SERCE technical report pages 42-44

2.2 | TERCE data

TERCE evaluated the learning of 195,752 students from 15 Latin American countries and Nuevo León, a state in Northern Mexico. TERCE assessed learning in the disciplines of language (reading and writing) and mathematics of third- and sixth- grade students in primary school and natural sciences of sixth-grade students. Similar to SERCE, 5 context questionnaires were designed to collect information on factors associated with learning achievements. Moreover, 5 countries, namely Costa Rica, Ecuador, Guatemala, Paraguay and Uruguay, developed national modules which complemented the regional studies by addressing questions on educational policies of national interest and were added to the context questionnaires. National modules allowed a more detailed study of the factors affecting learning which are specific to each country. For instance, the national module for Costa Rica studies the impact of the use of ICT on educational quality.

TERCE used a stratified proportional to size random-sampling procedure as in SERCE. However, there are modifications to the sampling frame in TERCE's sampling approach. One of the key differences between SERCE and TERCE was the non-exclusion of students whose mother tongue was not Spanish for representing the reality of the education systems as accurately as possible. Moreover, the number and type of strata are different in TERCE. The stratification variables are defined as follows:

1. Administrative unit: public and private administration.
2. Area: rural and urban schools, defined by each country.
3. Grades in school: Schools with only third grade, with only sixth grade and with third

and sixth grades.

The sampling procedure in TERCE has two stages. In the first stage, schools are selected (in each explicit stratum) with a probability proportional to their size. In the second stage, a classroom is randomly selected. Hence, unlike SERCE, only students in one of the classrooms in the schools selected were invited to take the test in TERCE for cost saving purposes. Regarding the exclusion criteria, the smallest 2% of the schools in terms of the average number of students per classroom was excluded in TERCE after making the trade off between the costs involved in applying the tests to those schools and the benefits that it contributes to the validity of the tests results. Oversampling is used in cases where the country was participating in the project, "TERCE National Modules", where the sampling error of relevant sub-populations exceeded 10 test points, and where the over-representation of a sub-group of the population in a country was considered as a "plus" for the analysis (e.g. indigenous population). To restore proportionality which is affected by oversampling, sample weights are used in the analysis.

The TERCE tests were in pen and paper. In each test, there were multiple-choice questions and 7% to 9% of open questions. Depending on the subject of the test and grade in which the student was, a student had a maximum of 45 to 70 minutes to answer the questions in a booklet. In each test, each student answered a booklet of questions. Each booklet was made up of two blocks of questions. Each block had 11 to 16 questions. Six booklets were assembled and two of the blocks came from SERCE and those are called "anchor blocks" which ensure the comparability between SERCE and TERCE test results.

A total of 5 Context Questionnaires using multiple-choice questions were designed for each of the main actors in the educational systems. Information on associated factors was collected through the following context questionnaires:

- Third-grade and sixth-grade student questionnaire: These questionnaires were answered in person by students who participated in the third- and sixth-grade TERCE tests. They contained questions on the educational aspects at home, learning processes and strategies in the classrooms, recreational activities and availability of materials.
- Family questionnaire: These questionnaires were answered by a family member or tutor of the student. They contained questions on socioeconomic aspects of home environment, educational habits at home, among others.
- Teacher questionnaire: These questionnaires were answered by the teachers of the students. They contained questions on the quality of teachers' work environment, teachers' motivation, the monitoring and feedback of teachers' performances, among others.
- Director/Principal questionnaire: These questionnaires are answered by the directors or principals of the institutions participating in TERCE. It contained questions on the infrastructure and administrative autonomy of the school, among others.

2.3 | Comparability of SERCE and TERCE

SERCE and TERCE tests were applied to different groups of students, with different questions (at least a proportion of them) and at different points in time so it is expected that they to some extent differ in terms of difficulty. Procedures of equalization of difficulties within the framework of Item Response Theory (IRT) were thus carried out to ensure the comparability of the results from SERCE and those from TERCE. The test specifications of SERCE were used as one of the inputs in devising those of TERCE. This means that the aforementioned equating process makes sense as the contents of the tests, or the test

specifications were the same and the equating procedures were aimed at solving problems on variations of the difficulty of the tests but not correcting for variations in their contents. Moreover, there were items common to measurements of both TERCE and SERCE tests which act as a bridge between the results obtained from the population in SERCE and TERCE. These items are the "anchor blocks" (2 in each test).

A concurrent calibration within the framework of IRT was conducted as the equating process. Comparing with the separate calibration, it has the main advantage of being able to make the maximum use of information for estimating the parameters. By using a concurrent calibration procedure, it is possible to compute a new estimation of student achievement in both SERCE and TERCE measures, which must be re-scaled from the logit scale to the scale reported in SERCE, thus facilitating the reading and understanding of comparable results. The concurrent calibration procedure was performed using the same SERCE calibration program (Winsteps) to ensure that the modeling process was the same (the same mathematical specifications of the statistical models and the same processes of estimating its parameters) as that in SERCE. In this equating process, the steps performed are as follows:

1. The TERCE measurement was calibrated separately, using the sample weights of the sample of students that satisfy the SERCE exclusion criteria. Calibration was done in Winsteps with a Rasch model.
2. SERCE and TERCE were jointly calibrated, using the senate sample weights and including all available information (all participating countries in and all the items of both tests) in the model. With the parameters on the difficulty of the items in this calibration, the ability of the students in both studies was estimated.
3. The examinees were selected from the countries that participated in both tests. Afterwards, new regional results were estimated for SERCE and for TERCE which were already matched. The mean difference between the IRT scores in the SERCE and that in the TERCE populations were obtained from the joint calibration. This value corresponds to the actual difference in terms of performance in both measurements on the scale of the concurrent calibration. Finally, this difference was used to position the scores of the TERCE results on the SERCE logit scale. The TERCE results on the SERCE logit scale were then transformed to the reporting scale according to same transformation used in the SERCE.

There are 6 data files on the test scores of language (reading and writing) and mathematics of third- and sixth- grade students after performing the concurrent calibration procedure in the TERCE databse. They are used for the analysis in this paper since they ensure the comparability between TERCE and SERCE results and can be used to answer research questions such as "how much has the performance of students changed from the SERCE study to date?"

A link error is the variability induced by the equating procedure. This error is denoted as σ^2_{link} and is included in the standard error of the difference of the mean scores between both SERCE and TERCE measurements for each country k, as shown in the following equation:

$$se_k^2 = se^2_{k(SERCE)} + se^2_{k(TERCE)} + \sigma^2_{link} \tag{1}$$

where se_k^2 is the standard error of the difference between SERCE and TERCE measurements by country, $se^2_{k(SERCE)}$ and $se^2_{k(TERCE)}$ are respectively the standard error of the country's mean scores in SERCE and that in TERCE. The link error influences the significance

of the difference but its value is low relative to the standard errors of the mean scores $se^2_{k(SERCE)}$ and $se^2_{k(TERCE)}$. Therefore, it has no real effect on the conclusions obtained.

2.4 | Measuring Socioeconomic Background

In principle there are several measures of socioeconomic background one could construct. The family questionnaires have information on parental education and some measures of household wealth. In this paper we focus on parental education as our main measure of socioeconomic background. Following the literature, and to maximize the sample size, we take the maximum observed education across both parents.

The most standard education classification in OECD countries is the ISCED classification, described in Table 3. However, the LLECCE assessment databases use instead the CINE classification in Table 4. Moreover, the SERCE and TERCE surveys group the CINE categories slightly different, as we can see in Tables 5 and 6. Therefore, in our paper, we make these comparable by grouping parents in one of four categories according to their level of education, following the procedure in Table 7.

The outcome of this exercise is shown for mothers in Tables 8 and 9. Across years, countries such as Guatemala and Nicaragua display the lowest levels of education, while Argentina, Chile or Panama appear consistently on top. Some countries, like Colombia, see dramatic increases in the education of the parents of the children taken these tests.

Some of the figures are admittedly surprising. For example, it is surprising to see the massive amount of mothers in Guatemala who report no education in the 2006 survey, and how much lower it is in 2013. It is also surprising to see what happens in Colombia, for example. That said, we are confident that our analysis does not have substantial measurement error in parental education for two main reasons. First, we group these education categories in only two: below upper secondary education, and at least upper secondary education. By aggregating categories, we are likely to have less error. Second, in Figure 1 we compare the proportion of mothers with completed secondary education in both years in our data, with the proportion of females aged 25 or above with completed secondary education using the education database from the World Bank. Mothers are more educated on average in the LLECE than in the World Bank databases, but that is not surprising, since they are younger on average in the LLECE database given that the World Bank database includes a large number of older women, belonging to older and more uneducated cohorts. What is remarkable in this figure is the correlation between these two measures, which is almost 0.78. This is true in the cross section but also over time (Figure 2). For example, notice that Guatemala experiences large increases in education in both the LLECE and the World Bank databases, and so does Colombia. Third, we will measure socioeconomic background by taking the maximum education across both of the child's parents, and then make it into a dichotomous variable. A similar approach is adopted by

TABLE 3 ISCED levels

Level	ISCED
0	None
1	ISCED 1 (primary education)
2	ISCED 2 (lower secondary)
3	ISCED Level 3B or 3C (vocational/pre-vocational upper secondary)
4	ISCED 3A (upper secondary) and/or ISCED 4 (non-tertiary post-secondary)
5	ISCED 5B (vocational tertiary)
6	ISCED 5A, 6 (theoretically oriented tertiary and post-graduate)

TABLE 4 CINE levels

Level	CINE
	No tiene estudios (No studies)
P1	CINE-P1 (primary education)
P2	CINE-P2 (lower secondary)
P3	CINE-P3 (upper secondary)
P4	CINE-P4 (non-tertiary post-secondary)
P5	CINE-P5 (Short-cycle tertiary)
P6	CINE-P6 (tertiary or equivalent)
P7	CINE-P7 (Master's, specialization or equivalent)
P8	CINE-P8 (Doctorate or equivalent)

Source: TERCE technical report pp.275/410 http://uis.unesco.org/sites/default/files/documents/isced-2011-sp.pdf and http://uis.unesco.org/en/topic/international-standard-classification-education-isced

TABLE 5 Code of education levels in question qf_item_2_a and qf_item_2_b in the family questionnaire in SERCE

Code	Description
1	No estudio (no studies)
2	Primaria incompleta (primary education incomplete)
3	Primaria completa (primary education)
4	Secundaria o media incompleta (secondary education incomplete)
5	Secundaria o media completa (secondary education)
6	Superior o universitaria incompleta (university incomplete)
7	Superior o universitaria completa (university or higher)

Source: SERCE family questionnaire and technical report. Note: the questionnaire asks for both fathers' (ending with a) and mothers' (ending with b) highest level of education.

TABLE 6 Code of CINE levels in question dqfit09_01 and dqfit09_02 in the family questionnaire in TERCE

Code	CINE
1	No tiene estudios (No studies)
2	CINE-P 1-2 (primary education and lower secondary)
3	CINE-P 3 (upper secondary)
4	CINE-P 4-5 (non-tertiary post-secondary and short-cycle tertiary)
5	CINE-P 6 (tertiary or equivalent)
6	CINE-P 7-8 (Master's, specialization or equivalent, and Doctorate or equivalent)

Source: TERCE technical report pp.275/410. Note: Question dqfit09_01 and dqfit09_02 respectively ask about the highest education level completed by each student's father and mother.

TABLE 7 Our classification of levels of education in SERCE and TERCE family questionnaires

Name	Category SERCE	Category TERCE	$\mathbb{1}$(at least upper secondary)	$\mathbb{1}$(at least post secondary)
No primary education	1, 2	1	0	0
Primary + lower secondary education	3, 4	2	0	0
Upper secondary (high school) education	5	3	1	0
At least post secondary education	6, 7	4, 5, 6	1	1

Note. This categorization was employed to make our results from the PISA dataset comparable to these figures. For Category SERCE and TERCE, please refer to Table 5 and Table 6 respectively.

TABLE 8 Percentage of mothers by education level per grade - SERCE (2006)

Country Name	Grade 3					Grade 6				
	None	Pri	Sec	Uni	Count	None	Pri	Sec	Uni	Count
Argentina	2.49	39.39	36.70	21.42	4,552	2.09	38.32	35.90	23.70	4,441
Brazil	12.27	56.59	22.93	8.21	4,775	11.32	57.27	21.70	9.71	4,579
Chile	1.09	24.20	47.98	26.72	4,690	1.63	28.21	47.06	23.09	5,394
Colombia	19.68	43.78	22.61	13.93	4,808	19.08	38.19	25.18	17.55	5,138
Costa Rica	5.23	47.66	29.09	18.03	3,559	4.12	45.14	31.62	19.12	2,857
Dominican Republic	12.53	42.48	25.61	19.39	2,898	7.57	36.69	29.01	26.74	2,664
Ecuador	6.51	40.44	35.39	17.66	4,010	5.78	41.99	34.40	17.83	3,862
Guatemala	42.55	43.80	9.09	4.55	5,475	35.88	46.62	12.26	5.25	4,294
Nicaragua	21.63	51.33	9.90	17.15	4,258	15.43	56.03	13.08	15.46	4,815
Panama	7.93	29.86	38.21	24.00	4,980	4.53	29.81	36.27	29.39	4,497
Paraguay	7.40	56.45	21.11	15.04	3,574	5.20	54.46	20.32	20.02	3,189
Peru	9.58	38.00	32.01	20.41	4,343	6.50	39.10	34.23	20.17	4,229
Uruguay	0.93	32.16	52.67	14.23	5,971	0.86	30.20	51.45	17.48	5,359
Total	12.84	48.89	25.69	12.58	57,893	11.03	49.11	25.79	14.07	55,318

Note. Calculations done using mathematics weights. Abbreviations used: None - No Education | Pri - Primary education | Sec - Secondary education | Uni - University education

TABLE 9 Percentage of mothers by education level per grade - TERCE (2013)

Country Name	Grade 3					Grade 6				
	None	Pri	Sec	Uni	Count	None	Pri	Sec	Uni	N
Argentina	2.39	37.81	48.96	10.84	2,361	3.13	38.33	50.13	8.41	2,474
Brazil	13.15	34.07	41.89	10.89	2,188	15.40	36.63	38.62	9.36	2,056
Chile	2.95	23.42	61.09	12.54	3,414	2.85	24.04	59.95	13.16	3,778
Colombia	6.47	29.28	52.55	11.69	3,277	2.95	32.65	55.25	9.14	3,770
Costa Rica	8.06	45.86	38.28	7.80	2,877	7.57	47.88	36.92	7.62	3,046
Dominican Republic	8.53	34.42	34.80	22.26	2,312	6.44	34.53	37.10	21.92	2,796
Ecuador	6.60	47.30	34.19	11.91	3,823	6.38	50.15	31.09	12.38	4,206
Guatemala	18.82	52.72	25.40	3.07	3,129	18.63	52.99	24.84	3.54	3,376
Nicaragua	12.01	39.22	36.50	12.28	2,639	10.55	41.46	34.48	13.51	2,863
Panama	6.49	36.59	41.45	15.47	2,250	5.54	35.86	42.08	16.52	2,552
Paraguay	5.19	41.36	39.63	13.82	2,129	3.87	43.49	38.82	13.82	2,398
Peru	6.24	31.09	55.53	7.14	3,748	5.11	31.57	53.94	9.37	3,889
Uruguay	1.11	33.43	56.30	9.16	2,109	1.42	36.13	54.43	8.01	2,241
Total	7.46	37.56	43.82	11.16	36,256	6.86	39.17	42.78	11.18	39,445

Note. Calculations done using senate weights in Family Questionnaires. Abbreviations used: None - No Education | Pri - Primary education | Sec - Secondary education | Uni - University education

Alesina et al. (2019) and Neidhofer et al. (2018) to maximize sample coverage.

FIGURE 1   Scatter plot and correlation between percentage of *mothers* who at least completed upper secondary education in SERCE(2006) and TERCE(2013) and percentage of *females* who at least completed upper secondary education from World Bank data in 2006 and 2013.
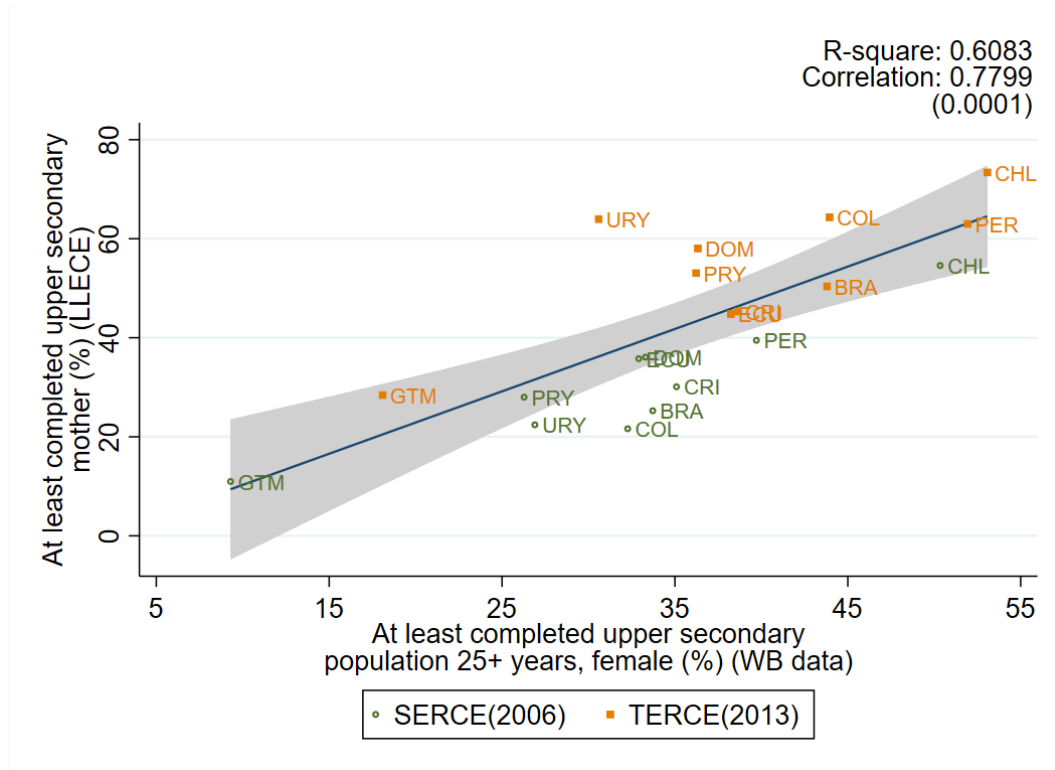
Note. For SERCE, upper secondary education corresponds to code "5", "6" and "7" in Table 5; For TERCE, upper secondary education corresponds to code "3", "4", "5" and "6" in Table 6. Correlation for only SERCE is 0.8992 with significance value 0.0004. Correlation for only TERCE is 0.7375 with significance value 0.0149. Data for Argentina, Chile, Costa Rica, Dominican Republic, Ecuador, Nicaragua and Panama in 2006 when SERCE was implemented is missing. Data for Argentina, Chile, Costa Rica, Nicaragua and Panama in 2013 when TERCE was implemented is missing. To maximise coverage, missing data in 2006 is approximated using the average of the data in 2004, 2005, 2007 and 2008, and missing data in 2013 is approximated using the average of the data in 2011, 2012, 2014 and 2015, assuming that trends in education had not changed a lot within 5 years.

