

DEVELOPMENT IN THE AMERICAS

LEARNING BETTER

Public Policy for Skills Development

Edited by
Matías Busso,
Julián Cristia,
Diana Hincapié,
Julián Messina,
and Laura Ripani



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Preface

New technologies that are fusing the physical, digital, and biological worlds are impacting all industries, countries, and individuals. This so-called Fourth Industrial Revolution will change the way we live and transform the way we work.

Preparing this and future generations of workers for a fast-changing world is not only desirable, it's essential. At the Inter-American Development Bank (IDB) we know that a key ingredient to improve lives in Latin America and the Caribbean is having the right skills to face the challenges of this new era. For this reason, we dedicated the 2017 edition of our flagship publication, *Development in the Americas (DIA)*, to studying this topic and to proposing evidence-based solutions to address this critical problem.

Undoubtedly, our region will be heavily impacted by sweeping trends around the world. Artificial intelligence, automation, the Internet of Things, 3D printing, and autonomous vehicles are not science fiction anymore. They are real and available in many parts of the world and beginning to find their way to Latin America and the Caribbean. These new trends are changing our jobs and the way we work. The full impact of these changes is still unknown, but clearly there will be a fundamental transformation in the way businesses do their business and workers do their work.

A phrase by Robin Chase (co-founder of Zipcar) is telling: "My father had one job in his lifetime, I will have six jobs in my lifetime, and my children will have six jobs at the same time." Not only will our work not be a 9-to-5 job, but we will also not have the same job for our entire life. The Fourth Industrial Revolution will impose continuous and fast changes that will imply new challenges.

A central challenge is how to prepare the workers of today for the jobs of tomorrow. I am optimistic because one of the region's principal assets is its people's talent. But much must be done, starting with helping the many workers in the labor force today find good jobs, and stay updated on their skills to be relevant in the future. For younger generations, it is

important to start developing core skills as early as possible. These basics will be the foundation for further knowledge and skills accumulation. A good start will help, but will not assure a positive skills trajectory. Every day, from early childhood to adulthood, learning should be on the agenda of Latin American and Caribbean citizens.

In the global market, the region will be competitive if its talent is unlocked. And the key to unlock this talent is better learning.

Learning does not happen only in school. At home, parents play a key role promoting skills during the early years. School is an important learning platform for children and adolescents. The workplace is an essential arena for skills development for many years—roughly two thirds of our lives or more. All these learning spaces and the actors who dominate these spaces play a role in promoting skills development over the course of a lifetime. The multifaceted nature of this process means families, the private sector, and government must be informed about solutions that are cost-effective, and committed to being part of the effort to invest in the right skills.

The region is investing in developing skills for a brighter future. This book shows that continuing these investments is essential, but it also has a word of warning: money can buy skills, but only if used wisely. Some policies that have been applied at the experimental level have shown promise and suggest that small investments can generate big benefits. These policies should be tried and adapted to different contexts to see if they can be new tools in our countries' repertoire of policies that work.

In that sense, more experimentation and evaluation is needed. The only way to know what works and what does not work is by innovating, piloting, evaluating, and learning. This book will embark readers on a tour of evidence-based policies that improve skills along the lifecycle, providing policymakers with more tools to expand learning at home, in school, and at work. It also leaves some questions unanswered that need to be addressed with further innovation and research.

Latin America and the Caribbean will face vertiginous changes in the years to come. Our lives will not be the same, but I believe they can be better. The Inter-American Development Bank is committed to improving lives in Latin America and the Caribbean. This task begins with building the skills of our people to be part of, rather than afraid of, change.

Luis Alberto Moreno

President

Inter-American Development Bank

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1 Learning Better for an Uncertain Future

The workplace is changing fast. In the developed world, robots substitute for workers on the assembly line; self-service cash registers replace cashiers at the supermarket; ATM machines supplant tellers at the bank, and ordering tablets substitute for waiters at restaurants. In both manufacturing and services, the demand for typical blue- and white-collar clerical jobs, which were traditionally mid-paying jobs, is declining in favor of machines. As scary as this shift may seem to some workers, robotization and technological change also offer job opportunities. Technological advances increase the productivity and demand for jobs that require abstract problem-solving, creative thinking, and social skills. Science, engineering, math, and technology jobs are in greater demand today than ever before.

Has this wave of technological change swept across Latin America and the Caribbean? The evidence is mixed. High-paying occupations that are intensive in abstract, inventive tasks are growing, but at a much slower pace. Middle-skilled jobs are disappearing but not nearly as fast as in developed countries. Behind these subtler changes is the slow penetration of new technologies. Low wages relative to the cost of technology offer fewer incentives for firms to adopt new technologies. At the same time, poor entrepreneurial and worker skills render technology adoption more challenging, and a productive structure biased towards unproductive, small- and medium-sized enterprises limits the penetration of machines in the workplace.

The changes in the labor markets of the developed world today provide a window to the future in Latin America and the Caribbean. Technological change may be slower in the region, but it is unstoppable. This offers the region a welcome opportunity to prepare for the changes to come. Coping with technological change and reallocating workers associated with it is not easy, and governments in the developed world

are struggling to find solutions. Developing a workforce that has strong and adaptable skills is paramount.

This book explores what governments can do to boost the skills of the population—a costly endeavor if done at the scale required to meet these challenges. It is, therefore, important to be able to provide adequate skills in a cost-effective manner. Traditionally, the process of skills development was considered to occur primarily during childhood in schools. But this is not the case. One of the overarching messages is that cost-effective solutions to improve skills are available at all ages, from early childhood to adulthood. People are important to this lifelong process as skills development involves marshalling the efforts of various actors: families, teachers, school administrators, entrepreneurs, and firm managers. Similarly, learning spaces for skills development go well beyond the traditional classroom to homes, schools, job sites, and other training facilities. A public policy challenge is to coordinate different ministries that often work in isolation: social protection, education, labor, and finance. How can policymakers make sure they are getting it right? One path that should guide their efforts is the pursuit of evidence-based policies. This book shows how such policies can shed new light on what works in the development of a more skilled labor force today, and in the preparation of younger generations for the changes that are sure to come.

Unbundling Skills

Skills are capacities that can boost the productivity of individuals, allowing them to produce more valuable output with the same time, technology and equipment. Even though these capacities can be innate or acquired, this book emphasizes skills—both general and specific—that can be developed over the life cycle. General skills enhance the productivity of people in a broad range of occupations and can be classified in three main categories: socioemotional skills, cognitive skills, and academic skills. Socioemotional skills help people identify and manage their own and others' emotions (e.g., the ability to work in groups). Cognitive skills include long-term memory and pattern recognition as well as executive control, which relate to the coordination of several mental functions. Academic skills encompass facts, concepts, procedures, and strategies in subjects such as math, reading, and science, as well as

computer skills. In contrast, job-specific skills increase productivity in a particular range of occupations, sectors, or firms.

A central message of this book is that skills are highly malleable throughout the life cycle, starting early in life at home guided by parents, continuing in childhood and adolescence in school led by teachers, and also during adulthood when individuals learn while doing their jobs or acquiring further education. At any age, there are several basic principles that underlie effective learning. The process begins with an activity adjusted to the level of the learner and important for her. New knowledge should build upon the learner's prior knowledge; ultimately, practice makes perfect. Providing feedback during this process is crucial, and, in the same way that training can enhance skills, failure to use certain skills can depreciate them quickly. Therefore, from a public policy standpoint, minimizing the length of the transitions between school levels, between school and the labor market, and between jobs, can be important for skills development.

Skills in the Region: Low and Unequal

Schooling has increased in the region since the beginning of the twentieth century. Today, the region has almost universal access to primary education; three out of four children enroll in secondary school, and countries in the region are systematically expanding access to preschool and tertiary education. The average years of education increased from essentially zero in the early twentieth century to nine years of education today. However, while Latin America and the Caribbean galloped ahead to expand access, the rest of the world flew. Thus, the region has been left in the proverbial dust, unable to catch up with countries of similar levels of development in terms of schooling, years of education, and skills.

Despite much progress in terms of skills accumulation, compared to countries with similar levels of development, skills in the region are low at every stage of life. Consider childhood. Most countries in the region have participated in a variety of international and regional assessments that allow for cross-country comparisons. Scores from the Trends in International Mathematics and Science Study (TIMSS) and the Second Regional Comparative and Explanatory Study (SERCE) were used to compare math achievement in countries in Latin America and the Caribbean with other countries. Only 30 percent of fourth graders in the

region achieve a minimum standard of basic math skills. These students may have some basic mathematical knowledge, but they cannot add and subtract whole numbers, recognize parallel or perpendicular lines and familiar geometric shapes, or understand maps, and they cannot read and complete simple bar graphs and tables. In contrast, 95 percent of fourth grade students in the United States and 66 percent in countries with similar levels of gross enrollment and development reach the low benchmark for that grade and subject.

The lack of basic academic skills during childhood carries over into adolescence. In 2015, ten Latin American countries participated in the Programme for International Student Assessment (PISA). In a field of 72 participating economies, all Latin American and Caribbean countries ranked at the bottom of the proficiency distribution. More than 60 percent of the 15-year-old Latin American participants in PISA are unable to conduct more than the simplest math tasks for that grade, which means that they are likely to struggle using basic math concepts throughout their lives. In the Caribbean, the situation is much the same. Results from the 2013 Caribbean Secondary Education Certificate (CSEC), an assessment administered to secondary students in Barbados, Trinidad and Tobago, Jamaica, and Guyana, show that at the end of five years of secondary school only 34 percent of students have the skills required to pursue higher education. Despite the region's relatively poor performance, it seems to be making some progress. In Brazil, Chile, Mexico, and Peru—the only four countries in the region with reliable data for both 2000 and 2015—the share of low achievers dropped 14 percentage points both in math and language.

When individuals enter the labor market as adults, a lifetime of deficient skills accumulation can take a toll on their productivity in the workplace. Results from the OECD's 2015 Programme for the International Assessment of Adult Competencies (PIACC) reveal the very low level of skills among adults in Chile, the only Latin American country that participated in this round of the program (and the region's best performer on PISA). Only about 2 percent of adults in Chile achieve the highest levels of literacy proficiency, compared to an average 11 percent of adults across OECD countries. Adults who lack this level of proficiency cannot search and integrate information across multiple, dense texts or synthesize similar and contrasting ideas or points of view. Numeracy skills are similarly poor. Almost 62 percent of adults were not capable of performing tasks that require two or more steps involving the

calculation of whole numbers, decimals, percentages, and fractions (39 percentage points worse than adults in the OECD).

Skills are not only low in the region when compared with other countries of similar level of development but also unequally distributed between low- and high-income households. The steep socioeconomic gradients in skills development start during early childhood. The Regional Program of Indicators of Child Development (PRIDI, for its Spanish acronym) collected data on children 24 and 59 months old in four areas: language and communication, cognitive, motor, and socioemotional development. The program collected data on nationally representative samples in four countries: Costa Rica, Nicaragua, Paraguay, and Peru. A child born in a high-income household scores between 40 and 60 more points on standardized tests measuring socioemotional, cognitive and language skills than a child born to a low-income household. These gaps persist throughout their lifetimes. During childhood, the gap in academic skills is about 66 points. During adolescence, gaps in math, reading and sciences are between 85 and 95 points, and during adulthood, gaps in academic and socioemotional skills range from 40 to 60 points. Not surprisingly, adults born to mothers with low education levels earn 30 percent less than adults born to educated mothers. Skills gaps do not close in the region.

Not Just a Money Problem

Why is Latin America and the Caribbean so behind in skills development? Apparently, money is not the only, or main, issue. Today the region spends on average 3 percentage points more of its GDP on education than it did 25 years ago. In fact, all countries in the region—from the Southern Cone to the Andean region to Central America and the Caribbean—increased their investment in education by at least 1.5 percentage points of GDP over the same period and on average spend as much of their GDP on education as developed countries (around 5 percent of GDP).

However, the region does trail more advanced economies in terms of total spending per student. In part, this is to be expected since an important share of the budget for education is spent on wages, and labor is more expensive (in absolute terms) in developed economies. The rise in education spending does not mean that Latin America and the Caribbean should not invest more resources in skills development. Some countries are still underinvesting and need to increase their investment

in skills. But for most countries, given the current share of GDP spent on skills development, the room for improving skills outcomes by spending more is likely to be limited by the pace of economic growth. Therefore, governments should focus on how to spend current resources more effectively.

Families also seem to be spending significant amounts on skills development. Based on income and expenditure surveys, the average household in Latin America and the Caribbean spends about 7 percent of its budget on skills-related expenses. That share of household spending is more than in the United States where the average household spends about 6 percent. However, the proportion of students that attend private primary and secondary schools in the region is about 22 percent, compared to 8 percent in the United States. Therefore, households in the region are likely spending their money to compensate for either the deficiencies in access or quality of public schools, while in the United States private spending complements public spending.

Both public and private spending follow an inverted U-shape over the life cycle: measured as a share of GDP, more of this spending goes to primary and secondary education than to early childhood and tertiary education. This spending pattern reflects countries' priority to first expand primary school systems and, after reaching a certain coverage level, move to provide more universal access to secondary school. This pattern is echoed in private spending. Spending per family member increases from an average of 1 percent of the family budget for children aged 5 or less to about 2 percent during childhood through young adulthood. It then slips back to 1 percent after age 25 and 0.5 percent for people over 30 years old.

Not Just a Lack of Incentives Either

Why do families invest their scarce resources on skills development? Because they realize it's worth it. Returns to education are high in Latin America and the Caribbean. Each year of additional education in the region translates into an average 9.6 percent increase in real wages. By comparison, the real rate of return of stocks in the U.S. postwar period was 6.9 percent, and the long-term real return of bonds was merely 1.6 percent. Thus, from a purely financial viewpoint, education in Latin America and the Caribbean represents a tremendously smart investment decision.

Moreover, higher wages or wealth are not the only benefits of education. More educated workers are less likely to be unemployed and more likely to work at a job they enjoy. Education also helps individuals make better decisions about their health and reduces their engagement in risky behaviors, building trust in themselves and others in society.

However, going to school is not enough. The labor market clearly distinguishes between attending and completing a certain schooling level. Degree completion carries a hefty premium. The premium for completing 11 years of education is significantly lower than that for the 12 years needed to complete high school. In other words, starting, but not finishing secondary school, is virtually not rewarded by the market. Instead, graduation pays, literally.

These average returns to education differ across schooling levels. The returns are particularly high among workers with tertiary education. In the case of Latin America, the returns to a year of tertiary education jump to 16.6 percent. But not all postsecondary education is created equal. Returns across types of institutions vary significantly. Some vocational training programs have high returns, while others do very poorly. In postsecondary education, universities tend to provide higher returns than technical schools. Similarly, some fields of study pay more than others. For instance, engineering and other technical degrees are highly valued by the market, bringing high returns in Chile and Colombia. In contrast, education, social work, and design garner much lower average returns.

Beyond education, the market also values experience. Individuals become more productive as they gain more experience on the job because they acquire new skills through learning by doing or other forms of training. The experience premium, which fell during the last decade in Latin America, is still very high in the region. Longitudinal data from Brazil show that the labor market rewards general, sectoral, and firm level experience for all workers, but the returns vary significantly across educational levels. While more educated workers receive a higher reward for general and sectoral experience, workers without a high school degree benefit more from staying in the same firm. Each year of experience in the labor market earns workers without a high school degree about 2.4 percent more in wages. The premiums jump to almost 8 percent for workers with some tertiary education. Similarly, a year of sectoral experience for individuals with less than a high school education represents on average 0.7 percent in higher wages, compared to 1.7 percent for

workers with tertiary education. In terms of firm experience premiums, the estimates show that less educated workers receive on average a return of 1.3 percent while workers with some tertiary education receive smaller premiums that decline with firm tenure. Thus, skills acquired by more educated workers are more easily transferable across firms, while tasks performed by less educated workers are more firm-specific.

Spending Better: The Case for Evidence-based Policy

The main bottlenecks for skills development do not seem to be just a lack of government spending or incentives to accumulate skills. Rather, what is needed is better spending on improving the quality of interactions at home and at school, supporting students to avoid risky behaviors and complete more years of education, and creating a better business environment that fosters learning by doing in the workplace. Blindly pumping money into the educational system would be unlikely to produce the desired results, even if it were feasible. Given weaker growth prospects in the region, further hikes in public spending seem unlikely. Thus, using existing resources more wisely is the key.

How can countries be sure they are using their resources wisely? To begin with, governments must eliminate the guesswork in policy-making, and, for this, rigorous evidence can point the way. Rigorous evidence provides a compass by exposing both successes and failures and providing a sound basis for decision-making. Armed with this knowledge, policymakers can avoid expanding programs that are ineffective at promoting skills acquisition and scale up cost-effective programs. With evaluations of past experiences as their guide, governments can avoid mistakes and take advantage of opportunities to help their citizens learn better.

Governments would be more effective if they followed the evidence before launching new policies. A website that serves as a companion to this book can help in this endeavor. The website SkillsBank (www.iadb.org/skillsbank) categorizes, standardizes and presents evidence on policies that address key challenges in skills development. It compiles a wealth of information and puts it at the fingertips of policymakers. The website provides aggregate information on average effects of policies that tackle early childhood development, learning in primary and secondary school, and enrollment and completion in secondary schools. In addition to collecting and analyzing the data, it provides details about

context and implementation that policymakers should consider when adapting interventions to their own countries.

Policies for Lifelong Learning

While people can learn at any stage in life, they do not learn the same things in the same way. Therefore, public policy must be developed to address the goals, capacities, resources, and peculiarities of each age group. The people and places associated with each stage vary and dictate the policy course to follow. Although country context matters, evidence from around the region and the world provides useful guidance on what works and doesn't work for preschoolers through adults.

Early Childhood: Helping Parents Help Their Children

Cognitive and socioemotional skills start developing early. Thus, investing in early childhood development can have a major impact on skills development and on preparing children to compete in a changing technological world. These investments can also help reduce skills inequalities that constitute the breeding ground for the income inequality that so plagues Latin America and the Caribbean. Traditional policies in early childhood have centered on increasing access and quality of daycare centers and preprimary education. Promoting enrollment in high-quality daycare centers and preprimary education, particularly for poorer families, can directly increase child well-being through improved cognitive stimulation. Moreover, increasing access to daycare centers and preprimary education can also expand women's labor force participation.

But there is an additional important policy option that has received little attention until recently: parenting programs. These programs help parents adopt caregiving practices that foster child development. The evidence indicates that parents are the key actors for these youngest learners, and their homes are their best stage. It also shows that these programs can significantly improve child development at limited cost. Moreover, parenting programs are rare in the region, and hence, the opportunity to expand them is great.

Why do parenting programs work? Most parents care about their children, but many fail to adopt the best parenting practices because they do not know either the consequences of their actions or the most effective approach to elicit desired behaviors. A landmark study in the

United States analyzed 1,300 hours of interaction between parents and children and found, that in words heard, the average child on welfare was exposed to about half the words per hour as the average working-class child and fewer than one-third as the average child in a professional family. Moreover, the average child in a welfare family received mainly negative feedback (criticism of unwanted behavior) instead of positive feedback (praise of good behavior). This means that children in low-income households were receiving exactly the opposite of what development experts recommend. The current wisdom is that positive reinforcement (the carrot) is far more effective than negative reinforcement (the stick) from a developmental perspective.

Programs to change parenting practices may be particularly needed in Latin America and the Caribbean. The evidence suggests that many parents provide little cognitive stimulation to their children and favor punishment (even harsh corporal punishment) over praise (Berlinski and Schady, 2015). Some parenting programs, such as a well-known Jamaican stimulation study, seek to develop cognitive skills by encouraging parents to incorporate age-appropriate learning activities that usually require simple materials such as books and toys into their daily routine. Other parenting programs, such as Incredible Years, in operation in 18 countries, focus on improving child behavior. These programs teach parents to understand their children and their abilities, and to develop appropriate rules, boundaries, and routines. This book reviewed these two different types of programs and found that they indeed improved child development. However, the evidence base on parenting programs is composed mostly of small-scale programs implemented in developed countries. Hence, the need is to evaluate large-scale programs in the region to determine whether the promise of parenting programs lives up to expectations.

Childhood: Improving Primary Education At Low Cost

Developing academic skills in foundational subjects such as math and language is the focus during childhood, and mastering these basics is paramount to compete in today's world. Not surprisingly, schools are the main setting where learning takes place at this stage of life and teachers are the principal conduit. Poor learning in primary education is the biggest challenge. The average Latin American and Caribbean student lags more than one year behind what is expected based on the region's level

of economic development. Clearly, the region will not be able to go toe to toe with other regions in productivity and output if its children begin with such a marked disadvantage.

The key question is how to improve learning while keeping education budgets manageable. On the plus side, decision makers have numerous policies to choose from. Unfortunately, the region has conducted few evaluations to learn what is effective and what is not. The review of the evidence revealed only 13 rigorous evaluations implemented in the region on how to improve learning in primary education—inexcusable in a region that spends about \$80 billion a year on primary education!

However, international evidence can shed some light on promising areas worthy of local experimentation and evaluation. Once these areas are identified, Latin American and Caribbean governments must adapt interventions that worked in other contexts to their own environment and evaluate them for their actual effectiveness in their own settings.

There is great variation in the expected learning effects and costs of some relevant policy options that have been evaluated in countries around the world. One important set of policies includes the big-ticket options of reducing class size, extending the school day, and increasing teachers' years of education. Some of these policies have shown evidence of effectiveness. Reducing class size from 25 to 20 students can boost yearly learning by 15 percent and extending the school day from 4 to 7 hours by 10 percent. On the other hand, increasing teachers' years of education has not shown to increase learning. But all these policies carry high price tags; spending surges range from about 20 percent for class size and teachers' years of education to a whopping 60 percent for extending the school day. Of course, a longer school day may bring other important benefits by freeing up parents' time so they can enter the labor market or work longer hours, and providing a safe environment for children. Still, policymakers searching for policy options that can increase learning at low cost had best look elsewhere.

Another important set of policies includes those that may not be on policymakers' radar but perhaps should be given their effectiveness at enhancing student learning at very low cost: non-monetary incentives for students, lesson plans, and guided technology with extra time. Nonmonetary incentives can boost students' effort with simple, inexpensive strategies such as providing information about the high returns to education and organizing reading competitions across schools. Lesson plans provide teachers with detailed plans that can save them time

and ensure that instruction is both effective and engaging. However, to be implemented these plans have to be accompanied by capacity building, which can increase the cost of the intervention. Finally, another important intervention uses technology with clear guidance regarding the subject targeted, the software used, and the schedule of use during additional instruction time. These policies can generate important increases in yearly learning, ranging from about 20 percent for nonmonetary incentives and lesson plans to 40 percent for guided technology with extra time. And costs are tiny—just a 2 percent increase in annual costs for each of these policies. The lesson is clear: to boost student learning in primary schools, policymakers should focus on low-cost options that have demonstrated evidence of effectiveness and assess the feasibility of implementing them in particular contexts.

Adolescence: Multiple Challenges, Multiple Solutions

Adolescence is a difficult stage of life and skills development. Youth face multiple challenges at this age ranging from avoiding dropping out of secondary school, ensuring the development of key academic skills, and fostering socioemotional skills to steer clear of risky behavior. How can governments help adolescents and their families tackle these challenges?

Historically, expanding the supply of tuition-free, public secondary schools and raising the compulsory years of education have been the main policies used to increase enrollment at this educational level. Yet in the last 15 years, conditional cash transfers have been the main policy instrument to stimulate the demand for secondary education and boost enrollment. Conditional cash transfers provide a monetary incentive to families, conditional on children enrolling (and attending) school. These programs have been extensively evaluated and, on average, these evaluations find that they have been quite effective at promoting enrollment, particularly for the initial stages of secondary education.

However, conditional cash transfers have been less successful in keeping adolescents in schools until graduation and in promoting learning, perhaps because they target credit constraints but do not deal with other reasons why youth abandon secondary school. One reason why students drop out of secondary school is lack of interest in the curriculum. Some interventions have tried to convince students of the future benefits of secondary education by providing them with better, more

personalized, and more accurate information about the returns to secondary school and university education. Other interventions provide information on funding opportunities. Scholarships and achievement awards provide direct incentives for school completion and rank first among promising mechanisms to promote high school graduation. However, most of these interventions have taken place outside the region. Ser Pilo Paga, an innovative program in Colombia, is an exception. The program offers incentives for students to stay in high school and graduate by providing good students who are eligible with college loans that are forgiven if they complete their university degree. Preliminary results show improvement in the test performance of secondary school students, particularly among students from the lowest socioeconomic backgrounds. Other interventions such as curricular reform and offering extracurricular activities show promise though they have not been rigorously evaluated yet.

The roadmap to improve learning in secondary schools is murkier, in part due to limited evidence, especially from the region. Still, strategies that cater to the particular challenges faced during adolescence hold promise for boosting learning. Monetary incentives to students have shown evidence of effectiveness. Similarly, extending the school day—although costly and challenging to implement at large scale—have produced improvements in learning. Additionally, hiring teachers competitively, providing them monetary incentives tied to students' learning and supporting teachers' pedagogical practices offer promising results. Finally, the provision of nonmonetary incentives to boost students' motivation is also promising. In particular the program "Expande tu Mente!" in Peru, which seeks to convey the idea that the brain is like a muscle and that training can increase intelligence, has shown positive effects with a tiny price tag: less than a dollar per student per year.

Socioemotional skills play a key role in avoiding risky behaviors with harmful long-term consequences. One important socioemotional skill involves the capacity of individuals to self-regulate and avoid escalating a minor altercation into a fight. This is particularly important in our region, where youth violence plagues communities and families. To promote self-regulation among low-income male adolescents, an NGO in Chicago designed an innovative program called "Becoming a Man." This program involves one-hour, weekly group sessions in which participants play games, discuss problems, and role-play situations with the final goal of avoiding automatic violent reactions under stress. Results of this

intervention have been striking: violent arrests are down by half and secondary school graduation rates are up by about 15 percent.

Can these remarkable impacts on socioemotional skills be replicated in Latin America and the Caribbean? Only time, and more evaluations, will tell. Certainly, the program would have to be adapted to the region's cultural idiosyncrasies though its underlying principles may work across contexts. By way of example, another socioemotional program that promoted better parent-adolescent communication reduced behavioral problems in the United States; similar results were documented in a culturally adapted replication of the program in Ecuador (Familias Unidas). This example supports a more general conclusion: carefully designed interventions can promote the development of socioemotional skills among youth, significantly reduce risky behavior, and set them up for greater success in the future.

Higher Education: Balancing Access and Quality

Is money a constraint for the expansion of higher education? The region rapidly expanded the ranks of college graduates during the last two decades. Still, the region needs even more highly skilled adults, particularly in the areas of science, technology, engineering, and mathematics (STEM) if it is to compete meaningfully in a technologically dominant world. However, attending college is costly. First, there is tuition. In some countries, college tuition is inexpensive or free, while in others it is a financial burden, particularly if students choose to attend private schools or private institutions are the only available option. Second, higher education often requires students to move away from home, adding housing and other living expenses to their overall costs. Finally, there are foregone wages.

The evidence shows that credit constraints are a major obstacle to college attendance in the region. At the same time, increasing high school completion has led to rising demand for higher education. The system's response has been to expand institutions and programs, sometimes in an organic, non-systematic manner. The returns to attending some of the region's postsecondary education programs are low or even negative. Thus, a key challenge for the region today is to continue expanding postsecondary enrollment and boost graduation without compromising the quality and relevance of programs and institutions. The policy options need to pivot around two pillars: alleviating credit constraints

to facilitate access while putting mechanisms in place to ensure quality and relevance.

Supply-side subsidies, in the form of public funding of public or private institutions, are effective at promoting enrollment but, because funding is typically not tied to student performance, they can lead to the provision of low-quality educational services. Demand-side subsidies, either in the form of scholarships or student loans, can also be effective at promoting access. However, they should be carefully designed to create incentives for good student outcomes and avoid concentrating financial risks among students.

In either case, these initiatives do not replace systemic, effective quality assurance mechanisms—something the region is sorely lacking. In Colombia, for instance, only 13 percent of higher education institutions were accredited in 2016. These low levels likely reflect the voluntary nature of accreditation and weak incentives. Some other countries, like Argentina and Chile, have more mature systems of accreditation.

On-the-Job and For-the-Job Learning: The Importance of Firms

For youth and adults, the labor market is fundamental in the skills development process. The knowledge accumulated at home and in school during the formal education years become actual skills needed in the labor market. On-the-job training helps develop specific skills that can boost workers' productivity. Thus, while preparedness is important, the intensity and quality of the training received in the workplace is crucial. This is even more true in a fast-changing world, where updating skills is the key to workers' relevance and longevity. Starting today, and into the future, countries must invest in systems that eliminate boundaries between education and training in a lifelong learning approach.

Firm-provided training in the region is lagging. The share of firms that provide training is more than 10 percentage points less than in the East Asia and Pacific (EAP) region. This gap appears to be related to the type of activities undertaken in Latin American and Caribbean firms, with many more firms performing simple tasks that require little or no training.

Assessing the quality of training received on the job in Latin America and the Caribbean is complicated, because quality is often subjective and unobservable. The best indication of workers' skills development in the labor market is the evolution of their wages, which varies depending

on the type of employer. Workers employed by larger firms in the tradable sector (“good firms”) see their wages improve rapidly compared to workers employed in smaller firms engaged in nontradable activities (“bad firms”). Over a 7-year period in Chile, workers who had completed secondary school saw their wages improve by almost 20 percent if they were employed in good firms, as compared to 6 percent if they were employed in a small- or medium-sized enterprise operating in a nontradable sector. The wage gain of the high school graduate employed in a good firm is even larger than that of a college graduate employed by a bad firm, although she does not catch up completely over the 7 years. Thus, not only does the type of employer matter, but good employers may help close the skills gap workers bring to the labor market.

Public policy can boost the number of good firms over bad firms. The range of policies to achieve this objective is complex, including macroeconomic, regulatory, and competition policies, and is beyond the scope of this book. But public policy can also influence the likelihood of accessing a good firm. This is particularly important for young workers who enter the labor market with less developed skills. Having access to a good firm that provides training is the best way to increase a worker’s chances of improving productivity (and wages) throughout her career.

Youth training programs have been widely used in Latin America and the Caribbean to improve the employability of disadvantaged youth, providing participants with a combination of vocational training and an internship at a firm in the private sector. Some programs include socioemotional skills training. These programs often succeed in helping disadvantaged youth access employment in good firms, although the gains are sometimes restricted to particular subgroups of the population. In general, these programs continue to positively impact the quality of employment (earnings, formal work) in the medium and long term and are cost-effective because they typically last a short time.

One shortcoming of youth training programs is their limited scope, given their focus on disadvantaged youth. Broader-reaching programs should also be explored. Apprenticeships have a positive impact on both youth employment and firm productivity in several OECD countries but have seldom been used in Latin America and the Caribbean. Several key differences stand out when comparing traditional youth training programs in the region to apprenticeships: (i) apprenticeships tend not to target youth with the lowest skill base; (ii) they offer longer, more intense training and hence are costlier, and (iii) they are co-financed by

the private sector. These larger scope programs are promising avenues for public policy experimentation.

An evidence-based set of policies aimed at improving the skills of youth and adults should be part of a strong and structured skills development system that brings the education and training closer to the needs of employers. The simplest way to do that is for the public and private sectors to work together to prepare workers with the skills they need today and in the future. As in other periods of the life cycle, but perhaps more urgently at this stage, innovation and experimentation in Latin America and the Caribbean are key to finding and offering the right solutions for the many workers in the labor market, anxious to improve their lives with a good job.

Toward Better Learning Across the Board

Better learning is key for Latin America and the Caribbean to compete in the global economy today and in the future. Finding effective interventions and investments in skills is a necessary condition to reap the benefits of technological change and avoid the risks of being left behind, incapable of producing high value-added goods, and unable to join the ranks of high-income regions.

Learning must occur at all ages, in many settings, taking better advantage of existing resources. Parents must learn how to better prepare their children to be school-ready. Young children must learn fundamental skills that will be the basis of their future learning and of the skills they will need in the labor market. Adolescents must develop the academic and socioemotional skills that will allow them to become responsible, productive adults. Teachers at all educational levels must learn how to bestow knowledge in a manner that inspires students to stay in school and prepares them for the workforce. Managers must learn how to train their workers for the tasks at hand and motivate them to raise the productivity of their firms.

Clearly, skills development is not a linear process in which skills are built sequentially and progress smoothly from one stage to another. Nor are the stages of skills development compartmentalized and isolated from each other. While some actors may predominate in each stage, which may take place largely in one setting, nothing is exclusive about the people and places associated with any one phase of skills development over the life cycle. The process is as intertwined, complex,

and unpredictable as life itself. Parents, teachers, and employers may pass in and out of this process multiple times, opening—and closing—the doors to learning. Adolescents may enter the workforce well before they had planned, or people may return to formal education late in life. While these twists and turns may blur the lines and interject numerous caveats, they do not negate the general characteristics and trends that predominate in each age group and are the organizing elements of this book.

Given the complexities of the learning process, the task of policy-making for skills development is daunting indeed. Policymakers are on the front lines of this learning process, struggling with how to make all this happen with targeted, well-designed, evidence-based policies that fit within their budgets. Learning from the successes and failures throughout the region and the world, governments can help put their citizens on a better learning path that prepares them, their firms, and their countries to compete in today's dynamic, opportunity-filled economic environment.

2 What Counts for Skills Development

In 1991, in a small hospital in Bogota, something unusual happened. Two recently born identical twins, Wilber and Carlos, were separated. Wilber continued his life with his biological parents, a low-income family living in a rural area. But his brother Carlos was raised by an upper-middle income family in Bogota. For the next 25 years, their lives followed two starkly different paths. Wilber had a rough upbringing, dropped out of secondary school, and ended up working as a butcher. Carlos, on the other hand, was well nurtured, obtained a university degree, and landed a job as an accountant (Dominus, 2015). Why were their lives so different? The answer is not genes; they are identical twins. In all likelihood, the stark contrast in the support they received during their upbringing made all the difference. This explanation is well supported by the academic literature. Many so-called adoption studies have shown that whether children are adopted by upper-middle income families or low-income families can have a dramatic impact on their life stories. These studies provide strong evidence of the key role the environment plays in people's development (van IJzendoorn and Juffer, 2005).

Ideally, societies would like to provide people like Wilber the same opportunities that people like Carlos enjoyed. However, providing Wilber exactly the same support as Carlos is impossible or highly unlikely. Carlos probably lived in a safe area, had his own bedroom, had access to many books, attended private school, had parents who were avid readers, and enjoyed access to many expensive services. Public provision of all these services to Wilber would require a massive increase in public spending on skills development and demand significant cuts in other spending areas or tax hikes. Such a massive increase in spending on skills development is unlikely in the foreseeable future.

A more feasible alternative is to identify which services, among the many that Carlos enjoyed, are truly critical and then to ensure that

all children have access to them. For example, for the first two years of life, is attending a good daycare program critical or is it better to train parents in appropriate caregiving practices? For primary and secondary school children, is having a longer school day critical or should policy focus on having teachers that actively engage students and provide frequent feedback? Because resources are limited, policymakers need to decide which services to prioritize. This book seeks to provide relevant evidence to guide these difficult policy decisions. But this guidance demands a thorough understanding of the process of skills development.

A good starting point is to recognize that skills development is a life-cycle process. That is, individuals across societies and over time typically follow a common trajectory in their development in distinct stages. These stages can be defined as early childhood, childhood, adolescence, and adulthood. These stages vary markedly in terms of the skills that are developed, the environments in which these skills evolve, and the role different actors play at each stage. Furthermore, skills developed at each stage may become the foundation for skills acquired at later stages. Understanding how individuals develop skills and which environmental factors are critical at each stage can help governments choose and support policies that enhance the skills development process.

What Are Skills?

This book defines skills as innate or acquired capacities that increase the productivity of an individual. This definition includes a wide array of abilities, such as abstract and deductive reasoning, pattern recognition, knowledge of facts and algorithms, understanding one's own and other people's emotions, and having specific knowledge or abilities useful for certain occupations, sectors of the economy, or individual firms. While recognizing the role of innate abilities, the emphasis is on how to develop skills across the life cycle. Moreover, though improvements in health and nutrition can affect skill levels indirectly, this chapter focuses on investments and actions that seek to directly improve skills.

A certain ability can be considered a skill only if it allows an individual to be more productive in an economic sense: that is, the individual can produce more output, keeping constant all other factors—such as the time allocated to the task, the available technology, physical capital, and the arrangement of factors in the economy. Also, society must

value the additional output related to the individual's higher capacity. An individual's ability to outperform others in certain tasks, such as playing videogames, is not interpreted as skills since that ability generates no additional value for society (except if these individuals are professionals in their field, such as internationally-renowned videogame players, or if those abilities are valued by the market).

Because the concept of skills is directly linked to the production of an economic good or service, certain abilities that may be considered a skill in a certain society at a particular point in time may not be a skill in another society or at another point in time. For example, physical strength was an important skill in agricultural production in the developed world until the beginning of the 1900s, but it became less important as tractors—and more generally, mechanization—were adopted. Also, having higher skill levels may be conducive to higher production capacity in the market, at home, or both. While recognizing that improvements in skills can benefit welfare beyond higher productivity and earnings, such as in health, prosocial behavior, and civic participation (Oreopoulos and Salvanes, 2011), this book will focus on skills related to higher productivity in market production.

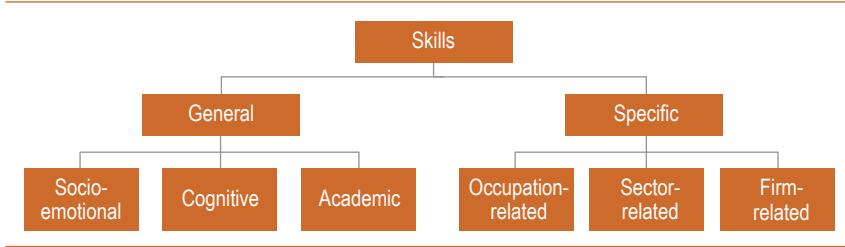
Breaking It Down

Skills can be classified into two main categories: general and specific. General skills increase the productivity of a person in a broad range of occupations, sectors, or firms; examples include abstract reasoning, reading comprehension, and computer-related skills. In contrast, specific skills increase the productivity of a person in a narrow range of occupations, sectors, or firms. For instance, knowledge of the anatomy of the human mouth is relevant for dentists or maxillofacial surgeons but not necessarily the general public. Similarly, the ability to set up and troubleshoot a computer network is relevant for computer networking specialists.

General and specific skills can be further broken down into six finer categories, as shown in Figure 2.1.

General skills include:

- *Socioemotional skills.* These skills help people identify and manage their own and others' emotions to improve productivity, including the ability to work in groups.

Figure 2.1 Types of Skills

- *Cognitive skills.* These skills include foundational ones such as long-term memory and pattern recognition as well as executive control, which relates to the coordination of other mental functions such as working memory, response inhibition, and selective attention. They also include *metacognitive skills*—defined as the capacity of an individual to plan actions, monitor progress, and evaluate outcomes.
- *Academic skills.* These skills include knowledge of facts, concepts, procedures, and strategies in general subjects such as math, reading, and science, as well as computer skills.

Specific skills include those that are:

- *Occupation-related.* These skills use knowledge, procedures, and strategies in relevant tasks for a certain occupation. For example, knowing how to use different operating systems and applications is critical for software programmers.
- *Sector-related.* These skills include knowledge and understanding of trends, market structure, technologies, and challenges facing a certain sector (for example, banking).
- *Firm-related.* These skills focus on knowledge about a firm's products and procedures, as well as an understanding of the people who collaborate to keep it going, such as employees, clients, and suppliers.

Skills tend to be closely related to other skills nearby in the figure. For example, socioemotional and cognitive skills are inextricably linked, and are differentiated here and in the literature only for analytical purposes. Similarly, cognitive and academic skills are closely connected,

as cognitive tests are strong predictors of academic achievement. In turn, academic skills in certain subjects are foundational for acquiring skills related to certain occupations (for example, math for engineering or physics). Occupations are related to sectors, though in some cases the relationship is stronger than in others. For example, dentists operate only in the health care sector, whereas other professionals such as engineers can operate across sectors. Lastly, firms tend to operate in specific sectors, though some large diversified conglomerates may operate in multiple sectors.

Skills are loosely sorted in the figure from the most general to the most specific. That is, socioemotional and cognitive skills are the most general as they provide a foundation for developing many of the other skills. For example, developing math skills requires cognitive skills such as abstract reasoning and pattern recognition. But it also requires recognizing and managing emotions to keep stress levels under control when faced with a difficult problem, and patience and perseverance to find a solution. In turn, a person working as a software programmer can further specialize in the specific challenges of a certain sector (such as banking) and in the even more specific challenges of operating in a particular organization (such as the Inter-American Development Bank).

Skills are also sorted according to their demand, from those whose demand is more constant across time and societies to those whose demand is less constant. For example, socioemotional skills, which essentially facilitate interacting and collaborating with other people, have been important since the beginning of humankind, are important now, and will remain important as team-based work gains preponderance in market production. Similarly, cognitive skills related to pattern recognition and abstract reasoning have been important from ancient times to the present. However, cognitive skills may have become more important as production tasks have become more abstract than in the past (compare the work of a software programmer to the work of a carpenter). Similarly, the demand for academic skills, such as reading, writing, and calculating, has been rising in the past 200 years as tasks related to information processing have gained prominence. Moreover, during this period, the importance of different subjects has shifted considerably. For example, astronomy has become relatively less important while statistics has become more important as the analysis of data has become commonplace in society.

Specific skills tend to change even faster than general skills. In particular, in the case of occupation-related skills, some professions have virtually disappeared, others have emerged, and most have undergone important changes in the skills that they require. These shifts are even greater at the level of sectors and firms. Technological change affects sector-related skills more directly. Moreover, the skills related to operating in a particular firm may change substantially as this firm changes over time, faces a deep restructuring process, or even closes down.

Measuring Skills

Different reasons motivate the measurement of skills. Teachers measure skills to monitor students' progress, and firms measure skills of prospective employees to make hiring decisions. This book has two central motivations for analyzing skills assessments. First, skills assessments are important to document overall levels and trends of skills across populations. For example, it is important to determine how children entering primary school in Latin American and Caribbean countries measure up to their counterparts in countries of similar or higher levels of development in terms of cognitive skills. This type of information is vital for developing or revising specific policies. Second, skills assessments are used to measure the effects of specific interventions. Extending the previous example, countries would like to know whether expanding access to daycare services produces a greater effect on children's cognitive skills than expanding parenting programs. Consequently, understanding how skills are measured, and the reliability of these measurements, is an important aspect of this analysis.

Unfortunately, since skills are not directly observable, measuring them is a difficult task indeed. Other markers such as health indicators (e.g., cholesterol levels) can be directly or clinically measured. Skills cannot. Assessing skills requires a measure that is closely linked with the underlying skill. To measure individual skills, such as cognitive skills, the most common method is to use objective standardized tests. Written tests are widely used to measure cognitive and academic skills and predominate in educational settings, given their easy application and low cost.

However, some scholars argue in favor of measuring skills by observing performance in a representative task (Ericsson et al., 2006). An example of this approach is the marshmallow task used to measure

the capacity of young children to delay gratification. In this task, young children can choose to have one marshmallow right away or wait 15 minutes and receive two marshmallows. Those who waited to receive two marshmallows were considered to have a higher capacity to delay gratification; they were followed over time and found to have greater success in school. Similarly, a variety of software simulations have been developed to measure skills in representative tasks for surgeons and pilots. Subjective assessments can also be used. Many tests of a child's socioemotional skills construct ratings from parents or teachers. These subjective assessments are useful to collect information that is difficult to measure with objective means—though in many cases they contain substantial measurement error.

In some cases, skills can be quite difficult to measure. For example, self-control under stress, a key skill to reduce violent behavior, is hard to assess. Moreover, in some cases, skills can be measured, but it is too expensive to elicit measures with sufficient precision at a representative level. In cases in which skills are difficult to measure, measuring some final outcome that is intrinsically linked with the skill under analysis may be the only option. For example, to measure levels of self-control, statistics on violent behavior can be used. It is reasonable to think that youths who exhibit high levels of violent behavior have low levels of self-control.

Thus, in cases in which skills are difficult to assess, the focus shifts to measuring final outcomes. Among the outcomes that can be measured is actual output in a certain job. For example, the precision and amount of time it takes a plumber to finish the average job can serve as a measure of her overall level of specific skill. Relevant behaviors can also be measured. For example, conscientiousness can be measured by computing the fraction of days that a worker arrives on time to work. Finally, wages can be measured. The underlying assumption is that wages are closely linked to productivity and productivity is largely influenced by skills; thus, wages can be considered a good proxy for skill levels. An application of this approach is to study how skills evolve during adulthood by looking at how wages change as people age. Economists have convincingly argued that learning-by-doing on the job is an important mechanism for developing skills, based on the empirical evidence that wages tend to increase in the years following an individual's entry into the labor market. However, the link between productivity and wages may be weaker in Latin American and the Caribbean due to distortions in labor markets.

How have different types of skills been assessed and how much data is available for countries in Latin America and the Caribbean? The data are best for academic skills because representative data have been widely collected using common instruments, which allows for reliable comparisons across countries and time. For example, many countries in the region have been participating in the Program for International Student Assessment (PISA), which has measured academic skills of 15-year-old students around the world every three years since 2000.

Data are more uneven for measuring cognitive skills. On the plus side, a number of cognitive tests have been applied in different countries and time periods. For example, the Ravens Progressive Matrices test, which seeks to measure abstract reasoning, has been widely applied all over the world since its development in 1938. Unfortunately, in many cases the samples involved were not representative, making comparisons across countries and over time difficult. For instance, many samples include only undergraduate students and may be fairly representative for countries such as the Republic of Korea, where the majority of the population attends college, but are far from representative in countries such as Guatemala, where a small fraction of the population attends tertiary education. An important exception to the absence of reliable data on cognitive skills is the Regional Project on Child Development Indicators (PRIDI) study, which measures these skills in a nationally representative sample of children ages 2 to 5 in four Latin American countries (Verdisco et al., 2015).

Data are even spottier for socioemotional skills. Many instruments have limited reliability and validity, and few instruments have become standard and widely used. Moreover, with socioemotional skills, “more is not always better.” That is, higher scores on cognitive tests such as the Ravens Progressive Matrices are always good news, as they signal improvements in cognitive skills. However, in the case of socioemotional skills, beyond a certain point—a hard-to-define optimal level—higher levels could be detrimental to performance. Greater perseverance in a child who puts little effort into solving novel problems is good news. But more perseverance in a child who already tries hard could signal obsessive or stubborn behavior. These optimal levels are difficult to determine and can vary across societies and time. For example, a child who strives in competitive environments may be considered a perfect candidate to eventually work in the private sector in the United States. However, she may be seen as overly competitive in certain countries, such as Japan,

that promote collaboration over competition. In short, socioemotional skills remain difficult to measure, and there is little solid data to make comparisons across countries and over time.

Specific skills pose the greatest measurement challenge. In principle, specific skills should be relatively easy to measure given their concrete nature. For instance, the expertise of nurses can be assessed by testing their factual and procedural knowledge and their performance of representative tasks such as administering vaccines. But obtaining a comprehensive measure of overall specific skills in a country represents a monumental task indeed. To start with, a data collection exercise like the one described for nurses would need to be designed and implemented for a wide range of occupations. Moreover, only those individuals working in each assessed occupation (nursing skills for nurses, management skills for managers) would need to be identified and tested. It would also be difficult to make comparisons over space and time given that the skills necessary for a certain occupation surely vary with the level of development and the technology prevalent in a country at any point in time. That is, the skills required to work as a nurse in the United States are quite different than those needed to work as a nurse in, for example, Haiti. Finally, these occupation-related skills are in continual flux; hence any actual measurement may soon become obsolete. These challenges explain why little available data exist on occupation-related skills for different countries and time periods. The same challenges arise when thinking about sectors in the economy and even more when thinking about firm-related skills. Still, it seems possible and advisable to identify and test expertise in representative tasks in key occupations.

In summary, different skills are measured using different approaches. Academic and cognitive skills are typically measured using objective tests. Socioemotional skills and specific skills may be measured using subjective assessments and final related outcomes. For example, interventions to boost socioemotional skills may be evaluated in terms of their effects on risky behavior, educational attainment, and labor market outcomes. For interventions (such as job training programs) that seek to increase specific skills, effects will be evaluated in terms of labor market outcomes, including earnings and employment levels.

Based on the importance of different skills and the measurement challenges just described, this book focuses on a number of key outcomes, summarized in Table 2.1. In general, the focus is on outcomes that are important for skills development, are commonly measured, and

correspond to areas in which Latin American and Caribbean countries still face major challenges. A good example is academic achievement—an important outcome because it reflects skills that are useful for a range of occupations, are commonly measured by national or international assessments, and are an area in which the region needs to improve substantially.

For early childhood, the focus is on outcomes related to socioemotional and cognitive skills (including communication). These foundational skills facilitate the acquisition of other skills, can be measured, and are important markers for children in the region. For childhood, the spotlight is on academic skills. These include critical areas of knowledge, such as reading and math. School attainment during this stage is not included because elementary school enrollment is almost universal in the region. For adolescence, academic achievement remains a critical outcome, complemented by two other important markers. School attainment is an important outcome, given the large number of adolescents in the region who drop out before completing secondary education. Additionally, the development of socioemotional skills is relevant to help adolescents to avoid risky behaviors such as substance abuse, criminal activity, and unprotected sex that can have long-term deleterious effects. During adulthood, educational attainment remains an important outcome because of the low coverage and high returns associated with post-secondary education. Finally, a key outcome during adulthood is earnings because of its close link with quality of life.

Learning about Learning

In most cases, people are not born with skills, nor do they acquire them by osmosis; they learn them—but how? Fortunately, research from different fields highlights the importance of certain principles for effective learning. Though these principles should not be blindly applied across skills, stages of the life cycle, and contexts, they provide initial guidance on which practices and policies should be promoted. Four key principles stand out for developing a range of skills (Carretero, 2009; Schneider and Stern, 2010).

First, the learning activity should be adjusted to the level of the learner. Sometimes referred to as “scaffolding,” the idea is that an educational task should be challenging but achievable. This intuitive principle can be captured by imagining a presentation by an expert. On one hand,

Table 2.1. Key Outcomes in the Skills Development Process

Stage	Key outcomes
Early childhood	Cognitive skills Socioemotional skills
Childhood	Academic skills
Adolescence	Academic skills Schooling attainment Socioemotional skills
Adulthood	Schooling attainment Earnings

if the arguments are too simple and easy, the audience will not learn much and may be bored. On the other hand, if the arguments are too complex, then the audience will find the material too difficult and, again, may be “turned off.” The goal is to balance the requirements necessary to do the task and the capacity of the learner.

Second, the skill to be acquired should be significant to the learner. Here, the key is motivation: if the learner considers the skill important, then she will be willing to invest the effort to learn it. This significance may be derived from intrinsic motivation, that is, the desire to learn the skill for its own sake. Or, alternatively, the learner could be extrinsically motivated to learn the skill because it will allow her to achieve a certain objective (e.g., a good grade or certification needed for a job).

Third, the new knowledge should build upon the learner’s prior knowledge. Research from cognitive psychology suggests that it is easier to adopt and maintain new knowledge if it builds upon and connects to previous knowledge. Developing these connections with prior knowledge ensures that the new learning is linked to existing knowledge, creating a network of related knowledge and its applications. The following example highlights the advantages of building new knowledge on existing knowledge. Suppose that you want to explain to a person what a vest is. You could say that a vest is a garment worn on the upper part of the body for a particular purpose or activity, or you can just say that a vest is a sweater without sleeves. The latter explanation is probably more effective because it builds directly on existing knowledge.

Fourth, learners need to practice a skill intensely to really develop it. The old adage that practice makes perfect rings as true in skills development as in any other area—and there is overwhelming evidence to support this truism. Models of academic learning emphasize the need

to provide time to develop skills (Slavin, 1995). A central feature of skills development—whether they be cognitive and academic skills, socio-emotional skills, or specific skills—involves sustained practice. In fact, the learning-by-doing model, which takes on a key role during adulthood when individuals join the labor market, typically involves intense practice of common tasks in the chosen occupation.

But not all practice is equally effective. Providing feedback during practice plays a central role for the accumulation of skills and it is easy to see why. Imagine throwing darts in a dark room where you cannot see the target. Can you improve? Clearly not. Anders Ericsson, one of the leading scientists in the study of how to develop expert performance, provided the following example to illustrate the importance of feedback in learning. Surgeons improve substantially with experience, while radiologists who read mammograms do not. Why? Ericsson argues that the explanation revolves around the difference in feedback that these professionals receive. On one hand, surgeons tend to receive immediate clear feedback: if they make a mistake, in many cases their patient dies. In contrast, radiologists read images generated with low-dose x-rays to detect if a person has a tumor or not. But they rarely receive feedback regarding whether their assessments were right or not. Consequently, the lack of feedback reduces the possibility for them to hone their skills over time.

Fortunately, certain tasks are learned naturally with experience because they generate automatic feedback. For example, the famous psychologist Daniel Kahneman points out that when driving a car you will notice, almost unconsciously, how much you need to turn the wheel to make a curve or how much you need to press the gas pedal to accelerate (Kahneman, 2013). Hence, because of the presence of automatic feedback, we should expect driving to improve with experience (and it does). But in many other instances, feedback is not automatic. For example, in many schools in Latin America and the Caribbean, children may spend weeks doing math exercises without receiving feedback. The feedback comes only following the final exam, when students could receive the sad (and belated) news that their method of solving the problem is incorrect. Worse yet, in certain cases, students receive the wrong feedback due to potential gaps in knowledge among teachers. This general point also applies to learning-by-doing. Workers in firms may receive infrequent feedback or they may receive feedback in ways that are not conducive to improving performance. Feedback that

is interpreted as criticism and that does not include specific, concrete steps to solve problems can cause more harm than good.

