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Gender, Education, and Skills in Latin America and the Caribbean: Evidence from the Regional Learning Assessment

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Inter-American Development Bank
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| TECHNICAL NOTE

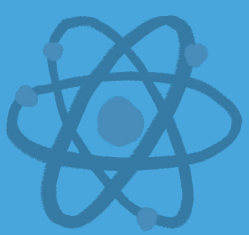
GENDER, EDUCATION, AND SKILLS IN LATIN AMERICA

Evidence from the regional learning assessment

Emma Näslund-Hadley
Haydee Alonzo







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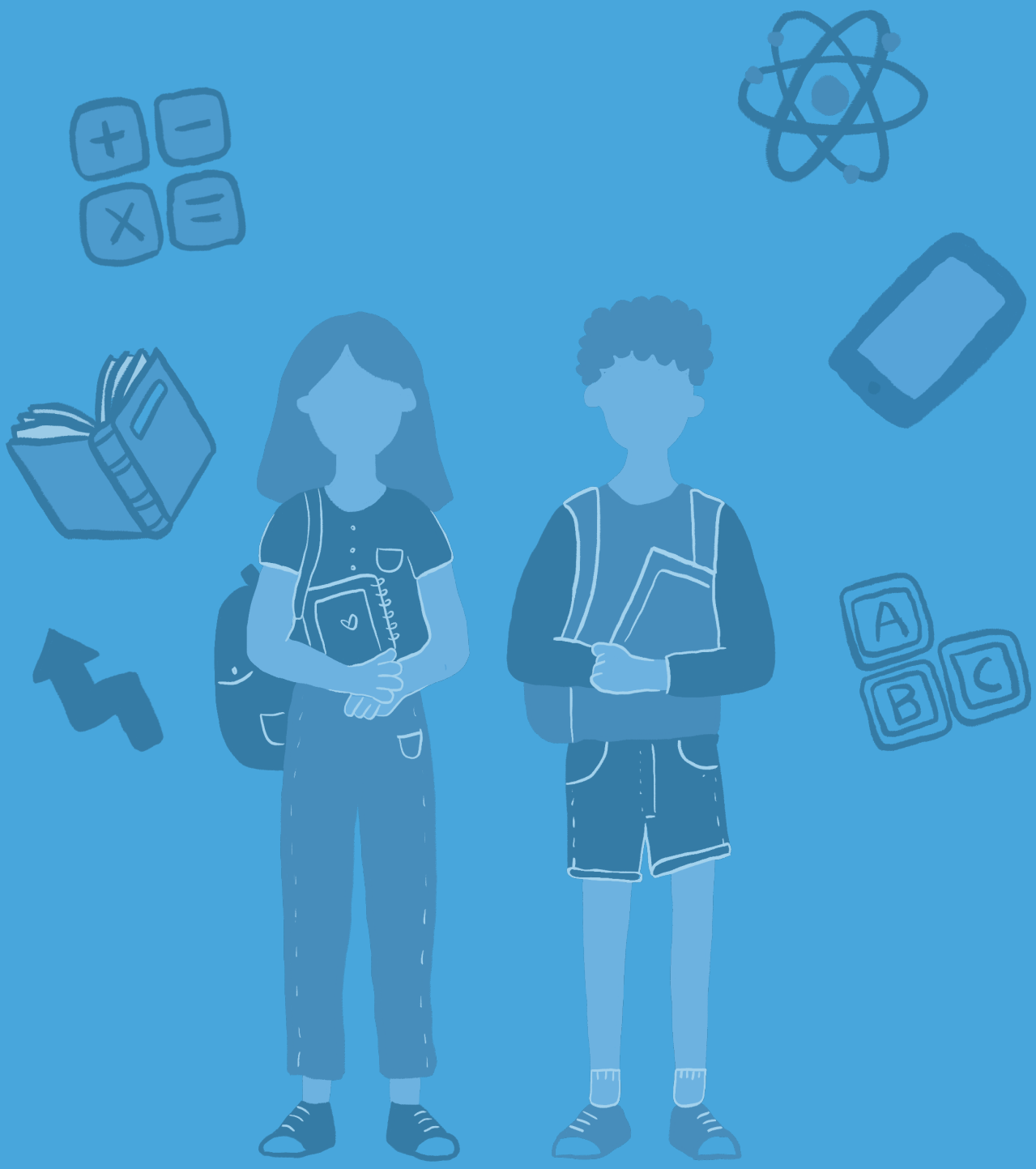
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I. INTRODUCTION

Latin America has made significant strides toward expanding access to education for all children. Persistent disparities remain, however, in the educational outcomes for boys and girls. These gender gaps are evident not only in enrollment and completion rates but also in performance across key subjects such as mathematics, language, and science. The underlying causes of these disparities are complex, shaped by societal norms, family expectations, and economic conditions that affect boys and girls differently. In some cases, girls outperform boys in certain academic areas, while boys tend to excel in STEM subjects, especially math.

Indigenous populations face additional barriers of inequality whereby gender gaps are further exacerbated by racial and ethnic disparities. The participation of Latin American countries in international student assessments—such as PISA (Programme for International Student Assessment), TIMSS (Trends in International Mathematics and Science Study), and ERCE (Regional Comparative and Explanatory Study)—provides valuable insight into these trends. While the region often performs below the average of OECD countries, gradual improvements are evident in countries. But the evaluations also highlight persistent shortfalls, including achievement gaps linked to socioeconomic status, rural-urban divides, gender, and Indigenous identity.

This study utilizes the 2019 Regional Comparative and Explanatory Study (ERCE 2019) databases to analyze educational performance across Latin American countries, focusing on gender disparities. It explores the region's progress and its challenges. Brazil, Costa Rica, Mexico, Peru, and Uruguay have all shown strengths in specific subjects, yet gender-based achievement gaps persist. The analysis reveals that girls tend to outperform boys in language and science, while boys generally excel in mathematics. Indigenous girls face particular disadvantages in mathematics, scoring lower than both Indigenous boys and non-Indigenous peers. At the same time, Indigenous boys show lower performance in language and science compared to their female and non-Indigenous counterparts.

The study delves into the factors driving these achievement gaps, finding that differences in observable characteristics, such as access to resources, do not fully explain the gender gaps in mathematics performance. Instead, less tangible factors—such as societal expectations, parental perceptions of children's abilities, and the value placed on education by families—play a significant role. These findings underscore the complex mix of gender, cultural, and socioeconomic influences in shaping educational outcomes in Latin America.

II. EDUCATION OUTCOMES IN LATIN AMERICA

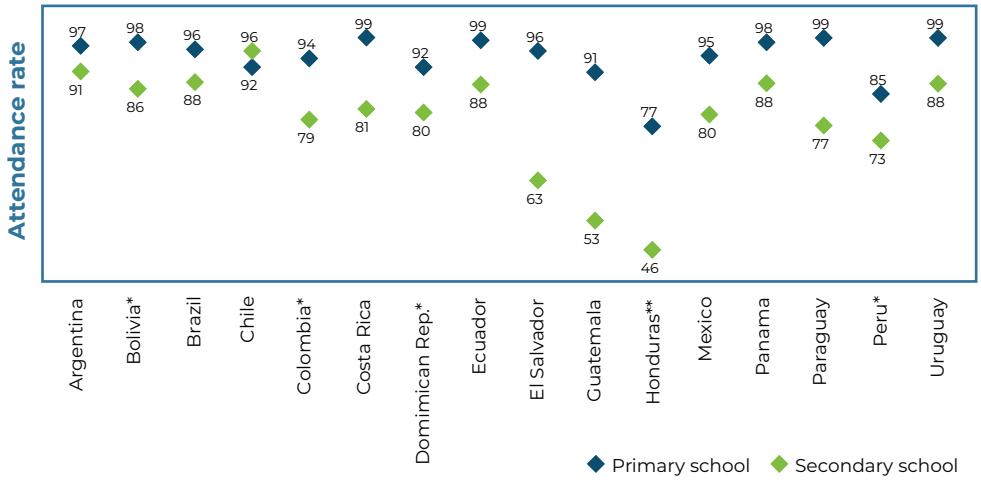
Access to primary education is nearly universal throughout the region, with net attendance rates reaching 95 percent or higher. Chile, Colombia, the Dominican Republic, Guatemala, Honduras, and Peru are slightly behind these levels (Figure 1).

The secondary level, however, presents a stark contrast to the successes seen in primary education (Figure 1). Access to secondary education lags, with only Argentina and Chile reporting net attendance rates exceeding 90 percent, while El Salvador, Guatemala, and Honduras show net attendance rates falling below 65 percent. Most countries find their secondary education attendance rates ranging from 73 percent to 88 percent. While these countries are better than the lowest performers, they still reveal major obstacles as students move from primary to secondary education. The retention of students and their advancement to higher educational levels pose persistent challenges in the region.

Regional evaluations show levels of learning achievement (LLECE, 2016; LLECE, 2021) have not improved since the Third Regional Comparative and Explanatory (TERCE) study conducted in 2013 through the Fourth Regional Comparative and Explanatory (ERCE) study in 2019 (Table 1)[1] . Brazil, Colombia, Costa Rica, Mexico, Peru, and Uruguay exceeded the regional average across subject areas and grade levels. Colombia's performance in third-grade mathematics is the only exception, as it did not exceed the regional benchmark. Notably, from the TERCE 2013 study to the ERCE 2019 study, Brazil, the Dominican Republic, and Peru showed marked improvements across all three assessments. Additionally, Honduras and Nicaragua demonstrated major improvements in mathematics for both third and sixth grades. By way of contrast, Argentina and Guatemala showed notable declines in their educational performance, highlighting disparities in the region.

Close analysis of the ERCE 2019 data reveals areas of concern across the region. Nearly half of all third graders failed to reach the Minimal Proficiency Level (MPL)[2] of 688 in mathematics and 675 in language, underscoring major challenges to foundational outcomes. By the time students reach the sixth grade, we see over 70 percent of students scored below the MPL in mathematics (789), in language (754), and in science (782), highlighting widening educational gaps as students progress through the schooling system. Particularly troubling are student performances in the Dominican Republic, Guatemala, Nicaragua, Panama, and Paraguay, which had the highest proportions of students underperforming in these subjects (Figure 2).

Figure 1: 2022 Primary and secondary level net attendance rates (percent)



* Data corresponds to 2021; ** data corresponds to 2019.

Source: IADB CIMA calculations, based on Harmonized Household Survey data.

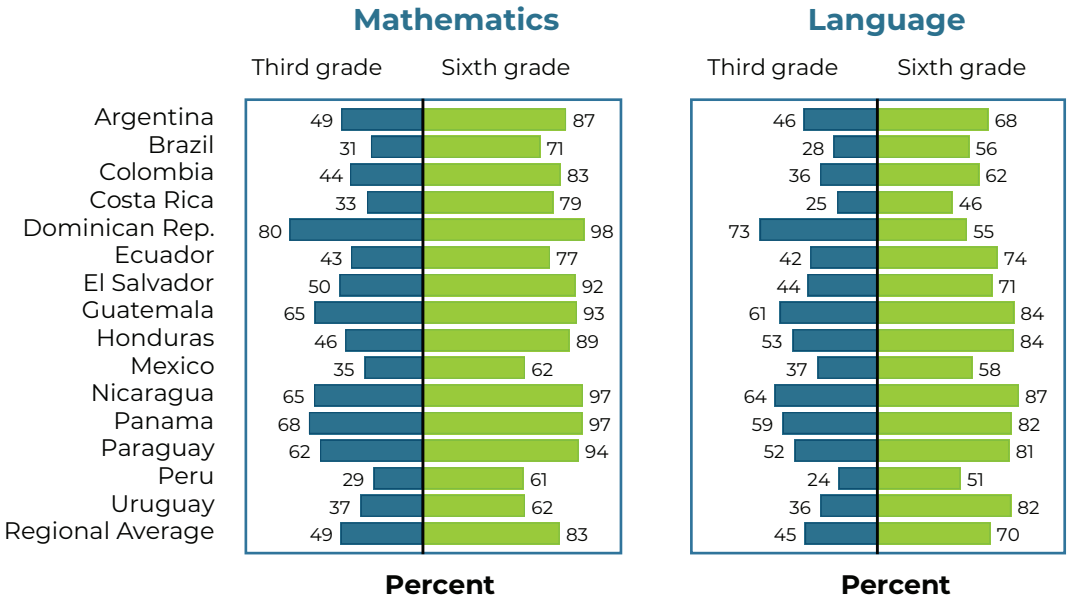
[1] The learning achievement results of the ERCE 2019 are comparable with those of the TERCE 2013, allowing countries to monitor the progress of their results between 2013 and 2019 and analyzing them in the context of the region (LLECE, 2021).
[2] The MPL in the third grade is defined as level 2 or higher, while the MPL in the sixth grade is defined as level 3 or higher (LLECE, 2021).

Table 1: TERCE 2013 and ERCE 2019 average test scores

Country	3rd Grade Mathematics		3rd Grade Language		6th Grade Mathematics		6th Grade Language		6th Grade Science	
	TERCE 2013[1]	ERCE 2019[2]	TERCE 2013	ERCE 2019	TERCE 2013	ERCE 2019	TERCE 2013	ERCE 2019	TERCE 2013	ERCE 2019
Argentina	717	690	703	689	722	690	707	698	700	682
Brazil	727	744	712	748	709	733	721	734	700	718
Colombia	694	705	714	716	705	707	726	719	733	711
Costa Rica	750	725	754	748	730	726	755	757	756	758
Dominican Republic	602	624	614	624	622	636	633	644	632	649
Ecuador	703	709	698	699	702	720	683	684	711	720
El Salvador		691		697		676		699		705
Guatemala	672	662	678	656	672	657	678	645	684	661
Honduras	680	702	681	675	661	682	662	661	668	674
Mexico	741	722	718	713	768	758	735	726	732	726
Nicaragua	653	663	654	646	643	663	662	654	668	669
Panama	664	654	670	659	644	645	671	652	675	672
Paraguay	652	666	653	675	641	647	652	657	646	657
Peru	716	740	719	753	721	759	703	741	701	723
Uruguay	742	722	728	723	765	759	736	734	725	731
Regional Average[3]	700	695	700	695	700	697	700	694	700	697

Source: [1]LLECE (2016). [2]LLECE (2021). [3]The ERCE 2019 regional average is based on the authors' calculations using ERCE 2019 databases.