FIGURE 2 Scatter plots and correlation between percentage change of percentage of mothers who at least completed upper secondary education in SERCE(2006) and TERCE(2013) and percentage change of percentage of females who at least completed upper secondary education from World Bank data in 2006 and 2013.
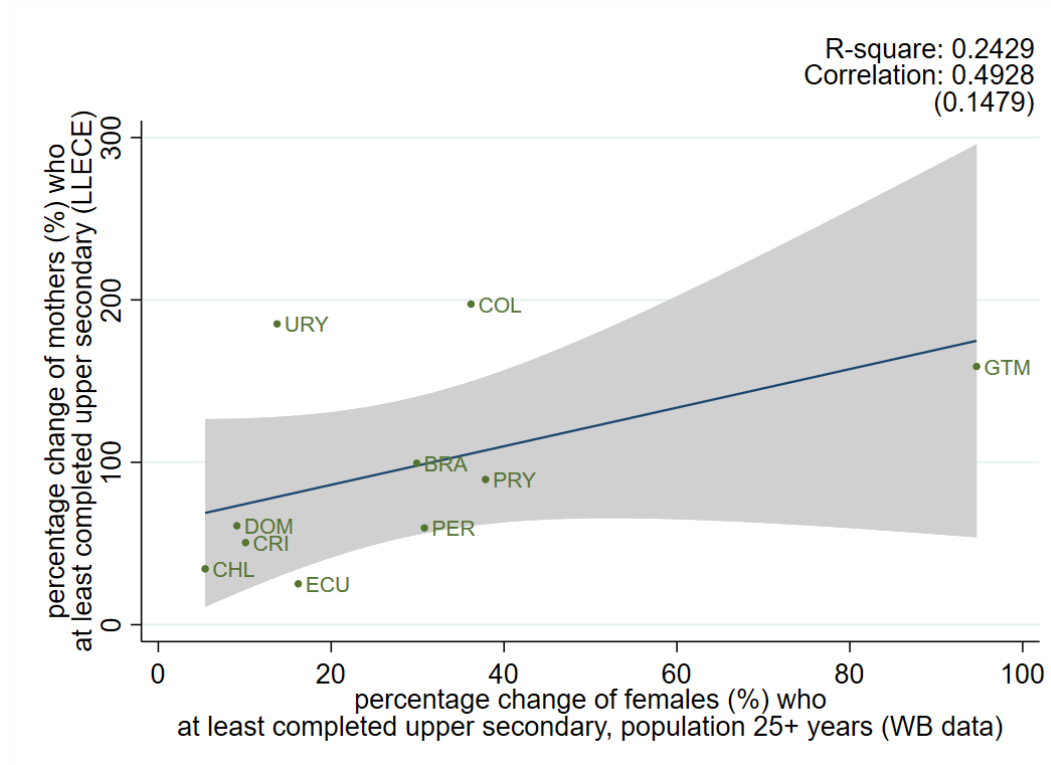
Note. For SERCE, upper secondary education corresponds to code "5", "6" and "7" in Table 5; For TERCE, upper secondary education corresponds to code "3", "4", "5" and "6" in Table 6.

3 | MEASURING MOBILITY

We mentioned already that we will measure socioeconomic background by taking the maximum education across both of the child's parents, and then make it into a dichotomous variable. We did not however discuss how we will use the test score data.

One option is to use the raw scores. They are in principle comparable across countries and time, because they were designed that way. Unfortunately the scale is difficult to interpret.

Another option is to use ranks. Ranks are typical in the modern literature on inter-generational mobility, because they allow researchers to abstract from the distribution of the outcome. Their interpretation is also straightforward. There is however an important question when one uses ranks to compare countries or regions: should one define rank at the regional or trans-regional level? We discuss these next.

3.1 | Rank of test score on the parents' educational attainment - rank computed at the Latin American level

We start by discussing the model where we construct test score ranks using the entire sample of students across all countries. In countries with high test scores (e.g., Chile), students will on average have high ranks, and the opposite for countries with low test scores (e.g.,

Guatemala). For each country c and cohort t we estimate:

$$R(Y_{itc}^k) = \alpha_{tc} + \beta_{tc} HS_{itc}^P + \epsilon_{itc} \qquad (2)$$

where $R(Y_{itc}^k)$ is the test score (rank computed at Latin American level) for student i at time t living in country c. HS_{itc}^P is a dummy which equals to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary and equals to 0 otherwise. Results are robust to using the minimum or the average of parental education or only the education of one of the parents.[4] β_{tc} measures the impact of the parents' additional education (high school degree) on the rank in distribution of their child i's test score for each cohort t and country c. We make use of the sample weights provided by LLECE to compute the rank of the test score at the Latin American level.

We estimate two main specifications. First, $R(Y_{itc}^k)$ is the student i's math test score (rank). Second, $R(Y_{itc}^k)$ is the student i's reading test score (rank). We present results on β_{tc} where higher values correspond to lower mobility and α_{tc}, which is the i's expected rank in the test distribution when the maximum of the mother's and father's education is below completed high school (higher values now correspond to more mobility).

The advantage of this measure is that the effect of parents' education on the child's educational attainment is easier to compare. However, this does not solve a key problem in the comparison of mobility across countries: the test score distributions may differ markedly across countries and such differences can obscure the interpretation of the results. Consider, for example, country A and country B, where country A is a lot more unequal than B. When using indexes of positional mobility, there is a strong mechanical force towards measuring less mobility in A than in B. The reason is that it takes a lower absolute change in income in country B to move up (or down) any given percentile, compared to A, since in B the income distribution is more compressed.

3.2 | Rank of test score on the parents' educational attainment - rank computed at the country level

Alternatively, we can construct ranks within country. In this case, the median rank is the same across all countries, regardless of whether they are a high or a low test score country. For each country c and cohort t we estimate:

$$R(Y_{itc}^k) = \alpha_{tc} + \beta_{tc} HS_{itc}^P + \epsilon_{itc} \qquad (3)$$

where $R(Y_{itc}^k)$ is the test score (rank) for student i at time t living in country c. HS_{itc}^P is a dummy which equals to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary is at least completed upper secondary (high school) and equals to 0 otherwise. β_{tc} measures the impact of the parents' additional education (high school degree) on the rank in distribution of their child i's test score for each cohort t and country c. We estimate two main specifications. First, $R(Y_{itc}^k)$ is the student i's math test score (rank). Second, $R(Y_{itc}^k)$ is the student i's reading test score (rank). We present results on β_{tc} where higher values correspond to lower mobility and α_{tc}, which is the i's expected rank in the test distribution when the maximum of the mother's and father's education is below completed high school (higher values now correspond to more mobility).

Computing the rank at country level has the advantage to provide a measure of intergenerational mobility within the country. For example, consider Country A and Country B's distributions which do not overlap and Country A's distribution always lies to right

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[4] Alesina et al. (2019) and Neidhofer et al. (2018) adopt a similar approach to maximize sample coverage.

of the Country B's one (i.e. Country A's test scores are much higher than Country B's test scores). If we compute the intergenerational mobility measure by merging Country A and Country B's distributions in one distribution, we may find a low intergenerational mobility coefficient for Country B. This measure would hide important considerations about the educational mobility within the country B because people may move up and down the distribution in Country B, but by construction we would never observe students move to the top of the merged Country A and Country B's distribution.

3.3 | Socioeconomic Gaps in Achievement Within and Across Schools

Given that our main outcome is education achievement, it is natural to investigate the potential role of schools as a driver of inequality. We will ask to what extent cross country differences in socioeconomic gradient in learning can be accounted for cross country differences in socioeconomic segregation in schools. One simple way of doing this is to compare overall and within school estimates of socioeconomic gaps in test scores, and how they differ across countries.

Formally, we estimate the following regression for each country c and cohort t when we control for school fixed effects:

$$R(Y)^k_{itcs} = \alpha_{tc} + \beta^S_{tc} HS^P_{itcs} + \theta_s + \epsilon_{itcs} \tag{4}$$

where $R(Y)^k_{itcs}$ is the test score (rank computed at European level) for student i is school s at time t living in country c, HS^P_{itc} is a equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary is at least completed upper secondary (high school) and equals to 0 otherwise. β^S_{tc} measures the mobility within the schools after accounting for school fixed effects. We estimate two main specifications. First, $R(Y^k_{itc})$ is the student i's math test score (rank). Second, $R(Y^k_{itc})$ is the student i's reading test score (rank).

4 | THE SOCIOECONOMIC GRADIENTS IN ACHIEVEMENT ACROSS LATIN AMERICA

4.1 | The Geography of Learning Mobility

We start by estimating socioeconomic gaps in learning using as outcome variable test score ranks, where ranks are constructed using the entire distribution of achievement across students in all countries in the sample. We have different estimates for each year and grade, separately for math and language. To help visualize our results we place them on heat maps of the region.
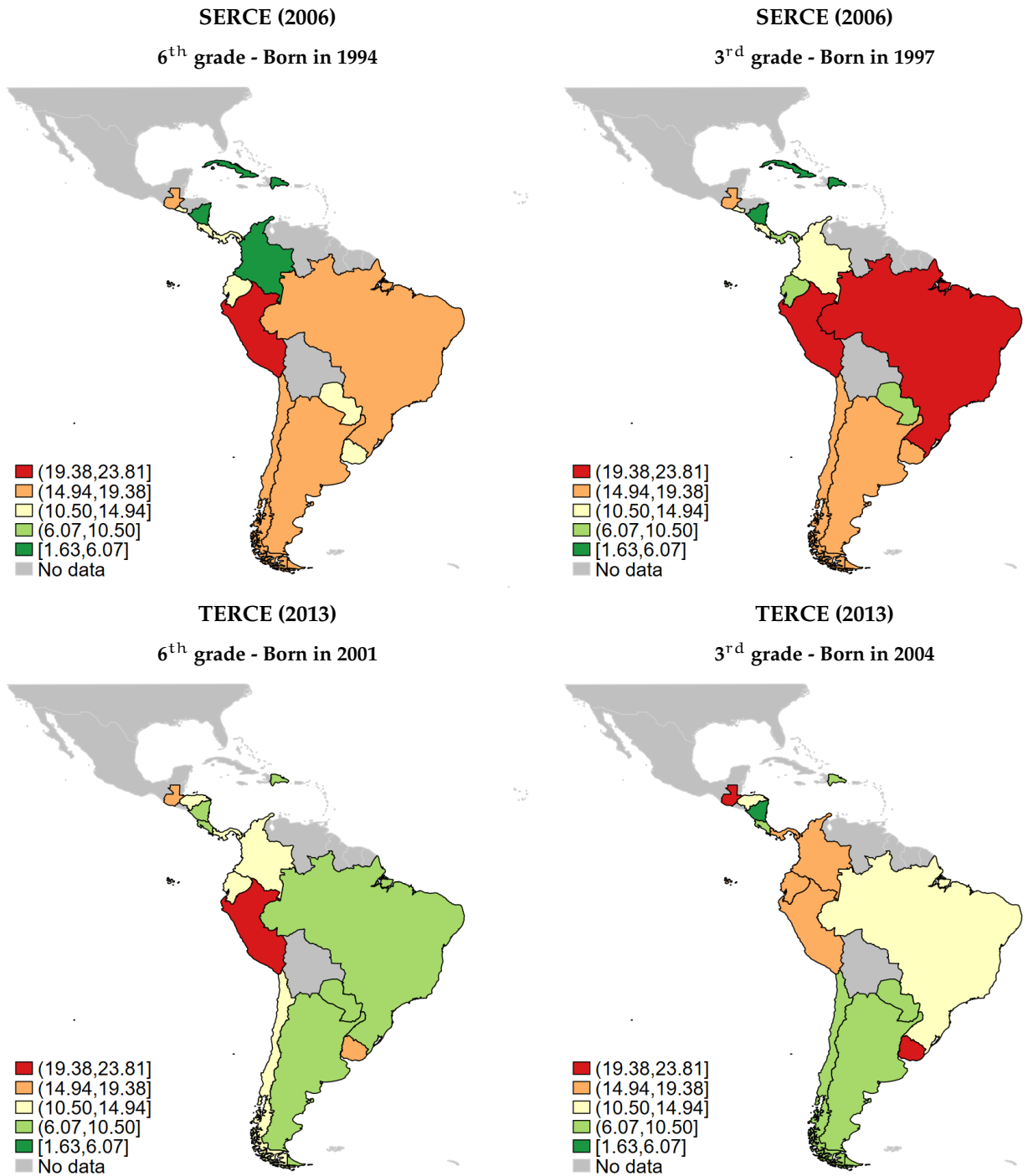
Figure 3 documents a wide dispersion in socioeconomic gaps in math achievement across countries. In 2006, in some the countries the difference in the achievement of children from more and less educated is as low as 1-6 percentiles (e.g., Nicaragua, third grade math assessment), while in others it can be as high as 20 percentiles (e.g., Brazil, third grade math assessment). More generally, in 2006, countries in Central America seem to be more mobile, in the sense that socioeconomic gaps in achievement are lower, than countries in South America. Interestingly, by 2013 this is no longer the case, with low and high mobility countries being spread out all over the region. The picture for reading is similar as the one for math (Figure G5).

It is important to check if the main picture of mobility in the region depends substantially

on how we measure the main outcome. In particular, does it matter whether we compute cross country or within country ranks of test scores?

The answer, fortunately, is no, as we can see from the Figures G5 and G6 in Appendix G. It is interesting that this is the case. It means that the forces driving socioeconomic gradients in learning across countries are strong enough to survive different measurements of these outcomes.

FIGURE 3 Heat map of immobility: expected percentile improvement in math test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Math Latin American rank

Note. The heat maps present the intergenerational mobility for each country and cohort (the estimates are based on equation 2, regression of the rank math score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the Latin American level. Green areas are the most mobile and red areas are the least mobile. The intervals are the same for each year. The median age of 6th grade students is 12 years old, while the median age of 3rd grade students is 9 years old.
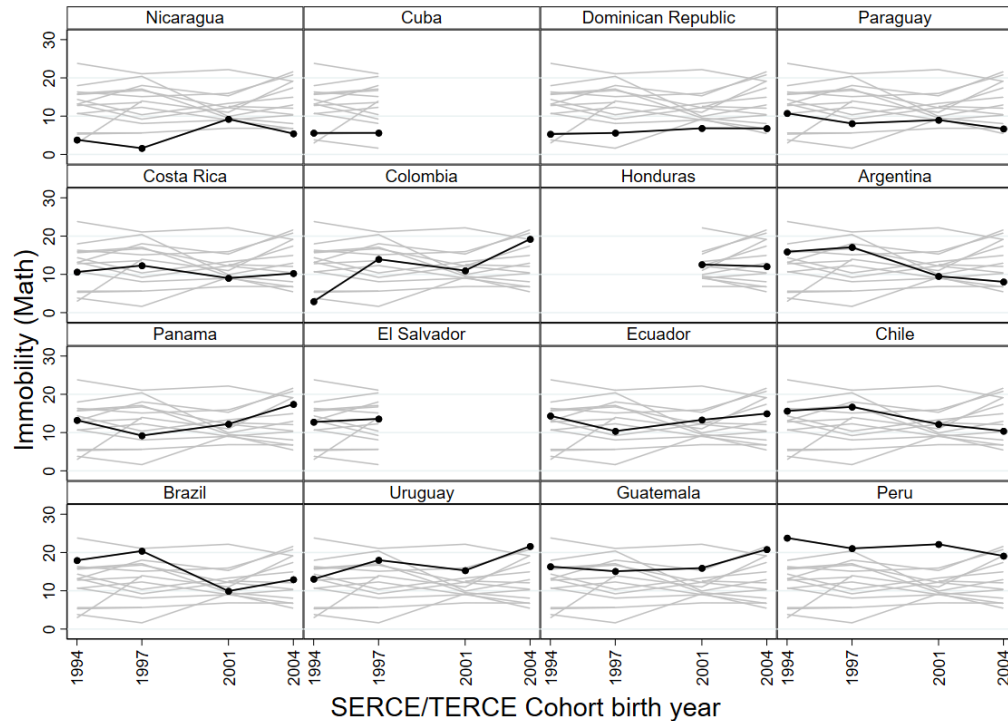
4.2 | Trends in Socioeconomic Gaps in Learning

From the maps presented above we can see that there are not only differences across countries in socioeconomic gaps in learning, but also differences within countries over time. At a first glance it may appear that across the region there has been a general improvement in these gradients, although this may be because this is true in large countries such as Brazil or Argentina.

In this section we examine trends in these gaps more closely. The following graphs display our mobility estimates for four cohorts of children: those born in 1994 (in 6th grade in 2006), 1997 (third grade in 2006), 2001 (sixth grade in 2013) and 2004 (third grade in 2013). As above, we have separate graphs for math and language, and for the two rank measures we consider: across country ranks and within country ranks. Once again, we show that we have broadly the same patterns in the data regardless of which measure we choose.

Starting with the math results, the main country experiencing a reduction in mobility over time is Colombia (Figure 4 and Table 10). In the opposite direction, countries becoming more mobile over time are Argentina, Brazil and Chile. The remaining countries experience little movement, exhibiting primarily a flat time and cohort profile in mobility. Our estimates for the language test are a little different, with Nicaragua, not Colombia, becoming less mobile over time, and Panama joining the above mentioned three other countries in becoming more mobile over time (Figure F2).

FIGURE 4 Trends in immobility: expected percentile improvement in math test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Math Latin American rank.

Note. The graphs present the immobility for each country and cohort (the estimates are based on equation 2, regression of the rank math score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the Latin American level. Birth year of SERCE third-grade cohort is 1997, and that of SERCE sixth-grade cohort is 1994. Birth year of TERCE third-grade cohort is 2004, and that of TERCE sixth-grade cohort is 2001.

TABLE 10 Mobility (coefficient of parental education dummy in Equation 2) based on math scores ranked at the Latin American level

Country	Immobility				Absolute Mobility			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	15.90	17.09	9.53	8.05	48.99	47.43	48.92	48.42
Brazil	17.95	20.40	9.92	12.95	45.81	46.87	46.88	48.00
Chile	15.65	16.72	12.19	10.40	48.76	50.23	60.67	61.71
Colombia	2.93	13.96	10.99	19.21	49.26	48.89	42.03	34.08
Costa Rica	10.63	12.31	9.02	10.26	62.41	60.26	52.44	55.79
Cuba	5.61	5.63			73.46	77.34		
Dominican Republic	5.31	5.62	6.84	6.80	23.04	19.23	19.60	19.39
Ecuador	14.39	10.37	13.33	14.96	33.29	39.30	42.77	40.21
El Salvador	12.77	13.59			41.97	45.91		
Guatemala	16.33	15.10	15.94	20.82	34.56	36.03	34.38	32.90
Honduras			12.57	12.08			34.42	39.85
Nicaragua	3.82	1.63	9.24	5.44	37.16	43.03	26.73	32.82
Panama	13.24	9.22	12.23	17.42	29.24	35.85	24.46	28.57
Paraguay	10.75	8.08	9.00	6.71	38.97	45.17	26.18	33.49
Peru	23.81	21.08	22.17	19.10	34.88	31.84	36.18	38.49
Uruguay	13.09	18.02	15.31	21.63	69.39	58.52	55.37	43.92
Total	12.14	12.59	12.02	13.27	44.75	45.73	39.36	39.83

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

4.3 | Variation Within and Across Schools

In this section we estimate socioeconomic gradients in math and language achievement within and across schools, as explained above. We represent our results graphically in the following series of figures, which show three lines (Figure 5).
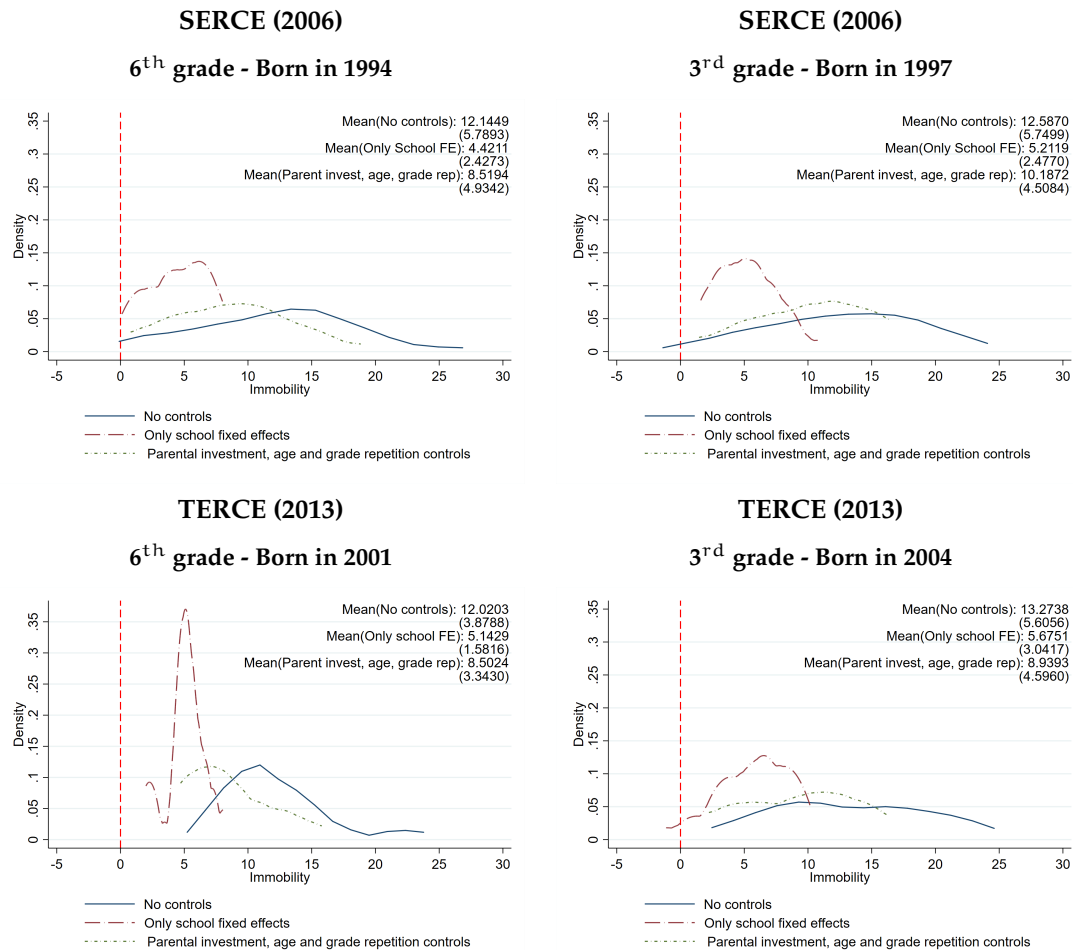
The first (solid) line corresponds to the density of socioeconomic gaps in learning across countries. One constructs it from the heat maps shown above. The second (dashed) line shows what happens to the estimates after we include school fixed effects in the model, so that all variation across families occurs within schools. The third (dotted) line adds further family background variables to the model, such as parental investments.