Beyond feedback, other promising strategies can ensure that practice pays off. Ericsson points out the key role that “deliberate practice” can play in the development of any skill (Ericsson, 2006; Ericsson, 2009; Ericsson, 2015). His research has documented that top performers in a variety of fields (such as musicians, chess masters, track and field athletes, and tennis players) not only practice intensely but also practice in a deliberate way. This so-called deliberate practice typically involves a coach who provides feedback and advice about which weakness to tackle and what specific form of practice should be done to improve that weakness. This practice requires long and sometimes strenuous sessions in which the trainee does the assigned exercise and monitors the advances to figure out the potential adjustments needed. According to expert performance theory (Ericsson, 2014), deliberate and engaged practice increases performance levels, independent of academic degrees or even experience in a job.

These basic principles and strategies about how to promote skills highlight the critical roles different supporters of the learning process play in a person’s life. Parents, teachers, and other mentors should apply effective strategies to develop different types of skills across different contexts. This is not an easy task.

Hence, a sound public policy strategy to develop skills should provide support to the key skills developers: parents, teachers and firms. This support should be emphasized during critical times of an individual’s development and in groups that may gain more from that support. For example, low-income parents may not understand the importance of providing sufficient cognitive stimulation during early childhood or the importance of providing positive reinforcement. Consequently, public programs that focus on these parents and that provide specific advice and feedback to them about how to implement evidence-based parenting practices could go a long way to provide a good start for children. Similarly, public programs that focus on teachers who may not have clocked enough practice time during pre-service training and who may have gaps in relevant knowledge could also help students develop their skills during elementary and secondary education. Finally, public programs can encourage firms to invest more resources, more effectively, in the skills development of their workers.

Though parents and teachers are critical in the skills development process, at the end of the day, each individual has a key responsibility

and plays a central role in his or her own development. This is where metacognitive skills come into play. Metacognitive skills allow an individual to identify problems, analyze them, and apply sound strategies to solve them. In particular, a body of research suggests that developing these metacognitive skills is not only important for tackling real world life problems in an array of different domains (personal and work-related) but also for helping individuals effectively manage their own learning.

Metacognition in a learning context is intrinsically related to the “learning-to-learn” concept. More specifically, metacognition in learning can be considered the ability to pursue and persist in learning, and to organize one’s own learning, including through effective management of time and information. This competence encompasses awareness of one’s learning process and needs, identifying available opportunities, and overcoming obstacles in order to learn successfully. The development of metacognitive skills related to learning becomes important during childhood and adolescence as individuals assume ever greater responsibility for their own learning. It becomes critical during adulthood as they become responsible for continuing their skills development.

These learning principles can be summarized as follows. Prolonged practice with feedback is a critical requirement to develop any skill at any stage of the life cycle. The four principles of effective learning should be promoted to master specific skills across all stages. Teachers, parents, and firms, as well as other agents of learning, play a key role in the learning process. During childhood and adolescence, they should be well prepared to design and conduct the learning process effectively. As individuals age, they must develop metacognitive skills to assume control of their own learning. Given these insights into learning, focusing on training parents and teachers and developing self-regulating skills can produce substantial improvement in skills development.

Forgetting Curves: The Other Side of Learning

A central message of this book is that skills are highly malleable. Training can enhance skills but the absence of training can chip them away. In other words, people forget—hence the old adage, “Use it or lose it.” How quickly skills depreciate when levels of training are low has important implications for a range of decisions regarding skills development. For example, the speed of skills depreciation may affect educational decisions such as how to structure school curricula to allow opportunities to

revisit key concepts frequently and ensure sufficient learning opportunities throughout the year (including summer vacation). It can also affect important decisions regarding the transition of students between formal education and the labor market. Finally, it also affects key labor market decisions such as the need to avoid long periods in which individuals may not be working due to involuntary unemployment or family-related needs (such as childbearing). While from a theoretical standpoint, skills can clearly depreciate, for policy it is important to understand the extent of skills depreciation, its potential implications, and some general strategies to tackle this challenge. Importantly, even if a skill is apparently lost, recovering (or relearning) it takes less time than learning it the first time if the initial learning was at an expert or similar level.

How quickly do people forget factual information? Unfortunately, the evidence shows that people forget rapidly, especially during the initial period after learning (Carpenter et al., 2012). Forgetting curves document the relationship between the percent of correct information recalled and the time elapsed since the information was learned. A recent systematic review of the evidence shows that after 7 days of learning a set of words, individuals were able to remember 90 percent of them; after 35 days, 50 percent; after 70 days, 30 percent; and after one year, 15 percent. In short, the process of forgetting information is rapid during the first weeks after learning certain information and levels off later on.

That we forget information fast is well documented. However, though information recall is important for many activities, developing skills demands much more than memory. To shed more light on this issue, studies document the effects of skills interventions during the period in which additional support was provided and again after it ended. A good starting point is evidence from early childhood interventions, in particular, the Perry Preschool Project—one of the longest and most influential longitudinal studies ever undertaken.

This research project was conducted in the 1960s in a small city in Michigan in the United States. The 123 children between 3 and 4 years old who participated in the research project were randomly assigned to a part-time preschool or to a control group. Children attending the preschool also received a weekly home visit that aimed to promote better parenting practices at home. Thanks to the program, children dramatically improved their cognitive skills by age 4 (Elango et al., 2016). However, these gains were short-lived. By age 6, two years after the

program ended, the effects of the program on cognitive skills had shrunk to 41 percent of the initial gains and to only 7 percent by age 9. The study showed that gains in cognitive skills faded rapidly over time. But the story doesn't end there. Effects of the program did show up later in life. In particular, measures of academic skills in elementary school among beneficiary children were significantly higher than their peers, a higher fraction graduated from high school, and other important adolescent and adult outcomes were better. Hence, in spite of the initial fade-out in cognitive skills, the program seemed to pay off in terms of an array of skills and relevant adult outcomes over the long term. Other longitudinal studies of early childhood programs, such as the Abecedarian daycare project in North Carolina and the Jamaican parenting program, have documented similar trajectories of effects (Elango et al., 2016; Gertler et al., 2014).

The trajectory of effects for beneficiaries of the U.S. Infant and Health Development Program (IHDP), which aimed to promote the health and development of babies with low birth weight (less than 2,500 grams), contrasts sharply with these other experiences. Some 985 children participated in this intensive program in eight sites across the United States. Beneficiary children received weekly home visits during the first year of life and biweekly home visits in their second and third years of life. They also had access to year-round, full-time daycare services during their second and third years. Participating families were expected to have monthly group meetings to further promote the objectives of the program. The program generated large short-term effects on cognitive skills measured at the end of the intervention, but these effects completely disappeared by age 5. Moreover, and importantly, by age 18 beneficiaries showed no academic or other relevant benefits (McCormick et al., 2006).

Fade-out patterns also have been documented in educational interventions. In particular, Chetty, Friedman, and Rockoff (2014) use rich administrative data from the United States to document the fade-out of academic skills benefits due to the difference in effectiveness of teachers. The effects of having a more effective teacher in a certain year decline to about 58 percent in the following year and to 46 percent, 36 percent, and 34 percent after two, three, and four years, respectively. Importantly, this study also provides evidence that having a better teacher translates into higher earnings in adulthood. Thus, the study does find fade-out effects, but it also documents important long-term outcomes.

Evaluations of educational interventions that follow individuals after the treatment ends almost invariably document important fade-out effects over time. The famous STAR experiment, a large-scale rigorous study implemented in the state of Tennessee in the United States, examined the effects of reducing class sizes from 23 to 15 students per class from kindergarten to third grade. Beneficiary students increased their test scores substantially during the first year of implementation and throughout the life of the intervention. However, two years after the program ended, the effects declined to about 30 percent of the initial gains, remaining relatively constant at that level until grade 9 (Krueger and Whitmore, 2001). Other longitudinal evaluations of educational interventions echo this same pattern of fade-out effects (Andrabi et al., 2011).

Fade-out effects have also been present in public programs that seek to improve labor market outcomes through job training. A rigorous evaluation of Job Corps—the largest job training program for disadvantaged youth in the United States—provides evidence supporting this view (Schochet, Burghardt, and McConnell, 2008). The Job Corps program seeks to help youth become responsible and productive citizens by providing comprehensive services, including basic education, vocational training, and counseling, as well as a range of additional supporting actions. The evaluation showed that the program boosted employment and earnings during several post-treatment years. However, these gains were not sustained over time. Just four years after the start of the evaluation, there were no detectable effects on earning or employment. One potential explanation for these disappointing results is that the skills developed as a result of program participation depreciated over time because of the mobility of program beneficiaries across occupations and in and out of the labor market.

During adulthood, the main mechanism for developing and maintaining skills involves working in demanding tasks. However, little definitive evidence has been found regarding how different types of employment (or lack of it) affect skills. This is because labor market transitions tend to be determined by individual decisions, making it difficult to find similar groups of individuals that undergo different labor market experiences. An important exception is retirement, as this decision is strongly influenced by external factors such as social security rules. Researchers have exploited variation in retirement rates across countries, induced by differences in legislation, to analyze the effect of early retirement on skills depreciation (Rohwedder and Willis, 2010). Results indicate that skills depreciate more

slowly in countries with low early retirement rates compared to those with high early retirement rates. This evidence supports the notion that continuous work in late adulthood reduces skills depreciation.

The bottom line is that the benefits of skills interventions typically fade over time, especially if the skills are not used. Moreover, these fade-out effects follow a recurring pattern in which gains drop off sharply following termination of the program and then level off over time. Large effects on focused skills during treatment seem to be a necessary but not sufficient condition for achieving relevant adult outcomes. The Infant and Health Development Study is a case in point; it generated large cognitive effects during treatment that vanished after two years and did not translate into better adult outcomes. On the bright side, effects on important outcomes, such as cognitive and academic skills, that persist for more than two years after the end of the treatment are associated with improved adult outcomes. In other words, improvements that survive the initial strong fade-out stage seem to indicate permanent improvements in skills development.

What lessons can be drawn from this analysis of skills depreciation? Above all, skills depreciation is a widespread phenomenon that must be considered when developing skills policies. Intense investments in skills seem to generate hefty short-term gains that at least partially dissipate over time. However, these effects do not fade out completely and tend to improve relevant adult outcomes. Hence, the key appears to be sustained support to promote skills throughout the life cycle. Large investments at certain points in time are not enough, and extended periods of low investments or inactivity should be avoided.

The order of skills development also matters. Given the need for practice, general skills should be targeted first, followed by programs to develop specific skills. The development of specific skills builds upon (and allows practice of) general skills that were developed earlier on. Think about the college student in engineering who reads information on the web, analyzes it using statistical techniques, and writes a report. All these general skills are practiced while developing specific knowledge to work in the field of engineering.

On a more practical level, the importance of skills depreciation suggests the need to ensure that learners understand the importance of the skills they are developing, build habits that are conducive to sustained practice of key skills such as reading every day, and use techniques learned, such as basic math, in their daily life.

The Difference Makers

What factors really make a difference in a person's skills development? Are parenting practices a critical factor? What about the role of teachers? Or finishing high school? These are important questions. Pinpointing key factors can help focus attention on how to provide them in a cost-effective way.

To provide empirical evidence on these critical questions, this analysis has reviewed rigorous studies on the long-term effects of skills interventions, particularly on adult earnings. Only studies that have measured the effects of large-scale governmental interventions, and have used rigorous methodologies, have been included. Small studies of model programs have not been included because their effects when implemented at scale have not been established.

The good news is that in recent years, researchers have produced great evidence on how a number of factors affect earnings. The bad news is that all these studies were conducted in member countries of the Organisation for Economic Co-operation and Development (OECD). Hence, caution should be used in extrapolating these results to Latin America and the Caribbean. However, different interventions, such as attending preschool or providing computers for home use, tend to produce similar results in short-term measures of skills regardless of the context. Consequently, it is likely that the findings from rigorous studies, implemented in developed countries on how different interventions affect earnings, will be relevant for Latin America and the Caribbean as well. Still, the rigorous evidence from OECD countries is complemented with some weaker evidence from the region about the potential effects of certain factors on earnings.

Table 2.2 presents the average effects on earnings of a number of interventions. All effects are presented as percent increases in earnings of providing a certain intervention for one year. For example, the table shows that attending one more year of secondary schooling is an important factor during adolescence, boosting adult earnings by 5 percent in OECD countries. Similarly, an additional year of secondary schooling will increase adult earnings by 5 percent in Latin America and the Caribbean. Note that for interventions lasting more than one year, the total effect on earnings is compounded. That is, if an intervention generates an increase in earnings of 10 percent per year and the intervention lasts two years, then the total increase in earnings is 21 percent (1.1×1.1). Table 2.2

Table 2.2. Effect on Earnings of Main Factors in Developing Skills

Increase in earnings per year of intervention (percent)

Stage	Factor	Representative intervention	Effect on earnings	
			OECD	LAC
Early childhood	Parenting	Parenting program	—	—
	Preschool enrollment	Attendance	5%	—
	Preschool quality	Having a better teacher	—	—
Childhood	Primary school quality	Having a better teacher	1%	—
Adolescence	Secondary enrollment	Attendance	5%	5%
	Secondary school quality	Having a better teacher	1%	—
	Support and guidance	Mentoring and academic support	2%	—
Adulthood	Post-secondary enrollment	Attendance	11%	12%
	Post-secondary quality	Attending a better institution	—	—
	Post-secondary specialization	STEM versus Social Sciences	11%	—
	Learning-by-doing	Work experience	2%	—

Source: Average earnings effects for OECD countries were computed using the studies described in Tables 2.3 and 2.4. Average earnings effects for Latin American and Caribbean countries were obtained from Montenegro and Patrino (2014).

Notes: This table presents evidence on the average effects of different skills interventions on adult earnings. All effects are presented as average percent gain in earnings. To compute effects for OECD countries, evaluations of governmental programs that were implemented in multiple sites are included. Moreover, only included are evaluations that use the following methodologies: randomized controlled trials, regression discontinuity, instrumental variables, differences-in-differences, control function and fixed effects at the individual or family level. Not included are evaluations that use cross-sectional comparisons, even when they adjust for observable differences across groups via regression or matching methods. Average percent gains for each analyzed intervention are computed in two steps. First, effects to present average gain per year of intervention are normalized. For example, Bahr et al. (2015) report that attending a two-year community college increases earnings by 23%. In this case, the per-year gain is considered to be $(1.23)^{0.5} - 1 = 10.9\%$. Second, the aggregate summary for each analyzed intervention (e.g., post-secondary enrollment) is computed by averaging the per-year effects on earnings across studies. The evidence for Latin American and Caribbean countries corresponds to cross-sectional estimates of the effects of the analyzed interventions on earnings. Finally, "having a better teacher" refers to the effects of a one standard deviation increase in teacher effectiveness.

summarizes the results of the included studies, which are described in more detail in Tables 2.3 and 2.4.

Starting with early childhood, some studies suggest that good parenting practices can make a difference. Though no large-scale evaluations exist of the effect of this program on earnings (which explains why the table reports no data), an evaluation of a model program in Jamaica showed 25 percent higher earnings among beneficiaries (Gertler et al., 2014). Evaluations of nine parenting programs in Latin America and the Caribbean show substantial effects on cognitive skills (Berlinski and Schady, 2015).

For children aged 3 and 4 years old, attending preschool can also make a difference. The OECD evidence indicates that attending preschool

Table 2.3. Effects on Earnings of Skills Interventions during Childhood and Adolescence

	Factor	Intervention	Study	Country	N	Duration (years)	Per-year effect
Early childhood	Preschool enrollment	Head Start	Garces, Thomas, and Currie (2002)	US	728	1	12%
		Universal preschool	Havnes and Mogstad (2015)	Norway	498,947	2	0%
		Universal Kindergarten	Cascio (2009)	US	840	1	2%
Childhood	Primary school quality	One SD better teacher in grades 3–8	Chetty, Friedman, and Rockoff (2014)	US	650,965	1	1%
Adolescence	Secondary enrollment	One more year of education at age 12	Meghir and Palme (2005)	Sweden	19,316	1.5	1%
			Stephens and Yang (2014)	US	3,680,223	1	0%
		One more year of education at age 14	Oreopoulos (2006a)	Canada	3,296	1	10%
	Secondary school quality		Devereux and Hart (2010)	UK	85,766	1	2%
			Oreopoulos (2006b)	US	29,804	1	14%
		One SD better teacher in grades 3–8	Chetty, Friedman, and Rockoff (2014)	US	650,965	1	1%
		Support and guidance	Career Academies	Kemple (2008)	US	1,428	3.5
Quantum Opportunity Program	Rodríguez-Planas (2012)		US	1,069	4.5	1%	

Source: Authors' compilation.

Notes: This table presents studies that have estimated the effects of skills interventions implemented during childhood and adolescence on adult earnings. The effects are presented as percent gains in earnings for the total duration of the intervention. This table is constructed using the total gain in earnings if it is reported by the authors of the original studies. If the gain in earnings is not reported, it is computed as a ratio of the difference between average earnings of treatment and control groups and average earnings of control group or sample mean. Devereux and Hart (2010) only report effects for male and female sub-samples separately. For this study, the weighted average of male and female effects is computed and the composite effect is reported.

for one year increases earnings by 5 percent, enhances cognitive skills during early childhood, and improves academic skills during elementary school (see, for example, Berlinski, Galiani, and Gertler, 2009).

Finally, the quality of preschools—that is, their effectiveness in developing cognitive and socioemotional skills—is expected to matter for earnings. Though direct empirical evidence on this factor is limited, the important

Table 2.4. Effects on Earnings of Skills Interventions in Adulthood

Factor	Intervention	Study	Country	N	Duration (years)	Per-year effect	
Post-secondary enrollment	Community college: one year	Bahr (2014)	US, California	759,489	1	15%	
		Stevens, Kurlaender, and Grosz (2015)	US, California	256,851	1	14%	
		Jepsen, Troske, and Coomes (2014)	US, Kentucky	20,458	1	6%	
		Bahr et al. (2015)					
		Liu, Belfield, and Trimble (2015)	US, Michigan	488,062	1	9%	
	Community college: two years	College: four years		US, North Carolina	235,113	1	5%
			Bahr (2014)	US, California	759,489	2	3%
			Stevens, Kurlaender, and Grosz (2015)	US, California	345,810	2	13%
			Jepsen, Troske, and Coomes (2014)	US, Kentucky	22,092	2	19%
			Bahr et al. (2015)	US, Michigan	488,062	2	11%
Post-secondary specialization	Payoffs to different fields	Liu, Belfield, and Trimble (2015)	US, North Carolina	235,113	2	13%	
		Liu, Belfield, and Trimble (2015)	US, North Carolina	235,113	4	11%	
Learning-by-doing	One year of working experience	Kirkeboen, Leuven, and Mogstad (2016)	Norway	1,245	4	11%	
		Dustmann and Meghir (2005)	Germany	6,385	1	2%	

Source: Authors' compilation.

Notes: This table presents studies that have estimated the effects of skills interventions implemented during adulthood. The effects are presented as percent gains in earnings for the total duration of the intervention. This table is constructed using the total gain in earnings if it is reported by the authors of the original studies. If the gain in earnings is not reported, it is computed as a ratio of the difference between average earnings of treatment and control groups and average earnings of control group or sample mean. Some studies —Bahr et al. (2015), Jepsen, Troske, and Coomes (2014), Liu, Belfield, and Trimble (2015)—report effects for male and female sub-samples separately. For these studies, the weighted average of male and female effects is computed and the composite effect is reported. The effect for post-secondary specialization is computed using the evidence from Figure IX in Kirkeboen, Leuven, and Mogstad (2016: 58). This effect is computed as a difference between gain in earnings of STEM students and Social Science students. The effects for learning-by-doing are based on the evidence reported in Table 10 in Dustmann and Meghir (2005: 99). To get this effect, the average gain across skilled and unskilled workers weighted by sample size and years of experience is computed.

effects of model programs, such as the Perry Preschool Project, suggest that improving the quality of preschools can affect adult outcomes.

During childhood, one factor stands out: elementary school quality. Since elementary school enrollment is virtually universal in the

region, expanding school coverage is not a central factor at this stage. On the other hand, with almost all children attending school, improvements in school quality could improve skills among large segments of the population.

Evidence exists to back up this idea. A careful study implemented in the United States showed that teacher quality affects adult earnings. Specifically, shifting a student from an average teacher to a teacher in the 84th percentile of the teacher quality distribution for one grade level would increase her adult earnings by about 1 percent (Chetty, Friedman, and Rockoff, 2014). Hence, improving the quality of primary education is critical, especially if quality improves in all grades.

As children move to adolescence, school quality remains important, but other critical factors emerge for skills development. In particular, many adolescents in the region drop out of school before completing their secondary education. This is a significant problem, as evidence from both OECD countries and the region suggests that earnings increase by 5 percent with each additional year of secondary education. Consequently, ensuring that students complete secondary education can yield important gains in adult earnings.

Adolescence also brings new challenges to individuals. The greater freedom they typically enjoy during these years opens up the possibility of engaging in risky behaviors. In particular, recreational drugs, criminal activities, and unprotected sex can cast a long-term shadow over an individual's life. Keeping youth from traveling down this dangerous path provides a strong motivation for implementing socioemotional support programs during this stage. The available evidence suggests that such efforts can pay off. Two programs implemented in the United States provided beneficiaries with mentoring and academic support; each year of support generated an increase in 1 to 3 percent in earnings (Kemple, 2008; Rodríguez-Planas 2012).

Adulthood brings great opportunities for the development of skills. Post-secondary education is the difference maker in this stage. OECD evidence indicates that one additional year of post-secondary education can propel earnings a sizeable 11 percent, and the effect may be even greater in Latin America and the Caribbean. Improvements in the quality of post-secondary education likely play an important role as well, but little evidence exists to back up this suspicion.

However, all post-secondary education is not created equal. What people study matters. Evidence suggests that the returns to

post-secondary education vary significantly depending on the field of study. In particular, a rigorous study done in Norway showed that a university degree in a career related to science, technology, engineering, or math increased earnings 11 percent per year of study more than a degree in the social sciences (Kirkeboen, Leuven, and Mogstad, 2016). Evidence from the United States also suggests that the returns to different fields of study vary significantly (Barrow and Malamud, 2015).

Finally, limited evidence on the role of learning-by-doing suggests that this is an important factor for skills development. In particular, a study in Germany showed that the average worker enjoys a cumulative increase of 2 percent per each additional year of work experience (Dustmann and Meghir, 2005). That is, a worker who has accumulated five years of work experience will have a salary 10 percent higher than a worker who did not accumulate work experience during that time.

The Rest of the Story

This chapter opened with the story of Wilber and Carlos, the twins who were separated at birth and who followed markedly different lives. The story is actually a bit more complex. Wilber and Carlos were not voluntarily separated. Instead, they were part of a complicated hospital error involving not one, but two sets of twins. Another set of twins, Jorge and William, born at the same time and place, were also separated at birth. The hospital mismatched the four babies and both sets of twins were separated. Carlos and Jorge were raised by high-income parents, though only Jorge was their biological child. Wilber and William were raised by a low-income family, though only Wilber was the biological child of this family. William and Carlos were switched to other families without anybody realizing the mistake. Twenty-four years later, the two individuals raised by the low-income families had not completed secondary education and were working as butchers, whereas the two individuals who were raised by the high-income family had completed post-secondary education and were working as professionals (Dominus, 2015).

This story illustrates the main message of this chapter. Skills are highly malleable and can be developed with adequate stimulation and support. The chapter has analyzed how skills are developed from two different perspectives: conceptual and empirical.

Conceptually, several points have been made. To begin with, multiple skills are necessary for productive work. These skills are developed

at different stages of the life cycle in a way that ideally builds upon previous skills. Some skills can be easily measured, but for others it is better to use proxies to look at levels and effects on final outcomes, such as risky behavior and earnings. To improve policy, it is important to advance a more comprehensive agenda to measure skills at different stages of life. It takes intensive practice, feedback, and proper guidance to develop skills. Finally, skills are quickly lost; hence, people need to keep practicing those that continue to be relevant.

These theoretical conclusions, though important, are not enough to pinpoint the critical factors in the skills development process. Empirical evidence provides the basis for arriving at four main conclusions. First, the quantity and quality of education have been linked to earnings. The essential role of education is relevant throughout the life cycle. Second, support by parents and mentors can make a difference, particularly during early childhood and adolescence. Third, specialization in occupations with high demand can raise earnings considerably. This point is well illustrated by the differences in returns yielded by various fields studied during post-secondary education. Finally, labor market experience can pay off handsomely in earnings. Individuals who accumulate relevant labor market experience are likely to see their earnings rise significantly.

This chapter lays out a set of theoretical principles and empirical findings about the skills development process. This basic conceptual framework will guide the analysis in the remainder of this book, with the ultimate aim of assisting governments in better promoting skills to improve equity, productivity, and the quality of life in Latin America and the Caribbean.

3 Skills Development: Breaking It Down

Skills are the backbone of economic development. They are a key driver of economic growth and a key determinant of income mobility. If Latin American and Caribbean countries want to catch up to more developed economies in terms of wealth, they first need to boost the skills levels of individuals entering the labor market. And if they want to increase income mobility, they need to enhance the skills—and the opportunity to acquire those skills—of all their citizens, including children born into low-income households (Solon, 1992; Chetty et al., 2017).

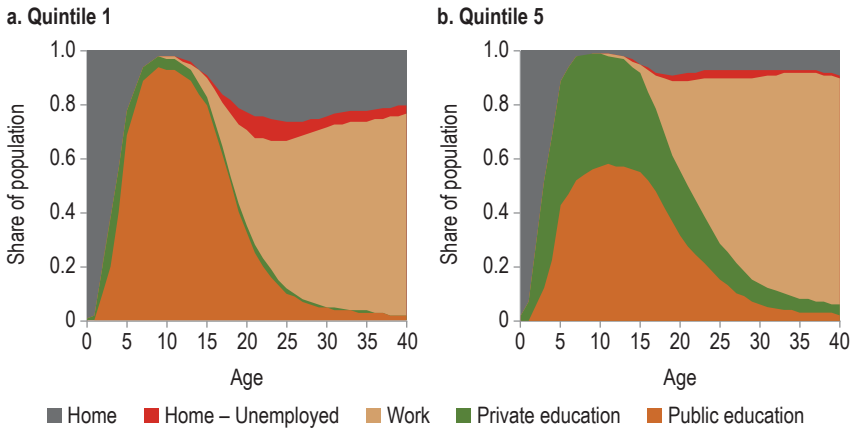
When discussing skills accumulation in the region, it is useful to lay out a simple production function of skills and examine its different inputs: (i) the individual's stock of skills; (ii) the time and effort devoted to learning; (iii) the private financial resources spent by households and firms in skills development; and (iv) public spending on education and job training. The goal is to look at these inputs and at different skill measures separately, document socioeconomic gradients in skills, and set the stage for the rest of the book to design sounder public policy for skills formation.

A Lifetime of Learning

People acquire skills throughout their lifetime and in a variety of settings. Cunha and Heckman (2007) develop a simple model of the evolution of skills over the life cycle. At each stage in life, parental background, parental and individual investments, and the skills accumulated up to that point in time determine the skills at the next stage. Early in life, parents with better parenting skills can provide their children with an environment at home that supports and fosters learning. They can also influence their children's skills by investing more resources (e.g., buying books or toys) or investing more time (e.g., reading or helping with homework). Children and youth also invest their own resources and time

Figure 3.1 Where Skills Are Formed

Environment by age and income quintile, Latin American and Caribbean regional average



Source: Authors' calculations based on household surveys.

Note: Latin American and Caribbean regional average was calculated as the unweighted mean of the country-level shares using last year with available data (2012-2014). Only countries with information regarding public and private education were included. Those countries are: Argentina, Bolivia, Brazil, Colombia, Costa Rica, El Salvador, Mexico, Peru, and Uruguay. Information for ages 0-4 only includes information for Argentina, Brazil, El Salvador and Uruguay. The share was computed as follows: each individual was considered to be "at home" if she was not enrolled in any educational institution, was not working, and was not looking for a job (dark gray); she was considered "in school" if she was enrolled in any educational institution (green/dark orange), she was considered at work if she was not enrolled in any educational institution and was working (light orange), and "at home unemployed" if she was not enrolled in any educational institution, not working, and actively looking for a job (red).

in their skills formation (e.g. by choosing how much effort to put into studying). Once a person enters adulthood and leaves the formal education system, most skills accumulation occurs in the workplace. There, the individual can acquire skills through formal training offered by the firm or by learning-by-doing in her firm, occupation, or industry.

People are most likely to develop skills in the three places where they spend the most time: at home, in school, and in the workplace. Figure 3.1 shows the average time spent by a person in these three environments, contrasting patterns in the 20 percent lowest-income households (Panel A) and the 20 percent wealthiest households (Panel B). Several points are worth noting. First, what happens at home is probably the only thing that matters during early childhood. Some children, largely from high-income households, enter daycare at age 2; however, for most children the only place they can develop skills is at home. Second, during childhood and adolescence, what happens in school becomes crucial

to understanding skills formation: at that age they spend between four and seven hours a day in school. The rest of the time is spent at home—again, what happens there is vitally important. Children in low-income households are more likely to attend public schools. Therefore, skills formation in these schools is what matters the most for them. Children born to high-income households are more likely to attend private schools and remain in the formal education system much longer, usually through higher education. Once individuals finish formal education, they enter the labor market. The majority of them accumulate skills in the workplace. However, an important fraction of 18-to-25-year olds are unemployed and not studying (which means that in all likelihood whatever skills they acquired are beginning to fade). This process of skills erosion is much more severe among people in low-income households.

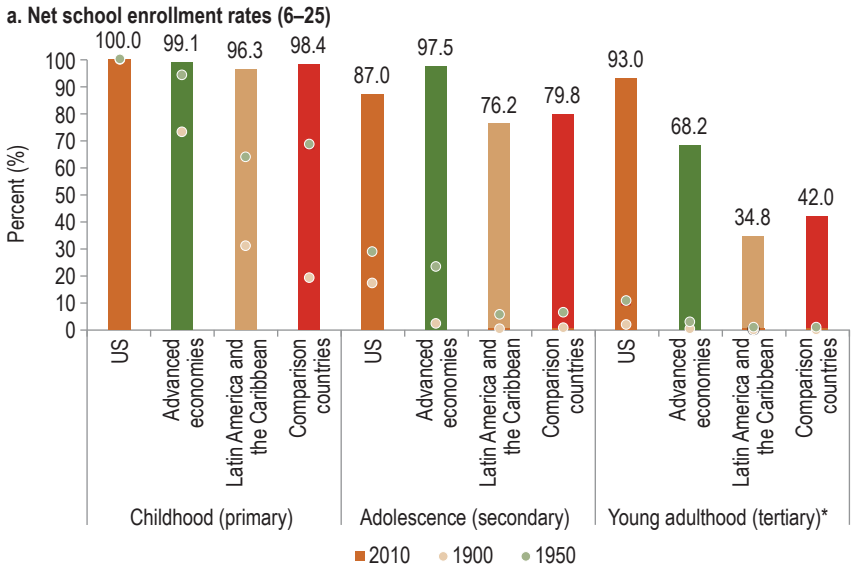
The process of skills accumulation is dynamic and has three important characteristics (Cunha and Heckman, 2007). First, skills are *self-productive*. Skills acquired today persist into the future and reinforce the ability to accumulate more skills tomorrow. Thus, gaps in the level of skills are difficult to close later in life without compensatory investments. Second, there are *dynamic complementarities*. Today's skill investments increase the return on future investments and, therefore, provide incentives for parents and children to invest even more on skills tomorrow. Third, different types of skills *complement* each other. That is, better cognitive, academic, or socioemotional skills today facilitate developing even more socioemotional, academic, and cognitive skills tomorrow. Gaps in, say, academic skills can generate gaps in socioemotional skills (and vice versa).

Importantly, the mechanisms of skills accumulation say nothing about the incentives of individuals to invest their time and resources into developing skills (e.g., staying or dropping out of school, career choice, etc.). That issue is analyzed in Chapter 4, which explores the levels and evolution of the returns to skills in the region.

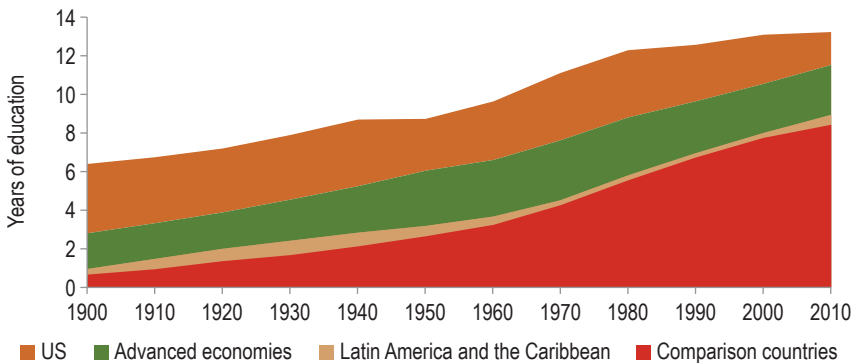
Skills: A Race to the Top

Schooling has increased in the region. Even though schooling is not synonymous with skills, it serves as a proxy to study the long-run trends in skills formation (for which data are lacking). Each bar in Panel A of Figure 3.2 shows the level of net enrollment in school over the life cycle in 2010 for Latin America and the Caribbean as well as for other comparison

Figure 3.2 Schooling in the Twentieth Century



b. Convergence in years of schooling



Source: Authors’ calculations based on Barro and Lee (2015) and household surveys.
 Note: The last available data by Barro and Lee for Latin America and the Caribbean countries were adjusted using household survey data and extrapolated using the trends identified by Barro and Lee. Simple average by region is reported on the graphs. Latin America and the Caribbean region includes: Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, and Venezuela. Comparison countries include: Albania, Algeria, Bulgaria, Hungary, Indonesia, Malaysia, Morocco, Philippines, Poland, Serbia, Thailand, Tunisia and Turkey. Developed countries include: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom. Regions’ averages are calculated as the unweighted means of the country-level indicators.
 * Tertiary enrollment rates are calculated as the number of people between the expected school graduation rate and the expected school graduation rate plus five years, who have not completed tertiary education and that are currently enrolled in tertiary education, over the population in the same age range that have not completed tertiary education.

regions of similar level of development.¹ Inside each bar, each dot shows the level in 1900 and each triangle, the level in 1950.

In 1900, schools were rare in Latin America and the Caribbean. Only one in three children attended primary school, while the proportion of people enrolled in secondary and tertiary education was negligible. Since then, enrollment in primary school has steadily increased by 0.6 percentage points per year and has almost caught up with more developed economies. All countries in Latin America have shown progress. Today, 18 countries have pre-primary enrollment rates higher than 50 percent. Most countries in the region have achieved near full enrollment in primary school, but the on-time completion rate is only 76 percent (Bassi, Busso, and Muñoz, 2015).

This high enrollment rate in primary school translated into more students accessing secondary school. By 1950, the region started expanding access to secondary education, which increased from 6 percent to almost 78 percent in 2010. Today, ten countries enjoy secondary school enrollment rates higher than 85 percent. Even though enrollment rates in the region kept pace with those of countries at similar levels of development, there are still sizable gaps with respect to more advanced economies. The bottleneck is not in enrolling students in secondary school. It is, instead, the high dropout rates in the region. Only 45 percent of students graduate on time from secondary school (Bassi, Busso, and Muñoz, 2015). Among the reasons for high dropout rates include the high opportunity cost of being in school (Atkin, 2016) and a lack of interest in attending school (e.g., Eckstein and Wolpin, 1999). The underlying culprits may be the low quality of education in the region and its limited relevance for succeeding in the job market (see Bassi et al., 2012 and Chapter 8).

The tertiary school enrollment rate followed a similar pattern, rising from 1 percent in 1950 to 40 percent in 2010. The expansion, however, is very recent. In the last 15 years, average enrollment in higher education has doubled in the region, reaching 37 percent. In fact, enrollment rates in 10 countries have surpassed 40 percent. However, this increase in access has not been accompanied by a proportional increase in

¹ The comparison group is based on two criteria: i) countries with GDP per capita (PPP at constant 2011 international dollars) in the same range as countries in Latin America and the Caribbean (between \$6,500 and \$25,500) and ii) countries for which data were available for at least two of the indicators used in the chapter, providing some level of consistency across comparisons.

graduation. About 50 percent of the students who start a 4-year program and 64 percent of those who begin shorter programs eventually drop out (Ferreyra et al., 2017).

Naturally, increasing school enrollment rates translated into a labor force with more years of schooling. The average years of education increased from essentially zero in the early twentieth century to nine years of education on average today (Figure 3.2, Panel B). The region has made significant progress, and today its population is probably more skilled than ever before. Despite this progress, the region has not caught up with developed countries in terms of schooling, in terms of years of education—or, as the next section shows, in terms of skills.

Skills: Systematically Low

A newborn's health and well-being are the cornerstone of the skills development process. In the past five decades, the region has made great strides in reducing infant mortality, the proportion of children born with low weight, and stunting rates (Berlinski and Schady, 2015). From 1960 to 2010, infant mortality declined by more than 75 percent in the majority of countries in the region. On average, about 9 percent of children are born with low birth weight (less than 2,500 grams), 4.7 percentage points lower than that observed in other developing countries. Since 1990, stunting has fallen by approximately 50 percent in 10 countries. Most countries in the region now have stunting rates that are equal to or lower than those found in other countries with similar income levels.²

Most young children in the region attend primary schools. But how much do they actually learn in schools? Most countries in the region have participated in a variety of international and regional assessments that allow comparing their academic skill levels with those of students from other countries. Scores from the Trends in International Mathematics and Science Study (TIMSS) and the Second Regional Comparative and Explanatory Study (SERCE) were equated in order to compare math achievement between countries in Latin America and the Caribbean and

² It is difficult to make international comparisons beyond health outcomes because of a lack of data. There is no source of information that allows for comparing countries in LAC with more developed countries in other dimensions of child development like cognitive, language, socioemotional and motor skills.

developed countries.^{3,4} The results of these assessments show that primary students in the region are not learning the most basic academic skills that they should in school, and that their performance is very low compared to developed countries.

The equated scores between the two tests show that in most Latin American and Caribbean countries fewer than half of the students would have scored above the low benchmark had they participated in TIMSS, which means that most students lack even the basic skills required for that grade (Figure 3.3).⁵ These students may have some basic mathematical knowledge, but they cannot add and subtract whole numbers, recognize parallel or perpendicular lines and familiar geometric shapes, or coordinate maps, and they cannot read and complete simple bar graphs and tables. In contrast, 95 percent of fourth grade students in the United States and 66 percent in countries with similar levels of gross enrollment and development reach the low benchmark for that grade and subject.

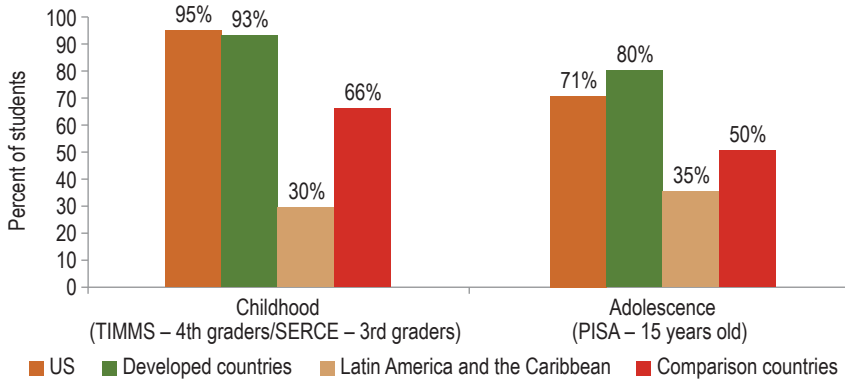
This lack of basic academic skills during childhood carries over into adolescence. Adolescents in Latin America and the Caribbean also have low academic skill levels compared to developed countries and to countries with similar levels of development in other regions. This deficit reflects both the poor skills development these teenagers received during childhood, which limits their capacity to learn, and the low quality of secondary education. The deficiencies of their past combine with inadequate schooling in the present and add up to an insufficient stock of skills to thrive in the future.

³ SERCE is a regional assessment that was administered in 2006 to third-graders in 15 Latin American and Caribbean countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Nicaragua, Panama, Paraguay, Peru, Mexico, and Uruguay. TIMMS is an international assessment that was administered in 2007 to fourth-graders in various countries around the world, including Colombia and El Salvador. The procedure basically exploited the fact that two countries (Colombia and El Salvador) took both exams. Following a procedure similar to the one used in Hanushek, Peterson, and Woessmann (2014), it uses relationships to predict how other countries would have performed on TIMMS.

⁴ There is a very high correlation between different measurements of academic assessments and other skill measures (e.g., IQ) when doing cross-country analysis. This result has been interpreted to mean that many assessment tests capture the underlying cognitive ability of each country (Rindermann, 2007).

⁵ In the actual TIMMS, only 31 percent of fourth grade students in Colombia and 22 percent of fourth grade students in El Salvador score at or above the assessments' low benchmark in math.

Figure 3.3 Students that Achieve at Least the Low Benchmark in Math on International Tests (percent)



Source: PISA and authors' calculations using TIMSS 2007 and SERCE 2006.

Note: To equate low benchmark rates across SERCE and TIMSS participating countries, the authors execute a crosswalk between the two tests by identifying levels of performance on SERCE that yield equivalent percentage of Colombian students meeting the TIMSS low benchmark (400 points). Low benchmark TIMSS: Students have some basic mathematical knowledge. Low performers PISA: cannot use basic algorithms, formulas, procedures or conventions to solve problems involving whole numbers. Countries in each category are grouped as follows: TIMSS/SERCE – (Latin America and the Caribbean) Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay. (Comparison countries) Algeria, Armenia, Georgia, Hungary, Kazakhstan, Latvia, Morocco, and Tunisia. (Developed countries) Australia, Austria, Denmark, England, Germany, Hong Kong, Italy, Japan, Netherlands, New Zealand, Norway, Scotland, Singapore, and Sweden. PISA – (Latin America and the Caribbean) Brazil, Chile, Colombia, Dominican Republic, Mexico, Peru, and Uruguay. (Comparison Countries) Albania, Algeria, Bulgaria, Croatia, Georgia, Hungary, Indonesia, Latvia, Macedonia, Montenegro, Poland, Romania, Thailand, Tunisia, and Turkey.

In 2015, 10 Latin American countries participated in the Programme for International Student Assessment (PISA). Amongst the 72 participating economies, all Latin American and Caribbean countries ranked at the bottom of the proficiency distribution: Chile, Latin America's best PISA performer, ranked 48 in math, 42 in reading, and 44 in science, while the Dominican Republic was the worst performing country of all those that participated. Moreover, more than 63 percent of the 15-year-old Latin Americans that participated in PISA are unable to conduct more than the simplest math tasks for that grade and are likely to struggle using basic math concepts throughout their lives.⁶

⁶ Regional gaps are absolute but also exist when controlling for level of development. For each country in Latin America one can find a country of similar or lower per capita GDP that performs better on the 2015 PISA assessment test.

Results from the 2013 Caribbean Secondary Education Certificate (CSEC), an assessment administered to secondary students in four Caribbean countries, show similarly poor results for Barbados, Trinidad and Tobago, Jamaica, and Guyana. CSEC, a test taken by people who have finished the 5 years of secondary school, is used to determine access to higher education. Only 34 percent of students that took the Math CSEC in these four countries were able to pass the test and demonstrate the skills required to access higher education.

Despite the region's relatively poor performance, it seems to be making progress. In Brazil, Chile, Mexico, and Peru—the only four countries in the region with reliable data for both 2000 and 2015—the share of low achievers dropped 14 percentage points in both math and language.

When individuals enter the labor market as adults, a lifetime of deficient skills accumulation can take a toll on their productivity in the workplace. Results from the 2015 OECD's Programme for the International Assessment of Adult Competencies (PIACC) reveal the very low level of skills among adults in Chile, the only Latin American country that participated in this round of the program (and the country in the region that best performs in PISA). Only about 1.6 percent of adults in Chile achieve the highest levels of literacy proficiency, compared to around 10.6 percent of adults on average across OECD countries. Adults that lack this level of proficiency cannot search and integrate information across multiple, dense texts or synthesize similar and contrasting ideas or points of view. Numeracy skills are similarly poor; almost 62 percent of adults scored at or below Level 1 in numeracy (39 percentage points higher than the OECD average of 22.7 percent). That means they cannot perform tasks that require two or more steps involving the calculation of whole numbers, decimals, percentages, and fractions, for example.

Skills Inequality

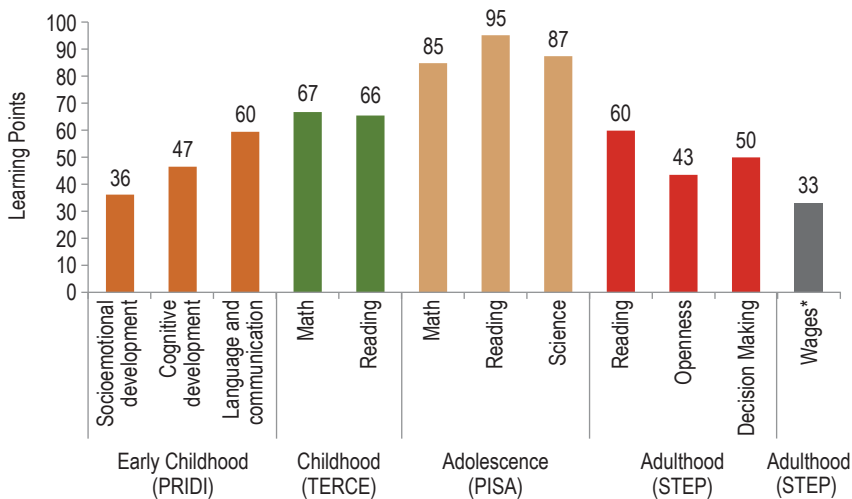
Skills are not only low in the region but also unequally distributed between low- and high-income households. The steep socioeconomic gradients in skills development start during early childhood. The Regional Program of Indicators of Child Development (PRIDI, for its Spanish acronym) initiative collected data on children 24 and 59 months in four areas: language and communication, cognitive, motor, and socioemotional development. The program collected data on nationally representative samples in four countries: Costa Rica, Nicaragua, Paraguay, and Peru (Verdisco et al., 2015).

Figure 3.4 presents socioeconomic gaps over the life cycle. Gaps are measured in terms of a standard deviation. To give a sense of what this magnitude means, consider that in the United States during grade 5 children’s performance in nationally normed math tests improves 0.4 of a standard deviation while during grade 10 that performance improves 0.25 of a standard deviation (Hill et al., 2008). Note, however, that measures are not comparable across different instruments.

The first three bars show the gaps in PRIDI scores between the richest and poorest quintiles. The differences in language development and cognition are large, while the variation is smaller in socioemotional development. Similar results were found using the Peabody Picture Vocabulary Test in Chile, Colombia, Ecuador, Nicaragua, and Peru (Schady et al. 2015).

The skills gaps that appear in the early years remain large throughout childhood, adolescence, and adulthood. In the 2013 Third Regional Comparative and Explanatory Study (TERCE), third grade students in the poorest quintile did significantly worse than those in the richest quintile. By age 15, the average PISA score among Latin American and Caribbean

Figure 3.4 Gaps in Skills by Socioeconomic Status



Source: Author’s calculations based on Regional Project on Child Development Indicators - IDB; Third Regional Comparative and Explanatory Study (TERCE); PISA; and Skills Towards Employability and Productivity Survey - World Bank (STEP).

Note: First three surveys calculate the socioeconomic status of the child using household data on assets and dwelling characteristics. The gap refers to the difference between the 5th and the 1st quintile. STEP socioeconomic status was calculated using the maximum level of education of the parents and controlled for education, age and gender of the person. Point estimates show difference between parents with less than primary with parents with tertiary education.

students in the lowest quintile was about 85-95 points (almost one standard deviation) lower than the average score among the wealthiest Latin American and Caribbean students. These differences between rich and poor students are much smaller in developed countries. In adulthood, the World Bank's Skills Towards Employability and Productivity Program (STEP) measures skills in low- and middle-income countries, including Colombia and Bolivia, and finds socioeconomic gradients among adults in academic and socioemotional skills as well as wages. Individuals with more educated parents reach adulthood with literacy and noncognitive skills (measured as intellectual curiosity and decision-making ability) that are 0.4-0.6 standard deviations higher than their counterparts with less educated parents. Because both cognitive and noncognitive skills affect wages (Heckman, Stixrud, and Urzúa, 2006), it is no surprise that these gradients in skills translate into gradients in wages: a person whose parents completed secondary education enjoys wages that are 33 percent higher than a person with the same level of education but whose parents did not complete primary education. Parents with low skills beget children with low skills and wages. Can differential investments compensate children born to poor households?

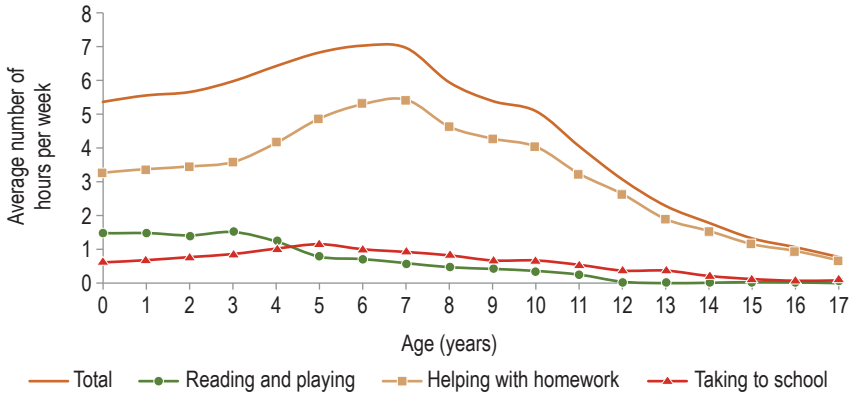
Time to Learn

Parents invest time in raising their children by playing, reading, or helping them with homework. This helps children develop skills. Early on in life, play offers parents an opportunity to engage with their children and contributes to the cognitive, physical, and socioemotional development of children and youth (e.g., Ginsburg, 2007). When parents read to their children from a young age, they help develop vocabulary and listening comprehension skills that later on impact their children's academic skills (e.g., Sénéchal and LeFevre, 2002). Similarly, parents who involve themselves in their children's homework and academic achievement have a small to moderate effect on their children's academic skills development. (Fan and Chen, 2001). Interestingly, higher parental expectations rather than direct supervision explain most of this effect.

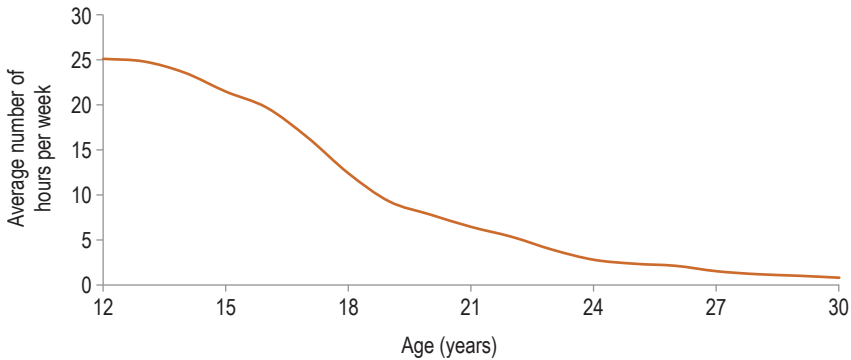
Measurement of these time investments can be roughly approximated using time use surveys focused on the so-called primary child-rearing activities: that is, the number of hours that parents devote to their child as opposed to other activities (e.g., cooking) while children are in the house (Zick and Bryant, 1996). Figure 3.5 (Panel A) shows the

Figure 3.5 Time Invested in Acquiring Skills

a. Parental time



b. Own time



Source: Authors' calculations based on Torres and Agüero (2017).

Note: Calculations were based on the Time Use Surveys of Argentina (2013), Colombia (2012–2013), Ecuador (2012), Mexico (2009), Peru (2010), and Uruguay (2013). The sample used in every country varies according to the question of the Time Use Survey, which most of the time differs between countries. Argentina's question about homework refers to the time spent helping all household members, not only children. For Uruguay, the question about homework applies to households with children from 4 to 12 years old. For Colombia, the question about reading to a child is only asked to households with children between 0 and 5 years old. Ecuador's survey regarding reading to children considers households with at least one child who is 12 or younger. For Mexico, questions are only asked of households with children between 0–15 years. In Peru and Ecuador, the question about reading also includes the time spent playing with the child. It includes the time spent reading to the child and helping them with homework.

average time Latin American and Caribbean parents spend with their children in activities related to skills formation. Total time increases until they enter elementary school (mainly through activities like playing and reading). During elementary school, parents spend about 4.5 hours a week helping their children with their homework. After peaking around

age 7, parents spend less and less time until the end of secondary school when time investment is minimal. These results are larger than those found, for instance, in the United States. Parents in the United States spend about 3 hours a week on educational care (that includes reading, teaching and helping with homework) and about 2.8 hours a week doing travel child care such as driving a child to school or to a doctor (Guryan, Hurst, and Kearney, 2008).