Figure 2: Students performing below the Minimal Proficiency Level, third- and sixth-grade mathematics and language (percentage of students)



Source: LLECE (2021).

At the international level, the Programme for International Student Assessment (PISA) reveals that fifteen-year-olds in the region lag their OECD counterparts in mathematics, language, and science, with no notable improvements from the 2018 to the 2022 PISA study (OECD, 2019; OECD, 2023). The region ranks in the lower half of the global standings for educational quality in mathematics, language, and science. On average, students in the region are five years behind their OECD counterparts and ten years behind the leaders in these educational rankings in mathematics (Ortiz, Bos, Giambruno, & Zoido, 2023).

The 2022 results revealed that all regional participants scored below Proficiency Level 2 in mathematics on average. In language, however, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Uruguay scored above Proficiency Level 2, while only Chile, Colombia, Costa Rica, and Uruguay did so in science. In the 2022 PISA study, fifteen-year-olds from El Salvador, Guatemala, and Paraguay, recent entrants into these cross-national assessments, ranked among the lowest five in mathematics and the lowest ten in science. These rankings place them alongside the Dominican Republic. Despite being among the region's best performers in these areas, Chile and Uruguay continue to rank among the bottom performers compared to the OECD countries. The Dominican Republic and Panama showed improvements across all subjects, signaling a positive, albeit modest, shift in their educational trajectories (Table 2).

Table 2: 2018 and 2022 PISA average test scores

Country	Mathematics		Language		Science	
	2018[1]	2022[2]	2018	2022	2018	2022
Argentina	379	378	402	401	404	406
Brazil	384	379	413	410	404	403
Chile	417	412	452	448	444	444
Colombia	391	383	412	409	413	411
Costa Rica	402	385	426	415	416	411
Dominican Republic	325	339	342	351	336	360
El Salvador		343		365		373
Guatemala		344		374		373
Mexico	409	395	420	415	419	410
Panama	353	357	377	392	365	388
Paraguay		338		373		368
Peru	400	391	401	408	404	408
Uruguay	418	409	427	430	426	435
Regional average	388	373	407	400	403	400
OECD average	489	472	487	476	489	485

Source: [1]OECD, 2018. [2]OECD, 2023.

III. DATA AND DESCRIPTIVE STATISTICS

Data

The data used for the analysis derives from the Regional Comparative and Explanatory Study conducted in 2019 (ERCE 2019)[3], a study of 16 countries: Argentina, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay. It engaged approximately 160,000 students from roughly 4,000 schools to measure the learning achievements and skills expected of every child in the region, specifically in Mathematics and Language for third and sixth graders and Science for sixth graders (LLECE, 2021).

Using multiple-choice and open-ended exam questions, the ERCE 2019 tested third and sixth graders. In addition, students, their families, teachers, and principals completed questionnaires to analyze performance factors; sixth graders had a special questionnaire on socioemotional skills (empathy, school self-regulation, and openness to diversity).

The analysis examines data from fifteen of the countries that participated in ERCE 2019, with Cuba the sole country not included in the study.

Associated Factors

The literature on education achievement highlights a number of factors affecting learning at the primary and secondary levels. Demographics, including gender and socioeconomic status, significantly impact academic outcomes (Cole, 1997; Liu, Peng, & Luo, 2020). The importance of textbooks and learning materials in improving education quality is well established (Smart & Jagannathan, 2018; UNESCO, 2016), as is the impact of home libraries on academic success (Sikora, Evans, & Kelley, 2018). Furthermore, homework is shown to benefit students' academic success (Bas, Sentürk, & Ciğerci, 2017).

Studies also indicate a strong correlation between students' sense of belonging at school and their academic and mental health outcomes (Gopalan & Brady, 2020; Gopalan, Linden-Carmichael, & Lanza, 2022). Conversely, repeating grades has negatively affected students' academic progress (Okoth Owino, Odongo Ajowi, & Onderi, 2022; Ikeda & García, 2013). Furthermore, students' confidence in their math abilities, or math self-efficacy, benefited their math performance, while math anxiety can lead to poorer outcomes (Richland, Naslund-Hadley, Alonzo, Lyons, & Vollman, 2020). Parental education and involvement play crucial roles in students' academic success (Desforges & Abouchaar, 2003; Fan & Chen, 2001). Higher parent education levels often correlate with better school performance, indicating higher socioeconomic status. Active parental engagement in education supports children's learning at home, complementing school efforts and leading to better academic results (Kantova, 2024).

Research highlights the impact of teacher involvement and support on student learning outcomes (Ansong, et al., 2024). When teachers demonstrate genuine interest and engagement in their students' well-being and academic progress, these have a bearing on students' motivation, engagement, and overall academic achievements. Additionally, academic performance is shown to vary based on students' living environments, with differences noted between those in rural versus urban settings and those attending schools in more favorable neighborhoods versus neighborhoods that are less favorable (Panizzon, 2015). The characteristics of schools themselves play a crucial role in achievement and achievement gaps, underscoring the importance of a supportive educational environment for students (Evans & Cook, 2000).

This study examined the impact of several factors on achievement gaps between boys and girls. These factors are categorized at three levels: (i) student-level, (ii) teacher-level, and (iii) school-level.

[3] The regional study is coordinated by the Latin American Laboratory for Assessment of the Quality of Education (LLECE, by its Spanish acronym), of the Regional Bureau for Education in Latin America and the Caribbean (OREALC/UNESCO Santiago), with the participation of the national coordinators of the participating countries.

Student-level factors

- **Gender.**
  This variable takes a value of 1 for a female student and 0 for a male student.

- **Family socioeconomic status.**
  This standardized composite variable was created using a set of variables that include the parents' educational, economic, and employment backgrounds, as well as assets and books owned by the household and housing quality. The higher the index value, the higher the socioeconomic status of the student's household.

- **Days studying or doing homework.**
  This variable takes the value of 1 if the student studied or did homework almost every day in the past week (four days or more) and 0 if the student studied or did homework less than four days in the past week.

- **Books at home.**
  This variable takes the value of 1 if the student has more than ten books at home and 0 if the student has ten books or fewer at home.

- **Sense of school belonging.**
  This standardized composite variable measures students' sense of feeling accepted and respected in school, using a set of four statements: (i) I like being part of this school; (ii) I feel proud to be part of this school; (iii) I like coming to this school; and (iv) My teachers make me feel happy to come to this school. The higher the index value, the higher the student's sense of belonging.

- **Repeated a grade level.**
  This variable takes the value of 1 if the student repeated a grade level at least once and 0 if the student never repeated a grade level.

- **Mathematics self-efficacy.**
  This standardized composite variable measures students' confidence in solving basic mathematics problems, using a set of three questions: (i) In general, I do well in mathematics; (ii) I'm good at solving mathematics problems; and (iii) I am confident that I will do well in mathematics at the end of the school year. The responses to these questions were on a four-point scale ranging from 1 = "Strongly disagree" to 4 = "Strongly agree." The higher the index value, the higher the student's self-efficacy level in mathematics.

- **Mathematics anxiety.**
  This variable takes the value of 1 if the student reports feeling nervous when solving a math problem and 0 if the student did not feel nervous when solving a math problem.

- **Expectation of educational attainment.**
  This variable takes the value of 1 if the student expects to complete postgraduate studies and 0 if the student does not expect to complete postgraduate studies.

- **Mother's education level.**
  This variable takes the value of 1 if the mother completed tertiary education level and 0 if the mother has secondary education or less.

- **Parent involvement in student learning.**
  This standardized composite variable measures the degree of parent involvement in their child's learning, according to the child, using a set of four questions: (i) They checked or helped me do my homework; (ii) They asked me if I did my homework; (iii) They asked me what I did at school; (iv) They asked me what grades I got. For third graders, the responses to these questions took the values as follows: 1 = A lot; 2 = A little; 3 = Never. For sixth graders, the responses had the following values: 1 = Never; 2 = 1 or 2 times in the past week; 3 = 3 or 4 times in the past week; 4 = every day or almost every day in the past week. The higher the index value, the higher the parent's involvement in student learning.

- **Parental expectations for students' education attainment.**
  This variable takes the value of 1 if the parent expects the child to complete postgraduate studies and 0 if the parent does not expect the child to complete postgraduate studies.

- **Parental perception about the ease of student learning.**
  This variable takes the value of 1 if the parent believes the child learns mathematics/language/science easily and 0 if the parent does not believe that the child learns mathematics/language/science easily.

Teacher-level factors

- **Teacher interest in student welfare.** This standardized composite variable measures teacher interest in student welfare, using a set of five questions: (i) Teachers take an interest in each one of us; (ii) Teachers can tell when I'm worried about something; (iii) Teachers encourage me when I find the subject difficult; (iv) Teachers are nice to me even if I make a mistake; and (v) Teachers help me feel better if I'm sad or angry. The responses to these questions had the following values: 1 = Never or almost never; 2 = sometimes; 3 = many times; and 4 = always or almost always. The higher the index value, the higher the teacher's interest in student welfare.

- **Teacher support in student learning.** This standardized composite variable measures the degree of teacher support for student learning, using a set of ten questions: (i) The teacher asks if we understand what they are explaining; (ii) The teacher encourages us to finish the tasks we started; (iii) The teacher asks us to do fun activities; (iv) The teacher tells me what I've done well; (v) When I make a mistake, the teacher helps me correct my mistakes; (vi) The teacher asks us to explain how we solved a problem or exercise; (vii) The teacher asks us to discuss among classmates how to solve a problem; (viii) The teacher encourages us all to participate; (ix) The teacher asks us to correct the answers or work of other classmates; and (x) The teacher makes us work on group projects. The responses to these questions were index valued as follows: 1 = Never or almost never; 2 = sometimes; 3 = many times; 4 = always or almost always. The higher the index value, the higher the teacher's support in student learning.

School-level factors

- **Geographical location.** This variable takes the value of 1 if the school is in an urban area and 0 if the school is in a rural area.

- **Enrollment size.** This is a continuous variable that measures the number of students enrolled at the school.

- **Proportion of students in poverty.** This is a continuous variable that measures the proportion of students who are in poverty.

- **Services.** This standardized composite variable assesses the range of services offered at the school by determining the availability of specific services: (i) electricity, (ii) drinking water, (iii) sewer, (iv) telephone, (v) mobile computer lab, (vi) bathrooms in good condition, (vii) internet connection, and (viii) garbage collection. The higher the index value, the better the school's services.

Descriptive statistics of Associated Factors

Analysis of regional pooled data of the participating countries reveals several gender-based differences in educational experiences and expectations (Table 3). In both third and sixth grades, data show girls report being more anxious than boys when faced with mathematical tasks. While girls tend to be more self-efficient in mathematics than boys in third grade, boys tend to be more self-efficient in sixth grade than girls. Girls in both grade levels report a higher sense of belonging at school than boys, which may be linked to their more frequent engagement with study and homework. Furthermore, the involvement of parents in their children's education appears to be greater for girls, with a significant portion of these parents holding expectations for their daughters to pursue postgraduate studies, in contrast to those with sons. Expectations around learning also differ by gender; parents of boys are more likely to anticipate their sons excelling in mathematics, whereas parents of girls have higher expectations for their daughters' language skills. Additionally, the data indicates that boys are more likely to repeat grades than girls. Teachers also tend to demonstrate more interest in and support for girls' learning than boys, suggesting a potential bias in educational attention and resources[4].

[3] To view country-specific results, please refer to the tables A.1–A.5 in the annex.

Table 3: Gender differences in sample characteristics, third and sixth grades

Factors	3rd Grade			6th Grade		
	Girls	Boys	Difference	Girls	Boys	Difference
Student Mathematics Self Efficacy Index	0.3	0.1	0.2***	-0.3	-0.2	-0.1***
Student mathematics anxiety	66.1	64.6	1.5**	48.8	44.0	4.8***
Student repeated a grade level	16.0	20.0	-4.0***	13.9	20.8	-6.9***
Student Sense of School Belonging Index	-0.10	-0.33	0.23***	-0.12	-0.27	0.15***
Student has more than ten books at home	49.4	48.0	1.4*	57.2	54.2	3.0***
Student studied or did homework everyday	50.6	46.0	4.5***	51.7	44.1	7.6***
Student expects to complete postgraduate studies				26.3	18.6	7.7***
Family Socio-economic Status Index	0.12	0.10	0.01	0.14	0.14	0.01
Mother completed tertiary education	17.0	16.3	0.8	16.0	16.5	-0.5
Parent Involvement Index	0.04	-0.05	0.09***	-0.13	-0.21	0.07***
Parent expects child to complete postgraduate studies	42.2	38.6	3.6***	44.3	37.3	7.0***
Parent believes child learns mathematics easily	56.6	61.3	-4.7***	51.2	54.3	-3.1***
Parent believes child learns language easily	59.9	52.9	7.0***	63.7	52.6	11.1***
Parent believes child learns science easily				67.0	61.7	5.3***
Teacher Interest in Student Welfare Index	0.03	-0.08	0.11***	-0.16	-0.24	0.08***
Teacher Support of Student Learning Index	0.05	-0.05	0.10***			
Teacher Support of Student Learning in mathematics Index				-0.13	-0.21	0.08***
Teacher Support of Student Learning in language Index				-0.15	-0.24	0.10***
Teacher Support of Student Learning in science Index				-0.16	-0.24	0.08***
School is in an urban area	78.1	77.7	0.5	80.4	80.3	0.0
Size of school enrollment	419	414	5	465	462	3
Proportion of poor students	40.8	41.0	-0.2	39.4	39.7	-0.3
School Services Index	0.55	0.54	0.00	0.57	0.56	0.01

Notes: Standard errors are presented in parentheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

The ERCE 2019 data shows a multifaceted picture of academic achievement, clearly revealing that students' mathematics, language, and science performance in the third and sixth grades is significantly linked to their family's socioeconomic status and their mother's educational level. Additionally, a student's success is positively influenced by how much their parents are involved in their education and the amount of time they dedicate to home study. These achievements are also positively associated with parents' expectations for their child's ongoing education and their belief in the child's innate ability to grasp mathematics and language. Intriguingly, while boys tend to excel in mathematics, girls surpass boys in language and science proficiency. The study also uncovers some negative correlations, revealing that higher achievements in mathematics are inversely related to their anxiety toward the subject. Furthermore, mathematics and language achievements negatively correlate with grade repetition (Tables 4 and 5).

