In a knowledge-based global economy, investment in human capital is an essential component of any inclusive growth strategy. When workers lack the necessary skills, new technologies and production processes are adopted more slowly and do not translate into new growth models with higher value-added activities. However, skills affect individual’s lives and well-being far beyond what can be measured by labour-market earnings and economic growth. This is particularly relevant for Ibero-American countries as they embark on a path of structural reforms to unleash new and sustainable sources of growth.

What specific skills challenges are Ibero-American countries facing today? What are the similarities and differences in educational performance and skills amongst the countries? What accounts for differences in performance between Latin American countries compared to Spain and Portugal and how can this gap be closed? What are the main drivers of student performance? How do these skills challenges impact labour market outcomes?

Skills in Ibero-America: Insights from PISA 2012 provides an overview of the main skills challenges facing Ibero-American countries.
Skills in Ibero-America: INSIGHTS FROM PISA 2012
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Foreword

Education and skills foster economic growth, social inclusion and strong institutions. This is particularly relevant for Ibero-American countries, where numerous economic and social challenges – such as low productivity, lack of social inclusion and high youth unemployment – can be linked directly to the poor quality of education and low skills development. Investing in education and skills is therefore an important component of ongoing structural reforms aiming to drive sustainable growth in the region.

The Organisation for Economic Co-operation and Development (OECD) has been working closely with Ibero-American countries on education and skills for two decades. Nine countries from the region have joined the Programme for International Student Assessment (PISA) since the first survey in 2000. More recently, and based on PISA’s work, the annual Latin American Economic Outlook highlighted the main challenges faced by Latin American countries when it comes to education, skills and innovation in a dynamic economic environment.

The report Skills in Ibero-America: Insights from PISA 2012 examines the challenges that Ibero-American students face in acquiring the knowledge and skills necessary to participate in increasingly knowledge-based and technology-driven labour markets. This report results from close co-operation among the Development Centre, the Global Relations Secretariat and the Directorate for Education and Skills of the OECD, with the financial contribution of the Spanish Agency for International Development Cooperation. It builds on a first stocktaking exercise that the Ibero-American Group of PISA (GIP, Grupo Iberoamericano de PISA) carried out in the “Ibero-America in PISA 2006: Regional Report”.

The report salutes strong progress in school enrolment and student performance, noting that Ibero-American countries have improved faster than OECD countries between 2003 and 2012 on average. However, it highlights that the region lags behind in overall educational performance, especially in mathematics, which is likely to affect Ibero-American labour markets. The impact of skills shortages on the labour market is harmful particularly in Latin America and the Caribbean, where 36% of firms identify an inadequately educated workforce as a major constraint. In
Spain and Portugal, young people with insufficient skills have been affected disproportionately by unemployment and fuelled in large part the rise in poverty that followed the financial crisis. The bottom line is clear: greater engagement and efforts from Ibero-American countries are essential for improving the overall quality, efficiency and equity of education systems.

The OECD will continue working with the Ibero-American region to support efforts to ensure that young people are equipped with the foundational skills to create and seize economic opportunities. The forthcoming PISA 2015 results reiterate the message that Ibero-American governments need to maintain the momentum and implement far-reaching and ambitious reforms to achieve sustainable and inclusive growth. Education will continue to be a major component of the OECD Latin American and the Caribbean Regional Programme, which will support the region with its three key priorities for reform: i) increasing productivity, ii) advancing social inclusion, and iii) strengthening institutions and governance.

We look forward to deepening our co-operation with governments of the region to design, develop and deliver better policies for better lives.

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Jobs, wealth and individual well-being depend on nothing more than what people know and what they can do with what they know. There is no shortcut to equipping people with the right skills and providing people with the right opportunities to use their skills effectively. And if there’s one lesson the global economy has taught us over the last few years, it’s that we cannot simply bail or stimulate ourselves out of a crisis, nor can we just print more money. Indeed, most of the Ibero-American countries could be doing much more to equip more people with better skills to collaborate, compete and connect in ways that lead to better jobs and better lives, and that drive their economies forward. If these countries wish to become part of the knowledge based societies, have the capacity to absorb and make use of rapid technological changes, and spur innovation, the only way forward is to improve the skills of their citizens.

Poor skills severely limit people’s access to better-paying and more rewarding jobs. The uneven distribution of skills has significant implications for how the benefits of economic growth are shared within societies. Put simply, in countries where large shares of adults have poor skills, it is difficult to introduce productivity-enhancing technologies and innovative ways of working, which then stalls improvements in living standards. Skills affect outcomes more than earnings and employment. Data from OECD’s Survey of Adult Skills also show that people with lower skills are far more likely than those with better literacy skills to report poor health, perceive themselves as objects rather than actors in political processes, and have less trust in others. Countries simply can’t develop fair and inclusive policies and engage with all citizens if a lack of proficiency in basic skills prevents people from fully participating in society. And for no group is all that more important than for today’s youth, who cannot compete on experience or social networks in ways that older people can.

There is no doubt that many Ibero-American countries have placed education and skills high on their policy agendas. Many have made significant changes to their educational laws and regulations. Most of them
have introduced national assessments and monitoring tools. Educational expenditures have also risen. For example, between 2003 and 2012, the resources allocated to secondary school students increased by two to five percentage points in Argentina, Brazil, Chile, and Colombia as well as in Portugal and Spain. The growing focus on education has brought some encouraging results. Access to education and the number of years of schooling has increased in many countries. PISA shows that many Latin American countries have progressed faster than the OECD average in raising learning outcomes between 2003 and 2012. This is all the more remarkable in that, over the same period, the enrolment rate of 15-year-olds in secondary school has also substantially increased.

Yet, in a global society, the benchmark for educational success is no longer improvement in national standards alone, but rather the performance of the most advanced and most rapidly improving education systems. By this standard, the performance of Latin American students remains far below the OECD average, and the pace of progress remains below that of the most rapidly developing education systems. A large share of Latin American students that participated in PISA do not possess even the most basic foundational skills in mathematics (PISA Level 1). These students are unable to use simple basic mathematics concepts and operations to solve elementary problems and they cannot extract relevant information from a single source and make use of a single representational mode. Only half of the students can perform this type of tasks in Chile, a third in Costa Rica, Mexico or Uruguay, a fourth in Argentina and Brazil and a fifth in Peru and Colombia. The lost economic output due to this level of underperformance is equivalent to a permanent economic recession. For example, if Brazil would ensure that all 15-year-olds successfully complete at PISA performance Level 1, that alone would add USD 23 trillion to the Brazilian economy over the lifetime of these 15-year-olds. That is equivalent to 7.5 times the current size of Brazil’s economy and shows that the rewards to better schooling dwarf any conceivable cost of improvement.

Some Ibero-American countries have sought refuge in private schooling, in the belief they would deliver educational quality that is superior to public schooling. However, that is not borne out by the evidence. PISA 2012 shows that the better results observed in private schools are mainly due to their ability to attract students from more advantaged socio-economic backgrounds. The difference in performance vanishes once private schooling results are compared to public schools of similar social status.

Last but not least, in Chile, Uruguay and Peru, more than 20% of the performance variation can be explained by students’ socio-economic status. Indeed, students from disadvantaged socio-economic backgrounds accumulate difficulties over the duration of their school years. They are less
likely to attend pre-primary education, and they also repeat grades and miss school more often. However, education in Latin America is not just a simple story about poor kids from poor neighbourhoods; it is a complex tale involving many types of kids from many types of neighbourhoods. The fact that the socially most disadvantaged children in Shanghai, China outperform the wealthiest children in all Ibero-American countries except Portugal reminds us that poverty is not destiny and nullifies the excuses of the complacent.

In sum, despite the progress observed by PISA over the last decade, Latin American education systems still have a long way to go to reach world class standards. Of course, nobody can simply copy and paste school systems outright. However, PISA has revealed a surprising number of features which the world’s most successful school systems share. Everyone agrees that education is important, but the acid test comes when education is weighed against other priorities. How do countries pay their teachers compared to other highly-skilled workers? Would you want your child to be a teacher rather than a lawyer? How do the media talk about teachers? The first thing we can learn from PISA is that the leaders in high performing school systems have convinced their citizens to make choices that value education over other things. Chinese parents and grandparents will invest their last cent on the education of their children, meaning on the future. Latin America, in contrast, has started to mortgage its children's futures to finance its consumption today. It is important to set that right.

Placing a high value on education is, however, only part of the equation. Another aspect is the common belief that all children can succeed. The fact that students in East Asia consistently believe that achievement is mainly a by-product of hard work, rather than due to inherited intelligence, suggests that education and its social context can make a difference in instilling the values that foster success in education. Contrast that with the Ibero-American world, where the majority of students believe that success in school is an outcome of inborn intelligence or pure luck. These students will see school only as a sorting mechanism rather than as an opportunity for them to take responsibility for their own success.

High-performing school systems also share clear and ambitious standards across the board. Everyone knows what is required to obtain a given qualification. That remains one of the most powerful system-level predictors in PISA.

Ultimately, however, the quality of Ibero-American education systems can never exceed the quality of its teachers. Many countries in the region have invested considerable amounts in improving the employment conditions for teachers, but that is just a beginning. High performing education systems make teaching an attractive career choice in order to draw the best possible candidates. They ensure high-quality teacher education, provide good
induction and mentoring for new teachers, and base teacher professionalism on an evidence-based understanding of effective learning. They also provide intelligent pathways for teachers to grow in their careers, something that isn’t yet working in Ibero-American countries. Systems that deliver good educational results support their teachers to make innovations in pedagogy, to improve their own performance and that of their colleagues, and to work together to frame good practices. And they grow and distribute leadership throughout the school system. In the past, the main goal was standardisation and compliance, with top performers enabling schools to be inventive. You can mandate adequacy, but you can only unleash greatness.

The most impressive outcome of world class school systems is perhaps that they deliver high quality across the entire school system so that every student benefits from excellent learning. To do this, these systems are able to attract the most talented teachers to the most challenging classrooms and the strongest school principals to the toughest schools. For most Ibero-American countries, PISA results still show the reverse.

And ultimately, Ibero-American countries will need to rethink their instructional system to better anticipate the knowledge and skills it will need to reignite its economy. The coexistence of unemployed graduates on the street, while employers say they cannot find the people with the skills they need, shows clearly that more education alone does not automatically translate into better jobs and better lives. This may be due to the poor quality of the education system and/or to the gap between what students learn and the skills that employers need in the new landscape in which we live. Skills mismatch is a very real phenomenon now that is mirrored in people's earnings prospects and in their productivity. Knowing which skills are needed in society and which educational pathways will get young people to where they want to be is essential. Ultimately, good education is about promoting passion for learning and to grow humanity; to stimulate imagination; to develop independent decision-makers able to shape our future; and to build resilience and the joy of failing forward. One can solve most of the tasks in the current school examinations of Ibero-American countries in seconds with the help of a smartphone. If children are to be smarter than a smartphone, instruction needs to get beyond whether they can reproduce what they learned to see whether they can extrapolate from what they know and use their knowledge in novel situations. The world today no longer rewards people for what they know – Google knows everything – but for what they can do with what they know. That is also precisely what success on PISA is about. Improving the instructional system is therefore not just about updating and repackaging educational content, but it should be about helping students find out who they are, where they want to go in life, and how they will get there, in a rapidly changing and increasingly uncertain world.
This is a tall order, but every three years PISA reminds us that countries can deliver on the promise of education. Certainly, international comparisons are never easy and they aren’t perfect. But PISA shows what is possible in education and it helps countries to see themselves in the mirror of the educational results and the educational opportunities delivered by the world’s educational leaders.

What is certain is that without the right skills, people will end up on the margins of society, technological progress will not translate into economic growth, countries will face an uphill struggle to remain ahead in this hyper-connected world, and ultimately, they will lose the social glue that holds together democratic societies.

Andreas Schleicher
Director,
Education and Skills,
OECD
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# Acronyms and abbreviations

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<th>Definition</th>
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<tbody>
<tr>
<td>CAF</td>
<td>Development Bank of Latin America</td>
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<tr>
<td>DIF</td>
<td>Differential Item Functioning</td>
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<tr>
<td>ECLAC</td>
<td>Economic Commission for Latin America and the Caribbean</td>
</tr>
<tr>
<td>ESCS</td>
<td>Economic, Social and Cultural Status</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>IDB</td>
<td>Inter-American Development Bank</td>
</tr>
<tr>
<td>ISCED</td>
<td>International Standard Classification of Education</td>
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<tr>
<td>ISCO</td>
<td>International Standard Classification of Occupations</td>
</tr>
<tr>
<td>IZA</td>
<td>Institut sur Zukunft der Arbeit (Institute for the Study of Labour)</td>
</tr>
<tr>
<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PIAAC</td>
<td>Programme for the International Assessment of Adult Competencies</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment</td>
</tr>
<tr>
<td>PPP</td>
<td>Purchasing Power Parity</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical and Vocational Education and Training</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
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1. Introduction
In a knowledge-based global economy, an adequate investment in human capital increasingly becomes an essential part of any inclusive growth strategy. Without adequate investment in skills, new technologies and production processes are adopted more slowly and do not translate into new growth models with higher value-added activities. However, skills affect individual’s lives and well-being far beyond what can be measured by labour-market earnings and economic growth. For example, skills have a positive effect on health and are related to civic and social behaviours affecting democratic engagement and business relationships. Skills can also be key to tackling inequality and promoting social mobility (OECD, 2012). Yet, the effects of skills on well-being do indeed partly manifest themselves through good prospects and trajectories on the labour market.

In this context, ensuring that each citizen possesses the appropriate skills to participate fully in the labour market and contribute to economic growth has become a central preoccupation for policy makers (OECD, 2013a). Ensuring that the population acquires the skills required by an ever-changing labour market is a considerable challenge. An important aspect of this challenge is to make sure that individuals acquire basic or foundational skills. First, because people with poor skills face a much greater risk of experiencing economic disadvantage, and a higher likelihood of unemployment and dependency on social benefits (OECD, 2013b). Second, because possessing basic or foundational skills will also enable individuals to pursue further education and acquire more skills over their lifetime. Another critical aspect is providing relevant skills in order to avoid mismatches. Skills mismatches are costly not just for the economy, which does not maximise its potential given the available skills, but also for workers both in terms of earnings and well-being. Over the life cycle of a worker, certain skills might depreciate while others may be available, but misused; as a consequence, continuous efforts are required to maintain and develop new skills (OECD, 2012). In this respect, ensuring that students and workers have the opportunity to engage in vocational education and professional training that is meaningful for employers both today and in the future should constitute a central policy objective.
The results from the OECD Survey of Adult Skills (PIAAC) reveal the importance of developing key skills through school in order to provide a strong foundation for skills development later in life (OECD, 2013b). Hence, students’ achievements in PISA, near the end of compulsory education, provide key insights on the extent to which individuals who will soon join the workforce are well prepared.

The main objective of this report is to document the skills challenges faced by Ibero-American countries in light of an analysis of students’ achievement across PISA assessments. It begins with a close examination of the level and dispersion of students’ achievement, taking into consideration the evolution across PISA assessments. The analysis then focuses on understanding the main drivers of students’ performance. Specific emphasis is given to the role of students’ backgrounds and the effect of allocation of educational resources on inequalities in education outcomes.

A combination of policies could improve the quality and equity of Ibero-American education systems. Public spending on education should increase at all levels of education, not only to support an increase in coverage but also to improve schooling conditions. Early education in particular must continue to expand its coverage. Governments should also pay special attention to teachers and combine more stringent selection requirements with policies that provide greater incentive to retain and motivate teachers through improved pedagogical support and training. Ibero-American countries should also strengthen the governance of their education and skills systems. Developing information systems on school, teachers and students would improve the efficiency of resource allocation and increase equity by providing additional financial, human and material resources to disadvantaged students. In parallel, governments should invest in education programmes and school policies to promote a learner-friendly environment and adapt the curricula to the new needs of society. Improving technical and professional training for students, and also workers, is particularly important since this may facilitate students’ transition to the labour market and enable workers to adapt to the labour market’s changing needs.

