

How Much Are Latin American Children Learning?

Highlights from the Second Regional Student Achievement Test (SERCE)



Partnership for Educational
Revitalization in the Americas

Prepared by:
Alejandro J. Ganimian

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2009

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Why a document of this type?

This document offers a user-friendly summary of how Latin American children perform in math, reading and science

In recent years, debates on education policy have been shifting their focus from educational quantity—getting more children in school and ensuring they stay longer—to educational quality—the learning that children acquire while at school. This change is welcome. Evidence suggests that low-quality schooling confers few benefits, and that quality education (as measured by standardized tests) has a greater impact on individual earnings and economic growth, in addition to having a positive impact on society.

International tests are beginning to provide valuable information about the quality of education in Latin America. In mid-2008, UNESCO’s Laboratory for Assessment of the Quality of Education (LLECE) published the results of the Second Regional Comparative and Explanatory Study (SERCE), which evaluated the skills of third and sixth graders in math, reading and science in 16 Latin American countries. This test is the most recent and comprehensive study of the quality of education in the region.

In the document that follows, we highlight key findings of the SERCE study, with the goal of fostering an informed dialogue on student learning in the region. It presents a series of user-friendly tables and graphs that summarize the SERCE results and help policy-makers, parents, teachers and leaders in business and civil society to understand their implications. We hope this document helps further the conversation on student learning in the region.

Best regards,

Jeffrey Puryear & Marcela Gajardo

Co-directors, PREAL

What is SERCE?

SERCE is the second regional student achievement test conducted in Latin America and the Caribbean

What is SERCE?

SERCE (the Second Regional Comparative and Explanatory Study) was conducted by UNESCO's Laboratory for Assessment of the Quality of Education (LLECE) in 2006, and results were published in mid-2008. SERCE builds on the first regional assessment conducted by LLECE in 1998 (PERCE), but includes more countries, different grades and a new subject (science). PERCE and SERCE results are not comparable.

What did it evaluate?

SERCE assessed and compared the performance of third and sixth graders in reading and math and the performance of sixth graders in science.

Who participated?

16 countries in the region and the Mexican state of Nuevo Leon participated in SERCE:

- Argentina, Colombia, Cuba, El Salvador, Panama, Paraguay, Peru, Uruguay, the Dominican Republic and the Mexican state of Nuevo Leon participated in all three tests (math, reading and science);
- Brazil, Chile, Costa Rica, Ecuador, Guatemala, Mexico and Nicaragua assessed their students in math and reading, but not in science.

How were students scored?

SERCE divided scores into four performance levels from Level 1 (lowest) to Level 4 (highest). Students who could not answer the most basic questions in the test scored "Below Level 1".

How do countries rank on SERCE?

Cuba led all rankings with an ample advantage over the rest of the region

Table 1. Mean score for third graders on the SERCE math test, 2006

Cuba	648	The mean score of these countries is significantly above the mean score for the region.
Nuevo Leon	563	
Uruguay	539	
Costa Rica	538	
Mexico	532	
Chile	529	
Argentina	505	There are no significant differences between the mean score of these countries and the regional mean.
Brazil	505	
Colombia	499	
Paraguay	486	The mean score of these countries is significantly below the mean score for the region.
El Salvador	483	
Peru	474	
Ecuador	473	
Nicaragua	473	
Panama	463	
Guatemala	457	
Dom. Rep.	396	

Source: SERCE (2008). *Primer Reporte*. Table A.3.1, p.191 and Graph 3.2, p.76.

Note: The mean score for the exam is 500. Although the table shows statistical differences from the average score for the region, not all differences in mean scores between particular countries are statistically significant.

Chile, Costa Rica, Mexico, Nuevo Leon and Uruguay scored above the mean on the reading and math tests

Table 2. Mean score for third graders on the SERCE reading test, 2006

Cuba	627	The mean score of these countries is significantly above the mean score for the region.
Costa Rica	563	
Chile	562	
Nuevo Leon	558	
Mexico	530	
Uruguay	523	
Colombia	511	
Argentina	510	
Brazil	504	There are no significant differences between the mean score of these countries and the regional mean.
El Salvador	496	
Peru	474	The mean score of these countries is significantly below the mean score for the region.
Nicaragua	470	
Paraguay	469	
Panama	467	
Ecuador	452	
Guatemala	447	
Dom. Rep.	395	

Source: SERCE (2008). *Primer Reporte*. Table A.4.1, p.193 and Graph 4.2, p.106.

Note: The mean score for the exam is 500. Although the table shows statistical differences from the average score for the region, not all differences in mean scores between particular countries are statistically significant.

The Dominican Republic scored at the bottom of the rankings in the reading, math and science tests

Table 3. Mean score for sixth graders on the SERCE math test, 2006

Cuba	637	The mean score of these countries is significantly above the mean score for the region.
Uruguay	578	
Nuevo Leon	554	
Costa Rica	549	
Mexico	542	
Chile	517	
Argentina	513	
Brazil	499	There are no significant differences between the mean score of these countries and the regional mean.
Colombia	493	
Peru	490	
El Salvador	472	The mean score of these countries is significantly below the mean score for the region.
Paraguay	468	
Ecuador	460	
Nicaragua	458	
Guatemala	456	
Panama	452	
Dom. Rep.	416	

Source: SERCE (2008). *Primer Reporte*. Table A.3.5, p.192 and Graph 3.6, p.81.

Note: The mean score for the exam is 500. Although the table shows statistical differences from the average score for the region, not all differences in mean scores between particular countries are statistically significant.

Ecuador, Guatemala, Nicaragua, Panama and Paraguay scored consistently below the regional mean

Table 4. Mean score for sixth graders on the SERCE reading test, 2006

Cuba	596	The mean score of these countries is significantly above the mean score for the region.
Costa Rica	563	
Chile	546	
Nuevo Leon	542	
Uruguay	542	
Mexico	530	
Brazil	520	
Colombia	515	
Argentina	506	There are no significant differences between the mean score of this country and the regional mean.
El Salvador	484	The mean score of these countries is significantly below the mean score for the region.
Peru	476	
Nicaragua	473	
Panama	472	
Paraguay	455	
Guatemala	451	
Ecuador	447	
Dom. Rep.	421	

Source: SERCE (2008). *Primer Reporte*. Table A.4.5, p.194 and Graph 4.6, p.111.

Note: The mean score for the exam is 500. Although the table shows statistical differences from the average score for the region, not all differences in mean scores between particular countries are statistically significant.

Only two countries and Nuevo Leon scored above the regional mean in science

Table 5. Mean score for sixth graders on the SERCE science test, 2006

Cuba	662	The mean score of these countries is significantly above the mean score for the region.
Uruguay	533	
Nuevo Leon	511	
Colombia	504	There are no significant differences between the mean score of this country and the regional mean.
Argentina	489	The mean score of these countries is significantly below the mean score for the region.
El Salvador	479	
Panama	473	
Paraguay	469	
Peru	465	
Dom. Rep.	426	

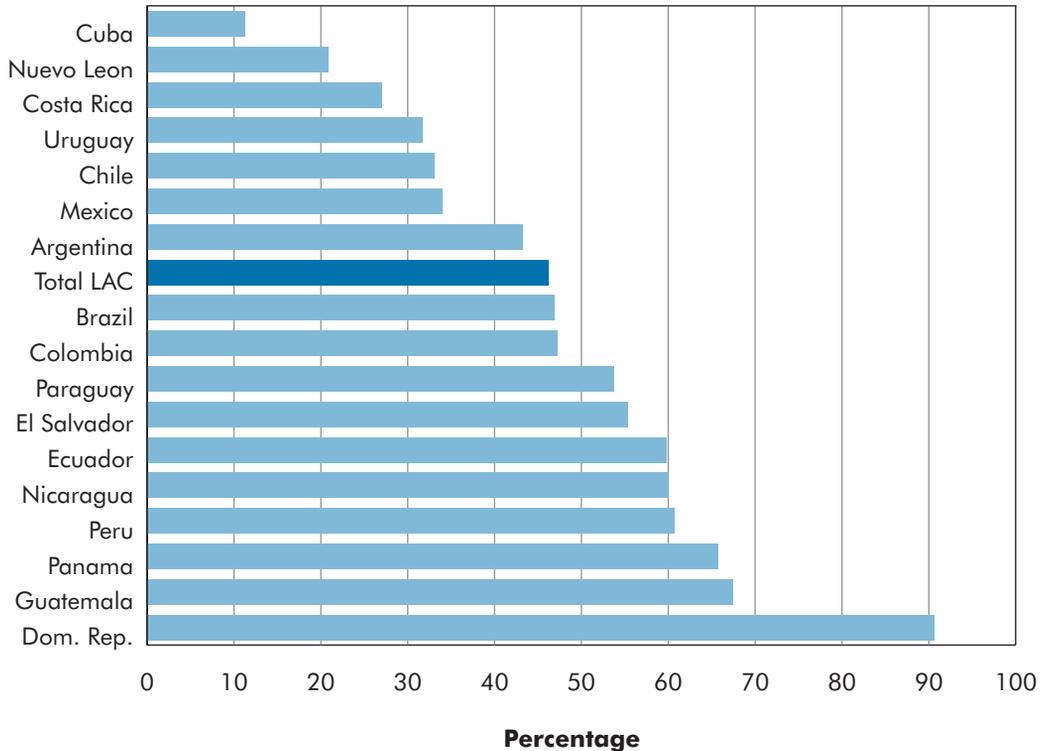
Source: SERCE (2008). *Primer Reporte*. Table A.5.1, p. 195 and Graph 5.2, p.127.

Note: The mean score for the exam is 500. Although the table shows statistical differences from the average score for the region, not all differences in mean scores between particular countries are statistically significant.

How many students underperform?

Nearly half of third graders in Latin America performed at the lowest levels on the math test

Figure 1. Third graders with lowest achievement (level 1 or below) on the SERCE math test, 2006

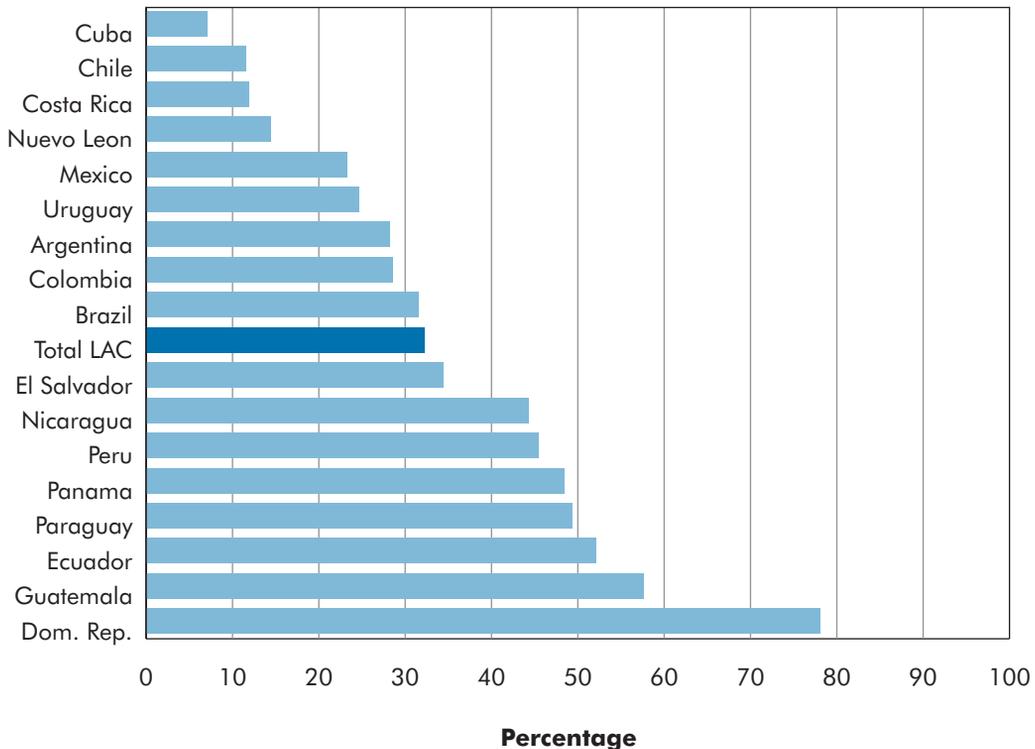


Source: SERCE (2008). *Executive Summary*. Table 4, p. 24.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what third graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 3, p. 23.