The main pattern, across all figures, is that the solid and dashed lines are very different, while the dotted line is quite similar to the dashed line, which means that these remaining controls are irrelevant for this discussion. The dashed line, corresponding to the density of within school socioeconomic gaps across countries, has a much lower variance than the overall density. This means that school segregation is likely to explain a substantial part of differences in mobility across countries. After we control for segregation (differences across schools), we dramatically reduce cross country differences in (within school) socioeconomic gradients in math and language achievement.

Figure 5 hides important heterogeneity, we therefore present the decomposition in within and between school contribution to mobility for each cohort and country in Table 11 and 6.

It is important to highlight that the results in terms of trends do not seem to be driven by composition effects (see appendix E for additional details).

FIGURE 5   Distributions of intergenerational mobility measures (math) across Latin American countries without controls and after controlling for country-specific characteristics. (Latin American rank)

Note. The Figures present the distributions of intergenerational mobility measures (rank of math score on dummy equal to 1 if the mother has at least upper secondary) across LAC countries without controls and with controls. The rank is computed at the LAC level. 'No controls' is the intergenerational mobility measure without controls, 'Only school fixed effects' is the intergenerational mobility measure after controlling for school fixed effects and 'Parent invest, age, grade repetition' is the mobility measure after controlling for these variables. Higher values on the x-axis indicate less mobile countries. The distribution is estimated nonparametrically, using an Epanechnikov kernel.

TABLE 11 Mobility (coefficient of parental education dummy in 2) based on math scores ranked at the Latin American level and within-school mobility

Country	Immobility				Within-school immobility			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	15.90	17.09	9.53	8.05	7.65	7.57	2.00	-1.13
Brazil	17.95	20.40	9.92	12.95	8.00	6.92	5.27	4.46
Chile	15.65	16.72	12.19	10.40	5.94	7.35	6.00	2.27
Colombia	2.93	13.96	10.99	19.21	0.11	3.80	5.49	7.94
Costa Rica	10.63	12.31	9.02	10.26	5.14	6.52	4.77	7.48
Cuba	5.61	5.63			5.60	5.02		
Dominican Republic	5.31	5.62	6.84	6.80	2.44	1.59	4.38	4.52
Ecuador	14.39	10.37	13.33	14.96	3.02	3.83	6.64	8.98
El Salvador	12.77	13.59			1.45	3.95		
Guatemala	16.33	15.10	15.94	20.82	4.72	2.47	4.98	7.19
Honduras			12.57	12.08			6.71	7.26
Nicaragua	3.82	1.63	9.24	5.44	2.14	2.50	2.54	2.77
Panama	13.24	9.22	12.23	17.42	6.78	5.40	4.97	7.84
Paraguay	10.75	8.08	9.00	6.71	1.76	3.54	4.83	4.59
Peru	23.81	21.08	22.17	19.10	5.83	6.85	5.21	5.06
Uruguay	13.09	18.02	15.31	21.63	5.73	10.87	8.21	10.24
Total	12.14	12.59	12.02	13.27	4.42	5.21	5.14	5.68

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

FIGURE 6 Decomposition of the mobility (math) trends in within and between-school variation by country. (Latin American rank)
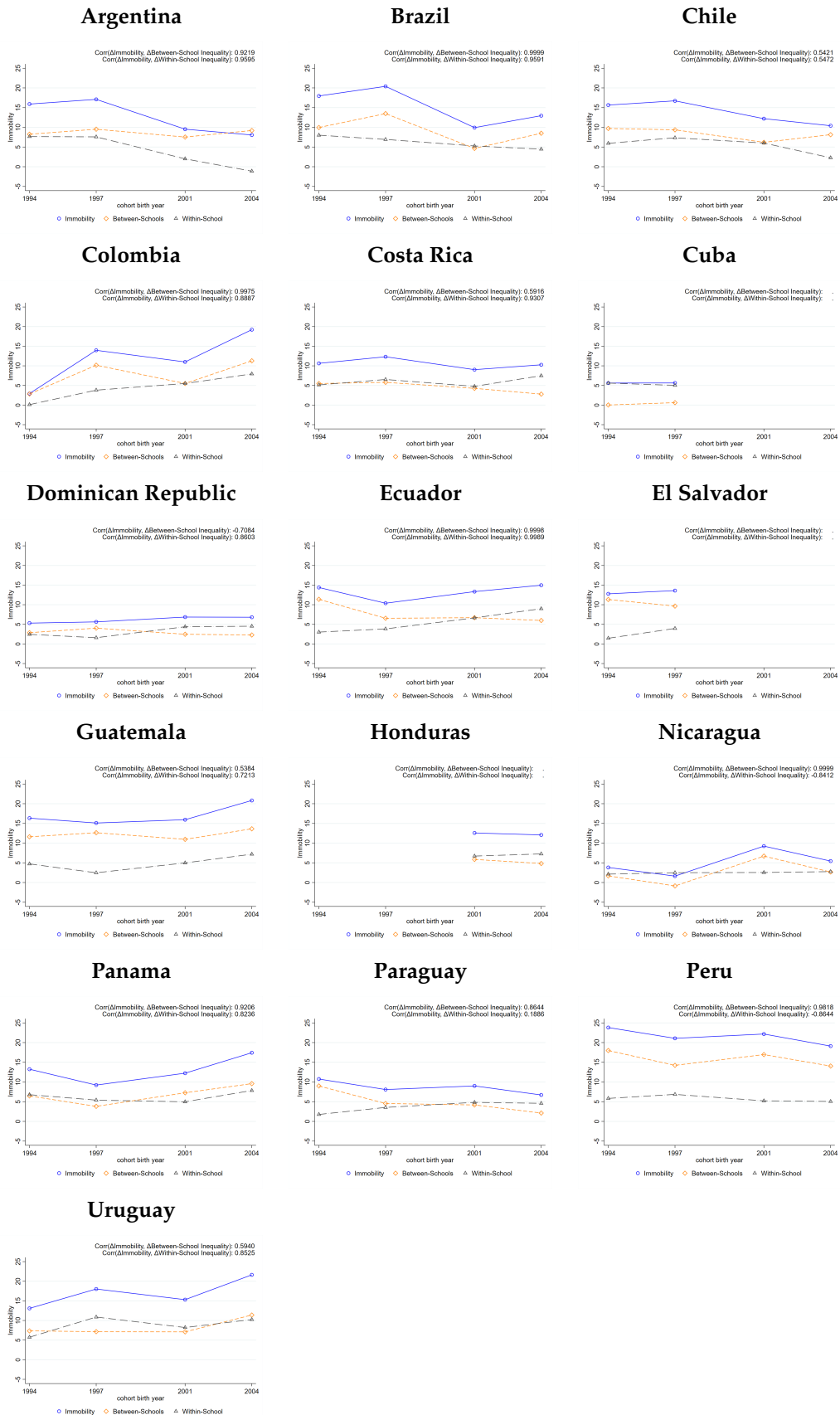
5 | CORRELATES OF LEARNING MOBILITY

5.1 | The Great Gatsby Curve

Finally we examine the relationship between income inequality and socioeconomic gradients in learning. There is substantial interest in such a relationship, reminiscent of the Great Gatsby Curve (e.g., Corak (2013)), which relates the level of inequality in a country with its level of intergenerational transmission. The evidence suggests that social mobility is lower in countries with high levels of inequality (DiPrete, 2020; Durlauf et al., 2021).

In this section we relate our measures of mobility (socioeconomic gradients in learning) to the Gini coefficient for each country, obtained from the World Bank Inequality Database. We find no strong relationship between socioeconomic gradients in learning and income inequality, measured using data from cohort's birth year (Figure 7), using data from implementation year (Figure 8) or using data from the LLECE survey (Figure 9). High inequality countries, such as Chile or Brazil, do not have notably higher or lower socioeconomic gaps in test scores than countries with relatively lower inequality, such as Costa Rica or Uruguay. Again, this holds across years, grades, and measures of test scores.

It has been argued however that there is a positive relationship between economic opportunity and income inequality in LAC (Ferreira and Schoch, 2020). The fact that we do not see this when we examine test scores suggests that the drivers of such a relationship occur after, either through higher education access, or through the labor market.
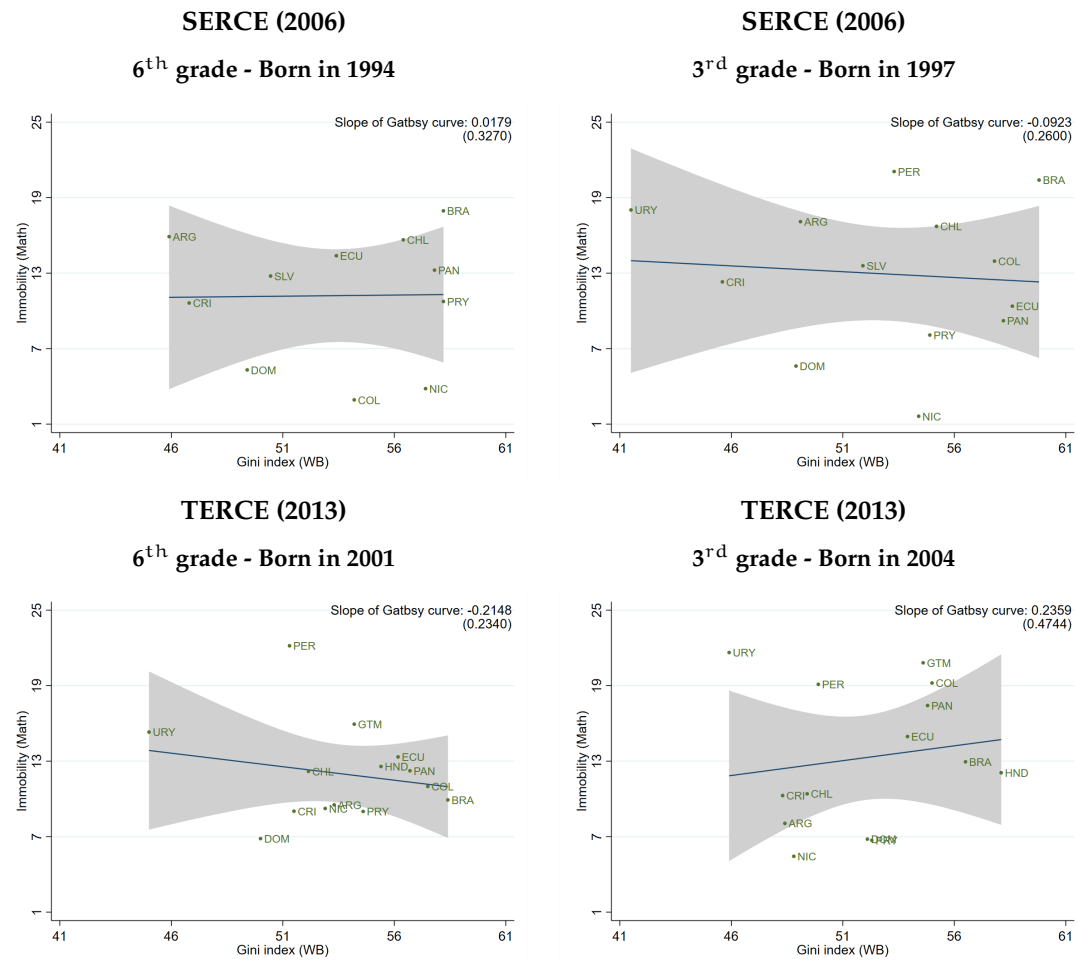
5.2 | Within-group and between-group inequality in test scores

Finally, we document a positive correlation between within-group inequality in test scores and the socioeconomic gradient in test score which is a measure of between-group inequality in Figure 10. Interestingly, this finding holds only for contemporaneous years. We do not find this pattern when we correlate the socioeconomic gradient in test score with the lagged within-group inequality in test scores (Figure 11).

6 | CONCLUSION

In this paper we document cross country differences in socioeconomic gaps in math and language achievement in third and sixth grades, using data from LAC, collected by LLECE. We find that there are substantial disparities across countries, but that these are not stable over time. A large component of these differences appears to be driven by the fact that in some countries there is stronger segregation across schools than others. Interestingly, there is no correlation between income inequality and socioeconomic disparities in learning in third and sixth grades.

FIGURE 7   Gatsby curve by cohort. Immobility (math) and Gini index (World Bank estimate) using *data from cohort birth years*

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE 8   Gatsby curve by cohort. Immobility (math) and Gini index (World Bank estimate) using *data from SERCE/TERCE implementation years*

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE 9   Scatter plots by cohort. Immobility (Maths) and standard deviation of the socioeconomic status index.
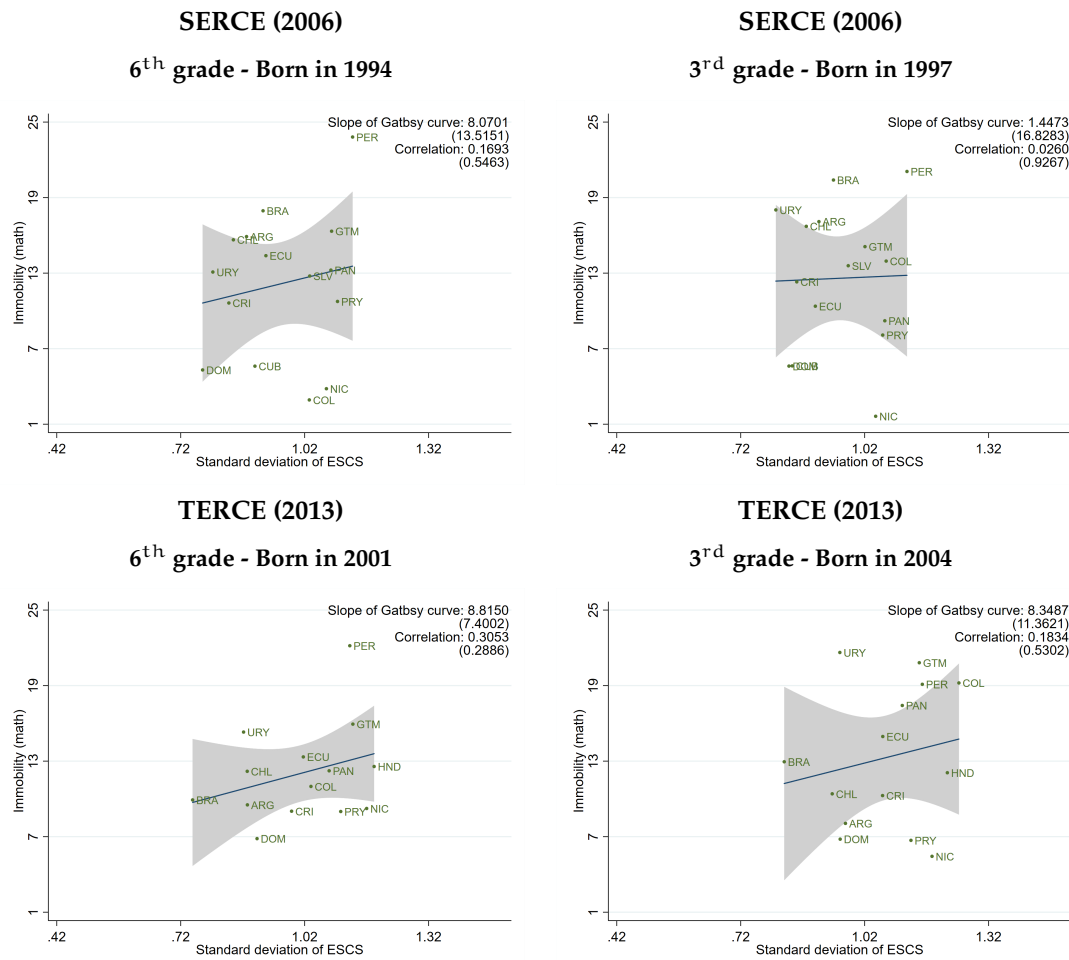

Note. The figure presents the scatter plots by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the standard deviation of the socioeconomic status index at the country level (Appendix J describes how this measure is constructed). Confidence interval at 95% level in grey.

FIGURE 10   Scatter plots by cohort. Immobility (Maths) and standard deviation of math test score.
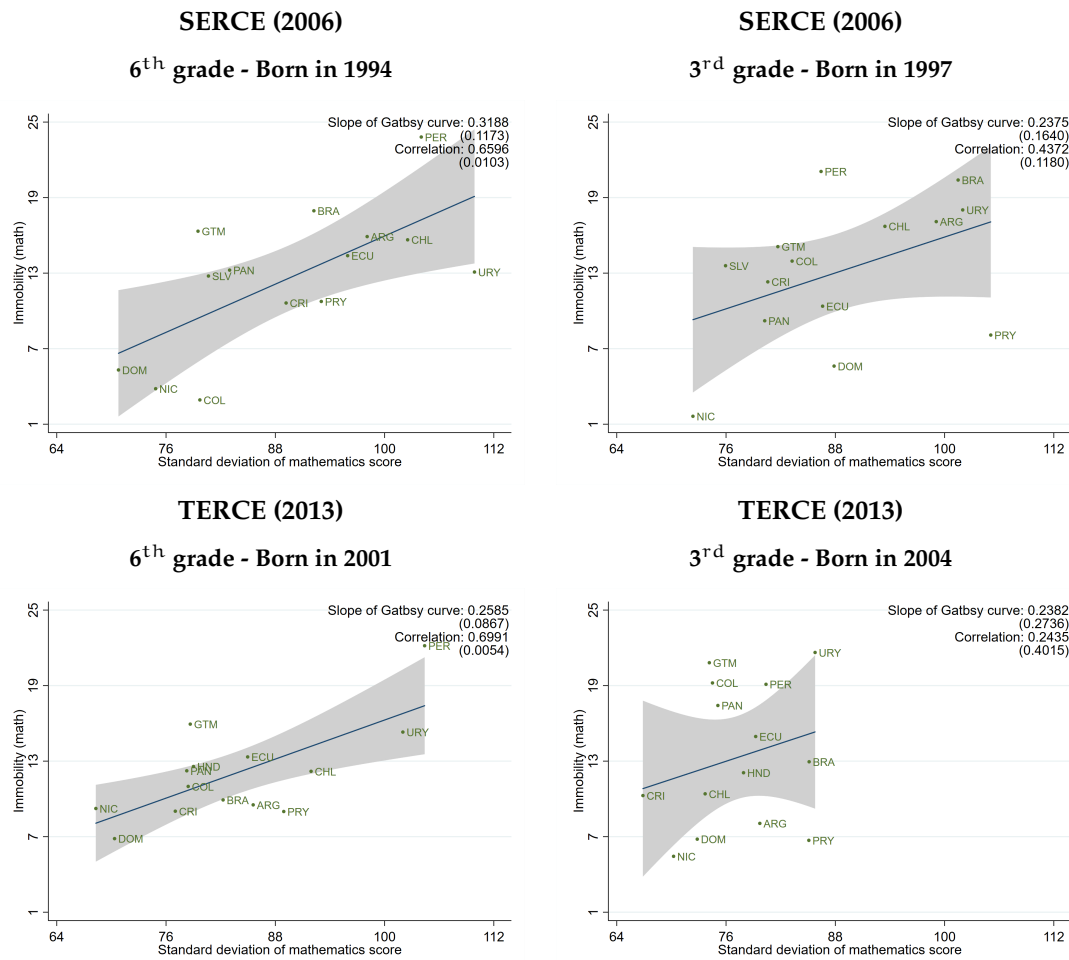

Note. The figure presents the scatter plots by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality in test score is the standard deviation of math test score. Confidence interval at 95% level in grey.