In terms of methodology, a relevant analysis for all Ibero-American countries requires acknowledging the large contextual differences between Latin American countries, on the one hand, and Spain and Portugal, on the other. Latin American countries share common features and form a relatively homogeneous cluster of countries within PISA, while Portugal and Spain more closely resemble the average OECD economy. Methodological choices were thus made in order to focus on issues relevant for most countries while taking account of the fact that the analysis could not encompass all the particularities of each country. In addition, the analysis relies on international comparisons, and not just on comparisons between the two
regions, which would be of limited interest. Ibero-American countries are compared to a list of countries with the same diversity in terms of income levels: both well-developed economies and others facing the challenges of emerging countries.

The analysis relies almost exclusively on the students’ achievement in mathematics, which was the major PISA domain in 2012 and 2003. Presenting the results separately for each domain would not provide much value added to the analysis, given the high correlation between PISA scores in mathematics, reading and science (above 80% in most cases). However, when the results differ significantly across subjects or provide relevant insights, figures for each subject are presented.

The first chapter provides an assessment of the relative position of Ibero-American countries in terms of the level and dispersion of students’ performances and how they have evolved over time. The second and third chapters discuss the role of equity issues in Ibero-America to understand the facts identified in the first chapter. Chapter 2 focuses on the role of students’ characteristics, namely gender, location and socio-economic background, while Chapter 3 concerns the contribution of teaching practices and schools’ characteristics in shaping students’ achievement and equity. Finally, Chapter 4 provides inputs on the potential implications of PISA results in terms of skills and labour market outcomes.
2. Students’ achievement and progress in Ibero-American countries

This chapter analyses the level, dispersion and trends of Ibero-American students’ performance across PISA assessments. Despite recent improvements, Latin American countries still perform well below Spain and Portugal, which are close to the OECD average in PISA 2012. While part of achievement gap can be attributed to socio-economic structural differences, Ibero-American countries generally reach lower levels of achievement than countries at a comparable level of GDP per capita and educational expenditure per student. Ibero-American countries also experience a relatively large dispersion of students’ performance in mathematics in comparison with the OECD average. However, the large proportion of Latin American students below basic levels of proficiency results in a relatively small gap between low and top performers in comparison with Spain, Portugal and the OECD average. Across PISA assessments, the performance of Ibero-American countries has improved substantially, which is all the more remarkable given that enrolment rates have increased rapidly in most of these countries. Most of the improvement was found among low performing and disadvantaged students in Latin American countries, and this narrowed the gap between top and low performers in general. In Spain, no changes were observed in performance or the distribution of performance, while in Portugal all students improved substantially, but top performers improved faster.
This chapter aims to present a complete assessment of the situation of Ibero-American countries in terms of performance in PISA. The overall position of countries in PISA 2012 is supplemented by an analysis of the dispersion of mathematics scores, and the evolution of both across PISA assessments is considered.

PISA 2012 reveals that Latin American countries lag behind other PISA participants in mathematics, and in particular behind Spain and Portugal, which score close to the OECD average. The relatively poor performance of Latin American countries cannot be entirely accounted for by differences in structural factors, such as the level of income and expenditures on education, the socio-economic profile of the countries or differences in enrolment rates. Portugal ranks substantially higher in mathematics performance once its socio-economic profile is taken into account, while the position of Spain is unaffected.

The analysis of the different PISA waves shows that, on average, Ibero-American countries have improved faster than OECD countries between 2003 and 2012. This is all the more remarkable in that, over the same period, Ibero-American countries have also substantially expanded enrolment of 15-year-olds in secondary schools on average. However, the improvement of Latin American countries in mathematics performance remains relatively small in comparison with the gap between them and the OECD average. The mathematics performance of Spain remained very stable between 2003 and 2012, while Portugal ranks among the OECD countries that experienced the most rapid progress, along with Mexico, Italy, Germany and Israel.

Spain and Portugal differ widely from Latin American countries in terms of the distribution of their students’ performance in mathematics. Latin American countries are characterised by a relatively large share of students at the lower end of the performance distribution, combined with a tiny proportion of top performers. In contrast, Spain and Portugal resemble the OECD in general, with few students performing either poorly or really well, and a large proportion of average students. Yet these distinctive features do not translate directly in the dispersion of students’ performance. Most Ibero-American countries, including Portugal, experience a larger dispersion of students’ performance in mathematics than the OECD on average.
Between 2003 and 2009, most Latin-American countries have experienced an increase in the performance of students at the bottom of the distribution, while top performers’ scores remained stable or increased at a slower pace. As a result, the increase in the average performance observed in most of these countries has also been accompanied by a reduction of inequality in mathematics performance. In Spain, neither low nor top performers have improved in mathematics across PISA assessments, and this resulted in an unchanged dispersion of performance. Surprisingly, top performers have improved faster than low performers in Portugal between 2003 and 2012. Although all students across the score distribution have made significant progress, this resulted in an increase in the dispersion of results over the period.

An in-depth analysis of Ibero-American countries’ performance in PISA 2012

General results for Ibero-American countries

Despite some improvements, Latin American countries still perform poorly compared to Spain and Portugal. In all three subjects tested (mathematics, science and reading), the eight Latin American countries rank in the bottom third of the 65 PISA countries. In mathematics, while the gap between the average performance of Spain and Portugal, on the one hand, and OECD countries, on the other, is less than 10 PISA score points, Latin American students perform almost 100 points lower than OECD students (Figure 1). This is equivalent to 2.4 years of schooling, as an additional year of schooling at age 15 is associated with an increase of 41 points in mathematics on average among the countries participating in PISA in 2012. Chile, the best-performing Latin American participating country, still ranks among the bottom 15 participating countries in the world, and a gap corresponding to 1.7 years of schooling is observed compared to OECD countries. Among Ibero-American countries, Peru and Colombia finished in the last position, with an average performance gap equivalent to 3.1 years of schooling.
Figure 1. Performance in mathematics (mean score PISA 2012)

Source: PISA, OECD 2012, Database
Given the overall high correlation among subjects, Ibero-American countries’ performance is similar in mathematics, reading and science. As depicted in Figure 2, performance is relatively similar in each country whether mathematics, reading or science is considered. Overall, Latin American countries have slightly higher scores in reading than in mathematics. This is particularly true for Costa Rica and Chile, which perform around 30 points above the Latin American average, while the difference is much smaller in mathematics. The correlation between mathematics and reading scores is still high, with a coefficient of correlation ranging from 0.74 in Costa Rica to 0.84 in Peru. It is larger between science and mathematics, with an average of around 0.85.

Figure 2. Performance in PISA 2012 for mathematics, reading and science

Source: PISA, OECD 2012 Database

More than half of 15-year-old Latin American children enrolled in school do not acquire the basic level of proficiency. The PISA 2012 scale ranks student proficiency across 6 levels. Level 1 in mathematics begins at 358 points and Level 6 at 669 points. According to PISA, Level 2 of proficiency in mathematics is the threshold for the basic skills needed to integrate fully into social and professional life. Students who perform below level 2 often face significant disadvantages in their transition into higher education and the labour force. The proportion of students whose score is below this threshold gives an indication to the degree of difficulty educational systems face in providing students with a minimum level of proficiency (OECD, 2013b). In OECD countries, including Spain and Portugal, around a quarter of 15-year-old students are below this threshold. Results for Latin American countries are striking. More than half of Chilean, Costa Rican, Mexican and Uruguayan
students do not have the basic level of skills in mathematics (Figure 3). In Argentina and Brazil, two-thirds of students are in this situation. This proportion reaches three out of four students in Colombia and Peru.

Additionally, very few Latin American students attain high levels of proficiency. The proportion of top performers, or students at proficiency levels 5 or 6, is lower than 2% in Latin American countries. Chile and Uruguay, with respectively 1.6% and 1.3%, are the only countries with more than 1% of top performers. With only 0.3% of top performers, Argentina ranks lowest among Latin American countries. In comparison, Spain (8%) and Portugal (10.6%) have many more top performers but still less than the OECD average at 12%. The students at proficiency levels 5 or 6 are able to draw on and use information from multiple and indirect sources to solve complex problems. They will be at the forefront of a competitive knowledge-based global economy (OECD, 2012).

Figure 3. Share of students at each proficiency level (%), PISA 2012

Performance in PISA accounting for structural differences across countries

In comparison with countries at similar income levels, Ibero-American countries do not perform well. Comparing Ibero-American countries with other economies with similar gross domestic product (GDP) per capita levels
reveals a high degree of heterogeneity in performance. Although there is a clear positive relation overall between the level of GDP per capita and performance, especially at low levels of GDP per capita, Latin American countries tend to have a low PISA score in mathematics compared to the other countries at the same level of economic development (Figure 4, Panel A). With a GDP per capita (current international USD PPP) of around USD 11,000, Colombia and Peru are outperformed by Thai students by 55 score points, or more than 1 year of schooling. Viet Nam’s performance is even more striking: although it registers a lower level of GDP per capita (around USD 5,300), it scores as high as 511 points, the equivalent of 3.4 years above the average performance of Colombia and Peru. With a GDP per capita of close to USD 15,000, Brazil and Argentina perform significantly lower than Costa Rica, whose GDP per capita is USD 13,400. However, all three countries have much lower mathematics performance than Thailand and Bulgaria. Similar conclusions can be drawn for Mexico and Uruguay, whose GDP per capita is comparable to those of Turkey and Romania, although the performance in PISA 2012 of the latter amounts to one additional year of schooling compared to the former. With a GDP per capita of around USD 21,000, Chile is outperformed by 50 points by Croatia and 100 points by Poland, both of which have a GDP per capita of the same magnitude. Poland and Estonia also outperform Portugal by around 40 score points, while New Zealand and Korea, with the same GDP per capita as Spain, obtain PISA mean scores in mathematics that are respectively 40 and 70 points higher.

Ibero-American countries can improve their use of educational resources. Comparing countries at the same level of income revealed that the differences in performance could not be explained merely by differences in income. Another factor could be differences in the priority given to education in the political agenda. For a given level of GDP per capita, some countries may spend more on education. Panel B of Figure 4 takes account of this and reveals that, for a given level of cumulative expenditure per student from ages 6 to 15, Latin American countries are outperformed by countries from the comparison group. Portugal and Spain could also improve their use of educational resources (in comparison with Korea and Singapore), but to a lesser extent as they are closer to the average performance of countries with a comparable level of expenditure. Overall, this suggests that there is room for improving the quality and efficiency of Ibero-American countries’ education systems, especially in Latin American countries.

Latin American countries would benefit from increasing the allocation of resources to education. Panel B (Figure 4) also makes apparent a positive relationship between public investment in education and performance below a certain threshold of expenditure. Latin American countries fall below this threshold, which suggests that they could improve the average performance of students by
increasing the share of resources allocated to education. In contrast, increasing expenditure on education is expected to have a limited effect on performance in Spain and Portugal unless accompanied by more efficient allocation.

**Figure 4. Performance in mathematics in PISA as a function of GDP per capita and cumulative expenditures per student**

Panel A. Performance in mathematics in PISA as a function of GDP per capita

Panel B. Performance in mathematics in PISA as a function of cumulative expenditures per student

Note: In Panel A, the GDP per capita is expressed in 2012 PPP current international USD and comes from the World Bank Development Indicators. In Panel B, the cumulative expenditure on education per student from ages 6 to 15 comes from the OECD, PISA 2012 Database and is approximated by multiplying the expenditure on public and private educational institutions per student in 2012 at each level of education by the theoretical duration of education at the respective level, up to the age of 15 (OECD 2013b). The cumulative expenditure on education are missing for Argentina and Costa Rica.


**Accounting for the socio-economic profile reduces the performance gap with OECD countries, but differences with Ibero-American countries remain.** All Ibero-American countries increase their mathematics performance when the socio-economic profile of their population is taken into account.
As a hypothetical exercise, Figure 5 displays for each country the performance of students with an average socio-economic status at the level of the OECD average (which is zero). The gains are substantial for Latin American countries, which improve their mathematics performance by 28 score points on average, corresponding to 0.7 year of schooling. However, accounting for the socio-economic profile does not affect rankings substantially. The case of Portugal is worth noticing as it is the only country in PISA which climbs more than ten positions in its performance rankings with Turkey and Viet Nam.

Figure 5. Mean score in mathematics, before and after accounting for countries’ socio-economic profile

Source: OECD, PISA 2012 Database
Box 1. What is socio-economic status and how is it measured?

Socio-economic status is a broad concept that summarises many different aspects of a student, school or system. A student’s socio-economic status is estimated by an index, the PISA index of economic, social and cultural status (ESCS), which is based on such indicators as parental education and occupation, the number and type of home possessions, which are considered proxies for wealth, and the educational resources available at home. The index is built to be internationally comparable (see the PISA 2012 Technical Report [OECD, 2014]). The ESCS index was derived from a principal component analysis of standardised variables (each variable has an OECD mean of zero and a standard deviation of one), taking the factor scores for the first principal component as measures of the PISA index of economic, social and cultural status (OECD, 2013b). Students are considered socio-economically advantaged if they are among the 25% of students with the highest PISA index of social, economic and cultural status in their country or economy; socio-economically disadvantaged students are those among the 25% of students with the lowest PISA index of social, economic and cultural status. PISA consistently finds that socio-economic status is associated with performance at the system, school and student levels. These patterns reflect, in part, the inherent advantages in resources that relatively high socio-economic status provides. However, they also reflect other characteristics that are associated with socio-economic status but that have not been measured by the PISA index. For example, at the system level, high socio-economic status is related to greater wealth and higher spending on education. At the school level, higher socio-economic status is associated with a range of characteristics of a community that might be related to student performance, such as a safe environment, and the availability of quality educational resources, such as public libraries or museums. At the individual level, socio-economic status may be related to parental attitudes towards education, in general, and to their involvement in their child’s education, in particular.
In the typical OECD country, a majority of parents (52%) have a tertiary education (ISCED 5 and 6), a small proportion attained secondary education (ISCED 2) as their highest level of education (12%), and the rest (36%) attained other post-secondary qualifications (ISCED 3 and 4). On average, 4% of parents work in elementary occupations (within ISCO major group 9), 16% in semi-skilled blue-collar occupations (within ISCO major groups 6, 7 and 8), 26% in semi-skilled white-collar occupations (within ISCO major groups 4 and 5), and 54% in skilled occupations (within ISCO major groups 1, 2 and 3). On average, more than 90% of students enjoy a desk, a quiet place to study, a dictionary, an Internet connection and a DVD player at home. Books of poetry are one of the least common household possessions: fewer than 50% of students reported having them at home. Classical literature and educational software are also relatively uncommon, followed by technical reference books and works of art. The average household has over 155 books. This general profile differs widely across countries. For example, in Iceland, parents have spent an average of more than 16 years in education, while parents in Turkey have spent an average of less than nine years in education. On average, students in Hungary, Korea and Luxembourg reported having more than 220 books at home, while those in Brazil, Colombia and Tunisia reported having fewer than 45 books at home.


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The evaluation of Latin American education systems should take account of differences in coverage and enrolment of the 15-year-old population, given that including those not enrolled in school would likely lower their performance. By construction, PISA surveys 15-year-old students in schools and excludes out-of-school children from the analysis. While enrolment rates at age 15 are close to 100% in most OECD countries, a substantial proportion of students are not enrolled in school in some Latin American countries. More than 20% of children aged 15 are not enrolled in school in Mexico, Colombia, Brazil and Costa Rica (Figure 6). In addition, due to the exclusion of schools and students in the sampling, the representativeness of PISA data is lower than the enrolment rate (Figure 6). The difference is striking for Costa Rica, where PISA coverage of the population aged 15 reaches only 50% while the enrolment rate is close to 80%. Countries with a large percentage of the 15-year-old population not in school would likely see the mean performance of their education system decrease if this population were included in the measurement. Assuming that out-of-school children perform at the bottom of proficiency Level 1 (i.e. 358 points), the average performance of Mexico, Costa Rica, Uruguay and Colombia would respectively decrease by 17, 10, 8
and 6 points (OECD, 2013c). This is equally true in Turkey, Thailand, Malaysia and, most importantly, Viet Nam, where the average PISA performance would decrease by 56 points due to the large share of out-of-school children. Thus, despite the relatively high selection of students across classes, education systems in Latin America (and other emerging countries) do not manage to provide a high level of education to the remaining students.