Roughly a third of third graders in the region performed at the lowest levels in the reading test

Figure 2. Third graders with lowest achievement (level 1 or below) on the SERCE reading test, 2006

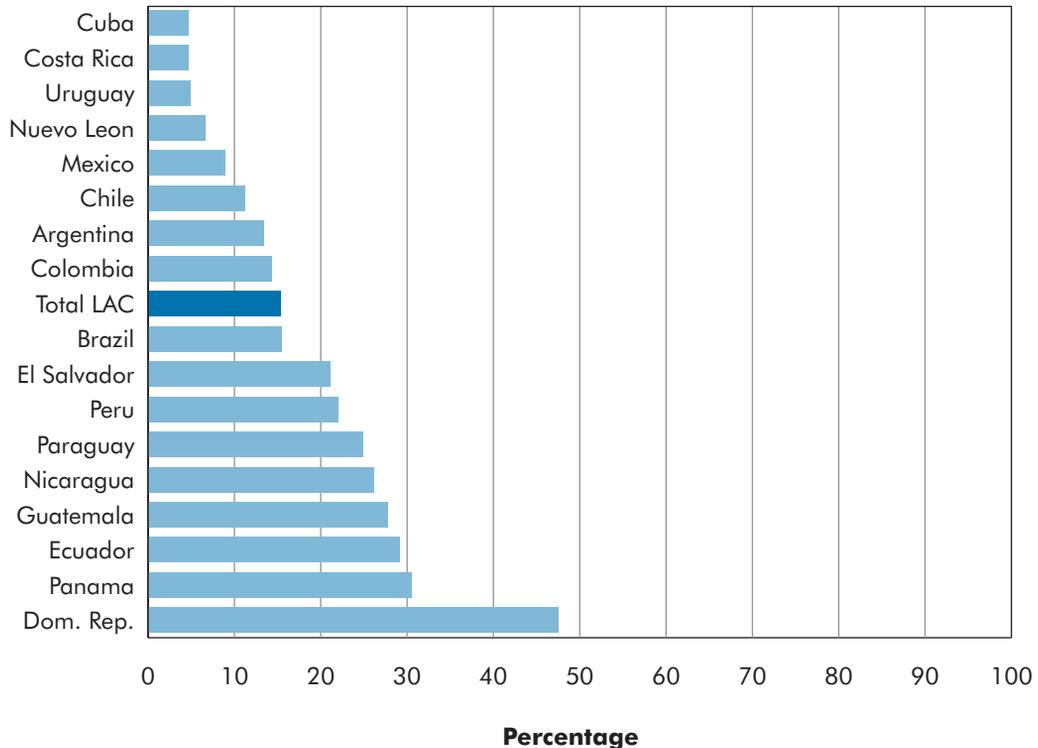


Source: SERCE (2008). *Executive Summary*. Table 7, p. 29.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what third graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 6, p. 28.

In sixth grade, there were fewer low performers, but this may be influenced by dropouts in earlier grades

Figure 3. Sixth graders with lowest achievement (level 1 or below) on the SERCE math test, 2006

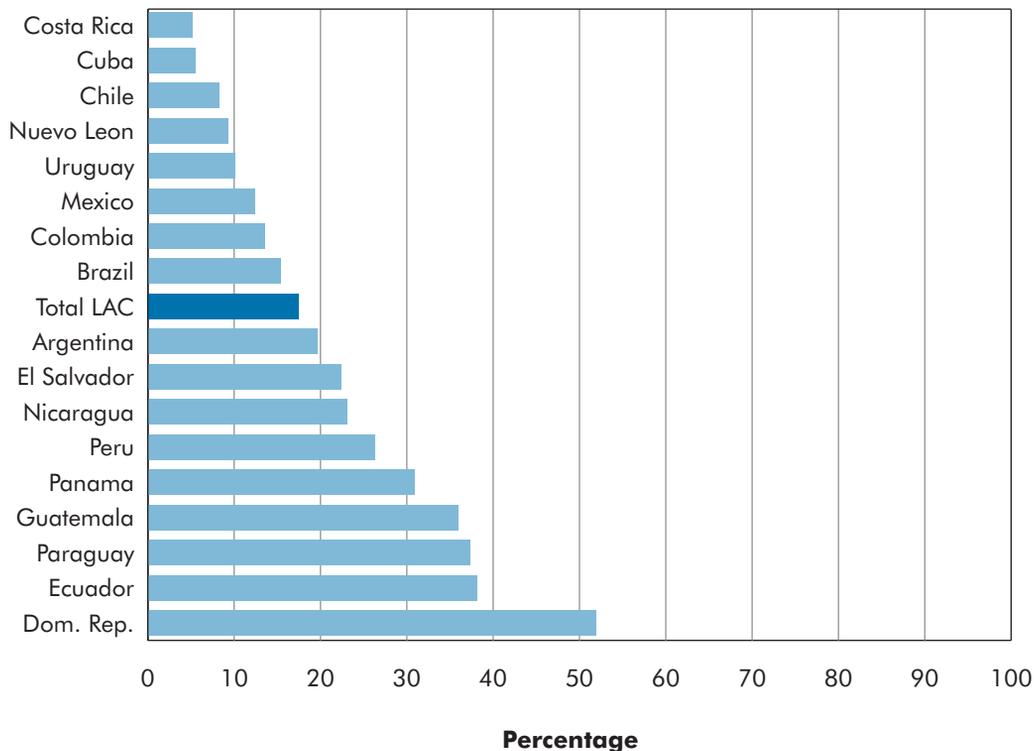


Source: SERCE (2008). *Executive Summary*. Table 10, p. 34.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what sixth graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 9, p. 33.

Costa Rica and Cuba had few low performers while most students in the Dom. Republic performed poorly

Figure 4. Sixth graders with low achievement (level 1 or below) on the SERCE reading test, 2006

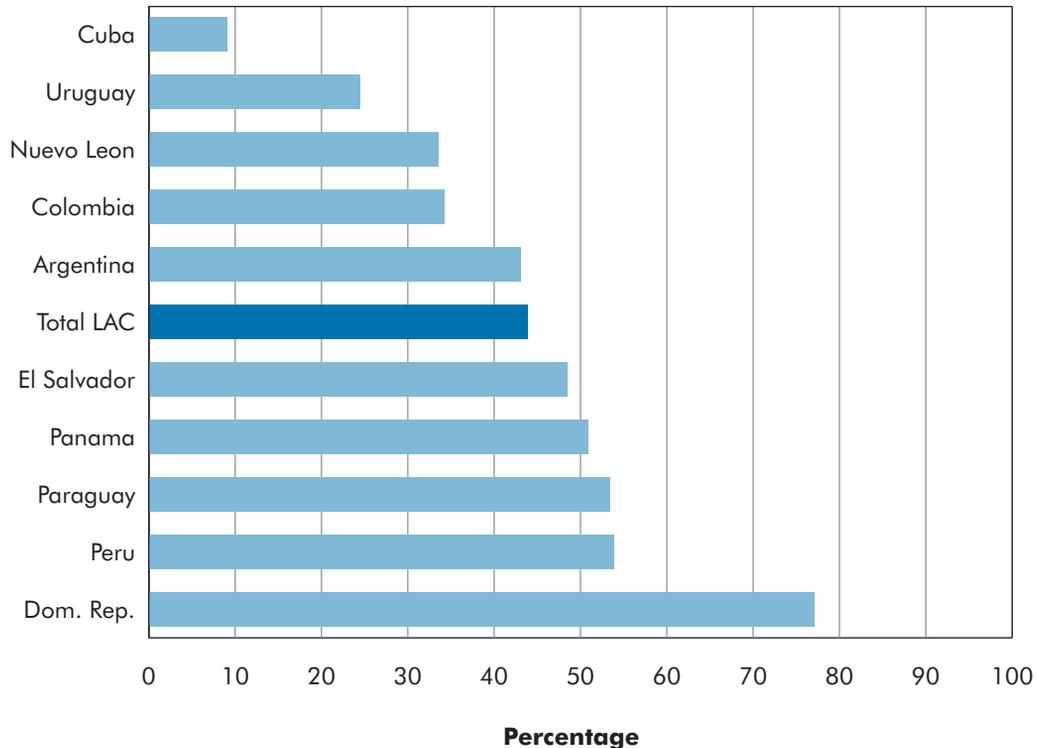


Source: SERCE (2008). *Executive Summary*. Table 13, p. 39.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what sixth graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 12, p. 38.

More sixth graders performed at the lowest levels in the science test than in the math or reading exams

Figure 5. Sixth graders with lowest achievement (level 1 or below) on the SERCE science test, 2006



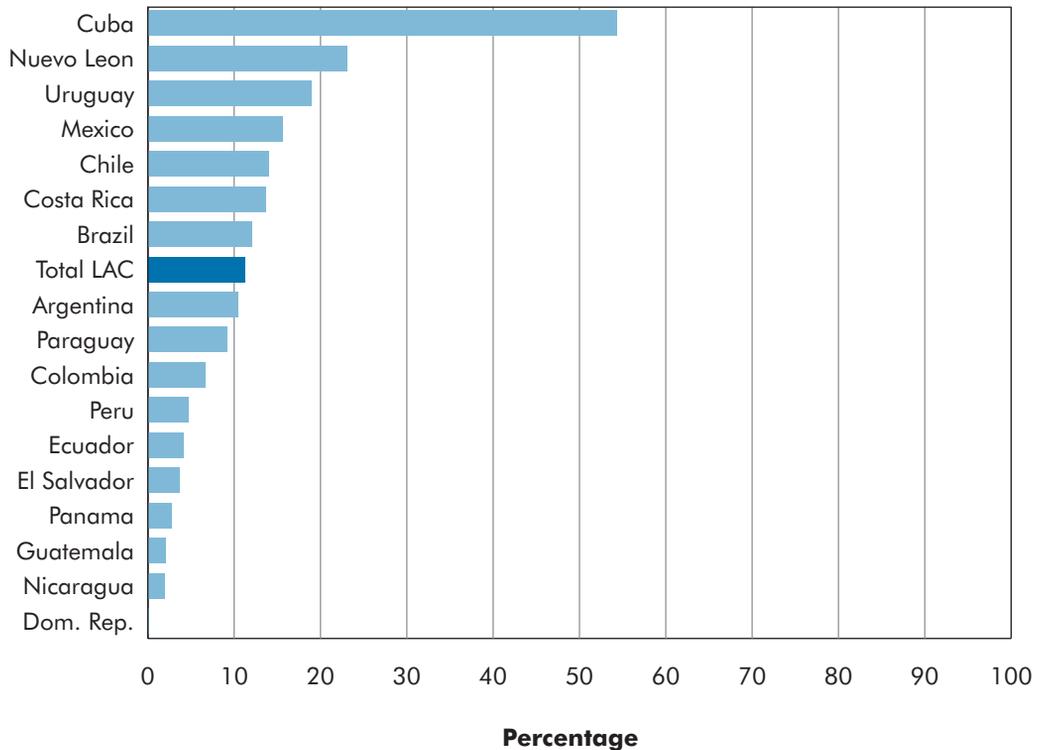
Source: SERCE (2008). *Executive Summary*. Table 16, p. 43.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what sixth graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 15, p. 42.