FIGURE 11   Scatter plots by cohort. Immobility (Maths) and lagged standard deviation of math test score and ESCS.
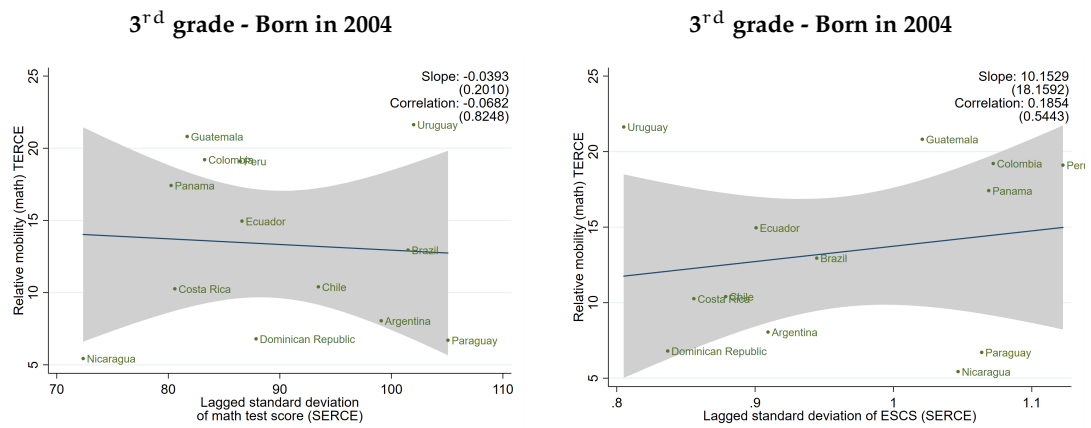

Note. The figure presents the scatter plots by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The lagged inequality in test score and ESCS is the standard deviation of math test score and ESCS respectively. Confidence interval at 95% level in grey.

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Appendices to "Socioeconomic Gradients in Test Scores across Latin American and the Caribbean"

A | STRUCTURE OF SERCE AND TERCE

The sixteen SERCE databases are structured as follows:

TABLE A1 SERCE Database structure

Category	Databases
Student questionnaires	L3, L6: Reading scores by grade
	M3, M6: Mathematics scores by grade
	C6: Science scores (6th grade only)
	QA3, QA6: Questionnaire for students
Family questionnaire	QF3, QF6: Questionnaire for students' families
Teacher questionnaires	QP3, QP6: Questionnaire for teachers
	QL3, QL6: language teaching and curriculum by grade
	QM3, QM6: mathematics teaching and curriculum by grade
	QC6: science teaching and equipment (grade 6 only)
Principal/Director questionnaires	QD: Director questionnaire
Other	FE: School registration form

Note. Additionally, the accompanying questionnaires that students, teachers, parents or principals filled in are also included with the databases.

The TERCE database consists data files similar to those in SERCE. The sixteen TERCE databases are structured as follows:

TABLE A2 TERCE Database structure

Category	Databases
Student questionnaires	PL3, PL6: Reading scores by grade
	PM3, PM6: Mathematics scores by grade
	PC6: Science scores (6th grade only)
	QA3, QA6: Questionnaire for students by grade
Family questionnaire	QF3, QF6: Questionnaire for students' families by grade
Teacher questionnaires	QP3L, QP6L, QP3M, QP6M, QP6C:
	Questionnaire for teachers by grade and subject (grade 6 only for Science)
Principal/Director questionnaires	QD3, QD6: Director questionnaire

Note. Additionally, the accompanying questionnaires that students, teachers, parents or principals filled in are also included with the databases. Note also that there is only one teacher questionnaire but there are 4 corresponding data sets which contain the same questions.

TABLE B3 SERCE sample selection statistics, 3rd grade family questionnaire, mother education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	5,781	1,425	24.65	4,356	6,272	1,720	27.42	4,552
Brazil	5,388	682	12.66	4,706	5,534	759	13.72	4,775
Chile	5,791	1,049	18.11	4,742	5,880	1,190	20.24	4,690
Colombia	5,634	841	14.93	4,793	5,784	976	16.87	4,808
Costa Rica	5,025	1,337	26.61	3,688	4,714	1,155	24.50	3,559
Dominican Republic	3,947	1,330	33.70	2,617	4,374	1,476	33.74	2,898
Ecuador	4,993	1,099	22.01	3,894	5,212	1,202	23.06	4,010
Guatemala	6,677	1,336	20.01	5,341	6,881	1,406	20.43	5,475
Nicaragua	6,211	1,806	29.08	4,405	6,384	2,126	33.30	4,258
Panama	6,163	1,165	18.90	4,998	6,196	1,216	19.63	4,980
Paraguay	5,066	1,520	30.00	3,546	5,110	1,536	30.06	3,574
Peru	4,640	309	6.66	4,331	4,763	420	8.82	4,343
Uruguay	6,558	752	11.47	5,806	6,837	866	12.67	5,971
Total	71,874	14,651	20.38	57,223	73,941	16,048	21.70	57,893

Note. "Missing parents" means observations without information on mother's education, either because the parent(s) replied "I don't know" to the question on mother's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

B | SAMPLE SELECTION STATISTICS

In this section, we document the sample selection statistics and the relative sample sizes.

TABLE B4 SERCE sample selection statistics, 3rd grade family questionnaire, average of mother and father education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	5,781	1,135	19.63	4,646	6,272	1,416	22.58	4,856
Brazil	5,388	314	5.83	5,074	5,534	381	6.88	5,153
Chile	5,791	893	15.42	4,898	5,880	1,037	17.64	4,843
Colombia	5,634	447	7.93	5,187	5,784	580	10.03	5,204
Costa Rica	5,025	1,147	22.83	3,878	4,714	973	20.64	3,741
Dominican Republic	3,947	684	17.33	3,263	4,374	774	17.70	3,600
Ecuador	4,993	591	11.84	4,402	5,212	677	12.99	4,535
Guatemala	6,677	740	11.08	5,937	6,881	798	11.60	6,083
Nicaragua	6,211	991	15.96	5,220	6,384	1,333	20.88	5,051
Panama	6,163	654	10.61	5,509	6,196	703	11.35	5,493
Paraguay	5,066	1,092	21.56	3,974	5,110	1,093	21.39	4,017
Peru	4,640	271	5.84	4,369	4,763	380	7.98	4,383
Uruguay	6,558	460	7.01	6,098	6,837	563	8.23	6,274
Total	71,874	9,419	13.10	62,455	73,941	10,708	14.48	63,233

Note. "Missing parents" means observations without information on both mother's and father's education, either because the parent(s) replied "I don't know" to the question on mother's and father's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

TABLE B5 SERCE sample selection statistics, 6th grade family questionnaire, mother education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	6,069	1,598	26.33	4,471	6,151	1,710	27.80	4,441
Brazil	5,001	568	11.36	4,433	5,201	622	11.96	4,579
Chile	6,616	1,193	18.03	5,423	6,648	1,254	18.86	5,394
Colombia	5,851	669	11.43	5,182	5,870	732	12.47	5,138
Costa Rica	4,539	1,310	28.86	3,229	4,008	1,151	28.72	2,857
Dominican Republic	4,370	1,732	39.63	2,638	4,502	1,838	40.83	2,664
Ecuador	5,096	1,256	24.65	3,840	5,210	1,348	25.87	3,862
Guatemala	5,157	911	17.67	4,246	5,249	955	18.19	4,294
Nicaragua	6,128	1,331	21.72	4,797	6,468	1,653	25.56	4,815
Panama	5,003	776	15.51	4,227	5,364	867	16.16	4,497
Paraguay	4,307	1,159	26.91	3,148	4,362	1,173	26.89	3,189
Peru	4,504	263	5.84	4,241	4,585	356	7.76	4,229
Uruguay	5,989	727	12.14	5,262	6,160	801	13.00	5,359
Total	68,630	13,493	19.66	55,137	69,778	14,460	20.72	55,318

Note. "Missing parents" means observations without information on mother's education, either because the parent(s) replied "I don't know" to the question on mother's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

TABLE B6 SERCE sample selection statistics, 6th grade family questionnaire, average of
mother and father education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	6,069	1,342	22.11	4,727	6,151	1,449	23.56	4,702
Brazil	5,001	306	6.12	4,695	5,201	349	6.71	4,852
Chile	6,616	977	14.77	5,639	6,648	1,043	15.69	5,605
Colombia	5,851	396	6.77	5,455	5,870	470	8.01	5,400
Costa Rica	4,539	1,167	25.71	3,372	4,008	1,023	25.52	2,985
Dominican Republic	4,370	1,252	28.65	3,118	4,502	1,337	29.70	3,165
Ecuador	5,096	749	14.70	4,347	5,210	836	16.05	4,374
Guatemala	5,157	475	9.21	4,682	5,249	516	9.83	4,733
Nicaragua	6,128	649	10.59	5,479	6,468	963	14.89	5,505
Panama	5,003	395	7.90	4,608	5,364	467	8.71	4,897
Paraguay	4,307	809	18.78	3,498	4,362	813	18.64	3,549
Peru	4,504	219	4.86	4,285	4,585	312	6.80	4,273
Uruguay	5,989	451	7.53	5,538	6,160	528	8.57	5,632
Total	68,630	9,187	13.39	59,443	69,778	10,106	14.48	59,672

Note. "Missing parents" means observations without information on both mother's and father's education, either because the parent(s)
replied "I don't know" to the question on mother's and father's education or left the question blank in the family questionnaire. All
students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

TABLE B7   TERCE sample selection statistics, 3rd grade family questionnaire, mother education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	2,589	765	29.55	1,824	2,608	770	29.52	1,838
Brazil	2,405	631	26.24	1,774	2,412	670	27.78	1,742
Chile	2,955	497	16.82	2,458	3,110	490	15.76	2,620
Colombia	2,977	336	11.29	2,641	2,869	305	10.63	2,564
Costa Rica	2,552	262	10.27	2,290	2,551	260	10.19	2,291
Dominican Republic	2,090	418	20.00	1,672	2,254	495	21.96	1,759
Ecuador	3,499	409	11.69	3,090	3,461	406	11.73	3,055
Guatemala	3,122	560	17.94	2,562	3,152	678	21.51	2,474
Nicaragua	2,555	476	18.63	2,079	2,670	640	23.97	2,030
Panama	2,372	597	25.17	1,775	2,400	636	26.50	1,764
Paraguay	2,056	426	20.72	1,630	2,144	475	22.15	1,669
Peru	3,458	507	14.66	2,951	3,451	548	15.88	2,903
Uruguay	1,937	291	15.02	1,646	1,925	311	16.16	1,614
Total	34,567	6,175	17.86	28,392	35,007	6,684	19.09	28,323

Note. "Missing parents" means observations without information on mother's education, either because the parent(s) replied "I don't know" to the question on mother's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

TABLE B8 TERCE sample selection statistics, 3rd grade family questionnaire, average of mother and father education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	2,589	676	26.11	1,913	2,608	690	26.46	1,918
Brazil	2,405	518	21.54	1,887	2,412	557	23.09	1,855
Chile	2,955	412	13.94	2,543	3,110	408	13.12	2,702
Colombia	2,977	191	6.42	2,786	2,869	190	6.62	2,679
Costa Rica	2,552	155	6.07	2,397	2,551	153	6.00	2,398
Dominican Republic	2,090	201	9.62	1,889	2,254	269	11.93	1,985
Ecuador	3,499	263	7.52	3,236	3,461	255	7.37	3,206
Guatemala	3,122	282	9.03	2,840	3,152	409	12.98	2,743
Nicaragua	2,555	279	10.92	2,276	2,670	452	16.93	2,218
Panama	2,372	463	19.52	1,909	2,400	510	21.25	1,890
Paraguay	2,056	282	13.72	1,774	2,144	335	15.63	1,809
Peru	3,458	315	9.11	3,143	3,451	373	10.81	3,078
Uruguay	1,937	207	10.69	1,730	1,925	230	11.95	1,695
Total	34,567	4,244	12.28	30,323	35,007	4,831	13.80	30,176

Note. "Missing parents" means observations without information on both mother's and father's education, either because the parent(s) replied "I don't know" to the question on mother's and father's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

TABLE B9   TERCE sample selection statistics, 6th grade family questionnaire, mother education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	2,766	810	29.28	1,956	2,941	884	30.06	2,057
Brazil	2,236	586	26.21	1,650	2,520	720	28.57	1,800
Chile	3,384	635	18.76	2,749	3,982	740	18.58	3,242
Colombia	3,287	337	10.25	2,950	3,623	366	10.10	3,257
Costa Rica	2,540	249	9.80	2,291	3,000	304	10.13	2,696
Dominican Republic	2,656	426	16.04	2,230	2,743	504	18.37	2,239
Ecuador	3,765	354	9.40	3,411	3,989	353	8.85	3,636
Guatemala	3,118	332	10.65	2,786	3,306	455	13.76	2,851
Nicaragua	2,703	340	12.58	2,363	2,921	541	18.52	2,380
Panama	2,583	560	21.68	2,023	2,624	591	22.52	2,033
Paraguay	2,302	431	18.72	1,871	2,470	517	20.93	1,953
Peru	3,394	407	11.99	2,987	3,757	508	13.52	3,249
Uruguay	1,979	331	16.73	1,648	2,265	373	16.47	1,892
Total	36,713	5,798	15.79	30,915	40,141	6,856	17.08	33,285

Note. "Missing parents" means observations without information on mother's education, either because the parent(s) replied "I don't know" to the question on mother's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

TABLE B10   TERCE sample selection statistics, 6th grade family questionnaire, average of mother and father education

Country	Reading				Mathematics			
	All students	Missing parents	Missing parents	Sample size	All students	Missing parents	Missing parents	Sample size
	No.	No.	%	No.	No.	No.	%	No.
Argentina	2,766	717	25.92	2,049	2,941	791	26.90	2,150
Brazil	2,236	499	22.32	1,737	2,520	630	25.00	1,890
Chile	3,384	545	16.11	2,839	3,982	640	16.07	3,342
Colombia	3,287	204	6.21	3,083	3,623	230	6.35	3,393
Costa Rica	2,540	143	5.63	2,397	3,000	191	6.37	2,809
Dominican Republic	2,656	182	6.85	2,474	2,743	246	8.97	2,497
Ecuador	3,765	223	5.92	3,542	3,989	231	5.79	3,758
Guatemala	3,118	170	5.45	2,948	3,306	302	9.13	3,004
Nicaragua	2,703	205	7.58	2,498	2,921	410	14.04	2,511
Panama	2,583	441	17.07	2,142	2,624	482	18.37	2,142
Paraguay	2,302	308	13.38	1,994	2,470	385	15.59	2,085
Peru	3,394	296	8.72	3,098	3,757	377	10.03	3,380
Uruguay	1,979	255	12.89	1,724	2,265	284	12.54	1,981
Total	36,713	4,188	11.41	32,525	40,141	5,199	12.95	34,942

Note. "Missing parents" means observations without information on both mother's and father's education, either because the parent(s) replied "I don't know" to the question on mother's and father's education or left the question blank in the family questionnaire. All students (No.) − Missing parents (No.) = Sample size (No.); Missing parents (No.) / All students (No.) = Missing parents (%)

C | PARENTAL EDUCATION SUMMARY STATISTICS

This section presents the descriptive statistics on the average of percentage of mothers and fathers by education level per grade.

TABLE C11 Average of percentage of mothers and fathers by education level per grade - SERCE (2006)

Country Name	Grade 3				Grade 6			
	At most lower secondary	At least upper secondary	At most upper secondary	At least post secondary	At most lower secondary	At least upper secondary	At most upper secondary	At least post secondary
Argentina	62.46	37.54	80.31	19.69	59.18	40.82	77.68	22.32
Brazil	76.15	23.85	91.78	8.22	74.96	25.04	90.67	9.33
Chile	42.90	57.10	72.26	27.74	46.92	53.08	75.57	24.43
Colombia	80.15	19.85	85.41	14.59	76.46	23.54	82.55	17.45
Costa Rica	70.83	29.17	81.64	18.36	67.94	32.06	79.67	20.33
Cuba	15.81	84.19	49.55	50.45	17.36	82.64	52.38	47.62
Dominican Republic	69.99	30.01	81.77	18.23	60.74	39.26	74.76	25.24
Ecuador	62.79	37.21	81.41	18.59	64.40	35.60	81.40	18.60
El Salvador	92.64	7.36	93.29	6.71	89.10	10.90	89.59	10.41
Guatemala	89.66	10.34	95.11	4.89	86.71	13.29	94.08	5.92
Nicaragua	76.41	23.59	81.99	18.01	76.91	23.09	84.40	15.60
Panama	57.55	42.45	76.93	23.07	52.90	47.10	71.63	28.37
Paraguay	73.69	26.31	84.60	15.40	68.96	31.04	80.23	19.77
Peru	57.43	42.57	77.89	22.11	54.06	45.94	77.67	22.33
Uruguay	80.82	19.18	87.16	12.84	76.55	23.45	83.96	16.04
Total	67.29	32.71	81.41	18.59	64.88	35.12	79.75	20.25

Note. Calculations are based on individual student weights. The first two columns and last two columns for each grade sum up to 100% according to our classification of levels of education in Table 7

TABLE C12 Average of percentage of mothers and fathers by education level per grade - TERCE (2013)

Country Name	Grade 3				Grade 6			
	At most lower secondary	At least upper secondary	At most upper secondary	At least post secondary	At most lower secondary	At least upper secondary	At most upper secondary	At least post secondary
Argentina	43.79	56.21	80.27	19.73	44.86	55.14	81.19	18.81
Brazil	51.16	48.84	88.18	11.82	55.97	44.03	89.62	10.38
Chile	26.20	73.80	67.25	32.75	26.96	73.04	67.64	32.36
Colombia	37.91	62.09	74.40	25.60	37.01	62.99	78.65	21.35
Costa Rica	55.08	44.92	79.98	20.02	56.07	43.93	80.10	19.90
Dominican Republic	46.39	53.61	74.98	25.02	44.52	55.48	72.75	27.25
Ecuador	53.97	46.03	84.13	15.87	55.84	44.16	84.17	15.83
Guatemala	69.80	30.20	92.33	7.67	68.87	31.13	91.47	8.53
Honduras	73.28	26.72	88.18	11.82	73.46	26.54	88.02	11.98
Nicaragua	54.04	45.96	81.59	18.41	52.46	47.54	81.02	18.98
Panama	44.29	55.71	80.83	19.17	42.71	57.29	79.81	20.19
Paraguay	45.32	54.68	77.11	22.89	46.75	53.25	76.75	23.25
Peru	33.32	66.68	75.58	24.42	33.17	66.83	73.04	26.96
Uruguay	35.08	64.92	80.39	19.61	41.75	58.25	85.46	14.54
Total	47.83	52.17	80.37	19.63	48.60	51.40	80.69	19.31

Note. Calculations are based on senate weights. The first two columns and last two columns for each grade sum up to 100% according to our classification of levels of education in Table 7

D | TEST SCORE SUMMARY STATISTICS

The scores were computed using the SERCE scale which has mean 500 and standard deviation 100. using individual student weights from test score datasets.