Figure 6. Coverage and net enrolment rate of the 15-year-old population in class 7 or above in PISA 2012

![Figure 6](image_url)

Source: OECD, PISA 2012 Database

Ibero-American students are exposed to various learning opportunities due to variation in the length of secondary education and the age at which school begins. In most Ibero-American countries, the modal grade at age 15 is 10th grade. However, this is not the case in Costa Rica and Brazil, where 15-year-old students are supposed to be in 9th grade and 11th grade, respectively. These differences matter for a good understanding of international comparisons, since the organisation of secondary education does not rely on the same pace of learning in all countries. However, these differences are partially balanced by the large share (40%) of students one year ahead in Costa Rica and the large share (34%) of students one year below in Brazil (Figure 7). Different policies regarding the authorised age of entry into school partly explain the differences across countries in the share of 15-year-old students enrolled in the modal grade. In countries where parents have more flexibility to choose the age at which their children will enrol, it is more likely to have children of different ages attending the same grade. In Brazil, for example, it’s not
surprising that the proportion of students below the modal grade is so high (57%), once we know that 54% of the students started school when they were seven years old or older. Similarly, the high share of students that are one year ahead in countries like Costa Rica (40%), Colombia (21%) and Peru (24%) could be explained by practices related to the schools’ starting age.

Figure 7. Distribution of students in comparison to the modal grade (%), PISA 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>2 years below</th>
<th>1 year below</th>
<th>Modal grade</th>
<th>1 year ahead or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>5%</td>
<td>25%</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>Spain</td>
<td>7%</td>
<td>20%</td>
<td>50%</td>
<td>23%</td>
</tr>
<tr>
<td>Mexico</td>
<td>8%</td>
<td>18%</td>
<td>45%</td>
<td>29%</td>
</tr>
<tr>
<td>Portugal</td>
<td>9%</td>
<td>22%</td>
<td>49%</td>
<td>28%</td>
</tr>
<tr>
<td>Argentina</td>
<td>10%</td>
<td>25%</td>
<td>45%</td>
<td>26%</td>
</tr>
<tr>
<td>Uruguay</td>
<td>10%</td>
<td>24%</td>
<td>46%</td>
<td>26%</td>
</tr>
<tr>
<td>Peru</td>
<td>10%</td>
<td>24%</td>
<td>47%</td>
<td>26%</td>
</tr>
<tr>
<td>Brazil</td>
<td>11%</td>
<td>23%</td>
<td>46%</td>
<td>26%</td>
</tr>
<tr>
<td>Colombia</td>
<td>11%</td>
<td>23%</td>
<td>46%</td>
<td>26%</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>12%</td>
<td>23%</td>
<td>46%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Source: OECD, PISA 2012 database

Ibero-American students also experience high repetition rates in comparison with the OECD average. An average of 32% of students reported that they had repeated a grade at least once in Ibero-America, in comparison to 12% in OECD countries. Remarkably, the repetition rates are also high in Spain (33%) and Portugal (34%), though the mathematics performance of Latin American participant countries is much poorer. The share of students having repeated at least a grade is much smaller in the comparison countries, ranging from 0% in Malaysia to 15% in Indonesia (Figure 8). Moreover, some students may have repeated more than one grade, which can explain the significant share (12%) of Ibero-American students delayed by more than a year (Figure 8). Consequently, students in Ibero-American schools have on average reached a lower level of the education curriculum than their OECD peers when they are tested in PISA.
Grade repetition is a costly way of handling underachievement, while the benefits are unclear. The costs associated with the provision of an additional year of education to all repeaters are high. Estimates from PISA 2012 reveal that this cost reached more than USD 2.2 billion in PPP for Brazil (or USD 2 100 PPP per repeater) and more than USD 1 billion in the case of Spain (or USD 8 200 PPP per repeater) (OECD, 2013e). Moreover, when the retained students stay longer in the school system, they spend less time in the labour force afterwards (OECD, 2014a). The costs of grade retention should, however, be balanced with the benefits it can yield in terms of schooling outcomes. There is no consensus in the literature on the causal impact of repetition on subsequent schooling outcomes. For example, Manacorda (2012) finds that grade failure in Uruguay leads to a substantial drop-out rate and lower educational attainment even five years after it occurred. On the contrary, Jacob and Legfren (2004) show that retention in Chicago schools improved students’ achievement, although the effect is limited after three years. Given the overall cost of grade retention, alternative strategies such as summer school or remedial courses might be more cost-effective for dealing with low performers in the system.

Figure 8. Share of students who reported repeating a grade at least once (%), 2012

Source: OECD, PISA 2012 database
Even when focusing on students who never repeated a grade, Latin American countries lag behind in mathematics performance in comparison with the OECD average and benchmark countries. While the frequency of grade repetition can be considered an indicator of the quality of an education system, it is interesting to explore the relative performance of non-repeaters across countries. This can provide some insight on the relative performance of students who fulfil the knowledge requirements in their respective countries, keeping in mind that, on average, many fewer students repeat in OECD and comparison countries. In other words, it provides a conservative picture of the quality of Ibero-American education systems by focusing on a selected sample of students. Figure 9 reveals that despite the reduction in the performance gap, non-repeaters in Latin American countries still perform far below non-repeaters in OECD countries. Interestingly, the rise in performance is particularly high in Uruguay and Portugal (around 40 points), as well as Argentina and Spain (30 points), and not necessarily where the share of repeaters is highest. Overall, these results indicate that education systems in Latin America are not successful in providing sufficient skills, even to students who progress as expected in the school system.

Figure 9. Performance in mathematics of non-repeaters
(mean score in PISA 2012)

Source: OECD, PISA 2012 database
**Trends in performance**

Some Ibero-American countries improved more than the OECD average in **mathematics**. Annualised change is the average annual change in PISA score points from a country’s earliest participation in PISA to PISA 2012. The annualised change in mathematics performance across PISA assessments is 1.3 for Ibero-American countries, while the OECD average is -0.3\(^1\). The countries for which the improvements are statistically significant are Brazil, Mexico, Portugal and Chile. Brazil improved by 4 points a year since its first PISA assessment, Mexico and Portugal by 3 points a year and Chile by 2 points a year. Argentina, Colombia and Peru have improved by around 1 point a year but this is not statistically significant. Much like the OECD average, Spain’s performance has not improved over time. In comparison, the performance of Costa Rica and Uruguay has deteriorated by around 1 point a year. The decrease is only significant for Uruguay, which had its first PISA assessment in 2000, while Costa Rica started in 2009.

The performance gap between Ibero-American countries and the OECD will not close soon given the stability in recent years and the overall slowness of change. Apart from Brazil, Ibero-American countries did not improve their performance in mathematics between the 2009 and 2012 assessments (Figure 10). Performance actually decreased slightly for Colombia, Costa Rica and Mexico, and it dropped very sharply in Uruguay, which lost 18 points from 2009 and 2012, although its performance had been stable since 2003. Even over the entire period (2003-2012), the annual change in mathematics performance remains too small to rapidly close the performance gap with the OECD average. This gap ranges from 70 to 130 points in Latin American countries. Portugal, however, is on a good track with a performance not statistically different from the OECD average in 2012. The case of Brazil is worth highlighting, with a continuous increase in performance accompanied by an increase in enrolment (Figure 11). Increased funding together with the active promotion of educational reforms can explain these results.

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1. The metric for the overall mathematics scale is based on a mean for OECD countries of 500 points and a standard deviation of 100 points that were set in PISA 2003 when the first PISA mathematics scale was first developed. In 2012 the mean score of OECD countries was 494, which implies that the performance of OECD countries decreased between 2003 and 2012 (OECD, 2013b).
The improvements in mathematics performance are all the more remarkable given that PISA coverage of the 15-year-old population has substantially improved in Ibero-American countries on average. The coverage of most Ibero-American countries (including Spain and Portugal) has increased by more than 10 percentage points across PISA assessments (Figure 11). The bulk of this evolution can be attributed to increases in enrolment rates. Indeed, between 2003 and 2012 most Ibero-American countries registered increases in secondary enrolment rates well above the OECD average of 2.7 percentage points (World Bank, 2014). With an increase of 14 percentage points, Portugal is one of the countries where secondary school coverage increased the most, while in Brazil and Colombia it increased by close to 10 percentage points (World Bank, 2014). In Peru, Mexico and Uruguay, secondary school enrolment rates rose by more than 5 percentage points over the period, while the increase was closer to the OECD average in Spain, Chile and Costa Rica. Although other countries at similar income levels also increased their enrolment rates (in particular Turkey and Indonesia), the evolution was spectacular in Ibero-America in comparison with other Asian and Eastern European economies, which had already high secondary school enrolment rates in 2003. As mentioned above, it is not unrealistic to assume that the new entrants in the education system have on average lower performance than the others. As a consequence, they are likely to contribute to a composition...
effect lowering the overall performance in mathematics of the respective countries. Since the performance in mathematics has improved or remained stable in most Ibero-American countries, this suggests that the quality of their education systems has improved.

Figure 11. Evolution of 15-year-old population coverage across PISA assessments (%)

The dispersion of students’ achievement in mathematics

The dispersion of students’ achievement is relatively high in Ibero-American countries in comparison with the OECD average. As mentioned earlier, a large proportion of Latin American students perform below level 1, at level 1 and at level 2 (Figure 3). This results in relatively high levels of dispersion in Latin American countries, as measured by the coefficient of variation, which is defined as the ratio of the standard deviation to the mean of countries’ performance in mathematics. Out of eight Latin American countries in PISA, six display a higher dispersion in the PISA results than the OECD average of 0.186 (Figure 12). Peru and Uruguay, with a coefficient of variation of 0.229 and 0.217 respectively, are among the countries with the highest dispersion in mathematics performance in PISA 2012, while Mexico (0.180) and particularly Costa Rica (0.168) rank relatively low. While Spain and Portugal have a coefficient of variation comparable to the OECD average (as does Chile), the dispersion of students’ performance is noticeably higher in Portugal than in Spain. Overall, the dispersion of mathematics performance reaches comparably high levels in countries at the same level of GDP (Figure 12).
Conversely, the low share of top performers leads to a relatively small performance gap between low and top performers in Latin American countries. The average OECD score gap in mathematics between lowest- and highest-achieving students (i.e. the 10th and the 90th percentiles of performance) reaches 239 points, the equivalent of 5.8 years of schooling. The gap was less pronounced in all the participating Ibero-American countries except Portugal (247 points, or six years of schooling). Among Latin American economies, this score gap ranges between 172 points (4.2 years of schooling) in Costa Rica and 228 points (5.2 years of schooling) in Uruguay (Figure 13). Argentina, Brazil, Colombia, Costa Rica and Mexico were among the ten PISA participating countries with the least variation in results, according to this measure of dispersion. However, the measure may be affected by the relatively low coverage of the 15-year-old population in these countries. It would artificially reduce the performance gap between top and low performers, assuming that the out-of-school population performs rather poorly in comparison with the population surveyed in PISA.

The performance gap between low and top performers continuously narrowed in most Ibero-American countries between the 2003 and 2012 PISA assessments. The gap in mathematics performance between the high- and low-achieving students decreased in all Latin American countries, while the OECD average remained at the 2003 level. Portugal is the only Ibero-American country where the variation in performance increased between 2003 and 2012. The variation in mathematics performance decreased by

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**Figure 12. Dispersion of mathematics performance across countries**

![Graph showing dispersion of mathematics performance across countries](image-url)
around 60 PISA score points in Argentina and Brazil and by around 30 points in Colombia and Mexico (Figure 13). The reduction was more modest but still significant in Chile, Peru and Costa Rica. The difference remained remarkably stable in Spain over the period. Notably, the variation in performance decreased in the period 2009-2012 in most Latin American countries while the average PISA score did not increase over this period, as noted above.

Figure 13. Evolution of the gap in mathematics performance between top performers (90th percentile) and low performers (10th percentile)

In most cases, the decrease in the variation of performance can be attributed to improvements in performance at the bottom of the distribution. The annualised change in performance at different levels of the score distribution reveals that the students at the bottom (10th and 25th percentiles) have improved faster than the students at the top (75th and 90th percentiles) in all countries in which the variation in performance declined (Figure 14). Mexico and Brazil set an example in terms of the evolution of achievement since they were successful in increasing the performance of all students, but more for those at the bottom of the distribution (around 5 points a year on average), so that overall inequality decreased. In Chile and Colombia, the students at the bottom of the distribution improved significantly (between 4 and 2 points a year), while those at the top remained at the same level. The point estimates indicate a similar evolution in Peru, although none of the results are statistically different from zero. Similarly, in Argentina and Costa Rica, the evolution of performance at the different percentiles is never statistically different from zero. Nevertheless, the point estimates suggest that these countries have experienced an improvement for the students at the top of the distribution, with deterioration for those at the bottom. The evolution is similar and statistically significant in Uruguay, where
the performance of the students at the 90\textsuperscript{th} and 75\textsuperscript{th} percentiles decreased substantially (by around 2.4 and 2.2 points a year, respectively) and slightly (by 0.6 point) at the 25\textsuperscript{th} percentile, while the performance of students at the 10\textsuperscript{th} percentile increased by 1 point a year only.

Singularly, Portugal managed to improve performance at all levels of the distribution, but the performance of high-achieving students increased faster. In Portugal, the annualised change in performance of the 75\textsuperscript{th} and 90\textsuperscript{th} percentiles reached around 4 points over the period, against 2 points for the 10\textsuperscript{th} and 25\textsuperscript{th} percentile. This explains the increase in the performance variation described above. Among OECD countries, similar evolutions were only observed in Korea and Japan, top performing countries in PISA.

The general improvement of students at the bottom of the distribution is remarkable given the general increase in the enrolment rates over the same period of time. This could be attributed to various factors within or outside the respective countries’ education systems. For example, it could arise from a general reduction in inequalities at the country level, but also from a targeted allocation of educational resources toward poor performers, a change in teaching methods, support for disadvantaged students or a decrease in school segregation. The implementation of conditional cash transfer programmes in most Latin American countries may also explain part of the evolution. The next chapters explore the potential drivers of such an evolution by looking at the major changes within the education systems.

Figure 14. Annualised change in performance at different levels of the score distribution

![Figure 14](image-url)
3. Students’ characteristics and performance in Ibero-America

This chapter analyses one aspect of equity in PISA, namely the link between students’ performance and certain characteristics, including socio-economic status, gender and the location of the school they attend. The lack of equity is a major issue in Ibero-American countries. Students’ socio-economic status explains a large share of the variations in performance. Students from a disadvantaged background also face more difficulties throughout their schooling: they repeat grades more frequently and attend pre-primary school less often. The lack of equity also emerges through gender and geographical disparities. The gender gap in favour of boys in mathematics and science is particularly high in Ibero-American countries and cannot be explained by differences in socio-economic status or behavioural factors specific to girls. Moreover, students attending schools in rural areas and towns do not perform as well as students enrolled in cities. The corresponding gap in performance is partly, but not entirely, explained by the differences in socio-economic status of these students.
PISA defines equity in education as providing all students, regardless of gender, family background or socio-economic status, with opportunities to benefit from education. It implies that students’ socio-economic status has little or no impact on their performance, and that all students, regardless of their background, are offered access to quality educational resources and opportunities to learn (OECD, 2013c).

This chapter analyses the first aspect of equity, the link between students’ performance and their characteristics. Despite relatively low disparities in achievement, equity is a major issue in Ibero-American countries. Students’ performance in mathematics is strongly related to their socio-economic background, and girls lag behind in mathematics and science. The better performance of students from a higher socio-economic background partly arises from better schooling prior to the test. This is not the case for girls however, which suggests that alternative mechanisms are at play. In addition, students attending school in rural areas or towns perform poorly in comparison to students in cities. This reflects partly the socio-economic composition of the schools in rural areas.

The issues related to inequities in access to quality educational resources across schools and school segregation are dealt with in the next chapter.