How many students excel?

Only 1 out of every 10 third graders in Latin America performed at the highest level in math or reading

Figure 6. Third graders with highest achievement (level 4) on the SERCE math test, 2006

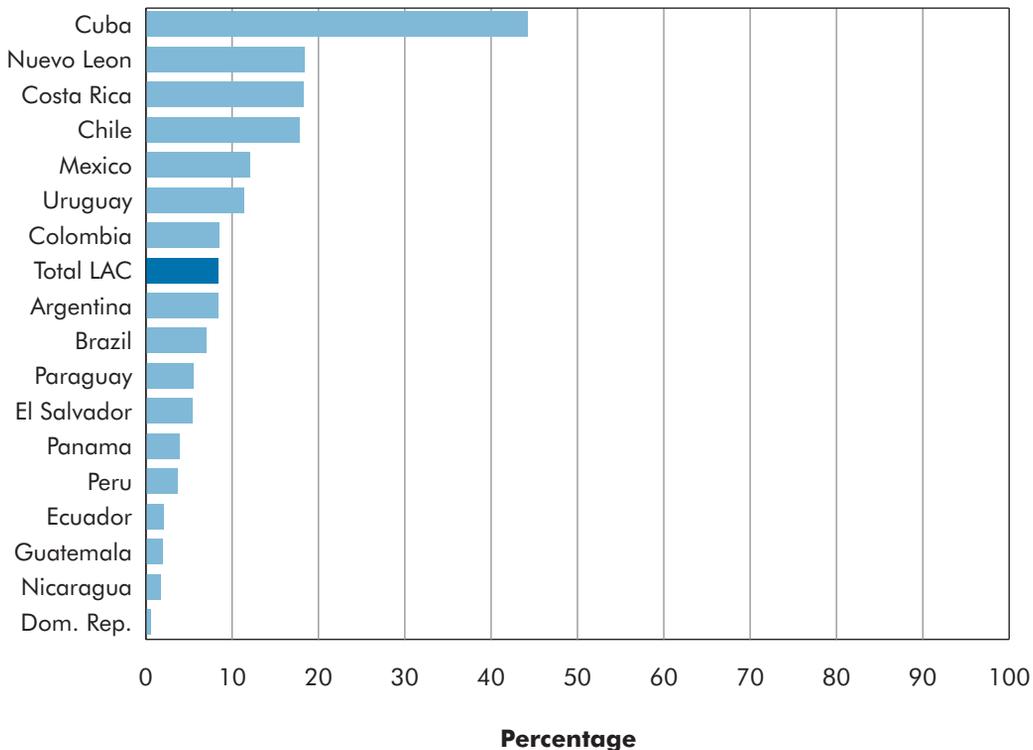


Source: SERCE (2008). *Executive Summary*. Table 4, p. 24.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what third graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 3, p. 23.

Cuba had by far the highest percentage of top performers in math and reading in the region

Figure 7. Third graders with highest achievement (level 4) on the SERCE reading test, 2006

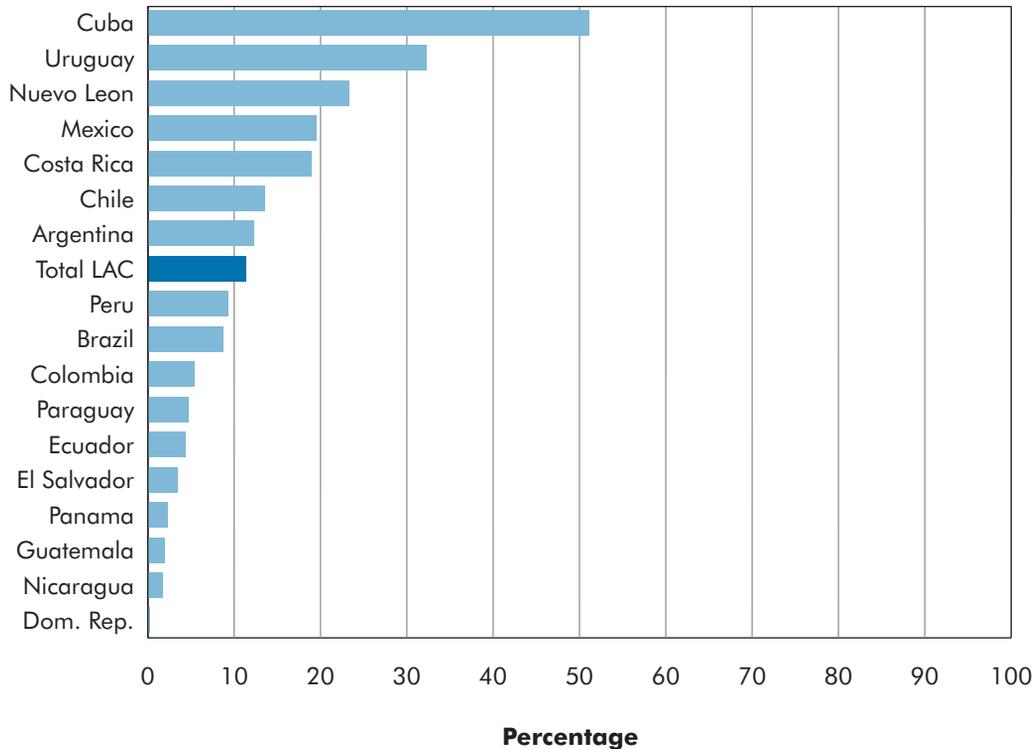


Source: SERCE (2008). *Executive Summary*. Table 7, p. 29.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what third graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 6, p. 28.

Even though only the better students reach sixth grade, few of them excelled in the math and reading tests

Figure 8. Sixth graders with highest achievement (level 4) on the SERCE math test, 2006

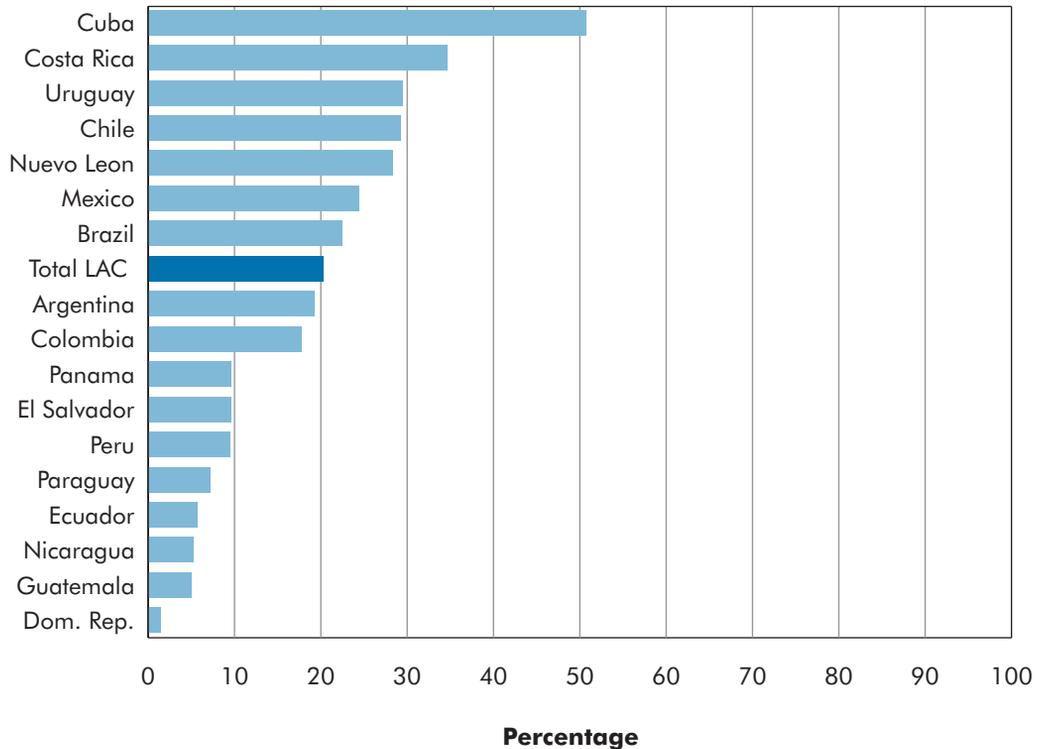


Source: SERCE (2008). *Executive Summary*. Table 10, p. 34.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what sixth graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 9, p. 33.

Central American countries had very few students who excelled at math or reading (except for Costa Rica)

Figure 9. Sixth graders with highest achievement (level 4) on the SERCE reading test, 2006

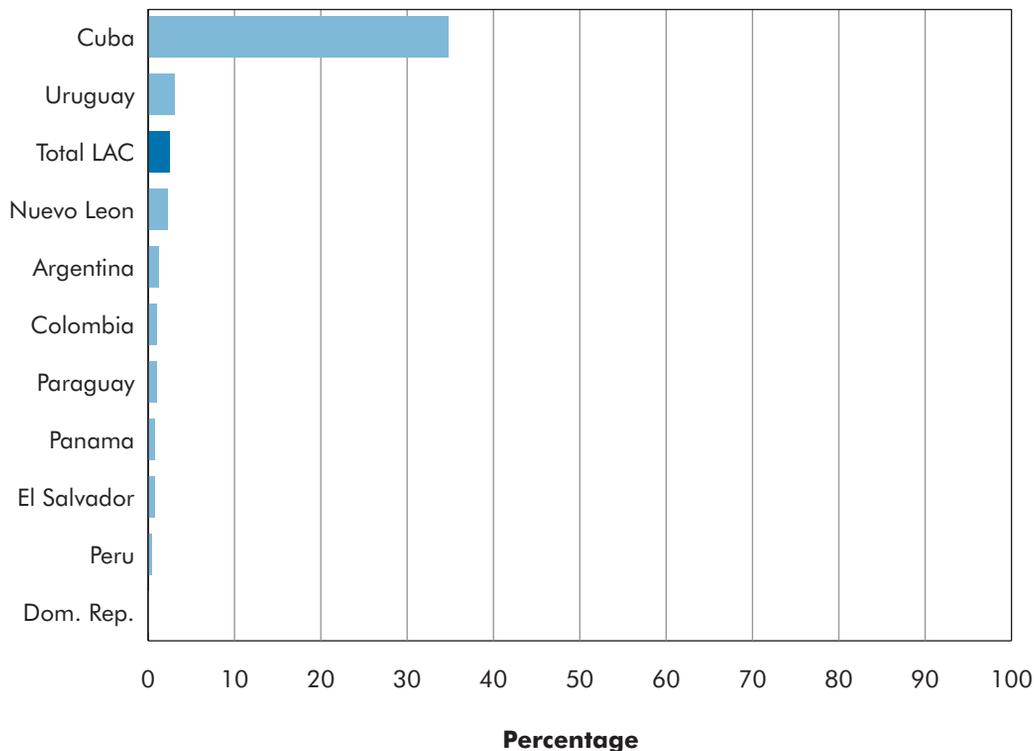


Source: SERCE (2008). *Executive Summary*. Table 13, p. 39.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what sixth graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 12, p. 38.