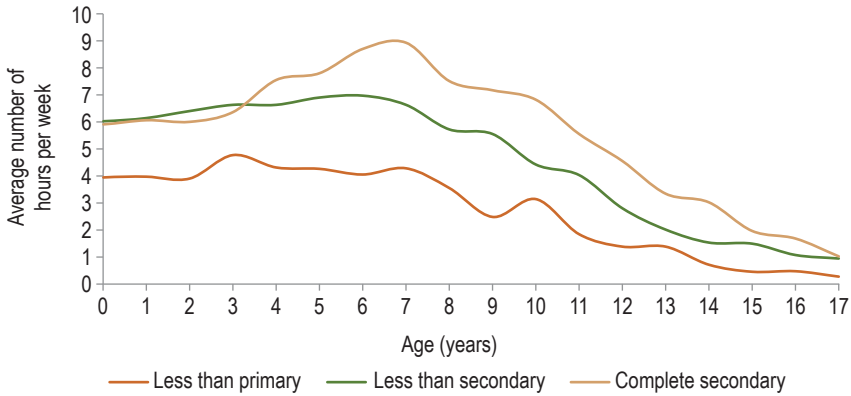
Individuals themselves also choose how much time to spend developing their skills. Panel B of Figure 3.5 shows the number of hours per week people spend in school and doing homework in Latin America and the Caribbean. Since students drop out of school early, the average number of hours decreases over time. Individuals between 12 and 17 years old spend approximately seven hours a week doing homework, while people between 18 and 23 spend less than four hours a week doing homework. The average goes down even further after age 23, when most individuals have entered the labor market. Data from PISA show that students in the OECD spend fewer hours in school per week and fewer hours learning outside of school than students in Latin America and the Caribbean; although within the region hours spent learning in and outside school varies considerably.

Parents with more education spend more hours a week helping their children with homework—a pattern that is fairly constant over the life cycle (see Figure 3.6). Allub and Berniell (2016) use several sources of micro level data for Latin America and the Caribbean to document a positive socioeconomic gradient in parental and individual time invested in developing children’s skills. Higher educated/income parents spend more time with children on both educational and recreational activities, especially when they are young, possibly because these parents can have a greater impact on their children.

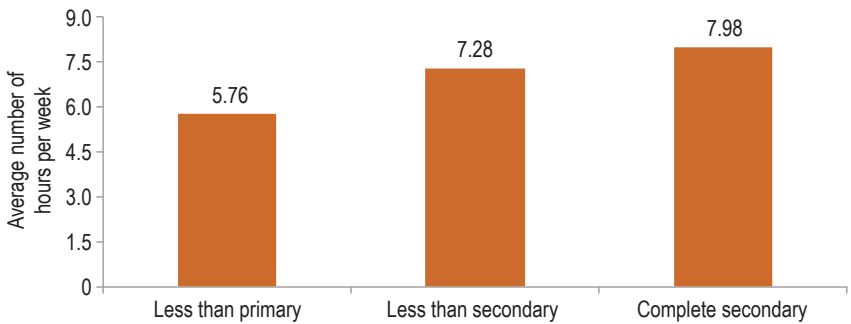
Latin American parents and children seem to allocate a similar number of hours to skills development as families in more developed countries. However, is it possible that the quality of those investments is low? Three examples suggest that is the case. One measure of the quality of interactions at home is given by the prevalence of harsh punishment or child abuse. In Belize, Bolivia, Jamaica, and Saint Lucia, the incidence (measured as once in a lifetime) of harsh corporal punishment is 40 percent or more, and in Colombia, Peru, Suriname, and Trinidad and Tobago, it is close to or above 30 percent (Berlinski and Schady, 2015). By comparison, in the United States the incidence of severe corporal punishment is about 5 percent per year (Lansford et al., 2010).

Figure 3.6 Time Investments in Skill Formation by Mother’s Educational Level

a. Parental time



b. Time spent doing homework



Source: Torres and Agüero (2017).
 Note: The sample includes only individuals who are 12 to 17 years old and whose mother lives with them in the household. Parental time investment includes the time spent reading to the child, helping them with homework, and taking the child to school.

A second example comes from a recent study that assessed the quality of the interactions of kindergarten teachers with their students in Ecuador. Kindergarten teachers in this country provide significantly lower pedagogical support to their students than in the United States (Araujo et al., 2016).

Another example of the quality-of-time investment is given by teacher-student interactions inside the classroom in primary schools. Bruns and Luque (2015) report data from class observations in six Latin American and Caribbean countries based on the Stallings Classroom Snapshot instrument. They classify classroom activities as instruction (reading aloud, lecturing, practice), classroom management (giving

instructions, managing students, discipline), and being off-task (being absent or socializing). The benchmark distribution of time based on observations in the United States is 85 percent or more time devoted to instruction, 15 percent or less to management and 0 percent of time being off-task. The average time spent on instruction in Latin America and the Caribbean was 25 to 35 percentage points lower than the desired benchmark, 10 to 20 percentage points higher than desired dealing with classroom management, and 10 percent of the time being off-task. To make matters worse, Näslund-Hadley, Loera Varela, and Hepworth (2014) report that when actually teaching, a high proportion of teachers deliver incorrect information or do not correct their students when they offer incorrect statements.

Spending on Skills

Public Spending: Quantity over Quality

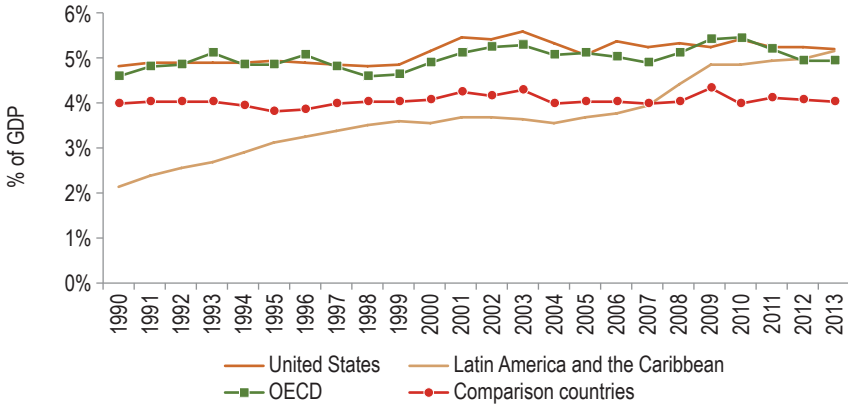
The expansion of enrollment in early childhood, basic, and higher education was fueled by significant increases in public spending. The region spends on average 3 percentage points more of its GDP on education today than it did 25 years ago, and it is currently catching up with the spending of developed countries (Figure 3.7).^{7,8} In fact, all countries with available data increased their investment in education by at least 1.5 percentage points of GDP. This has two implications. First, there is probably little room to continue increasing public spending above and beyond the long-term growth rate. Although spending varies across countries, some countries still have to increase their investments in education in order to catch up with developed countries. Second, given the lag in terms of schooling and skills, the effectiveness of the resources currently being spent surely needs to improve.

⁷ Public spending refers to local, regional, and central government expenditure on education (current, capital, and transfers; excluding household contributions) on educational institutions (both public and private), education administration, and subsidies for private entities (students/households and other private entities).

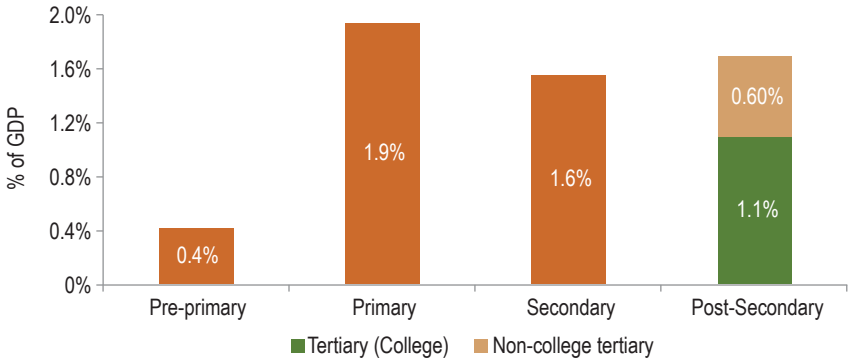
⁸ The increase in spending and the catch-up with comparison countries in the late 2010s is robust to several definitions. First, it is observed with and without imputations and interpolations. Second, it holds when the regional average is computed with and without population weights. Third, the increase is also observed for the subset of countries with data on TIMSS and PISA.

Figure 3.7 Government Expenditure on Education

a. As % of GDP



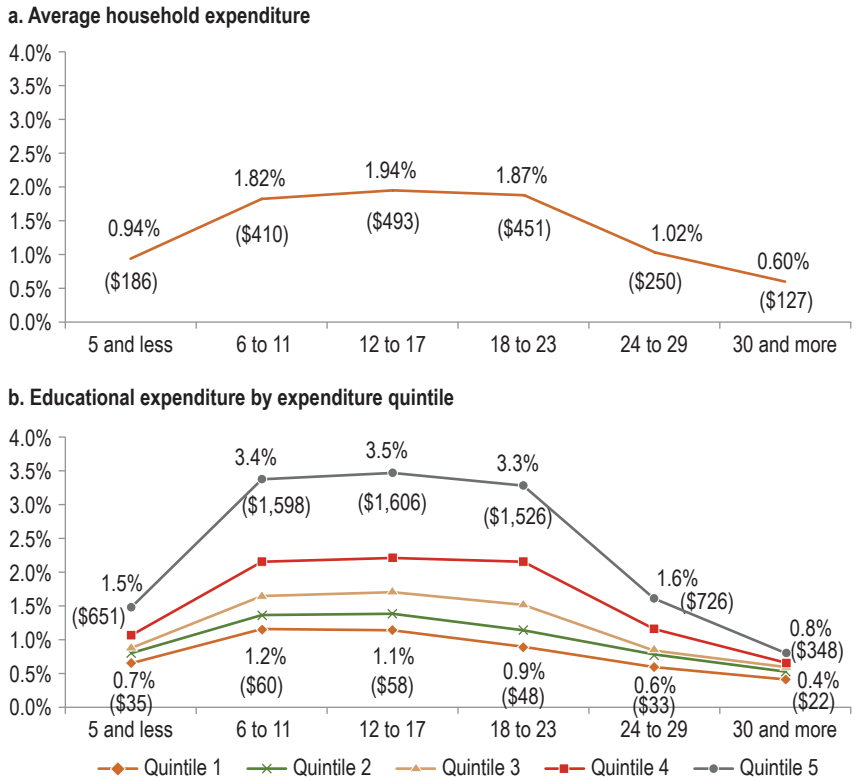
b. By educational level in Latin America and the Caribbean



Source: Panel A: Authors' calculations based on World Bank Indicators. Panel B: Volman (2016). Note: Panel A countries are grouped as follows: (Latin America and the Caribbean): Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Trinidad and Tobago, Uruguay and Venezuela. (Comparison Countries): Albania, Armenia, Bulgaria, Hungary, Indonesia, Kazakhstan, Latvia, Malaysia, Morocco, Philippines, Poland, Romania, Thailand, Tunisia, and Turkey. When data is missing, it was linearly interpolated using the closest two data points. Other points were imputed using data on countries where the correlation was higher than 0.8. Panel B Latin American and Caribbean countries include: Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela.

This spending is not distributed evenly over the life cycle (Panel B Figure 3.8). The share of public spending allocated to early childhood is about a quarter of the spending allocated to childhood, adolescence, and adulthood. The efficiency of this allocation is questionable. If there are strong self-productivity effects (i.e., if skills beget skills), then the marginal returns of investing in early childhood would likely be higher than the

Figure 3.8 Average Individual Educational Expenses by Age in Latin America and the Caribbean
As % of household expenditure/(PPP adjusted US\$2014)



Source: Acerenza and Gandelman (2016).

Note: Latin American and Caribbean average is calculated as the weighted mean of countries by population size. It includes data on Bahamas, Brazil, Bolivia, Costa Rica, Ecuador, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay. Expenditure survey dates range from 2003–2004 (Bolivia) to 2014 (Mexico).

returns of investing later in life. In that scenario, reallocating public monies from adolescence and adulthood towards early childhood would be more efficient.

Private Spending: Picking up the Slack

Another important input into the production of skills is the private spending of households in the region. Income and expenditure surveys, which are available for 12 Latin American and Caribbean countries, can be used to calculate the share of the household budget spent on child care, private

schools, college, tutors, materials, and transport. Panel A of Figure 3.8 shows the regional average of private spending. Similar to time investments, household spending on skills development follows an inverted-U shape. In this case, however, it tapers off later in life since an important component of private spending is paying for tertiary education.

As in the case of time investments, households in the region spend a similar share of resources on skills as their counterparts in more developed economies. While the average household in Latin America and the Caribbean spends about 6.5 percent of its budget on skill-related expenses, in the United States the average household spends about 5.8 percent (Acerenza and Gandelman, 2016).⁹ However, the proportion of students that attend private primary and secondary schools in the region is about 22 percent, whereas in the United States that proportion is 8 percent. Therefore, households in the region are likely spending their money to compensate for either the lack of access to or the lower quality of public schools, while in the United States private spending complements public spending (Székely and Mendoza, 2016b). In fact, Berlinski and Busso (2016) uncover interesting information on the willingness of Argentine households to contribute toward improving the performance of public school students. Using a survey experiment, they find that households would contribute an additional 12.8 percent of current educational expenditure to guarantee improved education quality.

Within countries, private spending clearly varies according to the socioeconomic level of households throughout the life cycle. During the early years of skills development, high-income households tend to spend twice as much on skills development as low-income households. These gaps widen during childhood, adolescence, and young adulthood when children and youth attend school and persist as they enter adulthood. Moreover, the gaps magnify if measured in absolute value because total expenditure is much higher for households at the top of the expenditure distribution. A household in the fifth quintile of the income distribution in Latin America and the Caribbean spends three times more on skills development than a household in the fourth quintile and 10 times more than a household in the first quintile. Even after controlling for price differences, a poor household in the United States spends about

⁹ Private spending does not include interest paid on loans taken for skill development (there is no such information in consumption surveys).

eight times more than a poor household in Mexico on skills development, while households in the top 10 percent of the distribution spend almost the same amount on skills development in both countries (Székely and Mendoza, 2016b). The richer households in Latin America seem to use private resources to compensate for the low quality of public schools; the poor cannot afford to do this.

After School: On-the-Job Learning and Firm Training

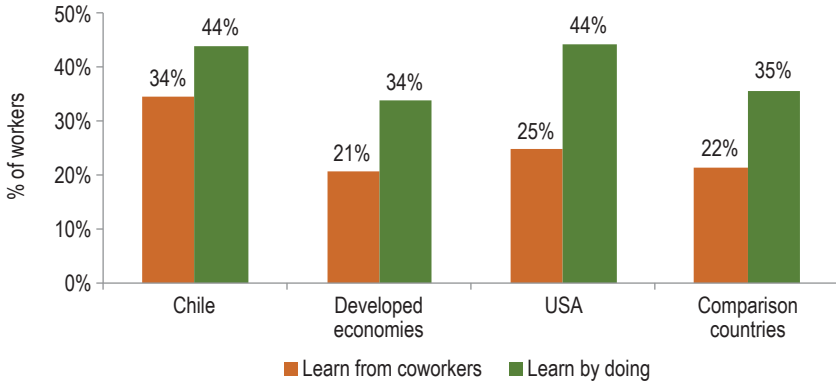
Once a person leaves formal education and enters the workplace the opportunities to accumulate skills depend on two factors. First, the workplace allows for learning on the job and sharpening one's skills. This happens informally via practice, experimentation, and peer effects. Second, some firms offer formal training to their employees.

Workers can learn on the job informally by doing tasks, solving problems, and practicing, but also by questioning standard practices and experimenting with new methods, techniques, and solutions (Ellström, 2011). In fact, from a worker's perspective, accepting a job early on in her career, even at a current low wage, that allows learning valuable skills, can maximize lifetime earnings (Sicherman and Galor, 1990). An indirect measure of how much workers learn by doing their jobs is the so-called return to tenure, that is, the wage gains of workers who stay in the same firm for a number of years. For instance, Jacobson, LaLonde, and Sullivan (1993) measure the value of specific skills in the United States and find that high-tenure workers (exogenously) who leave distressed firms suffer long-term losses of about 25 percent per year. These estimates reflect firm-specific skills, occupation or industry specific skills (Neal, 1995), and even more general skills that are difficult to parse empirically (Lazear, 2009).

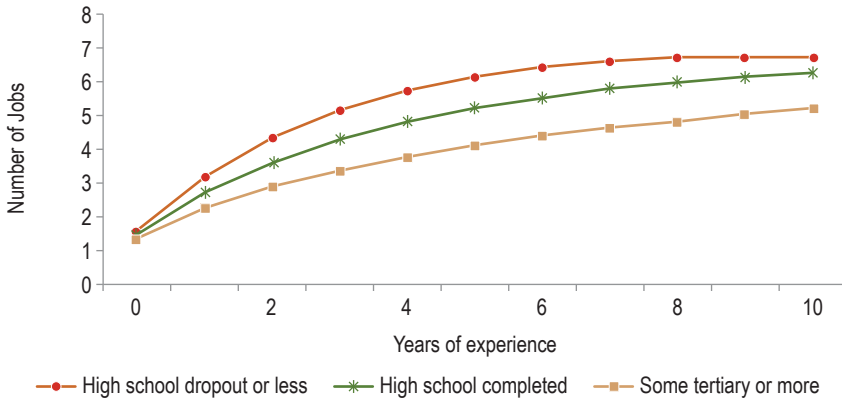
Coworkers and supervisors can also affect an individual's level of skills. On average, a 1 standard deviation increase in coworkers' productivity increases one's productivity by 0.14 standard deviations (Herbst and Mas, 2015). In principle, knowledge spillovers and peer pressure, which provide incentives to learn to be more productive on the job, explain these productivity increases. However, the final effect on wages is unclear. In the case of scientists in Germany, where knowledge spillovers are likely to be important, there are no productivity effects of peers (Waldinger, 2012). On the other hand, in Germany, in occupations with repetitive or observable tasks (i.e., peer pressure can be more

Figure 3.9 Informal Learning at Work

a. Workers that learn at work every day



b. Number of jobs by educational level



Source: Panel A: Authors' calculations based on PIAAC (2012-2015); Panel B: Authors' calculations based on Brazil's *Relação Anual de Informações* (RAIS) database from 1986 to 2009. Note: Panel A reports the percentage of workers that self-report that they learn every day at work from coworkers and supervisors, and learn by doing. Panel B is constructed using a 5 percent random sample of workers, no older than 18 in 1986, who were followed during their entire spells in the formal sector.

important), a 10 percent increase in peer ability raises wages by 1 percent (Cornelissen, Dustmann, and Schönberg, 2017).

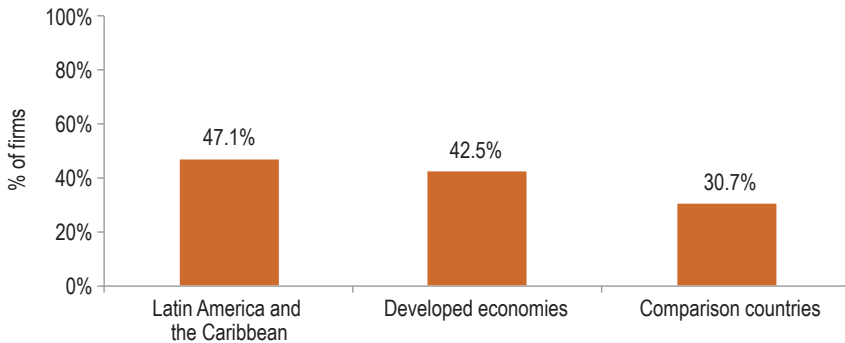
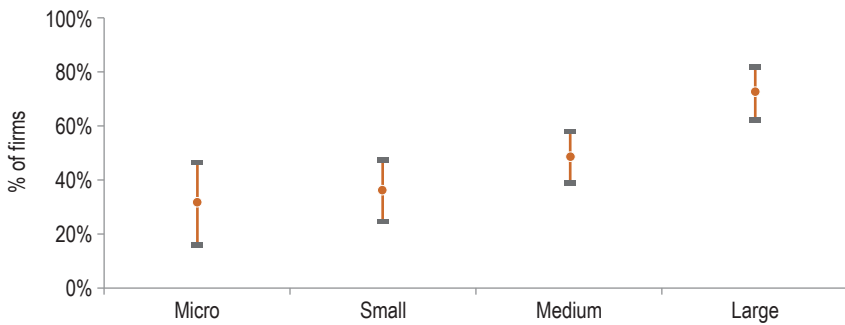
Data from PIAAC suggest that in both Latin America and developed countries workers perceive that informal learning at work, both in the form of on-the-job learning and by way of peer effects, is relevant for them on a daily basis (Figure 3.9, Panel A). Evidence from Brazil suggests positive wage returns to overall, sectoral, and firm experience (see Chapter 4). Longitudinal data of formal workers in Brazil provide information

on the average number of jobs people held as they gained experience in the labor market. People change jobs frequently even after several years in the labor market (Figure 3.9). This turnover is higher for less skilled workers (i.e., those who dropped out of secondary school) and likely translates into lower skills accumulation. At 35 years old, secondary school dropouts in Brazil have 2.5 fewer years of overall experience in the formal sector than workers with tertiary education (8.8 versus 11.2 years), a shorter average tenure in the current sector where they work (5.5 versus 7.9 years), and shorter firm tenure (1.9 versus 2.8 years). These differences would exacerbate the skill gap, in this case between more and less educated workers, even further.

A second channel for a worker to learn new skills in the workplace is formal training conducted by the firm. Companies have incentives to train workers in tasks specific to the production of their goods or services that cannot be used in other firms (Becker, 1964). However, firms have incentives to provide general training too. In Argentina, Chile, and Brazil, 60 percent of firms hire the best applicant they can and then provide extensive training in areas where the mismatch between demand and supply of skills is widest (Bassi et al., 2012).

Data from the World Bank Enterprise Survey suggests that a large proportion of firms in the region offer some form of training to their employees (Figure 3.10, Panel A). Note, however, that this survey does not capture data from very small firms which, in the region, employ a substantial portion of the labor force (Busso, Madrigal, and Pagés, 2013). Except for in Chile and Ecuador, firms themselves in most cases fund this training. Whether or not this is economically efficient depends on the nature of training: the more general the training (i.e. the more transferable those skills are to other firms and occupations), the less likely it is that firms themselves would provide that training. Assuming some positive externality in the form of peer effects or social benefits, it would make sense for the government to subsidize firm training. Firms engage in training largely to comply with certifications and standards imposed by domestic and foreign authorities rather than for individual skills development (Eberhard et al., 2016). Moreover, size matters greatly for training (Figure 3.10, Panel B). Larger firms, firms that employ higher skilled workers, and firms that export are more likely to train more of their employees (Eberhard et al., 2016; Mohan, Strobl, and Watson, 2016).

Developing skills in the workplace presupposes some level of job stability and a work environment conducive to formal or informal skills

Figure 3.10 Formal Training at Work**a. Firms that offer training to their employees****b. Firms that offer training to their employees by firm size**

Source: Panel A: Enterprise Surveys (World Bank). Panel B: Eberhard et al. (2016) based on Enterprise Surveys (World Bank).

Note: Micro firms are defined as the ones with less than 5 employees, small firms have between 5 and 19, medium firms have between 20 and 99, and large firms have 100 employees or more.

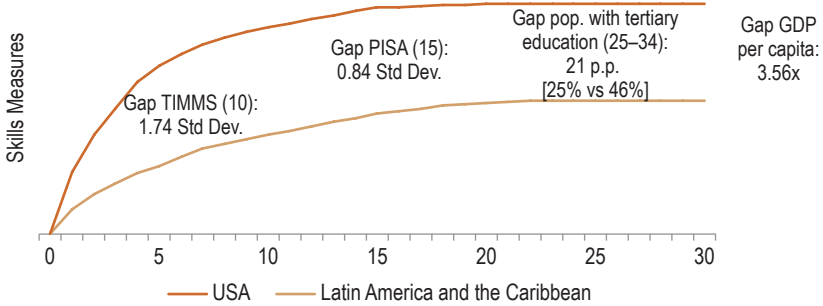
development. These conditions are rare in a region characterized by high informality (Gasparini and Tornarolli, 2009), high job turnover rates (Busso and Micco, 2003), and an abundance of small firms (Busso, Madrigal, and Pagés, 2013). Because low-skilled workers are more likely to be employed in small, informal, and high-turnover firms than workers that enter the labor market with more skills, their ability to acquire skills on the job is more limited and skills gaps are unlikely to be closed during adulthood.

Good Ideas, Bad Outcomes

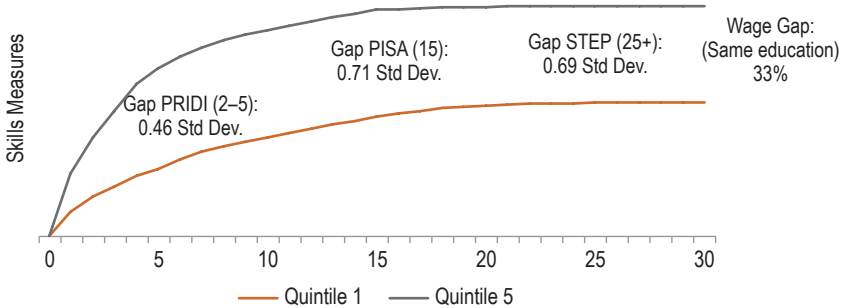
The region is slowly catching up to the developed world in terms of school enrollment rates. Today, enrollment in pre-primary and primary

Figure 3.11 Summary of Lifecycle Gaps

a. Life cycle gaps: Latin America and the Caribbean vs United States



b. Life cycle gaps by socioeconomic background



Source: PRIDI, TIMMS, PISA and STEP, Household Surveys, and World Bank Indicators.
 Note: Graph does not reflect actual levels and is intended only for illustrative purposes. Panel A socioeconomic indexes for PRIDI and PISA were constructed from the sources using assets and household characteristics. STEP socioeconomic background was constructed using the maximum level of education of the parents.

education is on a par with that of developed regions. The enrollment gap is also closing in secondary school and higher education. But this progress in enrollment is not closing the skills gaps.

Overall, it is not a rosy picture (see Figure 3.11). Some evidence suggests that a person born in Latin America and the Caribbean will reach adulthood with fewer skills than a person born in a more developed region. Similarly, a person born in a poor household in the region is also likely to reach adulthood with lower skills than a person born into a richer household. While a lack of longitudinal data precludes making these assertions for Latin America and the Caribbean with certainty, the

relationship between early poverty and adult skills has been confirmed in other settings (e.g., in the United States by Heckman, 2006).

Government spending in education as a share of GDP, private spending on skills development as a share of total household spending, parental time investments and individual time investments on skills development, are all close to the levels in more developed countries. But the results are very different in Latin America and the Caribbean.

If the problem is not the quantity of resources, then it must be the quality of those resources: the quality of interactions at home and at school, the incentives to stay in school and learn, and a better business environment that fosters learning by doing in the workplace. Targeting is important, too, if governments want to reduce inequality. Countries in the region need to find effective public policy tools to close socioeconomic gaps within their borders as well as the gap between them and developed countries. The rest of this book offers suggestions to achieve these goals.

4 The Market for Skills: Beyond Supply and Demand

Skills refer to the ability to apply knowledge to a specific set of tasks. In a market economy, workers supply skills needed to deliver a certain type and quality of good or service. Consumers, governments, and firms demand—and pay for—these skills. This process shapes how the market values different skills and provides the necessary incentives for current and future workers to acquire knowledge and skills. Because obtaining the knowledge and abilities that shape people’s skills is costly, workers expect compensation for their investment. Students need to be compensated for tuition costs and for foregone earnings while acquiring skills in school. Workers use their free time to study and gain new skills, expecting these investments to pay off in the form of better jobs in the future. The premium associated with a particular skill drives these expectations. The skill premium thus provides signals to current and future labor market participants about the return to a particular investment. For example, if jobs that require mastering a foreign language carry a particularly high wage with respect to similar jobs that do not require a foreign language, the market is signaling that workers with foreign language ability are in high demand with respect to the available stock of workers. But the returns to skills depend on more than just supply and demand forces. Skills are valued differently in different contexts, responding to non-market forces such as customs, social norms, institutions, and regulations. This chapter reviews the skill premium in Latin America and analyzes current and potential demand for skills in the region.

It Pays to Go to School—Still

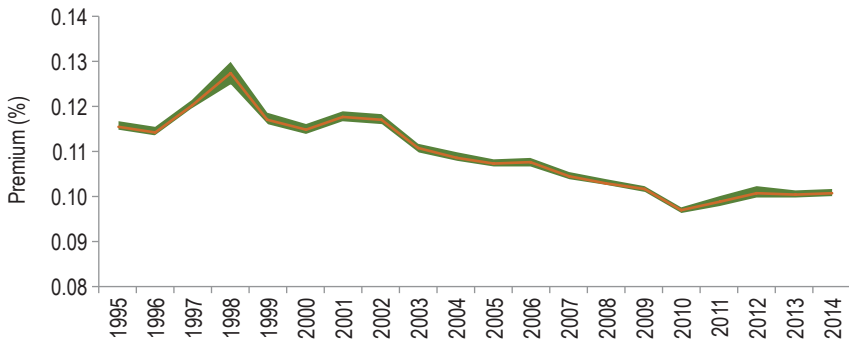
Skills are acquired in different places: the household; the neighborhood through interaction with peers; schools; and the labor market

(see Chapter 2). Schools may be the main providers; hence, years of schooling is the most commonly used, and most widely available, measure of skills. Years of schooling have increased rapidly during the last two decades (see Chapter 3). As more people complete more years of schooling, the schooling premium has declined significantly (Gasparini, and Lustig, 2011, and Fernández and Messina, 2017).

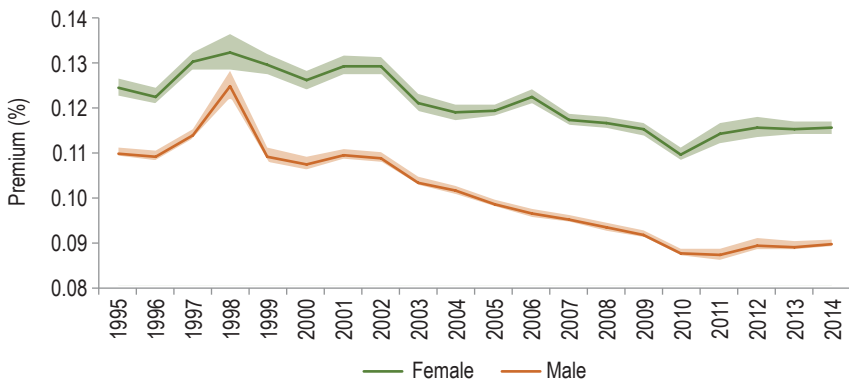
The schooling premium in Latin America fell steadily during the 2000s (Figure 4.1, panel A). After remaining relatively stable during the 1990s, the premium to a year of schooling fell from 2003 to 2010, recovering slowly thereafter. The decline was substantial—about 2 percentage points from peak to trough—and it was stronger for male than female workers (Figure 4.1, Panel B). It was also widespread across the region. Out of the 17 countries for which the schooling premium can

Figure 4.1 Premium to Education in Latin America and the Caribbean

a. Premium to year of schooling



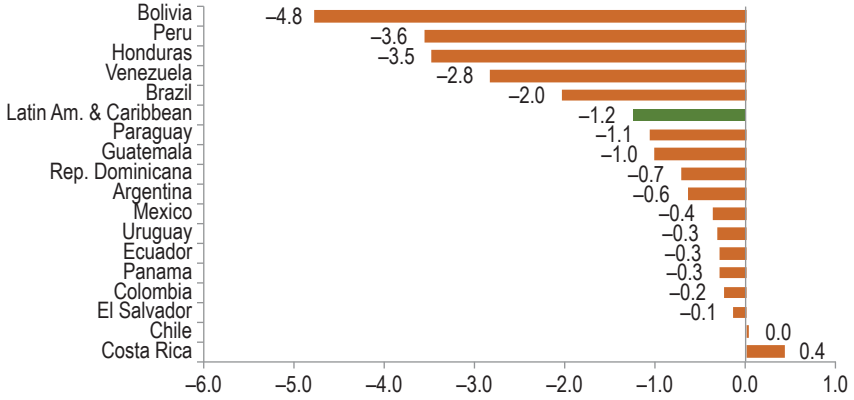
b. Premium to year of schooling by gender



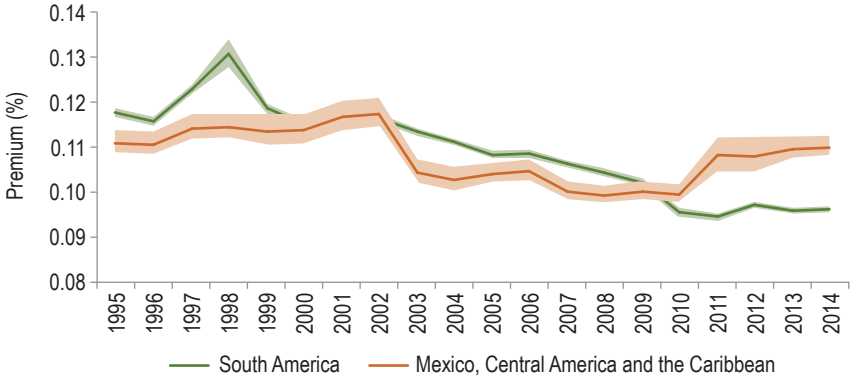
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Figure 4.1 Premium to Education in Latin America and the Caribbean (continued)

c. Change in premium to year of schooling (2003/2010)



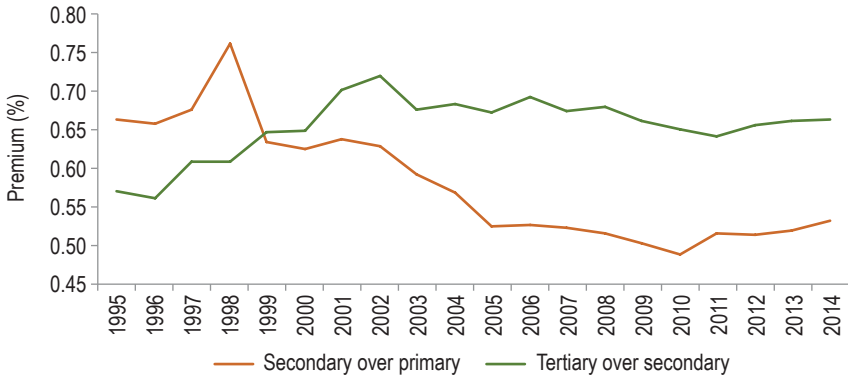
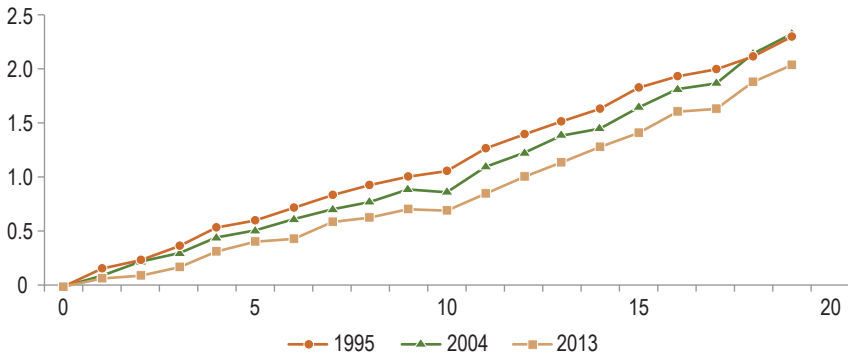
d. Premium to year of schooling by region



Source: Authors' calculations. Household surveys. Estimates are population weighted, controlling for gender, age groups and country fixed effects. Countries included in South America in Panel D: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. Mexico, Central America and the Caribbean include: Costa Rica, Dominican Republic, Guatemala, Honduras, Mexico, Panama and El Salvador. The wage variable is hourly earnings of all workers aged 16-65.

be consistently measured, only Costa Rica displayed an increase during 2003-2010 (Figure 4.1, Panel C).¹ However, the schooling premium varied significantly across countries. In particular, it fell much more rapidly in South America than in the few countries of Central America and the

¹ Countries with available data include: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, El Salvador, Uruguay, and Venezuela.

Figure 4.2 Unpacking the Education Premium in Latin America and the Caribbean**a. Premium to tertiary and secondary****b. Premium to each year of education**

Source: Authors' calculations. Household surveys. Estimates are population weighted, controlling for gender, age groups and country fixed effects. Countries include: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela. The wage variable is hourly earnings of all workers aged 16–65.

Caribbean where the schooling premium can be consistently measured over time (Figure 4.1, Panel D).²

Despite the fall in the average schooling premium, the evolution of labor market rewards across schooling levels (e.g., primary, secondary and tertiary) has differed substantially. In particular, the payoff to a college degree compared to just finishing secondary education declined very mildly. This contrasts with the performance of the premium for

² Country groupings are not driven by the behavior of a particular country. Unweighted averages deliver qualitatively similar results.

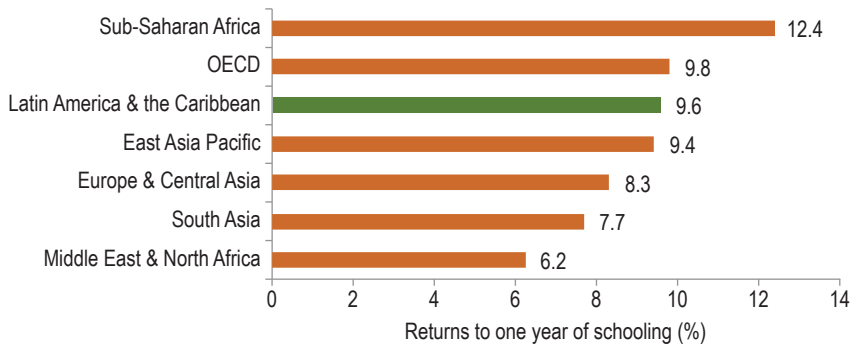
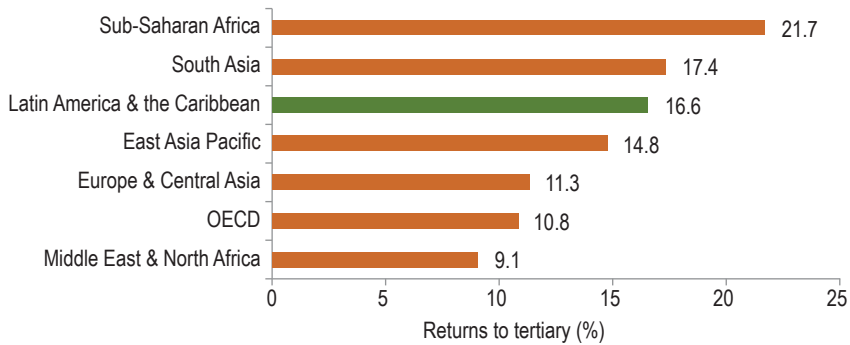
completing secondary school (compared to completing primary). Between 1998 and 2010, the premium for secondary education plummeted more than 30 percentage points (Figure 4.2, Panel A).

The labor market clearly distinguishes between attending and completing a certain schooling level. In other words, it pays to receive a diploma. For example, and in spite of the decline in the secondary education premium, high school graduation continues to carry an important wage premium. The premium for completing 11 years of education is significantly less than that for 12 years (Figure 4.2, Panel B). That is, starting but not finishing secondary school is virtually not rewarded by the market. Instead, graduation earns a student a wage hike. Regionally, every year of higher education appears to be linked to a similar return. Missing evidence of graduation effects from university (at 16 or 17 years of education) probably reflects differences in the duration of post-secondary education degrees across countries.

The broad regional patterns of schooling premiums and sheepskin effects, however, mask important variations across countries. Country-by-country analysis suggests that in Bolivia, Chile, Dominican Republic, and Ecuador the secondary education premium is quite low. Bolivia is an outlier because even the premium for tertiary completion is not high. Dropping out of high school is more heavily penalized in Argentina, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, El Salvador, Paraguay, and Venezuela. At the country level, the college graduation premium becomes more apparent. It is particularly evident in Argentina, Brazil, Chile, Colombia, Dominican Republic, Guatemala, Paraguay, El Salvador, and Venezuela.

In spite of the recent fall, returns to education remain high in Latin America and the Caribbean when compared with other regions. Calculating the returns to education requires comparing the schooling premium with the costs of going to school, which include tuition, books, and transportation costs, but most importantly, the foregone wages of students who do not participate in the labor market while studying. Once costs and benefits are compared (see Montenegro and Patrinos, 2014), the returns to education remain relatively high in Latin America—above Europe and Central Asia, and South Asia—and at a similar level to the OECD and East Asia and the Pacific (Figure 4.3, Panel A). Only Sub-Saharan Africa presents substantially higher returns than Latin America and the Caribbean.

Each year of additional education in Latin America and the Caribbean provides a 9.6 percent increase in real wages, on average. These

Figure 4.3 Returns to Education Around the Globe**a. Returns to a year of schooling by region****b. Returns to tertiary education by region**

Source: Countries with available information after 2000 are selected from Montenegro and Patrinos (2014). If a country had more than one estimate, the latest year is displayed. Panel B shows returns to tertiary education compared to people with completed secondary school. Countries included in Latin America and the Caribbean: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Uruguay, and Venezuela.

average returns differ across schooling levels. The returns are particularly high among workers with tertiary education. In the case of Latin America, the returns to a year of tertiary education jump to 16.6 percent. Only Sub-Saharan Africa and South Asia present higher returns to post-secondary education than Latin America and the Caribbean (Figure 4.3, Panel B). These are hefty returns. As a point of comparison, the real rate of return of stocks in the U.S. post-war period was 6.9 percent, and the long-term real return of bonds was merely 1.6 percent (Siegel, 2008). Thus, from a purely financial viewpoint education in Latin America and the Caribbean represents a tremendously smart investment decision.

Moreover, higher wages or wealth is not the only benefit of education. More educated workers are less likely to be unemployed and more likely to perceive other non-pecuniary benefits such as working at a job they like. Education also helps individuals make better decisions about their health and reduces their engagement in risky behaviors, while building trust in themselves and others in society. These benefits to education may be worth as much as the monetary returns (Oreopoulos and Salvanes, 2011).

An important caveat exists when interpreting the different measures of the schooling premium and returns to education. The standard Mincerian approach on which these estimates are based does not take into account two potential biases. On the one hand, the most prepared, or the most naturally gifted, are more likely to access higher levels of education. This “ability bias” tends to push up the returns to education, as some of those returns may reflect higher innate ability rather than a premium to the human capital acquired in school. In other words, natural intelligence rather than schooling may be behind some workers’ higher wages. On the other hand, education in household surveys is likely to be measured with some noise, depressing the estimates of the premiums to education (Griliches, 1977).³ Both sets of issues have received substantial attention in the economics literature.⁴ Although the discussion is far from settled, most evidence suggests that the effect of education on wages is as big, or even bigger, than the standard Mincerian framework suggests (Card, 2001).

Although average returns to post-secondary education are high, not all post-secondary education is created equal. Returns across institutions vary significantly. Some vocational training programs have high returns, while others do very poorly when compared to general high schools. In post-secondary education, universities tend to provide higher returns than technical schools (González-Velosa et al., 2015). Similarly, some fields of study pay far more than others (Kirkeboen, Leuven, and Mogstad, 2016). González-Velosa et al. (2015) show that engineering and other technical degrees are highly valued by the market, displaying high

³ This attenuation bias is due to a classic errors-in-variables problem. When an explanatory variable in a regression is measured with error the OLS estimator is always closer to zero, or downward biased (see Section 4.4.2 in Wooldridge, 2010).

⁴ See, for example, Card (2001) for a review of proposed solutions to deal with the ability bias and Angrist and Krueger (1999) for estimations of the importance of measurement error bias in the returns to schooling.

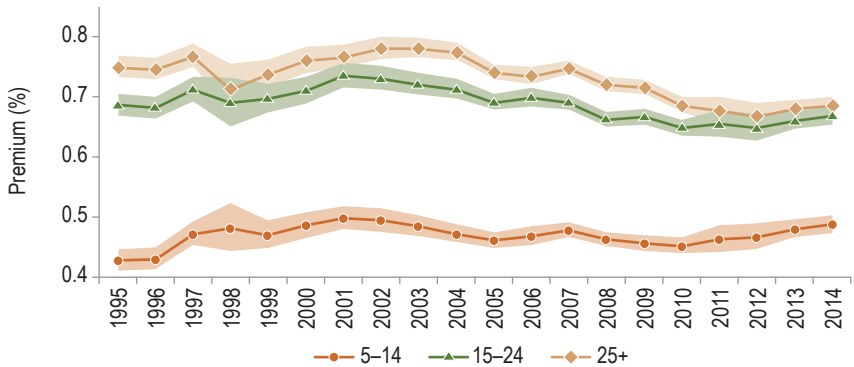
returns in Chile and Colombia. In contrast, education, social work, and design garner much lower average returns.

Even within these broadly defined fields of study, the returns to education vary considerably across institutions and, most importantly, across students. The best-performing graduates in any of the low-paying areas of study in Chile and Colombia do as well, if not better, than the worst performing students from engineering programs (González-Velosa et al., 2015). However, some of the poor-performing graduates in low-paying fields may obtain negative financial returns from their investments. Simply put, their education may not have been worth the time and money invested, raising an issue that has received support in a recent study of the Chilean post-secondary education market (Rodríguez, Urzúa, and Reyes, 2016). Thus, while average returns remain high, the differences across fields, institutions and students need to be taken into account when making schooling decisions. In this context, having good information about the alternatives becomes crucial. Chapter 9 discusses in detail the importance of information when making schooling decisions and the evidence of programs that try to improve student choices regarding post-secondary education.

Work experience is another fundamental determinant of a worker's worth in the market (Becker, 1964). Individuals become more productive as they gain more experience on their jobs because new skills are acquired through learning-by-doing or through other forms of training. The experience premium, which summarizes the market value of experience, fell during the last decade in Latin America. Figure 4.4 shows that the market return of experience for men started declining after 2000, in particular among workers with more experience.⁵ The experience premium for workers with more than 15 years of experience compared to labor market entrants (0 to 4 years of experience) fell by approximately 10 percentage points between 2003 and 2012.

⁵ In household and labor force survey data in Latin America, workers' experience cannot be directly observed, but potential labor market experience can be approximated by workers' age minus years of education minus 6. Potential experience is used through the chapter unless otherwise noted. This measure of potential experience is not well suited to approximate the returns to experience of females, because changes in participation through the life-cycle are not observed. Moreover, increasing female labor force participation over the last two decades introduces important compositional changes in the active labor force of females. Thus, the discussion of the experience premium focuses on males only.

Figure 4.4 The Evolution of the Experience Premium in Latin America and the Caribbean



Source: Authors' calculations. Household surveys. Potential experience is defined as age minus years of education minus 6. Estimates for Latin America and the Caribbean are population weighted, controlling for education and country fixed effects. The wage variable is hourly earnings of only male workers aged 16-65.

Changes in Schooling and Experience Premiums: Why the Decline?

The expansion of educational attainment and the aging of the population are prime suspects to explain the recent reduction in the schooling and experience premiums. A simple supply-demand framework suggests that if relative skill demand does not change, an increase in the supply of education or experience will lead to a decline in the wage premium of these components of human capital. However, other forces may also drive down these premiums. Most notably in South America, the sub-region where the skill premium fell fastest, the demand for skills may have declined because the region's growth has been propelled by the low-skill activities fueled by rising commodity prices. Non-market forces may be at play too. Many countries increased the minimum wage substantially during the boom years.

Certainly, supply changes have been an important force behind recent changes in the schooling premium in Latin America and the Caribbean, but they are not the sole factor (Messina and Silva, 2016). Fernández and Messina (2017) study the supply effects of education and experience in the schooling and experience premiums of Argentina, Brazil and Chile. They consider two types of workers: skilled and unskilled. Skilled workers are college graduates with varying labor market experience levels, while unskilled workers combine high school graduates with

high school dropouts. Within each group, workers with much and little experience can be used for production indistinctively, but the more experienced workers are more productive.⁶ The model evaluates how changes in the supply of college graduates and highly experienced workers translate into changes in the skill premiums.

Can the increase in high-skill workers explain the decline of the skill premium? Figure 4.5 shows the results of the model estimated by Fernández and Messina (2017) for two different scenarios, one in which only changes in supply predict the evolution of the schooling premium and another in which both changes in supply and demand can shape relative wages. The first aspect worth noting is that the rise in the relative supply of high skilled workers predicts a drastic reduction in the skill premium in the three countries. If anything, supply changes would have predicted an even stronger reduction in the skill premium during the last two decades.

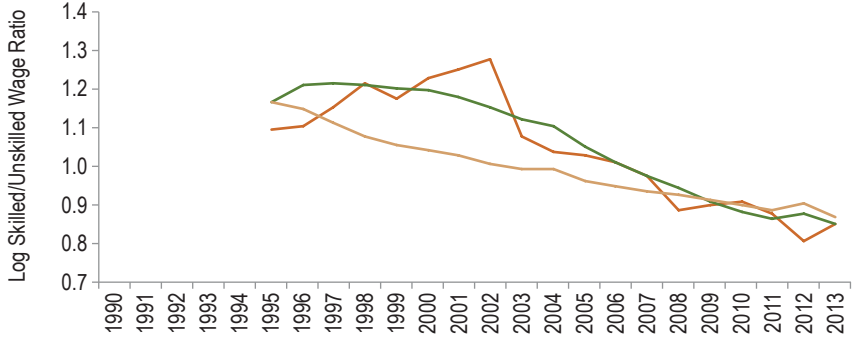
However, supply changes alone fail to capture the full dynamics of the skill premium. The skill premium increased during the 1990s and declined strongly thereafter. Supply trends totally fail to predict the schooling premium hike of the 1990s, a time during which the increasing supply of skilled workers would have predicted a reduction. This in turn implies that the reduction of the premium in the 2000s was under-predicted by supply changes. Thus, unless non-market forces (e.g., the minimum wage) sufficiently altered the skill premium, the demand for skills declined during the 2000s.

Part of the decline in the skill premium during the 2000s may be related to episodic events during the 1990s that ceased to push the premium up during the past decade. Most countries in the region engaged in rapid trade liberalization during the late 1980s and early 1990s. Contrary to what basic theory of international trade may suggest, these episodes favored the demand for high-skilled labor and depressed

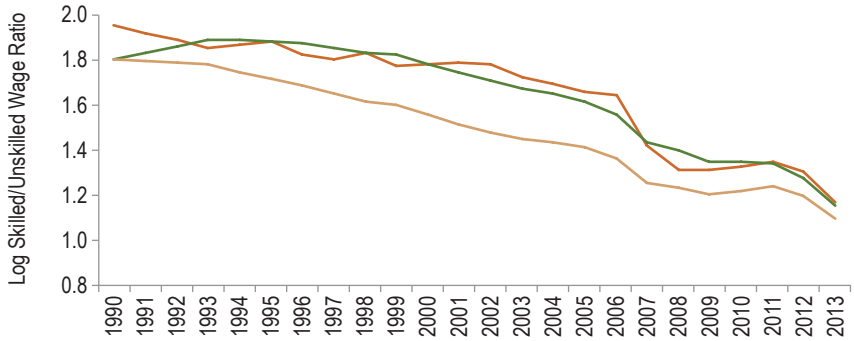
⁶ Fernández and Messina (2017) follow Card and Lemieux (2001) and Manacorda, Sánchez-Páramo, and Schady (2010) and model highly educated (college) and poorly educated (high school graduates and high school dropouts) workers as imperfect substitutes in a CES production function. Similarly, low and high experience workers are imperfect substitutes within the high and low education groups. A three step procedure estimates the elasticities of substitution to construct measures of the supply of high and low skill workers. The estimated elasticities of substitution across schooling groups (around 2.3) and experience groups (around 3.5 for poorly educated workers, and around 10 for college graduates) are well aligned with previous estimates. The model uses the same elasticities in all three countries.

Figure 4.5 Changes in the Skill Premium: The Importance of Relative Labor Supply

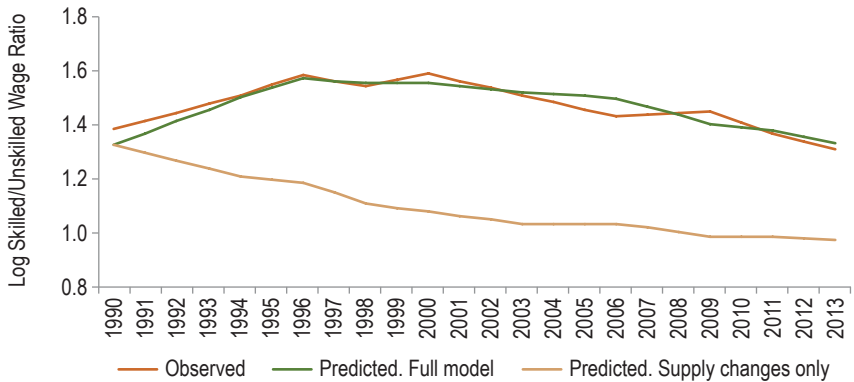
a. Argentina



b. Brazil



c. Chile



Source: Fernández and Messina (2017). The dark orange line shows the observed evolution of the skill premium. The light orange line shows the behavior of the skill premium predicted by changes in the relative supply of skilled/unskilled workers. The green line shows predictions of the full model, in which relative demand and supply shape relative wages across skill categories. Skilled workers are college educated or more. Unskilled workers are two types who are imperfect substitutes in production: high school graduates and those who obtained at most a primary education degree. Workers with different labor market experience within each education group are considered imperfect substitutes in production.

the demand for low-skilled workers, increasing the schooling premium (Goldberg and Pavcnik, 2007).⁷ In this interpretation, Latin America and the Caribbean returned to “normal times” in the 2000s, displaying a wage premium more in line with its level of development.