**Students’ socio-economic profile and performance**

Latin American countries stand out as poor performers in mathematics combined with a low level of equity in education outcomes. Figure 15 displays the strength of the relationship between the students’ socio-economic status and performance in mathematics as a function of the average 2012 PISA score in the country. Apart from Mexico, all Ibero-American countries are concentrated in the bottom left-hand part of the figure, combining below average performance and below average equity. PISA consistently finds that high performance and greater equity in education opportunities and outcomes are not mutually exclusive. Excellence and equity are attainable under a wide variety of conditions; neither national income nor socio-economic heterogeneity prevent the achievement of equity. Mexico, Thailand and Kazakhstan are good examples. They are comparable in terms of PISA scores, GDP per capita and socio-economic profile, but ensure a greater equity in education outcomes than other Latin American countries.
In Ibero-American countries, social, cultural and economic background explains the performance variations to a large degree. The strength of the relationship between performance and students’ socio-economic status is above the OECD average in all Ibero-American countries except Mexico (Figure 15). However, it is statistically significantly higher only in Portugal, Chile, Uruguay and Peru, with more than 20% of the performance variation explained by the socio-economic status of students, against 15% in the OECD.

Figure 15. Student performance and equity

Source: OECD, PISA 2012 Database
However, the association between socio-economic status and mathematics performance is not different than in comparison countries. The increase in mathematics performance associated with a unit increase in students’ socio-economic status (ESCS) displays large heterogeneity among Ibero-American countries. It ranges from around 19 points in Mexico to 37 in Uruguay (Figure 16), but these numbers should be compared to countries’ average PISA scores in mathematics (displayed in parentheses on the horizontal axis) for a better understanding. For example, the association in Brazil, 27 points, amounts to 6.8% of its PISA score, while the association in Viet Nam, 29 points, represents only 5.7%. Overall, the association of ESCS and performance is not particularly high in Ibero-American countries, standing at levels similar to the comparison countries.

Figure 16. Association between the socio-economic status of students and mathematics performance

![Figure 16. Association between the socio-economic status of students and mathematics performance](image)

Note: The numbers on the vertical axis correspond to the score points in mathematics associated with a one-point increase in the index of students’ ESCS. Numbers in parentheses correspond to the country’s mean score in mathematics performance in PISA 2012.

Source: OECD, PISA 2012, Database

Disadvantaged students start school later and in a less advantageous situation. The relatively low performance of students from low socio-economic backgrounds can be partly attributed to differences in pre-primary enrolment. The level of pre-primary enrolment of students from the lowest quarter of the ESCS index is much lower than for those who belong to the top quarter (Figure 17). In addition to providing one more year of schooling, pre-primary enrolment has been shown to have a positive impact on
cognitive and also behavioural and soft skills. After controlling for ESCS, pre-primary education raises PISA scores in mathematics by 41 points in Latin-American countries (OECD/CAF/ECLAC 2014). Noticeably, even in Latin American countries for which the enrolment rate in pre-primary education of advantaged students is higher than the OECD average, the enrolment rate for disadvantaged students is much lower than the OECD average, reflecting the high degree of inequity even in countries with relatively well developed pre-primary education.

Figure 17. Percentage of students reporting that they had attended pre-primary education for more than one year, by quartile of ESCS (2012)

Disadvantaged students are also more likely to be exposed to grade repetition. Students from a disadvantaged background, in the bottom quarter of ESCS, are more likely to repeat a grade than advantaged students in most countries, but the likelihood of repeating a grade reaches alarming levels in Ibero-American countries (Figure 18). More than 40% of disadvantaged students have repeated a grade in Ibero-American countries, except in Mexico. In Uruguay and Portugal this proportion reaches more than 60%, while 10% or less of advantaged students have repeated. However, the ratio of the repetition rate of disadvantaged students over advantaged students is not higher in Latin American countries than in countries with similar levels of GDP. The average ratio is 4 for Latin American countries – with a large heterogeneity, as it ranges from 10 in Uruguay to 1.85 in Colombia. The ratio is also remarkably high in Portugal, where it attains 5.7. Yet students from disadvantaged backgrounds repeat disproportionately more in Viet Nam (77), Bulgaria (37), and Czech Republic and Slovenia (16).
Moreover, the disincentives linked to grade repetition are more detrimental to disadvantaged students. By adding an additional year of schooling, grade repetition increases the direct and opportunity costs of completing secondary school (as it implies one additional year of education expenditures and delays the age of entry in the labour market). Regardless of the potential (positive or negative) effects of grade repetition on knowledge acquisition, this cost increase will affect disproportionally the disadvantaged students who are more likely to be financially constrained (See Fernandez and al. (2010) for an in depth analysis on the consequences of repetition policies in the case of Spain.).

Repetition seems to be biased against students from disadvantaged backgrounds. In countries like Spain, Portugal and Uruguay, a student coming from a disadvantaged background is three times more likely to repeat a grade than an advantaged student with the same PISA results (OECD, 2014a). In Peru, a disadvantaged student is more than one and a half times more likely to repeat a year than an advantaged student with the same grade. In countries like Colombia, Brazil and Chile, on the other hand, advantaged and disadvantaged students of the same level are equally likely to repeat a grade.

Figure 18. Percentage of repeaters in the bottom and top quarters of ESCS

![Graph showing percentage of repeaters in the bottom and top quarters of ESCS](Source: OECD PISA, 2012 Database)

The wealth component of students' socio-economic profiles constitutes a relatively important constraint in terms of access and performance in Latin American countries. When the variation in mathematics performance explained by the PISA index of economic, social and cultural status is decomposed into its different components, the contribution of wealth is much larger in Latin American countries than it is in Portugal, Spain and OECD countries on average. In Spain and Portugal, wealth alone does not explain
any variation in performance. In OECD countries, wealth alone explains only 0.2% of the variation in performance, while the average for Latin American economies reaches 2.1%. The contribution of wealth is particularly important in Colombia (4.4%), Peru (3.4%), Costa Rica (3.3%) and Brazil (2.3%). In these countries, wealth explains more variation in mathematics performance than the parents’ highest occupation status alone or the number of books at home alone, while this is almost never the case for the other countries participating in PISA. While lack of wealth seems to matter in the performance of students, its greater contribution to inequity probably arises through its effect on access to school. Looking at the net enrolment rates in secondary schools by quintiles of income reveals the great disparities that prevail in most Latin American economies (Figure 19). The likelihood of being enrolled in secondary school sharply increases with income. In Brazil and Costa Rica, children from the wealthiest quintile (top 20%) are nearly twice as likely to enter secondary education as those from the poorest quintile (bottom 20%). Hence, the measure of inequity from PISA, based on enrolled students, tend to underestimate the overall inequity present in Latin American countries.

Figure 19. Access to secondary education by quintile of income (%), 2012

Source: OECD, PISA 2012 Database

In Latin America, the socio-economic status of the school is more strongly associated with performance than the socio-economic status of the student. When the school average of students’ socio-economic status is taken into account, the effect of the socio-economic status of the student...
on mathematics performance is dramatically reduced in Latin American countries, as well as comparison countries. A one-unit increase in ESCS (given the average socio-economic status of the school) is associated with an increase of 5 points in mathematics performance in Mexico and of 15 points in Uruguay, the country where this effect is strongest in the region (Figure 20). This corresponds to the within-school association of ESCS and mathematics performance. On the contrary, the between-school association of ESCS and mathematics performance is very large. The effect of a one-unit increase in the school socio-economic status (for a given level of student socio-economic background) ranges from 30 points in Mexico up to 50 points in Uruguay (Figure 20).

**Figure 20. Association of student and school ESCS and mathematics performance**

Note: The overall association corresponds to the student-level score-point difference associated with a one-unit increase in the student-level ESCS in the regression of mathematics performance on student ESCS, age and gender. In the regression of mathematics performance on student ESCS, school ESCS, age and gender, the within-school association corresponds to the student-level score-point difference associated with a one-unit increase in the student-level ESCS, and the between-school association corresponds to the school-level score-point difference associated with a one-unit increase in the school-level ESCS. The numbers between parentheses next to the country names correspond to the PISA score in mathematics in 2012.

Source: OECD, PISA 2012 Database

Spain and Portugal differ in this regard. Accounting for the school socio-economic status does not substantially decrease the effect of the socio-economic status at the student level. This might reflect a lower segregation of students across schools. The predominance of the effect of socio-economic status
at the school level might be due to other omitted variables correlated to the socio-economic status of the school and students’ performance. For example, it might be the case that these schools benefit from better teachers or educational resources in general. It may also indicate a relatively high social segregation of students across schools. These possibilities are explored in detail in the next chapter.

The improvement in performance observed for disadvantaged students in comparison with advantaged students parallels the evolution observed for low versus top performers. In Latin American countries that have improved their average performance in mathematics across PISA assessments, disadvantaged students have improved their PISA score in mathematics while advantaged students stagnated or deteriorated (Figure 21). Similar to the evolution of performance by percentile of the PISA score distribution (Figure 14), the improvements at the bottom of the ESCS distribution are more pronounced in Brazil, Argentina, Chile and Mexico. In Spain, Peru, Costa Rica and Colombia, the performance of students did not vary substantially for disadvantaged and advantaged students, while in Portugal both types of students improved considerably. This suggests that Latin American countries may have managed to improve the achievement of low performers by targeting students from a low socio-economic background. The next chapter documents this by analysing the allocation of various educational resources across students and schools.

Figure 21. Evolution of students’ performance in mathematics by quarter of ESCS

Gender gap in PISA assessments

Boys’ advantage in mathematics and science is striking in some Ibero-American countries, while girls’ advantage in reading performance is not as significant as in OECD countries. In Latin American countries, boys outperform girls by around 19 points in mathematics against an 11-point difference in OECD countries on average (Figure 22). The gender gap is not significantly different from the OECD average in Portugal, Uruguay, Argentina and Mexico. In contrast, the gender gap in performance amounts to around one-half year of schooling (20.5 points) in Colombia, Costa Rica, and Chile. Noticeably, boys’ performance is 16.5 points higher than girls’ in Spain, which is the seventh worst-performing OECD country in this regard. In Colombia and Costa Rica, boys also perform significantly better than girls in science. The performance gap is not significantly different from zero in the other countries. Girls outperform boys in reading in all the economies considered, but the gap in performance is greater in OECD countries on average (38 points) than in Latin American economies (29 points). Girls’ advantage in reading performance is of the same magnitude as the OECD average in Portugal, Uruguay and Argentina. Countries like Colombia, Costa Rica and Chile combine a large advantage for boys in mathematics (and science) with a relatively low advantage for girls in reading. To this extent, gender inequalities can be described as a particularly important issue in these countries.

Figure 22. Gender differences (boys - girls) in mathematics, science and reading performance (mean score in PISA 2012)

Source: OECD, PISA 2012 Database
The gender gap in performance cannot be explained by the socio-economic characteristics of the families. The gender gap in mathematics performance does not vary significantly in most Ibero-American countries when the students’ socio-economic background is taken into account. There is not a significant difference in this gender gap between disadvantaged and advantaged households in Portugal, Uruguay, Colombia, Chile, Brazil and Mexico. Remarkably, the gender gap is higher among students from higher socio-economic backgrounds in Spain and Costa Rica. It is the opposite in Argentina and Peru (Figure 23). Given the overall high level of the gender gap in Ibero-American countries, these results indicate that the underlying causes behind it are widely spread across families from different backgrounds. Note, however, that the share of boys included in the PISA sample is lower in Latin-America compared to the OECD average, especially among students at the bottom quarter of performance. This may suggest that male poor-performers are under-represented in the study, which in turn may explain the extent of the gender gap – especially in Colombia. Indeed, if low-performing boys have higher chances of dropping out than girls, then part of the gender gap observed may be caused by the absence of poor male performers in the sample, rather than by an actual difference in performance between boys and girls (Munoz, 2014). The relatively small proportion of boys at the bottom of performance is, however, not proof in itself that boys drop out more often than girls.

Figure 23. Gender gap in mathematics performance (boys - girls) by quarter of ESCS

Source: OECD, PISA 2012 Database
Girls’ disposition towards mathematics does not appear to be a strong determinant of the gender gap in Ibero-American countries. Despite the large advantage boys have over girls in mathematics achievement compared with the OECD average, girls do not significantly lag behind boys in terms of perseverance and they are not more anxious than boys with regard to mathematics (Figure 24). A detailed description of anxiety and perseverance indexes is provided in Box 4. Similar conclusions hold when self-efficacy and intrinsic motivation are considered. This suggests that – unlike OECD countries, where on average the gender gap in these variables is large – the gender gap in mathematics in Ibero-America does not seem to be driven by the lack of self-confidence towards mathematics among girls. This is also true for the group of comparison countries.
The gender gap is not driven by grade repetition since girls in Ibero-America are less likely to repeat than boys. Globally, boys experience higher levels of grade repetition than girls, but this gap is particularly wide in Ibero-American countries (Figure 25). This suggests that the relatively poor performance of girls in mathematics cannot be attributed to lower grade attainment at age 15.

![Figure 25. Gender gap in grade repetition (%)](image)

Source: OECD, PISA 2012 Database

Box 2. Interpreting PISA indices

Indices used to characterise students’ dispositions, behaviours and self-beliefs were constructed so that the average OECD student would have an index value of zero and about two-thirds of the OECD student population would be between the values of -1 and 1 (i.e. the index has a standard deviation of 1). Negative values on the index, therefore, do not imply that students responded negatively to the underlying question. Rather, students with negative scores are students who responded less positively than the average response across OECD countries. Likewise, students with positive scores are students who responded more positively than the average student in the OECD area.
Box 2. Interpreting PISA indices (cont.)

PISA scale indices, like the PISA index of economic, social and cultural status, index of sense of belonging, index of attitudes towards school, index of intrinsic motivation to learn mathematics, index of instrumental motivation to learn mathematics, index of mathematics self-concept, index of mathematics self-efficacy and index of mathematics anxiety, are based on information gathered from the student questionnaire. In PISA 2012, each index is scaled so that a value of 0 indicates the OECD average and a value of 1 indicates the average standard deviation across OECD countries (see Annex A1 of PISA 2012 Results: Ready to Learn (OECD, 2014d) for details on how each index is constructed). Similarly, in PISA 2003, each index was scaled so that a value of 0 indicated the OECD average and a value of 1 indicated the average standard deviation across OECD countries. To compare the evolution of these indices over time, the PISA 2012 scale was used and all index values for PISA 2003 were rescaled accordingly. As a result, the values of the indices for 2003 presented in this report differ from those produced in Learning for Tomorrow’s World: First Results from PISA 2003 (OECD, 2004). Also, in PISA 2003, the index of intrinsic motivation to learn mathematics was named index of interest and enjoyment in mathematics. Both the index of intrinsic motivation to learn mathematics of 2012 and the index of interest and enjoyment in mathematics of 2003 are based on the same questionnaire items and can be compared across assessments.

In PISA 2012, several tests were conducted to determine whether the use of country-specific item parameters improved cross-country comparability of indices. For example, simulation studies indicated that using country-specific item parameters in regression models did not lead to improvements in the comparability of indices across countries. During the estimation procedure, an index of differential item functioning (DIF) across countries is produced that can be used to gauge the amount of DIF for each item across countries. If necessary, the impact of DIF on items can then be tackled using country-specific item parameters. However, simulation studies have shown that introducing country-specific item parameters for DIF items has a negligible impact on the regression coefficients in a two-level regression (students within countries) of background variables (with and without country-specific items) on cognitive scores in mathematics, reading and science.

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Location of schools and performance

Students living in more rural areas are significantly less likely to perform well, especially in Ibero-American countries. Apart from Spain and Argentina, the difference in mathematics performance between urbanised and less urbanised areas (cities versus towns, towns versus rural areas) in
Ibero-American countries is higher than the OECD average (Figure 26). The performance gap between students attending schools in cities (more than 100 000 inhabitants) and those attending schools in rural areas (less than 3 000 inhabitants) amounts to 31 score points on average in OECD countries. The gap is twice as big in Mexico and reaches 73, 74 and 89 points, respectively, in Chile, Uruguay and Peru. However, the share of students attending schools located in rural areas is very small – less than 10% – in most countries (Costa Rica being an exception). It is therefore more relevant to look at the differences in performance between cities and towns. The performance gap is around two times smaller in general but remains higher than the OECD average for most countries. This may point to the absence of strong states with well-developed institutions reaching out the entire population.