TABLE D13 Reading test score summary statistics - SERCE (2006)

Country Name	Grade 3							Grade 6						
	Min	p25	p50	p75	Max	Mean	Count	Min	p25	p50	p75	Max	Mean	Count
Argentina	98.88	451.06	515.81	572.58	878.48	514.30	4,356	68.90	444.48	501.90	575.40	970.19	511.43	4,471
Brazil	98.88	449.81	505.87	565.22	878.48	507.29	4,706	203.95	457.62	515.41	584.40	970.19	523.26	4,433
Chile	137.64	504.77	564.90	621.90	878.48	564.07	4,742	188.33	483.80	542.23	607.28	970.19	549.30	5,423
Colombia	98.88	450.90	508.45	567.88	878.48	513.55	4,793	203.95	459.36	513.48	574.57	970.19	518.37	5,182
Costa Rica	171.85	505.87	565.22	621.90	878.48	566.70	3,688	223.71	502.36	556.84	618.40	951.17	564.03	3,229
Cuba	141.71	544.15	621.90	701.69	878.48	627.44	4,919	246.77	515.13	595.71	668.29	970.19	597.18	5,505
Dominican Republic	98.88	353.11	410.42	455.13	877.62	399.52	2,617	73.03	381.18	429.78	474.52	761.54	428.93	2,638
Ecuador	98.88	405.73	462.57	519.33	861.49	457.34	3,894	-48.33	396.61	448.80	502.36	835.50	448.66	3,840
El Salvador	101.85	448.71	504.77	562.79	878.48	506.03	5,503	134.77	434.92	486.93	542.23	949.42	491.94	4,822
Guatemala	98.88	397.43	442.99	501.64	861.49	447.45	5,341	-45.30	399.92	448.80	500.25	855.89	451.48	4,246
Nicaragua	101.85	428.90	469.38	519.33	844.27	472.99	4,405	135.51	429.78	473.33	516.33	951.17	474.91	4,797
Panama	98.88	412.62	469.15	527.71	878.48	473.33	4,998	126.78	416.46	472.04	539.11	951.17	477.81	4,227
Paraguay	98.88	410.42	469.15	537.58	878.48	474.82	3,546	-45.30	399.92	458.35	522.11	930.59	460.26	3,148
Peru	98.88	412.22	469.15	527.71	877.62	473.06	4,331	134.77	416.46	473.33	528.54	835.50	475.55	4,241
Uruguay	98.88	462.57	521.68	586.36	878.48	524.85	5,806	18.83	473.51	539.85	607.28	970.19	545.17	5,262
Total	109.12	445.75	503.26	562.96	873.85	505.14	67,645	115.33	445.14	502.19	563.14	930.75	506.47	65,464

Note. Calculations based on individual student weight from the reading test score dataset.

TABLE D14 Mathematics test score summary statistics - SERCE (2006)

Country Name	Grade 3							Grade 6						
	Min	p25	p50	p75	Max	Mean	Count	Min	p25	p50	p75	Max	Mean	Count
Argentina	106.15	457.01	509.75	568.10	910.96	512.70	4,552	-55.01	452.99	517.12	582.61	942.07	518.75	4,441
Brazil	106.15	439.42	496.97	569.70	966.91	508.54	4,775	-11.87	442.28	500.08	555.69	1126.16	502.40	4,579
Chile	128.53	472.19	525.74	586.48	924.55	532.36	4,690	-55.01	460.26	520.45	582.61	1000.80	520.56	5,394
Colombia	106.15	453.01	492.97	550.51	982.89	504.01	4,808	-46.07	446.54	494.05	550.39	984.68	495.68	5,138
Costa Rica	128.53	488.97	538.53	588.08	877.39	542.16	3,559	120.97	487.91	543.94	606.73	1061.40	550.69	2,857
Cuba	209.25	551.31	640.83	729.54	982.89	648.45	4,918	218.27	525.65	629.18	735.21	1135.41	638.68	5,500
Dominican Republic	106.15	356.30	413.85	453.01	663.20	399.16	2,898	7.05	380.22	418.16	464.21	723.67	419.01	2,664
Ecuador	106.15	430.63	474.59	524.14	910.96	477.13	4,010	-49.61	406.21	460.26	520.45	787.39	463.32	3,862
El Salvador	128.53	439.42	486.58	536.93	897.38	489.21	5,563	136.05	427.83	477.41	529.60	861.30	478.93	4,821
Guatemala	106.15	415.45	457.01	507.36	897.38	457.48	5,475	-55.01	405.38	459.54	506.52	736.45	455.76	4,294
Nicaragua	106.15	435.43	472.19	522.54	856.62	474.11	4,258	-46.07	408.29	460.26	510.05	863.38	460.88	4,815
Panama	106.15	420.24	468.99	507.36	877.39	468.10	4,980	-46.07	405.38	452.99	504.34	865.25	455.55	4,497
Paraguay	106.15	422.64	483.38	550.51	968.51	489.21	3,574	-55.01	423.36	469.93	529.60	865.25	473.38	3,189
Peru	106.15	420.24	472.19	523.34	968.51	475.49	4,343	54.55	423.36	483.76	554.02	1133.95	490.49	4,229
Uruguay	106.15	472.19	536.93	604.06	982.89	541.32	5,971	-55.01	513.69	582.61	649.24	1111.61	582.72	5,359
Total	118.09	447.59	500.77	558.15	918.71	504.47	68,374	4.45	444.34	503.25	565.05	958.56	505.66	65,639

Note. Calculations based on individual student weight from the mathematics test score dataset.

TABLE D15   Reading test score summary statistics - TERCE (2013)

Country Name	Grade 3							Grade 6						
	Min	p25	p50	p75	Max	Mean	Count	Min	p25	p50	p75	Max	Mean	Count
Argentina	283.19	471.08	519.62	561.11	776.09	517.41	1,824	272.12	452.19	507.31	565.19	756.28	509.03	1,956
Brazil	241.63	473.43	525.88	572.07	776.09	524.16	1,774	272.12	473.32	522.93	586.32	805.11	529.41	1,650
Chile	321.55	534.50	575.21	621.40	776.09	575.03	2,458	229.86	501.80	563.35	615.72	805.11	558.19	2,749
Colombia	252.66	471.86	520.40	561.11	776.09	521.68	2,641	286.82	476.07	522.93	581.73	805.11	528.93	2,950
Costa Rica	283.19	502.40	543.89	590.08	776.09	545.03	2,290	307.03	495.37	546.82	597.34	805.11	547.12	2,291
Dominican Republic	241.63	410.02	454.64	503.96	714.56	456.29	1,672	204.52	408.09	454.94	507.31	805.11	459.16	2,230
Ecuador	248.74	455.42	508.66	555.63	776.09	509.98	3,090	204.52	434.73	490.77	546.82	768.23	492.86	3,411
Guatemala	252.66	452.29	500.83	543.89	776.09	499.15	2,562	229.86	438.41	489.85	537.63	805.11	490.53	2,786
Honduras	248.74	454.64	502.40	543.89	775.62	501.46	2,275	261.09	427.38	479.75	531.20	805.11	481.27	2,578
Nicaragua	241.63	435.85	485.96	525.88	718.47	482.94	2,079	235.37	432.89	479.75	531.20	712.18	480.61	2,363
Panama	248.74	449.16	500.83	543.11	745.88	494.80	1,775	235.37	437.49	489.85	545.90	805.11	489.23	2,023
Paraguay	248.74	435.07	485.96	525.88	714.56	483.43	1,630	267.53	419.11	468.72	522.93	768.23	472.90	1,871
Peru	252.66	473.43	522.75	572.07	776.09	523.00	2,951	204.52	446.68	507.31	565.19	805.11	506.69	2,987
Uruguay	256.57	473.43	525.88	579.90	776.09	526.90	1,646	281.31	468.72	531.20	584.48	805.11	534.58	1,648
Total	259.38	465.79	514.30	559.12	763.78	513.66	30,667	245.94	450.81	504.03	558.42	789.89	505.61	33,493

Note. Calculations based on individual student weight from the reading test score dataset.

TABLE D16   Mathematics test score summary statistics - TERCE (2013)

Country Name	Grade 3							Grade 6						
	Min	p25	p50	p75	Max	Mean	Count	Min	p25	p50	p75	Max	Mean	Count
Argentina	249.23	485.00	538.55	591.30	815.08	536.67	1,838	222.45	474.98	526.94	583.06	843.22	530.69	2,057
Brazil	324.36	486.60	546.54	597.69	815.92	546.86	1,742	268.17	464.59	516.55	573.71	843.22	523.32	1,800
Chile	324.36	538.55	589.70	633.65	815.08	586.09	2,620	280.64	518.63	578.90	637.10	843.22	583.88	3,242
Colombia	249.23	469.81	520.96	571.31	815.92	522.21	2,564	175.18	464.59	510.31	563.31	843.22	517.98	3,257
Costa Rica	359.52	516.97	556.13	597.69	815.08	558.99	2,291	295.19	484.33	532.14	583.06	842.87	536.75	2,696
Dominican Republic	242.84	404.28	447.44	498.59	750.34	452.29	1,759	175.18	396.00	440.69	484.33	757.65	439.92	2,239
Ecuador	242.84	469.81	519.37	572.91	815.92	524.68	3,055	246.35	453.16	512.39	570.59	843.22	514.88	3,636
Guatemala	242.84	454.63	501.78	548.94	787.90	503.57	2,474	175.18	435.49	484.33	534.22	842.87	489.92	2,851
Honduras	258.82	461.82	507.38	556.13	785.50	511.41	2,197	230.76	437.57	478.10	531.10	843.22	482.31	2,605
Nicaragua	232.45	445.04	485.80	538.55	787.90	491.65	2,030	175.18	419.90	462.51	505.12	758.69	465.16	2,380
Panama	242.84	445.04	498.59	546.54	787.90	496.95	1,764	175.18	419.90	462.51	510.31	843.22	465.21	2,033
Paraguay	232.45	435.45	486.60	548.94	810.28	492.81	1,669	175.18	410.55	456.27	512.39	843.22	461.37	1,953
Peru	232.45	485.00	538.55	589.70	815.08	535.38	2,903	175.18	456.27	522.78	591.37	843.22	528.44	3,249
Uruguay	261.22	502.58	556.13	612.07	815.08	555.44	1,614	246.35	498.88	566.43	631.90	843.22	571.26	1,892
Total	264.04	473.76	523.11	573.48	803.58	524.57	30,520	216.09	454.46	506.15	560.80	832.22	510.52	35,890

Note. Calculations based on individual student weight from the mathematics test score dataset.

E | TESTING FOR COMPOSITIONAL EFFECTS

Tables E17 and E18 present a test for the compositional effect, namely they test if maternal education drives mobility.

TABLE E17   Correlation between absolute mobility (math) and proportion of high educated mothers (mothers with at least upper secondary)

Panel A

Dependent variable	Absolute mobility (math)				
	Cohort 1994	Cohort 1997	Cohort 2001	Cohort 2004	Pooled data
	(1)	(2)	(3)	(4)	(5)
% of mothers with at least upper secondary	0.231	0.281	0.196	0.205	0.114
	(0.234)	(0.205)	(0.228)	(0.204)	(0.171)
Observations	15	15	14	14	58
R^2	0.081	0.162	0.040	0.066	0.025

Panel B

Dependent variable	Absolute mobility (math)				
	Cohort 1994	Cohort 1997	Cohort 2001	Cohort 2004	Pooled data
	(1)	(2)	(3)	(4)	(5)
% of mothers with no education	0.004	0.493	-0.577	-0.162	0.130
	(0.581)	(0.568)	(0.631)	(0.579)	(0.141)
% of mothers with only primary education	0.225	0.575	-0.338	-0.266	0.183
	(0.627)	(0.635)	(0.693)	(0.600)	(0.275)
% of mothers with a university degree	0.529	1.558	-0.540	-0.058	0.694
	(1.300)	(1.194)	(0.966)	(0.851)	(0.506)
Observations	15	15	14	14	58
R^2	0.154	0.264	0.085	0.067	0.093

Note. Panel A presents the estimates of absolute mobility (math) on the proportion of mothers with at least upper secondary education by cohort and by pooling the data. Panel B presents the estimates of absolute mobility (math) on the proportion of mothers with different education level by cohort and by pooling the data. Standard errors in parenthesis are estimated using cluster standard errors at country level (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).

TABLE E18   Correlation between the expected rank (math) of children with parents with at least upper secondary and proportion of high educated mothers (mothers with at least upper secondary)
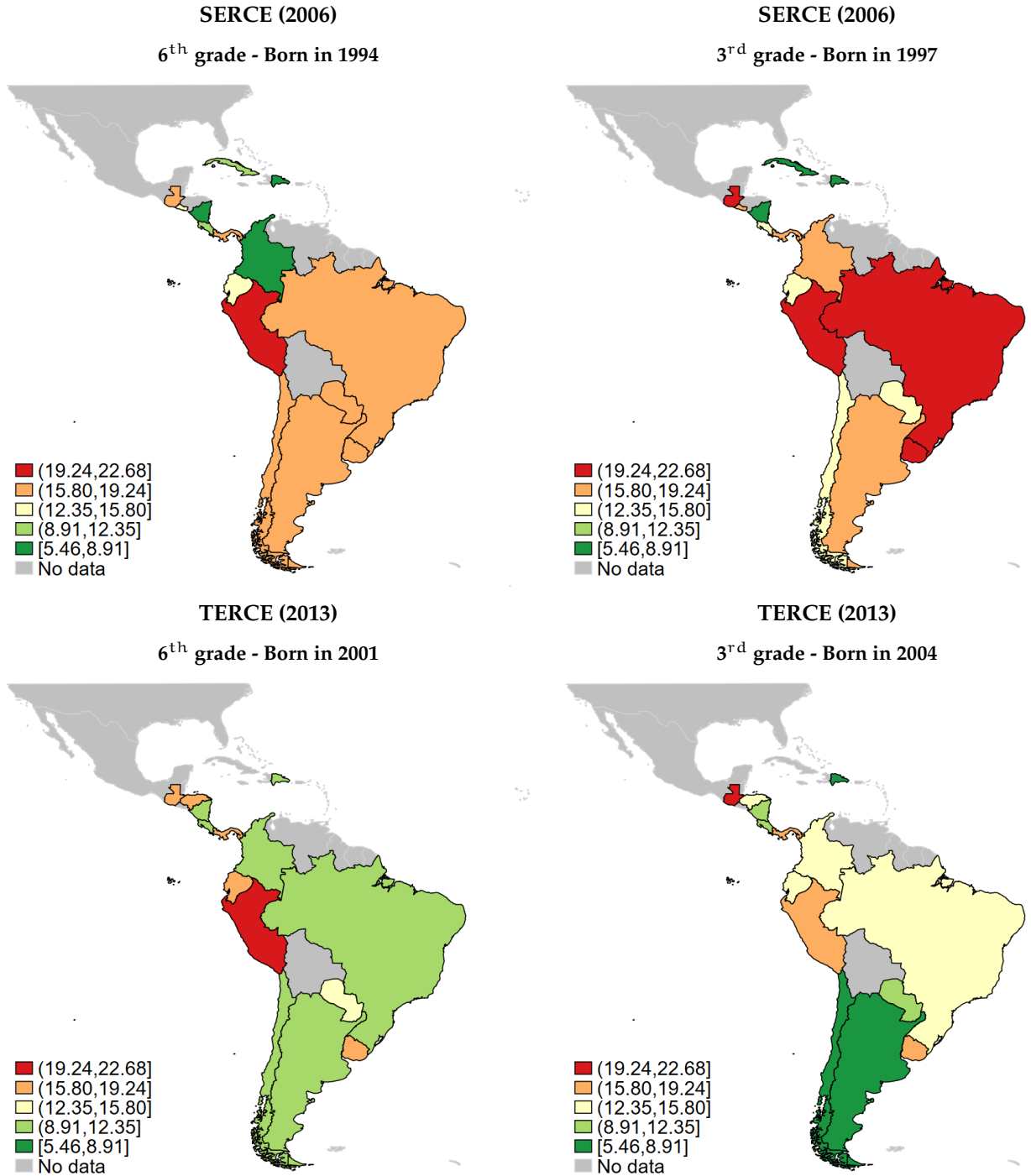
Panel A

Dependent variable	Expected rank (math) of children with parents with at least upper secondary				
	Cohort 1994	**Cohort 1997**	**Cohort 2001**	**Cohort 2004**	**Pooled data**
	(1)	(2)	(3)	(4)	(5)
% of mothers with at least upper secondary	0.231	0.281	0.196	0.205	0.114
	(0.234)	(0.205)	(0.228)	(0.204)	(0.171)
Observations	15	15	14	14	58
R^2	0.081	0.162	0.040	0.066	0.025

Panel B

Dependent variable	Expected rank (math) of children with parents with at least upper secondary				
	Cohort 1994	**Cohort 1997**	**Cohort 2001**	**Cohort 2004**	**Pooled data**
	(1)	(2)	(3)	(4)	(5)
% of mothers with no education	0.004	0.493	-0.577	-0.162	0.130
	(0.581)	(0.568)	(0.631)	(0.579)	(0.141)
% of mothers with only primary education	0.225	0.575	-0.338	-0.266	0.183
	(0.627)	(0.635)	(0.693)	(0.600)	(0.275)
% of mothers with a university degree	0.529	1.558	-0.540	-0.058	0.694
	(1.300)	(1.194)	(0.966)	(0.851)	(0.506)
Observations	15	15	14	14	58
R^2	0.154	0.264	0.085	0.067	0.093

Note. Panel A presents the estimates of expected rank (math) of children with parents with at least upper secondary on the proportion of mothers with at least upper secondary education by cohort and by pooling the data. Panel B presents the estimates of expected rank (math) of children with parents with at least upper secondary on the proportion of mothers with different education level by cohort and by pooling the data. Standard errors in parenthesis are estimated using cluster standard errors at country level (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

F | READING MOBILITY AT THE LATIN AMERICA LEVEL

FIGURE F1   Heat map of immobility: expected percentile improvement in reading test score
when the maximum of mother's and father's educational attainment is at least completed upper
secondary. Reading Latin American rank

Note. The heat maps present the intergenerational mobility for each country and cohort (the estimates are based on equation 2,
regression of the rank reading score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at
least completed upper secondary). The rank is computed at the Latin American level. Green areas are the most mobile and red
areas are the least mobile. The intervals are the same for each year. The median age of 6th grade students is 12 years old, while the
median age of 3rd grade students is 9 years old.