Except in Cuba, remarkably few students perform at the top level in science

Figure 10. Sixth graders with highest achievement (level 4) on the SERCE science test, 2006



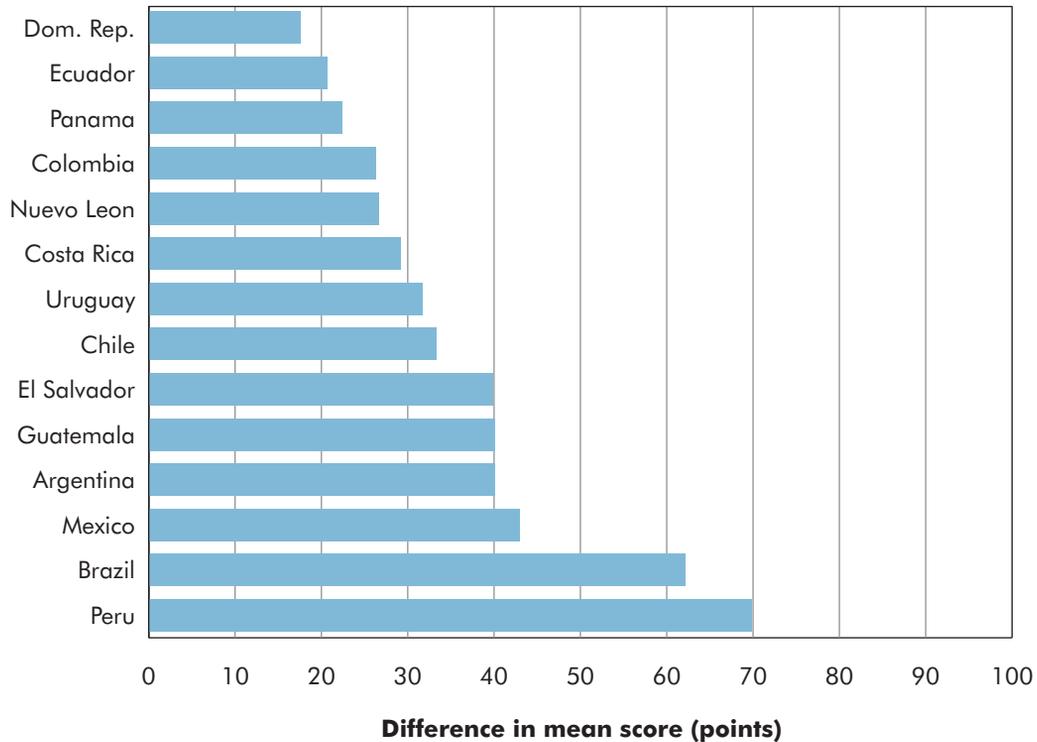
Source: SERCE (2008). *Executive Summary*. Table 16, p. 43.

Note: SERCE had four performance levels, ranging from Level 1 (lowest) to Level 4 (highest). SERCE also kept track of students performing below Level 1. For a description of what sixth graders can do at each level of the test see SERCE (2008). *Executive Summary*, Table 15, p. 42.

How do urban and rural students perform?

In most countries in Latin America, third and sixth graders in urban areas outperformed their rural peers

Figure 11. Urban third graders' advantage over rural peers in mean SERCE math scores, 2006

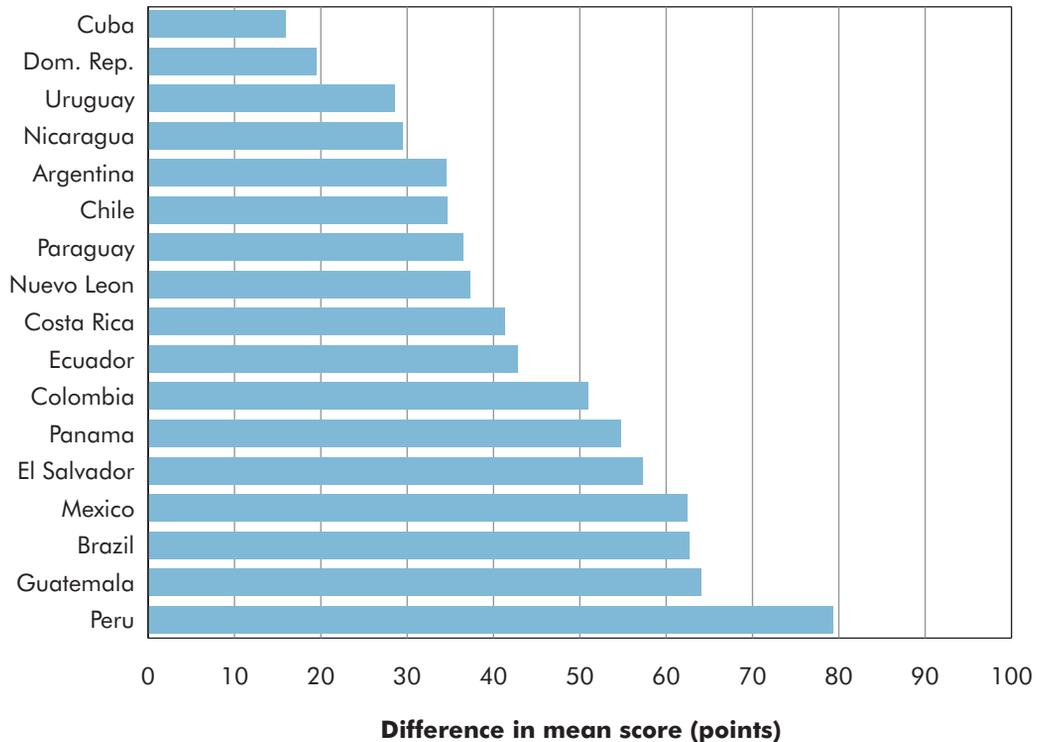


Source: SERCE (2008). *Executive Summary*. Table 5, p. 25.

Note: The graph only shows those countries where the differences in mean scores were statistically significant.

The achievement gaps between urban and rural students were wider than those between boys and girls

Figure 12. Urban third graders' advantage over rural peers in mean SERCE reading scores, 2006

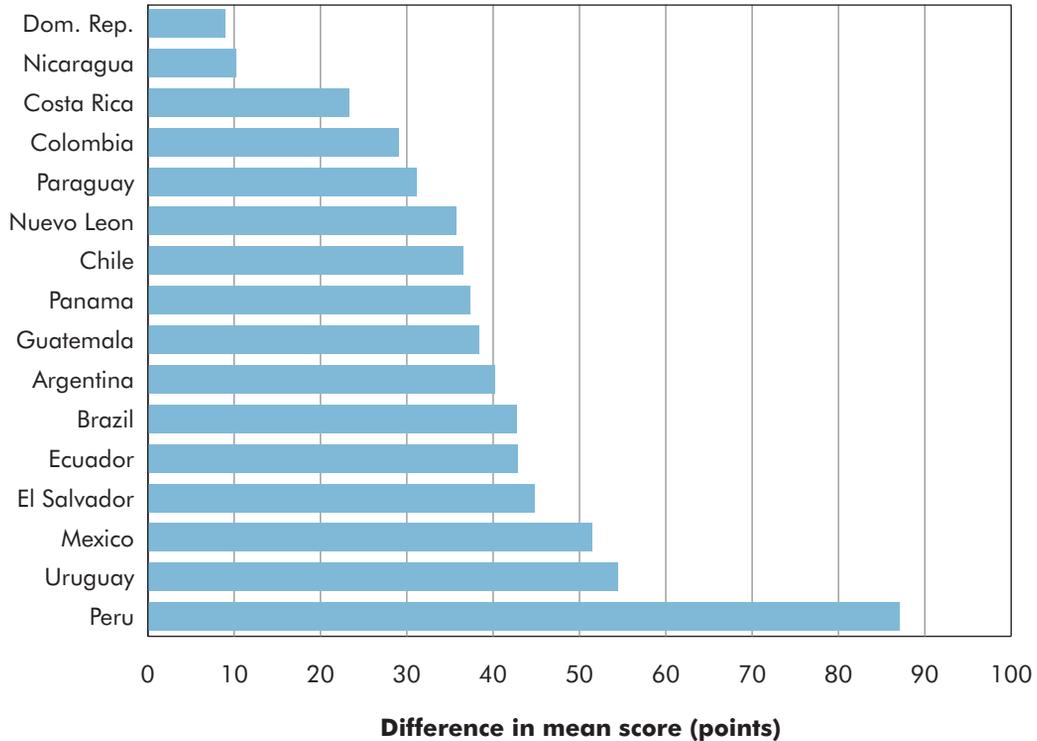


Source: SERCE (2008). *Executive Summary*. Table 8, p. 30.

Note: The graph only shows those countries where the differences in mean scores were statistically significant.

Peru had the largest urban-rural achievement gaps

Figure 13. Urban sixth graders' advantage over rural peers in mean SERCE math scores, 2006

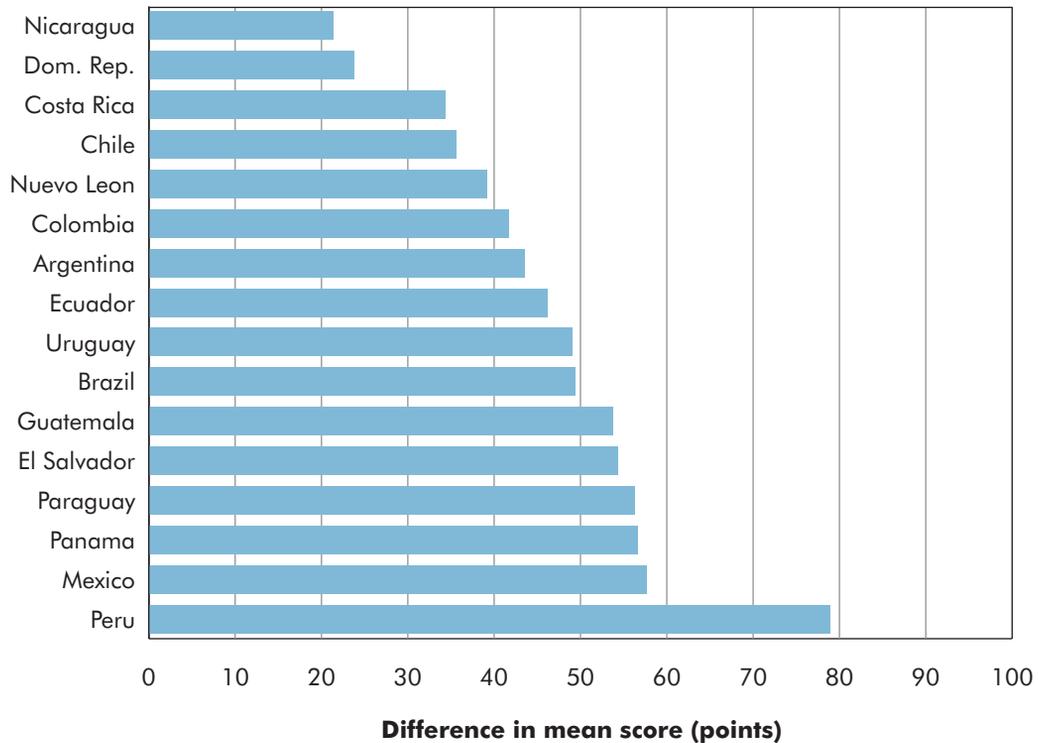


Source: SERCE (2008). *Executive Summary*. Table 11, p. 35.

Note: The graph only shows those countries where the differences in mean scores were statistically significant.