The differences in performance partly reflect differences in the socio-economic status of the students attending schools at different locations. When the students' socio-economic status is taken into account, the differences narrow significantly in all countries and are no longer significant in Spain and Costa Rica. However, the performance differences between cities and towns remain significant in Argentina, Brazil, Peru, Uruguay and Mexico. The case of Portugal is surprising, as taking account of the students’ socio-economic status reveals that students in towns and rural areas perform better than students in cities. The explanation lies in the quality of schools in more rural areas, as described in the next chapter.

**Figure 26. Difference in mathematics performance by school location before and after accounting for students’ socio-economic status (PISA points), 2012**

Source: OECD, PISA 2012 Database
This chapter analyses links between the level and the allocation of educational resources and students’ achievement in PISA. The educational resources considered here range from financial, material and human resources to more intangible inputs such as school governance and the learning environment. The availability of material and human resources in Ibero-American schools is generally comparable to countries at similar level of GDP per capita but remains well below the levels of richer countries. Latin American countries would benefit from further investment in education; however, the misallocation of educational resources represents a more acute drawback. Disadvantaged students and low performers are generally enrolled in schools of a lesser quality. The prevalence of private schooling contributes to this aspect of inequity by allowing students of higher socio-economic status to enter better quality schools. This is a factor in the low level of social inclusion observed in Ibero-American education systems. The strength of the link between students’ socio-economic status and the quality of schools’ educational resources has decreased across PISA assessments. This may have contributed to the observed improvement in the performance of disadvantaged students and low performers. In terms of learning environment, Ibero-American countries maintain relatively high engagement and motivation among students. Nevertheless, tardiness and absenteeism, more pronounced among disadvantaged students, could affect the quality of learning time.
This chapter focuses primarily on an analysis of the role of various educational resources in shaping students' achievement in PISA. A wide range of educational resources is considered, from financial, material and human resources to more intangible inputs such as school governance and the learning environment. In addition, the chapter examines how social segregation in schools interacts with educational resources, emphasising in particular the role of private schooling in Ibero-American countries.

The absolute level of material educational resources is particularly low in Ibero-American countries as compared to international standards. While additional expenditures on education over a certain threshold are not correlated with performance, Latin American countries have not yet reached this threshold and might improve performance by allocating more resources to education.

Material and human educational resources are also unequally and inefficiently allocated to students and schools in Ibero-American countries. Students from a low socio-economic background attend schools of lower quality. This contributes to and reinforces the equity issues described in the previous chapter. Moreover, the relatively high social segregation of students among schools reinforces the unequal distribution of resources. An analysis of the performance of students enrolled in private schools tends to support the view that these schools allow families from a higher socio-economic background to self-select but that they do not perform significantly better than public schools. The concentration of students from a high socio-economic background appears to be a stronger determinant of performance than the schools' physical infrastructure and educational resources. Still, the gap between disadvantaged and advantaged schools has narrowed over time in most countries and probably accounts for some of the improvement at the bottom of the score distribution.

An additional essential component of students' achievement is a good learning environment. The effective time spent learning, as well as the school climate in which students evolve, might improve the acquisition of knowledge in complement to the schools' infrastructure and educational resources. In Ibero-America, students spend enough time studying and doing homework, but truancy rates and the disciplinary climate are not optimal and can disturb the learning process. However, students show relatively high motivation and confidence, and teacher-student relations are not significantly worse than in other countries. More surprisingly, the socio-economic status of schools does not affect substantially the results.
International comparisons in the level of educational resources

The proportion of resources invested in education is similar in Ibero-American countries to economies at comparable levels of GDP per capita, but still well below that of richer countries. In Latin American countries, cumulative expenditure per student over the years of education (students aged 6 to 15) as a percentage of GDP per capita varies from 123% in Peru to 204% in Colombia (Figure 27). The order of magnitude is not different from countries at the same level of wealth, such as Thailand (129%) and Turkey (149%), but there is a substantial difference with Spain (266%), Portugal (314%) and richer countries in general. While overall, countries with higher level of cumulative expenditures per student do not perform better in PISA, a positive correlation exists at low levels of expenditure (Figure 4, above). This suggests that increasing the share of resources allocated to education could improve the performance of Latin American students. However, Ibero-American countries could first enhance the efficiency of education expenditure, as mentioned earlier. Indeed, for comparable levels of cumulated expenditure, Colombia’s average mathematics score is well below Thailand’s, for example, and the same is true between Portugal and Czech Republic (Figure 27).

Figure 27. Expenditure on education and teacher’s’ salaries relative to GDP per capita (%)

Note: Left axis shows cumulative expenditure per student aged 6 to 15, while the right axis shows expenditure on teachers’ salaries in lower and upper secondary schools. Data from Brazil, Costa Rica and Viet Nam are missing. The GDP per capita, from 2012, is expressed in 2013 PPP USD and comes from the World Bank’s Development Indicators, 2014.

Source: OECD, PISA 2012 Database
Most of the Ibero-American countries have increased the share of the GDP allocated to secondary school students between 2000 and 2013, but the countries starting at lower levels did not increase faster. With the noticeable exceptions of Peru and Mexico, expenditure devoted to each secondary school student as a percentage of GDP per capita has increased between 2000 and 2013 for the Ibero-American countries (Figure 28). With an increase of 14 percentage points between 2002 and 2012, Brazil stands out as a country that massively invested in education. It increased its position from the lowest level of expenditure per student in 2002 (together with Peru) to the highest level of expenditure among Latin American countries in 2012 (Figure 28). The resources allocated to secondary school students have risen swiftly from the mid-2000s onward in Argentina, Chile and Colombia. However, some of this expenditure served to catch up with previous levels, so that the overall increase in government expenditure per student in percentage of the GDP per capita ranges from 2 to 3 percentage points over the entire period. The evolution of expenditure over the period is comparable in Spain (3 percentage points), but higher in Portugal where spending increased by 5 percentage points. Overall, the Latin American countries did not increase the share of resources allocated to secondary school students faster than Spain and Portugal. However, GDP per capita has increased steadily in Latin American countries over the period, while it has decreased in Spain and Portugal. Consequently, the level of expenditure may have risen faster in these latter countries and one should remain cautious when interpreting the potential effects on the countries’ performance.

Teacher’ salaries relative to GDP per capita vary greatly across countries across the world and do not appear to be correlated with the cumulative expenditure per student. Generally, teachers’ salaries are quite similar in lower and upper secondary schools within one country. However, they differ widely across countries and interestingly large differences in teachers’ share of GDP per capita are observed between countries at comparable levels of GDP per capita. Overall, teachers’ salaries range from 50% of GDP per capita in Romania and Indonesia to more than 200% in Malaysia and Jordan. Ibero-American countries also display broad heterogeneity in teachers’ salaries. At the lower end, teachers in Uruguay and Argentina earn around 80% of GDP per capita, similar to Czech Republic. Twice as much is earned by teachers in Colombia, Mexico, Spain, Portugal and Korea (Figure 27). It is important to note, nevertheless, that relative to individuals with similar observable characteristics (age, gender, education, family status, etc.), Latin-American teachers seem to be underpaid (Mizala and Nopo, 2014). Again, teachers’ salaries do not seem to be strongly related to student performance.
Ibero-American education systems ensure that a large share of students are taught by qualified teachers, even if certification is not widespread. There are large disparities in the share of certified teachers (i.e. teachers who have received a diploma that validates their ability to teach) in Ibero-American countries (Figure 29). Levels are surprisingly low in Colombia, Chile and Mexico, with 10%, 20% and 28% of certified teachers respectively. In contrast, the proportion in Argentina, Peru, Spain and Portugal is close to the OECD average of 87%. However, the share of teachers with a university-level degree (ISCED 5A), referred to as qualified teachers, rises to around 90% in Colombia, Chile and Mexico, four percentage points above the OECD average. The share of qualified teachers is also quite high in most of the remaining Ibero-American countries (Figure 29), except Argentina (17%) and Uruguay (8%), where it is remarkably low but could be explained by teachers starting to teach before graduation according to the Uruguayan authorities. The case of Uruguay is still particularly worrying since only 57% of teachers start teaching with a certification. The share of qualified teachers reaches 72% in Portugal, which is surprisingly low in comparison with the OECD average. Overall, the share of qualified teachers is comparable across economies.
at different levels of GDP per capita. Similar proportions of qualified teachers are observed in Indonesia (82%), Viet Nam (87%) and Malaysia (89%), but also among richer economies like Korea (99%), Croatia (94%) or Slovenia (88%). Of course, the quality of teachers’ qualification and certification is likely to vary across countries and such differences might lead to wide differences in the quality of teaching.

Figure 29. Share of qualified and certified teachers (%)

Source: OECD, PISA 2012 Database

According to principals, teacher shortages hinder instruction in Latin American public schools. While Latin American countries do not appear to lag behind in terms of teacher qualification, school principals view teacher shortages as hindering instruction (see Box 3 for a detailed description of the methodology guiding principals’ perceptions on school quality and autonomy). On the OECD’s index of teacher shortage, most Latin American economies place much higher than the OECD average (Figure 30). The level reaches 0.6 in Colombia, Peru and Chile, 0.35 in Uruguay and 0.2 in Brazil. Among Latin American countries, only Argentina places slightly below the OECD average, which is quite surprising given the country’s small percentage of qualified teachers. Such a situation would typically arise if the number of trained teachers is not sufficient to respond to increasing enrolment needs. It could also be due to management or governance issues within the education system in terms of the allocation of teachers. In contrast, principals in Portugal and Spain do not perceive teacher shortages as an impediment, as indicated by the index level of -0.7, well below the OECD average. However, international comparisons based on self-reported measures should be interpreted with caution.
Similarly, a lack of adequate physical infrastructure and educational resources hinders instruction in most Ibero-American countries. Most Ibero-American countries rank in the bottom quarter of PISA participants on the index of adequacy of school infrastructure. Among Ibero-American countries, Colombia and Costa Rica rank lowest, at around -0.7 (Figure 30). At this level, around 50% of students attend a school where the principal considers that the quality of school infrastructure hinders learning (OECD, 2013c). In Peru, Uruguay, Mexico, Argentina and Brazil, where the indexes range from 0.47 to 0.35, around the same proportion of principals complain about the quality of infrastructure. In Spain and, to a lesser extent, Chile, principals do not consider the quality of school infrastructure as a main issue. Their index is close to the OECD average, while Portugal ranks surprisingly low. The conclusions are very similar about the adequacy of educational resources. Latin American countries rank significantly lower than the OECD average, but in this case Portugal and Spain are closer to the OECD average.

Figure 30. School principals’ views on adequacy of material and human resources

![Physical infrastructure index, Educational resources index, Teacher shortage index](source: OECD, PISA 2012 Database)

In terms of governance, Ibero-American schools have less autonomy over the allocation of resources and the design of curricula and assessment than OECD countries on average. Among countries with a relatively low level of autonomy, the index of school responsibility for resources allocation ranges from 0.5 in Portugal to 0.3 in Brazil (Figure 31). This bracket also includes
very good performers in mathematics such as Viet Nam (-0.43), Korea (-0.44) and Canada (-0.35). In contrast, schools in Peru and Chile have high levels of autonomy over resource allocation but do not perform well in mathematics. Overall, performance in mathematics does not appear to be related to the degree of autonomy accorded to schools across countries. The conclusions are somewhat similar regarding autonomy over curricula and assessments. Most Ibero-American countries have an index of school responsibility for curriculum and assessment well below the OECD average, but the same is true for countries with different levels of performance (Figure 31). Schools in Colombia, Peru and Chile have relatively large responsibility in the design of curricula and assessments.

While student achievement might improve if schools were provided with more autonomy to select and fire teachers, and to allocate the budget and set teacher salaries, this opportunity for improvement may not be available to all schools. It requires a high level of accountability and transparency at the decision-making level, which Latin American countries may lack. Thus, more autonomy can also lead to greater inequalities among schools.

**Figure 31. School autonomy over resource allocation and curriculum and assessment**

Source: OECD, PISA 2012 Database
Box 3. Principals’ perceptions on school quality and autonomy

School resources

The PISA 2012 questionnaire contained 13 items about school resources, measuring the school principal's perceptions of potential factors hindering instruction. Specifically, the principal was asked: “Is your school’s capacity to provide instruction hindered by any of the following issues?” and for each item, four response categories were proposed, namely “Not at all”, “Very little”, “To some extent” and “A lot”.

The index on teacher shortage was derived from four items: “Lack of qualified science teachers”, “Lack of qualified mathematics teachers”, “Lack of qualified language-of-instruction teachers”, “Lack of qualified teachers of other subjects”. Similar items were included in PISA 2000, 2003, 2006 and 2009. The items were not reversed for scaling, as the index measures the extent of teacher shortage.

The index on educational resources was computed on the basis of six items: “Shortage or inadequacy of science laboratory equipment”, “Shortage or inadequacy of instructional materials (e.g. textbooks)”, “Shortage or inadequacy of computers for instruction”, “Lack or inadequacy of Internet connectivity”, “Shortage or inadequacy of computer software for instruction”, “Shortage or inadequacy of library materials”. Similar items were included in PISA 2000 and 2003, while the question format and item wording were modified for PISA 2006 and 2009. In 2012 the items were modified from 2009. All items were reversed for scaling: the higher the index, the better the educational resources in the view of the principal.

The index on the quality of physical infrastructure was calculated on the basis of three items: “Shortage or inadequacy of school buildings and grounds”, “Shortage or inadequacy of heating/cooling and lighting systems”, “Shortage or inadequacy of instructional space (e.g. classrooms)”. Similar items were included in PISA 2000 and 2003, while question format and item wording were modified for PISA 2006 and 2009. In 2012 the items were modified from 2009. All items were reversed for scaling, thus the higher the index, the better quality of physical infrastructure in schools.

School responsibility for resource allocation and for curriculum and assessment

Indices of the relative level of responsibility of school staff in allocating resources and in issues relating to curriculum and assessment were derived from specific items in school principals’ report.
Box 3. Principals’ perceptions on school quality and autonomy (cont.)

The index of responsibility for resource allocation was computed from six items concerning who held considerable responsibility for tasks related to resource allocation (“Selecting teachers for hire”, “Firing teachers”, “Establishing teachers’ starting salaries”, “Determining teachers’ salaries increases”, “Formulating the school budget”, “Deciding on budget allocations within the school”). The index of responsibility for curriculum and assessment was derived from four aspects, namely “Establishing student assessment policies”, “Choosing which textbooks are used”, “Determining course content” and “Deciding which courses are offered”.

Both indices were calculated on the basis of the ratio of “yes” responses for school governing boards, principals or teachers to “yes” responses for regional/local education authorities or national educational authorities. Higher values on the scale indicated relatively higher levels of school responsibility in this area. The index was standardised to have an OECD mean of 0 and a standard deviation of 1 for the pooled data set, with equally weighted country samples.


The allocation of educational resources to students and schools

The quality of educational resources is strongly correlated to the socio-economic characteristics of students in Latin America. On average, disadvantaged students are enrolled in schools with lower quality educational resources. This is true in all the countries in Figure 32 (except Korea), but correlations are significantly higher in Latin American countries. Among Ibero-American countries, Peru has the highest correlation (0.36), indicating that socio-economically disadvantaged students are more likely to be enrolled in a school where the quality of educational resources is low. The index of quality of educational resources measures school principals’ perceptions of potential factors hindering instruction at their school. These factors may include shortages or inadequacies of science laboratory equipment, instructional materials, computers, Internet connectivity and software, or library materials. Higher values on this index indicate better quality of educational resources. Conversely, in Spain, the correlation is low (0.04), indicating that a student’s socio-economic context will not have an impact on the type of school in which the student is enrolled in or the quality of the learning environment.
In terms of the allocation of teachers, disadvantaged schools receive more teachers per student but the quality of teachers varies across countries. In OECD countries, disadvantaged schools typically have more teachers per student (the student-teacher ratio is 10.5% lower than in advantaged schools), but they also have fewer qualified teachers (the proportion of qualified teachers is 8% lower). Disadvantaged schools in most Ibero-American countries also benefit from more teachers per student. In Costa Rica, these schools have twice as many teachers per student as advantaged schools, for example (Figure 33). Schools with low socio-economic profiles also receive more teachers per student in Portugal, Peru, Spain, Mexico, Argentina and Chile. In Brazil and Uruguay the opposite is true: disadvantaged schools have more students per teacher. The proportion of qualified teachers is not substantially different between disadvantaged and advantaged schools in many cases. However, Portugal is a notable exception, with 30% more qualified teachers in disadvantaged schools. Conversely, in Uruguay and Argentina, the proportion of qualified teachers is more than 30% higher in advantaged schools.
Figure 33. Differences in teacher quality and quantity by schools’ socio-economic profile (advantaged - disadvantaged), 2012

Advantaged schools have fewer students per teacher and a higher proportion of qualified teachers than disadvantaged schools.