Table 4: Zero-order correlations of student and family characteristics, third grade

Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Mathematics score	1													
2 Language score	0.65***	1												
3 Student is a girl	-0.03***	0.06***	1											
4 Mathematics self-efficacy	-0.11***	0.00	0.09***	1										
5 Mathematics anxiety	-0.18***	-0.15***	0.02**	0.09***	1									
6 Student repeated a grade	-0.30***	-0.30***	-0.05***	0.01	0.08***	1								
7 Sense of school belonging	-0.02*	-0.02**	0.11***	-0.24***	-0.03***	-0.04***	1							
8 Student studied or did homework frequently	0.16***	0.17***	0.05***	-0.08***	-0.07***	-0.06***	0.10***	1						
9 Family Socio-economic Status Index	0.35***	0.38***	0.01	0.04***	-0.04***	-0.18***	-0.09***	0.08***	1					
10 Mother completed tertiary education	0.28***	0.29***	0.01	0.00	-0.05***	-0.11***	-0.04***	0.07***	0.44***	1				
11 Parent Involvement Index	0.17***	0.20***	0.05***	-0.12***	-0.01*	-0.09***	0.16***	0.17***	0.12***	0.08***	1			
12 Parent expects child to complete postgraduate	0.28***	0.31***	0.04***	0.01	0.02*	-0.14***	-0.07***	0.08***	0.33***	0.26***	0.11***	1		
13 Parent believes child learns Mathematics easily	0.29***	0.24***	-0.05***	-0.22***	-0.12***	-0.14***	0.04***	0.08***	0.18***	0.13***	0.07***	0.13***	1	
14 Parent believes child learns Language easily	0.27***	0.29***	0.07***	-0.06***	-0.09***	-0.16***	0.06***	0.09***	0.18***	0.14***	0.10***	0.16***	0.38***	1

Notes: *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

Table 5: Zero-order correlations of student and family characteristics, sixth grade

Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Mathematics score	1															
2 Language score	0.64***	1														
3 Student is a girl	-0.03***	0.07***	1													
4 Mathematics self-efficacy	0.30***	0.18***	-0.05***	1												
5 Mathematics anxiety	-0.20***	-0.15***	0.05***	-0.10***	1											
6 Student repeated a grade	-0.28***	-0.24***	-0.09***	-0.13***	0.05***	1										
7 Sense of school belonging	0.08***	0.05***	0.08***	0.31***	0.01	-0.09***	1									
8 Student studied or did homework frequently	0.14***	0.13***	0.08***	0.13***	-0.03***	-0.09***	0.13***	1								
9 Student expects to complete postgraduate	0.18***	0.16***	0.09***	0.18***	-0.08***	-0.13***	0.18***	0.12***	1							
10 Family Socio-economic Status Index	0.36***	0.40***	0.00	0.05***	-0.06***	-0.15***	-0.05***	0.06***	0.07***	1						
11 Mother completed tertiary education	0.26***	0.27***	-0.01	0.08***	-0.06***	-0.09***	0.00	0.06***	0.09***	0.40***	1					
12 Parent Involvement Index	0.07***	0.08***	0.04***	0.21***	0.02**	-0.10***	0.25***	0.19***	0.16***	0.07***	0.05***	1				
13 Parent expects child to complete postgraduate	0.30***	0.32***	0.07***	0.07***	-0.04***	-0.12***	-0.04***	0.04***	0.13***	0.30***	0.23***	0.03***	1			
14 Parent believes child learns Mathematics easily	0.32***	0.23***	-0.03***	0.41***	-0.15***	-0.13***	0.12***	0.08***	0.15***	0.11***	0.10***	0.10***	0.13***	1		
15 Parent believes child learns Language easily	0.23***	0.27***	0.11***	0.17***	-0.07***	-0.16***	0.14***	0.10***	0.16***	0.13***	0.10***	0.11***	0.15***	0.32***	1	
16 Parent believes child learns Science easily	0.18***	0.21***	0.06***	0.14***	-0.05***	-0.13***	0.14***	0.09***	0.15***	0.13***	0.10***	0.12***	0.14***	0.28***	0.47***	1

Notes: *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

In the sixth grade, a positive correlation is evident between student achievement and their confidence in math abilities, as well as a stronger sense of belonging at school. Additionally, students' own aspirations toward completing postgraduate studies are positively linked to their academic performance. These findings highlight the intricate relationship between various factors, including familial background, parental involvement, student well-being, and academic performance, particularly in mathematics and language (Table 5).

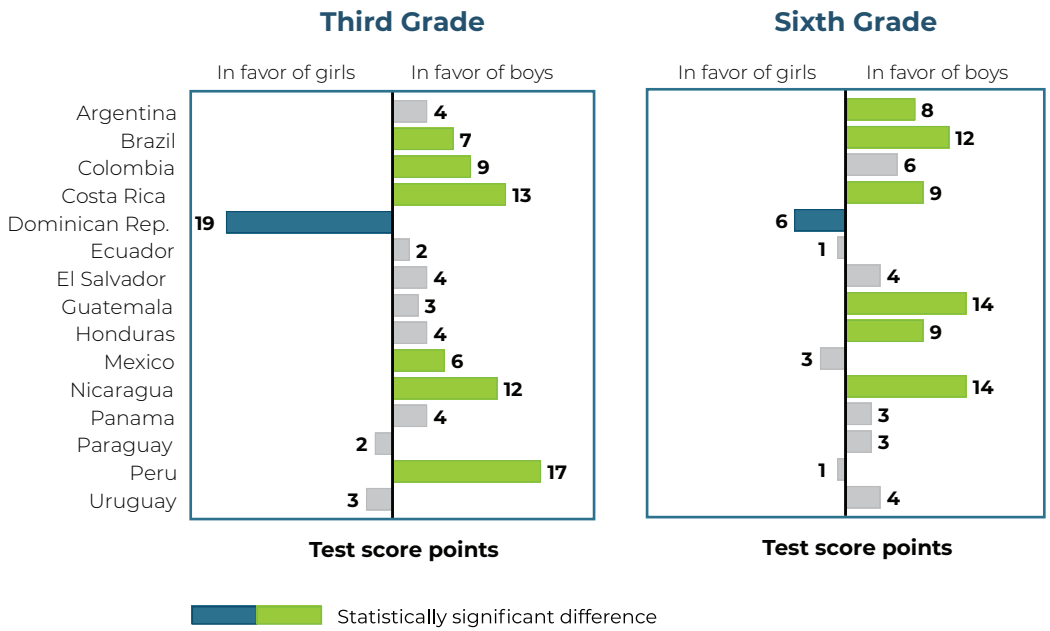
IV. GENDER DIFFERENCES IN ACADEMIC PERFORMANCE

The variation in test scores across countries highlights diverse educational achievement. Brazil, Costa Rica, Ecuador, Mexico, Peru, and Uruguay stand out for having the highest percentage of students in the region excelling in mathematics and science. Similarly, Brazil, Colombia, Costa Rica, Mexico, Peru, and Uruguay lead in language with the largest proportion of students achieving higher scores. On the contrary, the Dominican Republic, El Salvador, Guatemala, Nicaragua, Panama, and Paraguay have been identified as the countries with the greatest number of students struggling in mathematics. Moreover, the Dominican Republic, Guatemala, Honduras, Nicaragua, Panama, and Paraguay face challenges in both language and science, recording the highest percentages of students with lower scores.

In third-grade mathematics, boys outperform girls in Brazil, Colombia, Costa Rica, Mexico, Nicaragua, and Peru, indicating a gender gap in early mathematics education in these countries (Figure 3). This trend continues into sixth grade, where boys extend their lead with statistically significant margins over girls in Argentina, Brazil, Costa Rica, Guatemala, Honduras, and Nicaragua, suggesting persistent gender-based achievement differences as students advance in school. Contrary to these patterns, the Dominican Republic emerges as a notable exception at both grade levels, with statistical data showing that girls outperform boys, indicating a reverse in the typical gender gap observed in mathematics performance.

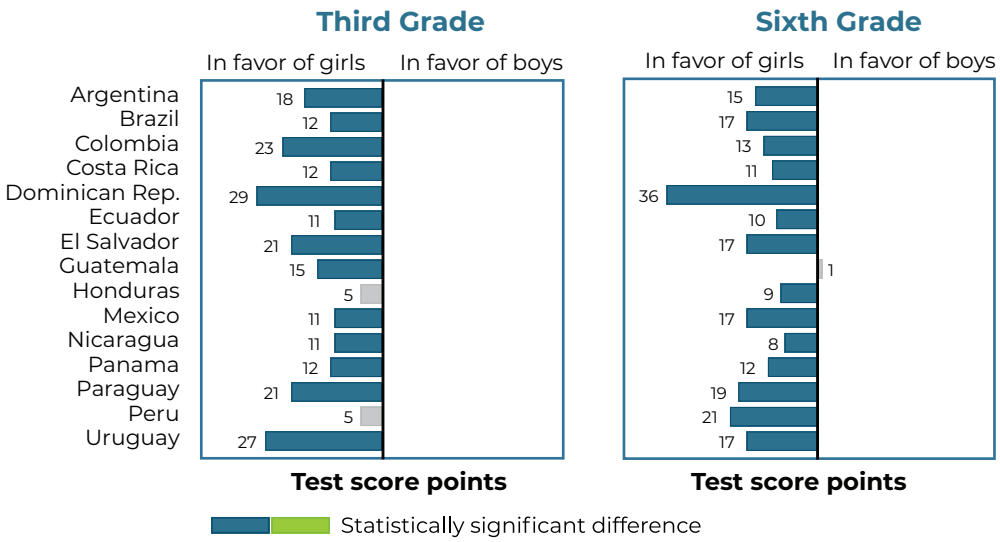
Republic and Uruguay, highlighting major gender disparities in early education language achievement. This pattern continues into sixth grade, where girls maintain their lead over boys in the Dominican Republic and Peru, emphasizing the advantage girls hold in language proficiency at various educational stages. Notable exceptions to this trend are seen, for example, among third-grade students in Honduras and Peru, who show few gender differences in language scores. Similarly, in sixth grade, Guatemala reports no discernible gender gap in language achievement.

Figure 3: Achievement gaps between boys and girls, third- and sixth-grade mathematics (test score points)



Source: Authors' calculations based on ERCE 2019 databases.

Figure 4: Achievement gaps between boys and girls, third- and sixth-grade language (average test score points)

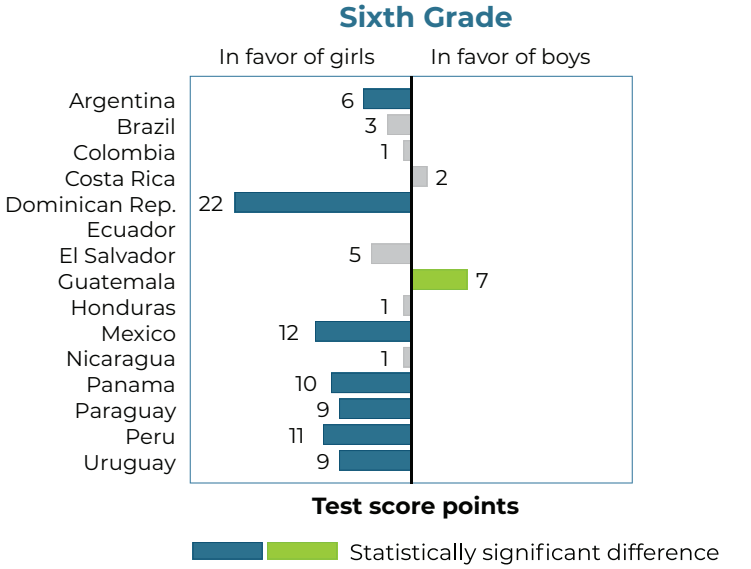


Source: Authors' calculations based on ERCE 2019 databases.

In primary education science, girls tend to outshine boys (Figure 5), outperforming them in seven out of fifteen countries—Argentina, the Dominican Republic, Mexico, Panama, Paraguay, Peru, and Uruguay—demonstrating strong capabilities in science at a young age. But Costa Rica and Guatemala are exceptions to this pattern of girls outperforming boys in science, indicating perhaps a country's educational dynamics or teaching methods, cultural influences, or curriculum aims.

In most countries, Indigenous girls score lower in mathematics compared to both Indigenous boys and their non-Indigenous peers. When accounting for socioeconomic status, the achievement gaps between Indigenous boys and girls are significant only in Guatemala and Nicaragua, favoring Indigenous boys (Figure 6). This indicates that Indigenous girls in these two countries are at a greater disadvantage in mathematics. In contrast, among non-Indigenous students, boys generally outperform girls in most countries except in Ecuador, Honduras, Mexico, and Peru, where the mathematics achievement gaps between boys and girls are insignificant. Among non-Indigenous students, the most significant achievement gaps in mathematics, gaps that favor boys, are observed in Argentina, Brazil, Costa Rica, Guatemala, and Nicaragua.

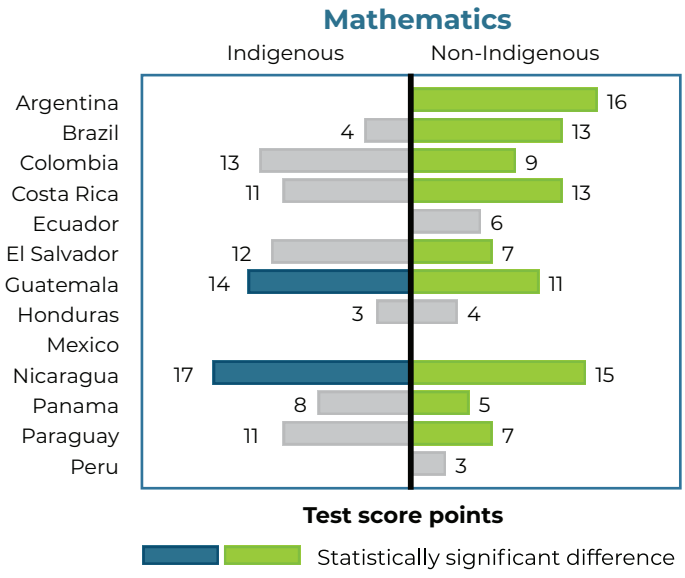
Figure 5: Achievement gaps between boys and girls, sixth-grade science (average test score points)



Source: Authors' calculations based on ERCE 2019 databases.