However, episodic events of the 2000s may also be correlated with the evolution of the skill premium. The skill premium fell fastest in the fast-growth countries of South America, which benefited most from the commodity price boom and associated terms of trade improvements. A plausible hypothesis is that the commodity boom may have boosted the demand for low-skilled workers if the industries that expanded following improvements in terms of trade and exchange rate appreciations were relatively intensive in unskilled labor.

Unskilled intensive sectors among non-tradables grew fast during the 2000s (Table 4.1). Most countries, for example, enjoyed a construction boom during the period, and construction is intensive in low-skill employment. Other low-skill intensive sectors that grew fast include hotels and restaurants (Argentina, Brazil and Peru), wholesale and retail (Chile), and land transportation (Brazil and Peru). However, some non-tradable skill-intensive sectors, in particular business services, also grew fast during the period.

A deterioration in the quality of school graduates may also play a role in shaping the evolution of the schooling premium during the 2000s. If the average quality of a high-school or college degree declines, then the schooling premium can be affected through two channels. The first channel acts through the students that access the system. When students of lesser ability access institutions of higher learning, the average quality of graduates may decline. This is not a sign that the system is doing a worse job of supplying skills. It is just a reflection that the system is becoming more inclusive. The second case is more worrisome, as school is the channel. The quality of the new schools and programs created to meet the growing demand for education may be lower, thereby deteriorating the human capital content provided to students.

⁷ In the Heckscher-Ohlin theory of international trade, trade liberalization should depress the skill premium in low skill abundant countries. However, in many LAC countries the sectors that were protected from international trade before liberalization were low skill intensive. Further, in countries like Mexico the liberalization brought about reorganization within the manufacturing sector in favor of higher value-added (and more skill-intensive) industries (Hanson, 2007). Hence, trade liberalization boosted the skill premium.

Table 4.1. The Four Fastest Growing Industries in Argentina, Brazil, Chile, and Peru

Sector	Mean Log Hourly Wage. Local Currency	Mean Years of Education	Employment Share (%)	Change in Employment Share (p.p.)
	2003			2003–2011
<i>Argentina</i>				
Construction (NT)	0.75	8.69	7.34	1.87
Other business activities (NT)	1.36	12.94	5.46	0.87
Hotels and restaurants (NT)	0.74	10.93	2.80	0.68
Extra-territorial organizations and bodies (NT)	1.39	12.09	0.33	0.30
<i>Brazil</i>				
Other business activities (NT)	1.57	9.88	4.25	1.85
Construction (NT)	0.82	5.11	7.77	1.51
Hotels and restaurants (NT)	0.63	6.55	3.62	1.05
Land transport; transport via pipelines (NT)	1.15	6.66	3.96	0.71
<i>Chile</i>				
Wholesale and retail trade and commission trade (NT)	7.16	10.74	16.37	2.85
Mining of metal ores (T)	7.69	13.47	0.02	2.50
Other business activities (NT)	7.78	13.15	3.88	1.43
Sale, maintenance and repair of motor vehicles (NT)	7.12	10.68	1.21	1.16
<i>Peru</i>				
Construction (NT)	1.44	8.90	4.10	1.89
Public administration and defense (NT)	1.49	12.06	4.45	0.95
Hotels and restaurants (NT)	1.33	8.01	5.38	0.90
Land transport; transport via pipelines (NT)	1.20	9.99	5.29	0.82

Source: Authors' calculations based on household survey data. Industries are considered at a 2-digit level of the International Standard Industrial Classification of All Economic Activities (ISIC), Rev.3. T: Tradable; NT=Non-Tradable. Mean Log Hourly Wage, Mean Years of Education and the Employment Share are calculated at baseline, i.e., in 2003.

The quality of new schools and programs created in the 2000s to meet increasing demand has raised considerable concern among policymakers throughout the region. Colombian data show that higher education graduates from new programs and universities score lower on exit exams and command lower wages in their first job than graduates from traditional, well-established programs. Is this because the new

programs and universities are of lower quality or because the students accessing those programs are less prepared? New research by Camacho, Messina, and Uribe (2016) shows that this gap is fundamentally driven by the lower preparedness of the students accessing the new programs and universities. The value added of new higher education programs, measured as the difference between a student's test scores at entry and at exit, varies little from the value added of traditional programs. At least in the case of Colombia, the student effect dominates the school effect. Of course, not all schools are the same. The value added of high- and low-performing institutions and programs varies widely. However, no evidence exists that this institutional gap increased during the 2000s. More research is needed to determine whether the conclusions reached for Colombia can be extended to other countries.⁸

The evidence suggests that the student channel was important, and may help explain the declining skill college premium. The education system in Latin America and the Caribbean has become more inclusive during the past two decades, opening the doors of many high schools and colleges to traditionally excluded low-income students (see Chapter 3). In turn, inequality of educational attainment measured through years of completed education has rapidly declined in the region during the period (Cruces, García Domench, and Gasparini, 2012). However, students from disadvantaged families enter schools less prepared, as their parents devote less time and resources to their children. Peer and neighborhood effects, although harder to evaluate, also likely negatively affect children from low socioeconomic backgrounds. The bottom line is that low-income students move up the educational ladder with lower skills. Consequently, high schools and universities today are filled with a more diverse mix of students, which may have lowered the average skill set from those graduating from schools. The corollary of this story is that secondary and post-secondary education may not have been remedial. Governments should place a greater emphasis on improving the quality of early childhood education and childhood skill development policies to guarantee that children from lower socioeconomic backgrounds enter secondary schools with equal opportunities. Chapters 6 and 7 review promising policies to boost skills among low-income students.

⁸ In part, the lack of evidence may relate to the difficulties in separating the student and school effects empirically, as the self-selection of weaker students into lower-quality institutions complicates the analysis significantly.

Non-market forces may also affect the schooling premium. During the 2000s, the minimum wage grew strongly in Argentina, Brazil, Chile, Ecuador, Honduras and Uruguay, and to a lesser extent in Guatemala, Nicaragua and Panama (Messina and Silva, 2016). Minimum wage hikes may push up the wages of low skill jobs. In Argentina and Brazil, the minimum wage played a role in the decline of the skill premium, but supply forces remain important (Fernández and Messina, 2017). Moreover, not all countries raised the minimum wage during the 2000s while the slide of the schooling premium was widespread across the region. Hence, while non-market forces may have been important in reducing the schooling premium in select countries, they are hardly the sole forces behind this regional trend.

Why returns to experience declined is not well understood. One possible explanation is age-biased technological change (Behaghel and Greenan, 2010). The introduction of new technologies may favor a skill set that older workers find more difficult to acquire than young workers, leading to a decline in the age premium. Alternatively, the commodity boom may be partly to blame. Sharp changes in terms of trade after 2003 altered the sectoral demand for labor, particularly in South America (Messina and Silva, 2016). Some sectors won and others lost, generating employment and wage opportunities for those workers who were able to move. But worker mobility is costly. Older workers are more invested in sector-specific skills, which carry a wage premium that may be lost if they switch sectors. Moreover, changing sectors may require re-training and perhaps moving residence, adding to the cost of transition. All these costs are higher for older than younger workers. Hence, in an economy in which changes in the demand across sectors are intensified, younger workers, regardless of their level of education, are more likely to reap the benefits of working in the expanding sectors.

The Rest of the Story

Clearly, skills are much more than what can be summarized by years of schooling and labor market experience. What area people specialize in or their field of study also matter for labor market performance. Quality counts too. The quality of education varies across institutions offering the same degrees. Even two students with the same degree from the same institution will most likely access the labor market with different

skill sets. They may start with different initial sets of skills or put in different degrees of effort and learn different things while in school.

Direct measures of skills in the adult population are unfortunately scarce in Latin America. International efforts to measure skills, such as the survey for adult skills (PIACC) carried out in OECD countries, at the moment only include Chile, although Ecuador, Mexico, and Peru will be participating in the next round. A notable exception is the World Bank's STEP skills measurement survey (STEP), which includes measures of skills in Bolivia, Colombia, El Salvador and a few other developing countries outside Latin America and the Caribbean.⁹ The survey includes a detailed questionnaire assessing the reading abilities of adults.

Skills encompass much more than cognitive abilities, such as reading comprehension and problem solving. Employers around the world also value socioemotional skills, such as the ability to communicate, to work in a group, punctuality, and responsibility (Cunningham and Villaseñor, 2016; Bassi et al., 2012). Good socioemotional skills allow workers to make the most of their cognitive skills and transform those cognitive skills into valuable output for their employers (Cunningham, Acosta, and Muller, 2016). A great advantage of STEP is that, in addition to measures of cognitive abilities, it includes information on personality traits and socioemotional skills, including indicators of the degree of extraversion, conscientiousness, openness to experience, emotional stability, agreeableness, grit, and decision-making.

Adolescents and adults in Latin American and Caribbean countries lag far behind their OECD counterparts in cognitive skills, including math and reading ability (see Chapter 3). Differences in the distribution of socioemotional skills across the countries are less marked, although there is no comparable data for OECD countries. Latin American countries actually tend to do better than other developing countries in the STEP sample. On average, the three Latin American countries included in STEP fare better than the other developing countries in all socioemotional skills except for emotional stability.

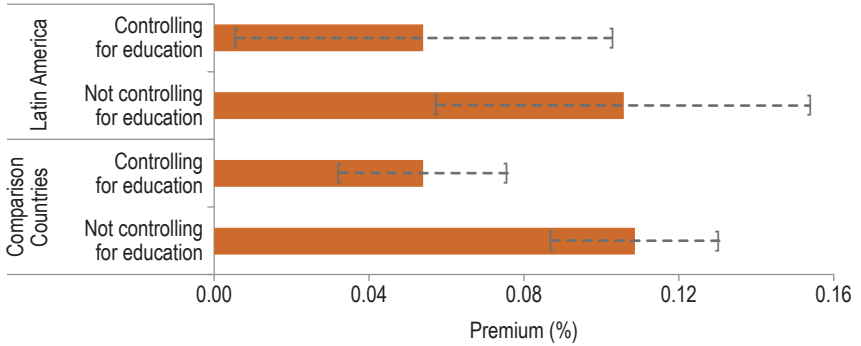
Are reading and socioemotional skills paid similarly in Latin America and other places around the world? In terms of reading, the answer is yes, and there is clear evidence that reading pays (Figure 4.6,

⁹ Other developing countries included in STEP are Armenia, China (Yunnan), Georgia, Kenya, Lao PDR, Sri Lanka, and Vietnam.

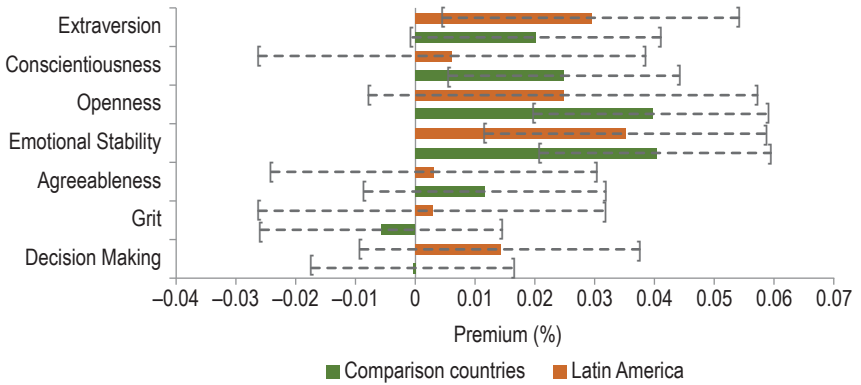
Panel A).¹⁰ One standard deviation in reading ability is associated with a 10 percent increase in wages. Of course, as with estimates of the

Figure 4.6 The Wage Premium of Cognitive and Socioemotional Skills

a. Premium to reading skills



b. Premium to non-cognitive skills



Source: Authors' calculations. STEP. Estimates control for a quadratic term in potential work experience, gender, and country fixed effects. Graph bars show the effect of an increase in one standard deviation of cognitive and noncognitive skills on wages. Dashed-lines are 95 percent confidence intervals. Latin American countries include Bolivia, Colombia, and El Salvador. El Salvador is not included in Panel A given that the survey did not include the reading test. See footnote 10 for details on the construction of reading and socioemotional skills.

¹⁰ The test for reading scores assesses three components: print vocabulary, sentence processing, and passage comprehension. The print vocabulary test consists of a series of images that respondents need to match with the correct word. Sentence processing questions ask respondents to judge if a sentence makes sense or not (e.g., three girls ate the song vs. the man drives a green car). In the passage comprehension questions respondents must complete a passage using the options in a questionnaire (e.g., the price will go up 20 percent by next wife/month). Answers to all questions are combined into a single score using principal component analysis. The score is standardized to have zero mean across countries and a standard deviation equal to one.

schooling premium, these associations cannot be interpreted as causal. Other factors positively associated with reading ability and excluded from the analysis may drive up wages. It is interesting, however, that the association between reading skills and wages is strong and similar across countries.

Not surprisingly, reading ability and education are positively correlated, because to a large extent people learn to read in school. Among the Latin American STEP countries, the correlation is 0.43. However, remarkably the returns to reading ability remain statistically significant even after accounting for differences in educational attainment across working adults. The premium of one standard deviation in reading skills declines to 5.5 percent after controlling for education but is still relatively large. The implication is that some of the variation in wages across graduates with the same level of schooling discussed earlier reflects differences in reading skills.

In terms of socioemotional skills, the answer is not nearly as definitive as for reading. The market does not reward all socioemotional skills equally, and the associated wage premium varies much more across countries. On average, across the three Latin American countries, extraversion and emotional stability are positively associated with higher wages (Figure 4.6, Panel B). However, the premium of one standard deviation, at around 3 percent, is much lower than that of cognitive skills. Interestingly, in the STEP countries outside Latin America more extraversion is not considered an asset. Instead, conscientiousness, openness to experience, emotional stability, agreeableness, and decision-making abilities command higher wages in other countries. But even country groupings are deceiving. Within Latin America, emotional stability is highly valued among employers in Bolivia and El Salvador, where extraversion and conscientiousness also carry a high premium. In Colombia, instead, the only socioemotional skill rewarded with higher wages is decision-making skills (Table 4.2).

If the demand for employees with the right socioemotional abilities in Latin America is as high as employers' surveys suggest, why aren't firms willing to pay a higher premium to attract the most able workers? One reason may be that the socioemotional skills and personality traits measured in STEP do not coincide with those sought by employers. In employers' surveys, managers from Argentina, Brazil, and Chile showed high demand for employees with commitment and responsiveness in the workplace, good customer relations, and the ability to work in teams (Bassi et al., 2012). To be sure, these socioemotional abilities are

correlated with the personality traits measured in STEP, but they are not the same. Clearly, it is important to measure the right set of socioemotional skills to guide policy recommendations (see Chapter 8).

An alternative explanation is that the socioemotional skills that STEP aims to capture were indeed in high demand, but they are very difficult to measure accurately. Measurement error in socioemotional skills and personality traits tends to underestimate their importance (Heckman, Stixrud, and Urzúa, 2006). Thus, the interpretation of these results should be treated with caution.

Some socioemotional skills affect other labor market outcomes beyond wages. Workers with more developed socioemotional skills are more likely to be employed in the formal economy (Table 4.2). Conscientiousness and emotional stability are associated with better jobs, as approximated by higher formality, in Bolivia and El Salvador, while in Colombia openness, emotional stability, and grit appear more important. However, the relationship between employment or unemployment and socioemotional skills is weak. Conscientiousness in Colombia and decision-making in Bolivia are negatively associated with unemployment, but other skills show modest positive associations. Conscientiousness is positively associated with employment in both Colombia and El Salvador; however, while emotional stability is favored by employers in Colombia, grit is more appreciated in El Salvador. Surprisingly, a more developed ability for decision-making is negatively associated with employment in Colombia and El Salvador.

From General to Specific Skills

Education and work experience provide general human capital that increases the productivity of workers beyond their current employer. A

Table 4.2. Socioemotional Skills and Labor Market Outcomes

	Extraversion			Conscientiousness			Openness			Emotional Stability			Grit			Decision Making		
	B	C	S	B	C	S	B	C	S	B	C	S	B	C	S	B	C	S
Wages			+			+				+	+							+
Formality			+	+		+		+		+	+	+	+	+				
Unemployment			+		x							+	+				x	
Employment					+	+				+			+				x	x

Source: STEP. Authors' calculations. B = Bolivia; C = Colombia; S = El Salvador. + denotes a positive and statistically significant effect at least at a 90% confidence level. x denotes a negative and statistically significant effect at least at a 90% confidence level. Agreeableness was not found statistically significant for any outcome.

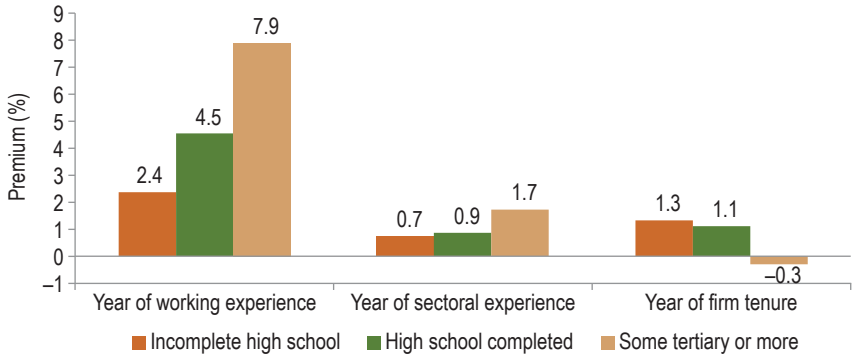
software developer who works for Apple can easily transfer her knowledge of general software architecture to Google, should she decide to switch jobs. The ability to understand a text quickly and extract the main messages, or the socioemotional skills that make a worker a good team player, are useful in multiple jobs and firms, independent of the industry or country where these firms operate.

By contrast, workers often develop skills specific to a firm. The Apple developer may have learned specifics about the particular architecture of Siri, the intelligent personal assistant that is part of the iPhone operating system, which may be of little use at her new job at Google. The acquisition of these skills may have been the result of specific investments (e.g., a course on some particular programming language needed to develop Siri), or may have come from on-the-job learning. The important aspect of firm-specific skills is that they have little or no value for the worker when she moves to another firm. In the middle, some skills are specific to an industry, regardless of the firm that employs the worker. Some of the programming tricks learned at Apple may be useful at Google, but they would be of very little use if the worker chose to change paths and open a restaurant.

Unpacking the relative labor market importance of general, sector, and firm-specific experience is complicated in general and more so in Latin America. Ideally, to disentangle the three types of skills acquired by different workers' experiences would require compiling data on workers over long periods of time across jobs in different sectors and firms, and then comparing their wages. These data are not readily available in most countries, with the exception of Brazil. RAIS, the *Relação Anual de Informações*, is an administrative data set that follows Brazilian workers across formal sector jobs for more than 25 years.¹¹ Even when perfect data are available, separating the returns to the three types of skills is complicated, and no approach is fully satisfactory. The chapter follows the methods developed by Dustmann and Meghir (2005) to

¹¹ The data, however, do not distinguish between nonemployment and informal employment spells once a worker leaves the formal sector. Informal wage employment in Brazil is less than in other Latin American and Caribbean countries, but nonetheless is relatively large. On average between 1986 and 2013, one in every three employees was in the informal sector. The analysis assumes that workers do not accumulate skills during non-formal spells. Thus, general and sector specific experience should be interpreted as experience in the formal sector. Similarly, the returns to firm-specific experience refer to returns to experience in the formal sector.

Figure 4.7 The Premium of General Labor Market, Sector Specific, and Firm Level Experience



Source: Authors' calculations. Relação Anual de Informações (RAIS). Estimates are produced using the methodology of Dustmann and Meghir (2005). All estimates are significant at a 95% confidence level. The dependent variable in the regression is hourly wages. Results refer only to male workers employed in the formal sector.

study the returns to skill in Brazil, allowing for differences across individuals depending on their level of education. The methodology aims at capturing the causal impact of different forms of labor market experience on wages.¹²

Labor markets reward general, sectoral, and firm level experience for all workers, but the returns vary significantly across educational levels (Figure 4.7). While more educated workers receive a higher reward for general and sectoral experience, workers without a high school degree benefit more from staying in the same firm. Each year of experience in the labor market earns workers without a high school degree about 2.4 percent more in wages. The premiums jump to almost 8 percent for workers with some tertiary education. Similarly, a year of sectoral experience for individuals with less than a high school education represents on average 0.7 percent in higher wages, compared to 1.7 percent for workers with tertiary education. In terms of firm experience premiums, less educated workers receive on average a return of 1.3 percent,

¹² Dustmann and Meghir (2005) rely on workers displaced due to firm closures to distinguish the returns to different skills from endogenous worker mobility. They further propose a control function approach using age as an excluded instrument to account for the fact that job acceptance and experience may be endogenous at job entry.

while workers with some tertiary education receive smaller premiums that decline with firm tenure.¹³ Thus, skills acquired by more educated workers are more easily transferable across firms, while tasks performed by less educated workers are more firm-specific.

Compared to Germany, the returns to overall experience for high school graduates are more stable across the career path. On one hand, the returns are lower in Brazil during the first five years (4.9 percent vs 6.1 percent in Germany). However, they remain higher than in Germany after the fifth year of experience (4.1 percent vs -0.4 percent). Returns to specific skills due to sectoral and firm experience are lower in Brazil than in Germany. For example, the return to a year of firm experience for high school graduates is 4 percent during the first five years at the firm and 1.1 percent afterwards in Germany, while in Brazil those returns are 1.9 and 0.2 percent, respectively (Dustmann and Meghir, 2005). This suggests lower levels of learning on the job in Brazilian firms. This slow process of on-the-job learning contributes to the skills gaps of the region with respect to comparator countries discussed in Chapter 3. The importance of human capital acquisition during employment spells will be studied in depth in Chapter 10.

Job Prospects: Changing with the Times

Every year hundreds of thousands of students graduate from high school and college and wonder what their labor market prospects are going to be like. Shall I start looking for a job or shall I keep on studying? The returns to schooling discussed earlier are useful guidance, but certainly not enough, considering the tremendous variance in job opportunities and wages across fields of study and specialization. Likewise, what seems good advice for today may not be good for tomorrow. New technologies render some jobs obsolete very rapidly, but also offer new employment opportunities in areas that did not even have a name only a few years ago.

In the industrialized world, employment is polarizing, a process that started 20–30 years ago. High-skill, high-paying occupations are on the rise together with low-skill, low-wage jobs, at the expense of jobs in the middle of the skill distribution (see Autor, Katz, and Kearney [2006] for

¹³ The data show that workers with tertiary education receive a return to firm experience of 0.4 percent during the first five years at the firm while receiving -1.7 percent afterwards.

the United States and Goos, Manning, and Salomons, [2009] for European countries). Behind this occupation polarization is a change in the nature of jobs. Abstract problem solving and creative tasks are increasingly in demand. At the other end of the spectrum, non-routine manual tasks that are not easily codifiable are also growing. Easily codifiable and routine tasks are slumping.

What's behind skill polarization? Changes in the nature and skill content of jobs appear related to a nuanced version of skill-biased technological change (Acemoglu and Autor, 2011). High-paying occupations requiring abstract reasoning complement technological advances, such as the introduction and widespread use of computers. Hence, their demand is on the rise. In contrast, routine occupations can be easily replaced by machines. Hence, the demand for typical blue- and white-collar clerical jobs, which were traditionally mid-paying jobs, is falling. Finally, rising standards of living thanks to technological advances boost the demand for all sorts of personal services, which tend to be low paying and of low skill content but are hard to substitute for with machines.

Evidence of polarization in Western European countries is shown in Table 4.3, which reproduces the results in Goos, Manning, and Salomons (2014). Employment in high-paying occupations, such as science and engineering, grew fast during the last two decades; meanwhile, mid-paying occupations, such as office clerks, machine operators and assemblers, and metal machinery and related trade workers, declined substantially. However, the demand for skill was not linear in skill content, as a pure skill-biased technological change mechanism would suggest. Low-skill content, low-paying occupations grew during the period, led by a surge in workers engaged in personal and protective services and other elementary service occupations.

Is polarization of occupations taking place in Latin America? The evidence is mixed. (Table 4.3).¹⁴ The demand for abstract occupations inched up in the four Latin American and Caribbean countries. Just as in Western European countries, science and engineering professionals grew faster on average. Note, however, that the speed of change was much faster in the developed countries. High-paying occupations

¹⁴ Note, however, that the period of analysis for the Latin American countries is shorter than for the European countries. The classification of occupations in Latin American household surveys has changed repeatedly during the last two decades and is different across countries, complicating the extension of the comparative analysis to other countries or longer time periods.

Table 4.3. Employment Polarization in Latin America

Occupations	ISCO Code	Change in Employment Share (p.p.)				
		Brazil (2002–2012)	Chile (2003–2011)	Mexico (2000–2008)	Peru (2002–2012)	Western European Countries (1993–2010)
<i>High-paying occupations</i>		1.87	1.30	1.46	1.21	5.62
Corporate managers	12	–0.08	–0.08	0.40	0.06	0.59
Physical, mathematical and engineering science professionals	21	0.23	1.02	0.26	–0.14	1.36
Life science and health professionals	22	0.42	0.15	0.39	0.18	0.57
Other professionals	24	0.75	0.84	0.22	–0.23	1.38
General managers	13	0.41	0.03	–0.08	–0.07	0.17
Physical and engineering science associate professionals	31	0.50	–0.63	–0.08	0.90	0.21
Other associate professionals	34	–0.59	–0.26	0.28	0.11	0.79
Life science and health associate professionals	32	0.23	0.24	0.07	0.40	0.55
<i>Middling occupations</i>		2.42	–3.85	–3.23	2.89	–9.27
Stationary plant and related operators	81	–0.04	–0.31	–0.23	0.01	–0.25
Metal, machinery and related trades workers	72	0.51	–0.45	–1.10	–0.06	–2.08
Drivers and mobile plant operators	83	0.42	0.26	0.16	1.39	–0.48
Office clerks	41	1.18	–2.10	–0.72	1.98	–2.06
Precision, handcraft, printing and related trades workers	73	–0.39	–0.27	–0.37	–0.31	–0.54
Extraction and building trade workers	71	1.56	–0.12	–0.05	0.04	–0.64
Customer service clerks	42	0.91	0.74	0.13	0.00	0.06
Machine operators and assemblers	82	–0.22	–0.41	–0.50	–0.20	–1.63
Other craft and related trades workers	74	–1.51	–1.18	–0.56	0.03	–1.66
<i>Low-paying occupations</i>		–0.84	4.33	6.82	–0.73	3.65
Laborers in mining, construction, manufacturing and transport	93	0.00	2.40	1.78	0.18	–0.55
Personal and protective services workers	51	–1.09	0.59	1.66	–0.25	2.36
Models, salespersons and demonstrators	52	1.68	1.26	0.22	0.71	–0.11
Sales and services elementary occupations	91	–1.43	0.08	3.17	–1.38	1.95

Sources: Authors' calculation based on household surveys for Brazil (Pesquisa Nacional por Amostragem de Domicílios, PNAD 2002), Chile (Encuesta de Caracterización Socioeconómica Nacional, CASEN), Mexico (Encuesta Nacional de Ingresos y Gastos de los Hogares, ENIGH) and Peru (Encuesta Nacional de Hogares, ENH). The data for Western European countries are taken from Goos, Manning, and Salomons (2014).

increased by 1 percentage point every three years in Western European countries, and every six years in Latin America. In Brazil and Peru, the contraction of middle, routine occupations did not take place, showing little sign of replacement of routine tasks with computers and other IT innovations. Peru contrasts sharply with the typical patterns of polarization as office clerks, a highly routine occupation that is shrinking fast in the industrialized world due to codification of tasks and the introduction of computers, grew relatively fast. Thus, changes in the occupation structure of Brazil and Peru are more consistent with a traditional skill-biased technological change pattern, in which a monotonic relation between skill content and employment growth is observed.

Consistent with the polarization hypothesis, low-paying occupations grow rapidly while middle, routine occupations decline slowly in Chile and Mexico. The expansion of low-paying occupations is particularly remarkable. Led by mining, construction, transport, and manufacturing laborers in Chile, and elementary service and sales workers in Mexico, the pace of growth of low-paying occupations more than doubled the average of low-paying jobs in the industrialized world. To some extent this may relate to the excessive number of workers in agricultural activities. The region is still going through a strong process of structural change in agriculture, which enjoyed substantial productivity gains during the last decade. This generated an excess supply of low-skill workers that needed to be employed in other sectors and occupations. Agricultural employment shrank in all four countries but was much stronger in Mexico: in just eight years the share of workers engaged in agricultural activities declined by 4.6 percentage points from 14.2 percent to 9.6 percent.

The decline of middling occupations in Chile and Mexico was not nearly as fast. The de-industrialization of Mexico, driven by the rapid expansion of Chinese exports (Blyde et al., 2016), led to a contraction of metal, machinery, and related trade workers. In Chile, this process was fundamentally driven by lower demand for office clerks. Interestingly, these two occupations also declined fastest in Western Europe.

Jobs in the Age of Technology

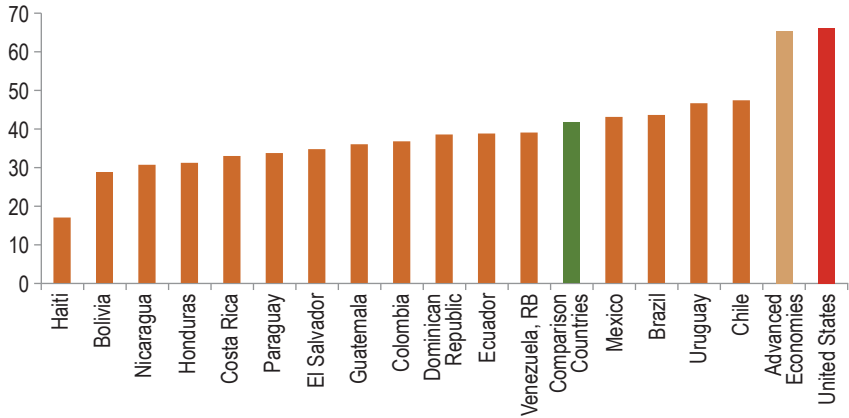
Employment in Latin America and the Caribbean is changing, but it is changing slowly. Compared to the industrialized world, signs of skill-biased technological change and polarization are not always observable,

and when they are, the employment structure adjusts much more slowly (Messina, Oviedo, and Pica, 2016). Other developing countries also lag behind in this process of structural transformation (Maloney and Molina, 2016). Differences between the industrialized and developing worlds may simply reflect relative prices. Many of these technological advances are introduced by firms with a cost-cutting objective, which may be less important in the developing world where low-skill labor is abundant and cheap (relative to developed countries).

However, lags in technology adoption may also relate to various obstacles and barriers in the penetration and diffusion of new technologies. Possible factors behind this technological gap include the capacity of Latin American entrepreneurs to identify, assimilate, and put in place new technologies, the skill level of the workforce to make those technological changes feasible, as well as institutional, cultural, and other political barriers. Overall, these factors likely contribute to a relatively slow pace of technology adoption and diffusion in Latin America.

Technologically, Latin American countries lag far behind advanced economies and, in particular, the United States (World Bank, 2016). Figure 4.8 highlights this gap between Latin America and advanced economies in the availability and adoption of digital technologies. The index is a simple average of four indicators: the percentage of businesses with websites, the number of secure servers per million residents, download speeds, and 3G coverage in the country (World Bank, 2016). All Latin American countries fall behind advanced economies, and the gaps vary little across countries; even the most developed economies in the region such as Chile and Uruguay present a substantial technological gap with respect to advanced economies. Note, however, that this technological gap is shared among developing economies. The penetration of digital technologies in a pool of comparison countries with similar GDP per capita to the average Latin American economy is similar to that observed in Venezuela and Mexico.

To understand differences in the penetration of technology between developing and developed countries, it is important to distinguish between the adoption of new technologies and their diffusion across the economy. Technology adoption lags are not new, and are shared across developing countries. Throughout the nineteenth and twentieth centuries, Latin American countries on average lagged about 23 years behind the United States in introducing new technologies (Comin and Hobijn, 2010). Despite this significant delay, over the two centuries the average

Figure 4.8 Digital Adoption Index by Country

Source: World Bank (2016).

Note: Comparison countries and advanced economies values were calculated as the simple mean across countries. Comparison countries were selected using the definition used in Chapter 3: it includes countries within the same range of GDP per capita adjusted for purchasing power parity as the Latin America and the Caribbean countries and that have available data for at least two indicators used in Chapter 3. The countries for this graph are grouped as follows: (Comparison Countries) Albania, Algeria, Armenia, Bulgaria, Croatia, Georgia, Hungary, Indonesia, Kazakhstan, Latvia, Macedonia, Malaysia, Morocco, Philippines, Poland, Romania, Serbia, Thailand, Tunisia, and Turkey. (Advanced Economies) Australia, Austria, Belgium, Canada, Czech Republic, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Lithuania, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, and United Kingdom.

adoption lag steadily declined. For example, cars, invented in 1885, took on average 38 years to be adopted in Latin American countries (23 years more than in the United States), while cellphones and personal computers, both invented in 1973, took only 16 years (7 more than in the United States). Clearly, the adoption lag between Latin America and advanced countries has converged over the last 200 years.

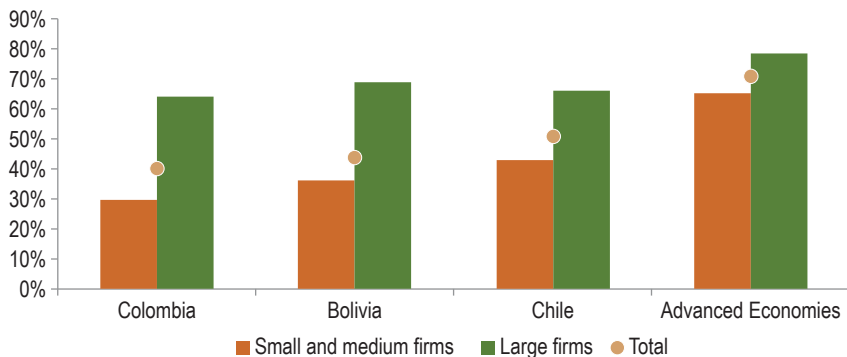
However, Latin America is still behind advanced countries and is slipping compared to other developing regions. Before the mid-twentieth century, Latin America was always faster to adopt technology than East Asia and Sub-Saharan Africa. For instance, the telephone took 77 years to be adopted in East Asia and 41 years in Latin America. For new IT technologies including cellphones, PCs and the internet, East Asia was faster to make the switch (and almost as fast as OECD countries). Latin America is now more on a par with Sub-Saharan Africa in terms of adopting technology. Thus, lags in technology adoption are a first factor that may help explain the data. New technologies take time to arrive to the region, slowing the pace of labor market transformation. However, this cannot be the

whole story. Most IT innovations that polarized employment in the United States and other industrialized countries during the last three decades are, to some extent, already in use in Latin American labor markets.

The extent of transformation in the economy induced by technological change does not depend solely on the speed of technology adoption. Perhaps even more important is how fast these technologies are diffused. Even though technology adoption has converged across countries, how quickly new technologies spread and penetrate societies still varies considerably. The gap in technological diffusion was smaller for older inventions and has steadily widened over the past 200 years. Thus, even if newer technologies arrive earlier in developing countries, they diffuse relatively slower than older ones. Naturally, this slow penetration contributes to understanding why Latin American countries are so technologically behind their industrial counterparts.

Interestingly, at the heart of Latin America's technological problems is the proliferation of small, unproductive firms in the region's economies. Figure 4.9 shows the proportion of workers using a computer at work by firm size for Colombia, Bolivia, Chile, and developed countries. As expected, Latin American countries lag behind in the share of workers using a computer at work: the gap with developed countries runs from 20 percentage points in Chile to 30 percentage points in Bolivia. However, the gap is much larger for small than for large firms. Firms with more than 50 employees in Latin America incorporate computers in the workplace nearly as quickly as large firms in advanced economies. In

Figure 4.9 Use of Computers by Firm Size



Source: PIACC and STEP. Authors' calculations. Large firms are defined as firms with 51 or more employees.

Bolivia, for instance, the gap is less than 10 percentage points among large firms. However, the gap among small- and medium-sized firms is very large. Only 35 percent of the workforce employed by small- and medium-sized firms in Bolivia uses a computer, as opposed to almost 65 percent in advanced countries.

A decomposition analysis using the well-known Oaxaca-Blinder technique suggests that differential exposure to new technologies across smaller and larger firms is important to explain the differences in computer use between Latin American and advanced economies. Of course, much of the difference in computer use is due to differences in the educational levels of the workforce. However, the role of firms cannot be disregarded. In particular, the fact that smaller firms in advanced economies use IT technologies much more intensively than in Latin America and the Caribbean is the second largest factor (after education) in explaining differences in computer use between the two sets of countries.

The relatively slow penetration of new technologies in small- and medium-sized firms, and a production structure heavily biased towards smaller enterprises are major obstacles to the labor market transformation that would boost the demand for new economy skills. Two fundamental sources of misallocation of resources in Latin America are tax collection systems and the poor enforcement and incomplete coverage of social security, both of which favor smaller, less productive firms, while constraining the growth of larger, more productive ones (Busso, Madrigal, and Pagés, 2013). Clearly, the potential distortions affecting the efficiency and size distribution of firms do not stop here. Regulatory barriers (such as red tape and registration fees) and developmental barriers (such as poor governance and lack of human capital) negatively affect the entry and exit of firms and the allocation of resources (Bergoening, Loayza, and Piguillem, 2010). Other factors include the availability and skill of managers, which is typically lower in developing countries (Bloom et al., 2012), and barriers to competition in nontradable sectors, which are particularly high in Latin America and the Caribbean (Lederman et al., 2014).

Whatever the barriers to technological diffusion, the penetration of new IT technologies in the region is largely segmented. A few large, relatively productive firms can assimilate and apply new technologies rapidly, while a large number of smaller firms are very slow to modernize and change technology. Under these circumstances, penetration rates

of technologies remain low (i.e., few units of new technology are used within the economy), even though the speed of technology adoption has accelerated in recent decades.

Slower technology adoption and penetration in the region leads to lower growth and lower standards of living. The positive side is that it also allows the region to start preparing for the changes to come, which are already taking place in the developed world. Reframing labor market policies to facilitate technological change while mitigating the possible negative consequences is an important element of the policy agenda for the near future.

Moving forward, the employment polarization process that has only started in the most advanced countries of the region will likely spread to the rest of Latin America and the Caribbean. In Chile, where the diffusion of new technologies is closest to advanced countries, there are clear signs of employment polarization. Other countries around the region show no signs yet, as the pace of technological change may be hindered by the abundance of low-skilled labor and a wide range of distortions that prevent the rapid spread of new technologies. However, new technologies cannot be shut out forever. Policies that alleviate the distortions behind technology diffusion are likely to boost growth and the demand for non-routine manual and abstract skills in the region as it walks, rather than races, into the age of technology.

5 For Better Skills Policies: Turn on the Light

Governments throughout Latin America and the Caribbean know that skills are important for improving productivity and well-being. That's why they have been investing ever increasing sums to promote skills development. Unfortunately, despite their efforts and substantial resources, skills levels remain low. Why these disappointing results? Because policymakers have been essentially shooting in the dark, committing precious resources to many programs that may sound good on paper but have not been proven in practice. Rigorous evidence provides a way out of this conundrum, shedding light on both good and bad policy options. Using evidence as the basis for their decision-making, policymakers can see the policy path ahead more clearly.

Minimizing the guesswork in policymaking will be increasingly important as weaker growth prospects preclude further hikes in public spending. Governments must learn how to raise skills levels with only limited increases in spending. The key lies in making cost-effective investments in skills development, and, to that end, rigorous evidence exposes both successes and failures. Policymakers need to avoid expanding programs that are ineffective, while scaling up cost-effective programs. By using rigorous evidence, governments can avoid mistakes and take advantage of opportunities.

Consider the case of the One Laptop per Child program in Peru in 2008. This program was based on the presumption that children could teach themselves using a personal laptop. Although Peru invested more than \$200 million in the program, results were disappointing. A rigorous evaluation detected no effects of the program on math and language learning (Cristia et al., 2012). Moreover, the evidence suggested that similar programs implemented elsewhere in Latin America and the

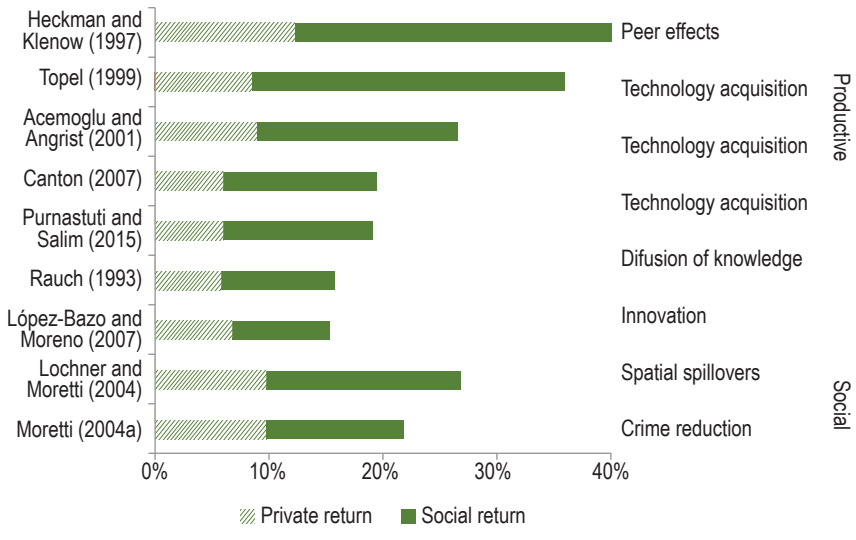
Caribbean would also have limited effects, even though governments had spent more than \$2 billion on personal laptops in the past few years (Arias Ortiz and Cristia, 2014). The use of evidence could have prevented governments from channeling resources to an expensive program that produced few gains in terms of skills.

Now consider the case of another program in Peru, a pilot called Grow Your Mind (*Expande tu mente*). The intervention provides students with a short educational session aimed at instilling the idea that the brain is like a muscle that can be trained to boost intelligence. A rigorous evaluation showed that this program improved learning in math and the costs were tiny: just half a dollar per student (Ministry of Education of Perú, 2017). Despite its promise, virtually no other country in the region is currently implementing this type of program.

Moving forward, the use of rigorous evidence can allow governments to identify effective programs to expand. Because rigorous evidence provides a powerful tool to improve policy design across the life cycle of skills development, this chapter explores why and how governments should incorporate evidence more thoroughly into their decision-making process.

The Case for Government Intervention

There are three main rationales for governments to spend public resources on skills development. First, without effective government intervention, investment in skills development would be lower than the socially desirable level. Why? Because the production of skills generates important externalities. Individuals who invest time, effort, or resources in developing their skills are rewarded with a sense of personal fulfillment or, potentially, a higher wage when they start using those skills in their jobs. But these personal investments generate other benefits to society. In addition to these private returns, investments in skills development produce what economists call productive and social externalities. Productive externalities occur because a skilled workforce facilitates the adoption and diffusion of new technologies and ideas, increasing everyone's productivity (and wages) in the economy (Lucas, 1988). Social externalities arise because people with a higher level of skills are more engaged in their communities, less likely to commit crimes, more prone to fulfill their civic duties, and ultimately, better equipped to contribute to a democratic society (Hall, 2006). Figure 5.1 summarizes the main mechanisms that the economic literature has identified to capture these

Figure 5.1 Private and Social Returns to Education

externalities. The social returns are usually as large as the private returns themselves. Individuals, however, do not capture these social returns and will therefore make their skill-investment decisions based solely on their private returns. Without government intervention, this leads to underinvestment in skills.

The second rationale concerns equity. Without government intervention in the form of providing and improving public education and skills development, individuals in poorer households would face worse opportunities in life than those in richer households. Children in poor households face more stringent resource constraints than children in better-off households. The benefits of skills acquisition are typically uncertain and reaped only in the future, while the costs in terms of parental and an individual's own time, effort, direct spending, and foregone income are incurred in the present. Individuals typically cannot borrow against future earnings to finance current costs (that is, future human capital cannot be used as collateral). Thus, some individuals who want to acquire more skills are not able to do so.

These constraints affect poor individuals more severely: poor parents have less time to help their children with homework and less money in general to spend on skills formation. By way of example, in Chile, providing access to credit to students applying to college leads to a 100

percent increase in immediate enrollment and a 50 percent increase in the probability of ever enrolling. More importantly, access to loans eliminates the bias against low-income students in enrollment and in years of college attainment (Solís, 2017).

Another source of inequity that provides a rationale for government intervention are information constraints. Individuals often lack accurate information about the costs of acquiring skills or about the benefits of investing in skills (Dinkelman and Martínez, 2014; Bobba and Frisancho, 2016; Jensen, 2010; Hastings et al., 2016). There are many examples of these information failures. For instance, providing low-income students in Chile with information about alternative career choices can help them access higher education options that require less time and thus less cost to obtain a degree (Busso et al., 2017).

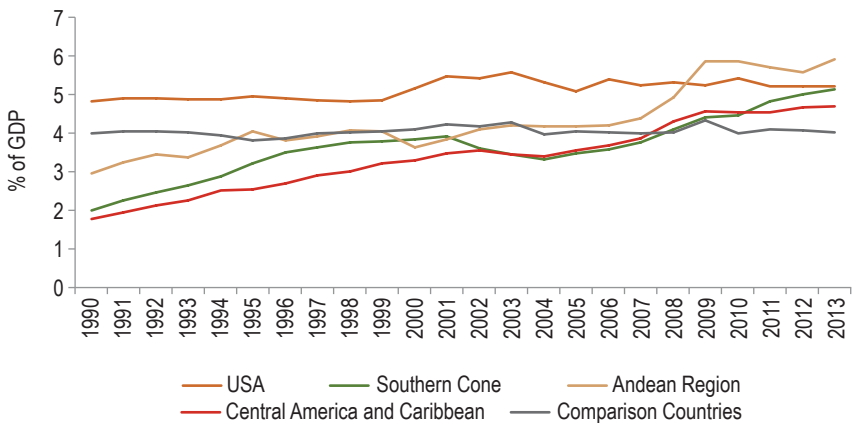
The third rationale for effective government intervention in skills development is political rather than economic. A government often intervenes in the provision of skills because the process of educating and developing the skills of children and young people socializes them and allows them to share a common culture. Pritchett (2002), for instance, argues that one of the historical reasons for governments to provide schooling is that it shapes beliefs, ideas, and values. How? Because it is difficult to fully decouple skills from some beliefs: a person learns to read by reading texts, which are not value free; the structure of the classroom also communicates values (e.g., appropriate behaviors with classmates and dedication to work). By providing skills, the government can also affect people's beliefs, and by affecting beliefs, it can shape its society's culture.

Finally, increasingly tight budget constraints for skills development policies will put more pressure on policymakers to spend the same amount of resources in a better way. Policymakers can use several direct policy tools to affect the amount of public and private investment in skills development and its allocation across socioeconomic groups. First, they can change or introduce laws. For instance, most countries have laws that establish a mandatory schooling age and education laws that govern how schooling is financed and provided. Second, policymakers can shape the regulatory environment in which institutions that provide skills operate, such as the certification requirements imposed on higher education institutions. A third tool that governments use is providing relevant information for individuals deciding whether to invest in developing their skills. In Chile, for instance, mifuturo.cl provides a platform with information on earnings, probability of employment, costs,

and funding opportunities for different careers and higher education institutions. Fourth, governments can subsidize the demand for skills development via transfers (conditional cash transfers, school vouchers) or the supply of skills development (direct provision of public education, parenting programs, job training programs).

It is difficult to quantify the total amount of resources that Latin American and Caribbean governments currently spend on skills development. Measures of public spending usually include only the sum of local, state, and central government expenditures on education (including current and capital expenditure as well as transfers). The bulk of this spending relates to the direct provision of education. As discussed in Chapter 3, the region has reached levels of spending relative to GDP that match developed regions and countries with similar levels of GDP per capita. This is true almost everywhere in the region. The Southern Cone, the Andean region, and the Central American and Caribbean regions have all significantly increased their spending on education and almost caught up and even surpassed the level spent by similarly developed countries and by some advanced economies (Figure 5.2).

Figure 5.2 Public Spending on Education by Region within Latin America and the Caribbean



Source: Authors' calculations based on World Bank Indicators and Volman (2016). Note: Countries are grouped as follows: Andean Region: Bolivia, Colombia, Ecuador, and Venezuela. Central America and Caribbean: Barbados, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, and Trinidad and Tobago. Southern Cone: Argentina, Brazil, Chile, Paraguay, and Uruguay. Comparison Countries: Albania, Armenia, Bulgaria, Hungary, Indonesia, Kazakhstan, Latvia, Malaysia, Morocco, Philippines, Poland, Romania, Thailand, Tunisia, and Turkey. When data is missing, it was linearly interpolated using the closest two data points. Other points were imputed using data on countries where the correlation was higher than 0.8.

Measured as a share of GDP, more of this spending is allocated to primary and secondary education than to early childhood and tertiary education (Table 5.1). This is because countries first worked on expanding their primary school systems; only after reaching a certain coverage level have they moved toward providing more universal access

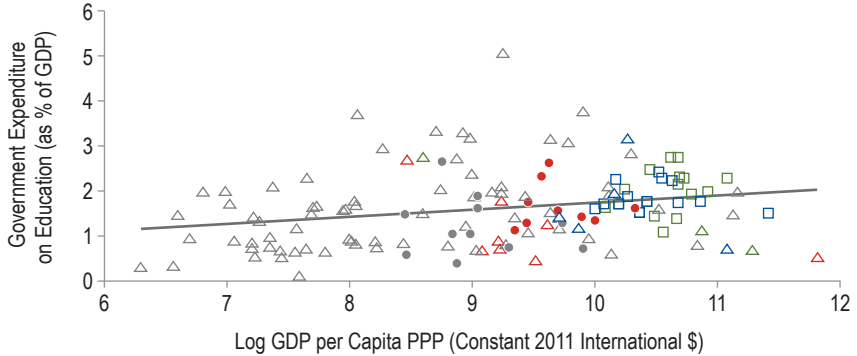
Table 5.1. Government Spending on Education by Educational Level, Select Latin American and Caribbean Countries

Country	Government expenditure in education as % of GDP				
	Total	Preprimary	Primary	Secondary	Tertiary (college)
Argentina	5.3%	0.4%	1.6%	2.2%	1.1%
Belize	6.2%	0.1%	2.7%	2.6%	0.9%
Bolivia	6.5%	0.4%	2.1%	2.4%	1.7%
Brazil	6.1%	0.4%	1.8%	2.6%	1.2%
Chile	4.6%	0.7%	1.4%	1.5%	1.0%
Colombia	4.9%	0.3%	1.7%	1.8%	1.1%
Costa Rica	7.6%	0.5%	2.9%	1.9%	2.3%
Dominican Republic	2.6%	0.2%	1.3%	0.9%	0.2%
Ecuador	4.8%	0.7%	2.1%	0.8%	1.2%
El Salvador	3.8%	0.4%	1.8%	1.2%	0.5%
Guatemala	2.8%	0.3%	1.7%	0.5%	0.3%
Honduras	5.9%	0.4%	2.9%	1.5%	1.0%
Jamaica	6.3%	0.2%	2.3%	2.0%	1.1%
Mexico	5.3%	0.5%	2.0%	1.7%	1.1%
Nicaragua	4.5%	0.2%	1.9%	0.6%	1.3%
Panama	3.3%	0.1%	1.1%	1.0%	1.0%
Paraguay	5.2%	0.3%	2.0%	1.7%	1.2%
Peru	3.7%	0.6%	1.4%	1.1%	0.5%
Uruguay	4.5%	0.5%	1.0%	1.6%	1.4%
Venezuela	7.5%	1.0%	2.9%	1.6%	2.0%
Latin America and the Caribbean	5.1%	0.4%	1.9%	1.6%	1.1%
Comparison Countries	3.8%	0.4%	1.3%	1.5%	0.8%
USA	5.1%	0.3%	1.6%	1.8%	1.4%
OECD	4.9%	0.5%	1.3%	1.9%	1.2%

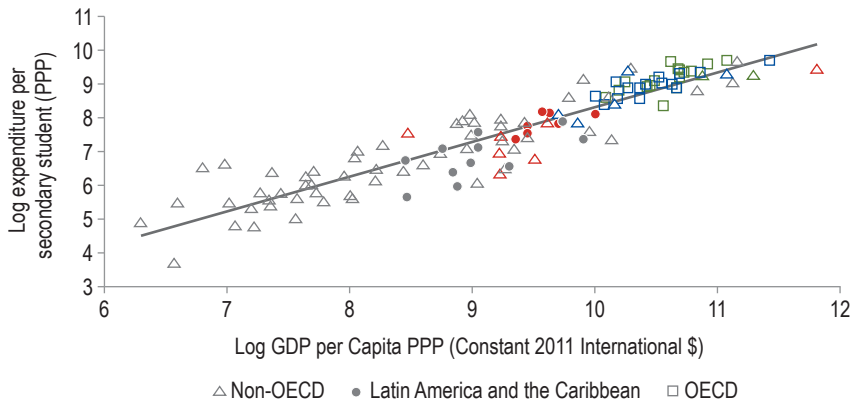
Source: WorldBank – Education Statistics and Volman (2016). Note: The year closest to 2014 was chosen for each country from the information available from 2009 to 2014. Countries included in comparison countries are: Albania, Armenia, Bulgaria, Hungary, Indonesia, Kazakhstan, Latvia, Malaysia, Morocco, Philippines, Poland, Romania, and Thailand.