Urban-rural gaps were narrower in Nicaragua and the Dom. Republic, where most students performed poorly

Figure 14. Urban sixth graders' advantage over rural peers in mean SERCE reading scores, 2006

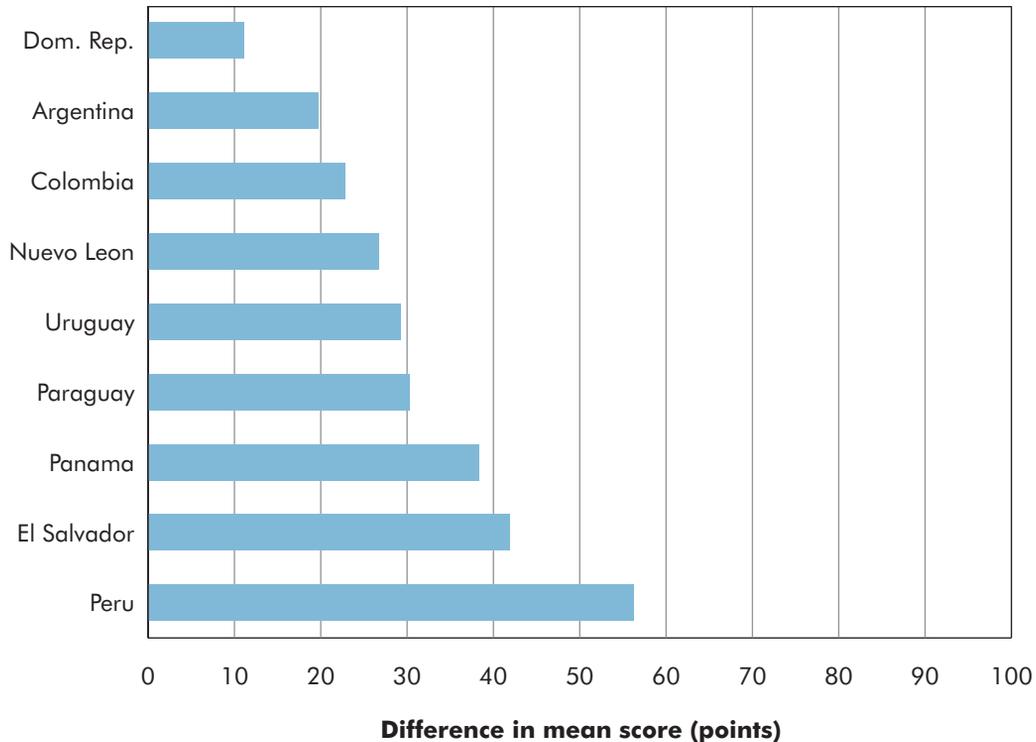


Source: SERCE (2008). *Executive Summary*. Table 14, p. 40.

Note: The graph only shows those countries where the differences in mean scores were statistically significant.

Urban-rural achievement gaps were narrower in science than in math and reading

Figure 15. Urban sixth graders' advantage over rural peers in mean SERCE science scores, 2006



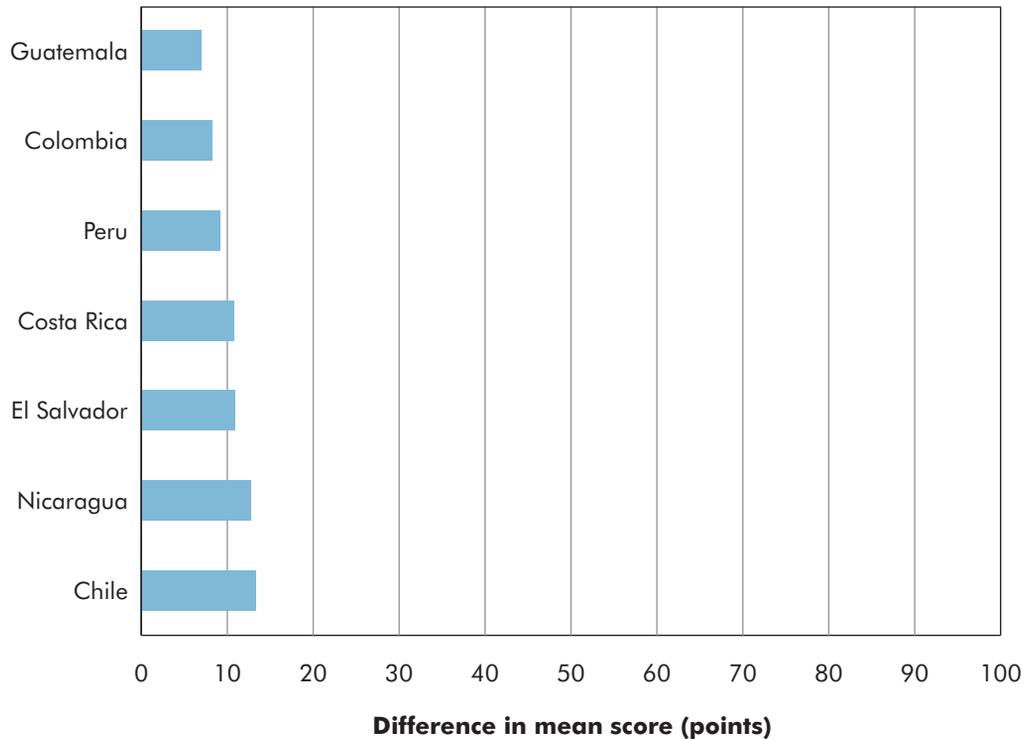
Source: SERCE (2008). *Executive Summary*. Table 17, p. 44.

Note: The graph only shows those countries where the differences in mean scores were statistically significant.

How do boys and girls perform?

Gender achievement gaps emerged only in about half of participating countries

Figure 16. Third grade boys' advantage over girls in mean SERCE math scores, 2006

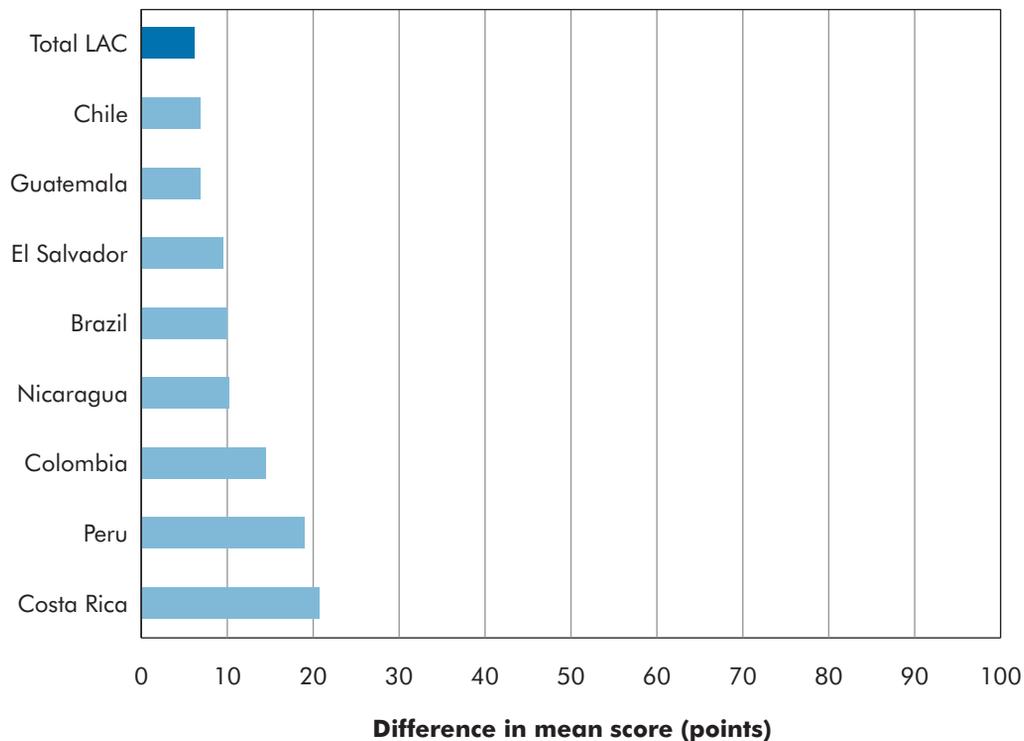


Source: SERCE (2008). *Executive Summary*. Table 5, p. 25.

Note: The graph only shows those countries where the differences in mean scores were statistically significant. There were no significant differences in the mean math scores of third grade boys and girls for the region as a whole. In the Dominican Republic, girls had a statistically significant advantage of almost 13 points. There were no significant differences in the mean third grade reading scores of boys and girls for any country.

In countries where there was a difference, boys outperformed girls in third and sixth grade math

Figure 17. Sixth grade boys' advantage over girls in mean SERCE math scores, 2006

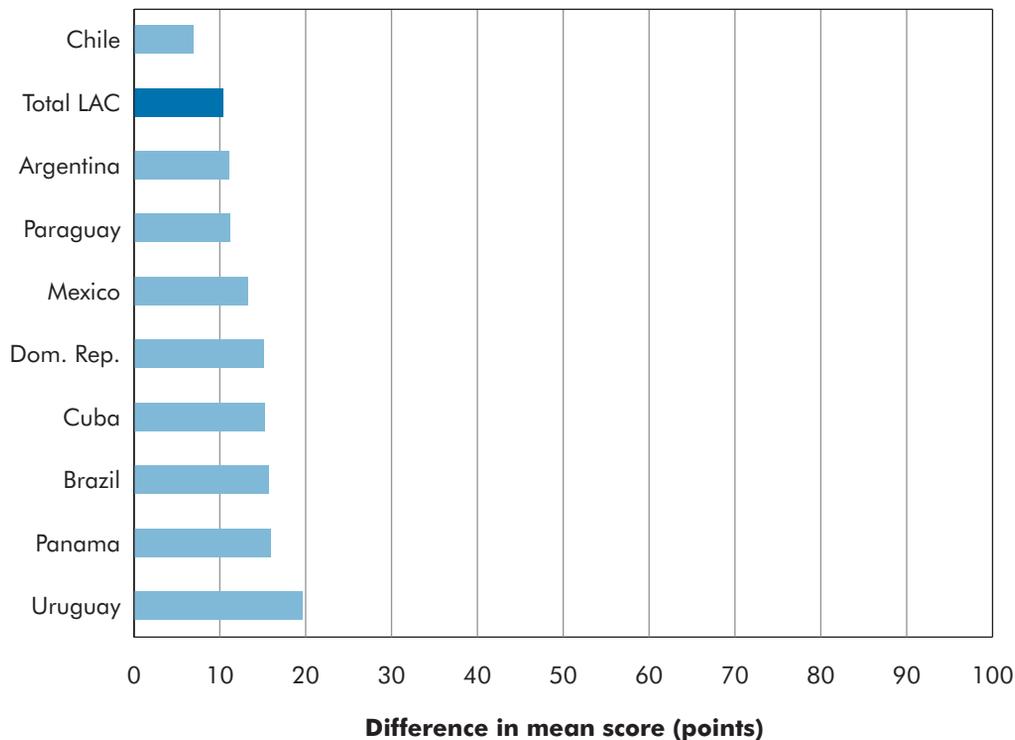


Source: SERCE (2008). *Executive Summary*. Table 11, p. 35.