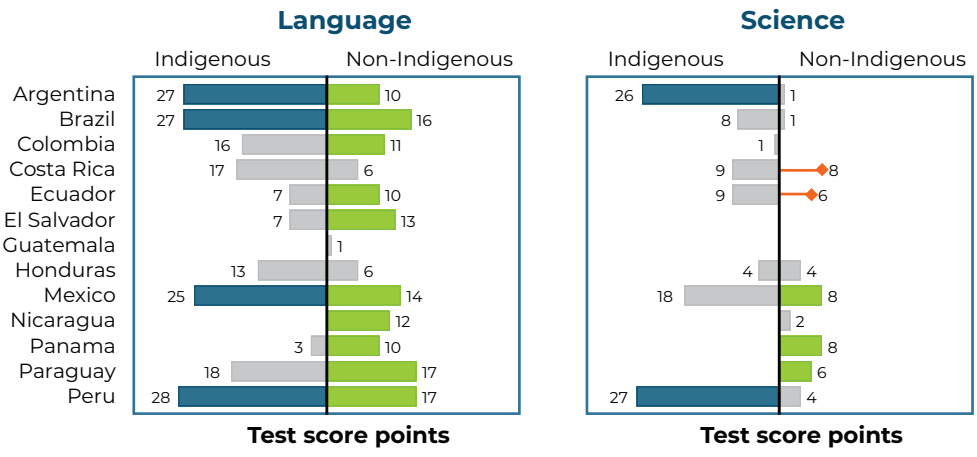
Indigenous boys generally score lower in language and science compared to Indigenous girls and their non-Indigenous counterparts. When adjusting for socioeconomic status, the achievement gaps between Indigenous boys and girls are significant only in only a few countries (Figure 7). Significant language achievement gaps favoring girls are observed in Argentina, Brazil, Mexico, and Peru, while science achievement gaps favoring girls are found in Argentina and Peru. In these countries, Indigenous boys face greater disadvantages in language and science than Indigenous girls. In contrast, among non-Indigenous students, girls significantly outperform boys in language across most countries, except in Costa Rica, Guatemala, and Honduras. The most pronounced language gaps are noted in Brazil, Paraguay, and Peru. In science, the gender disparities among non-Indigenous students are generally less pronounced. Mexico, Panama, and Paraguay see science achievement gaps favoring girls, while boys in Costa Rica and Ecuador perform better in science. These insights highlight the complex interplay of ethnicity, gender, and socioeconomic factors in shaping educational outcomes across different regions and subjects.

Figure 6: Achievement gaps between boys and girls by Indigenous status, sixth-grade mathematics (average test score points)



Source: Authors' calculations based on ERCE 2019 databases.

Figure 7: Achievement gaps between girls and boys by Indigenous status, sixth-grade language and science (average test score points)



Source: Authors' calculations based on ERCE 2019 databases.

V. SOCIOEMOTIONAL SKILLS

Socioemotional Skills

Research indicates that students who develop positive connections with their peers and teachers display higher motivation to engage in school activities and accomplish their academic objectives (Bresciani & Lea, 2018). Additionally, when students demonstrate the ability to focus, effectively handle and regulate their emotions, foster positive relationships with peers and teachers, and exhibit resilience when faced with challenges, they tend to achieve more favorable academic outcomes, resulting in improved grades (Ladd, Birch, & Buhs, 1999; Raver, 2005, as cited in Bresciani & Lea, 2018).

Hence, it is important for students to be able to acquire and apply the knowledge, attitudes, and skills necessary to recognize and manage emotions, develop positive relationships, make responsible decisions, and cope effectively with various challenges in life. Social Emotional Learning (SEL) is an essential aspect of education that promotes emotional intelligence, self-awareness, empathy, and social skills, enabling students to thrive academically, socially, and emotionally.

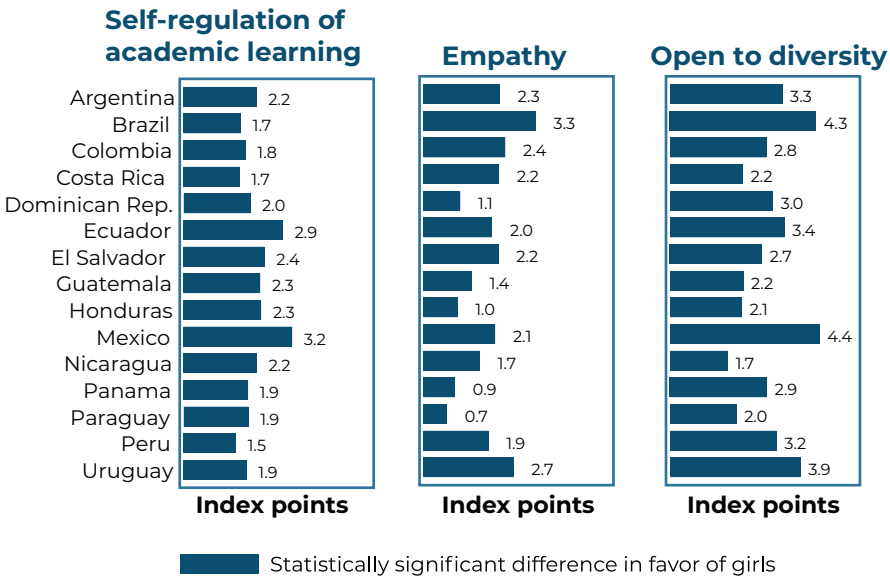
Using self-administered questionnaires, ERCE 2019 measured three socioemotional skills among sixth-grade students: openness to diversity, empathy, and self-regulation of academic learning. Openness to diversity is defined as "the degree to which students perceive or anticipate that they are capable of accepting, tolerating, and establishing links with those who are different from them, due to their belonging to other groups." Empathy is defined as "the ability to recognize the perspective of another, both in a cognitive sense and emotionally." Finally, self-regulation of academic learning is defined as "the ability to effectively regulate one's emotions, thoughts, and behaviors in a learning experience, and persevere toward the desired goal" (UNESCO-OREALC, 2022).

Generally, sixth graders across the region exhibit moderately high levels of empathy, aligning with or closely approximating the regional average. Additionally, these students report openness to diversity, hewing to the regional norm, except in Costa Rica, where students deviate from the regional average by displaying greater openness to diversity. Furthermore, responses from sixth graders on self-regulation indicate a positive trend, with minimal variations observed between the averages of individual countries and the regional benchmark.

Gender Differences in Socioemotional Skills

Regarding gender differences in learning and SEL, there is evidence of some variations in how boys and girls may approach and engage in social and emotional processes. Girls across the board show higher levels of socioemotional skills compared to boys, a disparity that holds steady across all countries participating in the ERCE (Figure 8). Specifically, sixth-grade girls in every country demonstrate superior self-regulation in academic learning, empathy, and openness to diversity when compared with their male counterparts. The most significant differences are observed in openness to diversity, with a gap ranging from 2 to 4.4 index points. Notably, the largest disparities in self-regulation of academic learning are found in Ecuador and Mexico. In terms of empathy, Brazil and Uruguay witness the widest gaps. Additionally, Brazil and Mexico stand out for having the most pronounced differences in openness to diversity.

Figure 8: Socioemotional Skills Index gaps between boys and girls, sixth grade (average index points)

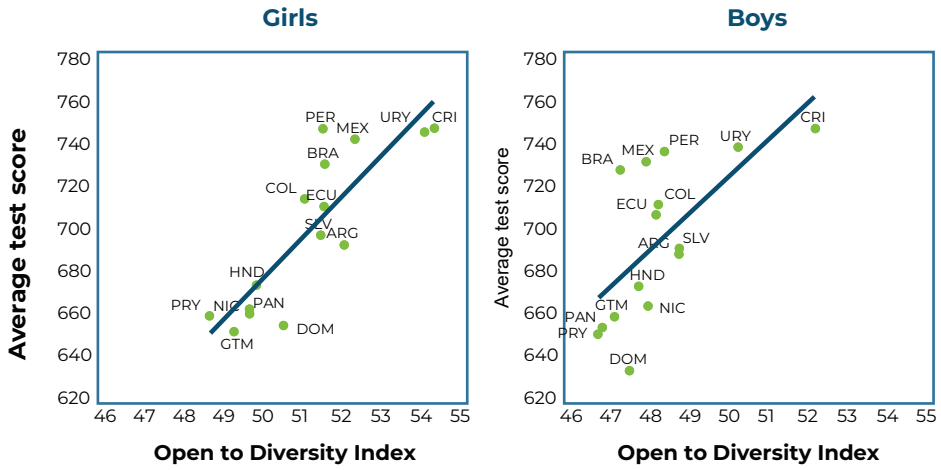


Source: Authors' calculations based on ERCE 2019 databases.

Could socioemotional factors influence gender differences in learning?

The analysis indicates that only the Open to Diversity Index correlates with test scores among the three socioemotional indices, showcasing a positive association with cognitive abilities across all subject areas[6]. This relationship holds for both boys and girls in all countries (Figure 9). Yet, it is stronger for girls (correlation coefficients are 0.85 for girls and 0.66 for boys), suggesting that a greater openness to diversity may enhance academic performance, particularly among female students. Moreover, students from countries with higher cognitive skills, such as Costa Rica and Uruguay, tend to be more open to diversity. This contrasts with students from lower-scoring countries like the Dominican Republic, Guatemala, Honduras, Nicaragua, Panama, and Paraguay, who demonstrate lower scores on the Open to Diversity Index. This pattern underscores the potential impact of socioemotional competencies, especially openness to diversity, on enhancing educational outcomes.

Figure 9: Relation between Open to Diversity Index and average test scores, sixth grade



Source: Authors' calculations based on ERCE 2019 databases.

[6] For results by subject, see figures A.1–A.3 in the annex.

VI. SOCIAL NORMS

Social norms regarding gender are the often unwritten rules and expectations deemed suitable for individual behaviors, thoughts, and interactions. Children learn and internalize these norms early in life, and they are perpetuated by cultural, social, and institutional factors. They shape gender roles and identities and influence decisions and attitudes in girls and boys from an early age. Gendered social norms often assign specific roles and responsibilities to individuals based on their gender; they also influence certain behaviors and emotional expressions for each gender. Gendered social norms can limit opportunities and access to resources for individuals who do not conform to traditional gender roles.

This study delved into gender-related social norms by examining two critical aspects pertaining to parents: (i) their expectations regarding their child's academic achievements and (ii) their confidence in their child's ability to learn in key subjects such as mathematics, language, and science. These dimensions are instrumental in understanding the influence of familial attitudes and beliefs on children's educational trajectories and performance, shedding light on how gendered perceptions within the household can impact students' academic confidence and success.

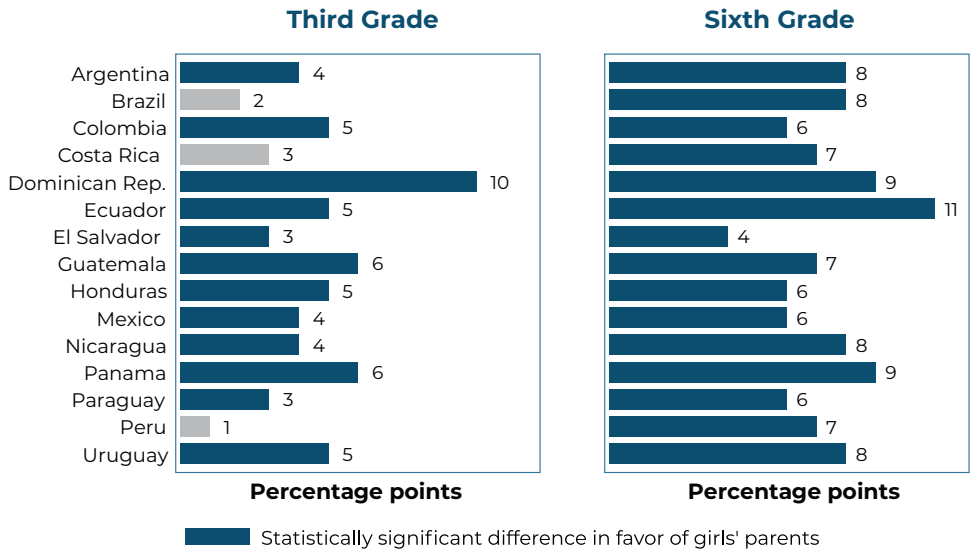
The ERCE data reveals a pattern in parental expectations across participating countries: about a third of the students have parents who expect them to pursue postgraduate studies, consistent in both third and sixth grades. Particularly in Brazil, Costa Rica, and the Dominican Republic, over 50 percent of students at these grade levels are reported to have parents with high educational aspirations. Moreover, around 60 percent of students in both grades have parents who perceive their children as finding mathematics and language relatively easy to learn. Third-grade achievement in mathematics is notable for students in Argentina, Colombia, Costa Rica, the Dominican Republic, and Ecuador, while sixth-grade achievement is seen in Argentina (again) and well as in Costa Rica and the Dominican Republic, where over 65 percent of students have parents who believe their children have an effortless grasp on mathematics. For language, Costa Rica, the Dominican Republic, and Ecuador are prominent for third-grade achievement, while the Dominican Republic, Ecuador, Honduras, and Paraguay take the lead in the sixth grade, each with over 65 percent of students viewed by their parents as excelling. Additionally, about 70 percent of sixth graders are seen by their parents as adept in science: in Argentina, Costa Rica, the Dominican Republic, Ecuador, and Honduras more than 75 percent of parents believe their children excel in science.