TABLE F19   Average rank of reading test score of children with at least one parent with upper secondary at the Latin American level

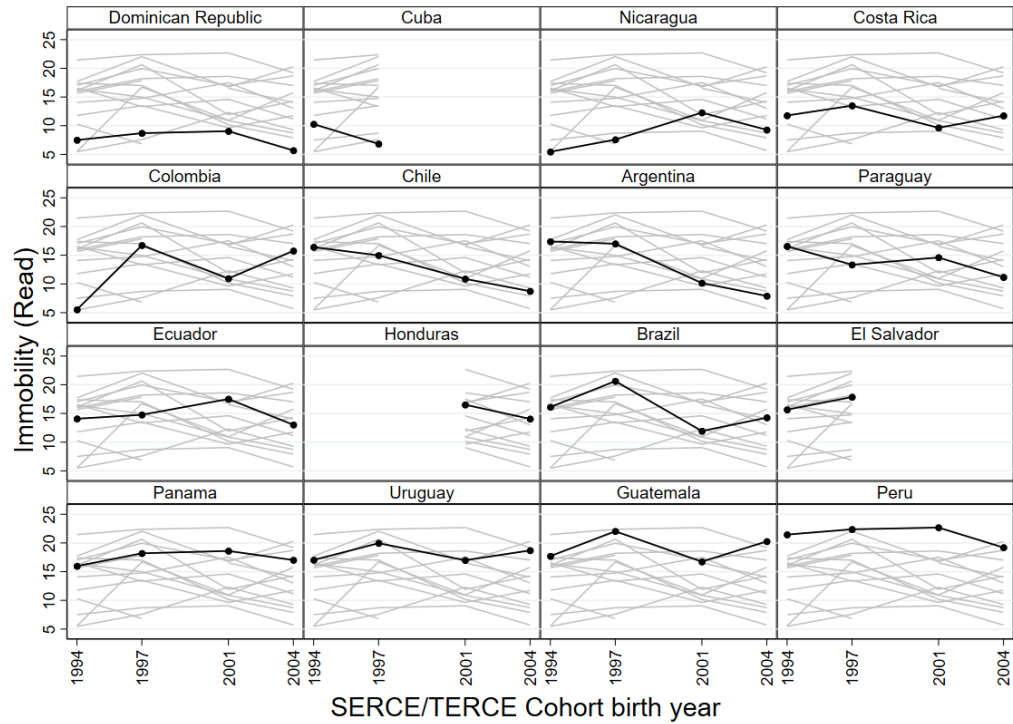| Country	Average rank of children with educated parents ($\alpha+\beta$)			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
country				
Argentina	59.69	64.31	52.18	52.98
Brazil	64.99	67.05	60.46	59.28
Chile	68.02	74.65	67.54	73.99
Colombia	57.05	66.79	57.86	56.29
Costa Rica	73.91	78.56	66.24	66.35
Cuba	73.50	80.95		
Dominican Republic	29.53	27.83	33.64	30.02
Ecuador	41.04	46.24	51.35	53.45
El Salvador	57.94	67.50		
Guatemala	47.88	53.77	52.02	55.52
Honduras			50.05	52.82
Nicaragua	43.37	46.80	43.63	41.00
Panama	47.40	50.56	48.03	48.13
Paraguay	47.06	51.49	41.39	41.56
Peru	50.30	52.87	53.51	57.75
Uruguay	72.46	72.78	62.37	59.90
Total	55.61	60.14	52.88	53.50

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

TABLE F20   Mobility (coefficient of parental education dummy in 2) based on Reading scores ranked at the Latin American level

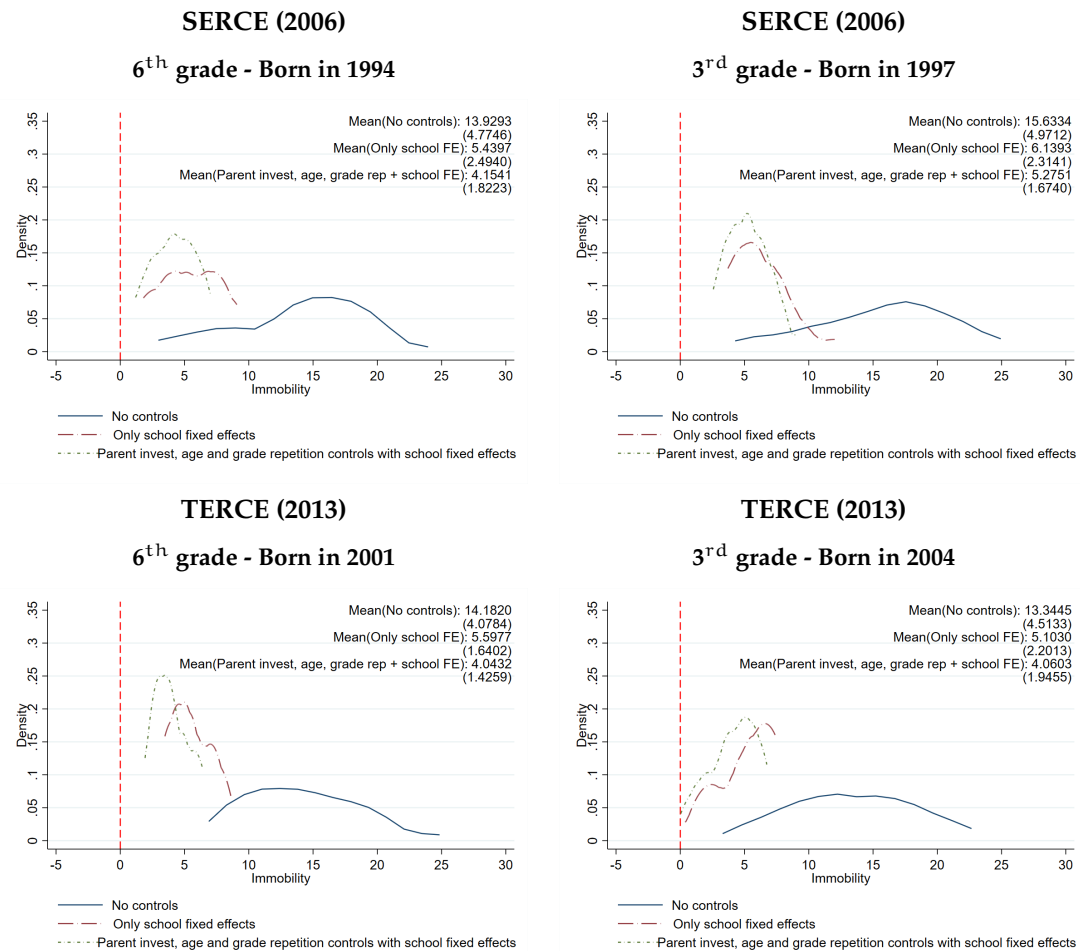| Country	Immobility				Absolute Mobility			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	17.40	17.01	10.16	7.90	42.29	47.30	42.02	45.08
Brazil	16.11	20.64	11.93	14.27	48.88	46.41	48.53	45.02
Chile	16.41	14.98	10.88	8.74	51.60	59.67	56.66	65.25
Colombia	5.53	16.72	10.95	15.76	51.53	50.07	46.91	40.53
Costa Rica	11.78	13.50	9.64	11.75	62.13	65.06	56.61	54.60
Cuba	10.28	6.84			63.23	74.12		
Dominican Republic	7.50	8.70	9.05	5.69	22.02	19.13	24.58	24.33
Ecuador	14.08	14.77	17.52	13.02	26.97	31.47	33.83	40.43
El Salvador	15.66	17.86			42.28	49.64		
Guatemala	17.71	22.04	16.74	20.27	30.17	31.73	35.28	35.25
Honduras			16.52	14.05			33.53	38.77
Nicaragua	5.46	7.58	12.28	9.28	37.90	39.21	31.35	31.72
Panama	15.97	18.20	18.61	17.02	31.43	32.36	29.42	31.10
Paraguay	16.57	13.34	14.60	11.16	30.49	38.15	26.79	30.40
Peru	21.45	22.37	22.68	19.20	28.85	30.49	30.83	38.55
Uruguay	17.03	19.96	16.98	18.69	55.43	52.82	45.39	41.21
Total	13.93	15.63	14.18	13.34	41.68	44.51	38.69	40.16

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data

FIGURE F2 Trends in immobility: expected percentile improvement in reading test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Reading Latin American rank
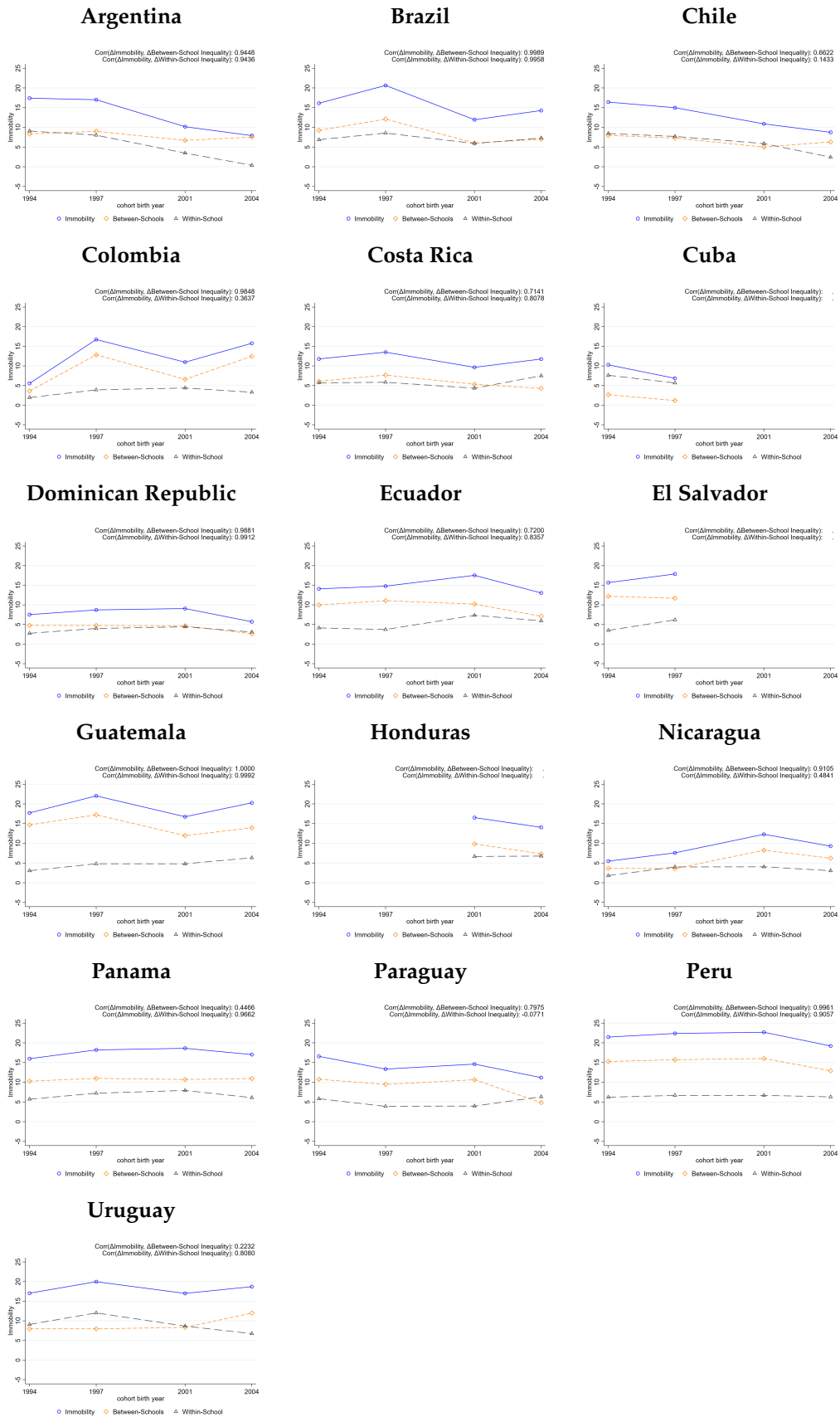

Note. The graphs present the immobility for each country and cohort (the estimates are based on equation 2, regression of the rank reading score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the Latin American level. Birth year of SERCE third-grade cohort is 1997, and that of SERCE sixth-grade cohort is 1994. Birth year of TERCE third-grade cohort is 2004, and that of TERCE sixth-grade cohort is 2001.

FIGURE F3 Distributions of intergenerational mobility measures (reading) across Latin American countries without controls and after controlling for country-specific characteristics. (Latin American rank)
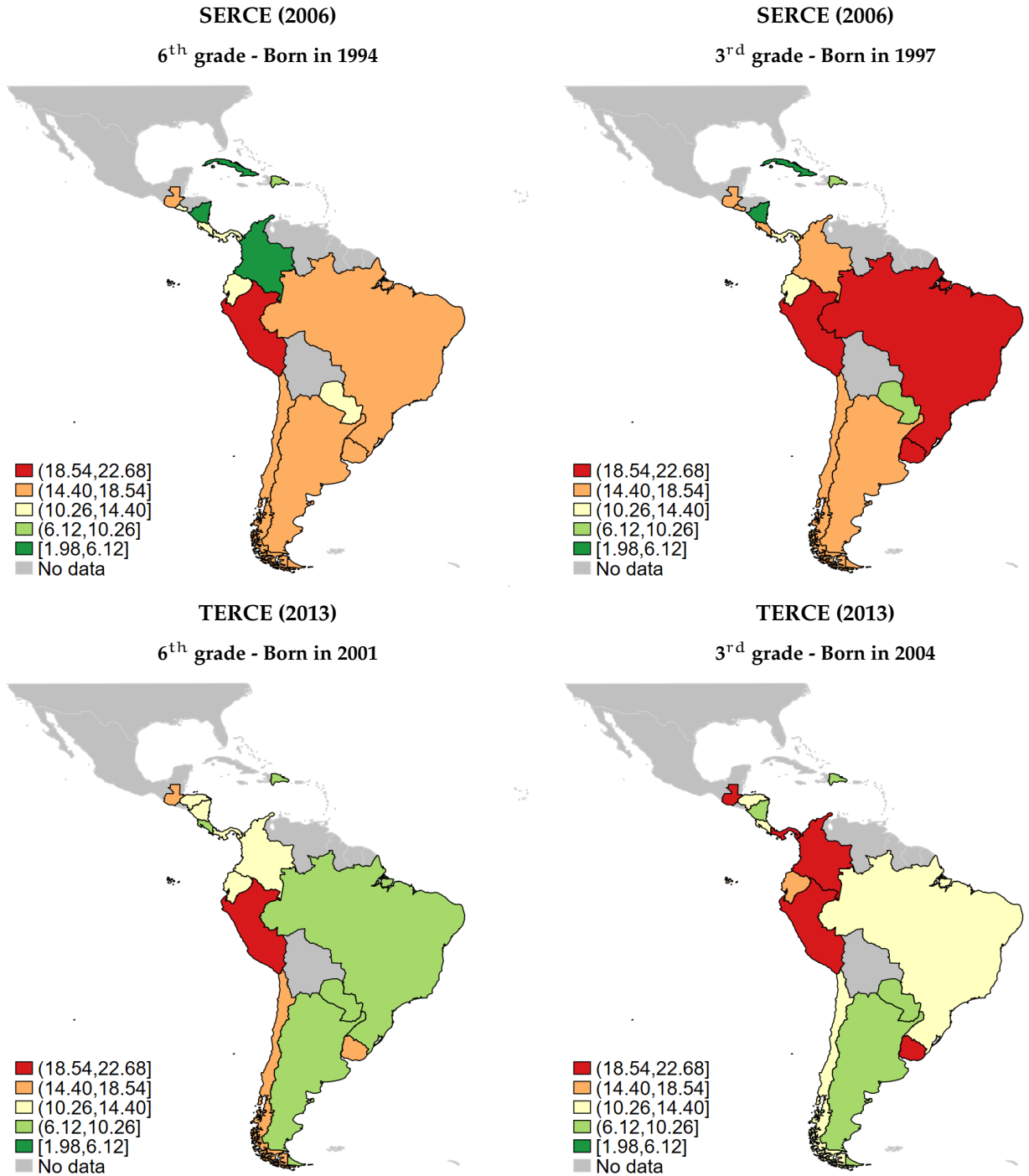

Note. The Figures present the distributions of intergenerational mobility measures (rank of math score on dummy equal to 1 if the mother has at least upper secondary) across LAC countries without controls and with controls. The rank is computed at the LAC level. 'No controls' is the intergenerational mobility measure without controls, 'Only school fixed effects' is the intergenerational mobility measure after controlling for school fixed effects and 'Parent invest, age, grade repetition' is the mobility measure after controlling for these variables. Higher values on the x-axis indicate less mobile countries. The distribution is estimated nonparametrically, using an Epanechnikov kernel.

FIGURE F4 Decomposition of the mobility (read) trends in within and between-school variation by country. (Latin American rank)
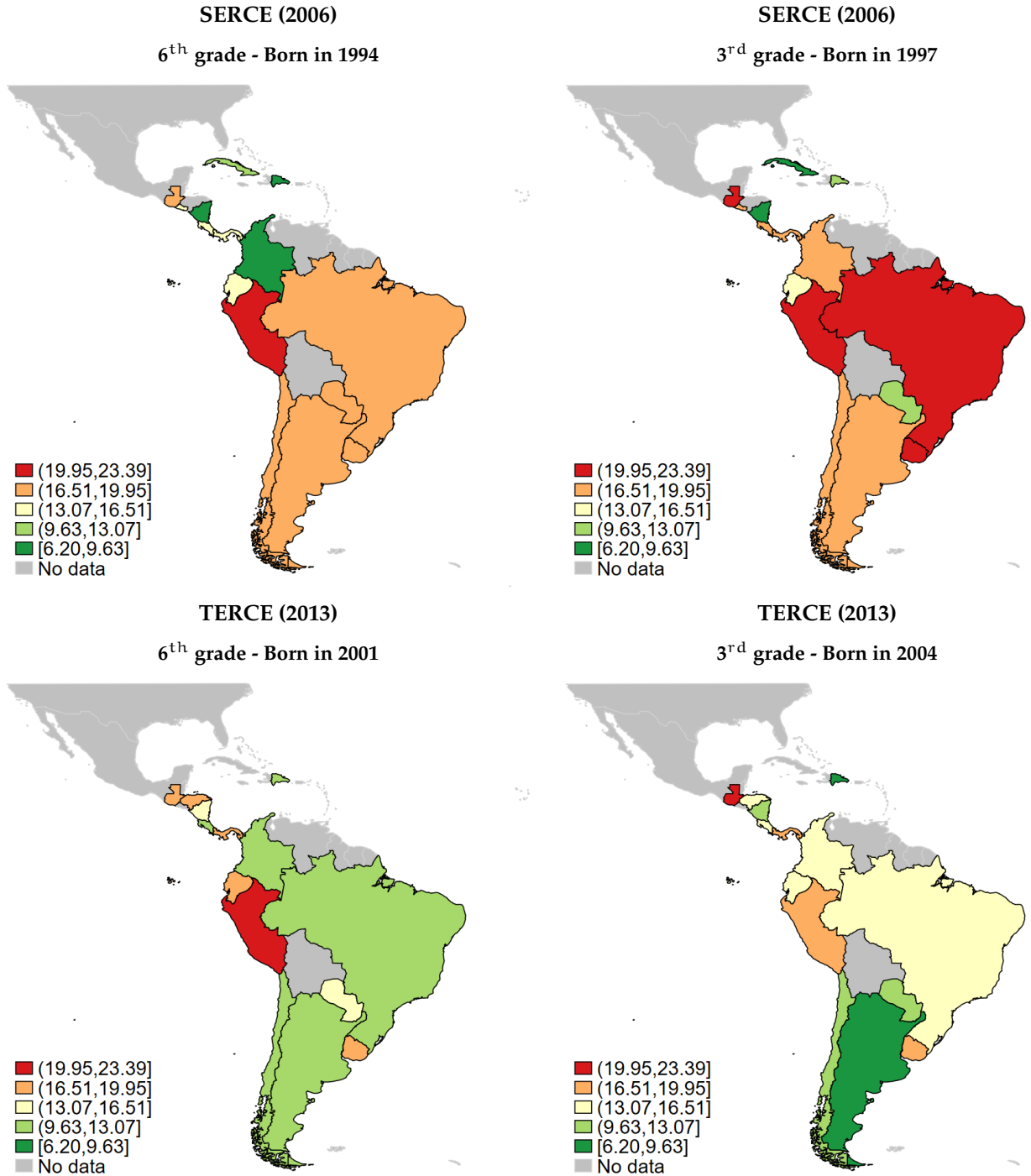
G | MOBILITY MEASURE (COUNTRY RANK)

FIGURE G5   Heat map of immobility: expected percentile improvement in math test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Math country rank

Note. The heat maps present the intergenerational mobility for each country and cohort (the estimates are based on equation 3, regression of the rank math score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the country level. Green areas are the most mobile and red areas are the least mobile. The intervals are the same for each year. The median age of 6th grade students is 12 years old, while the median age of 3rd grade students is 9 years old.