Advantaged schools have more students per teacher and a lower proportion of qualified teachers than disadvantaged schools.

Note: Differences in resources between students in advantaged and disadvantaged schools that are statistically significant are marked in a darker tone.

Source: OECD, PISA 2012 Database

The positive relationship between the socio-economic profile of a school and the quality of its educational resources has decreased over time. While schools in the top quarter of the socio-economic profile index still had better educational resources than schools in the bottom quarter in 2012, the difference is generally smaller than it was in 2006 (Figure 34). The reduction in the relative advantage of better-off schools has been particularly large in Brazil and Uruguay, where the difference decreased respectively by 0.6 and 0.8 points. In Argentina, Colombia and Mexico, the advantage of schools with a high socio-economic profile increased between 2006 and 2009 and then decreased substantially. This improvement in the allocation of educational resources might partly explain the narrowing in the dispersion of performance in Latin American countries over the period.
Similarly, low performers have benefited more from improvements in physical infrastructure. In the vast majority of Ibero-American countries, the average index of adequacy of schools’ physical infrastructure has increased faster for the students who scored in the bottom quarter at the mathematics assessment (Figure 35). The improvement for low performers has been particularly strong in Brazil, Argentina and Chile. One exception is Colombia, where the index of physical infrastructure decreased for both weak and strong performers, although the decrease is more pronounced for the latter. Altogether the findings suggest that policies aiming at improving schools’ material resources improved equity and efficiency by targeting in priority disadvantaged and less-skilled students.

To the extent that the improvement in performance between 2006 and 2012 observed in many Ibero-American countries is largely due to improvements at the bottom of the distribution, it seems that these policies were relatively successful. As the following paragraphs will detail, however, the link between better material resources and performance is not straightforward.
Differences in performance among cities, towns and rural areas partly reflect differences in the quality of schools. The index of school resources indicates large heterogeneity across school location, despite an overall very low level in Latin American countries (Figure 36). The index of school resources is consistently higher in more urbanised areas. The index for schools in cities ranges from 1.1 in Colombia to 0.5 in Uruguay in cities; for schools in rural areas it ranges from 2 in Peru to 0.5 in Uruguay. Schools in rural areas and small towns might experience difficulties in accessing good educational resources, and teachers in particular. Thus, policies aiming to ensure equitable spatial attribution or resources might be effective in tackling inequity.

In the case of Portugal, the good physical infrastructure of rural schools can partly explain their good performance in comparison with more urban schools once ESCS is taken into account. Portugal is special in that its schools located in rural areas have better resources than schools in towns or cities (Figure 36). Rural schools also benefit from a better disciplinary climate. These two striking findings are in line with the unusually good performance observed for these schools in Figure 26 (above).
School segregation, private schooling and performance

In Latin American countries, the lack of social inclusion contributes to the low equity observed in terms of education outcomes for students from different socio-economic backgrounds. The Social Inclusion Index is measured as the percentage of the total variation of student socio-economic status found within schools. It indicates the degree to which students with different socio-economic status attend the same school or the degree to which different schools have different socio-economic profiles. The index is similar in Spain and the OECD on average, at slightly more than 75%. Compared to this average, the index is surprisingly low in Portugal (69%). It is much lower in Chile (47%), and Peru and Mexico (around 55%) (Figure 37). While social inclusion remained stable between 2003 and 2012 in Spain and the OECD on average, it decreased by 8 percentage points in Portugal and Uruguay and by 5 percentage points in Mexico. Increasing social inclusion in a school system – thus reducing socio-economic segregation – has been suggested as the most effective policy for improving equity in both the short and long term, a policy far more effective than creating magnet schools or offering school choice (OECD, 2013c).
The importance of private schooling in some Ibero-American countries contributes to school segregation by allowing the sorting of students by socio-economic status. The share of independent private schools ranges from 4% in Portugal to 17% in Uruguay. Private schools under government supervision are not common in most Ibero-American countries, except Spain, Argentina and Chile, where they represent respectively 24%, 26% and 48% of schools. The distribution of school type by top (advantaged) and bottom (disadvantaged) quarter of the schools’ socio-economic background reveals that private schools are hardly represented at all among the disadvantaged schools (Figure 38). The only sizeable exception is Chile, where a large share of schools are privately run and 32% of disadvantaged schools are private schools under government supervision. On the contrary, more than half of the advantaged schools are private schools in most countries. In Chile, Peru, Uruguay, Brazil and Chile, private independent schools account for close to or more than 50% of disadvantaged schools. Shockingly, in Chile public schools represent only 5% of advantaged schools.
Private schools have systematically better material and human resources than public schools. The lack of adequate physical infrastructure and educational resources is heavily concentrated among public schools in Ibero-American countries. Latin American countries exhibit the largest gaps between private and public schools (Figure 39). Such differences are not observed in the group of comparison countries except in Thailand. The indices of adequacy of material resources are actually often higher in Latin American private schools than in the average OECD private schools. The shortage of teachers also touches mainly public schools in Latin American countries. However, the differences are less striking than for material resources and are only significant for Brazil, Uruguay, Mexico, Peru and Chile (Figure 39).
However, the differences in performance between private and public schools are only marginally explained by material resources. The association between performance in mathematics and a one-unit increase in the index of physical infrastructure ranges from around 2 points in Peru to 14 points in Uruguay among Ibero-American countries (Figure 40). The effect of physical infrastructure on performance is statistically significant only in Uruguay, Argentina, Chile and Brazil. These are precisely the countries for which, as mentioned above, the improvements in terms of physical infrastructure were greatest among low-performers, and Brazil and Argentina are also the countries in which the performance among the weakest students has improved the most. These combined observations reinforce the idea that the provision of better physical infrastructure for the students at the bottom of the score distribution improved their performance. However, once the schools’ socio-economic status is accounted for, the effect of physical infrastructure on performance becomes small and insignificant in all Ibero-American countries but Uruguay. The conclusions are similar for the association between educational resources and mathematics performance. These results should be interpreted with caution and do not indicate an absence of a causal relationship between material resources and student achievement. They indicate that the association between the socio-economic status of a school and performance prevails over its material resources – in other words, that the socio-economic status of a school is driving the quality.
of material resources and its effect on performance. In Korea, for example, better material resources are allocated to more disadvantaged schools.

Figure 40. Effect on mathematics performance of a one-unit increase in the index of physical infrastructure

![Graph showing the effect on mathematics performance of a one-unit increase in the index of physical infrastructure. The x-axis represents the index of physical infrastructure, with bars indicating performance before and after controlling for schools' ESCS and educational resources. Darker bars indicate a significantly different effect on mathematics performance from 0.]

Note: Darker bars indicate that the effect on mathematics performance is significantly different from 0.

Source: OECD, PISA 2012 database

Thus, despite better resources, private schools do not perform better than public schools in general. Once differences in the socio-economic background of students and schools are taken into account (Figure 41), the difference in performance between private and public schools is no longer significant and even becomes positive for most Ibero-American countries (OECD/CAF/ECLAC, 2014). However, in Brazil, Argentina and Spain, private schools keep performing better once students’ and schools’ ESCS are taken into account, while the opposite is true in Uruguay.

Although the importance of physical infrastructure in educational outcomes, in particular at very low levels, should not be underestimated, these results suggest that private schools’ high apparent performance in the region relies almost exclusively on their ability to attract better off students. In so doing, they can afford better material educational resources but more importantly they also regroup better performers. This in turn is also likely to improve the classroom interactions and the learning environment. These important determinants of students’ achievement are discussed in the next section.
Learning environment and education outcomes

The quality of an education system crucially depends on its ability to guarantee and promote an adequate learning environment. This section analyses the contribution of various elements – learning time, the school climate and student motivation and relations with teachers – to the level and the evolution of performance in Ibero-American countries.

Latin American students spend relatively long amounts of time learning in school, as well as after school. In most Ibero-American schools, the length of mathematics lessons is close to or higher than in OECD countries, where the average is 218 minutes a week. Students in Spain, Brazil and Costa Rica spend around 210 minutes a week in mathematics lessons, compared to 253 minutes in Mexico and up to 288 minutes in Portugal (top graph, Figure 42). With almost 400 minutes of mathematics per week, Chile has the longest learning time in school in PISA 2012. Uruguayan students, in contrast, spend only 155 minutes a week learning mathematics. The duration of mathematics lessons is strongly correlated to the time spent learning other subjects such as
as languages or science. It does not reflect the preferences of a country for a specific type of knowledge but rather the total time spent learning during a week. In terms of after-school learning, Latin American students spend 260 minutes a week on homework on average, not substantially different from 290 minutes in OECD countries (bottom graph, Figure 42). However, they work more often with a personal tutor or a parent and spend almost twice as much time (66 minutes, against 37 in OECD countries) attending after-school classes paid for by parents.

Figure 42. Students’ learning time in school and after school (minutes per week)

Source: OECD, PISA 2012 database
However, learning time has an ambiguous effect on performance in Ibero-American countries. The time that students spend in regular school lessons is positively correlated to performance both within and across countries (OECD, 2011). In general, countries or students with longer average learning time in regular school lessons tend to achieve higher scores. This positive link does not hold at the country level in Ibero-America but after controlling for the socio-economic status of students and schools, there is a strong positive correlation between learning time in regular school lessons and performance at the student level. However, the time students spend in out-of-school-time lessons and the time spent in individual study are both negatively related to performance (OECD, 2011). The effect of the overall learning time is therefore ambiguous. In a recent study, Cabrera-Hernandez (2015) reveals that an increase in the length of school time in Mexican primary schools in 2007 had substantial effects (0.11 standard deviation) on mathematics and Spanish tests scores, with larger effects for low performers. These results suggest that if Ibero-American countries are willing to increase learning time, they should support time spent in regular lessons.

However, Ibero-American students are also more likely to be late and skip classes than students in OECD countries and other emerging economies, and this is detrimental to the study environment and, in practice, translates into fewer hours of quality learning time. Around 47% of Latin American students arrived late at least once in the two weeks preceding their PISA assessment, while this was the case for only 35% of students in OECD countries on average. Brazil, Spain, Colombia and Mexico are close to the OECD average, with less than 40% of students arriving late, while the proportion ranges from 47% in Argentina to 59% in Uruguay (Figure 43). Late arrival at school is consistently less frequent in Asian and Eastern Europe economies with GDP per capita levels comparable to Ibero-American countries. The share of students who reported skipping class exceeds 40% in Argentina and Costa Rica, but is below 20% in Brazil, Colombia, Peru and Chile (Figure 43).

Student truancy affects all students in the classroom. In Latin America, around 75% of students attend schools where more than 25% of students arrived late at least once in the two weeks before the PISA assessment; in Uruguay, Costa Rica, Portugal, Chile, Peru and Argentina, half the students attend schools where this was the case for more than 50% of students. Truancy affects students either directly, because it disturbs classes and
reduces effective learning time, or indirectly through its impact on teacher behaviour, teacher-student relations and the disciplinary climate over the year. PISA 2012 results reveal that schools with more truancy have a lower index of teacher-student relations as well as a poor disciplinary climate (OECD, 2013d and f).

Figure 43. Tardiness and truancy among students (%)

| Source: OECD, PISA 2012 Database |

Ibero-American countries are not particularly more affected by school absenteeism than other countries. Although arriving late does reduce the effective time spent learning, looking at the percentage of students who skipped a whole day of classes may better approximate the actual time students spend in class. As shown in Figure 44, Ibero-American students do not display systematically higher levels of absenteeism, but rather are present across the ranking. Still more interesting, absenteeism does not seem to be correlated with performance. Countries with very poor levels of performance, like Colombia, present levels of absenteeism similar to high-
performing countries, such as Korea. In the same way, even though Spain is, after Portugal, the best performer among all Ibero-American countries, it has one of the highest percentages of students who reported skipping one or more days of school.

Figure 44. Percentage of students who skipped days of schools in the two weeks before PISA

Disadvantaged students are more likely to arrive late at school, to skip classes or school days. The percentage of students arriving late is always lower among students at the top quarter of the ESCS, and the difference is significant for most countries in Ibero-America. They also tend to skip more days of school than students from a higher socio-economic status (Figure 45). However, the difference is significant only for Chile, Peru, Portugal, Uruguay and Spain among Ibero-American countries.
While the actual time spent learning matters, the quality or intensity of learning time is also crucial. Truancy mainly impacts the amount of time spent learning in school. A sufficient amount of time is a necessary condition to perform well, but so is the quality of the learning environment in the classroom. A good disciplinary climate, high motivation among students and constructive teacher-student relations would improve learning and translate into better performance.

According to students, the disciplinary climate and teacher-student relations are not particularly low in Ibero-American countries. The index of teacher-student relations is not significantly lower than the OECD average in most Ibero-American countries. Indeed, Spain and Portugal have better teacher-student relations than the average for OECD countries, and the indices for Costa Rica, Brazil, Peru and Mexico are not substantially lower (Figure 46). The same is true concerning the school index of disciplinary climate. Even if Ibero-American countries, with the exception of Spain and Uruguay, rank below the OECD average, their level is not very different from the level of other countries in the sample (Figure 46). Again, there does not seem to be a
correlation between the level of performance and the disciplinary climate in the school, given that the disciplinary climate in high performing countries, such as Korea, is very similar to the climate among low-performers, such as Brazil or Costa Rica.

Figure 46. School climate

Source: OECD, PISA 2012 database

The link between school climate and performance in mathematics is particularly weak in Ibero-American countries. In comparison with other countries in the sample, a one-unit increase in disciplinary climate (Figure 47, Panel A) or teacher-student relations (Figure 47, Panel B) is not associated with a substantial effect on mathematics performance. An increase in disciplinary climate is significant for Argentina, Mexico, Uruguay and Brazil, but the intensity of the association is relatively low compared to the OECD average. Surprisingly, improvements in teacher-student relations are negatively associated with mathematics performance, suggesting the existence of a trade-off between students’ sympathy for their teachers and optimal student-teacher relations in terms of learning. In any case, the correlation is not statistically significant or is of low magnitude for most Ibero-American countries. Thus, despite the relatively poor levels of student-teacher relations and disciplinary climate, these variables explain little and less than in other countries about the performance of students in mathematics.
Figure 47. Relation between school climate and mathematics performance

Panel A. Change in maths performance associated with a one-unit increase in the school index of disciplinary climate

Panel B. Change in maths performance associated with a one-unit increase in the school index of teacher-student relations

Note: Coefficients significantly different from 0 are reported in dark blue.
Source: OECD, PISA 2012 database

Figure 48. Differences in the index of disciplinary climate, by schools’ socio-economic profile

Source: OECD, PISA 2012 database
There are few differences in terms of disciplinary climate between advantaged and disadvantaged schools in Ibero-America. This difference is not only close to zero, it is also generally smaller than in the other countries of the sample (Figure 48). Thus, contrary to the other countries, the relatively poor levels of discipline observed among Ibero-American countries does not seem to be related to the specific socio-economic characteristics of schools but rather a feature common to all schools in the region.

Box 4. Students’ perceptions on teachers and school

The PISA 2012 student questionnaire contained items about the students’ disposition, behaviour and self-beliefs toward mathematics, teachers and school in general.