Gender Differences in Social Norms

A trend emerges between the third and sixth grades: parents of girls more frequently express the hope that their daughters will complete postgraduate studies compared to parents of boys, highlighting a major gender-based gap in expectations (Figure 10). This gap is particularly wide in the Dominican Republic, where parents have higher educational aspirations for their daughters than for their sons. On the other hand, in El Salvador, the expectations gender gap is much smaller, suggesting a more balanced view of educational potential, less influenced by gender norms.

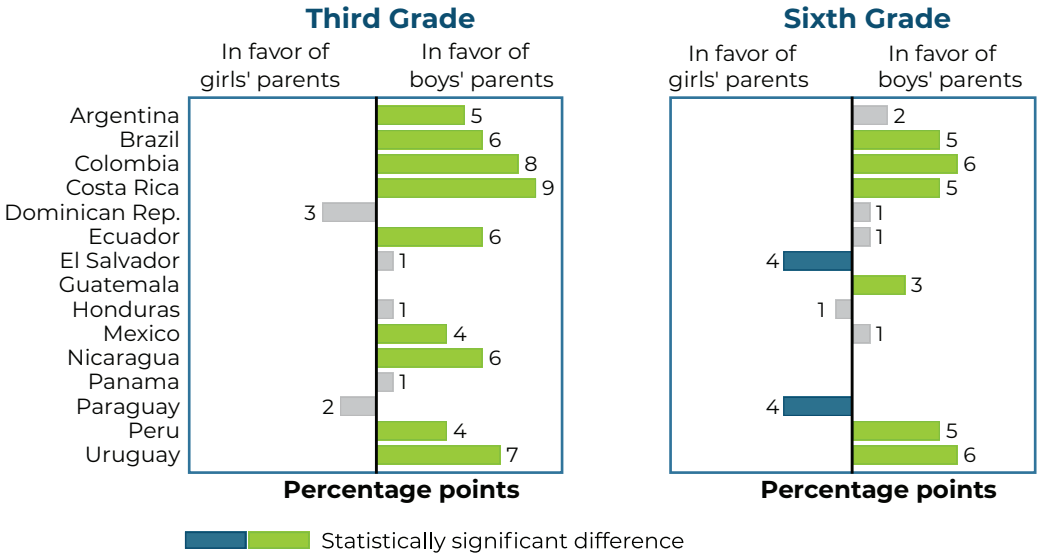
In nine out of fifteen countries—Argentina, Brazil, Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Peru, and Uruguay—the trend observed for parents of third graders is that more parents believe their sons learn mathematics more easily than parents of girls do (Figure 11). This perception is notably persistent into sixth grade, with Brazil, Colombia, Costa Rica, Guatemala, Peru, and Uruguay still reflecting a prevalent belief among parents that boys naturally excel in Mathematics. However, El Salvador and Paraguay stand out as exceptions in the sixth grade, where a greater proportion of parents of girls believe their daughters understand mathematics more effortlessly than boys.

Figure 10: Difference in percentage of parents of boys and girls who expect their child to complete postgraduate studies, third and sixth grades (percentage points)



Source: Authors' calculations based on ERCE 2019 databases.

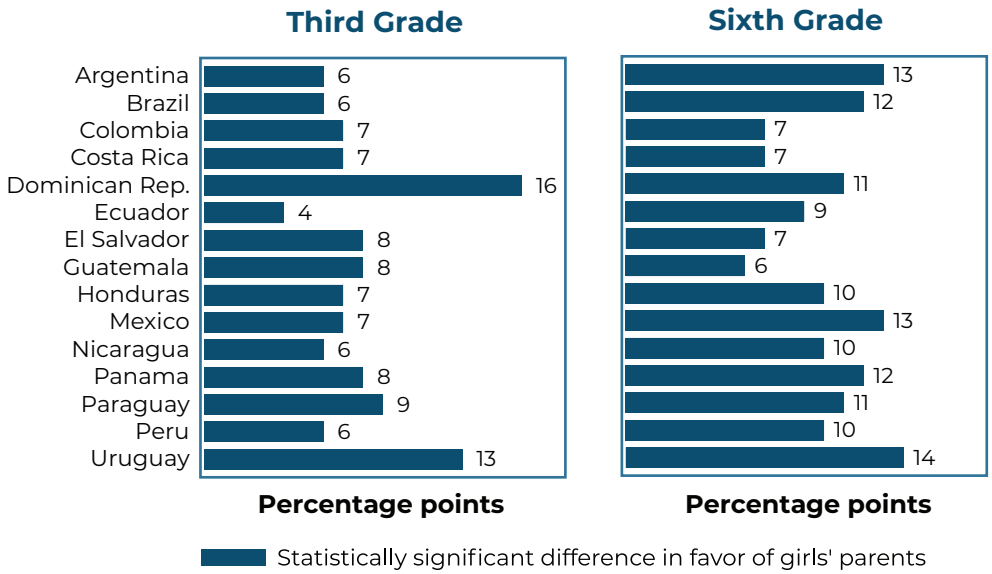
Figure 11: Difference in percentage of parents of boys and girls who believe their child learns mathematics easily, third and sixth grades (percentage points)



Source: Authors' calculations based on ERCE 2019 databases.

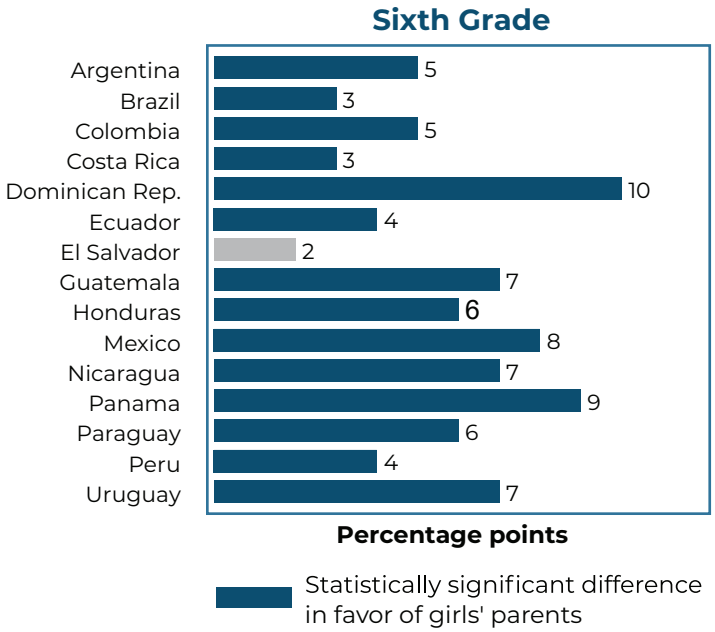
One sees a consistent trend regarding school performance in language and science whereby more parents believe their daughters learn these subjects more effortlessly than their sons (Figures 12 and 13). Regarding third-grade language skills, this belief is particularly strong in the Dominican Republic and Uruguay, where the gap in parental perceptions is notable. By the time students reach sixth grade, the belief that girls learn language more easily than boys expands significantly, with countries like Argentina, Brazil, the Dominican Republic, Mexico, Panama, Paraguay, and Uruguay observing gaps exceeding ten percentage points. Additionally, in sixth-grade science, parents in the Dominican Republic and Panama stand out, their expectations favoring girls.

Figure 12: Difference in percentage of parents of boys and girls who believe their child learns language easily, third and sixth grades (percentage points)



Source: Authors' calculations based on ERCE 2019 databases.

Figure 13: Difference in percentage of parents of boys and girls who believe their child learns science easily, sixth grade (percentage points)



Source: Authors' calculations based on ERCE 2019 databases.

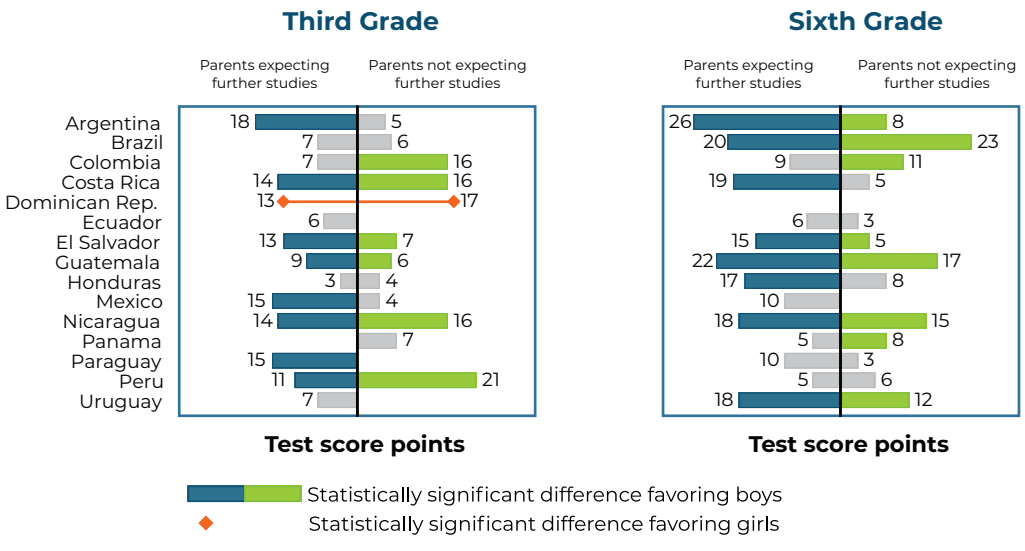
Could social norms influence gender differences in learning?

These norms often prescribe specific behaviors, expectations, and roles for individuals based on their gender, which can impact how boys and girls approach education and learning experiences. Social norms may shape students' academic interests and aspirations, such as in cultures where certain subjects are stereotypically associated with one gender (for example, math with boys and language with girls). Students may be more or less likely to pursue those subjects based on societal expectations. Social norms can affect how students engage in classroom discussions and activities. Girls may be more inclined to participate in collaborative and group-oriented activities, while boys may be more assertive in individual tasks. Unconscious biases based on social norms can lead teachers to have different expectations for boys and girls regarding academic performance, behavior, and leadership abilities. Social norms can shape preferred learning styles and strategies. Boys may be encouraged to take a more hands-on and experimental approach, while girls may be expected to be attentive and nurturing listeners. These are only some ways in which social norms can generate gender differences in education-related aspects.

The ERCE 2019 data reveals a consistent pattern across participating countries: students whose parents hold high educational expectations, particularly those anticipating postgraduate studies, consistently outperform their peers at both the third- and sixth-grade levels. Students from Brazil, Colombia, El Salvador, Guatemala, Mexico, Panama, Peru, and Uruguay exhibit the largest average achievement gaps (exceeding 50 test score points), a gap aligned with these high parental expectations at both grade levels. These findings emphasize the strong influence parental expectations have on academic performance of students in general, reflecting the critical role family aspirations play in shaping educational outcomes.

The relationship between parental expectations and achievement gaps between boys and girls in third and sixth grades greatly varies across the region. In El Salvador, Guatemala, and Nicaragua achievement gaps favoring boys in mathematics persist across both grade levels, regardless of the parents' postgraduate aspirations for their children (Figure 14). A similar pattern is observed in Costa Rica and Peru for third grade and in Argentina, Brazil, and Uruguay for sixth grade. In the Dominican Republic, a contrary trend is observed, with major achievement gaps in mathematics, this time favoring girls, consistently across all levels irrespective of parental expectations. In these countries, parental expectations for further education do not appear to influence the mathematics achievement gaps between boys and girls, suggesting that these gaps are driven by factors beyond parental aspirations.

Figure 14: Achievement gaps between boys and girls with parents expecting and not expecting postgraduate studies, third- and sixth-grade mathematics (average test score points)



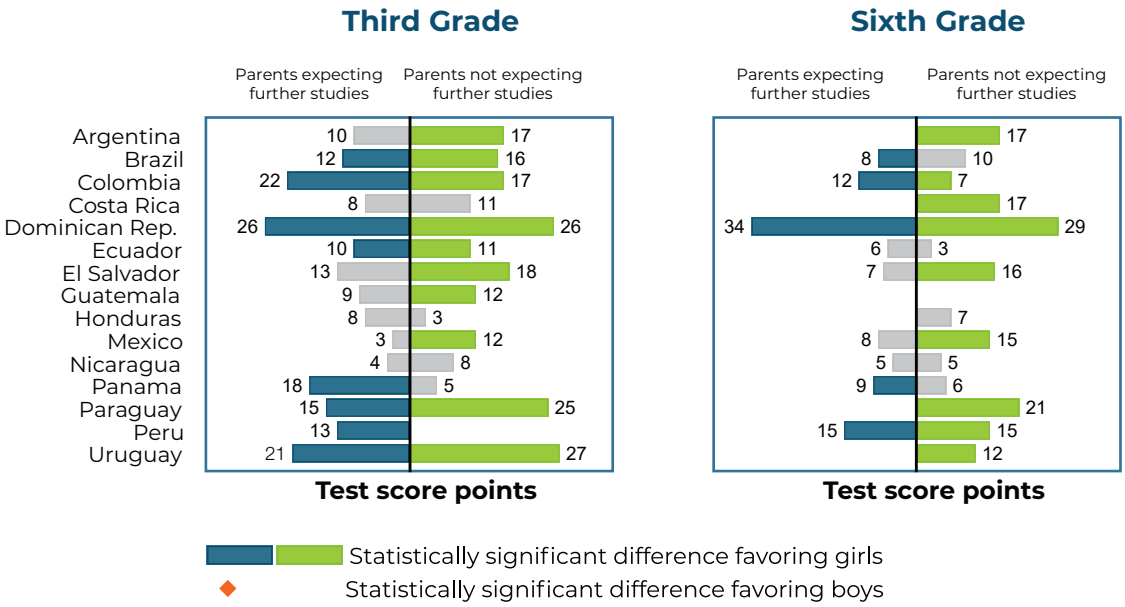
Source: Authors' calculations based on ERCE 2019 databases.