FIGURE G6   Heat map of immobility: expected percentile improvement in reading test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Reading country rank

SERCE (2006)

6$^{\text{th}}$ grade - Born in 1994

SERCE (2006)

3$^{\text{rd}}$ grade - Born in 1997

TERCE (2013)

6$^{\text{th}}$ grade - Born in 2001

TERCE (2013)

3$^{\text{rd}}$ grade - Born in 2004

(19.95,23.39]
(16.51,19.95]
(13.07,16.51]
(9.63,13.07]
[6.20,9.63]
No data

Note. The heat maps present the intergenerational mobility for each country and cohort (the estimates are based on equation 3, regression of the rank reading score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the country level. Green areas are the most mobile and red areas are the least mobile. The intervals are the same for each year. The median age of 6$^{\text{th}}$ grade students is 12 years old, while the median age of 3$^{\text{rd}}$ grade students is 9 years old.

TABLE G21   Average rank of math test score of children with at least one parent with upper secondary at the country level

Country	Average rank of children with educated parents ($\alpha+\beta$)			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	59.63	61.10	53.38	54.10
Brazil	63.03	65.06	55.33	56.93
Chile	57.00	56.81	53.52	53.34
Colombia	52.89	62.68	53.54	56.91
Costa Rica	58.18	60.53	54.87	55.57
Cuba	50.86	50.54		
Dominican Republic	54.41	55.31	52.85	53.94
Ecuador	58.29	57.09	56.98	57.13
El Salvador	62.54	64.82		
Guatemala	63.89	63.96	60.16	64.17
Honduras			59.35	59.47
Nicaragua	53.19	52.05	55.01	54.47
Panama	56.82	56.14	55.36	58.33
Paraguay	57.77	56.37	54.27	54.07
Peru	60.02	60.71	55.13	55.48
Uruguay	63.42	65.82	55.86	57.11
Total	58.13	59.27	55.40	56.50

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

TABLE G22   Average rank of read test score of children with at least one parent with upper secondary at the country level

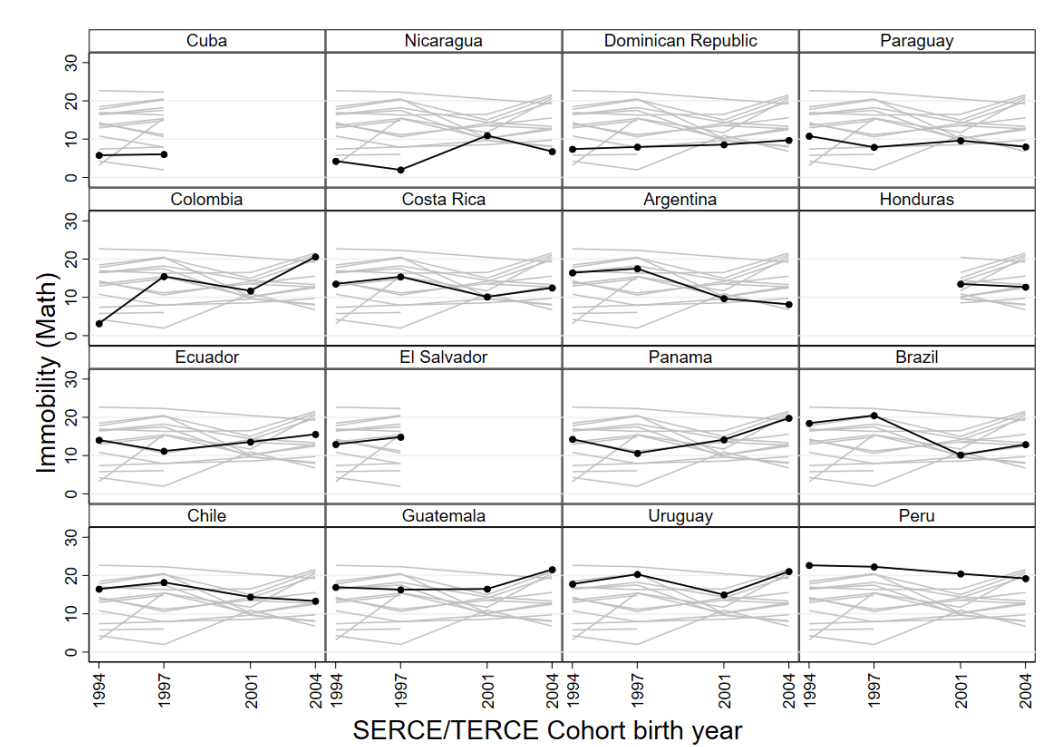| Country | Average rank of children with educated parents ($\alpha+\beta$) | | | |
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	59.74	60.43	53.57	54.21
Brazil	61.82	65.66	57.01	57.31
Chile	57.70	56.54	52.68	52.71
Colombia	55.01	63.88	53.74	55.20
Costa Rica	59.07	62.22	55.12	55.78
Cuba	51.37	50.67		
Dominican Republic	56.68	57.39	53.57	52.48
Ecuador	58.70	59.11	58.96	56.22
El Salvador	65.66	68.83		
Guatemala	65.34	69.51	60.95	63.54
Honduras			62.26	60.62
Nicaragua	54.37	56.56	55.85	55.69
Panama	58.36	60.56	58.06	57.98
Paraguay	61.87	60.50	55.89	54.50
Peru	59.91	60.83	55.73	55.17
Uruguay	63.88	66.49	56.28	56.40
Total	59.30	61.28	56.41	56.27

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

TABLE G23   Mobility (coefficient of parental education dummy in 3) based on math scores ranked at the country level

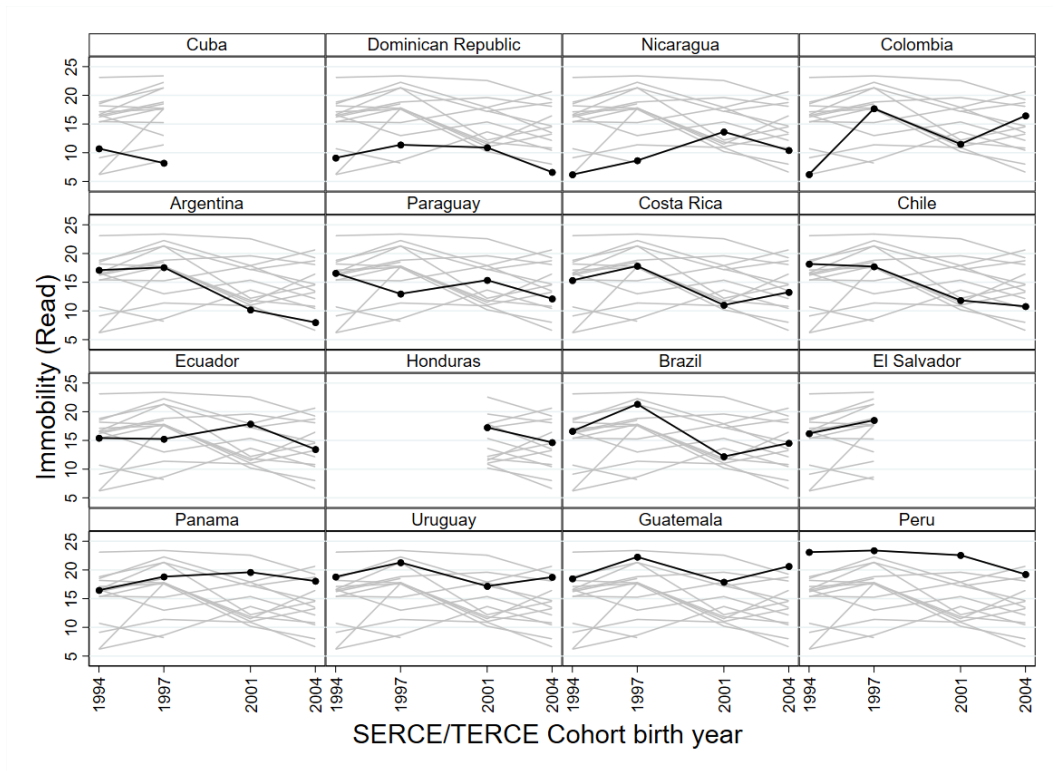| Country	Immobility				Absolute Mobility			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	16.45	17.52	9.70	8.18	43.18	43.59	43.68	45.92
Brazil	18.46	20.48	10.18	12.90	44.57	44.57	45.15	44.03
Chile	16.49	18.22	14.40	13.34	40.50	38.59	39.12	40.01
Colombia	3.17	15.47	11.71	20.62	49.72	47.21	41.83	36.29
Costa Rica	13.52	15.39	10.13	12.50	44.66	45.15	44.74	43.08
Cuba	5.80	6.05			45.07	44.49		
Dominican Republic	7.40	7.97	8.56	9.73	47.01	47.34	44.29	44.21
Ecuador	14.05	11.18	13.57	15.57	44.24	45.92	43.41	41.56
El Salvador	12.95	14.85			49.59	49.97		
Guatemala	16.95	16.31	16.50	21.57	46.94	47.65	43.66	42.60
Honduras			13.50	12.72			45.85	46.75
Nicaragua	4.27	1.98	10.95	6.78	48.92	50.07	44.07	47.69
Panama	14.29	10.62	14.16	19.78	42.53	45.52	41.20	38.55
Paraguay	10.82	7.91	9.63	8.00	46.95	48.46	44.63	46.07
Peru	22.68	22.29	20.47	19.24	37.34	38.42	34.65	36.25
Uruguay	17.78	20.32	14.99	21.07	45.63	45.50	40.87	36.04
Total	13.01	13.77	12.75	14.43	45.12	45.50	42.65	42.07

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

TABLE G24   Mobility (coefficient of parental education dummy in 3) based on Reading scores ranked at the country level

Country	Immobility				Absolute Mobility			
	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004	SERCE grade 6 1994	SERCE grade 3 1997	TERCE grade 6 2001	TERCE grade 3 2004
Argentina	17.12	17.58	10.20	8.00	42.62	42.85	43.38	46.21
Brazil	16.61	21.33	12.20	14.53	45.21	44.33	44.81	42.78
Chile	18.19	17.73	11.85	10.80	39.51	38.81	40.83	41.92
Colombia	6.22	17.69	11.51	16.45	48.79	46.18	42.24	38.75
Costa Rica	15.33	17.83	11.03	13.27	43.74	44.39	44.09	42.51
Cuba	10.72	8.20			40.65	42.47		
Dominican Republic	9.11	11.38	10.90	6.61	47.57	46.01	42.67	45.87
Ecuador	15.43	15.25	17.87	13.45	43.27	43.86	41.09	42.77
El Salvador	16.21	18.52			49.45	50.31		
Guatemala	18.50	22.27	17.90	20.64	46.85	47.24	43.05	42.90
Honduras			17.26	14.66			45.00	45.96
Nicaragua	6.20	8.65	13.64	10.42	48.17	47.91	42.21	45.27
Panama	16.47	18.83	19.61	18.07	41.89	41.73	38.45	39.91
Paraguay	16.59	12.98	15.36	12.13	45.28	47.52	40.53	42.37
Peru	23.11	23.39	22.57	19.24	36.81	37.44	33.15	35.93
Uruguay	18.81	21.29	17.19	18.76	45.07	45.20	39.09	37.64
Total	14.97	16.86	14.93	14.07	44.32	44.42	41.47	42.20

Note. Years in the second row are cohort birth years. Blank spaces in the table indicate missing data.

FIGURE G7 Trends in immobility: expected percentile improvement in math test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Math country rank

Note. The graphs present the immobility for each country and cohort (the estimates are based on equation 3, regression of the rank math score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the country level. Birth year of SERCE third-grade cohort is 1997, and that of SERCE sixth-grade cohort is 1994. Birth year of TERCE third-grade cohort is 2004, and that of TERCE sixth-grade cohort is 2001.

FIGURE G8 Trends in immobility: expected percentile improvement in reading test score when the maximum of mother's and father's educational attainment is at least completed upper secondary. Reading country rank

Note. The graphs present the immobility for each country and cohort (the estimates are based on equation 3, regression of the rank reading score on dummy equal to 1 if the maximum of mother's and father's educational attainment is at least completed upper secondary). The rank is computed at the country level. Birth year of SERCE third-grade cohort is 1997, and that of SERCE sixth-grade cohort is 1994. Birth year of TERCE third-grade cohort is 2004, and that of TERCE sixth-grade cohort is 2001.

FIGURE G9 Decomposition of the mobility (math) trends in within and between-school variation by country. (Country rank)
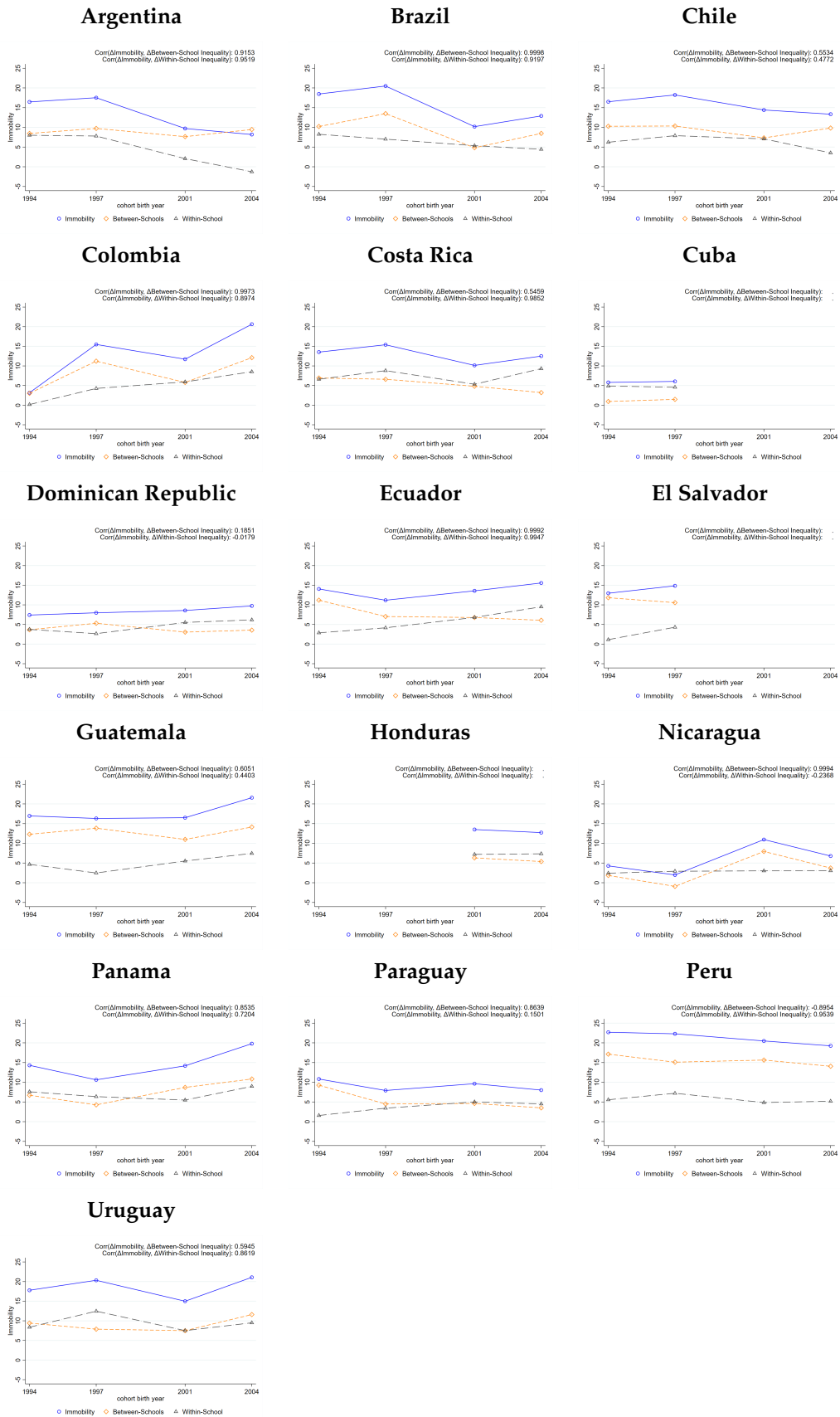
FIGURE G10 Decomposition of the mobility (read) trends in within and between-school variation by country. (Country rank)
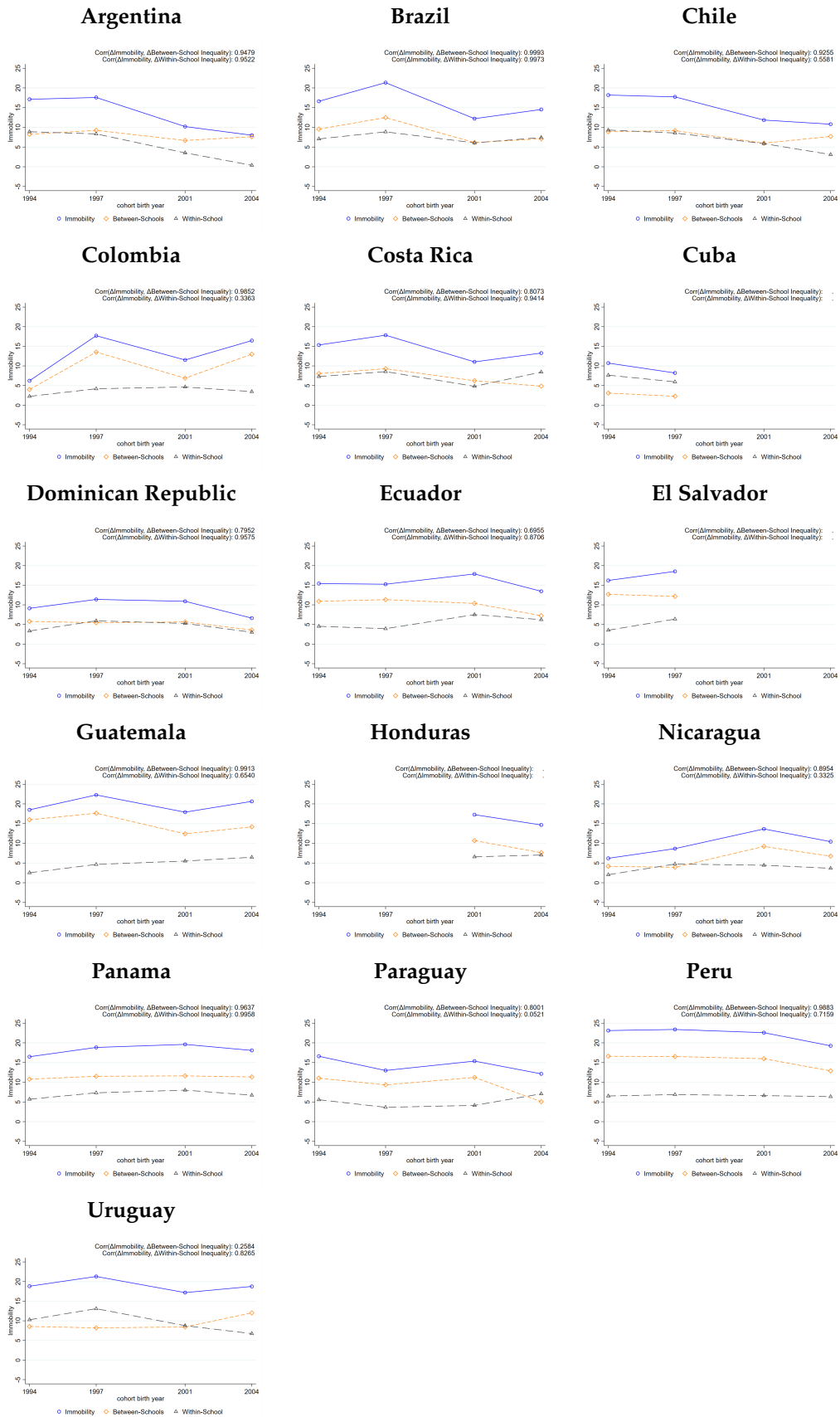
H | THE GREAT GATSBY CURVE