Note: The graph only shows those countries where the differences in mean scores were statistically significant. In Cuba, girls had a statistically significant advantage of more than 8 points

Girls performed on par with boys in third grade reading and they outperformed boys in sixth grade reading

Figure 18. Sixth grade girls' advantage over boys in mean SERCE reading scores, 2006

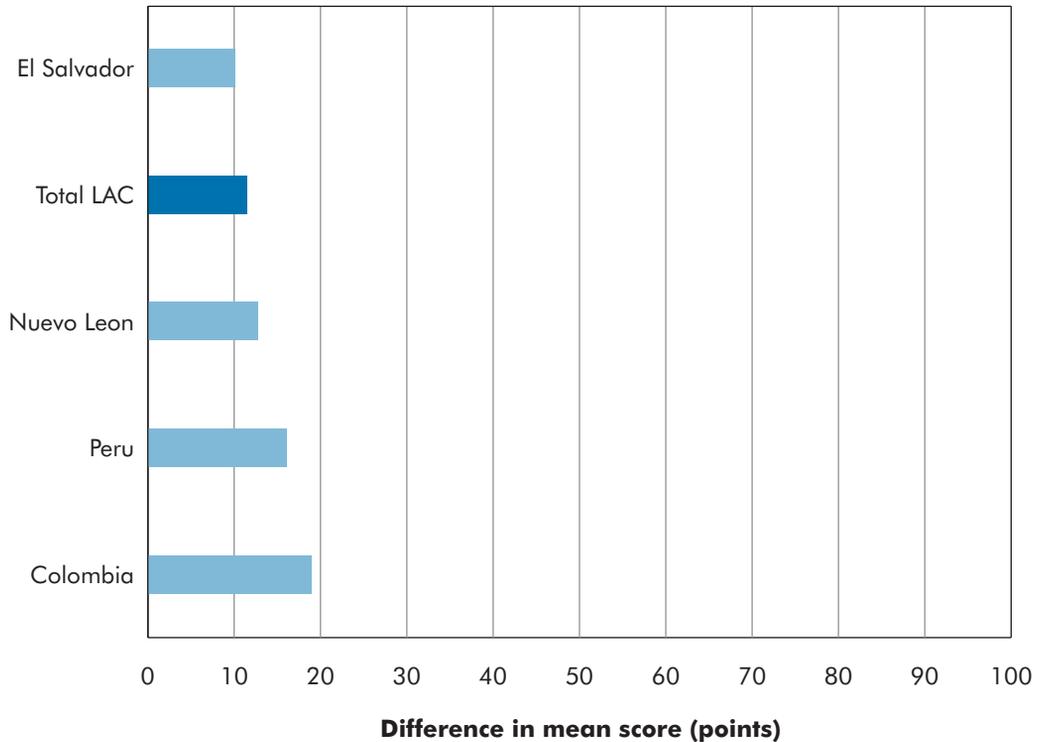


Source: SERCE (2008). *Executive Summary*. Table 14, p. 40.

Note: The graph only shows those countries where the differences in mean scores were statistically significant. No country shows a statistically significant advantage of boys over girls in sixth grade reading.

There were gender achievement gaps in less than half of the countries that tested science

Figure 19. Sixth grade boys' advantage over girls in mean SERCE science scores, 2006



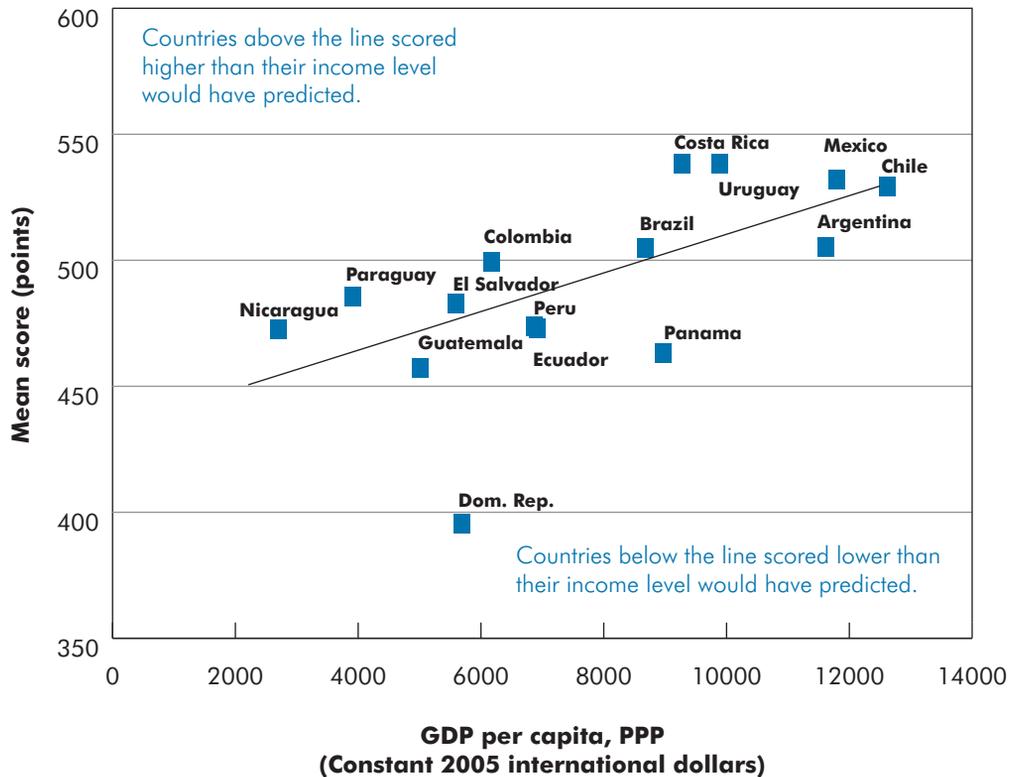
Source: SERCE (2008). *Executive Summary*. Table 17, p. 44.

Note: The graph only shows those countries where the differences in mean scores were statistically significant.

Is a country's income related to its performance on SERCE?

Generally, wealthier countries scored better than poorer countries

Figure 20. Mean third grade math scores on SERCE by GDP per capita, 2006

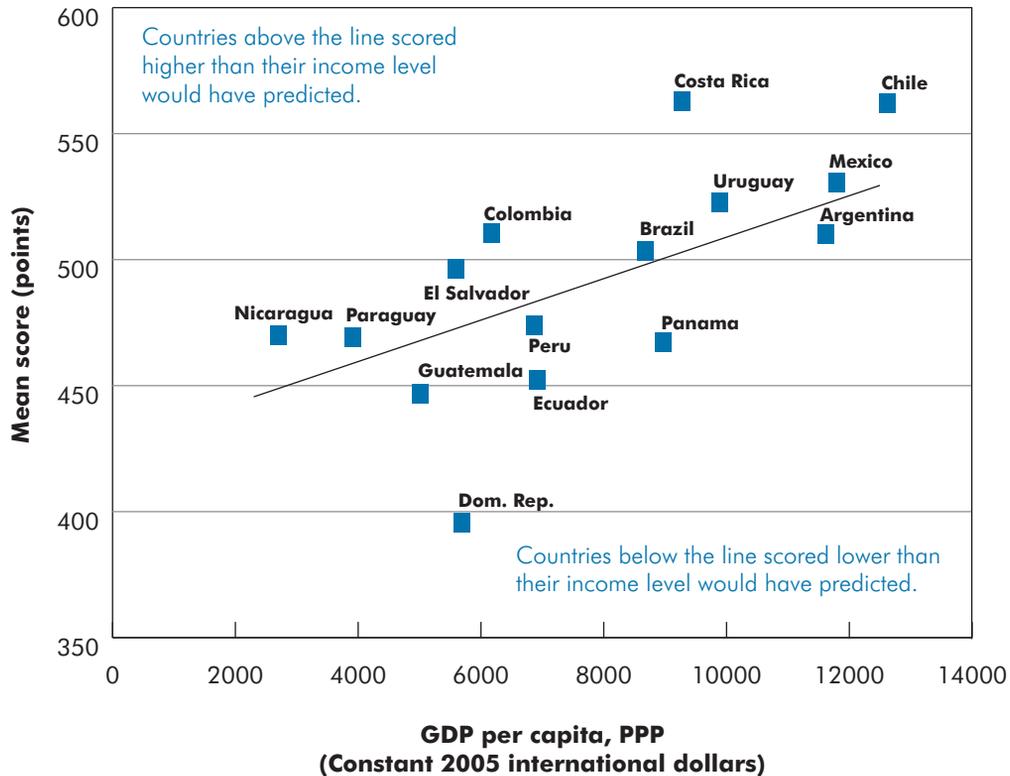


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.3.1, p. 191. For GDP figures, World Bank (2008). World Development Indicators 2008. CD-ROM.

Note: Cuba was not included in the graph because no comparable information on GDP per capita for this country was available. GDP per capita, PPP, is gross domestic product divided by midyear population converted to international dollars using purchasing power parity rates.

Some countries with similar income levels achieved very different results (e.g., Dom. Rep. and El Salvador)

Figure 21. Mean third grade reading scores on SERCE by GDP per capita, 2006

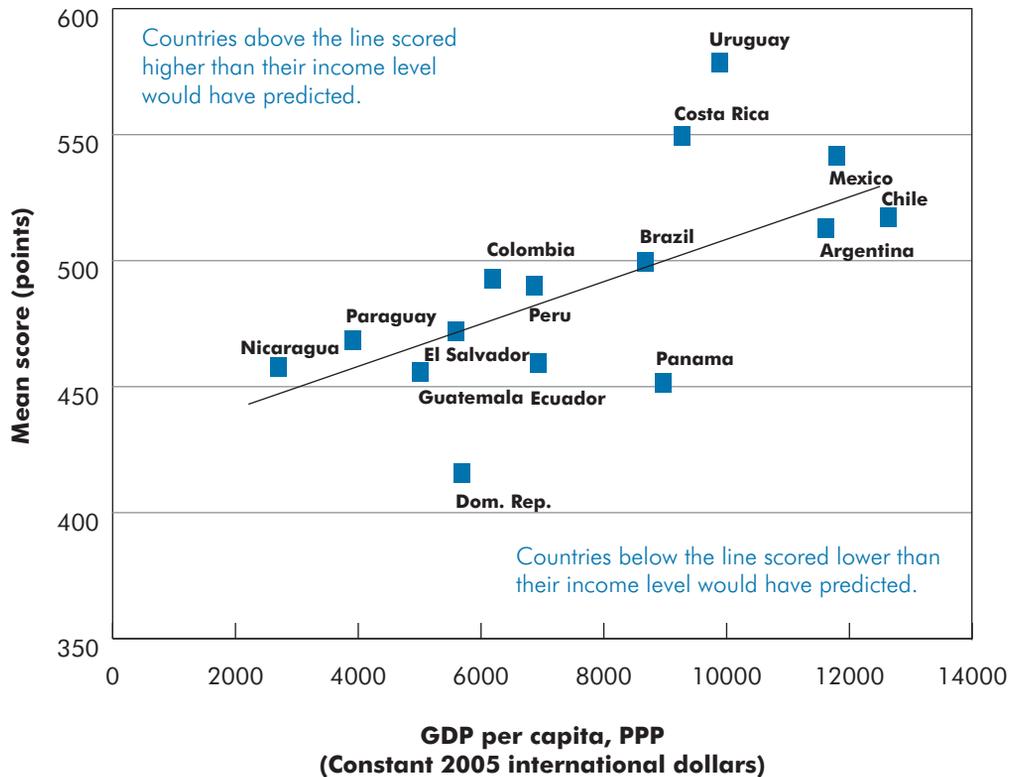


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.4.1, p. 193. For spending figures, World Bank (2008). World Development Indicators 2008. CD-ROM.

Note: Cuba was not included in the graph because no comparable information on GDP per capita for this country was available. GDP per capita, PPP, is gross domestic product divided by midyear population converted to international dollars using purchasing power parity rates.