In contrast, mathematics achievement gaps favoring boys in Colombia manifest primarily when parents do not expect their children to pursue education beyond secondary school, with no gaps appearing when there are higher educational aspirations for both third and sixth grades (Figure 14). Also in the sixth grade, substantial gaps favoring boys are observed in Panama only when parents express low educational aspirations, with no gaps evident when higher expectations are held. This could indicate that in these countries, higher parental expectations for education may help narrow the mathematics achievement gaps between boys and girls.

In Colombia and the Dominican Republic, significant language achievement gaps favoring girls are consistently observed at both grade levels, irrespective of parental postgraduate aspirations (Figure 15). This trend is also evident in Brazil, Ecuador, Paraguay, and Uruguay at the third-grade level and in Peru at the sixth-grade level. In these countries, the presence of parental aspirations for further education seems to have little impact on the language achievement gaps between boys and girls, suggesting again that these gaps are driven by factors other than parental aspirations.

In Argentina, El Salvador, and Mexico, significant language achievement gaps favoring girls are evident only when parents do not expect their children to pursue education beyond secondary school, with no gaps appearing when there are higher educational aspirations for both third and sixth grades (Figure 15). A similar pattern is found in Guatemala for third grade and in Costa Rica, Paraguay, and Uruguay for sixth grade, where language achievement gaps also favor girls but only when parents express no expectations about post-secondary education; no gap appears for either the third or sixth grades when educational aspirations are higher. The absence of these achievement gaps when parents have higher aspirations suggests that fostering such expectations could be instrumental in closing the gender gaps in language achievement. Perhaps higher parental aspirations could play a key role in equalizing academic opportunities for boys and girls.

Figure 15: Achievement gaps between boys and girls with parents expecting and not expecting postgraduate studies, third- and sixth-grade language (average test score points)



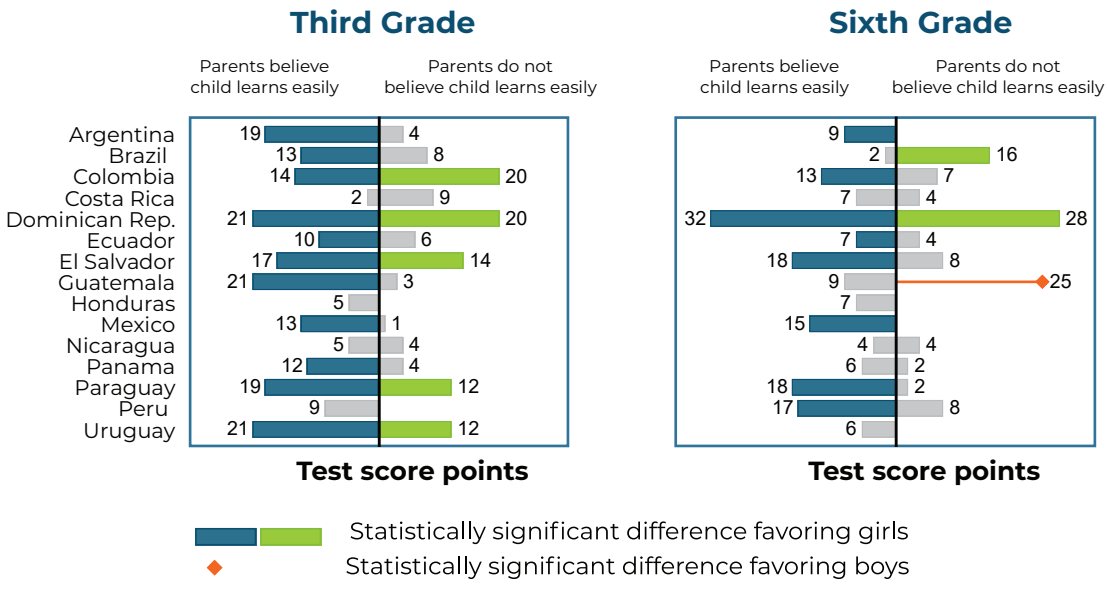
Source: Authors' calculations based on ERCE 2019 databases.

The ERCE 2019 data reveal a strong correlation between parental expectations regarding their children's learning capabilities and corresponding academic performance across mathematics, language, and science. Students whose parents have confidence in their ability to learn easily tend to achieve higher scores, with an average difference of about 60 test score points compared to their peers whose parents express less confidence. This trend is consistent in both third and sixth grades, where students from Argentina, Brazil, Costa Rica, Mexico, Panama, Paraguay, Peru, and Uruguay exhibit the largest achievement gaps, each surpassing 60 points.

While parental beliefs in their children's learning capabilities have a strong impact on overall academic performance, they influence the gender-related mathematics achievement gaps only in a few countries. This influence is primarily seen where parents say they believe their children learn mathematics easily. But the situation differs for language achievement. In Colombia, the Dominican Republic, Paraguay, and Uruguay, language achievement gaps favoring girls are evident in the third grade and continue, in the Dominican Republic, into the sixth grade, regardless of parental beliefs about their children's learning capabilities (Figure 16). This could suggest that the language achievement gaps between boys and girls in these countries are influenced by factors beyond parental beliefs.

In countries like Argentina, Brazil, Ecuador, Guatemala, Mexico, and Panama at the third-grade level, and in Argentina, Colombia, Ecuador, El Salvador, Mexico, Paraguay, and Peru at the sixth grade, no notable language achievement gaps are observed when parents do not perceive their children as strong in language learning (Figure 16). However, when parents believe in their children's language abilities, gaps favoring girls start to appear. This indicates that while parental beliefs do not create gender gaps where none exist, they can exacerbate existing gaps.

Figure 16: Achievement gaps between boys and girls with parents who believe and those who do not believe their child learns easily, third- and sixth-grade language (average test score points)



Source: Authors' calculations based on ERCE 2019 databases.

VII. GENDER GAPS DECOMPOSITION

The Model

The study employs the Oaxaca-Blinder Decomposition to examine the boy-girl achievement gaps across math, science, and language, offering a detailed comparison of average test scores by gender. This analytical approach splits the gap in test scores into two components:

1. The **explained component** highlights the portion of the test score difference that can be attributed to identifiable and observable factors. It assesses the extent to which certain quantifiable variables contribute to the observed differences in academic performance by gender, pinpointing specific drivers for the gap.

2. The **unexplained component** encompasses the fraction of the score gap that remains after accounting for the measurable influences analyzed. This portion is often regarded as reflecting the impact of unobservable or intangible factors that are not directly measured in the study but still play a role in shaping the gender gap in academic achievements.

By dissecting the score gap through this decomposition, the study aims to uncover both the tangible and intangible factors influencing gender disparities in educational outcomes, providing an understanding of the underlying causes of achievement gaps between boys and girls.

In the Oaxaca-Blinder Decomposition utilized for analyzing gender achievement gaps in education, it's posited that the average test score of a student in subjects like math, science, and language (denoted by Y) has a linear relationship with a set of explanatory variables *X*. These variables consider factors potentially influencing scores, such as student, family, teacher, and school backgrounds. The model assumes that the error term v is conditionally independent of *X*:

$$Y_{ji} = \beta_{j0} + \sum_{k=1}^{K} X_{ik}\,\beta_{jk} + v_{ji}, \qquad j = B, G$$

where $E(v_{ji}|X_i) = 0,$ and *X* is the vector of covariates $(X_i = [X_{i1}, \dots, X_{iK}])$. The overall difference in average outcomes between group *B* and *G*,

$$\hat{\Delta}_O^{\mu} = \bar{Y}_G - \bar{Y}_B,$$

can be written as:

$$\hat{\Delta}_O^{\mu} = \underbrace{(\hat{\beta}_{G0} - \hat{\beta}_{B0}) + \sum_{k=1}^{K} \bar{X}_{Gk}(\hat{\beta}_{Gk} - \hat{\beta}_{Bk})}_{\hat{\Delta}_S^{\mu}(Unexplained)} + \underbrace{\sum_{k=1}^{K} (\bar{X}_{Gk} - \bar{X}_{Bk})\hat{\beta}_{Bk}}_{\hat{\Delta}_X^{\mu}(Explained)}$$

where $\hat{\beta}_{i0}$ and $\hat{\beta}_{ik}(k = 1, \dots, K)$ are the estimated intercept and slope coefficients, respectively, (that show how each observable characteristic affects the [math, science, language] test score) of the regression models for groups *j=B,G*. The first term in the equation, $\hat{\Delta}_{OS}^{\mu},$, is called the "unexplained" effect in Oaxaca decompositions, which accounts for the portion of the difference not explained by observable factors. The second term, $\hat{\Delta}_X^{\mu},$, is a composition effect, which is called the "explained" effect, representing the portion of the gender difference in test scores attributable to differences in observable characteristics in the Oaxaca-Blinder Decomposition (Fortin, Lemieux, & Firpo, 2011). The unexplained component captures effects due to coefficient differences, reflecting potential discrimination or other non-observable factors. In contrast, the explained component quantifies the impact of differences in group characteristics, offering insights into how specific observable attributes contribute to the observed gender gaps in educational achievements.

The covariates in the Oaxaca-Blinder Decomposition models are tailored to each model based on the dependent variable, which consists of test scores in mathematics, science, or language. Common covariates across all models include factors such as student grade repetition, family socioeconomic status, maternal tertiary education completion, parental expectations for the child's postgraduate studies, parental beliefs about the child's learning ease, urban school location, school enrollment size, proportion of poor students, and school services.

Specifically, models analyzing mathematics test scores at both the third- and sixth-grade levels incorporate additional covariates such as the student mathematics self-efficacy and mathematics anxiety. For models examining both mathematics and language scores in the third grade, additional covariates include the student sense of school belonging, teacher interest in student welfare, and teacher support for student learning. Models that assess test scores across mathematics, language, and science in the sixth grade include an additional covariate of whether the student believes they learn easily. For models focused on language test scores in both third and sixth grades, additional covariates include whether the student engaged in daily study or homework and parent involvement. Moreover, models evaluating language test scores in the sixth grade also consider whether the student has access to more than ten books at home. These carefully selected covariates aim to provide a robust framework for analyzing the multifaceted influences on academic performance across subjects and grade levels.

Results[7]

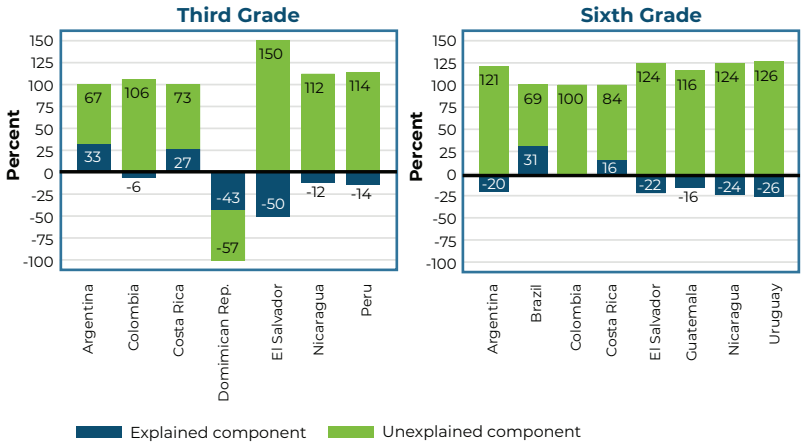
The mathematics achievement gap between boys and girls in both third and sixth grades is attributed for the most part to the unexplained component of gender differences (Figure 17). For third-grade students, the unexplained component accounts for between 67 and 150 percent of the learning gap in mathematics that favors boys, with the Dominican Republic an exception, where 57 percent of the gap favoring girls is attributed to this component. Similarly, in sixth grade, the unexplained component accounts for between 69 and 126 percent of the achievement gap in mathematics, again favoring boys. Notably, in Colombia, the gender gap in mathematics achievement at both grade levels is entirely explained by this component.

The unexplained component of gender in the achievement gap in language that favors girls varies significantly across Latin American countries and is not always the primary factor (Figure 18). In Colombia, Costa Rica, Ecuador, El Salvador, Mexico, and Panama, gaps in third-grade language test scores favoring girls are predominantly attributed to gender gaps in observable factors. Argentina presents a balanced case, where the gender gap is equally attributed to disparities in observable factors and to the unexplained portion of the gap. In contrast, in Brazil, the Dominican Republic, Guatemala, Paraguay, and Uruguay, the unexplained component of gender plays a significant role in explaining the differences. For sixth graders in the Dominican Republic and El Salvador, the language achievement gap is mainly attributed to this component, while in Argentina, Brazil, Ecuador, Mexico, Nicaragua, Paraguay, Peru, and Uruguay, the gap is largely explained by gender differences in observable factors. The factors affecting language achievement gaps at both grade levels include grade repetition, parental perceptions of a child's language skills, and interest in the child's higher education.

For sixth-grade science in Argentina, the Dominican Republic, Mexico, Panama, and Paraguay, gender differences in observable factors account for more than half of the achievement gap that favors girls (Figure 19). The most important factors are grade repetition, parents' perception of a child's ability to learn science, and interest in higher education, both for the parents and the student.

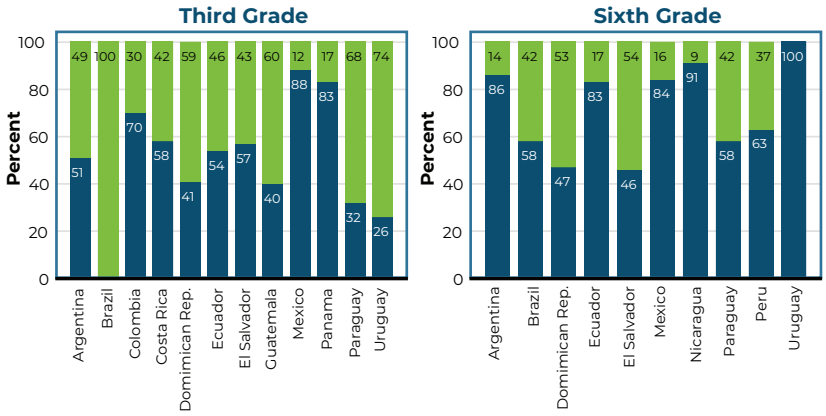
[7] While achievement gaps are statistically significant for some countries, in Figures 3, 4, and 5, when controlling for covariates such as mother's education level, mathematics self-efficacy and anxiety, grade repetition, family socioeconomic status, parent involvement, and expectations, the significance disappears at any level of confidence and are not shown in this analysis.