FIGURE H11 Gatsby curve by cohort. Immobility (Read) and Gini index (World Bank estimate) using *data from cohort birth years*
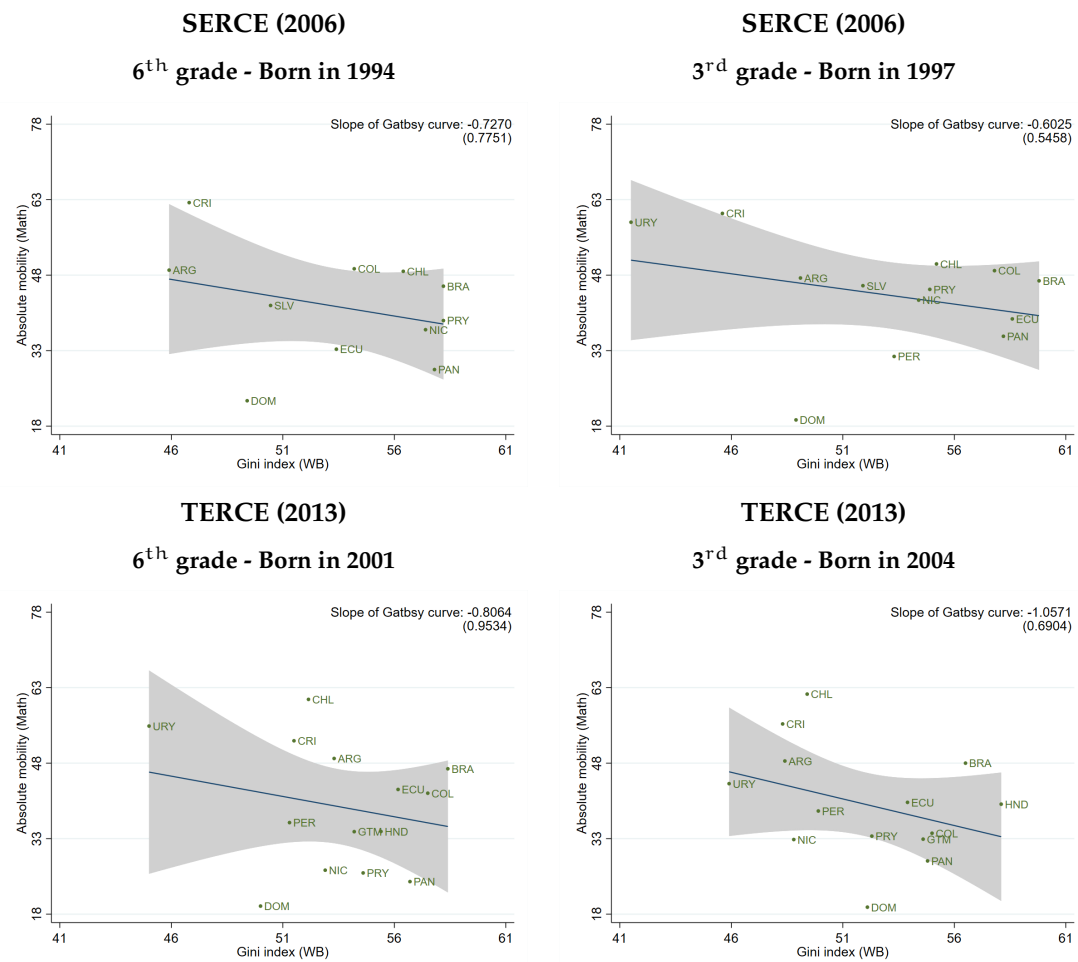

SERCE (2006)
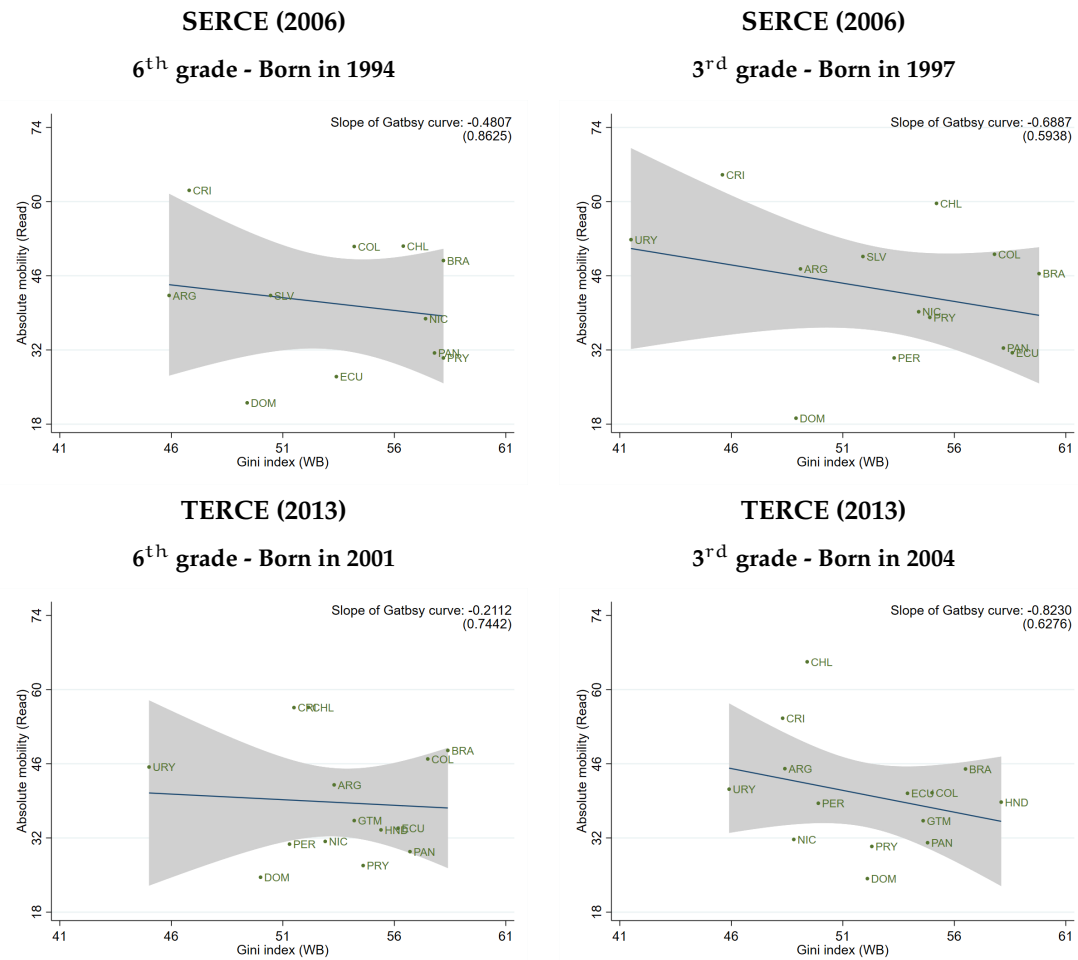#### 6th grade - Born in 1994

SERCE (2006)
3rd grade - Born in 1997

TERCE (2013)
6th grade - Born in 2001

TERCE (2013)
3rd grade - Born in 2004

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the reading score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE H12   Gatsby curve by cohort. Immobility (Read) and Gini index (World Bank estimate) using *data from SERCE/TERCE implementation years*
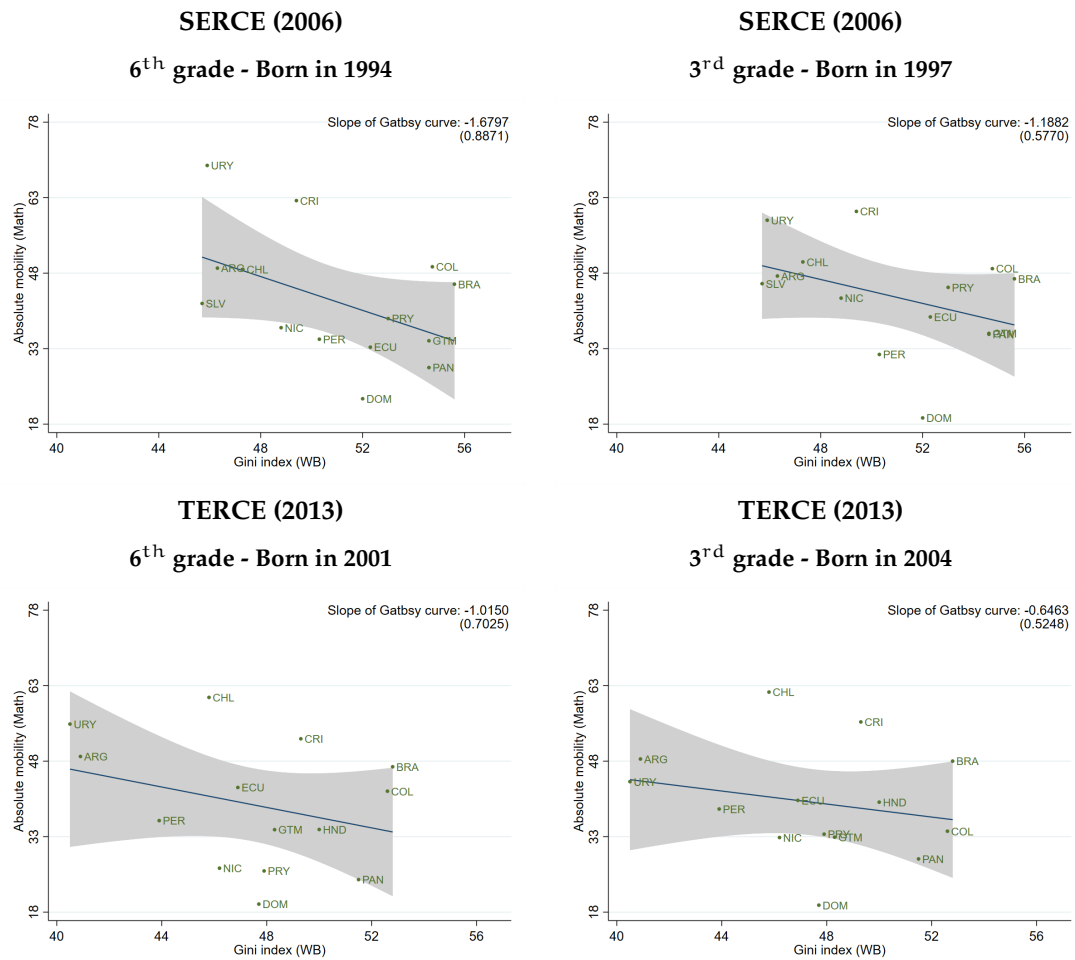

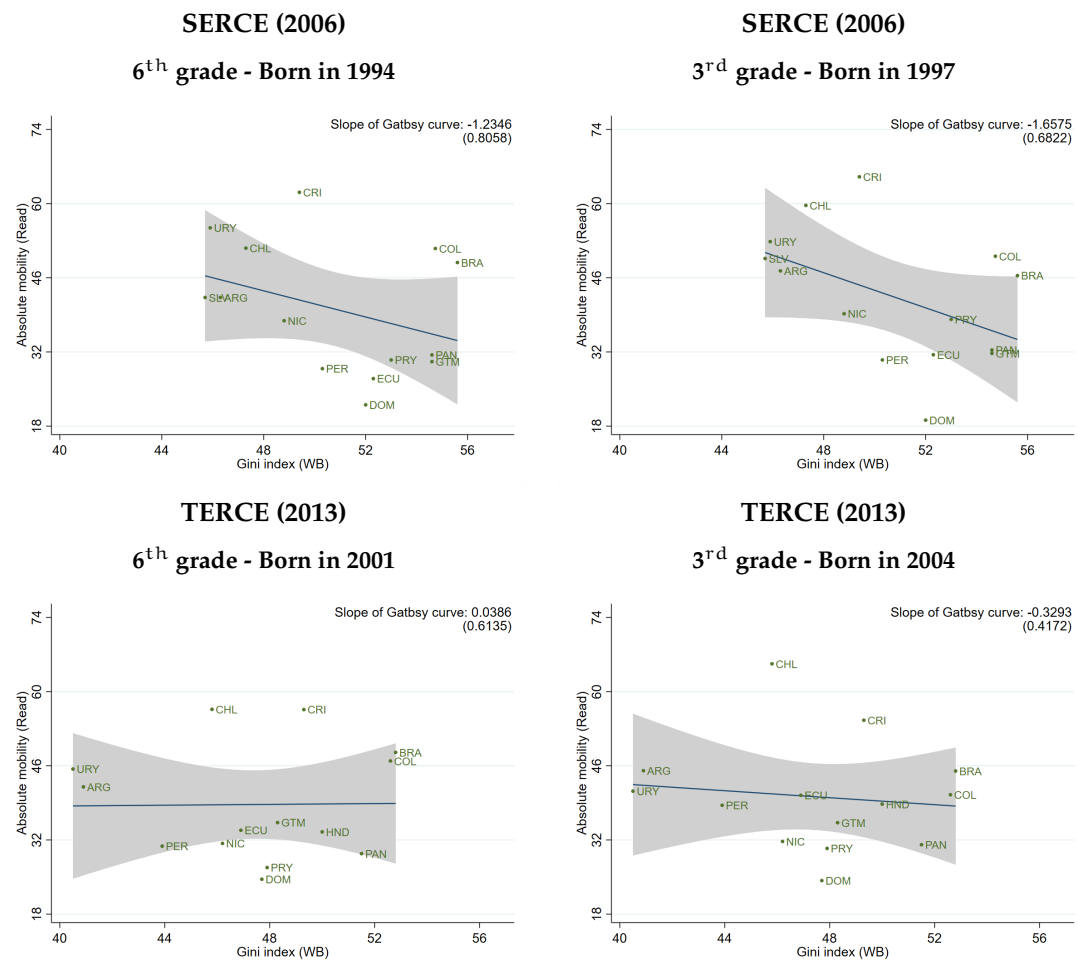Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the reading score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE H13 Gatsby curve by cohort. Absolute Mobility (math) and Gini index (World Bank estimate) using *data from cohort birth years*

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE H14   Gatsby curve by cohort. Absolute Mobility (Read) and Gini index (World Bank estimate) using *data from cohort birth years*

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the reading score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE H15 Gatsby curve by cohort. Absolute Mobility (math) and Gini index (World Bank estimate) using *data from SERCE/TERCE implementation years*

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the mathematics score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

FIGURE H16   Gatsby curve by cohort. Absolute Mobility (Read) and Gini index (World Bank estimate) using *data from SERCE/TERCE implementation years*

SERCE (2006)

6th grade - Born in 1994

SERCE (2006)

3rd grade - Born in 1997

TERCE (2013)

6th grade - Born in 2001

TERCE (2013)

3rd grade - Born in 2004

Note. The figure presents the Gatsby curve by cohort. The estimates of immobility are based on equation 2, regression of the rank of the reading score on a dummy equal to 1 if the parent with the highest education at least completed upper secondary. The rank is computed at the Latin American level. The inequality measure is the Gini index from the World Bank. Confidence interval at 95% level in grey.

I | CORRELATION BETWEEN EDUCATIONAL MOBILITY (?) AND LEARNING MOBILITY

FIGURE I17 Correlation between Educational mobility (Neidhofer et al., 2018) and Learning mobility
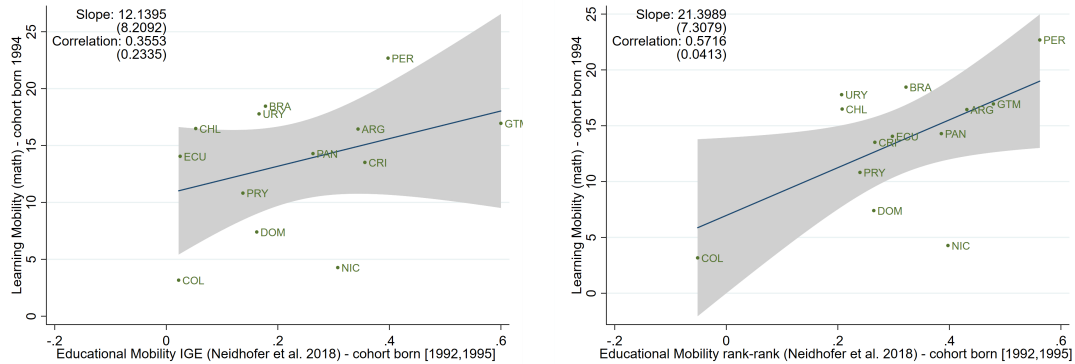
Note. The Figure presents Correlation between Educational mobility (IGE and rank-rank) (Neidhofer et al., 2018) and Learning mobility. Significance level of the correlation coefficient in parenthesis. Standard error of the slope in parethesis.

J | SOCIOECONOMIC STATUS INDEX (ESCS)

We identify the questions from the family questionnaires which are present in both waves, which are shown in Table J25. We then estimate the ESCS using the questions that are common in SERCE and TERCE so that the index is comparable across two waves. We validate the ESCS by checking how correlated its standard deviation is with commonly used measures of inequality from the World Bank, as shown in Figure J18.

TABLE J25 Shared questions in SERCE and TERCE family questionnaires

Item	Question	SERCE Question Number	TERCE Question Number
a	What is the highest educational level that the student's father and mother have completed?	2	9
b	What material is most of the floors in your home made of?	8	14
c	Do you have any of the following services (utilities) in your home?	9	15
d	Do you have any of the following assets in your home?	10	16
e	How many books are there in the child's house?	11	21

FIGURE J18   Correlation between standard deviation of socioeconomic status in SERCE(2006) and TERCE(2013) and inequality measures from the World Bank. Grade 3 and 6, Read and Maths
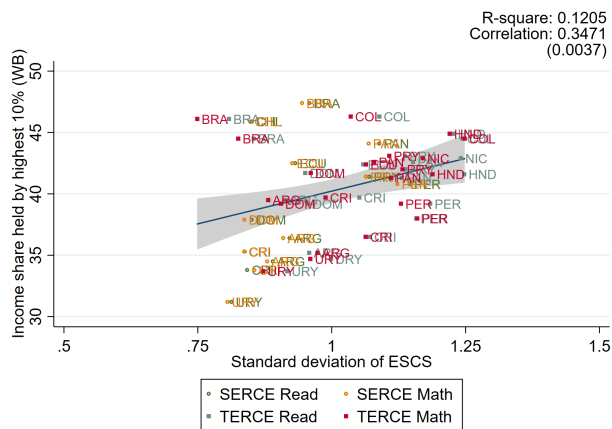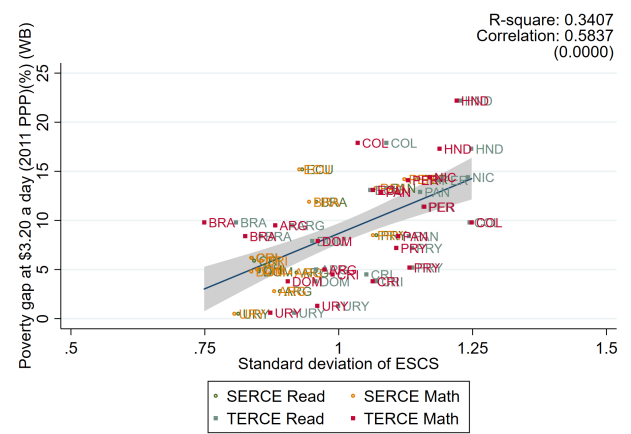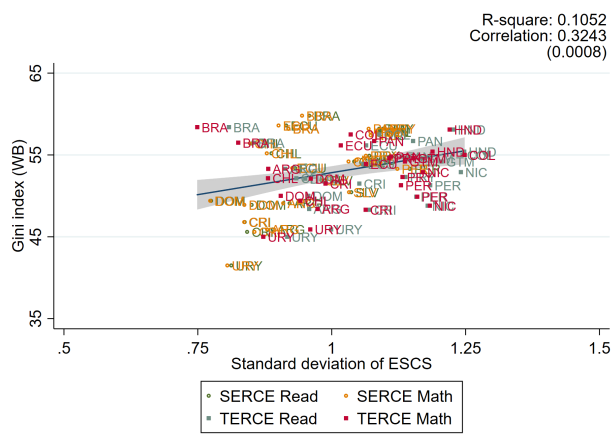
Note. The Figure presents a validation of the inequality in ESCS with the data from the World Bank on the GINI coefficient, income share held by top 10% and poverty gap. Significance level of the correlation coefficient in parenthesis.