The index measuring mathematics anxiety was computed on the basis of five items that were also used in PISA 2003. Students were asked: “Thinking about studying mathematics: to what extent do you agree with the following statements?”, with the response categories “strongly agree”, “agree”, “disagree” and “strongly disagree”. The items were the following: “I often worry that it will be difficult for me in mathematics classes”, “I get very tense when I have to do mathematics homework”, “I get very nervous doing mathematics problems”, “I feel helpless when doing a mathematics problem”, “I worry that I will get poor grades in mathematics”. All items were reversed, so that higher perceived difficulty corresponds to a higher level of anxiety.

For the index of perseverance, each student was asked “How well does each of the following statements below describe you?”, and the statements were: “When confronted with a problem, I give up easily”, “I put off difficult problems”, “I remain interested in the tasks that I start”, “I continue working on tasks until everything is perfect”, “When confronted with a problem, I do more than what is expected of me”. The student questionnaire had five response categories, namely “Very much like me”, “Mostly like me”, “Somewhat like me”, “Not much like me” and “Not at all like me”. The last three items were reversed.

The index on disciplinary climate in the classroom is based on students’ perceptions on how often certain things occur during mathematics lessons. The five items were: “Students don’t listen to what the teacher says”, “There is noise and disorder”, “The teacher has to wait a long time for students to quiet down”, “Students cannot work well”, “Students don’t start working for a long time after the lesson begins”; the four response categories were: “Every lesson”, “Most lessons”, “Some lessons”, “Never or hardly ever”.

Five items on teacher-student relations were included in the student questionnaire, namely “Students get along well with most teachers”, “Most teachers are interested in students’ well-being”, “Most of my teachers really listen to what I have to say”, “If I need extra help, I will receive it from my teachers”, “Most of my teachers treat me fairly”. This scale provides information on student perceptions of their teachers’ interest in student performance. There are four response categories: “Strongly agree”, “Agree”, “Disagree”, “Strongly disagree”. All items were reversed.

Despite their low performance, Ibero-American students display higher levels of motivation than students in other countries. When asked whether they enjoy reading about mathematics or if they are interested in the things they learn in mathematics, the share of Latin American students who answer affirmatively is higher than the OECD average and than in Eastern European countries (Figure 49). However, motivation seems to be negatively correlated with performance in mathematics and may rather indicate that the level of mathematics taught to Ibero-American students is not very challenging. Another potential explanation is that students have difficulty estimating their actual level in mathematics. The latter explanation is, however, less plausible given that, as noted in the 2014 Latin American Outlook (OECD/CAF/ECLAC, 2014), when asked about their ability to resolve certain specific tasks (such as calculating a car’s fuel consumption or the savings on a television with a 30% discount), Latin American students report lower levels of self-confidence than the average in OECD countries and seem therefore conscious of their weaknesses.

Figure 49. Students’ motivation towards mathematics

Source: OECD, PISA 2012 database
Overall, even though Ibero-American schools have poor levels of disciplinary climate and student-teacher relations, these levels remain comparable to those of similar countries that score higher in the PISA test. Moreover, there are no significant differences within countries between advantaged and disadvantaged schools. In addition, student motivation seems to be quite high, something unexpected given students’ poor performance. Thus it seems that intangible factors related to the class environment are unable to explain the low performance of Ibero-American countries in PISA.
This final chapter seeks to address the skills challenges individuals may face on the labour market in light of the analysis of Ibero-American educational systems based on the PISA results. Low proficiency in Latin American countries is likely to translate into skills shortages as well as vertical and horizontal mismatches on the labour market. The high proportion of students below a basic level of proficiency constitutes an obstacle to the development of more specific skills, especially technical skills. Moreover, the tiny proportion of top performers may hinder innovation and entrepreneurship. The improvements at the bottom of the performance distribution in PISA will have at best limited effects on the labour market, as the share of students with the basic level of proficiency did not increase substantially. The chapter also analyses the potential contribution of TVET and ICT use to narrow the skills gaps on the labour market. TVET appears particularly promising in Latin American countries, where disadvantaged students appear to be more successful in technical and vocational courses than in general courses. While ICT use at home is positively related to students’ problem-solving performance, the effect of ICT use in schools is ambiguous and depends on the way it is integrated into the curriculum.
In a fast changing, knowledge-based and globalised economy, skills challenges are particularly relevant to Ibero-American countries, which are facing severe economic conditions, although Latin America is affected in different ways than Spain and Portugal.

Most Latin American countries are caught in a middle-income trap, and the few countries that managed to escape, like Chile and Uruguay, still have income levels below the OECD average and relatively slow growth rates compared to other emerging economies. A fundamental cause of the middle-income trap is the inability to move towards a more knowledge-based and skills-based economic model (OECD/CAF/ECLAC, 2014). Although Latin American countries have accumulated more human capital in recent decades, the quality, complexity and diversity of available skills must still improve. Latin American countries are also directly confronted with the consequences of the shift in supply and demand of skills due to the entry of large emerging countries into the global economy. The subsequent increase in demand for commodities acted as a disincentive for high-skills investment in Latin America (OECD/CAF/ECLAC, 2014). Indeed, as commodity sectors – which do not require highly qualified workers – expanded, the demand for high skills decreased and therefore workers' incentives to acquire better skills also decreased. In parallel, this shift in wealth also translated into a large positive shock on the global labour supply of low- and middle-skilled individuals.

The wave of technological innovation that occurred in the past few decades has affected all Ibero-American countries. It has fostered demand for skills acquired through higher qualifications but also decreased the relative demand for less-skilled workers involved in routine tasks, who were partly replaced by machines (OECD et al., 2014).

Among rich economies, Spain and Portugal were severely hit by the financial crisis and the structural adjustments that followed. They belong to the five OECD countries where poverty has recorded the largest increase (OECD, 2014b and c). The most important driver of poverty was the large rise in unemployment, which particularly affected young people. Given the tightened public budget and the little room left for fiscal stimulus, engaging in structural reforms to improve education and skills development is key to boosting productivity, but also addressing youth unemployment and inequalities.
This chapter seeks to put in perspective the analysis of the performance of Ibero-American educational systems based on the PISA results in light of the skills challenge individuals may face on the labour market.

Figure 50. Mean mathematics scores in PSIA 2006 and numeracy scores in the Survey of Adult Skills 2012, 20-22 year olds

![Figure 50: Mean mathematics scores in PSIA 2006 and numeracy scores in the Survey of Adult Skills 2012, 20-22 year olds](image)

Source: OECD, PISA 2012 Database

The implications of students’ performance in skills acquisition

PISA performance in mathematics is correlated with job-relevant numeracy skills. The results from the Survey of Adult Skills (PIAAC) 2012 show that the countries performing well in PISA tend to display a relatively high performance in PIAAC and vice versa. Figure 50 reveals the correlation between mean mathematics scores in PISA 2006 and numeracy scores in the Survey of Adult Skills 2012 among people aged 20-22 who had finished education and training. The data suggest that the students’ performance in PISA will be at least partly reflected in their acquisition of job-related skills later in life. Part of the effect will transit through the ability to pursue further education, the quality of post-secondary training in the different countries, and also the specialisation chosen. A study in Canada, which followed the students tested
in PISA for 10 years, shows that having solid foundations in the type of skills measured by PISA has a strong positive effect on the students’ advancement in post-compulsory education and reduce dropouts (OECD, 2010a).

The high shortage of skills in Latin American economies suggests that horizontal and vertical skills mismatches are of major concern in the region. The share of firms identifying an inadequately educated workforce as a major constraint is strikingly high in Latin American countries. Around 36% of firms are affected, compared to 22% in Sub-Saharan Africa and only 15% in OECD countries (Figure 51). Given the intermediary level of development of Latin American economies, the inadequacy of the workforce probably arises both from the insufficient level of skills of the active population (vertical skills mismatch) and the gap between the type skills available and the need of the labour market (horizontal skills mismatch). The rest of the chapter analyses the PISA results within these two dimensions.

![Figure 51. Percentage of firms identifying an inadequately educated workforce as a major constraint](image)

Source: Enterprise Surveys (2012), World Bank, Washington DC.

The large share of low performers constitutes a major drawback for Latin American countries in efforts to overcome the lack of job-relevant skills. As mentioned above (Figure 3), more than 50% of students do not acquire basic skills in secondary education. These students will face great difficulties in acquiring any type of skills in the future (OECD, 2016). In particular, these students may not even possess sufficient levels in reading and numeracy to be oriented efficiently towards existing technical training. Yet technical vocational education and training (TVET) represents a promising opportunity in Latin America to ensure that education is geared towards employment in a context of high skills mismatches (OECD et al., 2014).

Similarly, the lack of top performers in Latin American countries may constitute a constraint. While equity should remain a priority for Latin American countries, top performers have a strategic role to play in modernising the structure of the economy, triggering innovations and
fostering entrepreneurship. In Latin American countries, less than 1% of students reach proficiency levels 5 or 6 in the mathematics scale, while more than 12% of students are top performers on average in OECD countries. This is all the more surprising in that social segregation is remarkably high in Latin American countries, which would a priori suggest the emergence of top performers from the elite. Ensuring that a critical mass of top performers is trained in the secondary education system may become a strategic objective in these countries.

Vertical skills mismatch will remain an issue in the short run. The evolution of the share of students by performance level across PISA assessments reveals that the share of students with basic skills did not improve substantially (Figure 52). The reason is essentially that, given the low starting level of Latin American students, the improvements at the bottom of the PISA score distribution translated mainly as a flow of students from below level 1 to level 1. The share of students at level 2, considered the level at which students have acquired basic skills in mathematics, did not rise substantially in most countries. This is particularly striking in the case of Argentina and Colombia, where the share of students at level 5 or 6 decreased simultaneously. In Uruguay, the share of students at low levels of performance increased at the expense of top performers, while in Portugal the exact opposite happened.

Figure 52. Evolution of the distribution of students by level of performance between 2006 and 2012

Source: OECD, PISA 2012 database
The potential of technical and vocational studies in Ibero-America

Ibero-American countries are very heterogeneous in terms of the development of technical and vocational studies. In 2012, the share of students enrolled in vocational (or pre-vocational) studies at age 15 ranged from 0% in Peru and Brazil to 25% in Mexico and Colombia (Figure 53). The differences should be interpreted with caution, as the starting age of TVET varies across countries. In addition, the starting age is close to 15 in many countries, so that differences in enrolment may reflect differences in the share of repeaters who may not have had the opportunity to begin this type of studies. Nevertheless, in Colombia, Mexico, Portugal, Argentina and, to some extent, Costa Rica, the opportunity to join TVET is offered to a relatively large share of 15 year olds, while this is not the case among the remaining Ibero-American countries. Colombia, Portugal and Argentina have substantially developed TVET studies. The share 15 year olds enrolled in technical training decreased dramatically in Uruguay, from 13% in 2006 to 2.7% in 2012. Mexico also experienced a decrease of 10 percentage points, although it started from a very high share of students enrolled in TVET. The situation remained quite stable in other countries across PISA assessments. The structure and needs of Latin American economies suggest that TVET
studies could start earlier in the education cycles. Given the relatively large number of small businesses in Portugal and Spain, they could also benefit substantially from the development of a strong TVET system. Both countries have actually launched promising reforms in this direction.

Figure 54. Impact of general versus other schools, controlling for gender and age of students

![Figure 54](image)

Source: OECD, PISA 2012 database

In Latin American countries, socio-economically disadvantaged students tend to perform better in vocational schools than in general schools. In comparison countries, students enrolled in general schools largely outperform the students enrolled in vocational (or pre-vocational) schools, irrespective of socio-economic status (Figure 54). On the contrary, differences in performance are much lower in most Latin American countries (Avendaño et al., forthcoming). Moreover, students from disadvantaged backgrounds tend to perform better in vocational schools than in general schools in most Latin American countries, even if the difference is not higher than 20 points in Argentina and Colombia and is not statistically significant in Mexico and Costa Rica. Therefore orientation toward vocational training may be an interesting option for socio-economically disadvantaged students in the region. To account for potential composition and selection effects, the
comparison was restricted to students who never repeated a grade. Since the grade at which students start vocational courses often coincides with age 15, repeaters are de facto excluded from vocational courses in the analysis, leading to a strong selection effect. Another potential issue would arise from a strong selection of boys in vocational studies given that they outperform girls in mathematics. However, enrolment in vocational studies appears to be gender balanced. The results should nevertheless be interpreted with caution, since other types of selection may take place. In Latin American countries, the potential of TVET studies may hold all the more promise, as employers say they have difficulties finding employees with technical skills (OECD et al., 2014).

Problem solving and ICT use in some Ibero-American countries

Accompanying the wave of technological change in recent decades, computer literacy has become part of the set of skills that students should master to increase their employment possibilities. The use of information and communication technologies (ICT) in schools is supposed to familiarise students with computer use, especially for those who do not have access to this technology at home.

ICT use in schools has an ambiguous effect on problem-solving performance. As expected, the students who use ICT at home perform better in a computer-based assessment of problem solving. Among the few Ibero-American countries that implemented this test (Spain, Portugal, Chile and Uruguay), the performance gap in favour of students who used ICT at home reaches 60 score points in PISA 2012 (Panel A, Figure 55). The performance gap is relatively stable across countries, and not substantially larger in OECD countries on average as compared to Ibero-American countries. Once the socio-economic profile of the students is taken into account, the performance gap narrows to 21 score points in Chile and Uruguay, 31 in Portugal and 37 in Spain, compared to 39 score points in the OECD on average. While this suggests that providing access to ICT would help students in problem solving, Panel B of Figure 55 reveals that ICT use in school has an ambiguous effect on problem solving. Indeed, ICT use in school is positively correlated with problem solving in Spain, Slovenia and Turkey, but strongly negatively correlated in Portugal and Uruguay, for example. As a result, ICT use in school does not appear to be correlated with performance in problem solving for the OECD countries as a whole. In a recent study, Falck et al. (2015) suggest
that the null effect of computer classes can be explained by a combination of positive and negative effects. The positive effect arises when computing devices substitute for not very effective teaching methods. The negative effect comes when effective teaching methods are replaced by not as efficient computer learning. This in turn would suggest that countries such as Spain or Slovenia engage in an effective use of ICT in schools, while this is not the case in Uruguay and Portugal.

Figure 55. Performance gap in problem solving for students who use ICT at home and at school

Panel A. Performance gap in problem solving for students who use ICT at home (2012)

Panel B. Performance gap in problem solving for students who use ICT in schools (2012)

Source: OECD, PISA 2012 Database
6. Conclusion and policy recommendations
Analysis of the PISA 2012 results revealed the various challenges faced by Ibero-American countries in terms of the performance, equity and efficiency of their education systems and provided some insight on potential implications in terms of providing the relevant skills for labour-market needs. This section summarises the main findings of the report and provides useful policy directions that could enhance the quality of Ibero-American education systems. It also discusses the implications in terms of skills accumulation on the labour market.

The performance of Latin American countries in PISA 2012 represents a serious concern for the region. Not only do most countries register low results compared to OECD countries such as Spain and Portugal, but they also perform poorly compared to other emerging economies, in particular in Southeast Asia. This conclusion holds for all three subjects assessed in PISA 2012: mathematics, reading and science. The results of Latin American countries are even more worrying than a substantial proportion of 15-year-old are out of school. In terms of proficiency levels, this translates into more than 50% of Latin American students not acquiring a basic level of competencies and very few students performing very well.

The results of Latin American countries reveal the lack of efficiency of their education systems. Latin American countries tend to perform worse than their Asian counterparts even after controlling for the level of GDP per capita or the cumulative level of expenditure on education for students aged 6 to 15. The very high level of grade repetition, together with high levels of school truancy, signals the inefficiency of Latin American education systems. Yet the most prominent aspect of this lack of efficiency lies in the misallocation of educational resources across schools and students, which relates to equity issues discussed in detail below.