Some countries achieved similar results even at very different income levels (e.g., Nicaragua and Panama)

Figure 22. Mean sixth grade math scores on SERCE by GDP per capita, 2006

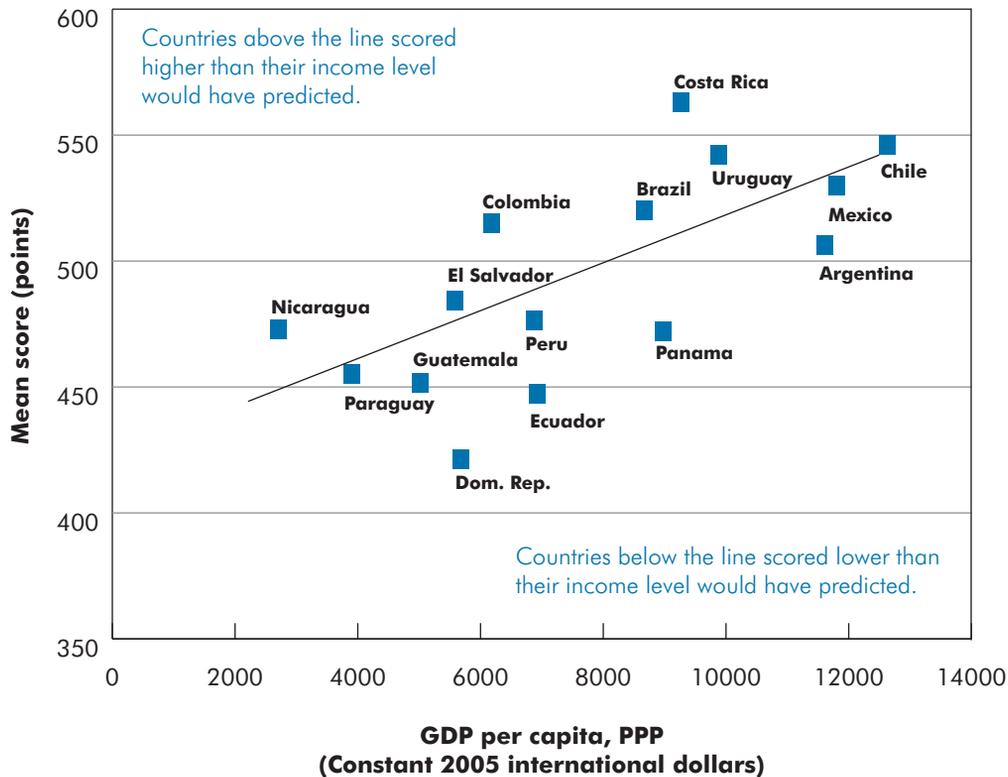


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.3.5, p. 192. For GDP figures, World Bank (2008). World Development Indicators 2008. CD-ROM.

Note: Cuba was not included in the graph because no comparable information on GDP per capita for this country was available. GDP per capita, PPP, is gross domestic product divided by midyear population converted to international dollars using purchasing power parity rates.

These trends hold across grade levels and subjects

Figure 23. Mean sixth grade reading scores on SERCE by GDP per capita, 2006

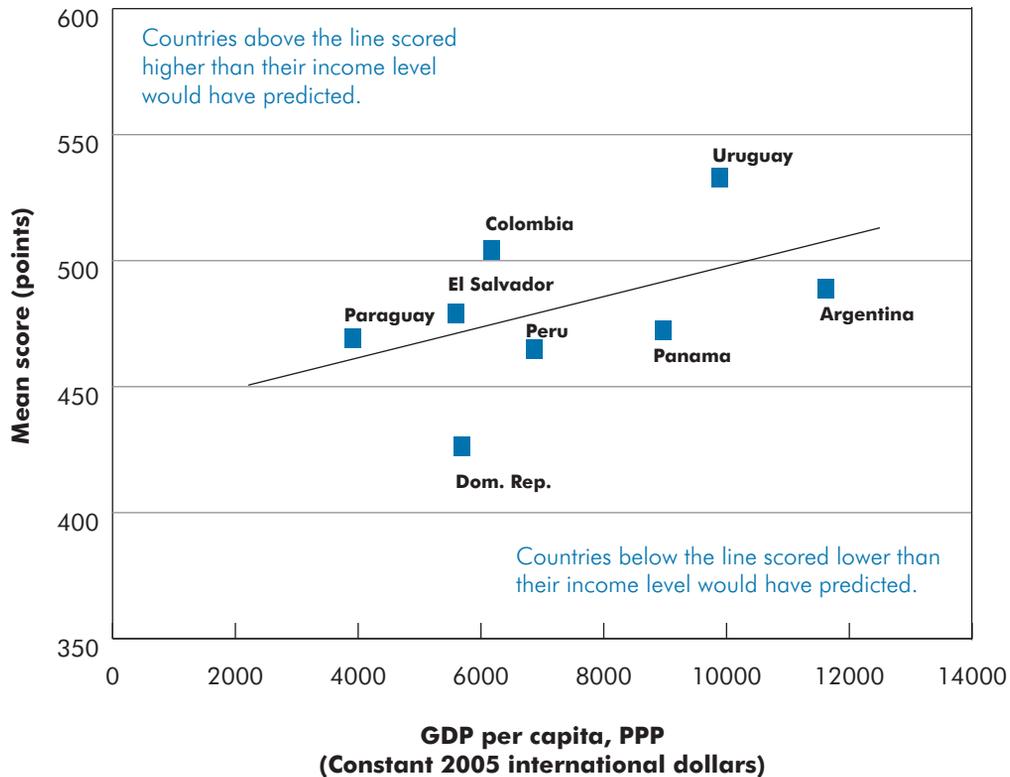


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.4.5, p. 194. For GDP figures, World Bank (2008). World Development Indicators 2008. CD-ROM.

Note: Cuba was not included in the graph because no comparable information on GDP per capita for this country was available. GDP per capita, PPP, is gross domestic product divided by midyear population converted to international dollars using purchasing power parity rates.

These results suggest that a country's income alone does not determine its performance

Figure 24. Mean sixth grade science scores on SERCE by GDP per capita, 2006



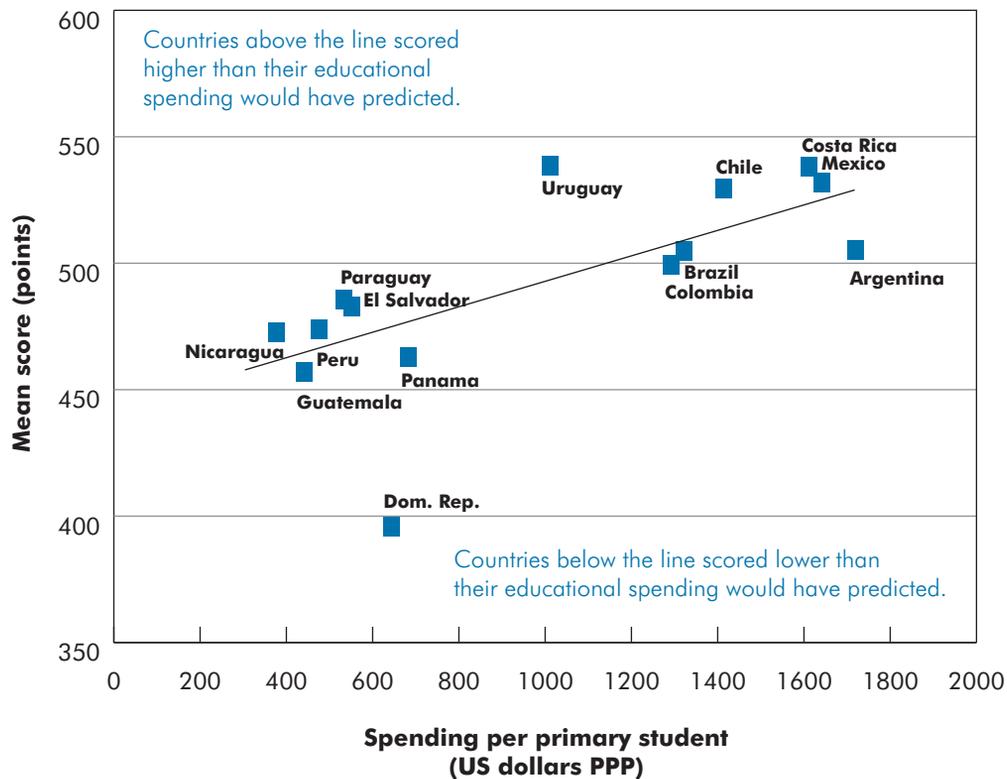
Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.5.1, p. 195. For GDP figures, World Bank (2008). World Development Indicators 2008. CD-ROM.

Note: Cuba was not included in the graph because no comparable information on GDP per capita for this country was available. GDP per capita, PPP, is gross domestic product divided by midyear population converted to international dollars using purchasing power parity rates.

Is investment in primary education related to SERCE performance?

In general, countries that invest more per primary school student had higher average scores

Figure 25. Mean third grade math scores on SERCE by spending per primary school student, 2006

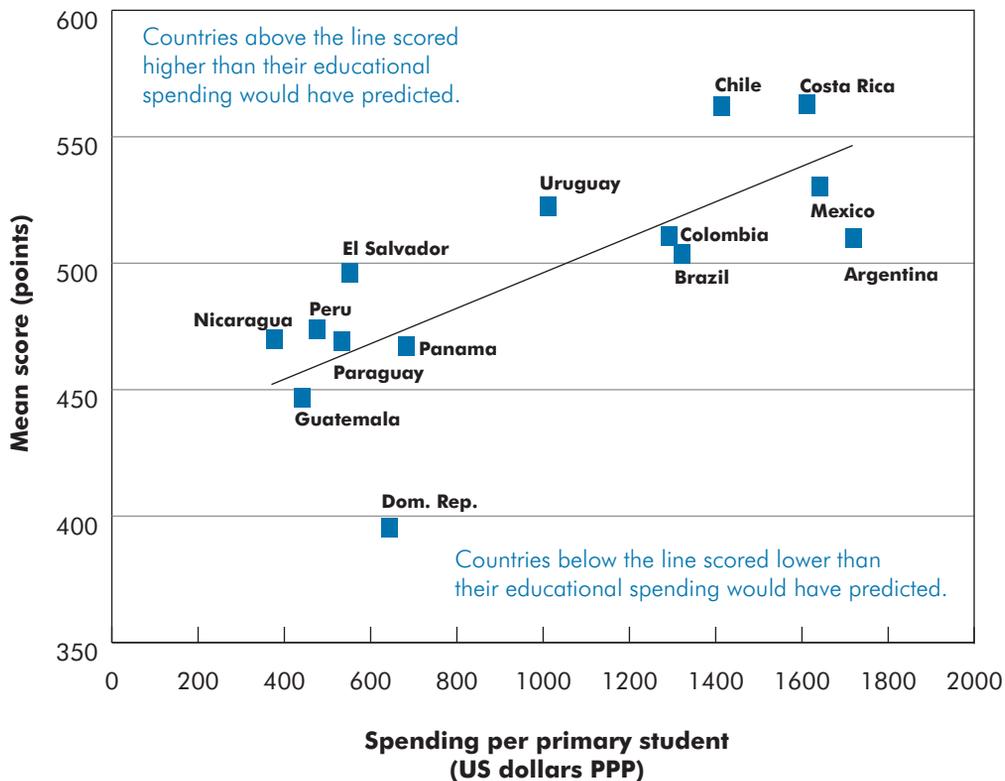


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.3.1, p. 191. For spending data, UNESCO (2008). *Global Education Digest 2008*. Table 13 in the annex, pp. 146-155.

Note: Cuba and Ecuador were not included in the graph because no comparable information on spending per primary school student for these countries was available.