Figure 5.3 Spending on Secondary Education, Latin America and the Caribbean and Other Regions

a. Percent of GDP



b. Dollar amount (PPP)



Source: Authors' calculations based on World Bank Education Statistics.

Note: The color shows the tercile in which the country performed in the math PISA test in 2015. Countries in the third (lowest) tercile are red; countries in the second (middle) tercile are blue; and countries in the first (highest) tercile are green. Countries that did not participate in PISA 2015 are gray. OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment; PPP = purchasing power parity.

to secondary school. Today, many countries in the region are expanding access to preprimary and tertiary education.

Figure 5.3 shows the relation between the log of GDP per capita and spending on secondary education as a share of GDP (Panel A) and in constant dollars adjusted for purchasing power parity (Panel B).¹

¹ Spending levels for primary and tertiary education are very similar and lead to similar conclusions.

Red markers show countries in the bottom third of the distribution of performance on the international benchmark for student learning, the Programme for International Student Assessment (PISA), while blue and green markers show countries in the first and second terciles, respectively.

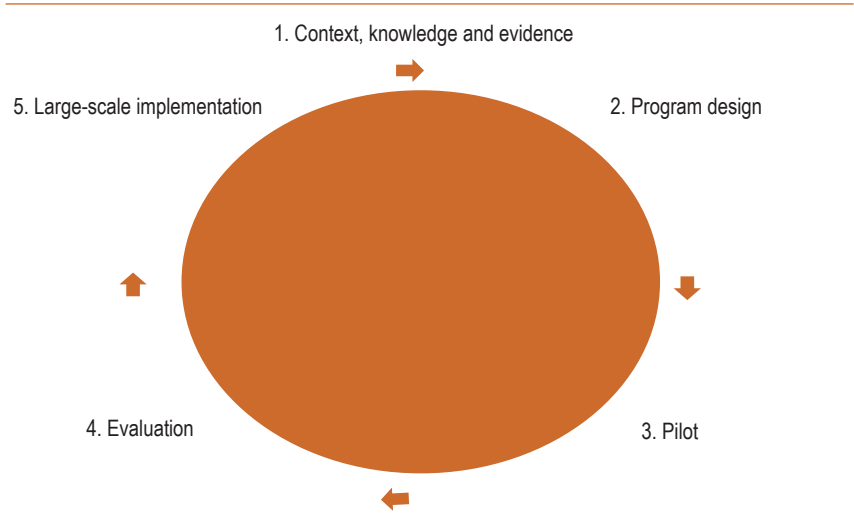
Two trends are notable. First, while the share of GDP spent by Latin American and Caribbean countries is similar to more developed economies, they perform worse on PISA. Second, the region trails behind more advanced economies in terms of total spending per student. This is in part to be expected because an important share of the budget in education is spent on wages, and labor is more expensive (in absolute terms) in developed economies. Importantly, countries that spend more per student perform better on PISA. However, these countries also differ from Latin American and Caribbean countries in other dimensions: they are more affluent, have different labor markets, have different institutional capacities, and so on. This does not mean that Latin America and the Caribbean should not invest more resources in skills development.² What it means is that given the current share of GDP spent on skills development, the room for improving skills outcomes by spending more is likely to be limited to the level of secular economic growth. It is, therefore, imperative that governments move away from policies for skills development that require spending larger shares of their GDP and start considering how to spend the current resources more effectively.

The Case for Evidence-based Policy

In a world with limited resources, policymakers must decide which interventions to implement from a set of possible alternatives. An “intervention” is simply some change to the status quo. It comprises a specific objective, a set of focused activities to meet that objective, and a budget to fund those activities. The ideal process of policy decision-making can

² Some recent evidence suggests that increasing spending on education does improve students' outcomes. Jackson, Johnson, and Persico (2016) use exogenous variation in education spending in the United States and find small effects for children from high-income families but large impacts for low-income children. A 10 percent increase in annual per pupil spending is associated with 0.43 additional years of completed education and 9.5 percent higher earnings. A 25 percent increase over all school age years eliminates the attainment gaps between children from low- and high-income families.

Figure 5.4 The Five Stages of Policy Decision-Making to Launch or Expand a Program



be divided into stages (see Figure 5.4). For the sake of concreteness, the discussion that follows describes how a Minister of Education should use this process to analyze how to implement a program to reduce class size.

In a first stage, policymakers analyze information about the context jointly with the available evidence. This analysis uses quantitative data about class size levels in the country, and compares these levels to some benchmark country (typically a country that is performing well in terms of the policy objective). To assess the learning effects of the intervention, policymakers also review knowledge from experts in this field. In this case, experts may argue that reducing class size could improve learning because in smaller classes teachers can provide more personalized instruction than in large classes. A third component of this initial phase is the use of rigorous evidence. Policymakers review the results of evaluations that have estimated the effects of the intervention on a relevant outcome. This review helps identify what effects can be expected in the country under analysis. In the example here, a review of studies in Bolivia, Israel, Kenya, and the United States reveals that reducing class size from 25 students (the regional average) to 20 students improves learning—but not much. On average, reducing class size by five students translates into an increase comparable to what a third grader learns in about 1.5 months of instruction. The effect on learning is modest.

The second stage focuses on the design of a program. In the example, the specific goal of the program is to reduce the average class size by five students. To accomplish this objective, a series of activities are analyzed. Because each classroom will have fewer students, more classrooms must be built. And more classrooms mean the government must hire more teachers. More schools may also need to be constructed if classrooms cannot be added onto existing schools because of space limitations. Finally, the government will also need to hire more principals and support staff.

In the third stage, a pilot program is implemented in a few schools to gather additional information about the potential effects of the program. During this stage, the program design can be refined.

The fourth stage involves the evaluation of the program in a larger number of schools (e.g. 100). A rigorous evaluation can provide an unbiased and precise estimate of the learning effects of the program. These estimates are invaluable information as they reduce the uncertainty involved in policymakers' decisions.

Finally, the program is implemented at a large scale. The implementation is usually rolled out slowly: the scale-up is gradual because of both budgetary and capacity constraints. As the process unfolds, the program may need to be reassessed using expert knowledge, other pilots, and additional evaluations.

This stylized process is not etched in stone and will certainly not advance in a linear fashion. The program could be dropped at any point in the process. Policymakers may discover new information about context, receive additional advice from experts, or uncover flaws during the program design, piloting, and evaluation.

While this is the way the process should be carried out, policymakers do not always follow this script. In many cases, some key steps of the process are skipped. Unfortunately, the use of evidence and the evaluation phase are typically stages that are left out. Ironically, while they are often sacrificed due to lack of resources, time, or political will, they can actually serve to save money and to muster political support.

In a field in which subjective opinions play a central role in decision-making, there is ample room for disagreement on basic issues that can generate harmful dynamics (see Box 5.1). Decisions based solely on theoretical arguments promote fads. Certain ideas become popular, are adopted on a large scale, but then fall out of fashion, and policies are reversed. Because change is costly, this cycle is burdensome for policymakers and citizens alike. Sometimes policies are reversed not because

BOX 5.1. USING EVIDENCE TO AVOID “WARS”

The field of education can become a battlefield when disagreements based on diverging theories and opinions lead to polarization, or “wars” waged by powerfully committed groups proposing markedly different approaches to tackle an issue. Such wars have occurred in an array of areas. “Reading wars” have pitted proponents of teaching children phonics first against advocates of teaching children to read whole words from the beginning. There have also been “math wars” in which groups clashed regarding the content and instruction activities that should take place during math classes.

How can a field go beyond “wars”? The field of medicine offers some instructive examples of how evidence can be used to settle disputes. Time and time again debates have raged over how to prevent or treat various diseases. The use of evidence has typically settled these debates and allowed the field to continue moving forward.

A good example concerns the epidemic of blindness among preterm babies during the 1950s. A newly introduced procedure for preterm newborns—the administration of high levels of oxygen just after birth—improved the babies’ chances of survival, but seemed to increase the prevalence of blindness among them. Some researchers argued that the high levels of oxygen triggered the blindness epidemic, while other researchers disagreed. An empirical study provided support to the notion that the elevated levels of oxygen were causing the rise in blindness. This study settled the debate and propelled a worldwide rollback in the use of high levels of oxygen for preterm newborns.

they are swept out by system-wide fads, but because a group with different ideas and stronger ties to certain political groups gains power. As power shifts to the other group, the policy is reversed. This is particularly likely with politically charged issues such as school accountability and teacher incentives. Evidence can provide an objective basis to counteract these fads and shifts in power.

Still, it may seem difficult in practice to implement this five-stage process of policy design for a government that faces multiple demands, has limited capacity and a short temporal horizon. This challenge can be tackled by allocating resources and providing political support to a specialized group that can take the lead in the design and evaluation of new programs. That is, the government can set up an internal division that seeks to analyze problems, design interventions to tackle them, and implement pilots and evaluations to identify which solutions really work in practice. This group can be implemented within the public sector; such is the case of MineduLAB, which seeks to find cost-effective

BOX 5.2. NEW INITIATIVES PROMOTING THE ROLE OF EVIDENCE

While the number of experimental evaluations on skills development is low, it is increasing rapidly. Efforts to strengthen the body of knowledge in different fields have been spearheaded by various organizations such as the Abdul Latif Jameel Poverty Action Lab, Innovations for Poverty Action, the International Initiative for Impact Evaluation, the Inter-American Development Bank, and the World Bank. Moreover, there are major initiatives that focus on promoting the role of evidence in skills development which are summarized in Table 5.2.1.

Table 5.2.1. Initiatives to Promote the Role of Evidence in Skills Policymaking

Activity promoted	National	Regional
Use of evidence	What Works Clearinghouse (United States)	SkillsBank (Latin America and the Caribbean)
Production of evidence	MineduLAB (Peru)	
Use and production of evidence	Education Evaluation Foundation (United Kingdom)	SUMMA: Laboratory of Education Research and Innovation (Latin America and the Caribbean)

What Works Clearinghouse. This initiative, established by the U.S. Department of Education, provides information through its website about ongoing research on high-quality education. It funds the review of studies on education practices, programs, and policies; defines which of these satisfy proper scientific standards; and provides reports and analysis summarizing the main findings. Eighteen specialized review teams research subjects ranging from adolescent literacy and dropout prevention to secondary mathematics and the transition to college. Each team includes a content expert, a methodological expert, and review staff.

SkillsBank. The Inter-American Development Bank launched in 2017 a website called “SkillsBank” which reviews and systematizes the evidence on how to promote skills at different stages of the life cycle. For each life stage, it identifies key policy challenges and presents evidence on overall learning effects for different types of programs that can be implemented to tackle each policy challenge. The website conveys the main findings of the existing evidence, as well as detailed information about the evaluations reviewed so that policy-makers and practitioners can analyze whether the particular intervention may be well suited to their specific contexts, or can be adapted.

MineduLAB. Instead of facilitating the use of existing evidence, MineduLAB focuses on producing new evidence. This initiative, launched in 2016 by the Ministry of Education of Peru, spurs innovation in the education sector in Peru to identify scalable, cost-effective interventions to improve educational

(continued on next page)

BOX 5.2. NEW INITIATIVES PROMOTING THE ROLE OF EVIDENCE *(continued)*

outcomes. MineduLAB partners with researchers to identify promising interventions that can be rigorously tested in the field and to guarantee high standards for the evaluations implemented. To reduce the costs of the evaluations, it makes extensive use of administrative data, including national standardized examinations. All interventions are implemented by the government of Peru. Thus, the results are reliable and are directly relevant to public policy in the region. In a short period of time, MineduLAB has produced an impressive portfolio of potential innovations including the evaluation of Grow your Mind described earlier.

The Education Endowment Foundation and SUMMA. These two organizations build on the basic premise that the production and use of evidence are connected. They seek to promote both activities to exploit potential synergies. The Education Endowment Fund aims to improve student learning of primary and secondary students of low socioeconomic status in the United Kingdom. To finance its activities, it obtained a grant of about \$200 million dollars in 2011 from the U.K. Department of Education. All interventions are independently evaluated by top research institutions. The vast majority of the evaluations use experimental methods. SUMMA seeks to improve the process of decision-making in educational policies and practices to increase the quality, equity, and inclusion of education systems in Latin America. It was launched in 2016 with the support of the Inter-American Development Bank, Fundación Chile, and the governments of Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. The initiative aims to promote the use of innovative research methodologies that are well suited for application in the region. By documenting innovative practices, it also seeks to generate institutional models that promote innovation, produce comparative analyses of educational strategies, and spur novel solutions.

solutions to improve education in Peru (this initiative is described in more detail in Box 5.2).

Alternatively, public-private partnerships can be implemented to spur research and development in the skills sector. Private firms and NGOs have tremendous potential to innovate because of their flexibility in creating teams, funding research, and pursuing effective strategies to come up with innovative solutions. But, for the private sector and NGOs to become valuable partners, they must be given the right incentives. If public policy for skills development is based on theories rather than evidence, the private sector is likely to deliver solutions that match these judgments, though in some cases these innovations may not be

effective. By contrast, if the government purchases from the private sector only those solutions that have been proven effective in empirical studies, then that provides strong incentives for private actors to invest in the development of effective innovations.

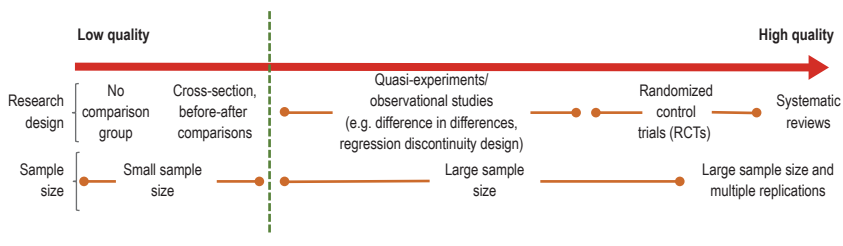
However, as opposed to drug development in medicine, providing intellectual property rights for the use of effective practices in skills development does not seem feasible. For example, if a group of private researchers finds that a specific way of training unemployed adults is effective, they will not profit from their innovation if competing firms or organizations copy their methods. In such cases, the role of the public sector would be to provide funding to private or nonprofit actors (firms, universities) or local governments so that they engage in the discovery of innovative solutions to develop skills. This funding should be set up to ensure that it supports research that will lead to cost-effective programs that can be implemented later at a large scale.

Not All Evidence Is Created Equal

What is rigorous evidence? Consider a policymaker who wants to assess whether an intervention works. She finds several studies that claim to measure the impact of such an intervention (such as class size reduction) on her outcomes of interest (for example, learning). However, not all studies should be valued equally. Studies of higher quality should weigh more in the decision-making process, while very low-quality studies should be discarded. Figure 5.5 summarizes several dimensions of quality for evidence.

First, only studies with a valid comparison group should be considered. In such a study, the outcome of individuals who received an intervention (known as a “treatment”) is typically compared with the

Figure 5.5 The Quality Ladder for Evidence



outcome of (similar) individuals who did not. In the example of class size, the relevant outcome could be how much students learned over the course of an academic year. A comparison group is particularly important when the outcome is expected to improve even without the intervention because in those situations an improvement could be due to normal growth and not necessarily to the intervention itself. In this case, most students learn something over the course of a year, regardless of the size of their class.

Second, studies in which individuals decide whether or not to receive the intervention (self-selection) are of lower quality than those in which the individual has no say as to whether she receives the treatment. Why? Because comparing individuals who decided that the intervention could be good for them with those who decided that the intervention might not be good for them would yield biased estimates of the effect of the intervention on the general population. This second criterion puts randomized control trials (RCTs) at the top of the quality ladder. RCTs typically recruit interested participants and then allocate the treatment randomly to a subset of them. Because participants are randomly assigned to treatment, the two groups (the treatment group and the comparison group) should be very similar except for the fact that one received an intervention and the other did not. Any difference in outcomes following the intervention can therefore be attributed only to the intervention itself.

In many situations, however, treatments cannot be randomly assigned. A second tier of high-quality studies consists of interventions in which treated and comparison groups are assigned quasi-randomly, without direct manipulation by the researchers. These studies, known as quasi-experiments, usually rely on the assumption that the treatment assignment is unrelated to the outcomes of interest. For instance, suppose that only individuals whose score was above a certain threshold were allowed to participate in a treatment. Such is the case in most conditional cash transfer programs; the beneficiaries' wealth (measured by an asset index or score) must be below a certain limit. By comparing the outcomes of individuals right above the threshold with the outcomes of (very similar) individuals located right below the threshold, the researcher can measure the effect of the treatment.

Other quasi-experimental designs can be very informative about the effectiveness of interventions. For instance, researchers could compare the outcomes of individuals who applied to receive the program and

received it versus those who applied and did not. Some studies compare the outcomes of treated and comparison groups before and after the treatment was delivered. These studies are less credible than RCTs, but could still be suggestive of an intervention's effectiveness. A general rule is to avoid both studies that compare the same group of individuals before and after the treatment and those that compare individuals with the rest of the population in a cross-section.

A third dimension that determines the quality of a study is its so-called external validity, which is an indication of how representative the effects are of a larger/different population. All else being equal, studies done with larger samples are of higher quality. Similarly, studies done with samples representative of the whole population versus those done in narrowly defined samples are of higher quality. Finally, studies that have been replicated in different settings, by different research teams, over the years are also of higher quality.

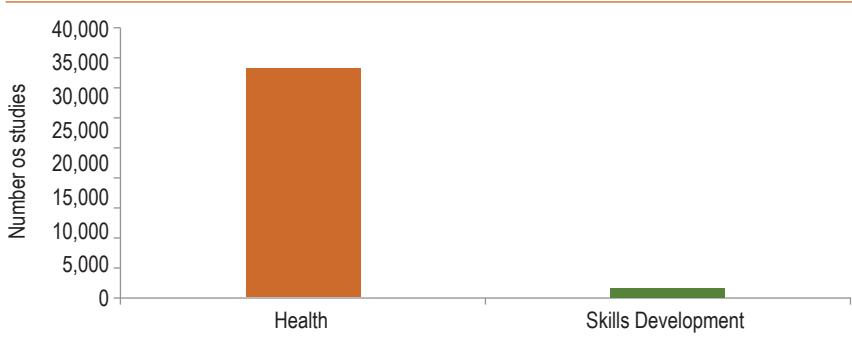
This last point raises an important issue. In general, it is better to guide policy based on a set of studies than based on a specific study. For this reason, systematic reviews sit at the top of the quality ladder. The basic idea of systematic reviews is that the procedures followed to identify, select and analyze studies should be explicit and applied in a consistent fashion. In a sense, doing systematic reviews means incorporating the basic notions of objectivity and transparency that are embraced in science. This is why selected key questions tackled in the book, such as how to improve enrollment in secondary education, have been analyzed performing systematic reviews of the literature.

A fourth dimension of quality is for studies to have been properly validated and vetted. A critical aspect of the scientific process is to publish research results in reputable peer-reviewed scientific journals. The peer-review system, by which several experts in an area critique each piece of research, helps the editor of the journal filter out research that has not been done using sound methodologies. Of course, the system is not perfect. Sometimes good research papers end up not being published, while bad ones do. Hence the importance of relying on scientific consensus rather than a single piece of evidence.

The Race for Evidence

To what extent do governments produce and use evidence on skills development to inform decision-making? It is difficult to determine how

Figure 5.6 Experimental Evaluations in Skills Development versus Health in the World



Note: For “Skills” the data includes all trials registered in relevant websites (See footnote 3) that pertain to interventions related to early childhood development, education, learning, parenting programs, and so on. For “Health” the data includes all trials registered in clinicaltrials.gov (See footnote 4) and includes both medical and public health interventions.

prevalent different sources of information have been when policymakers are making decisions. However, there are objective data on the production of evidence, as measured by the number of evaluations published on skills development. This chapter collected information on the number of experimental evaluations that were produced worldwide between 2000 and 2013.³ Evaluations published since 2014 were not analyzed because it is difficult to obtain reliable information about evaluations produced in recent years. As a benchmark, experimental evaluations implemented in the health sector during the same period were also searched.⁴ The results, reported in Figure 5.6, are telling.

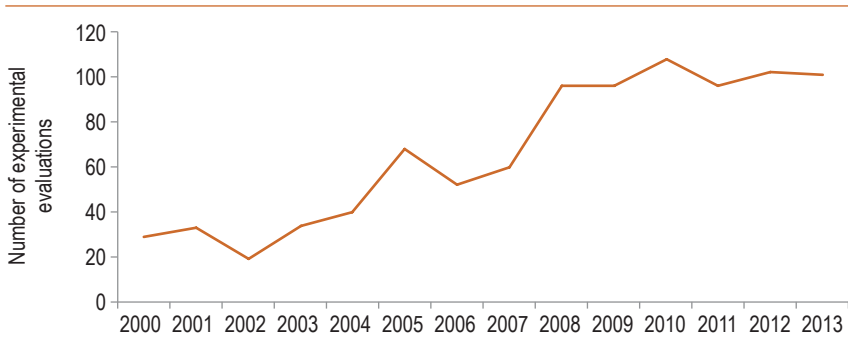
While about 900 evaluations were conducted on skills development, this number is dwarfed by the more than 22,000 evaluations related to health. Because skills development encompasses many stages, and each stage comprises a multitude of potential interventions, the existing body of evidence for each policy option is fairly limited.

Consider, for example, the intervention discussed earlier in the chapter: reducing class size for students in primary education. Because

³ The websites of the following initiatives were searched: the Abdul Latif Jameel Poverty Action Lab (J-PAL), the American Economic Association’s registry for randomized controlled trials, the Education Endowment Foundation (EEF), Innovations for Poverty Action (IPA), the International Initiative for Impact Evaluation (3ie), and What Works Clearinghouse (WWC).

⁴ In this case, information came from clinicaltrials.gov, a website maintained by the National Institutes of Health.

Figure 5.7 New Experimental Evaluations of Skills Development Produced Each Year

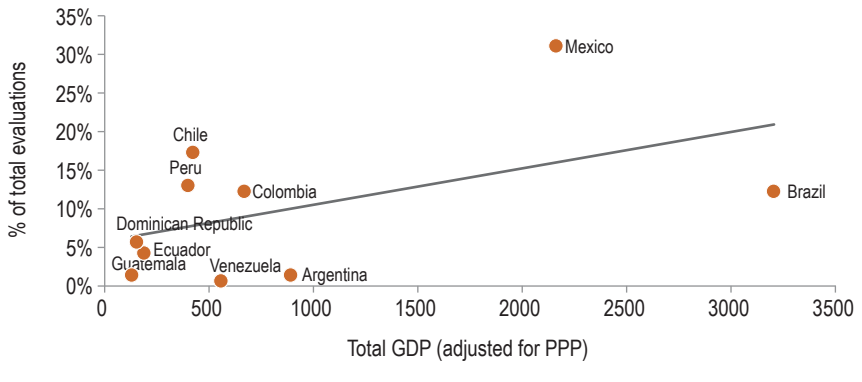


it is very expensive to reduce class size, it is critical for policymakers to have reliable information about the expected learning effects of reducing class size. However, only two rigorous experimental evaluations have measured the effects of this policy. The first evaluation was performed in the United States around 1987, and the second was performed in Kenya around 2006 (Krueger, 1999; Duflo, Dupas, and Kremer, 2011). Moreover, even including studies that have used other sound methodologies, the number of available studies worldwide increases only to six.

The evidence is even more limited for another important intervention: extending the school day. Many countries in the region are contemplating increasing the number of hours that students attend school from about 4 to 7 hours a day. Implementing this policy at large scale implies massive increases in spending. Currently, the average country in the region spends about 2 percent of GDP on primary education. Per student costs would jump by at least 50 percent if the school day were extended. Hence, the average country may need to boost spending by 1 percent of GDP to make this policy universal. Unfortunately, no rigorous experimental evaluations, and only three nonexperimental evaluations, have been conducted of this policy.

Though the number of existing evaluations is low, there are reasons for optimism. Figure 5.7 reveals that the number of new evaluations produced annually has increased from about 27 in 2000–02 to about 100 in 2011–13. In that decade, the average number of evaluations produced annually has quadrupled. Box 5.2 describes some major efforts to generate rigorous evidence in the area of skills development.

Figure 5.8 Share of Skill-Related Evaluations Produced by Countries in Latin America and the Caribbean



What about Latin America and the Caribbean? About 14 percent of the identified evaluations have been implemented in Latin American and Caribbean countries. This suggests that the region is slightly over-represented in the worldwide production of evaluations, considering that the region's population accounts for about 9 percent of the world population and 8 percent of total gross domestic product (adjusted for purchasing power parity). The number of evaluations produced in the region also increased substantially during the period. In particular, about five new evaluations were produced annually between 2000 and 2002, and this figure climbed to about 14 for the 2011–13 period.

Which countries are leading the way in terms of producing skill-related evaluations in the region? Figure 5.8 presents results to answer this question. In this figure, each point corresponds to a country, and for clarity, only the ten largest economies in the region are included in this analysis. Note that the vertical axis shows the share of evaluations implemented in each country and the horizontal axis shows the total gross domestic product adjusted for purchasing power parity. The figure shows that evaluations are not equally distributed across countries. While Mexico accounts for 31 percent of experimental evaluations, Argentina, Guatemala, and Venezuela account for 1 percent each.

Larger economies tend to account for a higher share of evaluations, a tendency that is not unexpected. Because the GDP of Mexico is much larger than that of Guatemala, Mexico could be expected to account for a larger share of evaluations. Hence, the dotted line in the figure that shows

the expected share of evaluations based on the GDP level. Countries above the dotted line conduct more evaluations than would be expected based on the size of their economy. In other words, Chile, Colombia, Mexico, and Peru have a higher share of evaluations than expected, while Argentina, Brazil, Ecuador, Guatemala, and Venezuela have a lower share than expected. Clearly, some countries in our region are leading the way in the production of evidence for skills policies while others are lagging.

Rigorous Evidence: Not a Silver Bullet

Even though evidence can be an important tool to improve efficiency and outcomes, it also has limitations. One important limitation is that sometimes it is difficult to create a treatment group and a comparison group because everybody is affected by the policy and the possibility of randomizing treatment (leaving some people untreated) is politically costly. For example, consider regulating private providers of skills, such as day-care centers, schools, or universities. One possibility would be to roll out these regulations geographically and compare outcomes in different areas of the country. If that were not possible and the regulations had to be set nationwide, it would be impossible to build a comparison group.

A second important limitation of using rigorous evaluations is that they cannot incorporate certain types of important externalities. Take the case of job training programs. An evaluation of a job training program may conclude that the beneficiaries of the program had higher employment rates than those who did not participate in the program. But did the program merely allocate the scarce jobs to the beneficiaries of the program and displace nonbeneficiaries? Or did the program actually increase overall employment levels? An experimental evaluation that compares beneficiaries and nonbeneficiaries in the same labor market cannot distinguish between these scenarios. Hence, assessing the overall effect of training programs is difficult using experimental evaluations. Still, it is possible to employ experimental evaluations to tackle these issues (see, for example, Crepón et al., 2013), although such studies are much more expensive and complex to implement.

Specific experimental evaluations may have additional shortcomings that do not apply broadly to the general methodological approach. First, an evaluation may have too small a sample size to detect reasonable effects. That is, an evaluation can report that the effect of an intervention was not statistically significant, but this may be just due to lack of

Table 5.2. Policy-relevant Evaluations

		Public spending	
		Low	High
Benefit per dollar spent	Low		One Laptop per Child
	High	Grow your mind	

precision related to a small sample size. In this case, another evaluation can be implemented with a larger, and adequate, sample size. Second, the results of an evaluation may not be valid because the examination used to measure outcomes may emphasize educational content that was covered in the treatment group but not in the comparison group. This challenge can be tackled by performing an evaluation that employs a fair test that is aligned with the curriculum that should be covered (or with a long-term relevant outcome such as labor earnings).

Third, context can play a major role in the effects of an intervention. Hence, an evaluation implemented in a certain context, such as urban areas of the United States, may provide little information regarding the potential effects of the evaluated program in a different context, such as rural Guatemala. To tackle this challenge, an evaluation can be conducted in the target context. Finally, an evaluation may be implemented by highly committed staff from an NGO, which may raise doubts about the expected results when implemented by the government. That is, the quality of implementation can affect the effects of an intervention. Once more, another evaluation could be set up in which the implementer is the government so that the results can better predict what can be expected under regular conditions.

In short, though it is important to be aware of the potential limitations of specific evaluations, a strong design can tackle these issues. In fact, the evaluations implemented by MineduLAB in Peru seek to tackle all the issues described. That is, in all cases, the evaluations involve large samples, use a broad standardized national examination to assess effects, are implemented in the actual context in which the policy may be scaled up, and are implemented by government employees.

Shining the Light on Policymaking

Incorporating evidence into the policymaking process for skills development policies and programs can improve outcomes. Which evaluations

are more relevant for policy purposes? Answering this question can help policymakers decide which prospective evaluations to fund among a crowded field of alternatives. Table 5.2 classifies programs according to the current level of government spending (across columns) and the benefit of the program per dollar spent (across rows).⁵

Ideally, all programs run by the government should be on the green diagonal. Governments should spend little on programs with low benefits per dollar spent and should devote considerable resources to programs with high benefits per dollar spent. Hence, the most policy-relevant evaluations are those that identify programs in the red diagonal. These evaluations can identify programs that yield few benefits but entail significant costs (such as One Laptop per Child) and programs that yield high benefits with little government spending (such as Grow your Mind).

Evaluations provide the light that can point policymakers in the right direction. They show how governments can change policies to improve outcomes without increasing spending. The chapters that follow identify and discuss several evaluations that can help guide governments as they seek to develop the skills of their citizens throughout their lives.

⁵ For prospective evaluations, expert knowledge may provide information about the expected benefits per dollar.

6 Getting an Early Start: Skills Development in Early Childhood

The evidence is in: investing in early childhood development can have a major impact on skills development (Berlinski and Schady, 2015). Moreover, reducing skills inequalities that surface early in life and often widen during the course of a lifetime can help attack the income inequality that so plagues Latin America and the Caribbean. Governments in the region have gotten the message and are increasing their investments in early childhood development. However, while increasing public investment in early childhood may be the right idea, not all investment is created equal and the actual gains may vary depending on the particular policy path chosen.

Governments are taking three basic policy approaches. The first aims to increase preprimary enrollment. Children attending preprimary programs participate in educational activities for about two to five hours a day in a center typically annexed to a primary school. Enrollment in preprimary programs has expanded markedly in the region, fueled by important increases in public supply. This is good news because there is strong evidence that attending a preprimary program increases cognitive and socioemotional skills in early childhood and ultimately earnings in adulthood. However, the preprimary enrollment rate in the region is quite high (65 percent) and on a par with that of the United States (64 percent). It may be difficult to achieve further increases in preprimary enrollment just by expanding public supply. Thus, other early childhood policy options should be examined.

A second policy option focuses on increasing access to safe and healthy daycare services. Children attending daycare are expected to spend at least eight hours there. Though expanding access to daycare may help some women to enter and stay in the workforce, the evidence

suggests that typical governmental programs have little impact on skills development. Moreover, public daycare programs tend to be expensive. Though relevant for other important policy objectives, this option holds limited promise from the perspective of skills development.

A final policy option focuses on parenting programs. These programs seek to help parents adopt caregiving practices that foster child development. The evidence suggests that these programs offer the best of both worlds: they can be highly effective and are relatively inexpensive. Moreover, parenting programs are rare in the region, meaning the room for expansion is enormous. Only a few countries implement them and typically spend limited public resources on them. Thus, expanding parenting programs is a highly relevant policy option to promote skills development during early childhood.

Against this policy backdrop, this chapter analyzes parenting programs in depth. These programs are based on the recognition that many parental decisions and actions—such as how to praise or admonish children for their behavior, or how cognitively stimulating their interactions with them are—have long-lasting effects on children. Parents typically receive little formal input on how to foster healthy child development. This lack of support can explain why many parents in the region seem to prefer using punishment (even harsh corporal punishment) instead of praise—even though child development experts suggest that the carrot is far more effective than the stick from a developmental perspective.

How can governments ensure that parents do what is best for their children in their homes? To answer this question demands a detailed analysis of the effects of different programs designed to encourage effective parenting practices and ultimately to foster healthy child development.

Early Childhood Development: A Rocky Road

Child development is hardly a linear process in which outcomes change or progress smoothly from one stage to another.¹ Rather, development ebbs and flows at different ages and stages. However, the development process is cumulative, and events occur during predictable time periods. As a result, factors that hinder or delay development in some areas

¹ This section relies heavily on Chapters 1 and 2 of Berlinski and Schady (2015).

or at certain points in time may have permanent consequences and may affect the well-being of an individual throughout her lifetime.

Child development is also multi-dimensional in nature. It embodies an array of psychological and biological changes that occur during early life (Fernald et al., 2009). These changes include:

- **Physical development:** Growth accelerates during the first 2 months of life and continues at a declining rate thereafter. This pattern is captured by several anthropometric measures (e.g., length/height-for-age, weight-for-age, and head circumference), which are important indicators of physiological growth. The process of physical development also includes motor skills (i.e., the ability to control the use of muscles). Children learn first to sit without support, which is typically followed by crawling on hands and knees, standing without assistance, walking with assistance, standing alone, and finally walking alone (WHO Multicentre Growth Reference Study Group, 2006). They reach these developmental milestones during predictable time periods.
- **Language/communication:** Children’s language development begins long before they utter their first word (Bloom, 1998) and progresses differently from one year to the next. Children babble at 2 to 4 months, make noises and try new and different sounds at 4 to 6 months. They point and gesture at around 12 months and say their first words and sentences in the first two years. They experience an explosion of words between ages 2 and 3 (Woodward and Markman, 1998). At 3 to 4 years old, children speak well in sentences, can chant rhymes, and enunciate clearly enough to be understood. As children move into the preschool years, indicators of language development include children’s production and understanding of words, their ability to tell stories and identify letters, and their familiarity with books.
- **Cognitive skills:** Cognitive skills include analytical skills, problem solving, memory, and early mathematical abilities (Johnson, 1998). When children respond to their own name at about 12 months and learn to stack or nest objects at 15–18 months, they are developing their cognitive abilities on schedule. By age 3, most children can solve simple puzzles, match colors and shapes, and understand concepts such as “more” and “less” (Kuhn and

Siegler, 1998). Cognitive development at school age is associated with the usage of letters and numbers, the ability to retain information, and the knowledge of basic information like one's name and address. Standardized tests of reasoning, problem solving, memory, and mathematical abilities at the start of school are reliable indicators of children's cognitive development and are strong predictors of scores throughout primary and secondary school (Duncan et al., 2007, Duncan, 2011).

- **Socioemotional skills:** Healthy infants and toddlers show preferential attachments to caregivers: they recognize their parents' faces at 1 to 4 weeks of life; they smile at 4 to 5 weeks, respond to parents' voices at around 7 months, and indicate their wants at 7 to 15 months. They enjoy initiating and responding to social interactions, such as waving bye-bye at 7 months, imitating activities and drinking from a cup starting at 9 months, helping in the house, using a fork/spoon and removing their clothes between the first and second year of life, brushing their teeth, and washing and drying their hands between 18 and 24 months. In the preschool years, children begin to develop social competence (getting along with other children, teachers, and adults), behavior management (ability to follow directions and cooperate with requests), social perception (identifying thoughts and feelings in themselves and others), and self-regulatory abilities (emotional and behavioral control, especially in stressful situations). All these skills are critical for children's success in school (Thompson and Raikes, 2007).

It is challenging to properly assess the state of such a complex, multifaceted phenomenon as child development. Berlinski and Schady (2015) have documented the considerable gains made in infant health in Latin America and the Caribbean in the last 30 years. The percentage of newborns with low birthweight is lower than in other regions with similar levels of economic development. Moreover, infant mortality rates and stunting have fallen dramatically. Over a 50-year period, in 15 of the 17 countries in Latin America and the Caribbean with available data, infant mortality fell by more than 75 percent; in three countries—Brazil, Chile, and Peru—infant mortality fell by more than 90 percent. However, despite this progress, there are still some important socioeconomic gradients in stunting.

It is more difficult to assess other aspects of child development such as motor skills, language, cognitive, or socioemotional development, since nationally representative and comparable data across countries and time are rarely collected. Assessment relies on data from a handful of studies that measure these outcomes. An initiative of the Inter-American Development Bank known as PRIDI (the Spanish acronym for Regional Program of Indicators of Child Development) collected data on cognition, language and communication, motor, and socioemotional development using nationally representative samples of approximately 2,000 children aged 24 months to 59 months in each of four countries—Costa Rica, Nicaragua, Paraguay, and Peru (Verdisco, Cueto, and Thompson, 2016).

Substantial delays exist in the development of language, particularly among the poorest (Verdisco, Cueto, and Thompson, 2016). The differences in average language and communication scores between those at the bottom and top income quintile at age 5 are large. In fact, the difference is equivalent to the gains of an average child over the course of 16 months in her language and communication scores. Schady et al. (2015) report similar socioeconomic gaps for children in rural areas of five Latin American countries (Chile, Colombia, Ecuador, Nicaragua, and Peru) using the *Test de Vocabulario en Imágenes Peabody* (TVIP), the Spanish-speaking version of the Peabody Picture Vocabulary Test (PPVT). Both studies also point to a gap in language and communication that widens with age.

The socioeconomic gradients are weaker for other outcomes, including motor skills, socioemotional development and the incidence of behavioral problems. However, socioemotional outcomes are largely parent-reported, while the others are observed directly and are the result of comprehensive assessments. Therefore, the lack of socioeconomic gradients in socioemotional development could well reflect social desirability bias or other forms of bias in survey response rather than similar socioemotional development among different socioeconomic groups.

Help at Home: Public Policy in Early Childhood

Three domains are essential for healthy development in childhood, according to the American Academy of Pediatrics: a nurturing, protective network of relationships with adults; a safe and supportive physical space in which to live and grow, and; adequate nutritional intake and habits (Shonkoff and Garner, 2012).

Children do not make autonomous decisions about how to interact with adults, where to live, or what to eat; this task lies largely with parents. And it is a difficult task indeed. Any parent will be quick to admit to the trials and tribulations of raising her children. People are not necessarily endowed with the knowledge required to make adequate parental decisions. As with any difficult job, training may be needed.

For a long time, public policy considered infants and toddlers to be in the domain of the family and defined the state's obligations towards them in terms of patronage or charity. The state did not interfere with family decisions about how to rear children, with the exception of some health (e.g., pregnancy controls, vaccination and growth check-ups) and social protection issues (e.g., adoptions, child custody). But times have changed. A child's inalienable rights, independent of her parents, are now universally accepted. The 1989 United Nations Convention on the Rights of the Child, signed by 194 nations, is the most widely ratified human rights treaty.

If children have their own rights as individuals and parents often need help in making choices in the best interest of their children, then a clear rationale exists for public intervention. How can governments ensure that parents make the right decisions when it comes to their children? In models of economic behavior, the key variables that determine parental decisions are their feelings towards their children, their income, the prices of goods and services and their knowledge/expectations about the effect of their actions on child development outcomes. Traditional economic policies rely on regulating markets, changing prices or income, to elicit behavioral changes. For example, vaccinations are offered for free to induce higher vaccination rates and, therefore, lower morbidity rates among children. Cash transfers are given to poor families to guarantee consumption of a minimal threshold of goods and services. These policies (and others like housing subsidies, daycare subsidies, parental leave, etc.) are likely to directly affect behaviors that are mediated by the market; lower vaccine prices will lead to more vaccinations, and more income will lead to higher food consumption.

What happens with parental behaviors that are not mediated by market transactions? Consider, for example, cognitive stimulation. Whether parents engage in sustained patterns of verbal interaction, which gradually increase in cognitive complexity as a child develops (an important behavior for the development of language according to Bronfenbrenner, 1974), is difficult to affect directly by prices or transfers. However, this can have life-changing consequences. A 20-year

follow-up of a randomized experiment in Jamaica in which the mothers of malnourished children were tutored on how to stimulate their 9 to 24-month-old children through play, found that those who received the stimulation eventually grew up to be adults with higher IQ scores, more educational attainment, improved mental health (reduced depression and social inhibition), less violent behavior, and earnings around 25 percent higher than those in the control group (Gertler et al., 2014; Walker et al., 2011).

Governments can use a number of instruments if the interactions between parents and children at home are failing. At one extreme is foster parenting and, eventually, adoption. If parents are unable to look after their children in a way that promotes healthy development, in extreme circumstances, a completely new parental environment might provide relief for children. A less dramatic alternative is to put at-risk children into daycare. In the traditional daycare setting, children from 6 months to 5 years of age are cared for by trained professionals who work under a structured curriculum of activities that foster physical development, language/communication, cognitive, and socioemotional skills. Children spend at least eight hours a day, five days a week in these centers so nutrition, rest, and in some cases health screening are also important aspects of the daycare setting.

Evidence on the success of daycare programs targeting at-risk children to improve their well-being is, unfortunately, rather limited. A notable exception is the Abecedarian project, a study carried out in the early 1970s in Chapel Hill, North Carolina. One hundred eleven children from low-income families were randomly assigned as infants to one of two conditions: a control group and a treatment group. The treatment group received full-time childcare services at a single site for 50 weeks a year from around 2 months of age through age 5. The teacher/childcare ratios at the center ranged from one adult per three children for infants/toddlers to one adult per six children for older children. The intervention positively impacted cognitive dimensions from age 3 onwards with some of these differences lasting through age 21 and improved academic achievement from ages 8 to 21 (Campbell et al., 2014; Campbell et al., 2001). Moreover, program participants had lower levels of grade repetition, were less likely to be placed in special education classes, less likely to drop out of high school, and more likely to attend a four-year college at age 21.

An on-going evaluation of a daycare program in Colombia (Nores, Bernal, and Barnett, 2016) illustrates the potential gains of high-quality

services in the region. AeioTU offers daycare for nine hours a day, 48 weeks a year, for infants and children up to 5 years of age. Childcare ratios are low (but somewhat larger than in Abecedarian), most teachers have either a bachelors or vocational degree and receive extensive training prior to starting and during the job. The educational curriculum is based on project learning and balances teacher-directed and child-initiated activities. The meals provided at the centers cover up to 70 percent of a child's daily nutritional needs. The cost of AeioTU is estimated to be US\$1,870 per child per year—three times more than prevalent community programs such as *Hogares Comunitarios*. The evaluation, implemented in two centers with 818 children, has showed gains in language and cognitive development (Nores, Bernal, and Barnett, 2016).

Evaluations of government-funded daycare programs in the region are less encouraging. The program implemented in Bolivia, *Proyecto Integral de Desarrollo Infantil*, provided full-time daycare services in centers located in the homes of women living in low-income communities. Each center had about 15 children and about five children per provider. The program produced small positive effects on child cognitive skills (Behrman, Cheng, and Todd, 2004). A similar community-based program in Colombia (*Hogares Comunitarios*), with larger ratios of children per provider (about 12), had small positive effects on child cognitive skills (Bernal et al., 2009). Finally, a public program in Ecuador provided funding to attend full-time daycare. The participating daycare centers each had about 45 children with a ratio of children per provider between 8 and 10. These daycare centers actually had a small negative impact on child cognitive skills (Rosero and Oosterbeek, 2011).

Most enrollment in daycare facilities aims to help families balance work with childcare needs and not necessarily to serve the needs of children at risk of developmental delay. In Latin America and the Caribbean, daycare enrollment has soared in the past 10 years (Berlinski and Schady, 2015). For example, in Brazil and Chile, the proportion of children in daycare doubled, and in Ecuador it jumped six-fold. In Brazil, Chile, Colombia, and Ecuador between one-fifth and one-third of children between the ages of 0 and 3 are in daycare. Public daycare is more prevalent among more educated women. The data on center quality are patchy but the quality of services tends to be poor (Berlinski and Schady, 2015). Sadly, low-quality services do not lead to gains in childhood development and may even harm children (Baker, Gruber, and Milligan, 2008; Bernal et al., 2014).

Toddlers have access to other forms of care outside the home; the most widespread is preprimary education. Preprimary school participation in the region has risen sharply for all income groups, and enrollment gaps among income quintiles have narrowed (Berlinski and Schady, 2015). Indeed, many countries (including Argentina, Chile, Colombia, Ecuador, Jamaica, Mexico, Peru, and Uruguay) enjoyed universal enrollment in kindergarten by 2013.

Do these programs work? During the 1990s, the provision of preprimary education in public schools in Argentina and Uruguay, mostly, expanded dramatically thanks largely to the construction of preschool rooms in existing primary schools. In Argentina, between 1991 and 2001, average enrollment for children between 3 and 5 years of age increased from 49 percent to 64 percent. In Uruguay, between 1995 and 2004, enrollment in preprimary education grew by 76 percent. In both countries, the newly enrolled children attended school for two to four hours a day during the normal school year (about 180 days) in a structured school/classroom environment.

Berlinski, Galiani, and Manacorda (2008) and Berlinski, Galiani, and Gertler (2009) look at how participation in preprimary education affects learning and behavior. As the decision to build new preschool rooms was compensatory (i.e., more rooms were built where less children were going to preschool), the studies use statistical techniques to tease out causal effects from the intervention. In Argentina, children who participated in preprimary education scored better on standardized tests in math and Spanish taken in the third grade as well as on measures of classroom behavior reported by teachers. In Uruguay, attending a preprimary school program reduced school dropout rates and increased the years of completed education. At age 15, those who attended preprimary education had completed 0.8 years of education more than those who did not attend.

Parenting programs are at the other end of the spectrum of interventions that affect the interactions of children with adults. How can governments encourage parents to adopt practices that support their children's healthy development?² Applying the most effective parenting practices demands time and resources, but most importantly it requires knowledge. Most parents care about their children but fail to

² The focus is on the management of behavior and cognitive stimulation. How to affect nutritional behavior such as breastfeeding is discussed in Chapter 3 of Berlinski and Schady (2015).

adopt the best parenting practices because either they do not know the consequences of their actions, or they do not know the most effective approach to elicit the desired behavior (Cunha, Elo, and Culhaner, 2013). For example, parents may be unaware that harsh corporal punishment of children causes lasting psychological damage, including elevated rates of mental health problems and aggression in adolescence and adulthood (Baumrind, 2001; Gershoff, 2002). Furthermore, they may not know that ignoring inappropriate actions and praising good ones may be a better parenting strategy to elicit a desired behavior.

Before reviewing parental interventions, it is important to understand the context in which these interventions are carried out. How can this be measured? A pioneering study recorded the conversations of 42 families living in Kansas cities with their children aged 7-9 months for around two and half years for an hour each month (Hart and Risley, 1995). The families differed in socioeconomic status. After analyzing 1,300 hours of interaction between parents and children, they found that in words heard alone, the average child on welfare was exposed to fewer words per hour (616 words) than the average working-class child (1,251 words) and fewer than one-third those of the average child in a professional family (2,153 words) (Hart and Risley, 2003:5). Moreover, the average child in a working-class family received much more positive feedback than her counterpart in a welfare family (12 affirmatives and seven prohibitions per hour compared to five affirmatives and 11 prohibitions per hour; that is, a ratio of 2 encouragements to 1 discouragement, compared to 1 encouragement to 2 discouragements). (Hart and Risley, 2003:5).

Unfortunately, information of this type is not available or affordable for nationally representative samples. The current approaches to measuring household environments rely on direct observation or on parental questionnaires. A popular instrument that relies on household observation by a trained enumerator is the Home Observation for Measurement of the Environment (Bradley, 1993; Caldwell, and Bradley, 1984). Berlin-ski and Schady (2015) rely on data from studies that measure this index in a sample of households in Antigua, Ecuador, Jamaica, Nicaragua, Peru, and Saint Lucia. They report large differences in the quality of the home environment in all countries across socioeconomic backgrounds. In households with lower levels of education, parents are less responsive to children and more punitive.

In numerous surveys, including the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Surveys (MICS), mothers

are asked how they discipline their children, including whether they spank or hit them, or whether they read to them. Based on these data, the prevalence of harsh punishment is about 40 percent or more in Belize, Bolivia, Jamaica, and Saint Lucia and about 30 percent or more in Colombia, Peru, Suriname, and Trinidad and Tobago (Berlinski and Schady, 2015). In most countries, harsh punishment varies significantly according to the education level of the mother. In particular, in Bolivia and Peru, children whose mothers did not complete primary school are twice as likely to face harsh punishment compared to those whose mothers completed secondary or more. Similarly significant socioeconomic gradients exist in the region in the frequency of reading (Berlinski and Schady, 2015).

Proof that People Can Change

In many households in the region, particularly among the poorest, parents are using child-rearing practices that do not promote healthy child development. Children are treated harshly and lack cognitive stimulation. Therefore, public policies directed towards changing these behaviors have the potential to promote healthier child development. This section reviews the evidence from randomized control trials in the fields of education, medicine, and psychology, for programs designed to affect child-rearing practices. The underlying theories of change of these programs are presented in Box 6.1.

Parental behavior can be modified for the benefit of children and there is ample evidence to prove it. The evidence comes from multiple approaches to changing parenting practices, from the early experiments with pre-term children, through the first Jamaican study, to the evaluation of behavioral therapy and other approaches to managing children's behavioral issues. However, size and scale matter. Despite the many successes, well-done experiments reveal a number of interventions that result in little gain for children. Therefore, the challenge for policymakers is to identify those programs that consistently provide successful results when implemented at scale.

What is, then, success at scale? The vast majority of studies involve single experiments that took place in a specific location at a given point in time with a small sample of children. Successful evaluations provide proof of a concept, but they don't attest to the gains that may result from scaling programs with diverse providers and populations. The

BOX 6.1. THE THEORIES BEHIND PARENTING PROGRAMS

Three theories of change underlie most parenting programs: transaction theory, developmental theory, and behavior change theory. Transaction theory considers child development as an interactive process (Olson and Sameroff, 2009). The development of self-regulation, for example, should be interpreted not as a trait of the individual, but rather, as the result of experience and interaction with caregivers and surroundings. Moreover, caregiver's behavior responds to their personality, knowledge of child development, and perceptions of the child. Thus, child development should be considered the product of bidirectional relationships between children and caregivers. Parenting interventions that follow this model therefore focus on the child-caregiver dyad and their interactions, rather than single-directional parent-to-child directives.

Developmental theory highlights the development of a child's skills. The first two years of life are characterized by the development of sensorimotor skills and emotional attachment. Studies show that early parenting stress can negatively affect this development, but proper sensitivity and responsiveness can reduce the impact of early stress (DiPietro, 2004; Belsky, 1984; Deater-Deckard, 1998). Thus, parenting programs seek to reduce maternal stress and closely monitor mothers' mental health.

Finally, behavior change theory stresses the value of modeling for acquiring new behaviors. It draws from social cognitive theory, which posits that individuals obtain knowledge by observing others in a context of social interaction (Bandura, 1986). In other words, they can learn by replication, not just by personal trial and error. Individuals learn from observing a model's behavior and the consequent outcomes. Parenting interventions can thus incite behavioral change in parents by showing them how to appropriately play or communicate with children through role modeling or coaching. If parents see positive results from certain types of interaction, they can learn to adopt more positive parenting practices.

results of on-site experiments, for example, may have been driven by the dedication of their personnel or a manager that is difficult to find elsewhere. Likewise, the parents that agreed to participate in an experiment may be more malleable to change than other parents that have not been approached by the research team.

The limits of single-site studies are highlighted by the evaluation of the Comprehensive Child Development Program (CCDP) in St. Pierre et al. (1997). The CCDP was a multisite U.S. program designed to facilitate low-income families and their children's access to a variety of social services. The evaluation looked at the performance of the program over 21 sites through

randomized control trials. It reported statistically significant effects on children's cognitive development at one site only. However, it was ineffective in the other 20. This is not an uncommon finding (e.g., Walters, 2015).

This review focuses on programs that were implemented in developed and developing countries and have been evaluated in multiple sites, geographic locations, or at different points in time. The hope is that selecting these programs will improve the quality of the advice provided to policymakers about potential programs. Included studies had to satisfy the following conditions: (i) assessed effects using experimental methods; (ii) published after 1990; (iii) delivered to parents with children aged 0 to 5; (iv) reported outcomes include at least cognitive or behavioral skills; and (v) the study was a primary evaluation of an intervention.

Several important programs failed to meet these eligibility criteria and, hence, were not included in the review. A number of well-designed programs, including Early Start (Australia), Abecedarian (US), Hawaii Healthy Start (US), Child First (US), Care for Child Development (China) among others, have only been implemented in single sites. Others such as the Child First program (US), have been implemented in multiple sites, but have no multisite evaluations to shed light on the consistency of the programs' results.

Also, certain parenting programs that were excluded have been designed so they can be easily implemented on a massive scale. Programs such as 123Magic, the Very Important Parents (VIP), or the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD) are actually marketed and offer flexible delivery platforms, including the web and multimedia. Recent evidence suggests that programs like these may enhance parenting behavior effectively and at low cost.