Figure 17: Achievement gaps between boys and girls with parents who believe and those who do not believe their child learns easily, third- and sixth-grade language (average test score points)



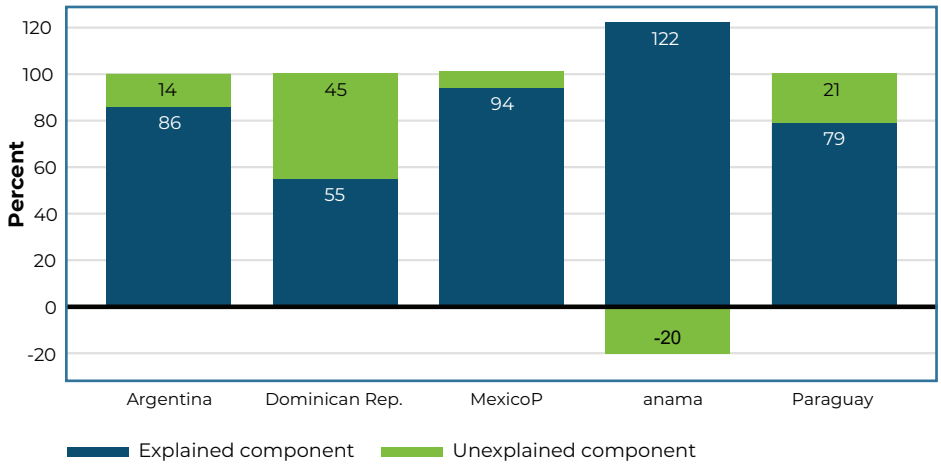
Source: Authors' calculations based on ERCE 2019 databases.

Figure 18: Achievement gaps between boys and girls with parents who believe and those who do not believe their child learns easily, third- and sixth-grade language (average test score points)



Source: Authors' calculations based on ERCE 2019 databases.

Figure 19: Achievement gaps between boys and girls with parents who believe and those who do not believe their child learns easily, third- and sixth-grade language (average test score points)



Source: Authors' calculations based on ERCE 2019 databases.

VIII. KEY POLICY MESSAGES TO ADDRESS GENDER GAPS IN EDUCATION

- This study highlights a complex landscape of academic performance across Latin America, where gender helps to shape educational outcomes. In most countries, girls outperformed boys in language and science, whereas boys showed stronger results in mathematics, reflecting broader educational trends. Notably, Indigenous girls and boys faced more challenges in mathematics and language/science, respectively, often scoring lower than their non-Indigenous counterparts and opposite genders.

- Analysis using the Oaxaca-Blinder Decomposition method indicated that gender differences in observable characteristics do not primarily account for the gaps in mathematics achievement between boys and girls in the third and sixth grades. Interestingly, this analysis also indicates that gender in unobservable or intangible factors does not fully explain the superior performance of girls in language and science, highlighting the role of parental perceptions and the emphasis on higher education as significant factors influencing these gaps. This study emphasizes the intricate relationship between educational outcomes and many factors, including parental expectations, gender norms, and sociocultural contexts

- The critical role of parental confidence in their children's learning abilities and their aspirations for their children's education cannot be overstated, suggesting that these perceptions significantly shape students' academic paths and achievements.

- The evidence presented calls for a strategic approach to policymaking and the implementation of educational interventions. In dismantling the barriers to quality education, there is a clear need for culturally sensitive policies that are also gender-inclusive. To bridge the regional gender gaps in education, it is imperative to adopt strategies that ensure equal opportunities for all students, fostering an environment where every child, regardless of gender or Indigenous status, can access and benefit from a quality education. This study's insights into the dynamics of gender gaps in education highlight the urgent need for comprehensive, targeted strategies to ensure quality education is accessible to every child in Latin America.

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ANNEX

Table A.1: Gender differences in student and family characteristics, third grade

Country	Student Self-Efficacy in Mathematics Index	Student mathematics anxiety	Student repeated a grade level	Student Sense of School Belonging Index	Student studied or did homework every day in the past week	Student Family Socio-economic Status Index	Mother completed tertiary education	Parent Involvement Index	Parent expects child to complete postgraduate studies
Argentina	0.23 (0.04)***	4.13 (0.02)**	-2.51 (0.01)**	0.24 (0.04)***	2.46 (0.02)	5.96 (0.02)**	1.33 (0.02)	0.10 (0.03)***	3.85 (0.01)***
Brazil	0.21 (0.04)***	-2.02 (0.01)	-3.16 (0.02)**	0.21 (0.04)***	4.76 (0.02)***	0.07 (0.03)	0.11 (0.02)	0.11 (0.03)***	1.80 (0.02)
Colombia	0.14 (0.06)**	4.47 (0.02)**	-8.44 (0.02)***	0.27 (0.05)***	10.56 (0.02)***	6.12 (0.05)	1.80 (0.01)	0.13 (0.05)***	5.49 (0.02)**
Costa Rica	0.31 (0.04)***	5.62 (0.02)***	-3.40 (0.01)***	0.25 (0.04)***	3.43 (0.02)**	-1.01 (0.03)	-1.98 (0.02)	0.15 (0.04)***	2.76 (0.02)
Dominican Republic	0.04 (0.03)	-5.13 (0.02)***	-9.24 (0.02)***	0.11 (0.05)**	6.06 (0.02)***	6.71 (0.03)**	1.34 (0.01)	0.14 (0.05)***	10.15 (0.02)***
Ecuador	0.11 (0.04)***	-4.08 (0.02)**	-4.07 (0.01)***	0.25 (0.03)***	3.23 (0.01)**	-1.05 (0.03)	1.73 (0.01)	0.15 (0.03)***	4.56 (0.01)***
El Salvador	0.23 (0.03)***	2.80 (0.02)*	-5.94 (0.02)***	0.20 (0.03)***	4.27 (0.02)***	1.87 (0.03)	0.74 (0.01)	0.05 (0.03)	2.79 (0.01)***
Guatemala	0.11 (0.03)***	-0.58 (0.01)	-6.52 (0.01)***	0.15 (0.03)***	3.60 (0.02)**	2.20 (0.04)	-0.03 (0.01)**	0.01 (0.04)	6.04 (0.01)***
Honduras	0.07 (0.03)**	-1.07 (0.01)	-5.41 (0.02)***	0.13 (0.04)***	7.00 (0.02)***	-4.68 (0.04)	-2.34 (0.01)	0.18 (0.05)***	5.10 (0.02)**
Mexico	0.08 (0.03)**	0.29 (0.02)	-3.29 (0.01)**	0.27 (0.04)***	3.43 (0.02)**	1.04 (0.03)	0.50 (0.01)	0.06 (0.03)*	4.48 (0.01)***
Nicaragua	0.20 (0.03)***	4.71 (0.02)***	-6.45 (0.02)***	0.07 (0.04)*	9.69 (0.02)***	5.49 (0.04)	1.26 (0.02)	0.16 (0.06)***	3.59 (0.02)*
Panama	0.03 (0.04)	-1.37 (0.02)	-2.78 (0.01)**	0.12 (0.04)***	1.44 (0.02)	3.55 (0.04)	-0.69 (0.01)	0.07 (0.03)**	5.61 (0.02)***
Paraguay	0.16 (0.03)***	1.03 (0.02)	-7.16 (0.01)***	0.15 (0.03)***	1.40 (0.02)	-0.12 (0.03)	-1.53 (0.01)**	0.06 (0.04)*	2.60 (0.01)*
Peru	0.20 (0.04)***	1.53 (0.02)	-1.34 (0.01)	0.16 (0.03)***	2.48 (0.02)	0.54 (0.04)	3.32 (0.01)	0.08 (0.03)**	0.99 (0.02)
Uruguay	0.18 (0.03)***	3.30 (0.02)**	-6.34 (0.02)***	0.32 (0.04)***	0.04 (0.02)	2.72 (0.02)	-1.20 (0.00)***	0.14 (0.03)***	4.91 (0.01)***

Notes: Standard errors are presented in parentheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

Table A.2: Gender differences in parent perception and teacher and school characteristics, third grade

Country	Parent believes child learns mathematics easily	Parent believes child learns language easily	Teacher Interest in Student Welfare Index	Teacher Support of Student Learning Index	School is in an urban area	Size of school enrollment	Proportion of poor students	School Services Index
Argentina	-5.11 (0.02)***	6.34 (0.01)***	0.18 (0.03)***	0.09 (0.03)***	-0.99 (0.01)	7.28 (6.56)	-0.67 (1.04)	0.00 (0.01)
Brazil	-5.87 (0.02)***	5.88 (0.02)***	0.04 (0.03)	0.05 (0.03)	-1.98 (0.02)	2.08 (11.94)	127.37 (1.37)	-0.03 (0.03)
Colombia	-7.91 (0.02)***	7.22 (0.02)***	0.20 (0.04)***	0.18 (0.05)***	1.37 (0.02)	27.05 (27.41)	12.02 (1.87)	0.06 (0.04)
Costa Rica	-9.30 (0.02)***	6.72 (0.02)***	0.22 (0.03)***	0.14 (0.04)***	0.75 (0.02)	5.02 (18.81)	43.15 (1.33)	0.02 (0.03)
Dominican Republic	2.63 (0.02)	16.43 (0.02)***	0.17 (0.05)***	0.17 (0.04)***	2.46 (0.02)	58.05 (50.75)	6.63 (1.25)	0.06 (0.03)**
Ecuador	-5.73 (0.01)***	3.86 (0.01)***	0.15 (0.03)***	0.15 (0.03)***	-0.03 (0.02)	0.85 (12.31)	-116.96 (1.17)	0.02 (0.02)
El Salvador	-0.85 (0.02)	8.16 (0.02)***	0.16 (0.03)***	0.15 (0.03)***	1.07 (0.02)	3.66 (8.61)	-184.30 (1.39)	0.04 (0.03)
Guatemala	0.09 (0.02)	8.01 (0.02)***	0.12 (0.04)***	0.14 (0.04)***	-0.42 (0.02)	10.82 (7.29)	51.57 (1.13)	0.03 (0.03)
Honduras	-0.66 (0.02)	7.37 (0.02)***	-0.04 (0.05)	-0.08 (0.07)	3.37 (0.02)*	-5.62 (10.99)	-52.52 (1.23)	-0.03 (0.03)
Mexico	-4.41 (0.02)**	7.46 (0.02)***	0.13 (0.03)***	0.12 (0.03)***	3.96 (0.01)***	4.41 (5.75)	-188.40 (1.06)*	0.04 (0.02)*
Nicaragua	-5.74 (0.03)**	5.73 (0.03)**	0.08 (0.06)	0.12 (0.07)*	1.65 (0.02)	7.83 (12.85)	-142.41 (1.27)	-0.01 (0.04)
Panama	-0.98 (0.02)	8.30 (0.02)***	0.10 (0.03)***	0.07 (0.03)**	-0.93 (0.01)	-19.41 (13.21)	-22.83 (1.12)	-0.03 (0.03)
Paraguay	2.24 (0.02)	9.17 (0.02)***	0.12 (0.04)***	0.10 (0.04)***	-2.40 (0.02)	-6.10 (7.29)	-94.40 (1.18)	0.01 (0.03)
Peru	-4.10 (0.02)**	5.69 (0.02)***	0.15 (0.04)***	0.13 (0.03)***	-1.13 (0.02)	1.97 (8.61)	-237.57 (1.37)*	-0.03 (0.03)
Uruguay	-6.77 (0.02)***	12.91 (0.02)***	0.14 (0.03)***	0.09 (0.04)***	0.13 (0.02)	-12.28 (17.99)	15.79 (1.29)	-0.01 (0.02)

Notes: Standard errors are presented in parentheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

Table A.3: Gender differences in student and family characteristics, sixth grade

Country	Student Self-Efficacy in Mathematics Index	Student mathematics anxiety	Student repeated a grade level	Student Sense of School Belonging Index	Student studied or did homework every day in the past week	Student expects to complete postgraduate studies	Student Family Socio-economic Status Index	Mother completed tertiary education
Argentina	22.62 (0.04)***	0.04 (0.02)**	-3.92 (0.01)***	0.18 (0.04)***	7.83 (0.02)***	12.55 (0.01)***	-0.62 (0.02)	0.09 (0.01)*
Brazil	21.32 (0.04)***	-0.02 (0.01)	-10.31 (0.01)***	0.09 (0.03)***	7.08 (0.02)***	-0.65 (0.00)	-1.30 (0.03)	-2.45 (0.02)
Colombia	14.07 (0.06)**	0.04 (0.02)**	-10.03 (0.02)***	0.15 (0.04)***	8.35 (0.02)***	5.75 (0.02)***	6.28 (0.05)	1.93 (0.01)
Costa Rica	30.56 (0.04)***	0.06 (0.02)***	-5.68 (0.01)***	0.11 (0.04)***	0.11 (0.02)	8.64 (0.02)***	4.62 (0.03)*	0.57 (0.02)
Dominican Republic	3.54 (0.03)	-0.05 (0.02)***	-11.95 (0.01)***	0.13 (0.04)***	5.17 (0.02)***	18.67 (0.01)***	1.87 (0.02)	1.81 (0.01)
Ecuador	11.44 (0.04)***	-0.04 (0.02)**	-2.94 (0.01)***	0.21 (0.03)***	3.06 (0.02)*	15.36 (0.01)***	2.34 (0.03)	-0.25 (0.01)**
El Salvador	23.44 (0.03)***	0.03 (0.02)*	-7.03 (0.01)***	0.11 (0.03)***	1.18 (0.02)	3.35 (0.01)**	4.05 (0.03)	2.01 (0.01)
Guatemala	11.29 (0.03)***	-0.01 (0.01)	-7.98 (0.02)***	0.15 (0.04)***	2.45 (0.02)	11.68 (0.02)***	-3.25 (0.05)	-0.09 (0.01)
Honduras	7.15 (0.03)**	-0.01 (0.01)	-6.30 (0.01)***	0.12 (0.04)***	6.48 (0.02)***	14.81 (0.02)***	-3.03 (0.04)	0.13 (0.01)
Mexico	8.30 (0.03)**	0.00 (0.02)	-2.24 (0.01)***	0.24 (0.04)***	10.58 (0.02)***	14.54 (0.02)***	1.02 (0.03)	-0.26 (0.01)**
Nicaragua	20.37 (0.03)***	0.05 (0.02)***	-5.62 (0.02)***	0.13 (0.04)***	8.39 (0.02)***	10.96 (0.02)***	-5.16 (0.03)	-1.72 (0.01)*
Panama	2.71 (0.04)	-0.01 (0.02)	-5.26 (0.01)***	0.08 (0.03)**	1.14 (0.02)	9.27 (0.02)***	4.02 (0.04)	2.53 (0.01)
Paraguay	16.29 (0.03)***	0.01 (0.02)	-8.16 (0.01)***	0.13 (0.03)***	4.91 (0.02)***	12.63 (0.01)***	-1.25 (0.03)	-1.21 (0.02)
Peru	19.67 (0.04)***	0.02 (0.02)	-4.91 (0.01)***	0.06 (0.03)*	5.36 (0.02)***	6.37 (0.02)***	-0.59 (0.05)	1.60 (0.01)
Uruguay	18.04 (0.03)***	0.03 (0.02)**	-5.24 (0.01)***	0.17 (0.04)***	-0.33 (0.02)	7.71 (0.01)***	4.68 (0.03)	1.54 (0.00)***