Countries with low per pupil investment tended to have low scores, but there were exceptions

Figure 26. Mean third grade reading scores on SERCE by spending per primary school student, 2006

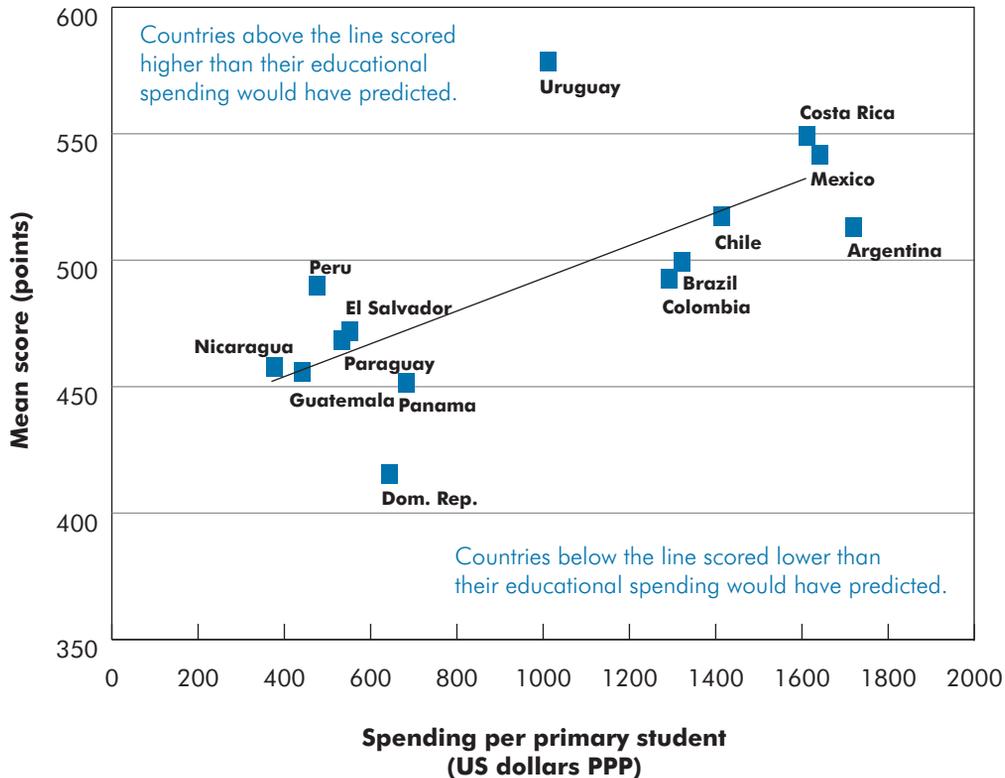


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.4.1, p. 193. For spending data, UNESCO (2008). *Global Education Digest 2008*. Table 13 in the annex, pp. 146-155.

Note: Cuba and Ecuador were not included in the graph because no comparable information on spending per primary school student for these countries was available.

Some countries with similar per student investment got very different results (e.g., Peru and Guatemala)

Figure 27. Mean sixth grade math scores on SERCE by spending per primary school student, 2006

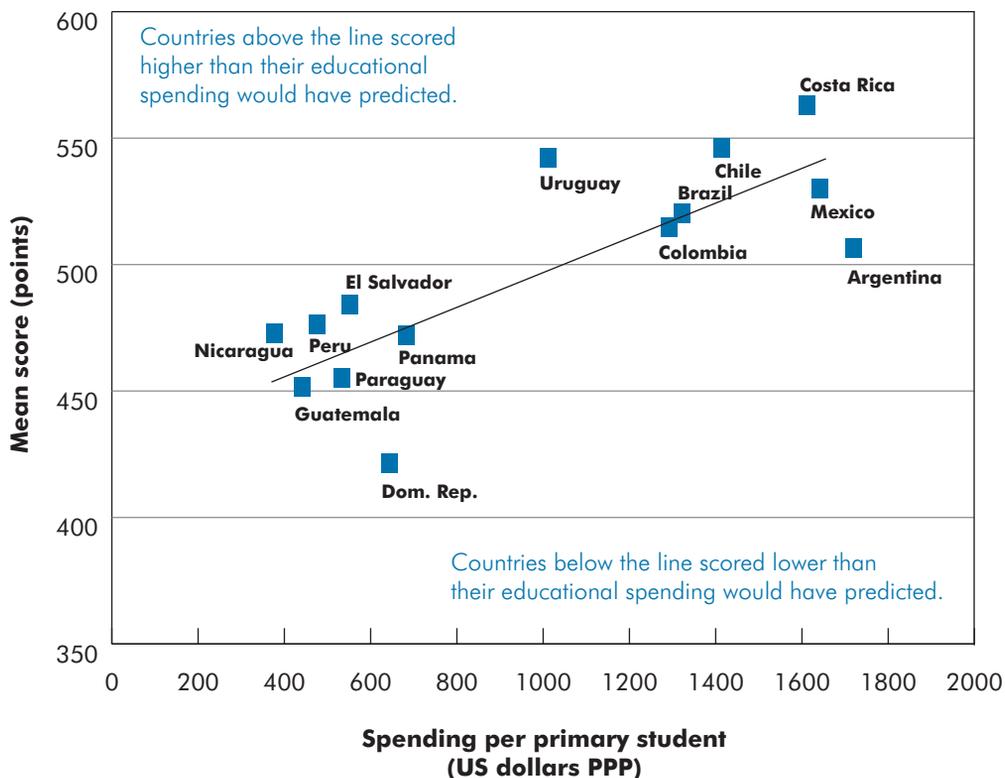


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.3.5, p. 192. For spending data, UNESCO (2008). *Global Education Digest 2008*. Table 13 in the annex, pp. 146-155.

Note: Cuba and Ecuador were not included in the graph because no comparable information on spending per primary school student for these countries was available.

Some countries invest different amounts per student but got similar results (e.g. Panama and Nicaragua)

Figure 28. Mean sixth grade math scores on SERCE by spending per primary school student, 2006

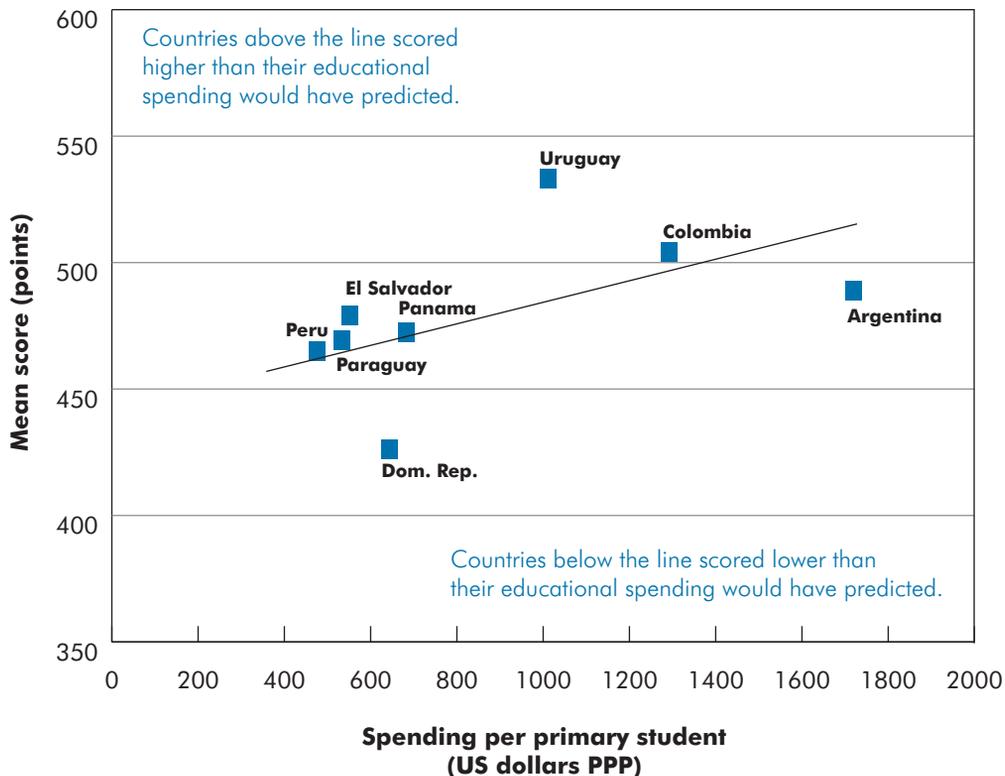


Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.4.5, p. 194. For spending data, UNESCO (2008). *Global Education Digest 2008*. Table 13 in the annex, pp. 146-155.

Note: Cuba and Ecuador were not included in the graph because no comparable information on spending per primary school student for these countries was available.

Some countries, like Uruguay, clearly got better results from their education spending than others

Figure 29. Mean third grade science score on SERCE by spending per primary school student, 2006



Source: For SERCE scores, SERCE (2008). *Primer Reporte*. Table A.5.1, p. 195. For spending data, UNESCO (2008). *Global Education Digest 2008*. Table 13 in the annex, pp. 146-155.

Note: Cuba and Ecuador were not included in the graph because no comparable information on spending per primary school student for these countries was available.

What can we conclude from the SERCE results?

SERCE results tell us several things about the quality, equity and efficiency of education in Latin America

Quality

Student achievement in Latin America is remarkably low, and most countries still have a long way to go to catch up with Cuba—the top performer in the region.

On average, students achieve considerably below expectations in math, reading and science, and too many of them have difficulties answering even the most basic questions on these exams.

Very few Latin American students excel in math, reading or science.

Equity

In most countries in Latin America, urban students outperform their peers in rural areas. In some countries in Latin America, boys achieve at a higher level than girls in math and science, and girls achieve at a higher level than boys in reading. These achievement gaps, however, are smaller than those between urban and rural students.

Efficiency

A country's wealth alone does not determine its performance: while richer countries typically perform better than poorer countries, several countries do not perform at the level their income would predict.

Education spending levels and a country's GDP only partially predict student achievement.

Strategic policy decisions might help reverse poor performance on SERCE

Latin America's poor performance on SERCE illustrates the failure of current policies to ensure that students learn key skills in math, reading and science. To address this, countries in the region should:

1. Set high learning standards and ensure they are met.

The fact that most Latin American countries lag far behind Cuba suggests that quality is a pending challenge for the region. To address the quality deficit, countries should set high expectations for their students and ensure these expectations are met, regularly monitoring progress towards them.

2. Target underperformers and help them catch up with the rest.

The overwhelming percentage of low-performers in SERCE suggests that schools in Latin America should identify early on students who are falling behind, and provide them with the remedial attention necessary to bring them up to acceptable levels of learning.

3. In addition to gender equity, emphasize equity for rural and poor students.

SERCE results suggest that Latin America's efforts to close the gender achievement gap are paying off: relatively few countries show differences in the average scores of boys and girls. Countries should now focus on improving the quality of schooling for students living in rural and poor areas.

4. Invest more per primary student and make spending more efficient.

SERCE results show more income and more investment are associated with higher learning levels, so improving education is likely to involve increasing spending. However, spending alone does not determine learning outcomes. Countries need to ensure they spend funds well.



The Partnership for Educational Revitalization in the Americas

(PREAL) is a joint program of the Inter-American Dialogue in Washington, DC, and the Corporation for Development Research (CINDE) in Santiago, Chile. PREAL seeks to improve the quality and equity of education by helping public and private sector organizations throughout the hemisphere promote informed debate on education policy, identify and disseminate best practices, and monitor progress toward improvement. PREAL's activities are made possible by the generous support of the American people through the United States Agency for International Development (USAID), by the Inter-American Development Bank (IDB), the GE Foundation, the International Association for the Evaluation of Educational Achievement (IEA), and the World Bank, among others. However, the contents of this document are the sole responsibility of its author and do not necessarily reflect the views of PREAL or any of its donors.



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