The bulk of parenting programs reviewed here focus either on strategies to manage child behavior or cognitive stimulation. Incredible Years, for example, focuses on teaching parents to understand their children and their abilities, and to develop appropriate rules, boundaries, and routines. The standard program covers material on building strong relationships with children through child-directed play interactions; how to be a social, emotional, and academic coach for children; how to provide praise and incentives to build social and academic competence; how to set limits and establish household rules; and how to handle misbehavior. Meanwhile, cognitive stimulation programs, such as Home Instruction for Parents of Preschool Youngsters (HIPPO), encourage parents to incorporate learning

activities with their children into their daily routine through a structured, scaffold curriculum of activities that usually require simple materials such as toys or books. Finally, more comprehensive programs include center-based care and parental support in other areas such as achieving economic self-sufficiency, like Nurse Family Partnership or Early Head Start.

Managing Child Behavior

Programs primarily designed to reduce child behavioral problems aim to improve parenting and family management practices (see Table 6.1). The programs have been designed for certain populations at risk of behavioral problems or that already manifest some maladjustment. Interventions in this realm usually involve treatment for oppositional defiant disorder and conduct disorder or preventive measures for children with high risk of behavioral disorders (Reedtz, Handegård, and Mørch, 2011). Problems such as oppositional defiant disorder or conduct disorder are predictive of school dropout, substance abuse, and

Table 6.1. Programs to Manage Child Behavior

	Healthy Steps	Parent-Child Interaction Therapy	Positive Parenting Program	Incredible Years	Healthy Families America	Family Checkup
Target children	No targeting criteria	Experiencing behavioral problems	Experiencing behavioral problems	Low SES or at risk	Low SES or at risk	At risk
Start age (years)	0	2–7	0–12	0–12	0	2–5
Intensity	—	Weekly	Weekly	Weekly	Weekly first six months, less frequently after	3 initial sessions and follow-ups
Duration	3 years	14 weeks	10 weeks	12 weeks	Up to age 5	Up to 24 sessions
Services	Home and center visits	Center visits	Home and center visits	Home and center visits	Home visits	Home visits
Providers	Professionals	Therapists	Professionals	Professionals	High school graduates	Therapists
Countries	1	2	2	4	1	1
Evaluations	1	2	5	6	1	2
Effects on behavior	1.43	1.35	0.60	0.32	0.32	0.09

Sources: Authors' calculations.

adult crime (Webster-Stratton, 1998). Poor parental interactions, often associated with economic stress, are the leading cause of preventable conduct problems. It is, thus, reasonable to target deprived populations for behavioral parenting interventions.

Programs such as Healthy Families America start as early as pregnancy since the objective of many interventions is to promote a healthy bond between parents and children. The duration of behavioral programs can be flexible depending on the initial evaluation of the underlying problem. For example, Positive Parenting Program offers five levels of program intensity. While Primary Care Positive Parenting Program (Level 3) consists of four 15-to 30-minute consultations over a period of one to two months, Enhanced Positive Parenting Program (Level 5), which specifically targets parents of families with severe behavioral difficulties, includes eight to 12 sessions over three months, each lasting between 60 and 90 minutes.

Most of these programs have been initially designed to be administered at home by a trained practitioner such as a therapist or social worker. Incredible Years, for example, delivers its parenting intervention via family service professionals with a bachelors or masters in social work, early childhood development, or a related field. Experienced mentors or trainers monitor program fidelity by evaluating videos of group sessions.

The impact on behavioral outcomes is measured by valid psychometric tests³ at the end of the intervention or within a year of termination. The programs with the greatest impact are Healthy Steps, Parent-Child Interaction Therapy and the Positive Parenting Program. These intensive interventions are usually conducted by professional therapists for children deemed to have well-diagnosed behavioral problems.

Introducing these programs in the region must take into account three important caveats. First, most behavioral outcomes are reported by parents rather than an objective observer blind to the treatment status and may be subject to bias. Second, there is no long-term evidence that these interventions affect adult outcomes. Finally, there are no studies of these programs for Latin American and Caribbean countries where finding or training therapists may be an important bottleneck.

³ The most common behavioral tests are the Child Behavior Checklist (a parent-reported questionnaire for children aged 2 to 18 that evaluates internalizing and externalizing behaviors) and the Eyberg Child Behavior Inventory (a behavioral rating scale to assess the frequency and severity of disruptive behaviors).

Table 6.2. Programs to Improve Cognitive Skills

	Jamaica Curriculum	Home Instruction for Parents of Preschool Youngsters	Parents as Teachers
Target children	Stunted	Poor and or/vulnerable	With special needs or in families at risk
Start age (years)	1	3–5	0
Intensity	Weekly	Weekly	Every 2 months
Duration (years)	2	2	3
Services	Home visits	Home visits	Home visits
Providers	Paraprofessionals	Paraprofessionals	Paraprofessionals
Countries	3	1	1
Evaluations	4	1	5
Effects on cognition	0.32	0.21	0.06

Sources: Authors' calculations.

Stimulating Cognition

Delays in cognition become apparent in children living in deprived conditions as early as 12 months of age (Bronfenbrenner, 1974). Thus, programs tend to target children living in vulnerable rearing contexts starting relatively early in their lives. The curriculums of these programs, however, are designed for different age groups. The benchmark Jamaica Curriculum consists of one-hour, weekly home visits over two years starting at one year of age, during which community aides teach parents how to play and interact with their children in a way that encourages cognitive development. HIPPOY was designed to teach parents how to enhance preschool-age children's school readiness. Home visits are conducted by paraprofessionals and are complemented by group meetings for parents.

Table 6.2 analyzes the impact on cognitive outcomes as measured by valid psychometric tests⁴ at the end of the intervention or within a year from the end of the intervention. The largest average effects are for the Jamaica Curriculum. These estimates mask substantial variation.

⁴ The most common cognitive tests for early childhood interventions are: the Peabody Picture Vocabulary Test, an untimed test of receptive vocabulary for children of different ages; the Bayley Scales of Infant and Toddler Development, which consist of standardized measurements used to assess the development of children aged 1 to 42 months; and the Stanford-Binet Intelligence Scale, which tests knowledge, quantitative reasoning, visual-spatial processing, working memory, and fluid reasoning in children.

For example, in the Jamaica Curriculum, the gains in the seminal Kingston intervention with 129 children (Grantham-McGregor et al., 1991) are about three times larger than in the Colombian experiment with 1,420 children (Attanasio et al., 2014). Still, it is important to recognize that implementation costs of the Colombian intervention are expected to be considerably lower compared to the seminal Kingston intervention.

As usual with interventions in early childhood, significant fade-out effects apply. Even though many studies find significant results in outcomes measured several years after the intervention, the effects tend to be smaller than those measured right after the experiment completion. For example, the seminal Jamaica study found that cognitive gains were 44 percent smaller on average at follow-ups between 7 and 21 years than they were right after the intervention. Still, these gains at follow-up are important as they translate into improved mental health, reduced violent behavior, and earnings around 25 percent higher than those in the control group (Gertler et al., 2014; Walker et al., 2011).

Integrated Programs

Rather than targeting a specific parental behavior, integrated programs provide parents with a wider array of services and support. These integrated programs provide comprehensive support to children from birth to 2 or 3 years old and their parents, and typically target low-income families starting at pregnancy (e.g., Nurse Family Partnership) or right after birth (e.g., Infant Health and Development Program). Services are provided by nurses or professionals and can be delivered at home or in centers within their communities (e.g., Early Head Start).

Many of these programs also provide tools and educate families in how to deal with an array of challenges associated with becoming a parent. For example, the Nurse Family Partnership program provides instruction in regular parenting skills to first-time mothers and provides emotional support to mothers. In addition, the program seeks to improve families' economic self-sufficiency by helping parents develop a plan for their future, continue their education, and find jobs. The other two programs in this group, Infant Health Development Program and Early Head Start, provide daycare services to beneficiary children.

Unfortunately, the effects of these interventions on behavioral and cognitive outcomes is decidedly small (see Table 6.3). However, the impacts seem to vary across populations. For example, in the IHDP, the

Table 6.3. Integral Programs

	Nurse Family Partnership	Infant Health Development Program	Early Head Start
Target children	Low-income or at-risk	Low birthweight or premature	Low income
Start age (years)	0	0	0–3
Intensity	Weekly, biweekly or monthly	Daily	Daily
Duration (years)	2	3	Up to age 3
Services	Home visits	Daycare, home visits and meetings	Daycare or home visits or both
Providers	Nurses or paraprofessionals	Professionals	Professionals
Countries	2	1	1
Evaluations	3	1	2
Effects on cognition	0.18	0.28	0.12
Effects on behavior	0.37	0.22	0.10

Sources: Authors' calculations.

cognitive impact on low-birth-weight children of less educated mothers far exceeded that on children of more educated mothers (Brooks-Gunn, Liaw, and Klebanov, 1992).

Weighing the Costs

One of the biggest questions relates to the relative costs of different parenting programs (see Table 6.4).⁵ This analysis limits itself to estimating the financial costs of implementation. That is, the reported costs do not factor in the opportunity costs to parents for participating in these programs or the distortionary costs of taxation to raise public funds to finance implementation. Costs are computed for Colombia prices and are expressed in 2015 dollars. Results indicate that human resources are the key driver of costs.

The annual total cost of a home visiting program ranges from \$334 per child per year for Parents as Teachers to \$921 for HIPPIY. The total cost of parenting programs varies largely according to the prescribed number of sessions and the number of facilitators per child/parent. Not surprisingly, the more expensive programs are the integrated programs,

⁵ The cost estimates are reported in Cristia and Higa (2016).

Table 6.4. Costs of Select Programs

Program	Annual costs per child					Total	Total costs per child
	Home visitors	Supervisors	Infrastructure	Management	Other		
Early Head Start – Home visits	251	134	23	52	110	569	1,043
Early Head Start – Center based	6,700	2	136	824	1,404	9,065	15,109
Early Head Start – Mixed	2,186	94	57	283	498	3,118	5,976
HIPPY	396	232	27	82	184	921	1,842
Jamaica Curriculum	383	125	0	79	279	866	1,732
PAT	177	32	23	30	73	334	1,003

Source: Cristia and Higa (2016).

Note: The programs are costed based on the information provided in the following studies: (i) Early Head Start (Home visits, center based and mixed): Love et al. (2005); (ii) HIPPY: Baker, Piotrkowski, and Brooks-Gunn (1998); Jamaica Curriculum: Grantham-McGregor et al. (1991); and PAT: Drotar et al., (2009). These estimations represent the costs of implementing the program in Colombia. Costs are expressed in USD 2015.

as they include a center-based component that not only requires an infrastructure outlay, but also involves more contact hours between children and providers. The full Early Head Start program implemented in Colombia would cost about \$9,065 per child per year.

Comparing the total cost of a program per child to the measured effect size, both cognitive and behavioral programs seem to be cost-effective. Nevertheless, delivery method and frequency make a difference. An evaluation of the three Early Head Start delivery platforms (Love et al., 2005) highlights the different impacts and costs associated with home-based, center-based, or mixed programs. The center-based Early Head Start program costs approximately 14 times as much per child as the home-visiting version, but has the same effect on cognitive test scores. The mixed approach, meanwhile, had a larger effect than the home-visiting platform. However, the mixed approach costs nearly six times as much per child as the strictly home-based one, but has barely three times the effect on receptive language.

Moreover, there is plenty of room for innovation; new, lower-cost parenting programs are out there just waiting to be implemented. For example, consider the parenting program implementing the Jamaican curriculum that involves weekly home visits. A feasible twist on this

program is to counsel parents at health clinics during regular medical check-ups (Walker et al., 2015). In this intervention, mothers watch videos and discuss parental strategies with community health workers while waiting to see medical professionals. Perhaps because parents received only five sessions during an 18-month intervention period, the effects were about one third compared to those from the seminal Kingston intervention. However, this intervention costs only a tiny fraction of the one involving weekly home visits. Consequently, a parenting program that takes advantage of regular medical check-ups may be one of the most cost-effective ways to improve early childhood development. Still, more research is needed to replicate these positive findings in different settings and when implemented by government agencies. The use of mass media, the internet and social media is a promising area for further research given its potential for large-scale impact at low cost (see Box 6.2).

Parenting Programs: Preparing for the Hardest Job in Life

Governments in Latin America and the Caribbean have a duty to their children—and their parents. Childrearing is a difficult job and, like any job, often requires training. Government has a role to play in this training. It should contribute to improve the quality of interaction between adults and children at home and in other venues in order to foster healthy child development. The programs reviewed in this chapter attempt to teach parents how to stimulate and manage the behavior of their children in a manner that is conducive to their development.

Researchers have long argued that parenting programs could play an important role in fostering child development. In 1974, the influential Bronfenbrenner review of early childhood interventions tentatively concluded that the most effective parenting interventions to boost child cognitive development included frequent home visits that encouraged parents and children to engage in progressively complex forms of verbal interaction that gradually promote a child's development (Bronfenbrenner, 1974). Not surprisingly, the evidence presented in this chapter supports this view. After all, is it really a surprise that parents are the best people to foster their child's development or that home is the best place to do it? What may be more of a surprise is that these parenting programs are not only the most successful in increasing cognitive development, they are also the least expensive compared to other forms of

BOX 6.2. PRIVATE SECTOR INNOVATION IN EARLY CHILDHOOD: THE CASE OF SESAME STREET

When it comes to promoting early childhood development, everything counts. From preschool, to daycare to home visit programs, policymakers search for successful interventions that can provide a head start to all children. Here, as well, the private sector has an important role to play, especially through the development of innovative programs to improve outcomes at low cost.

On November 10, 1969, the famous Big Bird and his friends aired in TV stations in the United States for the first time. Through its Muppets, short films, sense of humor, cultural references and a lot of repetition, Sesame Street became the first television show that actively used an educational curriculum to model and build its content.

The show became, almost instantly, a big success among parents and—especially—kids. Almost 90 percent of Kindergarten-age kids and children in first and second grade in the United States have watched it once a week before starting school (Zill, 2001). The show reaches children from almost all demographic and income groups and is broadcast in more than 140 countries around the world.

Gerald Lesser and Edward Palmer are highly credited for Sesame Street's research process and educational content. Through a thoughtful research and production process, they sought to improve kids' readiness for school by enhancing their cognitive skills (pattern recognition, logic and reasoning) and socioemotional skills (self-esteem, social competence, tolerance for diversity, and nonaggressive ways of solving conflicts).

There are numerous studies showing positive effects of Sesame Street on child development. A recent study takes advantage of the initial geographic variation in broadcasting due to technological constraints to assess the effects of Sesame Street's educational curriculum on long-term education outcomes (Kearney and Levine, 2015). Results indicate that kids from high Sesame Street coverage areas were more likely to be at the expected grade level for their age. These effects are considerably stronger in boys and in children living in more disadvantaged areas.

This kind of research serves not only to expand the discussion on how media and massive online courses have the potential to deliver educational improvement, but also to underscore the key role that the private sector can play in the search for innovative, cost-effective ways to impact child outcomes early in life.

intervention. Moreover, novel ways of providing parenting services during regular medical check-ups could lower the cost even further.

Interventions to improve parents' ability to deal with behavioral issues were originally designed to deal with diagnosed behavioral problems, but now they are being applied preventatively to a broader target population.

Although parental adjustments and child behavioral outcomes as reported by parents seem to improve with these programs, there is still little evidence to attest to the long-term effects of these policies. However, given the extent of harsh parenting practices in the region and what is known about the counterproductive nature of physical punishment, experimenting with these programs would seem to be the right thing to do.

Some programs combine parenting interventions with center-based care and the provision of other services to families. This approach builds on the belief that failure in multiple environments may require multiple coordinated programs or a single integrated program. These integrated programs are comparatively costly and the benefits are relatively small for the population at large, but are significantly higher for those at greater risk of developmental delay. Given the costs and the scarcity of high-quality childcare centers in the region, this strategy is best confined to the population most at risk.

At what age should these interventions begin? Again, the evidence would seem to support a gut feeling that the earlier, the better. Information campaigns about parenting strategies should begin during pregnancy, even before a child is born, and can also be part of a standard school curriculum at relatively low cost. Cognitive gaps start to appear among children living in deprived conditions at around 12 months of age. That may be too late to start. In fact, the most successful programs to boost cognitive development start with children between 9 and 24 months of age. There are no clear research-based guidelines regarding the optimal length and sequencing of programs. Again, targeted interventions at critical times can be cost-effective.

How should the programs be targeted? One view is that parenting programs should be available for the population at risk of developmental delays. Ideally, health professionals should assess children for risk in regular screenings, just like dental screening (Dishion et al., 2014). Another view follows the old adage that more is better and argues that parenting programs should be promoted among large segments of the population. The justification for this more universal approach stems from the observation that low cognitive stimulation and harsh parenting practices are prevalent in many households. More research on the effects and costs of parenting programs in different subsets of the population would help determine how to adequately select the target population for parenting programs.

What hurdles will countries encounter when introducing these programs? First, programs must be adapted to the prevailing culture. What

succeeds in one place at one time may not succeed in another. Second, success in small research-driven experiments does not imply success at scale. Therefore, it is fundamental to test programs as they will operate at scale. Third, countries will face the trade-off between developing the appropriate human resources for implementation or relying on volunteers and paraprofessionals who may be more rapidly and cheaply deployed but may ultimately be less effective. Trained staff, low turnover, and good supervision are fundamental to maintain the quality of implementation. This may require expanding services slowly.

Parenting programs, or any program in isolation, are not a silver bullet to eliminate delays in child development. However, parenting programs can clearly generate important gains in child development at limited cost. This finding couldn't come at a better time as countries in the region try to increase their public investments in early childhood development under tight budgetary restrictions. Because coverage of these programs in the region is currently limited, expanding parenting programs can be an essential policy tool to promote better skills development during early childhood. At the end of the day, virtually all parents want to do a good job. Certainly, government can provide a little help.

7 Improving Skills in Childhood: A Cost-Effective Approach

Childhood is a critical stage in the skills development process. During this stage, children can develop foundational skills in reading and math that will serve as the basis for continued learning and the development of specialized skills later in life. Primary schools play a central role during this stage and can help children develop these important skills. Governments in Latin America and the Caribbean understand the importance of primary education and are increasing their investments to improve its quality. Unfortunately, learning levels, though improving, are still low compared to other regions in the world with similar levels of economic development.

Given the uncertain economic environment, ever greater spending cannot be the strategy for improving learning outcomes. Governments must find ways to improve learning using existing resources in a better way. This chapter aims to aid policymakers in this search by reviewing the evidence on what works and what doesn't work, and at what price. The goal is to identify the interventions that provide a sizeable increase in learning at the lowest cost.

The Policy Landscape: Good News, Bad News

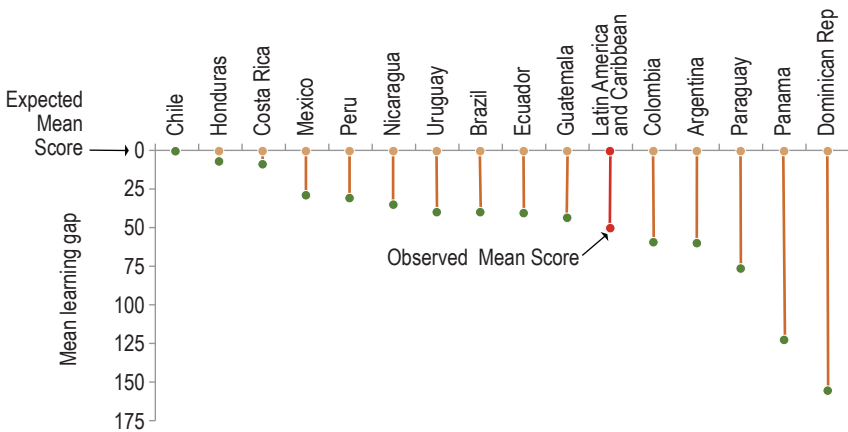
There is good news regarding skills development during childhood in Latin America and the Caribbean. Coverage in primary education has increased markedly in the last few decades and is now virtually universal; 96 percent of students aged 6 to 11 years old attend primary school. Hence, for countries in the region, the critical policy challenge is not how to promote school enrollment but rather how to increase student learning. Furthermore, recent data show that learning levels in primary

schools in the region have improved substantially. All countries that participated in the regional learning assessments implemented between 2007 and 2013 improved their average math performance (Berlinski and Schady, 2015).

Now the bad news. Current estimates suggest that learning levels for students in primary schools in Latin America and the Caribbean are lower than expected, given the region’s level of economic development. To shed light on this issue, this analysis combined data from the regional learning assessment TERCE (Tercer Estudio Regional Comparativo y Explicativo), implemented in 2013, and the international learning assessment TIMSS (Trends in International Mathematics and Science Study), implemented in 2011 (LLECE, 2016; Mullis et al., 2012). Results indicate that the average Latin American and Caribbean country is 50 points below what is expected based on its level of economic development (Figure 7.1). To put this figure in perspective, a third-grade student typically improves about 40 points during one year (Hill et al., 2008). Hence,

Figure 7.1 Mean Learning Gap

Mean learning gap = Expected mean score
(based on economic development) – Observed mean score



Notes: The mean learning gap is computed using a regression analysis in which the dependent variable is the standardized score in learning assessments TIMSS 2011 and TERCE 2013 and the independent variable is the GDP per capita in PPP of the year of the assessment per country. Then, the gap is the difference between the expected mean score based on economic development and the observed mean score. Latin American and Caribbean scores are computed as a simple average of the scores of the countries of the region. The scores are standardized initially using Chile performance in each assessment to combine the scores of all countries and then using all Latin American and Caribbean countries participating in TERCE 2013. Thus, each learning point corresponds to 0.01 standard deviation units of the 2013 score.

the average Latin American and Caribbean student lags more than one year behind what is expected based on the region's level of economic development. In short, there is an important mean learning gap in Latin America and the Caribbean.

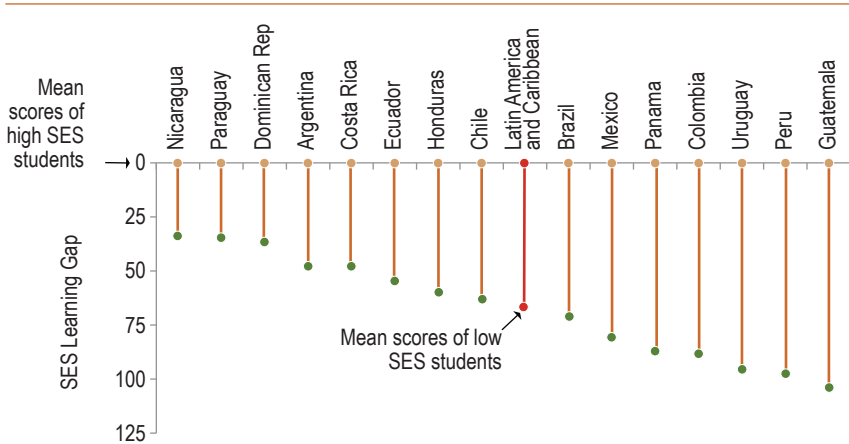
Countries vary widely in terms of these mean learning gaps. The mean learning gap for Chile, Honduras, and Costa Rica is close to zero (see Figure 7.1). That is, the average learning levels in these countries are close to what is expected based on their levels of economic development. However, mean performance in Paraguay, and especially in Panama and the Dominican Republic, is dismal. Paraguay is about 80 points below expectation, Panama is 120 points below expectation, and the Dominican Republic is a staggering 160 points below what is expected based on its level of economic development. The rest of the countries have mean learning gaps that range from 30 to 60 points, close to the regional average. Furthermore, these mean learning gaps are considerably larger if students in Latin America and the Caribbean are compared with their counterparts in member countries of the Organisation for Economic Co-operation and Development (OECD) and even larger when compared to students in the top-performing countries in the world. In short, learning levels in Latin America and the Caribbean are low and need to be increased to promote growth, productivity, and overall welfare.

Learning levels in primary education are not only low, they are also highly unequal. In all countries, students of high socioeconomic status learn more than those of low socioeconomic status. Consider the case of Brazil, which is close to the regional average in this dimension. Brazilian students whose mothers lack secondary education underperform their counterparts whose mothers have at least secondary education by 70 points (see Figure 7.2). This is a staggering difference. By third grade, the difference in learning levels is close to two full years of study. These socioeconomic learning gaps range from about 35 points in Nicaragua and Paraguay to about 100 points in Peru and Guatemala. Notwithstanding these differences across countries, the bottom line is that the stark income inequality prevalent in Latin America and the Caribbean is also reflected in learning measures in primary education.

Governments are well aware of the problem of low and unequal learning levels and are trying hard to tackle it. Real spending on primary education per student increased by about 100 percent between 1999 and 2014 in the average country in the region. This average trend is well represented by Colombia: annual spending per student increased during this

Figure 7.2 Socioeconomic Status (SES) Learning Gap

SES learning gap = Mean scores of high SES students – Mean scores of low SES students



Notes: High SES students have mothers with at least secondary education. Low SES students have mothers without secondary education. Mean scores for each group are computed as the average of the standardized score of students in the TERCE 2013 learning assessment. Latin America and Caribbean scores are computed as a simple average of the scores of the countries of the region. The scores are standardized using Latin America and the Caribbean's performance in TERCE 2013. Thus, each learning point corresponds to 0.01 standard deviation units of the 2013 score.

period from \$816 to \$1,453.¹ Moreover, in some countries, such as Brazil and the Dominican Republic, spending per student increased even more (about 200 percent). But even in Argentina and Mexico, where spending grew at the lowest rate, the increment was substantial (about 50 percent). That is more than in the United States, where spending per student grew by 40 percent during the period. However, the United States and other OECD countries had much higher spending levels both at the beginning and the end of the period under analysis compared to Latin American and Caribbean countries. Consequently, many countries in the region have been aiming to approach these higher levels of spending.

When Money Can't Be the Answer

Suppose you are named Minister of Education of a country in Latin America and the Caribbean. Your key objective and policy challenge is to increase learning in primary education. But you face important

¹ These figures, as all dollar amounts in the chapter, are expressed in constant 2015 dollars.

constraints. To begin with, the educational budget for primary education will probably remain largely unchanged during your tenure. Moreover, realistically, you can implement only a few reforms given the difficulties involved in changing a large and complex education system. In short, how can you improve learning in primary schools without either increasing spending or introducing many reforms?

A potential approach to this problem involves two complementary strategies. The first expands interventions on which your country spends little and that produce big results. Because these interventions are cost-effective, substantial improvement can be expected with limited additional spending. The second strategy scales back, or at least does not increase, spending on interventions on which your country spends a lot but that produce only limited results. Avoiding spending increases for expensive interventions that are not cost-effective will free up limited resources. Together, these two strategies can help achieve the goal of improving learning with limited increases in spending.

To apply these two strategies, policymakers must answer a fundamental question: which interventions are cost-effective and which are not? To shed light on this question, this chapter reviews rigorous evaluations of interventions that aim to increase learning in math and reading in primary school. Unfortunately, the review identified only 13 rigorous evaluations implemented in Latin America and the Caribbean. This is unacceptable. A region that spends about \$80 billion a year on primary education should be able to make policy decisions based on an ample body of evaluations implemented in its own context. Hence, a central message of this book is that countries need to invest in producing high-quality evaluations to determine the effects and costs of alternative interventions. Until these studies are produced, governments must make decisions based on the available evidence. To provide guidance in these decisions, this review examined the 13 rigorous evaluations implemented in the region as well as 81 evaluations implemented in other regions of the world.

The review also analyzed the costs of these interventions when implemented in Latin America and the Caribbean. In particular, it estimated the costs per student per year for the baseline case of Colombia. Colombia was selected for the baseline analysis because it is close to the regional mean in important dimensions such as GDP per capita, primary spending per student, and learning levels. The qualitative findings for Colombia remain unaltered when this analysis was repeated for other countries in the region, such as Chile and Guatemala.

Although a rigorous analysis of the effects and costs of different interventions is needed to prioritize interventions that work at low cost, such an analysis nonetheless has important limitations. First, results may vary across different contexts. What has worked in other regions may not work in Latin America and the Caribbean. Thus, the evidence from other regions should be analyzed carefully to understand how it can inform policies in each country. Specifically, what has worked in other regions should be interpreted as *promising* for Latin America and the Caribbean. Governments need to adapt interventions that worked in other contexts to their own environment and evaluate them to demonstrate their actual effectiveness in specific contexts.

Second, knowing how to implement reforms is as important as knowing which reforms to advance. Successfully implementing any reform is a formidable challenge in and of itself. Critical issues to consider relate to how to galvanize support for the reform and how to ensure its sustainability over time. For example, reforms that seek to increase student motivation can boost learning at low cost. But how this reform is implemented can be critical. On the one hand, it can be implemented through a stand-alone program focused on student motivation that is well funded and receives political support. Though this program may advance rapidly at first, it may be scaled back or even shut down when a new administration takes power and seeks to distance itself from the previous one.

On the other hand, reforms to increase student motivation can be implemented in a systemic manner to ensure long-term sustainability. In this case, the reform could introduce changes in an array of areas, including which aspects are emphasized during the selection, training, and supervision of teachers and principals. Because the reform will introduce numerous changes that will be incorporated into regular practice, it will be difficult to undo them when a new administration arrives. Moreover, there will be little political gain and incentive to reverse them. Consequently, advancing systemic reforms that involve changes in multiple areas may help ensure long-term sustainability. Clearly, smart implementation plays a pivotal role in this process, but will not be analyzed in detail due to space constraints.

Third, for important areas of educational policy, rigorous evidence is limited. Consider teacher policies. The consensus in the economics of education literature is that teachers are the single most important factor for student learning and that the interactions between teachers and students play a critical role in explaining learning levels (Araujo et al.,

2016; Hanushek and Rivkin, 2012). Hence, policies regarding the selection, training, support, and motivation of teachers are crucial (Vegas et al., 2016; Vegas and Ganimian, 2013). For some of these policies, such as in-service training and the use of monetary incentives, there is rigorous evidence of their effects. However, for other policies, such as pre-service training and selection procedures, rigorous evidence is only now emerging. Hence, alternative approaches should be followed to inform these important policy decisions.

This chapter builds upon existing systematic reviews of how to increase learning in primary schools. It contributes to past efforts in several ways. To start with, it analyzes a wider range of evaluations. That is, while prior studies focused on a single country or set of countries (such as developing countries), this chapter considers evidence from around the world. Since Latin America and the Caribbean has a GDP per capita close to the worldwide average, evidence from developed countries, such as the United States, and from developing countries, such as China or India, is relevant. Moreover, while prior reviews draw mainly from one discipline (such as economics), this chapter reviews studies from several disciplines.

Second, prior reviews have not typically provided evidence on costs, mainly because individual evaluations tend not to report these important data. Nonetheless, many evaluations do report some data on the inputs associated with the interventions evaluated. These data on inputs can be combined with information on local prices to infer the costs of the analyzed interventions. Though these cost estimates will not be error-free, they help inform the analysis.

Finally, the analysis will zoom in on evaluations that are relevant for the two strategies described. That is, it pays special attention to cost-effective interventions in which Latin America and the Caribbean spends little and on interventions that are not cost-effective and on which the region spends a lot.

What Works?

Many potential interventions can improve learning in primary school. To organize the review of these interventions, they are classified into six types:

- *Resource reallocation*: involves rearranging how existing school resources are used. For example, how students are assigned to classes.

- *Complementary inputs*: involves the provision of low-cost additional resources such as textbooks to students or lesson plans to teachers.
- *Motivation*: seeks to improve motivation using monetary or non-monetary incentives to teachers and students.
- *Training*: seeks to improve the effectiveness of key actors such as teachers, principals and parents.
- *Specialized instruction*: implements nontraditional instructional activities such as tutoring sessions for individual students.
- *Capital/labor intensive*: involves large expenditures in infrastructure and staff such as reducing the number of students per class.

Note that the types of interventions are roughly ordered according to their expected costs, from the least expensive to the most expensive. On one end of the spectrum, the resource allocation type includes interventions that involve assigning resources that are available in each school in a different way but without adding any new input. On the other end of the spectrum, the capital/labor intensive category encompasses interventions that require large increases in costly resources. For example, this category includes reducing the number of students in a classroom or extending the number of hours in the school day.

The main finding from the evidence is that many interventions—13 of 20 to be precise—are effective (see Table 7.1). This is a heartening finding as it points to many potential avenues to improve learning. These results confirm that education is a process that depends upon many different inputs. Hence, when an intervention strengthens one of these many inputs, learning improves. Nearly all the interventions reviewed involve a combination of inputs. For example, interventions that provide funding for materials to schools also provide certain guidelines as well as supervision regarding how to spend the money.

Which interventions are effective? As mentioned, the first category, resource reallocation, includes interventions that re-organize how school resources are used. That is, this category does not involve providing additional resources to schools, just changing certain internal organizational practices. The only intervention that has been evaluated so far in this category involves tracking, that is, the assignment of students to classes based on initial learning levels in a subject. On the positive side with tracking, teachers can target instruction to the right level because students in each group are all at similar learning levels. On the negative side, tracking

Table 7.1. Evidence on the Effectiveness of Different Interventions

Type	Intervention	Effective	Studies	
			World	Latin America and the Caribbean
Resource reallocation	Tracking	✓	2	
Complementary inputs	Funding for materials	✓	4	
	Lesson plans	✓	6	2
	Books		4	
	Computers		3	2
	Test scores data		2	
Motivation	Nonmonetary incentives to students	✓	3	
	Monetary incentives to teachers	✓	10	
	Monetary incentives to students	✓	5	
	Community involvement		5	1
Training	Managers training	✓	4	
	Teacher training		7	
	Parent training	✓	6	
Specialized instruction	Guided technology with extra time	✓	6	
	Small-group instruction	✓	5	1
	One-to-one instruction	✓	4	
	Guided technology without extra time		5	2
Capital/labor intensive	Class size	✓	6	1
	School day length	✓	3	3
	Teachers' years of education		4	1

Notes: The column "Effective" indicates whether the estimated effect for each intervention was positive and statistically significant. Each effect was estimated performing a meta-analysis with random effects including all studies reviewed for that intervention. Included evaluations fulfilled these conditions: (i) Implemented in primary or elementary school; (ii) Aimed to improve learning in math or reading; (iii) Compared the treatment group to the status quo; (iv) Effects measured at least 3 months after the start of the intervention; (v) Effects estimated using randomized controlled trials, regression discontinuity, instrumental variables or differences-in-differences; (vi) Tests measured content instructed in both the treatment and comparison groups; (vii) Effects measured using a continuous measure of learning; (viii) Sample included at least 200 students and 10 groups, such as schools, if assignment was done at the group level; (ix) Standard errors were computed incorporating clustering for group-based assignment to treatment (e.g. schools); (x) Sufficient information reported to compute effect sizes. For each included intervention, the effect corresponds to the first follow-up performed after 3 months of the start of the intervention. A summary measure of academic achievement on math and reading achievement was used for each evaluation or constructed averaging available effects on math and reading. Effects for only one specification were extracted following a pre-established criteria.

may lead to segregation, stigmatization, and reduced opportunities for low-income students. Overall, while tracking has been shown to improve learning, it can also have potentially harmful consequences and thus merits further research before being expanded in the region.

In the next category, complementary inputs, effectiveness varies. On one hand, interventions that provide funding to schools to purchase materials, and interventions that provide lesson plans for teachers, have proven to be effective. On the other hand, interventions that provide books and computers have had little effect. The lack of learning effects of interventions that provide computers should be emphasized because, often, introducing technology in schools is considered an easy fix to tackle difficult educational problems. However, the evidence suggests that programs based on providing hardware, such as the One Laptop per Child program, generate limited learning effects. Finally, interventions that test students and provide information on their performance to teachers and principals have not produced gains.

Why do some interventions that provide complementary inputs seem to work while others do not? One explanation is that the complementary inputs that are used intensively are the ones that work. That is, books and computers that are provided to schools in many cases are not used intensively or in pedagogically relevant ways. For example, a rigorous evaluation of the One Laptop per Child program in Peru showed that computers were typically used only a few hours each week for activities expected to generate few learning gains in academic subjects (Cristia et al., 2012). Consequently, complementary inputs must be provided with sufficient support and monitoring to yield good results. Confirming that good things also come in small packages, a small amount of funding provided to schools to be spent on necessary inputs such as textbooks for students and chalk for teachers produced favorable results, assuming these expenses were supervised.

Motivation interventions provide various types of incentives to motivate students and teachers to ramp up their effort. The thinking behind these interventions is that student and teacher effort are critical inputs in the learning process. As the famous Bolivian-American teacher, Jaime Escalante, said: “The key to my success with youngsters is a very simple and time-honored tradition: hard work for teacher and student alike” (Robledo, 2015). The empirical evidence seems to support Escalante’s view. Monetary and nonmonetary incentives to students and monetary incentives to teachers have improved student learning. In contrast, interventions that promote community involvement by providing funding for

setting up and organizing community school boards have produced little benefit. Typically, these community boards cannot reward or punish principals or teachers, meaning their actions have little real consequence; this likely explains their lack of effectiveness.

The 10 interventions categorized in the first three types—resource reallocation, complementary inputs, and motivation—share a common feature: they do not require additional human resources or training existing human resources. They seek to improve organization, ensure access to key but inexpensive complementary inputs, and improve conditions so that the process of instruction is streamlined and bottlenecks are tackled.

The fourth type of intervention—training—centers on improving the effectiveness of key actors in the learning process: teachers, managers, and parents. Interventions that train teachers seek to enhance their content knowledge or encourage them to adopt sound pedagogical practices. These training interventions typically include instructional activities, such as workshops, and, in some cases, on-site coaching. Overall, there is no evidence of effectiveness of teacher training interventions. However, studies implemented in low-income countries, such as Kenya, Mali and Uganda, tend to show positive and significant effects. In contrast, studies implemented in high-income countries, such as the United States and the United Kingdom, indicate null effects. Consequently, it is unclear whether teacher training programs implemented in Latin America and the Caribbean produce improvements in student learning. However, the evidence suggest that teacher training interventions may be more effective in contexts in which teacher preparation is weaker.

Interventions that train managers, including principals and administrators, aim to build their planning, monitoring, and supervisory skills. Interventions that train parents typically involve group meetings or home visits in which parents are asked to talk to their children about the importance of doing homework and working hard in school. These interventions have been shown to be effective.

Specialized instruction generally deviates from the standard model in which a teacher works with the entire classroom. One intervention provides one-on-one tutoring to students. Another intervention provides instruction to a small group of students. These two interventions typically target low-performing students. Hence, they seek to increase average learning and equity in learning. Both these interventions have been effective.

Two other interventions not only provide computers to schools, but also direct their use (guided interventions). They differ from interventions

that mainly provide computers, which are classified in the complementary inputs category, and are included in the specialized instruction category. A technology intervention is considered to be guided if it identifies the subject of the focus, the software to be used, and the schedule of use (Arias Ortiz and Cristia, 2014). One of these interventions entails using technology during extra instructional time, whereas the other replaces traditional instruction. The first intervention, in which technology is used during extra time, is found to be effective but the second is not.

The last category—capital- and labor-intensive interventions—includes three interventions: reducing class size, extending the school day, and increasing teachers' years of education. While intuitively it makes sense that these measures would improve learning, this is not necessarily the case. Evidence indicates that reducing class size and extending the school day are, indeed, effective in improving student learning. In contrast, there is no evidence that increasing teachers' years of education is effective. This does not mean that teachers' education does not matter. Having teachers with more years of education may, in fact, translate into more learning, but the effects are not large enough to be detected with the samples used. The reviewed evidence suggests that interventions that increase teachers' years of education generate, at best, limited increases in learning.

Thus far, this analysis has used evidence from around the world. What if only evidence from Latin America and the Caribbean is used? While no rigorous studies for the region exist for 12 of the 20 interventions, for the other eight interventions, the results generally hold. That is, in 6 out of 8 cases the same qualitative finding is obtained with evidence from around the world or from Latin America and the Caribbean alone.

Specifically, for Latin America and the Caribbean, providing lesson plans, implementing guided technology programs without extra time, reducing class size, and extending the school day are effective interventions. On the other hand, providing computers, promoting community involvement, providing small-group instruction to students, and increasing teachers' years of education are not effective.

Ranking Effective Interventions by Their Cost

The review of the evidence can be summarized in three words: many interventions work. This is good news for governments as they have many policy options from which to choose. But what about cost? Which options offer good returns in terms of learning at a low cost? To tackle

this question, the analysis computed the expected cost to increase learning by one point for each intervention.² Costs per learning point allow costs to be compared across interventions. For example, the cost for the intervention to reduce class size is \$281 per student per year and the estimated effect on learning is 6 points. Hence, reducing class size costs \$47 per learning point (\$281 divided by 6). Finally, to simplify the presentation, each intervention was classified as to whether its cost per learning point is low (less than \$5), medium (\$5 to \$15), or high (\$15 or more).

The results are revealing (see Table 7.2). Cost-effectiveness varies considerably across the interventions analyzed. On one hand, interventions

Table 7.2. Evidence on Costs per Learning Point for Effective Interventions

Type	Intervention	Cost per point	
		World	Latin America and the Caribbean
Resource reallocation	Tracking	Low	
Complementary inputs	Funding for materials	Low	
	Lesson plans	Low	Low
Motivation	Nonmonetary incentives to students	Low	
	Monetary incentives to teachers	Medium	
	Monetary incentives to students	Medium	
Training	Managers training	Low	
	Parent training	High	
Specialized instruction	Guided technology with extra time	Low	
	Small-group instruction	Medium	
	One-to-one instruction	Medium	
Capital- and labor-intensive	Class size	High	High
	School day length	High	High

Notes: Interventions that cost less than \$5 per learning point are considered to have “Low” cost. Those that cost between \$5 and \$15 are considered to have “Medium” cost and those that cost more than \$15 per point are considered to have “High” cost. Cost per learning point is computed dividing the weighted average cost by the estimated effect in learning points for each intervention. The methodology used to estimate average learning effects for each intervention is presented in the notes to Table 1. One learning point corresponds to an effect of 0.01 standard deviations. Costs for each evaluation were estimated per student-year for Colombia and correspond to 2015 dollars. For consistency, average cost for each intervention was computed using the weights obtained from the random-effects meta-analysis used to estimate average learning effects. To reduce the number of evaluations to be costed, only those with largest weights were directly estimated and for others their cost was imputed based on the average cost by intervention.

² A learning point is equivalent to an effect of 0.01 standard deviations in performance on an educational assessment like TERCE.

that reallocate resources and provide complementary inputs have a low cost per point. On the other hand, capital- and labor-intensive interventions have a high cost per point. Results are less clear-cut for motivation, training and specialized instruction. In each of these categories, there is one intervention with a low cost per point (nonmonetary incentives to students, training to managers and guided technology with extra time). The rest of the interventions have a medium cost per point, except training for parents, which has a high cost per point. As before, the findings for interventions for which evidence is available from the region are similar to those from around the world.

These results may be subject to error and should thus be interpreted with caution and confirmed by future rigorous evaluations. However, they nonetheless have some predictive power, especially in their relative rankings, and when taking into consideration interventions with wide differences in their cost per learning point. Consider two contrasting interventions. On one end of the spectrum is an intervention that provides nonmonetary incentives to students. Specifically, it seeks to promote student motivation by providing information on the expected earnings premiums of finishing secondary and tertiary education. This intervention has shown to be effective and costs less than \$1 per learning point. On the other end of the spectrum is an intervention that reduces class size. This type of intervention has also been shown to be effective but requires substantial increases in spending and costs about \$47 per learning point. These estimates are subject to errors and limitations. But it is extremely unlikely that more evidence from Latin America and the Caribbean will change the basic result: interventions that provide nonmonetary incentives to students are less costly per point than reducing class size.

Moreover, basic management principles support the results presented in Table 7.2. The basis of efficiency is doing more with existing resources. That is exactly what interventions that focus on resource reallocation, complementary inputs, and motivation aim to do. These interventions recognize the critical role that teachers and students play in the learning process. They try to remove small constraints and bottlenecks so that this process can proceed effectively and efficiently. For example, providing lesson plans to teachers and a small amount of funding to acquire materials can be inexpensive measures that yield important learning benefits. Similarly, motivating students and teachers is crucial to the learning process and does not require massive investments. In many

cases, it merely entails recognizing the effort made and instilling the idea that all students can learn. In contrast, interventions with a medium cost per point (training and specialized instruction) are almost by definition more expensive. One-to-one instruction, in particular, involves significant teaching time per child. Finally, the capital- and labor-intensive interventions do not improve efficiency because they basically entail providing more resources. Implementing these interventions has a direct effect on spending levels but limited effects on learning.

When a Little Spending Goes a Long Way

Cost-effective interventions, such as those involving resource allocation and the provision of complementary inputs, represent great opportunities for governments in Latin America and the Caribbean to improve learning while avoiding large increases in spending. Moreover, because public policies along these lines are uncommon in the region, there is room to implement them at large scale. Consequently, this section takes a closer look at them. It reviews the rigorous evidence on the effects and discusses the expected costs of five promising interventions: tracking, funding for materials, lesson plans, nonmonetary incentives, and guided technology with extra time. Table 7.3 presents the 21 evaluations reviewed. The section also discusses some interventions that have not been evaluated rigorously but that seem promising based on emerging evidence or their similarity to other effective interventions.

Consider interventions that involve resource reallocation. Unfortunately, only tracking interventions have been evaluated in this category. The two evaluations reviewed have been implemented in Kenya and India and have shown increases in learning in the range of 8 to 14 learning points. In the intervention in Kenya, first-grade students were divided into two sections based on their initial academic performance. In the intervention in India, students in different grades were rearranged into groups of similar academic performance during part of the school day to allow them to be taught at their own level. These interventions imply minimal cost because they basically involve testing students and then organizing instructional groups based in part on the information from those tests. Importantly, both evaluations documented that tracking also increased learning levels for students with low learning levels at baseline. Moreover, tracking can be designed to concentrate the learning gains on students who are lagging behind. For example, an intervention

Table 7.3. Evaluations of Low-Cost Effective Interventions

Intervention	Evaluation	Country	Method	Estimated	
				Effect	Cost
Tracking	Duflo, Dupas, and Kremer (2011)	Kenya	RCT	14	10
	Duflo et al. (2015)	India	RCT	8	20
Funding for materials	Blimpo and Evans (2011)	The Gambia	RCT	2	50
	Das et al. (2013)	India	RCT	9	17
	Glewwe, Kremer, and Moulin (2009)	Kenya	RCT	11	6
	Pradhan et al. (2014)	Indonesia	RCT	6	21
Lesson plans	Bassi et al. (2016)	Chile	RCT	8	16
	Leme et al. (2012)	Brazil	Diff-in-Diff	19	74
	Randel et al. (2011)	USA	RCT	1	25
	Worth et al. (2015i)	U.K.	RCT	9	25
	Worth et al. (2015ii)	U.K.	RCT	2	25
	Ysseldyke and Bolt (2007)	USA	RCT	21	46
Nonmonetary incentives for students	Abeberese, Kumler, and Linden (2014)	Philippines	RCT	6	10
	Nguyen (2008i)	Madagascar	RCT	20	1
	Nguyen (2008ii)	Madagascar	RCT	7	3
Guided technology with extra time	Banerjee et al. (2007)	India	RCT	19	43
	Lai et al. (2013i)	China	RCT	12	9
	Lai et al. (2013ii)	China	RCT	21	10
	Lai et al. (2015)	China	RCT	16	9
	Linden (2008)	India	RCT	25	68
	Mo et al. (2014)	China	RCT	16	24

Notes: Effects are presented in terms of learning points. One learning point corresponds to an effect of 0.01 standard deviations. Costs for each evaluation were estimated per student-year for Colombia and correspond to 2015 dollars. Evaluations that are described in the same paper are denoted with a letter after the year. For example, the evaluations Worth et al. (2015i) and Worth et al. (2015ii) are reported in the study Worth et al. (2015). The following abbreviations are used in the table. Diff-in-Diff: Differences-in-Differences; RCT: Randomized Controlled Trial.

could assign 50 students in first grade in a school to two classes based on their initial learning level. And to further support the students lagging behind, their class size could be reduced and the most experienced teacher could be assigned to their class. Still, tracking interventions should be viewed with caution because of their potential for increasing segregation and perpetuating inequities among students.

Other interventions involving resource reallocation are also promising. A basic principle of efficiency involves developing skills and

specialties directly relevant to the task at hand. In the context of primary education, a teacher who likes teaching young children could be assigned to first grade for several consecutive years so that the teacher can develop grade-specific teaching skills. An evaluation in the United States showed that teachers who accumulate experience in teaching a grade level are more effective than those without grade-specific experience, even controlling for total experience (Ost, 2014). Moreover, if a teacher is expected to teach a certain grade for several years, it makes sense to provide grade-specific training early on so that the benefits of the training can be reaped for those years. This strategy may work particularly well in Latin America and the Caribbean. A substantial portion of teachers need additional support to develop their content and pedagogical knowledge (Bruns and Luque, 2015). A related strategy, implemented in Cuban schools, assigns teachers to the same cohort of students as they progress through grades. The advantage of this strategy is that teachers develop strong emotional ties with students and know them well. More research is needed to determine which of the two strategies works best. However, both are probably more effective than simply assigning teachers to grades without following any explicit strategy.

During their primary school years, students tend to develop skills to self-regulate their study. This explains why first or second grade students need substantial external support to progress in their learning but students in higher grades do not. A good example of this phenomenon is the development of reading skills. Students in first or second grade need intensive support that involves not only motivational cues but also explanations regarding how to read new words and their meaning. However, many students in the third grade or higher can read by themselves for long stretches of time after they have mastered certain basic skills and developed a taste for reading. These developmental patterns suggest that additional support may impact younger students more than older students. Consequently, an intervention that increases class size in accord with grade level could be budget neutral but could achieve gains in overall learning. Under such a scheme, class size would be reduced in grades one to three and increased during grades four to six so that the average class size across grades remains constant.

Now consider interventions that focus on providing complementary inputs. The first intervention provides a limited amount of funding mainly for materials. The four evaluations reviewed in this area, implemented in Gambia, Kenya, India, and Indonesia, have documented increases in

learning ranging from 2 to 11 points. The associated costs per student per year are quite low, ranging from \$6 to \$50, and support the idea that this small pool of funding should be used to finance inexpensive complementary inputs such as notebooks and chalk. Guidance and supervision ensure the funds are used well. For example, in India, the funding was supposed to be spent only on materials. The purchasing process was monitored to reduce the possibility of diverting funds to other uses.

The second intervention provides lesson plans to teachers. The six evaluations of this intervention, implemented in Brazil, Chile, England, and the United States, documented positive effects ranging from 1 to 21 learning points. The design of these interventions varies. One of the interventions implemented in the United States tested students to determine their initial learning levels and assigned personalized learning materials and exercises to them using specialized software (Ysseldyke and Bolt, 2007). The other intervention implemented in the United States provided materials to teachers to help them reflect on their practices and improve their performance during instruction (Randel et al., 2011). The interventions implemented in Brazil, Chile, and the United Kingdom provided lesson plans that were similar for all students in a grade and that contained specific exercises and guides for each subject. All these interventions included a short period of training and some limited pedagogical support to facilitate the use of the lesson plans.

A promising intervention similar to those just described would provide guidelines and learning materials such as worksheets to parents. Providing these complementary materials would cost little and could help parents who want to support their children's learning but don't know how to do it. The use of technology could increase the learning effects of these interventions and reduce their costs. For example, guides for parents could be distributed electronically with links to free websites for students to use. Moreover, the exercises assigned to students could be tailored to their individual needs based on their performance on a trial exam or on teachers' recommendations. In cases in which students do not have access to computers, written materials could be distributed.

Next, consider interventions that seek to increase student motivation using nonmonetary incentives. Three interventions were evaluated, two in Madagascar and one in the Philippines, and they increased learning between 6 and 20 points. Both interventions implemented in Madagascar involved organizing a single meeting attended by students and their parents. In one case, organizers presented statistics on the

average earnings of individuals with different levels of education. In the other case, an adult who had achieved certain economic success shared her life story. The intervention implemented in the Philippines sought to motivate students in a different way. In a tournament organized across schools, students competed over the number of books they read during a month. The intervention also provided books to each classroom and trained teachers in reading activities.

Because motivation is critical for learning and can be promoted in inexpensive ways, it is a promising area for experimentation. To begin with, interventions can encourage students to try harder by emphasizing the simple idea that all students can succeed. This is the basis for interventions that seek to convince students that training (and effort) can increase intelligence. This line of work has been spearheaded by researchers such as Carol Dweck. Beyond many small-scale studies, emerging large-scale rigorous evidence from Peru for secondary education suggests that an intervention along these lines (called *Expande tu Mente*) can be effective and could cost as little as \$0.1 per point increase. This is a groundbreaking finding considering that popular interventions such as reducing class size or extending the school day cost from \$47 to \$210 per point increase.

The idea that all students can succeed and that effort in learning pays off should be shared by teachers, principals, and parents. Qualitative studies of outstanding teachers and principals almost invariably document these individuals' firm belief in the capacity of all children to learn. Campaigns to spread this important idea can produce learning gains at low cost. Moreover, if nonmonetary incentives work for students, why can't they work for teachers? One simple way to do this is by publicly recognizing the critical work that teachers do.

Finally, consider interventions that implement the use of guided technology during extra time. These interventions typically involve students using computers in biweekly sessions to solve problems and accumulate practice. These sessions do not replace regular instruction in math and language; rather, they are implemented during unused time slots during the school day or during after-school activities. The evidence, coming from evaluations in China and India, is remarkably consistent regarding the effectiveness of this intervention. All six reviewed evaluations show positive effects ranging from 12 to 25 learning points. Moreover, the document costs are limited because computers and software can be shared among students so that provided resources are efficiently used.