Notes: Standard errors are presented in parentheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

Table A.4: Gender differences in parent involvement, expectations, and perceptions, sixth grade

Country	Parent Involvement Index	Parent expects child to complete postgraduate studies	Parent believes child learns mathematics easily	Parent believes child learns language easily	Parent believes child learns science easily
Argentina	0.08 (0.03)**	7.67 (0.01)***	-2.09 (0.02)	12.82 (0.02)***	4.78 (0.01)***
Brazil	-0.01 (0.03)	7.82 (0.01)***	-4.72 (0.02)**	11.77 (0.02)***	2.80 (0.01)*
Colombia	0.10 (0.03)***	5.76 (0.02)***	-5.79 (0.02)***	6.92 (0.02)***	5.33 (0.02)***
Costa Rica	-0.01 (0.03)	7.13 (0.02)***	-4.98 (0.02)***	7.30 (0.02)***	3.15 (0.01)**
Dominican Republic	0.14 (0.03)***	9.31 (0.02)***	-0.95 (0.02)	11.35 (0.02)***	10.42 (0.02)***
Ecuador	0.11 (0.03)***	10.62 (0.02)***	-1.38 (0.02)	8.85 (0.01)***	3.64 (0.01)***
El Salvador	0.05 (0.03)*	3.58 (0.01)***	4.35 (0.02)**	7.27 (0.02)***	2.37 (0.02)
Guatemala	0.07 (0.04)*	7.46 (0.02)***	-3.26 (0.02)**	6.25 (0.02)***	6.67 (0.02)***
Honduras	0.09 (0.04)**	6.13 (0.02)***	1.05 (0.02)	9.65 (0.02)***	6.09 (0.02)***
Mexico	0.15 (0.03)***	6.46 (0.01)***	-1.22 (0.02)	12.97 (0.02)***	8.50 (0.02)***
Nicaragua	0.15 (0.04)***	8.12 (0.02)***	-0.11 (0.02)	9.89 (0.02)***	6.73 (0.02)***
Panama	0.07 (0.03)**	9.07 (0.02)***	-0.31 (0.02)	12.34 (0.02)***	9.40 (0.02)***
Paraguay	0.08 (0.04)**	5.63 (0.01)***	4.40 (0.02)**	11.33 (0.02)***	5.89 (0.02)***
Peru	0.04 (0.04)	6.62 (0.02)***	-4.59 (0.02)***	9.52 (0.02)***	4.28 (0.02)**
Uruguay	0.07 (0.03)**	8.11 (0.02)***	-5.77 (0.01)***	14.32 (0.02)***	6.65 (0.02)***

Notes: Standard errors are presented in parentheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

Table A.5: Gender Differences in Teacher and School Characteristics, Sixth grade

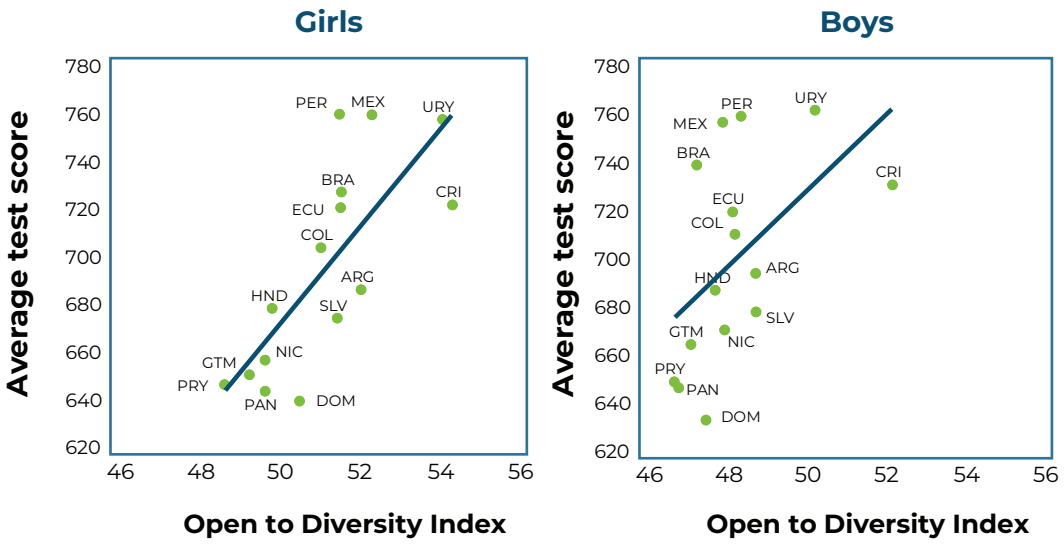
Country	Teacher Interest in Student Welfare Index	Teacher Support of Student Learning Index	School is in an urban area	Size of school enrollment	Proportion of poor students	School Services Index
Argentina	0.13 (0.03)***	0.13 (0.03)***	-1.58 (0.01)*	-1.26 (7.53)	-80.02 (1.03)	-0.01 (0.01)
Brazil	0.02 (0.03)	0.05 (0.03)*	-0.79 (0.01)	-0.24 (12.32)	83.47 (1.33)	-0.01 (0.02)
Colombia	0.08 (0.04)**	0.06 (0.03)**	0.72 (0.02)	-3.20 (18.67)	-167.50 (2.00)	0.05 (0.03)
Costa Rica	0.01 (0.04)	0.01 (0.04)	1.81 (0.02)	8.05 (15.38)	-72.00 (1.00)	0.02 (0.02)
Dominican Republic	0.12 (0.03)***	0.14 (0.03)***	0.48 (0.01)	78.01 (69.97)	133.03 (1.22)	0.01 (0.02)
Ecuador	0.07 (0.03)**	0.04 (0.03)	0.13 (0.01)	9.45 (14.54)	-153.64 (1.25)	0.01 (0.02)
El Salvador	0.09 (0.03)***	0.05 (0.03)*	2.42 (0.02)	6.25 (8.28)	-337.27 (1.31)**	0.04 (0.03)
Guatemala	0.12 (0.04)***	0.10 (0.04)**	-0.39 (0.02)	7.21 (11.39)	-101.93 (1.47)	0.01 (0.04)
Honduras	0.11 (0.04)**	0.09 (0.05)*	-0.29 (0.02)	-2.96 (10.87)	52.49 (1.13)	-0.03 (0.03)
Mexico	0.12 (0.03)***	0.13 (0.03)***	0.37 (0.01)	-1.62 (6.87)	-43.38 (1.12)	0.00 (0.03)
Nicaragua	0.05 (0.03)	0.07 (0.04)*	3.16 (0.02)**	16.21 (9.66)*	178.94 (1.28)	0.03 (0.03)
Panama	0.03 (0.03)	0.09 (0.03)***	2.39 (0.01)	9.23 (14.25)	-75.03 (1.25)	0.02 (0.04)
Paraguay	0.01 (0.03)	0.07 (0.04)*	0.26 (0.02)	11.64 (9.18)	-84.15 (1.33)	0.02 (0.03)
Peru	0.04 (0.03)	0.06 (0.03)*	3.91 (0.02)**	14.24 (10.44)	-196.20 (1.80)	0.08 (0.04)**
Uruguay	0.07 (0.03)**	0.11 (0.04)**	0.24 (0.03)	28.61 (18.79)	20.90 (1.26)	0.02 (0.02)

Notes: Standard errors are presented in parentheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.
Source: Authors' calculations based on ERCE 2019 databases.

Table A.6: Items in each socioemotional skill indicator

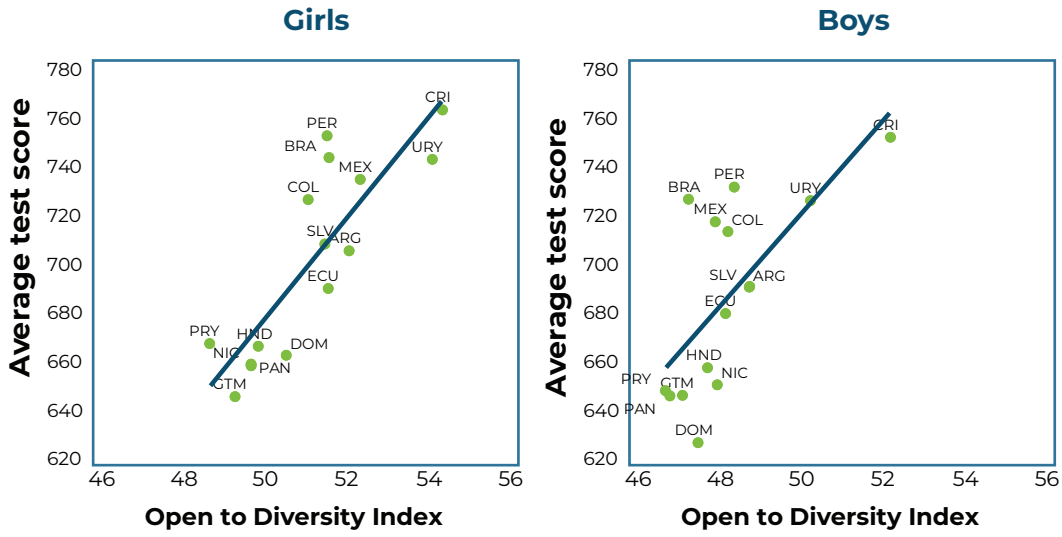
Openness to diversity
How would you feel if students from another country entered your class?
How would you feel if students from another region of the country entered your class?
How would you feel if a student entered your class who has a skin color different from yours?
How would you feel if a student who has a disability (blind, deaf, or who needs a wheelchair) entered your class?
How would you feel if students of a different religion than yours, entered your group?
How would you feel if in your class there were students of different ethnicities or indigenous peoples?
Empathy
When someone gets mad at me, I try to imagine what they are thinking or feeling
When two friends fight, it is easy for me to understand what both of them are thinking.
When a classmate who isn't my friend is sad, I try to cheer them up.
I defend my classmates when someone is bothering them.
I'm glad when a classmate does something good.
When a classmate who isn't my friend has a problem, I try to help them.
It makes me sad when a classmate has no one to play with.
Self-regulation of academic learning
I follow the class norms and rules.
I ask the teacher for help when I don't understand what to do.
I follow the class rules even when the teacher isn't looking.
I keep working in class even when my classmates are being disorderly.
I review my work thoroughly before turning in a test or homework,
I finish studying before starting to play.
I keep working on a task even when it is hard.
I do the class activities even when I don't feel like it.
I wait for my turn to talk in class.
I keep trying even when I can't work things out.

Figure A.1: Relation between Open to Diversity Index and test scores, sixth-grade mathematics



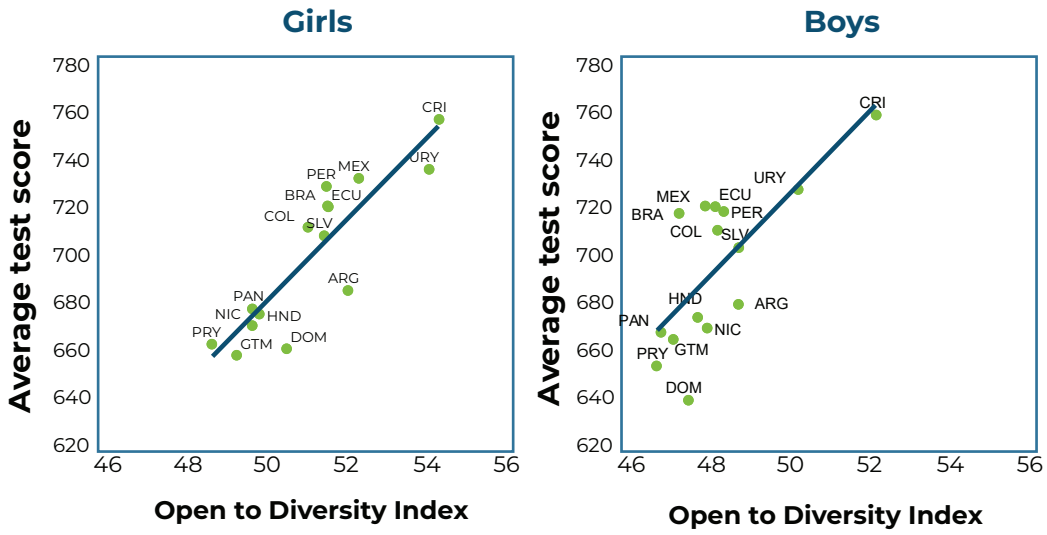
Source: Authors' calculations based on ERCE 2019 databases.

Figure A.2: Relation between Open to Diversity Index and test scores: sixth-grade language



Source: Authors' calculations based on ERCE 2019 databases.

Figure A.3: Relation between Open to Diversity Index and test scores: sixth-grade science



Source: Authors' calculations based on ERCE 2019 databases.