Although Spain and Portugal perform relatively well in PISA 2012, issues of quality and efficiency should not be overlooked. Spain and Portugal perform close to the OECD average in PISA 2012. Moreover, taking account of GDP per capita or socio-economic background at the country level tends to improve their relative performance. Nevertheless, they still lag behind when compared with Korea, Japan, Slovenia or Poland, which have similar levels of expenditure per student. This suggests that Spain and Portugal have some room for increasing the efficiency of human and financial resources within their respective education systems.
Lack of equity also remains a major challenge in Latin-American education systems, which are still characterised by strong socio-economic determinism. The strength of the relation between the socio-economic status of the students and their performance is much higher than in the OECD on average. The relative performance of students from poor families, with less educated parents and less access to books, compared to better-off students is significantly worse than among students in the same position in other regions of the world. Latin American countries are also subject to strong spatial inequalities. Even after controlling for socio-economic background, students attending schools in rural areas or small towns perform significantly worse than students attending school in cities. In addition, the gender gap in favour of boys in mathematics performance remains significantly higher than the OECD average for many Latin American countries.

Unequal repartition of educational resources across schools contributes to the lack of equity. In Latin American countries, the quality of the schools’ educational resources is strongly correlated with the socio-economic status of the students. Students with low socio-economic status also face the hurdle of attending schools with deteriorated infrastructures or less qualified teachers. The fact that social inclusion is particularly low contributes all the more to inequalities. The relatively large private schooling sector plays a role here by allowing the students from higher socio-economic backgrounds to regroup in these schools. The correlation between socio-economic status and quality of schools is much lower in Spain and Portugal. However, social inclusion is also particularly low in Portugal in comparison with OECD countries.

Most Ibero-American countries have experienced significant improvements in performance across PISA assessments. The overall dynamics of mathematics performance in Ibero-American countries is promising. Most of the countries have improved their performance at a faster rate than the OECD average. This increase was particularly high in Brazil, Mexico and Portugal. The increases in achievement are all the more remarkable in Latin American countries in that, over the same time period, enrolment rates at the primary and secondary levels have greatly increased (OECD/CAF/ECLAC, 2014).

Latin American countries have also succeeded in reducing inequalities in student achievement in mathematics. The performance gap between low and top performers continuously narrowed in most Ibero-American countries between the 2003 and 2012 PISA assessments. Indeed, most of the improvements in performance at the country level can be attributed to the increase in achievement of low performers. Similarly, the students from low socio-economic backgrounds improved faster than the students from a high socio-economic background, leading to more equitable education.
However, the gap in mathematics performance between top and low performers did not narrow in Spain and Portugal. Between 2003 and 2012, the performance of Spanish students remained stable across the distribution of PISA scores. On the contrary, Portugal experienced large improvements for all students. Yet, the improvement of performance in Portugal simultaneously triggered higher inequalities, as top achievers improved faster than low achievers.

Ibero-American countries have increased the quantity and the quality of educational resources, particularly in favour of disadvantaged schools. Government expenditure per student in secondary schools grew in most Ibero-American countries between 2003 and 2012. This resulted in an increase in the quantity and the quality of educational resources. Governments also were successful in funnelling the resources in priority to disadvantaged schools, for which the quality of physical infrastructure and the share of teachers holding a university degree increased faster.

Based on the main educational challenges presented above, the following section provides policy recommendations building on the experience of countries that have been successful in improving in PISA. The set of policies and programmes considered encompasses a large spectrum of measures, which are not limited to secondary education but relate to the entire education system. Yet the recommendations detailed in this section mainly aim at improving student achievement and enhancing the equity of education systems. Ensuring that students attain high proficiency in mathematics, reading and science constitutes an important step toward acquiring the skills needed on the labour market. Further guidance on how to better equip the students with skills relevant to the labour market is discussed at the end of the section. The successful countries from which good practices are taken include four Ibero-American countries – Brazil, Mexico, Colombia and Mexico – along with Turkey, Poland and Korea. While the recommendations are primarily intended to inspire countries that are less successful in PISA, all countries still face important educational challenges and can learn from other emerging economies.

The overall structure of the reforms undertaken in these countries follows a similar pattern, although the specificities of implementation vary by country. The architecture of educational reform is surprisingly similar across countries: following an increase in educational expenditure, accurate information systems were developed, which in turn favoured a better allocation of funding and improved management of educational resources. In parallel, reforms of school practices and curricula were undertaken together with measures aiming at improving the quality of teachers. While the policy recommendations follow the same structure, they present different options available to policy makers when designing the various programmes.
Increase educational expenditure at all levels of education to support increased education coverage while improving the schooling environment. While most Latin American governments have raised the level of public spending allocated to the different levels of education in the last two decades, expenditure remains low in comparison to OECD countries. At low levels of spending per student, an increase in spending is positively correlated with performance. The progress of educational expenditure should not only match the rapid increase in enrolment at the secondary level but also cover the expansion of pre-primary schooling and enhance the overall schooling environment. The impressive progress of Brazil in PISA assessments was also made possible by substantial financial efforts. Brazil’s spending per student in secondary education as a percentage of GDP per capita rose from 10% in 2002 (similar to Peru) to around 25% in 2012, close to the level of Spain.

Invest in pre-primary schooling to foster better knowledge acquisition later on. The poor PISA performance of 15-year-old Latin American students originates at an early stage of schooling. Exam results show that Latin American primary-school children have a poor understanding of concepts and domain-specific knowledge and have poorly developed cognitive processes (OECD/CAF/ECLAC, 2014). Attending pre-primary schooling has been shown not only to have positive effects on retention in the school system and on knowledge acquisition in later grades, but to have also long-lasting effects on skills development and labour market outcomes (Heckman, 2006). Investing in pre-primary education is all the more worthwhile in that it offers greater returns than other education levels while the opportunity costs are very low. To maximise the benefits of early-childhood education, policies need to extend beyond enrolment rates and seek to train staff to develop cognitive and also non-cognitive factors.

Implement an exhaustive information system on schools, students and teachers in order to monitor the allocation of resources and improve targeting. The creation and maintenance of a well-functioning exhaustive information system constituted the cornerstone of the educational reforms undertaken in the successful countries mentioned earlier. This tool is essential to the piloting of educational reforms as it provides the information needed to oversee and allocate financial, human, material and pedagogical resources to local governments, schools, students and teachers, based on objective pre-defined criteria. This system should include information on the infrastructure, equipment, resources and practices of public and private schools, and on the characteristics of teachers and students. Another crucial component is national assessments of students at different levels – ideally one assessment per cycle – in order to track their progress. Evaluations of schools, and potentially of teachers, should place students’ improvement at the centre. In terms of governance, most of the countries have created
independent institutions for managing the information system and national assessments. Many of the policy recommendations described below depend on the existence of such a tool.

Allocate financial, material and human resources according to the actual needs for improving both efficiency and equity. Following the creation of an information system, governments were allowed to dispatch funding to local governments based on the actual enrolment figures rather than population figures, with substantial efficiency gains. The successful countries in PISA also have designed various programmes to provide more resources to disadvantaged and low-performing students or schools. A first type of programme targeted low-performing or disadvantaged schools and provided better equipment, meals and transportation services, as well as more human resources (including teachers) and specific training for teachers. It was often complemented by a second type of measure targeting the students directly. Such programmes include providing remedial courses to low achievers, as well as enrolment campaigns in favour of girls. Conditional cash transfer schemes implemented in many Latin American countries have also proved effective in improving equity. Their structure can be used to target specific populations. In Brazil, for example, Bolsa Familia is now used as a vehicle for encouraging pre-primary enrolment as well as secondary school enrolment by including children aged 15 to 17.

Ensure more social inclusion in public and private schools. The low levels of social inclusion constitute a strong vector of inequality in Ibero-American countries. This issue is particularly important in countries with a sizable private schooling system. One way to partly mitigate school segregation is to map specific geographical zones for given schools while ensuring that the zones are socially diverse. However, this solution may not be very successful in the context of relatively large spatial inequalities and a large supply of private schools, as is the case in Latin America. Alternatively, the government could rely on school vouchers for low-income families or the imposition of a quota of students from disadvantaged backgrounds in certain schools. Such measures should also target private schools when possible.

Increase the quality of teaching through stronger selection and assessment of teachers, together with improved pedagogical support and advancement opportunities. Policies aiming at improving the quality of teaching should rely on a balanced mix of constraining measures and support in order to help teachers fulfil the new requirements.

A natural step toward better teaching is to increase qualification requirements and improve initial teacher training. Most of the successful countries in PISA have raised the selection criteria for newly hired teachers up to the university-degree level, and sometimes extended this obligation to
practicing teachers who were given some time to upgrade their qualification. These measures were supplemented by better initial training for teachers, mainly by insuring that both content knowledge and pedagogical skills were part of the training. The development of a unified and national exam for teachers also ensured a more equitable and transparent selection process.

In parallel, teacher effectiveness can be boosted by accountability measures, including outcome-based assessments. Assessing the teachers based on a measure of specific achievement has the advantage of providing a transparent assessment criterion for career advancement and provides strong incentives to teachers to make a greater effort. In particular, this approach has proved useful in Portugal in tackling teacher absenteeism, which is also a major issue in Latin America. Nevertheless, this approach involves some risks and should not guide the entire assessment process. One well-known and major drawback is the risk of inviting teachers to “teach to the test”. Another limit is the lack of flexibility of the measure, which may not be adapted to the specific schooling environment faced by teachers in a given year. Engaging teachers in the definition of their own objectives in terms of student achievement is a way to minimise this issue. Another way measuring the schooling environment is to define “value-added” assessment, taking into account progress in achievement rather than a specific level. Alternatively, the progress of students throughout the year could simply be displayed publicly, to the school staff and parents, without implication for the official assessment, in order to trigger peer pressure and social accountability.

In return, the government must ensure that teachers receive sufficient support throughout their careers. In order to fulfil higher standards, teachers should have access to modern pedagogical resources, special support and counselling at the beginning of their careers, and free and easy access to in-service training. Improving schooling equipment and ensuring a good material environment may also stimulate commitment among teachers.

Additionally, appropriate financial incentives can enhance the attractiveness of teaching and the retention of teachers. While there is large heterogeneity in terms of teachers’ salaries in Latin America, teachers are in general not well paid in comparison to private-sector employees with the same level of education. Increasing teachers’ salaries can be effective in attracting more qualified individuals. The timing of wage progression over the career constitutes an equally important tool. The salary increases should be concentrated at the beginning of a teacher’s career to encourage continual improvement and promote retention.
Ibero-American countries should develop curriculum standards adapted to the needs of the society and invest in pedagogical resources. In order to increase the quality of education, material and human resources are not sufficient. Teaching should rely on a clear curricula standard defined at the national level to ensure uniformity. The curricula should also be revised on a current basis to include knowledge and approaches relevant to the society in which the children will evolve later on. At the same time, the curricula should provide a framework flexible enough to allow teachers to adapt it to the local context. In parallel, teaching should evolve toward placing the students at the centre of the class, encouraging more engagement and aiming for the development of not only cognitive but also soft skills.

The challenges in terms of quality of education have long-term implications for skills accumulation and, hence, development. The experience of Southeast Asian countries shows that one of the main drivers of long-term economic success is the quality of human capital. Massive investments in secondary and tertiary education have played a key role for countries as they move up the global value chain and shift into higher technology and knowledge-intensive industries (OECD, 2013b). The development of job-relevant skills crucially depends on prior acquisition of a basic set of competencies that will make further learning possible. In this respect, the lack of top performers in Latin American countries, even among students from a high socio-economic background, appears to be a major drawback.

Given the very large share of students at a low proficiency level, Latin American countries need to develop second-chance education. In the short run, a substantial share of the Latin American population will join the labour market without mastering a basic set of competencies. These individuals should be offered the opportunity to upgrade their knowledge at least to a level of cognitive skills that will allow them to pursue basic professional or vocational training. These programmes should also be open to young workers willing to join.

But the key to success has not only been in investing more, but also in better directing education and training expenditures. In the long run, the stock and quality of human capital do not prevent countries from facing skills mismatches. Spain and Portugal, which were particularly hard hit by the 2008 economic crisis, are examples of such skills challenges. In fact, most OECD countries experience skills mismatches, and this cannot be explained by the low quality of education systems but rather by an inadequacy between what the youth study and what the labour market needs. This problem is even more pronounced in Latin America, where, according to the World Bank Enterprise Survey (2012), the share of firms identifying an inadequately educated workforce as a major constraint is highest (36% in Latin America and the Caribbean compared to 17% in high-income OECD countries).
In this respect, TVET systems can play a very important role in the region, but the necessary attention to and recognition of this is still lacking. The relatively good performance of students enrolled in vocational training in Latin America shows that there is a strong potential for improving the quality of education in the region, while also increasing the stock of skills for the future. However, TVET has not expanded enough in Latin America in recent years. The weight of TVET enrolment in secondary schools has remained the same in the last decade, increasing at a similar rate as general secondary education. This is partly because it is judged inferior to academic education, and also because the two education pathways offer different returns. Vocational training has also lost prestige, having become outdated and disconnected from the reality of the workplace (OECD/CAF/ECLAC, 2014).

The skills system could benefit from more engagement of the private sector in the design, financing, and monitoring of TVET. In Latin America, the TVET system has often been expanded by adding programmes somewhat disconnected from the needs of the labour market. The private sector, including the informal sector, has the knowledge and incentives to design a TVET curriculum that matches its skills needs. The education system could facilitate partnerships between TVET institutions and key sectors of the economy. While the public TVET system should focus in priority on transferable skills, tax incentives could be provided to private institutions and the private sector to participate in the financing of more specific skills.

Engaging in systematic data collection on labour-market needs would greatly benefit the piloting of the TVET system. The TVET system should not only ensure that it provides relevant skills today, but also anticipate future needs. In this regard, it would help to create an agency in charge of monitoring the demand for skills today and predicting future bottlenecks and opportunities. The agency would also be responsible for the dissemination of results to spur strategic investment in skills. Governments should ensure that key stakeholders participate in the work of this agency, including formal and informal employers, labour unions, training institutions, etc. This structure should also be supported by frequent data collection on the labour-market outcomes of students and on skills mismatches.

Introducing vocational courses in the general education framework could benefit all students. A large share of Latin American students will join the informal sector and self-employment, which is also developing in OECD countries. These specificities are not reflected in the curricula of students at the primary and secondary levels. Employment and labour-market outcomes of all students could be improved by introducing courses more adapted to the reality of their future work environment, such as financial education, some notion of work-related management and legal procedures, programming skills, etc. A randomised control trial in Brazil actually documented the
positive impact of introducing financial education in regular schools. Innovative material was designed by professionals to capture the interest of students. Teachers were trained to use the material and to integrate it in the general courses (mathematics, economics, etc.). The programme empowered students by allowing them to increase savings and to engage more often in the financial decisions of their households. The experience of Portugal is also interesting in this respect. The Novas Oportunidades programme gave students in general secondary schools the opportunity to take vocational courses earlier on. The programme reduced drop-outs and promoted vocational training, which now concerns around 50% of students.

Significant reforms based on the experiences of OECD countries and emerging economies with better education outcomes need to be adapted to the region’s needs. This implies not only education policies, but also a broader skills strategy that includes the education system and the acquisition of technical and “soft” skills on the labour market, in both the formal and informal sectors. This encompasses, but is not limited to, pre-employment, on-the-job training and lifelong learning programmes. Renewed skills strategies, such as the ones currently in effect in Spain and Portugal, also imply that public authorities in Latin America improve co-ordination mechanisms and discuss the main skills challenges with the main stakeholders, namely education institutions, either public or private, the corporate sector and social partners. Such co-ordination contributes to improving the performance and flexibility of education and training systems and, in the long term, provides a better answer to labour-market needs.
References


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In a knowledge-based global economy, investment in human capital is an essential component of any inclusive growth strategy. When workers lack the necessary skills, new technologies and production processes are adopted more slowly and do not translate into new growth models with higher value-added activities. However, skills affect individual’s lives and well-being far beyond what can be measured by labour-market earnings and economic growth. This is particularly relevant for Ibero-American countries as they embark on a path of structural reforms to unleash new and sustainable sources of growth.

What specific skills challenges are Ibero-American countries facing today? What are the similarities and differences in educational performance and skills amongst the countries? What accounts for differences in performance between Latin American countries compared to Spain and Portugal and how can this gap be closed? What are the main drivers of student performance? How do these skills challenges impact labour market outcomes?

*Skills in Ibero-America: Insights from PISA 2012* provides an overview of the main skills challenges facing Ibero-American countries.