When the Price Tag Is Too High

The second proposed strategy for governments is to scale back, or at least avoid expanding, interventions in which governments are spending considerable sums but that generate limited results. Pinpointing these interventions is difficult for various reasons, beginning with the problems obtaining disaggregated spending data. However, one set of interventions tends to account for the lion's share of spending: capital- and labor-intensive interventions. This section focuses on this type of intervention.

Interventions to reduce class size are motivated by the notion that in smaller classes, students receive more personalized attention from the teacher and may learn more. However, this intervention not only requires hiring more teachers and having more classrooms, it typically involves hiring additional support staff, such as principals and specialized teachers (for example, for music). For this analysis, the results of the reviewed evaluations were standardized to show the effects of decreasing class size from 25 to 20 students per class.

Results from all evaluations indicated a positive overall effect of 6 learning points from this intervention. The evidence, presented in Table 7.4, shows that effects vary, ranging from a negative effect of 1 learning point in an evaluation in the United States to a positive effect of 18 learning points in Bolivia. Though this evidence may suggest that effects are larger in less developed countries, results from other studies do not support this interpretation. An evaluation in Kenya found an effect of only 3 learning points, and two additional evaluations in the United States found effects ranging from 3 to 14 learning points. In terms of costs, reducing class size from 25 to 20 students in Colombia increases spending by an estimated \$281 per student per year. Combining the estimates of effects and costs suggests that the cost per point for this policy would be \$47 dollars—well above \$15; thus, this intervention is considered to have a high cost per point.

What reforms have countries in the region introduced to reduce class size? This question is difficult to answer, in part because data on average class size are lacking. However, data are available about the number of students per teacher in primary schools, and this indicator is closely related to class size. As shown in Table 7.5, the number of students per teacher for the region as a whole fell sharply from 28 to 21 between 1999 and 2014. Importantly, in most countries in the region,

Table 7.4. Evaluations of Capital- and Labor-Intensive Interventions

Intervention	Evaluation	Country	Method	Estimated	
				Effect	Cost
Reduce class size from 25 to 20 students	Angrist and Lavy (1999)	Israel	IV	9	281
	Duflo, Dupas, and Kremer (2015)	Kenya	RCT	3	281
	Hoxby (2000)	USA	IV	-1	281
	Jepsen and Rivkin (2009)	USA	Diff-in-Diff	3	281
	Krueger (1999)	USA	RCT	14	281
	Urquiola (2006)	Bolivia	IV	18	281
Extend the school day from 4 to 7 hours	Arzola (2010)	Chile	Diff-in-Diff	1	842
	Cerdán-Infantes and Vermeersch (2007)	Uruguay	Diff-in-Diff	5	842
	Hincapié (2016)	Colombia	Diff-in-Diff	8	842
Increase teachers' years of education by 2 years	Clotfelter, Ladd, and Vigdor (2007)	USA	Diff-in-Diff	0	248
	Harris and Sass (2011)	USA	Diff-in-Diff	-1	248
	Nye, Konstantopoulos, and Hedges (2004)	USA	Diff-in-Diff	2	248
	Santibañez (2006)	Mexico	Diff-in-Diff	0	248

Notes: Effects are presented in terms of learning points. One learning point corresponds to an effect of 0.01 standard deviations. Costs for each evaluation were estimated per student-year for Colombia and correspond to 2015 dollars. The following abbreviations are used in the table. Diff-in-Diff: Differences-in-Differences; IV: Instrumental Variables; RCT: Randomized Controlled Trial.

this decline has not been the result of an explicit reform to reduce class size. Rather, it has been the result of keeping teacher hiring levels above the growth of the student population. Irrespective of whether smaller class size is an explicit reform or not, it has had important implications in terms of spending. The analysis estimated that the average regional reduction in class size increased annual spending per student substantially—by 26 percent.

The second intervention, extending the school day, is based on the assumption that more time at school translates into more time devoted to learning and, consequently, in more learning. Implementing this intervention requires employing existing teachers, principals, and support staff for longer hours or hiring additional personnel to cover the longer school day. This intervention typically requires higher infrastructure spending, although the increase depends on the current use of infrastructure. If schools currently operate in two shifts—one in the morning and one in the afternoon—then extending the school day by several hours would require doubling the number of schools. In contrast, if schools operate with only one shift, then extending the school day does

Table 7.5. Indicators on Capital- and Labor-Intensive Interventions

Country	Students per teacher		Extended school day		Teachers' years of education	
	Circa 1999	Circa 2014	Circa 1999	Circa 2014	Circa 1999	Circa 2014
Argentina	22	17	5%	7%		
Brazil	26	21	0%	0%		
Chile	32	20	50%	87%	16.0	16.6
Colombia	24	24	—	7%		
Costa Rica	27	13	0%	14%	15.8	16.5
Dominican Republic	31	21	0%	3%	12.7	13.1
Ecuador	24	23	0%	0%	16.5	15.8
Guatemala	38	23	0%	0%		
Honduras	32	14	0%	8%	12.3	14.2
Mexico	27	27	0%	4%	14.8	15.7
Nicaragua	34	30	0%	2%	12.3	12.9
Panama	26	25	0%	1%		
Paraguay	27	24	0%	4%		
Peru	29	18	0%	2%	15.0	16.0
Uruguay	20	11	1%	13%	15.8	16.0
Latin America and the Caribbean	28	21	4%	10%	14.6	15.2

Notes: The indicator “Students per teacher” was obtained from the World Development Indicators database and corresponds to the number of students divided by the number of teachers based on head counts. The indicator “Extended school day” corresponds to the fraction of students in third grade that attend a school for at least 6 hours a day. For 1999, this indicator was approximated using information reported in studies and reports (Tenti Fanfani, 2010). For 2014, this indicator was constructed using data from TERCE that was collected in 2013. The indicator “Teachers’ years of education” was constructed using data from household surveys. When data were not available for year t , it was estimated by averaging data for years $t-1$ and $t+1$. If data for neither $t-1$ nor $t+1$ were available, then it was estimated by averaging data for years $t-2$ and $t+2$. The indicator “Students per teacher” was computed including students and teachers in all schools (i.e. both public and private). By contrast, indicators for “Extended school day” and “Teachers’ years of education” correspond to students and teachers in public schools.

not entail additional spending on infrastructure. This analysis examines an intervention that increases the length of the school day from 4 to 7 hours a day.

The evidence from three evaluations implemented in Latin America and the Caribbean indicates that this intervention generated an overall increase in learning of about 4 learning points. An evaluation in Chile documented a positive effect of 1 learning point, while evaluations in Uruguay and Colombia documented positive effects of 5 and 8 learning points, respectively. However, costs for this intervention are massive. Implementing the analyzed intervention in Colombia would

require increasing spending by \$842 per student per year. Combining these results, the estimated cost per point for this intervention would be \$210—a staggering amount. However, extending the school day could bring other benefits to families, including freeing up parents' time so that they can work in the labor market and providing a safe environment for children. Consequently, an overall assessment of this intervention should factor in the monetary value of these additional benefits. However, from the perspective of skills development, extending the school day may not be a cost-effective policy.

The average share of students attending an extended-day school increased from 4 percent to 10 percent in Latin America and the Caribbean between 1999 and 2014. Unlike the case of reducing class size, several countries in the region have implemented explicit policies to extend the school day. The leading case is Chile, which introduced a reform that increased the share of children attending an extended-day school from about 50 percent to 87 percent over a 15-year period. Colombia and Uruguay have introduced reforms in this area, and many other countries are starting to follow suit. However, given their high price, these reforms should be analyzed in depth to ensure they do not crowd out other more cost-effective interventions.

The final intervention reviewed increased the number of years of teachers' education. Proponents argue that teachers with more years of education should be better prepared to instruct students, and, hence, employing them should result in more learning. Unlike the cases of reducing class size and extending the school day, requiring teachers to have more years of education does not seem to increase student learning. Aggregating the four evaluations, one of which was implemented in Mexico, suggests that this intervention had a null effect on learning, a finding consistent with previous literature using less rigorous methodologies (see a review by Wayne and Youngs, 2003). Importantly, many other policy actions can potentially strengthen teacher preparation, but no rigorous evaluations of them could be included in this review.

Hiring teachers with more years of education should inflate expenses because of the need to compensate teachers for the years of additional study and for beginning to earn wages later in life. These expenses can be large given that the market returns to tertiary education are high in Latin America and the Caribbean. Increasing teachers' years of education by two years, from 14 to 16 years, would require increasing annual spending per student by an estimated \$248 dollars—a considerable amount.

The average years of education of a primary school teacher in the region increased from 14.6 to 15.2 between 1999 and 2014. This increase has been fueled by two different sets of public policies. On one hand, governments have raised the minimum number of years of education required for candidates to be hired as public school teachers. This requirement has typically affected only new entrants to the teaching profession and not existing teachers. Some governments have also introduced payment schemes that assign higher wages to teachers with more years of education. These policies could have important consequences because they introduce powerful incentives for teachers to acquire more years of education. Based on the reviewed evidence, governments should carefully consider using other criteria for selecting and setting wages for teachers that move beyond the number of years of their education.

From Evidence to Policy Action

The review of the evidence has identified certain interventions as cost effective and others as not. However, these findings and their implications are not a recipe for success to be followed in a strict fashion. Rather, they are a starting point to indicate potential areas of interest for policy action. For policy purposes, the specific contextual conditions and constraints should be analyzed in detail. For example, the evaluations reviewed indicate that providing a small amount of funding to acquire materials may increase learning at low cost. But before expanding this intervention in a particular context, an analysis should examine whether lack of materials is really a constraint. For instance, data from TERCE reveal that only 74 percent of Guatemalan students attend schools with chalk in all classrooms. In contrast, 92 percent of Chilean students attend schools stocked with chalk. Based on this information, lack of materials appears to be more of a constraint in Guatemala than Chile. Consequently, an intervention that provides a small budget for materials may generate larger effects in Guatemala than Chile. In other words, policy decisions should be based on a careful analysis of the existing evidence, together with an understanding of the conditions in the country.

However, evidence and context are not enough to produce sound public policy. Experimentation, monitoring, and evaluation must also be added to the mix. An appealing theory may be wrong and an implausible theory may be right. Only after testing these theories and ideas in

the field can the answer be known. Consequently, the quest for effective interventions should involve experimentation in the field, structured in stages. In a first stage, promising interventions can be tested in one or two schools as a proof of concept. During this stage, the basic design can be refined. A qualitative analysis will determine whether the intervention under consideration should be pursued further.

In a second stage, those interventions that passed the first stage can be evaluated using rigorous quantitative methods in a small sample of schools. The objective of this stage is to estimate the potential learning effects of the intervention under ideal circumstances (such as good supervision) and to further refine the design.

In a third stage, interventions can be evaluated using rigorous quantitative methods at large scale. During this stage, the learning effects and costs of the intervention can be assessed under normal conditions that can be expected when implemented at large scale. Overall, this gradual process of experimentation can be a useful strategy to foster innovation in education in an efficient fashion. A similar process is used in the development of drugs in the health care sector.

Which institutional and administrative changes need to be put in place to implement experimentation consistently? One potential strategy involves creating a specialized unit within each relevant Ministry that leads the process of searching for cost-effective strategies to tackle important challenges. This unit should receive funding, political support, and adequate human resources to promote the generation and use of evidence in the different operational units within the Ministry. An excellent example of this institutional arrangement is the creation of Min-eduLAB in the Ministry of Education of Peru in 2016 (see Box 5.2). In its short tenure, this agency has already identified several innovative solutions with the potential to generate large improvements in the quality of education at low cost.

This process of experimentation should not be pursued exclusively by the public sector. Nongovernmental organizations, researchers, universities, and private firms can play an important role in developing and testing effective solutions in education. The flexibility, agility, and natural tendency to experiment of private actors can be built upon to foster innovation in education (see Box 7.1). The government can promote the involvement of these actors in this process. Moreover, the specialized unit leading the process of experimentation within a Ministry can also act as a liaison with the Universities and private actors. Notwithstanding the specific institutional

BOX 7.1. INNOVA SCHOOLS: PRIVATE INNOVATION IN EDUCATION

Innova Schools is a network of private schools in Peru that aims to provide high-quality, affordable education from elementary to high school to children of middle- and low-income families. The 41 Innova Schools—31 in Lima and 10 in the provinces—have more than 32,000 students and 1,500 teachers. An average of six new schools have opened since 2010, and the network is expected to continue expanding in the coming years.

Innova Schools is pioneering a “blended learning” pedagogical approach. For about 70 percent of classroom time, students are expected to work in small groups, guided by a teacher. Instruction emphasizes group activities to foster collaboration and communication skills. The rest of the time, students use computers and other digital resources to learn concepts at their own pace. Teachers design personalized instructional activities for students and provide support during the process.

The network provides intensive training and pedagogical support to teachers to help them follow the innovative instructional approach described. In fact, teachers receive 120 hours of initial training and can access an online platform with more than 20,000 sample lesson activities. Teachers are expected to use these resources to plan instructional activities that are well adapted to the context and learning levels of their students.

arrangement, governments can spur the involvement of the private sector by providing three key ingredients: (i) funding, because it is difficult to raise private funds to innovate in education since new methods cannot be patented; (ii) flexibility, so that innovators can experiment with novel instructional methods; and (iii) feedback, to help innovators determine whether their innovations are really improving learning outcomes.

Some interesting experiences suggest that the provision of these three ingredients can spur innovation in education. For example, the charter system of schools in the United States was developed in part as a laboratory for innovation in education (Dobbie and Fryer, 2013). Under this system, school districts provide public funding to charter schools to cover expenses, flexibility in their administrative and pedagogical arrangements, and feedback in terms of student performance through regular standardized examinations. The evidence suggests that attending a charter school, as compared to a public school, has generated only limited learning effects for the average student in the United States (Betts and Tang, 2011). However, the introduction of charter schools has paved the way for new educational models which, in some cases, could generate important improvements in student learning.

The private sector is also relevant to primary education as a direct provider of services. However, this chapter has focused attention on how to improve the quality of education in public schools for two reasons. First, 80 percent of students attend public schools in the average country in the region. Second, low-income individuals are concentrated in public schools. Hence, if governments can improve the quality of education in public schools, they can increase both average learning and learning equity. Still, further research and analysis are needed on how to best integrate the private sector as a provider of services in primary education given its increasing relative importance in a number of countries such as Brazil, Chile, and Peru.

Finally, it is important to recognize that not all public decisions in education are amenable to experimentation. Rigorous evidence is lacking for a range of important policies governing teacher policies, the development of management capacity in the ministries of education, and the determination of appropriate school financing mechanisms. To analyze these policies, a different approach is needed that relies heavily on theoretical arguments, comparing educational systems, and expert knowledge.

It Can Be Done

This chapter has reviewed the rigorous evidence available on how to increase learning in primary education with limited increases in spending. The central message is that there are ways to do this. Interventions that focus on resource reallocation, complementary inputs, and motivation are promising for the region based on their expected cost-effectiveness. In contrast, other interventions such as reducing class size, extending the school day, and increasing teachers' education are not cost effective.

At a more general level, the potential exists to evaluate many different low-cost interventions that could be effective. Conversely, policymakers should be wary about expensive interventions that may sound good but produce only limited results. High cost does not assure high return. The evidence is presented in hopes of guiding policymakers in their search for efficient ways of improving learning in primary education.

8 Adolescence: Difficult Challenges at a Difficult Age

Adolescence is a difficult time of life. Ask any parent—or any teenager for that matter. Adolescents are not children, nor are they adults. However, they are often charged with adult tasks and responsibilities, like supervising younger children, driving, or holding a job. Even if they have the physical and cognitive skills for these tasks, they often lack the necessary socioemotional skills to make good choices.

Adolescence marks a whole new chapter in life. The choices and challenges young people face during their teens are quite different from the ones they face during childhood. At this stage, youth start developing their own identities. They become more independent, and the influence of parents and teachers is overshadowed by the role of peers.

Adolescents are also quick to experiment and seek out new experiences. Although experimentation is positive for their development, the inquisitiveness and daring of young people at this age is also dangerous, as it increases their susceptibility to risky behaviors. Research in psychology and developmental neuroscience shows that biological developments during this stage make adolescents more prone to experiment, focus on the concrete, live in the moment and, generally, exhibit what is known as present-oriented behavior than adults. On the one hand, hormonal changes increase the tendency of adolescents to seek new sensations and experiences and to respond to socioemotional stimuli and rewards (Spear, 2009). On the other hand, adolescents' brains are still developing in the regions associated with cognitive control and higher-order executive functions.¹ Thus, adolescents tend to have less

¹ The prefrontal cortex of the brain continues to develop through adolescence and into early adulthood (Casey et al., 2005; Blakemore and Choudhury, 2006).

mature self-regulatory skills (Albert and Steinberg, 2011) and are more likely to choose small immediate rewards rather than large delayed rewards (Steinberg, et al., 2009).

Adolescents' stronger inclination to engage in risky behavior is worrisome because choices made during this developmental stage can have long-lasting consequences on their educational and labor market futures.² Poor choices—including dropping out of school, drug use, alcohol consumption, or teen pregnancy—are extremely costly, and their consequences are not easily reversed.

Not surprisingly, the challenges inherent in this age group pose challenges for policy as well. Investing in human capital during this stage is more difficult than in previous developmental stages. Adolescents' penchant for new experiences significantly raises the opportunity costs of staying in school and working hard once enrolled. Therefore, home and school inputs and their interactions with adolescents (such as the quality of parenting and school instruction) are particularly important during this stage because they can tackle the special impediments adolescents face in accumulating cognitive, academic, and socioemotional skills. Adequate access to good schools can help counteract the higher costs to adolescents of remaining and working hard in school, thereby reducing their incentives to drop out or lag behind in their studies or skills accumulation. Similarly, providing relevant education can increase the expected benefits of graduating, which lowers the chances that students will drop out of school. Parents' ability to monitor their children's behavior can also help prevent and/or correct bad choices.

A major challenge of policies and interventions at this stage is to provide young people with incentives to keep investing in their skills development, despite the higher costs they face. Since adolescents accumulate most of their cognitive and academic skills at school during this stage, increasing secondary school coverage (enrollment), retention, and completion become a priority. As the last mandatory stage in the formal education system, it may well be one of the last chances to systematically address the deficiencies in young people's skill set while

² Although all adolescents experience the same biological developmental changes, more disadvantaged youth are at a higher risk of making poor choices with high costs because they tend to have lower levels of parental control, higher exposure to temptations (including deviant peers), and lower accumulated levels of cognitive and academic skills.

reducing their exposure to risky environments. Once in school, the biggest challenge is fostering learning and high academic achievement. Strategies at school and/or at home that aim to improve academic performance will encourage students to keep investing in skills accumulation as a means of landing a better paying job in the labor market. A final and complementary challenge at this stage is to prevent bad choices that can have both private and social costs. Enhancing socioemotional skills thus becomes crucial for preventing adolescents from making costly mistakes and for contributing to their long-term employability.

The Current Landscape: Better but...

The region has made significant progress in getting more adolescents into school. High enrollment rates in primary school have also led to a larger percentage of adolescents attending secondary school. In most countries, enrollment rates have significantly increased since 1995, and today they are close to 80 percent (see Table 8.1, Panel A). Graduation rates are also up in all countries over the same period. In 2014, almost 56 percent of students graduated on time from secondary school—a 21 percentage point increase compared to 1995 (Table 8.1, Panel B). Even though secondary enrollment rates are high, only 66 percent of individuals between 20 and 25 years old who complete primary school graduate from secondary school. This means that one-third of those who finish primary school drop out in the transition to or during secondary school.

Despite the positive trends in enrollment and graduation, adolescents in the region are not developing the skills they need to succeed in the labor market. In the 10 Latin American countries that participated in the Programme for International Student Assessment (PISA) in 2015, an average of 63 percent of adolescents could not complete even simple math tasks. While academic skills vary greatly across countries, the region's adolescents have low academic skills compared to developed economies. Table 8.2 shows the differences in academic performance between adolescents in Latin America and the Caribbean and the OECD. PISA equates 30 score points in the exam to one year of schooling (OECD, 2016b). By this measure, performance in the region is between one and five years behind that of the OECD.

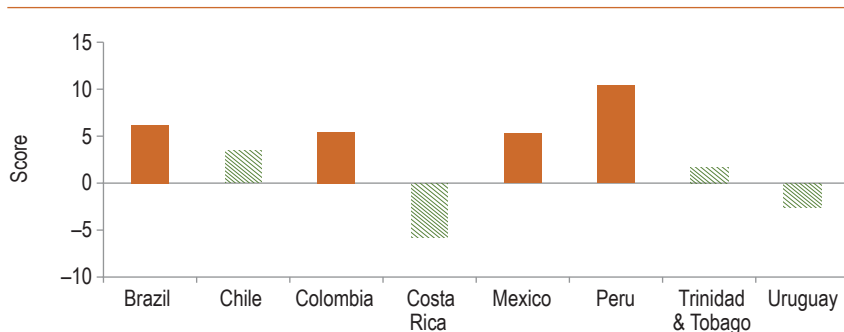
Still, some countries in the region have made small improvements in their PISA performance. Figure 8.1 shows the three-year average

Table 8.1. Secondary School Enrollment and Graduation Rates in Select Latin American Countries, 1995–2014

Country	Panel A				Panel B			
	Net Enrollment Rate				On-time Graduation Rate			
	1995	2005	2014	Change p.p (95–14)	1995	2005	2014	Change p.p (95–14)
Argentina	75.0	85.4	87.1	12.1	44.0	58.9	57.7	13.7
Bolivia	86.4	84.9	85.3	-1.1	48.7	47.3	60.7	11.9
Brazil	37.0	63.7	66.6	29.6	15.7	39.7	53.8	38.0
Chile	83.9	87.3	90.7	6.8	61.8	78.1	81.0	19.2
Colombia	71.7	79.7	85.2	13.5	22.8	43.0	50.6	27.8
Costa Rica	63.1	79.1	89.7	26.6	24.8	29.0	40.4	15.6
Ecuador	58.6	53.8	69.2	10.7	52.9	43.5	60.0	7.1
Mexico	59.0	69.4	76.5	17.4	24.5	41.3	48.6	24.2
Panama	71.7	77.8	83.7	12.0	39.4	52.0	60.8	21.4
Peru	72.8	77.9	85.5	12.7	44.3	61.2	72.3	28.0
Paraguay	48.6	72.6	80.0	31.5	23.4	22.4	57.0	33.6
El Salvador	46.1	59.0	65.7	19.6	23.8	38.1	45.3	21.6
Uruguay	69.8	80.8	81.1	11.3	32.8	31.3	32.5	-0.4
Venezuela	75.6	82.7	83.8	8.2	31.6	47.2	62.1	30.6
Latin America and the Caribbean	65.7	75.3	80.7	15.1	35.0	45.2	55.9	20.9

Source: Authors' calculations based on household surveys.

Note: Net enrollment rate is calculated as the number of children enrolled in secondary school and in the age group that officially corresponds to secondary schooling, divided by the population of the same age group. On-time graduation rate is calculated using the expected graduation age + 1 for each country.

Figure 8.1 Three-year Average Improvement in Math for Select Latin American and Caribbean Countries

Source: PISA 2015.

Note: The three-year trend is the average rate of change observed between two PISA assessments. Solid color bars are statistically significant changes (95%).

Table 8.2. Differences in Academic Performance between Adolescents in Latin America and the Caribbean and the OECD

Schooling years behind	Science OECD (493)	Reading OECD (493)	Math OECD (490)
-1		Chile (459)	
-2	Chile (447) Costa Rica (420) Trinidad & Tobago (425) Uruguay (435)	Colombia (425) Costa Rica (427) Mexico (423) Trinidad & Tobago (427) Uruguay (437)	Chile (423) Trinidad & Tobago (417) Uruguay (418)
-3	Brazil (401) Colombia (416) Mexico (416) Peru (397)	Brazil (407) Peru (398)	Colombia (390) Costa Rica (400) Mexico (408) Peru (387)
-4		Dominican Rep. (358)	Brazil (377)
-5	Dominican Rep. (332)		Dominican Rep. (328)

Source: PISA 2015.

Note: PISA scores are in parentheses. PISA equates 30 score points with about one year of schooling. This must be understood as an approximate equivalent and does not take into account national variations or differences across subjects.

improvement in math since each country joined PISA. Improvements in Brazil, Colombia, Mexico, and Peru are statistically significant, but still have a long way to go to close the gap relative to advanced countries. All countries need to improve at a faster rate in order to reach good performance levels.

The Culprits: Quality and Relevance

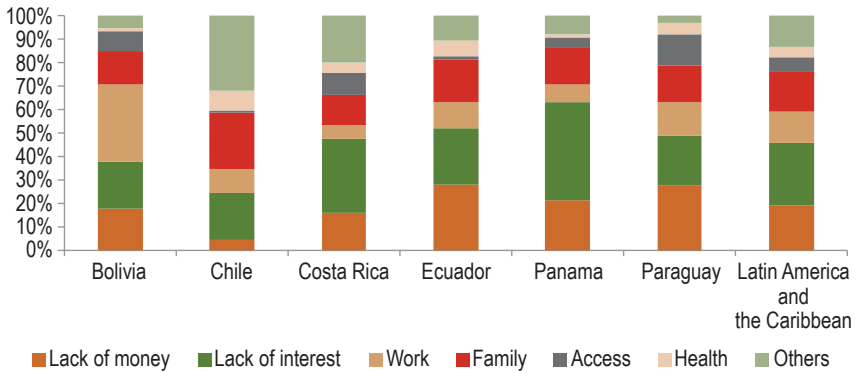
The low levels of academic achievement and the remaining gap in universal enrollment and graduation at the secondary school level indicate that schools across the region have a hard time promoting learning. Table 8.3 compares school inputs (such as teacher training and class size) across countries in the region with the average for OECD countries. Relative deficits in teachers’ preparedness, physical resources, student motivation, and school support help explain the quality problem in the region. For example, only 10 percent of teachers at the secondary level in Latin America and the Caribbean have a master’s degree, compared to 38 percent in OECD countries. Physical resources, student motivation (as measured by the number of days that students skipped school in the previous two weeks), and school support are also lower in Latin American and Caribbean countries than in OECD countries.

Table 8.3. Secondary School Inputs in Latin American and Caribbean Countries

Inputs	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru	Trinidad & Tobago	Uruguay	Latin America and the Caribbean	OECD
Human capital	—	7.2	5.3	20.1	22.4	9.2	10.8	0.9	10.1	37.7
Physical resources	31	27	27	28	29	21	29	24	27	23
Computer-student ratio	0.3	1.0	1.1	0.5	0.5	0.5	0.6	0.4	0.6	0.9
Student motivation	10.0	2.2	6.4	7.1	3.8	7.9	—	11.5	7.0	5.0
% skipped a whole school day more than 3 times in the last 2 weeks										
Support	60.8	65.5	56.4	56.7	45.4	68.8	46.5	66.8	58.4	73.6
% rooms where the students can do their homework										
% school staff help with homework	22.9	42.5	29.2	33.1	28.2	34.2	55.3	47.2	36.6	63.8

Source: PISA 2015.

Figure 8.2 Reasons Students Drop Out of Secondary School



Source: Household Surveys for Bolivia (2014), Chile (2013), Costa Rica (2015), Ecuador (2015), Panama (2015), Paraguay (2014), and Uruguay (2015).

Another possible culprit for low graduation rates and low levels of learning in schools is the limited relevance of secondary education in the region. Although lack of money is still an important factor driving drop-out rates, Figure 8.2 shows that students in the region leave secondary school mainly because they lose interest, especially in countries like Costa Rica and Panama. Labor market opportunities also generate temptations to abandon school, especially with declining returns to secondary schooling (see Chapter 4). In Mexico, almost one-third of students drop out of secondary school because they perceive a mismatch between the school curriculum and the skills demanded by the labor market (ENTELEMS, 2008). That is about the same proportion as those who drop out because of lack of money. Most countries offer technical or vocational secondary education as an alternative that aims to provide adolescents with job-specific skills. Box 8.1 explores whether these programs could increase the relevance of secondary education in Latin America and the Caribbean.

What Works for Teens?

To analyze the effectiveness of policies to promote school coverage and completion, learning, and the development of socioemotional skills, systematic reviews of evaluations in these three areas were conducted. In all cases, the analyses considered evaluations that explicitly measure relevant outcomes in adolescents 12 to 17 years old and that rely on experimental or quasi-experimental methods.

BOX 8.1. THE ROLE OF TECHNICAL AND VOCATIONAL PROGRAMS IN SECONDARY EDUCATION

Two types of technical education coexist in the region. The first, an alternative to general education programs, focuses on developing specific technical skills to help students land a job after they graduate. The second, vocational training, targets adolescents already in the labor force, either active or unemployed, and aims to teach students new skills or help them specialize in skills relevant to the job market. Recently, vocational training programs have also placed more emphasis on helping students develop socioemotional skills.

On average, technical schools account for about 21 percent of total enrollment in secondary schools, but the percentage varies greatly within the region. For example, while enrollment in technical secondary programs is only about 2 percent of total enrollment in Nicaragua, it reaches 36 percent in Mexico (Bassi and Ñopo, 2016). During the past decade, coverage of technical secondary schools has expanded, mostly in those countries that started with lower baseline shares in total enrollment.

Technical secondary education was initially conceived to provide training for the labor market to those who could not attend college or pursue other post-secondary studies. This historical origin partly explains the lower prestige of technical schools relative to academic ones in the region. Parents and students often perceive technical education as a second-class choice. Students who enroll in technical education tend to come from lower socioeconomic backgrounds and to be weaker in terms of academic performance. They usually lack the information or opportunities to pursue post-secondary studies and thus decide to follow a technical track to obtain the skills that will prepare them for the labor market.

Unfortunately, the connection between the technical secondary education model in Latin America and the Caribbean and the job market has been weak and inconsistent. There is no systematic support from the education system to help students join the workforce, such as internship opportunities (OECD, 2010; Székely, 2012). The weak links of secondary technical education to industry generate the additional problem of training students in occupations that are already saturated or even obsolete, which may increase unemployment rates for these students relative to students who graduate from academic schools. This is particularly worrisome if technical schools are the only option available to poorer students because they have very limited access to higher education.

Encouragingly, at the secondary level, Bassi and Ñopo (2016) show that returns to secondary technical education are 19 percent higher than those from academic programs among those whose schooling ends with high school (once individual observable characteristics are netted out to control for self-selection into a given educational path). These results are remarkable, considering that technical education is widely perceived as a second-class choice. However, the impact of technical secondary education on wages varies greatly across schools depending on their industry focus (Bucarey and Urzúa, 2013) and on the coursework and profiles of students (Almeida et al., 2015).

(continued on next page)

BOX 8.1. THE ROLE OF TECHNICAL AND VOCATIONAL PROGRAMS IN SECONDARY EDUCATION *(continued)*

The evidence suggests that under the current system, technical education can be a good career option for those who have limited access to post-secondary education options. However, more evidence is needed to better isolate the impacts of technical education programs and to understand the causes of the heterogeneity in effects, as well as differences across technical programs, career paths, and the labor market opportunities associated with each of them. The region also needs to redefine the ultimate goals of technical education in secondary schools. Now that the region has undergone the transition at the secondary level from elite to mass education, these issues are even more pressing. Whether technical education becomes an attractive option that increases the relevance of secondary education will depend on whether the quality of the current offerings in the region can be improved.

Coverage and Completion: Money Talks

Latin America and the Caribbean has made important progress in improving enrollment, dropout, and graduation rates at the secondary level. Although the region is still far from universal coverage and completion, the baseline levels are already quite high: the net enrollment rate in secondary education is 81 percent (Table 8.1), well above the 37 percent average for the least developed countries (UNICEF, 2016). However, as net enrollment and graduation rates increase, reaching the marginal adolescent becomes a greater challenge because youth who are still out of school or at risk of dropping out are likely to face greater obstacles to keep investing in education. Many teens leave school because they lack interest or because their opportunity cost of attending school is too high and they need to find a job.

The analysis of efforts to improve coverage and completion in secondary school includes 82 evaluations from 28 countries. A focus on secondary school gives this sample a distinct advantage over similar efforts. Notice that Latin America and the Caribbean is overrepresented in the sample of relevant studies (Table 8.4).³

Most efforts to address low coverage and completion at the secondary level have focused on making school more affordable by tackling liquidity and credit constraints. The most common approach

³ The analysis retained one evaluation per outcome, and then applied the following exclusion criteria for the effect sizes: (i) the effect sizes are reported in log odds or

Table 8.4. Evaluations Included in the Systematic Review

	Description	No. of evaluations
Type of intervention		
Conditional cash transfers	Cash transfers granted to households, conditional on sending their children to school	31
School inputs	Teacher training, textbooks, management practices, infrastructure improvements, and so on	27
Scholarships and achievement awards	Provision of cash to schools/households to cover school fees. Provision of cash to students, conditional on good performance at school	11
Counseling, coaching, and information	Counseling provided around academic choices, discussion of aspirations and guidance, provision of information about returns to schooling	5
Unconditional cash transfers (UCT)	Cash transfers granted to households with no conditions concerning school enrollment or attendance	4
Packaged interventions	Integrated strategies that bundle together more than one type of intervention	4
Region		
Africa		9
Asia		13
Europe and North America		19
Latin America and the Caribbean		41
Outcomes		
Coverage	Dropout or enrollment ^a	47
Completion	Graduation or grade progression	35

Source: Authors' compilation.

^a The sign in dropout effect sizes were reversed to be able to group enrollment and dropout outcomes.

to increasing coverage at the secondary level has been to use conditional cash transfers (CCTs), scholarships, and achievement awards.⁴ This pattern is even more pronounced in Latin America and the Caribbean, where almost 60 percent of the evaluations cover CCTs.

hazard ratios that cannot be transformed into percentage point changes; (ii) the unit of observation is the household/school/village/district and the outcome is measured in terms of number of students (since baseline data are not reported, a percentage point change cannot be calculated); (iii) the effect sizes do not reflect intention to treat; (iv) the effect sizes are estimated for other outcomes such as attendance or years of schooling; (v) estimates are only for select populations; (vi) standard errors and t-statistics are not reported.

⁴ In addition to scholarships and achievement awards, this category includes similar interventions such as voucher programs to attend private schools and reduced school fees.

Another common approach, used in one third of the evaluated programs, has been to invest in school inputs. Ranging from training teachers to supplying textbooks to improving management practices, these investments aim to motivate students and teachers while increasing the perceived payoffs of staying in school in order to improve coverage and completion. More personalized and/or targeted strategies have been tried to a lesser extent at the secondary school level. Counseling, coaching, and information provision strategies are included in only 6 percent of the evaluations studied. Similarly, only 4 percent of the evaluations examine efforts with a more integrated approach that combines parental supervision, mechanisms in schools to detect at-risk children, development of socioemotional skills, innovative curricula, and personalized support.

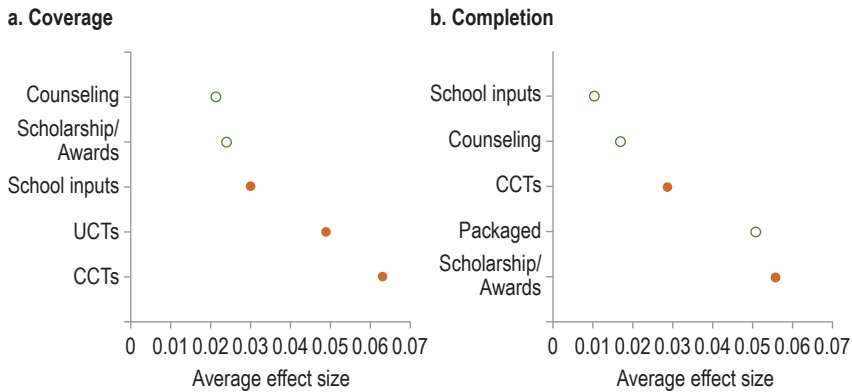
In general, the programs evaluated have led to favorable but modest improvements in school coverage and completion.⁵ On average, the programs have improved coverage (school dropout and enrollment) by 4 percentage points and completion (grade progression and graduation) by 2 percentage points.

CCTs and other interventions designed to make secondary school more affordable tend to have the most favorable and robust impacts on coverage (Figure 8.3). Some 43 percent of these interventions have improved coverage significantly. With respect to completion, scholarships or achievement awards provide the most consistent results: 80 percent of these interventions have yielded positive and significant results. CCTs also yield the most substantial impacts on coverage in secondary schools (6.3 percentage points) (see Panel A in Figure 8.3), while scholarships and achievement awards yield the largest average effect on completion (5.6 percentage points) (see Panel B in Figure 8.3).

In sum, the evidence shows that CCTs can lure more adolescents into secondary school: their average effect on coverage is equivalent to one-third of the gap between potential universal coverage at the secondary level and the actual net enrollment rate in Latin America and the Caribbean. This is not surprising given the conditionality imposed on enrollment and attendance. However, CCTs have not been as effective in

⁵ Summary effect sizes are informative but insufficient to make good policy choices since there are limits to the generalization of the results. See Frisanchio and Karver (2017) for details on the analysis of the extrapolation of the average effect sizes in the sample.

Figure 8.3 Improving Secondary Education
Summary Effect Sizes by Outcome and Type of Intervention



Source: Authors' compilation.

Note: Estimates come from a random effects meta-regression. Empty circles indicate that the average effect size is not statistically significant. CCTs = conditional cash transfers; UCTs = unconditional cash transfers. Packaged interventions bundle together more than one type of intervention.

convincing students to successfully progress through and/or finish high school. As children grow older, the cash transfer may not be sufficient to compensate for their foregone earnings, while other constraints such as relevance may kick in. Indeed, average enrollment and dropout gains from CCTs are modest as children grow older: summary effect sizes are about 12 percentage points for lower secondary school but only 6 percentage points in upper secondary school.

How cost-effective are CCTs in improving coverage and completion?⁶ As expected, CCTs are more cost-effective in addressing coverage than completion: each additional \$100,000 invested in CCTs yields 92 more students who enroll or stay in school and 33 new graduates or students who pass a grade (see Table 8.5). Moreover, irrespective of the outcome, CCTs are more cost effective in countries with lower baseline levels of coverage and completion, even after controlling for the country's GDP per capita. A one percentage point increase in baseline levels increases the ratio of cost per additional student (column 3 in Table 8.5) by \$143.

⁶ Cost estimates were obtained for 20 evaluations (13 studies in Brazil, Colombia, Honduras, and Mexico). Cost estimates correspond to the program experience approach, which recovers actual costs of implementation. Total costs include total administrative costs of the CCTs, as well as the average transfer amount. All nominal costs were deflated to constant 2010 U.S. dollars.

Table 8.5. CCT Programs in Latin America and the Caribbean: Cost per Additional Student

Outcome	Cost per student (\$)	Effect size (percentage points)	CE ratio	Yield per \$100,000 (no. of students)	No. of effects
Coverage	123	5.6	2,555	92	17
Completion	180	2.2	9,244	33	8

Note: Coverage outcomes include enrollment and graduation. Completion outcomes include grade progression and graduation. The CE ratio is defined as (Cost per student/Effect size). In the case of coverage, for example, this reflects the cost per extra student in school. Yield per \$100,000 is defined as (\$100,000/CE ratio). In the case of completion, for example, this reflects the additional number of graduates obtained by investing \$100,000 in CCTs.

But It Takes More Than Money

CCTs have been moderately successful in getting more adolescents into school but not particularly good at keeping them in school until graduation from secondary education. The reason for this shortcoming is simple: the conditionality imposed by CCTs does not deal directly with some of the reasons why youth drop out of secondary school. In fact, CCTs are best at promoting secondary school coverage where baseline levels are extremely low since in these settings beneficiaries are unlikely to undertake the activities imposed by the conditionality without the transfer. The road to universal enrollment and graduation from secondary school thus becomes steeper because of higher baseline levels and the greater challenges of reaching adolescents who remain out of school. Evidence points to good results from four specific lines of action: better targeting; increasing tangible rewards for graduation; experimenting with more comprehensive strategies that target different problems at the same time; and focusing on the connection between risky behavior and low educational investments.

Targeting schools with more students at higher risk of dropping out can be a cost effective strategy, especially because a subset of schools tend to have high dropout rates. This targeting strategy is used by Diplomas Now, a program in the United States focusing on sixth- and ninth-grade students in the most challenged urban schools. Diplomas Now relies on early prevention systems based on attendance, behavior, and academic performance and provides better and more personalized academic support through a combination of schools-within-schools (keeping students together with a group of teachers throughout high school), peer coaching for math and English teachers, and remedial

courses. Early results of this program show a decrease in the percentage of students with warning signs of dropping out.⁷

Beyond targeting, efforts should also deal with the intrinsic reasons why students drop out of public secondary schools, which in the region relate to high opportunity costs and lack of interest. Even though the premium of secondary education fell during the 2000s, the college premium remains high in the region. Moreover, there is a premium to completing secondary education (see Chapter 4). In other words, it still pays to go to school, and graduation is important. However, these average returns are not fully grasped by adolescents when deciding to stay in school as they also perceive a mismatch between what they learn in school and the skills they need for the labor market. Some interventions have tried to improve students' perception of future benefits from secondary education by providing them with better, more personalized, and more accurate information about the returns to secondary school and university education, as well as funding opportunities.⁸ Another approach is to focus on directly increasing the returns to secondary schooling and thus making it more costly to drop out or reduce effort in school. An innovative program in Colombia, *Ser Pilo Paga* (SPP), offers incentives for students to stay in high school and graduate by providing eligible good students with college loans that are forgiven if they complete their university degree. Preliminary results show improvements in the test performance of secondary school students, particularly among students from the lowest socioeconomic backgrounds, suggesting that the program effectively changes students' incentives to try to boost their grades, and could compensate for disadvantages in backgrounds that might otherwise impede or prevent them from completing degrees at elite universities (Londoño-Vélez, Rodríguez, and Sánchez, 2017).⁹

Another promising example is Career Academies in the United States. The model features a more integrated strategy with three main components: schools-within-school, the combination of an academic and a vocational curriculum, and partnerships with local employers. The goal

⁷ See <http://diplomasnow.org/our-impact/>.

⁸ For recent examples, see Bobba and Frisncho (2016), Dinkelmann and Martínez (2014), Avitabile and de Hoyos (2015), and Jensen (2010).

⁹ Early results show that the program promoted socioeconomic diversity in elite universities. Moreover, the program radically increased the share of admitted students that enrolled in college among the least privileged groups.

is to simultaneously foster applied learning and college preparedness to provide a full array of options at the post-secondary stage. Kemple and Snipes (2000) identify large effects on dropout (a decrease of 11 percentage points) and graduation rates (an increase of 14 percentage points), especially among students who are most in danger of dropping out. An adaptation of the model to the Latin American and Caribbean region may prove effective, especially because two of the main reasons that students drop out of secondary school are lack of interest and a mismatch between school and university/labor markets.

Finally, there may be an opportunity to reduce dropout by directly addressing adolescents' risky behaviors. During this developmental stage, teens become more susceptible to the influence of peers, while parents have less control over their children's choices and use of time. Family Check Up, a preventive intervention for at-risk adolescents, teaches parents family management practices that enable them to better deal with their children's problematic behavior. Adolescents in the program tend to exhibit less antisocial behavior, better self-regulation skills, and less involvement with deviant peers (Stormshak, Fosco, and Dishion, 2010). They also consume less marijuana, tobacco, and alcohol and are less likely to be arrested (Dishion, Bullock, and Granic, 2002; Van Ryzin, Stormshak, and Dishion, 2012). In sum, the program offers parents tools to better guide their children's choices to prevent costly deviations. In the region, Berlinski et al. (2016) show that an intervention that provides parents with information on absenteeism, behavior, and grades exhibits promising impacts on educational outcomes, including grade progression.

Learning: Tailoring to Teens

The transition from primary to secondary school poses new challenges for the learning process. Students are exposed to a wider range of subjects and teachers, and the content of lessons becomes more complex. At the same time, teachers spend considerable time off-task, dealing with classroom management or administrative work rather than instructional activities (see Chapter 3). Greater academic pressure and limited teacher support may thus widen previous gaps in the accumulation of skills, making it more difficult for adolescents to stay on track. Unfortunately, governments in Latin America and the Caribbean have had a hard time identifying strategies to deal with the specific problems that students face at the secondary level.

Table 8.6. Programs to Improve Student Learning

Areas	Program type	Description	No. evaluations
Teachers	Pedagogical practices	Introduction of new practices, instructional material, and training/coaching	7
	Monetary incentives	Provision of monetary incentives conditional on student success	11
	Competitive teacher selection	Introduction of competitive selection processes to become a teacher	2
	Alternative teacher selection	Introduction of alternative ways to become a teacher	2
Resources	Extended school day	Extend time spent in school	2
	Technology	Provision and use of technology as instructional tools	8
	Cash transfers	Provision of cash to attend school	5
	Vouchers/Subsidies/Scholarships	Provision of vouchers to send children to the school of their choice	6
Student motivation	Monetary incentives	Provision of monetary incentives to students conditional on academic success	3
	Information on returns	Provision of information about the returns to finishing school, requirements to attend college, etc.	2
Comprehensive programs	"No excuses" model	Comprehensive programs that are offered in "No excuses" charter schools are characterized by high expectations for all children, frequent teacher feedback, high-dosage tutoring, increased instructional time, and data-driven instruction. Given their charter status, they also have more flexibility in hiring/firing teachers.	4

Source: Authors' compilation.

Note: The results pertain to 52 evaluations that analyze the impact of different types of programs on student learning in mathematics, reading, and science.

Despite abundant evidence on primary education, there is limited rigorous evidence on what works to improve student learning in secondary school. This analysis is based on a systematic review of the evidence on programs in four main areas: teachers, resources, student motivation, and comprehensive programs that target different aspects or conditions for learning at the same time.

A systematic review finds evidence of effectiveness for four program types: monetary incentives to students, the "no excuses" model used by some charter schools in the United States, extended school days, and vouchers/subsidies/scholarships (see Table 8.7). On the other hand, cash transfers have had little impact on learning, which is not surprising given that their main objective was increasing coverage. Other

Table 8.7. Effectiveness of Programs to Improve Student Learning by Program Type

Evidence of effectiveness	Mixed evidence	No evidence of effectiveness
Monetary incentives to students	Pedagogical practices	Alternative teacher certification
"No excuses" model	Monetary incentives to teachers	Technology
Extended school day	Competitive teacher selection	Cash transfers
Vouchers/Subsidies/Scholarships		Information on returns

Source: Authors' compilation.

types of programs that are rapidly gaining popularity have also demonstrated little effectiveness: alternative teacher certification programs similar to “Teach for America” in the United States and programs that introduce technology in the classroom. Although more evidence could prove the value of these programs in alternative designs or in different contexts, governments should be cautious in scaling them up without first testing and evaluating them for their effectiveness.

Among the four program types that were found to promote student learning effectively, monetary incentives for students to improve their test scores and the “no excuses” model have the largest average effects on student learning (16 and 14 learning points, respectively)¹⁰ (see Table 8.8). The “no excuses” model of charter schools capitalizes on the independence and flexibility they have to implement different approaches to education. Their effectiveness comes from a combination of practices that enhance learning: imposing high expectations for everyone, providing frequent teacher feedback, tutoring, and increased instructional time, while using a data-driven approach to instruction (Dobbie and Fryer, 2011).

The extended school day also has a positive impact on student learning. Although the analysis included only two evaluations, the average effect size is 8 learning points. Lastly, programs that help families pay for their children’s education, whether with vouchers, school subsidies, or scholarships, have an average effect of 3 learning points, but vary within the region. The impact of attending a voucher school in Chile is 3 learning points (Lara, Mizala, and Repetto, 2011), while the average effect for Colombia’s voucher program is 18 learning points (Angrist et

¹⁰ One learning point equals an effect of 0.01 standard deviations. The average effect size for each program type is a weighted average estimated from a random effects meta-regression that weights each evaluation by the inverse of its variance.

Table 8.8. Evaluations of Programs to Improve Student Learning and Average Effect Sizes

Program type	Evaluation	Country	Method	Average effect (Learning Points)
Monetary incentives to students	Behrman et al. (2015)	Mexico	Experimental Design	19
	Blimpo (2014)	Benin	Experimental Design	31
	Sharma (2011)	Nepal	Experimental Design	4
	Weighted average			16
"No excuses" model	Abdulkadiroğlu et al. (2011)	USA	Experimental Design	7
	Angrist, Pathak and Walters (2013)	USA	Experimental Design	24
	Dobbie and Fryer (2011)	USA	Quasi-experimental Design	14
	Tuttle et al. (2013)	USA	Experimental Design	14
	Weighted average			14
Extended school day	Bellei (2009)	Chile	Quasi-experimental Design	8
	Hincapié (2016)	Colombia	Quasi-experimental Design	12
	Weighted average			8
Vouchers, subsidies or scholarships for students	Rouse (1998)	USA	Experimental Design	2
	Angrist et al. (2002)	Colombia	Experimental Design	18
	Abdulkadiroğlu, Pathak, and Walters (2015)	USA	Experimental Design	-4
	Barrera-Osorio et al. (2016)	Uganda	Experimental Design	12
	Lara, Mizala and Repetto (2011)	Chile	Quasi-experimental Design	3
	Wolf et al. (2010)	USA	Experimental Design	6
	Weighted average			3

Source: Authors' compilations. Note: All effects are statistically significant at a 95 percent confidence level. One learning point equals an effect of 0.01 standard deviations. The average effect includes all the main effects on learning reported in the evaluation. The weighted average is an estimate from a random effects meta-regression that weights each evaluation by the inverse of its variance.

al., 2002).¹¹ Results vary widely with this type of program because the size of the voucher is very different and its effect depends on the type of schools and school inputs made available.

¹¹ This average effect is an average of all the main effects on learning reported in the evaluation. Medium-term evaluations of the program by Angrist, Bettinger,

Table 8.9. Potentially Effective Programs for Promoting Student Learning

Type of program	Average effect (Learning points)	Max. effect (Learning points)	Key design parameters
Competitive teacher selection	21	41 Estrada (2015)	Hiring of new teachers based on a standardized test
Monetary incentives to teachers	4	21 Behrman et al. (2015)	Individual and group incentives to teachers, school administrators and students
Pedagogical practices	2	9 McEwan et al. (2015)	Improved instructional materials, teacher training, flexible teacher contracts and recruitment model, decentralized school management

Source: Authors' compilation.

Note: One learning point equals an effect of 0.01 standard deviations. The average effect includes all the main effect sizes in the evaluation. Maximum effect is the largest statistically significant effect found in the evaluation.

There is a consensus that teachers and their interactions with students are among the most important determinants of student learning (Araujo, et. al., 2016; Hanushek and Rivkin, 2012). Although the evidence is limited and mixed about the success of interventions to improve teacher effectiveness in secondary, some specific interventions aimed at hiring teachers competitively, providing monetary incentives to teachers to improve their teaching, and improving pedagogical practices offer promising results (for descriptions of these types of programs, see the middle column of Table 8.6). For each type of program, Table 8.9 shows the average and the maximum effect reported in an evaluation for these specific interventions, as well as their main characteristics.

The most promising evidence comes from a competitive teacher selection process introduced in Mexico in 2013. Traditionally, teachers were hired in a discretionary process led by teachers' unions. The reform introduced a standardized evaluation in the selection process. Learning among students whose teachers were hired through the competitive process improved significantly (Estrada, 2015). The effect size (41 learning points) is the largest found among the studies in the review.

and Kremer, (2006) and Bettinger, Kremer and Saavedra (2010) find significant impacts in math and reading scores. These studies were excluded from the meta-analysis, given that they evaluated the same program that Angrist et al. (2002) did and the inclusion criteria restrict the sample to the first evaluation done for each program.

A program that provided monetary incentives based on student achievement in Mexican high schools also produced large learning gains (Behrman et al., 2015). The combination of individual and group incentives to students, teachers, and administrators yielded a large effect of 21 learning points. A program that tried to improve pedagogical practices had an effect of 9 learning points: The Sistema de Aprendizaje Tutorial (SAT), an innovative middle school model implemented in Honduran rural villages, provides instructional materials, teacher training in the curriculum and instructional methods that focus on improving teacher-student interactions, flexible teacher contracts, an alternative teacher recruitment model, as well as decentralized school management. Although the impact of the program was not significant after the first year, large and significant effects have been identified after two years (McEwan et al., 2015).

Effective interventions to improve learning seem to share one characteristic: they cater to the specific challenges faced during adolescence. For example, the “no excuses” model of charter schools, implements a strict behavioral and disciplinary code while providing students with more time for studying and high behavioral and learning expectations. These features keep students under strict supervision, reducing the incidence of risky behaviors. Along the same lines, extended school days can foster learning by keeping adolescents under adult supervision and reducing the likelihood of being involved in risky behaviors (Berthelon and Kruger, 2011, Pires and Urzúa, 2015). Similarly, providing monetary incentives to students may directly target their preference for immediate rewards, while offering vouchers, subsidies or scholarships might allow them to attend a school better matched to their preferences and individual attributes.

Besides programs that directly target student learning, programs that aim to promote the socioemotional needs of adolescents also show potential to impact school performance.¹² Although there is still scarce evidence on the impacts of these programs, one innovative program, “*Expande tu mente*” in Peru, shows promising results. In a short period of time and with very few resources and training, the program teaches students that they can become smarter with training and practice (the “Growth mindset” concept).¹³ Early results indicate that the program has

¹² See Duryea and Soares (2016).

¹³ The Growth mindset concept is built around the idea that intelligence is malleable, and not something that cannot be changed.

a considerable impact on student test scores (Ministry of Education of Perú, 2017).

Going forward, countries need to weigh the costs and implementation challenges of approaches, and not only their prospective effectiveness. For example, competitive teacher selection has the potential to significantly impact student learning, but the political economy of these reforms is challenging in countries with strong teacher unions. Extending the school day has moderate impacts on student learning, but requires large investments in school infrastructure and hiring teachers (Bellei, 2009). In contrast, the large impacts on student achievement of the program in Honduras (after two years) cost about \$471 annually per student, 10 percent below the cost of traditional high schools in Honduras. Finally, programs like “*Expande tu mente*” in Peru have had important impacts on student learning with very low implementation costs. The Peruvian program costs approximately \$0.60 per student for a one-time intervention (Ministry of Education of Perú, 2017).

Developing Socioemotional Skills before It's Too Late

Helping teens develop their socioemotional skills is crucial to prevent costly deviations, improve employability and promote adequate investment in cognitive and academic skills. Chapter 4 explains which of these skills matter for long-term success. From a policy perspective, the malleability of skills is important. The relevant question is not “Which skills are *malleable*?” but rather, “Which skills are *more malleable*?” before adulthood. Even personality traits, long recognized as very stable, have been shown to be malleable through young adulthood. A systematic review of over 90 studies has found that adolescents and young adults exhibited relatively larger changes in some of the “Big 5” personality traits (extraversion, agreeableness, openness, conscientiousness, and neuroticism) than older age groups (Roberts, Walton, and Viechtbauer, 2006). For instance, extroversion improves significantly with age for adolescents and college-age students, but no consistent changes are noted at age 30 or beyond. Longitudinal studies in Australia have also found the Big 5 traits to be more malleable before age 25 than at older ages (Cobb-Clark and Schurer, 2012; Schurer, 2016).

In particular, the set of skills that comprise executive function are malleable through early adulthood. Neurological research has found evidence of important changes through age 25 in brain development in

the prefrontal cortex, which directs executive functions such as impulse control, planning skills, and self-regulation of emotions and behaviors. Empirical measures confirm the malleability of executive function through youth. For example, data from the United States show that the Flanker—a measure of inhibitory control—increases through age 18 and decreases after age 30. While the full life cycle is not covered, baseline project data for Venezuela also demonstrate a strong positive age gradient in the Flanker and other measures of self-control and self-regulation among children ages 10–16 (Stampini et al., 2016).

A wide variety of programs designed to improve socioemotional skills are currently offered to youth aged 12–18. These programs are often small pilots or one-off interventions, yet they can be grouped into six main categories (see Table 8.10).

This categorization of youth programs differs from that of typical youth programs, which are classified by whether they are in-school, in-home, or after-school. It has the advantage of capturing the main features of the programs, as well as important interactions across main actors. That is, it matters not only where the intervention occurs, but the nature of the intervention itself and the targeting. For example, a school-based program can be classified as classroom-based if there is a structured curriculum (see Box 8.2 for an example), or as activity-based if the focus of the program is experiential learning. Similarly, the “Becoming a Man” program in Chicago takes place in classrooms but is classified as a psychosocial intervention because it is based on interactive counseling

Table 8.10. Types of Programs Addressing Socioemotional Skills

Program type	Description	Example
Classroom-based	Classroom-based curriculum with trained personnel	Student Success Skills, US
Activity-based	Arts, music, sports, or internships that emphasize learning through doing	Venezuela’s youth orchestra program
Mentorship programs	Focus on developing a strong connection between the adolescent and a more experienced person	Big Brothers, Big Sisters, US
Psychosocial interventions	Primarily aimed at delivering a mental health intervention including group, individual or community-based counseling	Becoming a Man, US
Parent- and family-based programs	Combine training in specific skills such as communication or parenting with other services such as family therapy	Familias Unidas, Ecuador
Comprehensive programs	Offer a wide range of services such as training, health, and counseling often to youth who have dropped-out of school	Job Corps, US

Source: Authors’ compilation.

BOX 8.2. MIND LAB: PUTTING THE FUN INTO LEARNING

Policy efforts for developing adolescents' skills in the region can be complemented by private sector initiatives focusing on dealing with the specific challenges faced by adolescents, including the lack of interest in school. The program *MentelNovadora*, developed by the Mind Lab group, is one such example. Mind Lab developed an innovative curriculum that is implemented in strong partnership with public and private schools in Brazil. The program helps children ages 4 to 17 to develop their cognitive and socioemotional skills and get them more engaged with their learning processes. Teachers are trained to help students become aware of the thinking processes they use while playing and to guide them to think reflectively. These skills can be later evoked in different learning contexts or settings outside of school.

The program is tailored to each educational level. At the secondary level, the intervention aims to develop an inquisitive and self-reflexive attitude; stimulate self-knowledge, self-control, conscious decision-making and proactivity; promote awareness; and expand strategies to deal logically with situations.^a

Preliminary results show that fifth-grade students exhibited improved performance in mathematics, Portuguese, and natural sciences after three months of exposure to *MentelNovadora* (Rezende Garcia, Zuppo Abed, and Pereira da Ponte, 2014). A field study provided further insights into how the structure of the method contributed to the students' skills development.^b The study compared a treatment group to a comparison group that only played without engaging in the reflective discussions after the games. It found that children in the former presented an improvement in their problem-solving skills. This highlights the importance of incorporating critical thinking and self-reflection within teacher's pedagogical strategies to promote the development of academic and socioemotional skills.

^a Extracted from *Projeto pedagógico Mind Lab Vol.1*. Available at: http://www.mindlab.com.br/mindlab/wp-content/uploads/2014/04/Projeto-Pedag%C3%B3gico-Mind-Lab_Vol1.pdf

^b Available at: <https://www.mindlab-group.com/methodology>.

sessions. Some parenting programs, such as Familias Unidas in Ecuador, include training for teachers so that the youth receive consistent feedback both at school and at home. This classification puts the emphasis on the “what” of the program rather than the “where.”

To analyze the effectiveness of programs in improving socioemotional skills, the systematic review examined 70 evaluations, including nine from the Latin American and Caribbean region. The review considered two main categories of skills: interpersonal skills that relate to understanding and communicating with others; and intrapersonal skills that relate to the understanding of oneself and the ability to assess one's strengths and limitations (Table 8.11). Externalizing behaviors, such as

Table 8.11. Classification of Socioemotional Skills

Interpersonal skills	Intrapersonal Skills
<ul style="list-style-type: none"> • General interpersonal skills (24) <ul style="list-style-type: none"> • empathy • communication • agreeableness • extroversion 	<ul style="list-style-type: none"> • General intrapersonal skills (38) <ul style="list-style-type: none"> • self-esteem • self-efficacy • grit • emotional stability
<ul style="list-style-type: none"> • Externalizing behaviors (41) <ul style="list-style-type: none"> • aggression • conduct problems • disruptive behavior 	<ul style="list-style-type: none"> • Self-regulatory skills (7) <ul style="list-style-type: none"> • inhibitory control • self-control • conscientiousness • future orientation • planning skills

Source: Authors' compilation.

Note: Number of programs included in systematic review in this area in parentheses. This list is indicative but not exhaustive. Conscientiousness, or being diligent and thorough in tasks, is related to self-control and thus is classified under self-regulatory skills. Inhibitory control is the ability to override an internal predisposition or external lure. Self-control is the willful regulation of emotion, attention, and behavior to align with goals. Self-efficacy refers to one's belief about one's ability to perform specific tasks.

disruptive or argumentative conduct and aggression, are classified as a subcategory of interpersonal skills, while self-regulatory skills associated with executive functioning are classified under intrapersonal skills. The discussion of the results that follows aims to identify the most promising programmatic approaches for improving each skill category.

Twenty-four studies assessed general interpersonal skills such as empathy, communication, interpersonal competence, and social skills. Most programs showing positive results—over half the studies—targeted at-risk youth living in low-income areas. Although the 13 programs with statistically significant impacts adopted very different approaches, most of them established groups that provided youth with the opportunity to interact in safe spaces. A variety of programs were successful, including parent-based programs, psychosocial support, and comprehensive services.

Programs aimed at dealing with behavioral problems, such as difficult conduct, aggression, and truancy showed promising results. One-third of the programs (13/41) successfully improved interpersonal skills classified as externalizing behaviors. Parenting programs successfully reduced conduct problems for at-risk youth. Five of the six parenting programs demonstrated statistically significant impacts. The Familias Unidas parenting program implemented in Ecuador significantly reduced conduct problems (Molleda et al., 2016). Activity-based programs such as Venezuela's Youth Orchestra program (Alemán et al., 2016) showed reductions in difficult behavior among children with

less-educated mothers.¹⁴ Instruction-based programs were generally found not to be effective. Results were either mixed¹⁵ or statistically insignificant for 16 of 20 programs. In sum, the results for externalizing behaviors suggest that active interactions with counselors, mentors, and parents offer the best approach for teaching these skills.

Programs that aim to improve general intrapersonal skills are among the most commonly studied. Twelve of 38 studies showed positive results. Instructional-based and mentorship programs had similar results, with one out of three programs demonstrating statistically significant effects. In particular, the impact on self-regulatory skills seems to be promising. Three of four instruction-based programs improved self-regulatory skills. However, only 6 percent of the studies (a total of seven) examine these outcomes. The apparent mismatch is striking between the areas with potentially high impact—in terms of returns and malleability—and the interventions for which rigorous evidence is available. Many studies are based on small samples, so the results may not be replicated in large-scale programs. More research is needed on programs that aim to impact intrapersonal self-regulatory skills, which are particularly important during adolescence.¹⁶

Overall, both intrapersonal and interpersonal skills can be strengthened through programmatic interventions. Programs applied through experiential approaches with group interactions appear to be effective in developing interpersonal skills such as empathy, control of aggression, and communication, while in-classroom curriculums are useful for impacting intrapersonal skills such as self-esteem and establishing goals.

The region needs to address the gap in the availability of data on socioemotional skills. Filling this gap is critical for designing programs to improve these skills and to measure progress in this area.

The Path Ahead

Going forward, policy efforts for adolescents in the region should focus on the interrelated issues of school coverage and academic achievement

¹⁴ The level of significance for the full sample was 90 percent while the effect size was larger and the level of significance higher (95 percent) for the sub-sample.

¹⁵ Mixed impact is characterized by a combination of positive, negative, or no impact in the different intrapersonal skills constructs assessed by the study.

¹⁶ Externalizing behaviors have been separated out as part of interpersonal skills. Some of these skills may also fall under self-regulation.

as well as the development of socioemotional skills. Efforts must focus on designing policies that deal with the specific challenges faced by adolescents, including preventing students from dropping out of school, and developing the skills they should be acquiring during this stage of their lives. Although increasing secondary school coverage promotes skill acquisition, once teens enter school the main challenges are to keep them there and provide them with the cognitive, academic, and socioemotional skills they need. Importantly, school-based programs are not the only options for strengthening skills. Parenting programs, mentoring programs, and psychosocial programs can also help keep students in school, build socioemotional skills, and improve academic performance and educational advancement.

Going from evidence to action requires the systematic analysis of a wealth of interventions that confirm that the expected impacts of a given policy are favorable. Focusing on three important challenges during adolescence—improving coverage and completion, improving learning, and promoting socioemotional skills—this chapter provides policymakers with information on the effectiveness of alternative policy interventions. This chapter has four main takeaways.

First, CCTs in the region have increased enrollment but have had little effect on graduation rates. Thus, these interventions have proven to be more cost effective in the case of coverage than in completion and in cases where baseline levels are low. Universal enrollment and graduation become more challenging in Latin America and the Caribbean at the secondary school level, because of higher baseline levels and the greater challenges of reaching adolescents who are already out of school.

Second, programs promoting learning are more effective when catering to the specific challenges adolescents face. Providing teens with school models that increase the opportunity to prevent risky behaviors and foster academic environments seem to be quite successful. Moreover, focusing on teacher effectiveness is a very promising way to promote learning in the region. Nevertheless, countries should not focus solely on potential effectiveness; rather, they must take into consideration the differences in costs and implementation challenges in each particular context.

Third, socioemotional programs implemented during adolescence can strengthen both interpersonal and intrapersonal skills. Programs applied through experiential approaches, in which youth have the opportunity to exercise new skills through group interactions, are particularly

effective in forming interpersonal skills such as empathy and communication, and in reducing aggressive behaviors. In-classroom curriculums are effective for strengthening intrapersonal skills such as self-esteem and establishing goals.

Fourth, successful policies to deal with coverage and completion issues are often ineffective in improving learning. While CCTs have increased enrollment and reduced dropout rates, they are not aimed at improving learning and, consequently, are not effective at boosting academic performance. Similarly, interventions that have promoted learning, such as structured pedagogical practices, have done little for completion, dropout, and enrollment rates (Snilstveit et al., 2015). This highlights the need to work on both policy issues in parallel.

9 Making the Most of Higher Education

Latin America and the Caribbean underwent a major educational transformation in the past two decades. Higher education enrollment more than doubled, increasing from 18 percent in 1996 to 44 percent in 2014.¹ This phenomenon has the potential to bring substantial economic and social benefits to the region. By providing advanced and specialized skills, higher education can foster productivity and economic growth (Freeman, 2010; Giuri et al., 2007; Toivanen and Väänänen, 2016) and be an important determinant of social mobility (Daude and Robano, 2015). But higher education can generate more than monetary benefits; it can also improve the health and creativity of the workforce (Oreopoulos and Petronijevic, 2013). And it has important spillover effects; the technological advances and knowledge generated by a workforce with higher education may be shared among workers with varied skill levels (Moretti, 2004b).

While the surge in access to higher education promises social and economic gains, rapid expansion of the higher education system in Latin America and the Caribbean raises concerns over quality and relevance. Enrolling students with an arguably lower level of academic readiness and a larger, more diverse portfolio of careers and institutions brings major challenges in terms of assuring quality. Thus, tension has arisen between proponents of access and champions of quality. On the one hand, some emphasize the need to continue expanding access through increased subsidies or even free and universal higher education. Others

¹ In this chapter, higher education or post secondary education refers to both short-cycle and long-cycle diplomas, unless specified otherwise. Following UNESCO Institute for Statistics' international levels of education (UNESCO-UIS, 2012): level 5 = short-cycle higher education like community colleges or technical programs; level 6 = bachelor's or equivalent level; level 7 = master's or equivalent level; level 8 = doctoral or equivalent level.

contend that the system is not delivering quality and many students fail to receive an adequate return on their investment once they enter the labor market. Student protests, corruption scandals, and university strikes testify to the high level of dissatisfaction with the higher education system in many countries in the region.

In light of this tension, a fundamental question for Latin American and Caribbean nations is how to design policies that promote access while ensuring the quality of higher education. Assessing such policies demands an understanding of three characteristic features of skill formation in higher education. First, while the pursuit of knowledge for its own sake is an important objective of higher education, the provision of advanced, specialized skills required in the labor market is also a major goal. Thus, as opposed to what happens in earlier stages of skill development, the provision of higher education should aim at ensuring the relevance of skills. Given fast technological changes and the similarly rapid adjustments in the demand for skills, ensuring relevance is becoming ever more challenging, and demands flexibility and innovation in the process of skills formation.

Second, as opposed to what usually happens in primary and secondary education, higher education providers do not supply a set of nationally agreed-upon, standardized skills. Instead, prospective students make a rather complex decision to choose a degree and career from a diverse menu of options. This highlights the importance of developing policies that hold institutions accountable and provide information to students making career choices.

Third, unlike basic education, free and universal access to higher education is rarely a national mandate. In most countries in the region, private and public institutions often charge tuition. Given the fiscal prospects of most Latin American and Caribbean economies and the growing demand for higher education from households, financial innovations to encourage efficiency and cost-sharing schemes that ensure educational opportunity for all will be required.

In light of these considerations, this chapter will review two policy dimensions: how to fund the system to continue to improve access, and how to incentivize good outcomes in terms of quality and relevance. The analysis will take into account the complementary nature of these two dimensions.

The scope of this chapter is limited in three ways. To begin with, it analyzes only the provision of undergraduate programs, leaving

research and graduate programs for future work. Additionally, it studies policies aimed at improving the design of the higher education system as a whole (“outside the classroom”), as opposed to policies that alter the functioning of the providers (“inside the classroom”), such as teaching practices and institutional governance. In most countries in Latin America and the Caribbean, institutions exercise autonomous control over “inside-the-classroom” policies with little interference from the government. Finally, higher education institutions play multiple roles in society; they are centers of learning, research, innovation, technology transfer, and so on. Thus, their performance can be assessed in many different ways (rankings, number of high-level publications, number of patents, and so on). However, given the focus of the book, this chapter examines their performance through outcomes that are directly linked to skill development, such as learning outcomes, dropout rates, and the employability of graduates.

Examining the Evidence

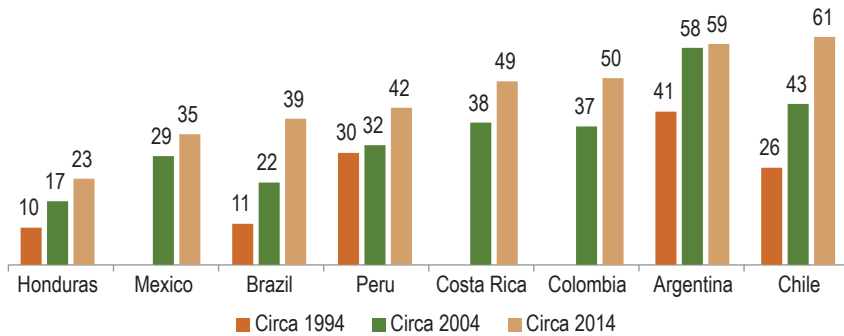
More Education for More People

Higher education in the region expanded at a remarkably fast pace in the past two decades with average gross enrollment more than doubling (UNESCO Institute for Statistics). Access to higher education grew faster in only one other region: East Asia and the Pacific. The expansion in access attained by Chile in the last two decades took Norway and Sweden 50 years to achieve (Espinoza and Urzúa, 2015).

While access increased in all countries, attainment still varies widely (Figure 9.1). Whereas gross enrollment in Chile and Argentina is close to 60 percent, it is less than 25 percent in countries like Honduras. Even in large countries such as Brazil and Mexico, only about 1 in 3 individuals between ages 18 and 23 attends a formal higher education institution.

Despite this substantial expansion in enrollment, there are still large wage premiums for higher education degrees even after controlling for sociodemographic characteristics (Figure 9.2). They are present not only for university degrees, but also for shorter technical and technological programs. However, these wage premiums have been declining, something that may reflect increases in relative supply. After all, as more people hold degrees, the associated premium is likely to go down. However, as

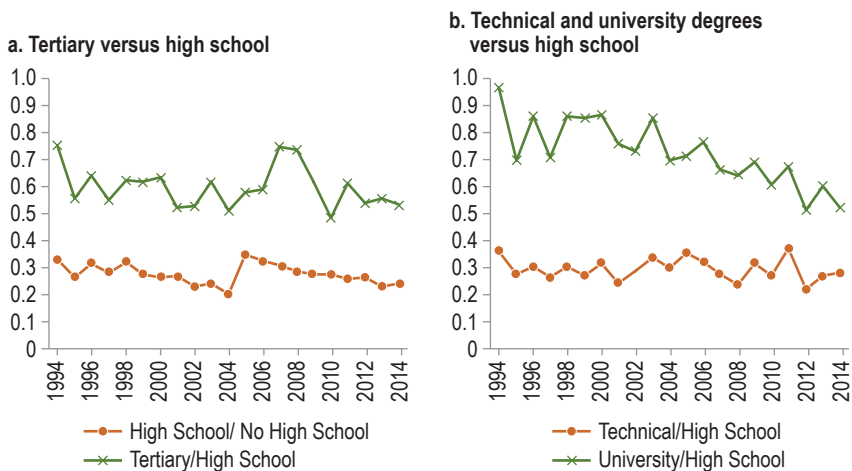
Figure 9.1 Gross Enrollment Rates in Higher Education (percent)



Source: Authors' calculations using household surveys.
 Note: Gross enrollment rates are measured as the share of individuals aged 18-23 enrolled in a higher education program at the time of the survey.

discussed in Chapter 4, other factors may be contributing to the lower wage premium of higher education. Demand for workers with higher education may be lower because of structural economic changes that limit the requirements of skilled workers. Lower wage premiums may also reflect a decline in the quality of programs and/or the academic readiness of students.

Figure 9.2 Average Wage Premiums in Latin America and the Caribbean, by Type of Degree



Source: Authors' calculations using household surveys from eight countries: Argentina, Brazil, Colombia, Chile, Costa Rica, Honduras, Mexico, and Peru. The figure plots the coefficients of a mincerian equation by year (controlling for marital status, gender, and age).

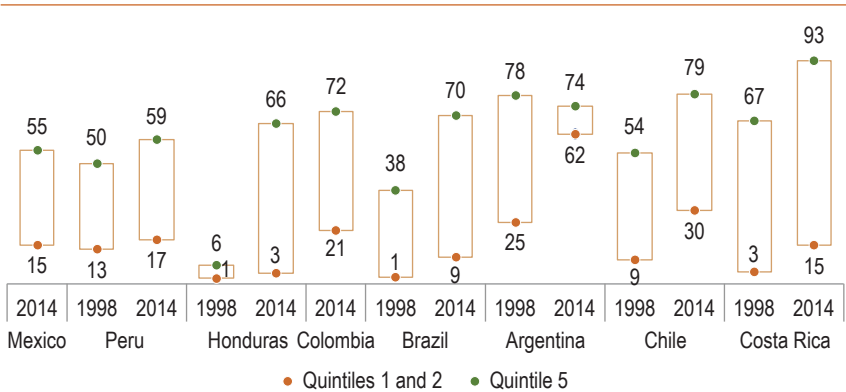
Greater Equity—up to a Point

In many countries, access expanded for lower-income groups that traditionally had been excluded from the system. This gain in equity was especially large in countries such as Argentina and Chile, where the enrollment of individuals aged 18–23 from the lowest quintiles rose from 25 and 20 percent in the 1990s to 62 and 66 percent in 2014 respectively (Figure 9.3). In Colombia, access for low-income students also increased significantly, reaching 48 percent. Despite these equity gains, large gaps in access by socioeconomic status are still present. For instance, in Brazil, Costa Rica, and particularly Honduras, access to higher education among those in the fifth quintile is very high, with enrollment rates around 70 percent, whereas enrollment rates among low-income students is 30 percent or less (Figure 9.3).

One of the barriers that may be limiting enrollment for low-income students is insufficient academic readiness. Graduation rates from secondary school in many Latin American countries are as low as 50 percent, and even many students with high school degrees are academically unprepared for the next level. The disappointing results of 15-year-olds in the region in the global education survey, the Programme for International Student Assessments (PISA), provide evidence of their poor academic training.

Students from low socioeconomic backgrounds may also be less informed about the costs, financing opportunities, and benefits of higher

Figure 9.3 Gross Enrollment Rates in Higher Education by Family Income Quintile, 1998 and 2014 (percent) (Individuals aged 18–23)



Source: Authors' calculations using household surveys.

education. The literature analyzing the United States has widely documented this phenomenon (Page and Scott-Clayton, 2016). Evidence is scant in Latin America and the Caribbean, but a recent study of Chile shows that college applicants tend to overestimate earnings outcomes for past graduates at their top-choice degree programs by 39.3 percent on average. Moreover, students from low socioeconomic backgrounds have less accurate expectations than other applicants. Compared to students from higher socioeconomic households, they tend to rely more on advertising and publicity than on school and government sources (Hastings et al., 2016). As in Chile, students from lower socioeconomic backgrounds in Colombia and Peru make very different choices about the types of institutions they attend and careers they pursue.²

Finally, for many disadvantaged students the problem may boil down to money. For some segments of the population in the region, financial barriers may be limiting access to higher education. In the United States, due to large information asymmetries, the private financial market is rarely willing to place a lien on future individual earnings to finance higher education investments. Evidence from Chile shows that loans have a positive (causal) effect on the probability of enrollment and, more importantly, they effectively eliminate the income gradient in enrollment (Solís, 2017).³ In Mexico, research suggests that credit constraints may explain inequalities in access (Attanasio and Kaufmann, 2009). Differences in current income can explain some of the gap in higher education enrollment by income levels in Latin America and the Caribbean (Alfonso, 2009).

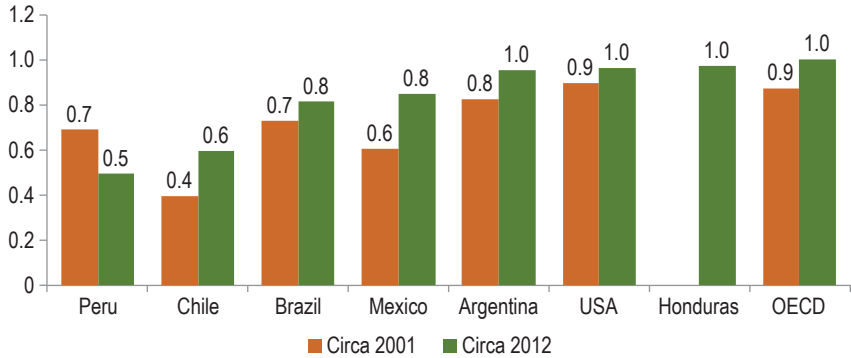
A Public-Private Joint Venture

Latin America and the Caribbean has a diverse array of financing models for higher education. Some countries rely mostly on public sources and provide free tuition (like Argentina), while others—such as Colombia and Peru—rely more on private funds and thus, higher entry fees (see Arias Ortiz, Elacqua, and González, forthcoming). Irrespective of the type of financing or allocation system, the expansion in higher

² Further evidence of differences in student choices by socioeconomic background can be found in Saavedra and Saavedra (2011) for Colombia and in Lavado, Martínez, and Yamada (2014) for Peru.

³ To estimate the causal impact, Solís exploits the sharp eligibility rules of two loan programs recently introduced to compare students around the cutoff and estimate access to credit.

Figure 9.4 Government Expenditure in Higher Education Institutions as Percentage of GDP (percent)



Source: UNESCO Institute for Statistics (UIS).

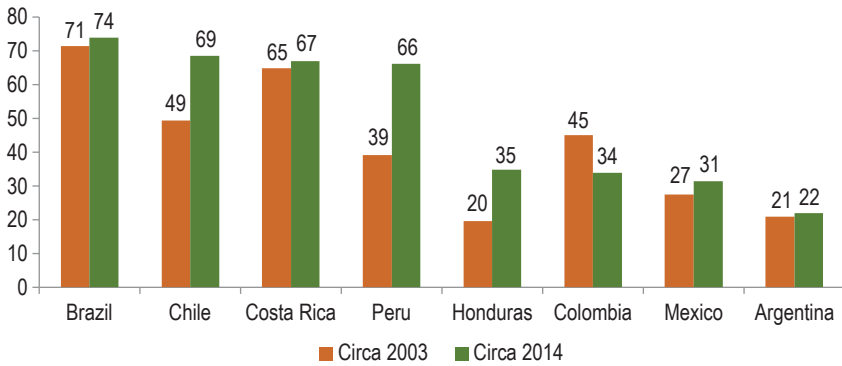
Note: Total general (local, regional, and central) government expenditure in educational institutions (current and capital), expressed as a percentage of GDP. The measure excludes transfers to private entities, such as subsidies to households and students, but includes expenditure funded by transfers from international sources to the government.

education resulted from private and public efforts. Except for Peru, the share of public spending in higher education as a percentage of GDP increased over the past decade (Figure 9.4). In Argentina and Honduras, this share is currently on a par with that of the United States and other member countries of the Organisation for Economic Co-operation and Development (OECD).

The limited available evidence indicates that private education is growing. In Mexico, household expenditures in higher education increased dramatically in the past two decades, even among the poor. While the largest surges have occurred among households at the top of the income distribution, the poorest households in the lowest deciles also increased their spending in real terms (Székely and Mendoza, 2016a). At the same time, the costs of higher education for households, measured by tuition and entry fees, have also been increasing. In Chile, for example, tuition increased 60 percent in real terms since the late 1990s and over 100 percent for some majors (courses of study). The cost of sending a student to college for a middle-class family is over 40 percent of family income (Meller, 2011).

More Degrees, More Programs, More Providers

Another force driving the surge in higher education enrollment has been the growth and diversification in supply. The number of institutions and

Figure 9.5 Private Gross Enrollment Rate in Higher Education (percent)

Source: Authors' calculations using household surveys.

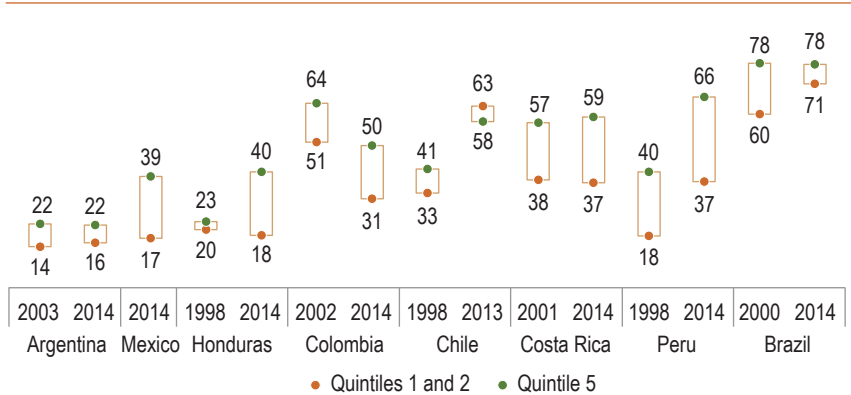
Note: The baseline year for Mexico is 2004, for Brazil 2001, and for Peru 1998. For Chile, the comparison year is 2013.

programs has increased substantially. Over the past decade, the number of institutions in Mexico and Brazil increased by 50 percent and almost 100 percent, respectively (Ferreyra et al., 2017). This increase was largely due to a surge in the number of private providers. Against a backdrop of growing demand, many governments in the region made regulatory adjustments to facilitate the introduction of private institutions in the market. Chile, for instance, authorized the establishment of non-profit institutions in the 1980s to meet the burgeoning demand for higher education (Brunner, 2009). In Brazil, the for-profit private sector expanded greatly and was able to cater to disadvantaged students who received subsidized loans. It is estimated that over one-third of college students in Brazil are enrolled in a for-profit university.⁴ In Peru, where the sector has also expanded quickly since the mid-1990s, about 40 percent of university students are in for-profit institutions.⁵ As a result, the share of enrollment in private institutions has expanded in many countries (Figure 9.5). Interestingly, in some countries, private institutions have helped absorb not only high-income students but also students from more disadvantaged backgrounds. In Chile, the expansion of private enrollment attracted a substantial share of individuals from the most vulnerable families. Something similar occurred in Brazil.

⁴ See Horch (2014).

⁵ See Bellido (2014).

Figure 9.6 Gross Enrollment Rates in Private Institutions by Family Income Quintile (Individuals aged 18–23)



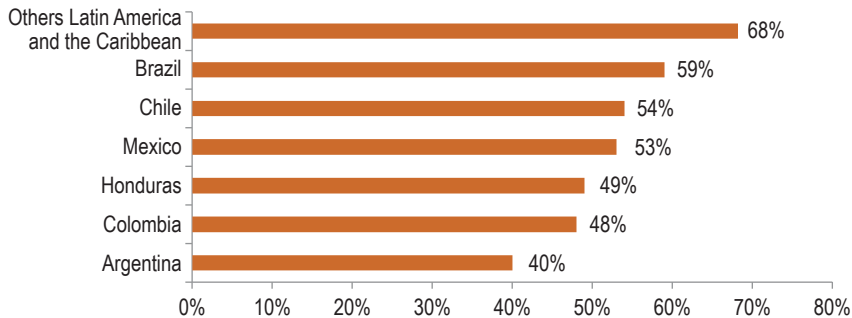
Source: Authors’ calculations using household surveys from 2014 except for Chile, in which case the data corresponds to 2013. The figure shows the percentage of students from quintiles 1-2 and 5 of the income distribution who are enrolled in private higher education institutions.

In Colombia, Costa Rica, and Peru, one out of three higher education students from the lowest income quintiles is enrolled in a private institution (Figure 9.6). Argentina displays the lowest enrollment in private higher education institutions, reflecting the dominance of the public system in this country.

The diversification in supply of higher education is also reflected in the number and types of degrees. In Colombia, for instance, the number of programs almost doubled, from 3,600 in 2001 to 6,279 in 2011 (Camacho, Messina, and Uribe, 2016). Importantly, technical and technological (TT) programs expanded greatly. Enrollment in these programs increased from 435,000 to 3 million students between 2000 and 2013 in Argentina, Brazil, Chile, Colombia, and Mexico (Ferreyra et al., 2017). Currently, one out of five higher education students in Latin America and the Caribbean is enrolled in a technical or technological program (OECD, CAF, and ECLAC, 2014).

Expansion: At What Expense?

A larger higher education system with more equitable access and a more diverse—and probably better tailored—supply of programs could be an important engine for sustained and equitable growth in Latin America and the Caribbean. However, rapid expansion into a larger, more

Figure 9.7 Dropout Rates in Undergraduate Programs, 2005

Source: IESALC (UNESCO), and SNIES for Colombia, Salmi (2013).

Note: Other Latin American and Caribbean countries include a simple average of Bolivia, the Dominican Republic, Uruguay, and Venezuela.

complex system may have reduced the quality and relevance of the system, and many students may be getting less out of their investment. Several pieces of evidence point in this direction.

Completion figures provide the first clue that something is awry. Dropout rates in Latin America and the Caribbean are remarkably high, ranging from 40 percent to almost 70 percent of all students (Figure 9.7). Arguably, some level of drop-out may be efficient if students observe their individual ability only after they enroll and need to “test” alternative careers before they find the one most suitable to their talents and ambitions. However, recent studies suggest that this phenomenon is associated with a lack of academic readiness and financial stability,⁶ implying large social and private costs.

Data from Colombia also point to incoming students’ lack of academic preparedness as an important issue that may affect quality. Using a rich administrative dataset and controlling for self-selection, Camacho, Messina, and Uribe (2016) study the expansion of higher education in the 2000s and find that, while the quality of programs remained stable, students have on average lower ability levels. Moreover, many of the new programs sprung up in areas of study that traditionally have had low returns. In Peru, both the quality of institutions and students’ academic standards have declined. Since the higher education market was deregulated in 1997, the share of low-quality institutions has grown and the probability of being underemployed for higher education graduates has

⁶ See Arias Ortiz and Dehon (2013) for a review of the literature in developed countries.

increased (Lavado, Martínez, and Yamada, 2014). The Peruvian government has recently introduced a comprehensive reform to assess this issue.

Related work analyzes the value added of higher education programs by comparing learning outcomes in standardized tests at the entry and exit of the system. The results are discouraging in high-demand programs, such as business administration and teaching (Bogoya and Bogoya, 2013; Balcázar and Ñopo, 2016).

A final piece of evidence comes from studies that estimate the net returns in the labor market of higher education graduates. An analysis of the dispersion in economic returns within the higher education system reveals big differences in performance across institutions, degrees, and careers. Even though this heterogeneity is not necessarily a signal of quality issues, studies show that programs with low performance and negative profitability may be absorbing a substantial share of students in the system.

For instance, programs with both very high and very low profitability coexist in Chile and Colombia (González-Velosa et al., 2015). While net economic returns⁷ are positive on average, there are major dispersions across both institutions and careers. Of great concern are the number of students who may be losing out in both countries. In Colombia, some 30 percent of university graduates and 59 percent of graduates from post-secondary technical and technological programs are experiencing negative net returns on their higher education. In Chile, 22 percent of university graduates and 51 percent of graduates of technological degrees face similar circumstances. Since low-income students are more likely to enroll in technological education programs, the equity implications are concerning. A study using an alternative methodology for Chile yields similar results (Rodríguez, Urzúa, and Reyes, 2016).⁸

The Real Test: How to Expand Access with Quality

As a result of public and private efforts, the higher education systems in Latin America and the Caribbean have grown in size, equity,

⁷ To estimate the net economic returns, the authors calculate the discounted lifetime stream of income net of financial and opportunity costs. Opportunity costs are estimated assuming that individuals attending higher education have higher unobserved abilities than the median worker.

⁸ The authors use administrative data from Chile to estimate a structural model for labor market outcomes (wages) and schooling choices that accounts for unobserved endowment (ability) that influences both specifications.

and complexity, increasing enrollment among students from lower socioeconomic backgrounds, diversifying the supply of providers, strengthening the role of private institutions, and increasing the share of shorter technical and technological post-secondary degrees. This expansion is unlikely to come to a halt, given the positive social returns perceived by policymakers, as well as the aspirations of a new generation of high school graduates, for whom a higher education degree is essential for success in the labor market. In this context, two important challenges lie ahead.

First, even though access to higher education is no longer restricted to the highest socioeconomic segments of the population, it still appears to be out of reach for many—especially the poor. Second, the rapid expansion of higher education may have taken place at the expense of quality and relevance. New students entering the system may be academically unprepared. At the same time, the rapid growth in supply and the subsequent increase in monitoring costs may have opened the door for subpar higher education institutions to enter the market. The greater complexity and diversification of programs may be increasing the costs of well-informed career choices.

The approach policymakers take to meet these challenges depends largely on the institutional environment, which varies widely across countries. However, several fundamental principles can be identified from existing evidence to address two important policy questions: how to fund the higher education system and how to incentivize good outcomes (in terms of quality and relevance)?

How Money is Allocated Matters

The Supply Side

Supply subsidies are the most common mechanism through which public funds are allocated to the higher education system in Latin America and the Caribbean (Salmi and Hauptman, 2006). Public funds are transferred to institutions from local or central authorities to finance current expenses and investments.

The criteria most commonly used to allocate public subsidies in higher education in the region are: negotiated or ad hoc budgets based primarily on historical trends, and distributed as block grants—as opposed to line-items—to give more flexibility and autonomy to institutions, and; funding formulas using inputs such as number of students or staff (see

Arias Ortiz, Elacqua, and González, forthcoming). The most common approaches typically do not take unit costs or outcomes into consideration. Thus, institutions are usually not rewarded for their efficiency (such as minimizing dropout levels) or their performance (their impact on graduates' learning or employment outcomes). The exceptions are rare, as is the case of Peru, where as of very recently the allocation of funding to universities is partly based on efficiency in execution and performance measures. The share of this allocation is, nevertheless, very small.

In principle, offering large public transfers to institutions with relatively low tuition fees is a very effective mechanism to foster enrollment, as the United States and Scandinavian countries did during the 1950s and 1960s (Dill, 1997). However, allocating supply subsidies only on the basis of inputs or historical patterns with no efficiency or performance incentives entails several risks. The first has to do with financial sustainability. Given the increasing demand for higher education and the deteriorating fiscal prospects of many economies in the region, this strategy may not be financially viable in the long run for most Latin American countries.

Second, information asymmetries between the government and the institutions can create agency problems: institutions can exploit their information advantages to pursue other goals. For instance, institutions may not be required to report drop-out rates and other indicators. This may perpetuate inefficiencies and ineffective programs (Thorn, Holm-Nielsen, and Jeppesen, 2004). Allocation based on historical budgets can also affect quality when public universities enroll more students without an increase in resources to meet the additional costs (Salmi, 2013).

Third, this allocation policy may also generate inequities. Unlike subsidies at earlier, compulsory stages of education, subsidies for higher education do not yield potential benefits to all taxpayers. Since higher education is noncompulsory, subsidies will benefit only those who choose to continue their studies and have the academic readiness necessary to enroll in a program. Since these subsidies are typically financed with general taxation, and the wealthier are more likely to be academically prepared for college, there is a significant risk of redistributing income from the poor to the rich. Indeed, in Latin American and Caribbean public universities that offer universal and free access, students from wealthier families, who are typically more academically prepared, enroll and graduate in greater proportions. The largest public university in Brazil, Universidade de São Paulo (USP), which provides tuition-free

education but is highly selective in terms of academic readiness, is a case in point.⁹

Innovative adjustments can be incorporated into the design of supply-side subsidies to promote better performance and/or make the subsidies more progressive. Aside from Chile, these instruments are rare in Latin America and the Caribbean. And even in Chile, the share of funding allocated via these instruments is minimal (See Arias Ortiz, Elacqua, and González, forthcoming). Not surprisingly, their impact has not been rigorously evaluated. However, two types of approaches are worth highlighting:

- *Competitive funds* incentivize quality in higher education by setting aside resources for which institutions and programs must compete. Competitive grants can be awarded, for example, for the development of new teaching methods or programs, and to encourage innovation in teaching and research (Daugherty et al., 2013). Examples include MECESUP and FONDECYT in Chile, FOMES in Mexico, and FOMECA in Argentina (See Arias Ortiz, Elacqua, and González, forthcoming). These funds have arguably been effective in encouraging universities to plan strategically and undertake rigorous projects to improve quality and relevance (Salmi, 2013).
- *Performance contracts* are regulatory agreements in which governments and institutions set mutual performance-based objectives. Institutions commit to fulfill a number of national objectives in exchange for access to additional funding (Salmi and Hauptman, 2006; Daugherty et al., 2013; European Commission, 2014). Typically, the agreements set out overall institutional strategies to attain specific targets related to teaching, research, and other activities, and have the virtue of providing flexibility to institutions in their choice of targets for improvement. (Strehl, Reisinger, and Kalatschan, 2007). Performance contracts have been widely used by several European countries (Denmark, Finland, France, Spain) and U.S. states (Virginia and Colorado). Overall, Latin America countries have little experience with these types of contracts. A notable exception is Chile, where performance

⁹ Salmi (2011) reports that 95 percent of medical school students at the Universidade de São Paulo graduated from elite private high schools.

contracts have been implemented since 2007, at first on a pilot basis, and now in a more systematic fashion (Salmi, 2013).

The use of these instruments to partially allocate supply subsidies is a promising practice. They can incentivize a more progressive allocation of subsidies, if funding is allocated based on indicators of equity. They can also promote transparency in the allocation of funding and incentivize efficiency and quality via greater accountability. Indeed, a review by Santiago et al. (2008) suggests a positive effect in both strategic planning and institutional and student outcomes.

The Demand Side

Public funding for higher education can also be channeled via demand subsidies, which are directly transferred to prospective students so they can purchase academic programs at a lower cost. The two most common types of subsidies are government grants or scholarships, and student loans.

Government Grants or Scholarships

This form of nonrefundable aid provided by the government to cover the direct costs of attending higher education (tuition, fees, materials) and/or living expenses is given directly to students or to program administrators to cover the costs of eligible students enrolled in the institution. Whether they are needs-based or merit-based, scholarships are a critical component of any financing structure to promote greater access, equity, and quality (Salmi and Hauptman, 2006).

Scholarships are usually awarded based on needs, academic criteria, or a combination of both. Countries in the region have used all modalities, which can have differing impacts (See Arias Ortiz, Elacqua, and González, forthcoming). Results from studies in the United States show that needs-based scholarships can increase equity in access by reducing the cost of schooling.¹⁰ As for merit-based grants, studies show

¹⁰ A review by Dynarski and Scott-Clayton (2013) shows that, on average, \$1,000 in college aid increases enrollment by 4 percent across studies in the United States. The effect on persistence and completion of this type of grant is also observed by Castleman and Long (2016), whose study uses regression discontinuity design (RDD) to examine the effect of a needs-based program in Florida that has a strict eligibility cutoff. They find significant increases in four-year college enrollment but

that they can motivate students to prepare better for college and pay off in improved college readiness, academic performance, and degree attainment.¹¹ In turn, better students make for better institutions. Evidence from Chile points in the same direction, showing positive effects on enrollment of a needs-based grant program (Becas Nuevo Milenio) and smaller effects of merit-based programs (Beca Excelencia Academica, BEA, and Beca Juan Gomez MillasJGM) (Santelices et al., 2016).

Unfortunately, both types of scholarships can lead to unintended consequences. Needs-based scholarships may adversely affect outcomes if they are offered to students who are not adequately prepared for academic studies. This is the case of the Pell Grant in the United States, whose recipients have abysmally low graduation rates: only 45 percent of all recipients complete their degree within six years of entering the program (Scott-Clayton and Baum, 2013). Academic-based scholarships can also have unintended consequences on equity, widening the gap in college attendance rates by race and socioeconomic status. This potential negative effect is particularly important in Latin America and the Caribbean where the quality of secondary schools varies widely. Thus, the combination of needs-based and academic-selection criteria adopted by some programs in Chile, Colombia, and Peru can prove beneficial.

To limit the risk of dropping out, scholarships can incorporate elements in their design that incentivize completion. A recent review of the Pell Grant suggests changes such as a disbursement calendar contingent on completing course credits (Scott-Clayton and Baum, 2013). Students may also be less likely to drop out if their financial aid is accompanied by counseling and career guidance. Recent evaluations of scholarship programs targeted to disadvantaged populations in Peru (Beca 18) and Colombia (Ser Pilo Paga) stress the importance of these complementary measures (see Box 9.1).

Scholarships will boost quality if students can make informed choices and most providers are incentivized to compete for resources. However, these conditions are often absent. Resources from scholarships rarely represent a significant share of institutional budgets, and

also in subsequent completion of the bachelor's degree. For other important references for the effect of student aid in the United States, see Bettinger (2004) and Hossler et al. (2009).

¹¹ See, for instance, Page and Scott-Clayton (2016) and Dynarski and Scott-Clayton (2013).

BOX 9.1. SCHOLARSHIP PROGRAMS IN COLOMBIA AND PERU

Ser Pilo Paga and Beca 18 are public scholarship programs that aim to increase access to higher education among high-performing students from disadvantaged socioeconomic backgrounds. They are administered, respectively, by the Ministries of Education of Colombia and Peru.

Ser Pilo Paga is targeted to economically disadvantaged students in Colombia who achieve high scores on the national standardized test for high school graduates. Beneficiaries attend the accredited higher education institution of their choice. To identify the effects of the scholarships on access and composition, Londoño-Vélez, Rodríguez, and Sánchez (2017) use a regression discontinuity design to evaluate the impact of the program. Results show important gains in access and equity: the loan significantly increased enrollment among eligible students. It also shifted enrollment from low-quality to high-quality institutions and from public to private universities. In response to the increased demand, top private universities increased their capacity. Suggestive evidence indicates the program may have raised performance in the standardized test among low income, eligible students. Preliminary results indicate that eligible students may be motivated to exert a greater effort on the exam, due to an increased opportunity to access a top university (Laajaj, Moya, and Sánchez, 2017).

Beca 18 is targeted to high-performing, low-income Peruvian high school graduates aged 16 to 22. The scholarship covers tuition, supplies, English-language instruction, remedial courses, counseling, a stipend to cover living expenses, transportation subsidies, and health insurance. A recent impact evaluation by Peru's Ministry of Education and the Inter-American Development Bank used a regression discontinuity design to assess the performance of beneficiaries a year and a half after applying for the scholarship (Ministry of Education of Peru 2016). The results show increases in access and completion are consistent with the findings in other countries. Interestingly, when compared to individuals who also enrolled in higher education programs, the scholarships appear to have a significant impact on academic achievement and self-reported measures of welfare by reducing the number of hours devoted to low-quality jobs. Results also show academic gains for beneficiaries who received increased tutoring.

beneficiaries are typically a minor share of the overall target population. Preferences and cultural stigmas have an important influence on career choices. Thus, the central objective of scholarship programs will mainly be to improve access for a credit-constrained population.¹² Ser Pilo Paga, for instance, alleviates a credit constraint for disadvantaged and

¹² For a summary of demand-side financing in education, see Patrinos (2007).

high-achieving students who, thanks to the scholarship, can attend the top universities in Colombia. Resources are only allocated to institutions with high-quality accreditation, something that in principle could create incentives for quality improvement among providers. But, since beneficiaries represent a small share of the target population, these quality effects will arguably be limited.¹³ Thus, complementary, comprehensive policies that ensure quality and accountability of the whole system are essential, as will be discussed later in this chapter.

Aside from increasing access, scholarships can also be effective in strategically supporting higher education programs that are of special relevance for development goals. For example, in Argentina, Brazil, Colombia, and Peru, this mechanism has been used to attract more students to priority careers, such as science, math, and technology (Salmi and Hauptman, 2006).

Student Loans

Internationally, student loans consistently have a positive impact on enrollment, and Chile and Colombia are no exception.¹⁴ Clearly, students prefer scholarships over loans to avoid accumulating debt. There is some evidence of a “psychological response” to educational debt that can influence career choices, as students steer away from lower-earning professions that would make it harder to repay debt (Scott-Clayton, 2015; Field, 2009).¹⁵ However, three arguments can be made in favor of subsidized loans over government-provided scholarships. The first can be justified on equity grounds, by recognizing that higher education has both social and private returns. Students obtain significant private benefits while society at large gains from better educated, productive individuals; thus, cost-sharing between the individual and the government is warranted (Chapman, 2016).

There is also a fiscal argument for cost-sharing that is particularly relevant in light of the impending, less favorable fiscal scenario in Latin

¹³ The program provides scholarships to 10,000 students every year. More than 600,000 students take the standardized high school level exit tests every year.

¹⁴ For Chile, see Rau, Rojas, and Urzúa (2013). For Colombia, see Melguizo, Sánchez, and Velasco (2016).

¹⁵ A field experiment study among law students at NYU showed that, when offered two educational aid packages of equivalent monetary value, students preferred the tuition subsidy over the loan repayment assistance. This difference in framing had an important effect on the enrollment and career decisions made by the students (Field, 2009).

America and the Caribbean. Providing tuition-free higher education is an expensive proposition from a fiscal standpoint. Some estimates in Chile suggest the fiscal burden would be at least 1 percent of GDP—a substantial opportunity cost that could imply, for instance, less investment in earlier education levels (Espinoza and Urzúa, 2015).

Finally, loans create incentives for greater student effort. As opposed to scholarships and free tuition, loans force students to internalize the cost of education, as well as the risk of failing to graduate. Ultimately, students may learn more and be less likely to drop out. These gains may come, however, at the expense of enrollment. Only students who are likely to graduate take out student loans (Ferreya et al., 2017).

Latin American and Caribbean countries have extensive experience with subsidized loan schemes, which vary across countries according to the source of funds, the expenses covered, and the level of subsidies (see Arias Ortiz, Elacqua, and González, forthcoming). In terms of their repayment mechanism, loans are of two major types. Traditional, fixed-term (mortgage-type) loans are repaid in equal installments over a period of time. Payments on income contingent loans (ICLs), on the other hand, automatically rise and fall with a borrower's earnings.

Interest in ICLs has recently surged in light of positive evidence. Typically in ICLs, debts are recorded while the person is studying and the relevant income tax authority is informed. When the debtor graduates, is employed, and receives an income above a particular threshold, a percentage of his or her income is remitted to the tax authority to repay the debt. To the extent that loan repayments automatically rise and fall with the individual's earnings and capacity to pay, they smooth consumption and reduce the burden of debt, especially among those with lower earnings. Debtors are also insured against default because they need to make repayments only once their earnings exceed a threshold (Chapman, 2016). Thus, unlike traditional loans, ICLs do not make debtors absorb the entire risk of investing in higher education.

ICLs can have important advantages over traditional loans. Since traditional loans are repaid on the basis of time and not on the capacity to pay, they carry a higher risk of default and of future hardship for borrowers (Chapman, 2016). This poses problems for lenders as well. They do not have a security for their investment in case of default, and if they ask for higher premiums or limit their business to students who can provide collateral, then they may not be able to provide sufficient lending (Barr, 2004).

Chile is the only country in Latin America and the Caribbean that has a large income-contingent loan scheme. This can be partly explained by Chile's heavy reliance on demand subsidies, which encourages innovation in loan design. But, more importantly, Chile meets an important precondition for an ICL: it has an information system that allows government officials to identify and track the income of individual citizens (Chapman, 2016). Many other countries in the region have very high levels of informality and lack reliable administrative data. In those countries, the administration of ICLs may require innovative solutions, such as resorting to private banking and insurance information systems.

When it comes to student loans, key design features, such as the expenses covered or the allocation of default risk, can have important consequences on outcomes. For example, the former design of the State Guaranteed Loan Program (SGL) in Chile may have created economic incentives to reduce quality among providers (Rau, Rojas, and Urzúa, 2013). Given that higher education institutions had to repay the lender when students dropped out, the institutions may have lowered their academic standards and shifted to more attractive but less demanding activities to reduce dropout risks.

The analysis of the SGL highlights the importance of tailoring the design of subsidized student loans. The shortage of rigorous evaluations to inform new and improved approaches is a major constraint in this regard. The goal should be to carefully evaluate the impact of new and existing initiatives, monitor their operation, and identify possible design adjustments.

The Means to Achieve the Ends

As opposed to what happens in the earlier stages of skills formation, individuals who plan to invest in higher education face an array of critical decisions regarding the type of track (university or technical), area of specialization (medicine or humanities) and type of institution (private or public). The variety, complexity, and importance of these choices highlights the role of information to construct regulatory policies implemented by the government to hold providers accountable for their performance and help individuals make informed career choices.

The decision to attend higher education is complex: students face several options in terms of funding and premiums on their investment that vary dramatically by institution and degree program. Information about the quality of teaching, costs, and procedures related to attending higher

education can be provided directly to prospective students to inform their choices. Interestingly, interventions that focus only on providing information about economic returns have limited results on enrollment (see, for example, Kerr et al., 2015). These interventions are effective only when they provide information about both expected benefits and funding mechanisms. Such interventions can improve exit exams and career choice, especially among low-income students who tend to suffer the most from information barriers. (Bonilla, Bottan, and Ham, 2016; Hastings et al., 2016; Avitabile and de Hoyos, 2015).

To better inform career decisions of prospective students, a few countries have constructed web portals that, based on administrative data, publicly disseminate indicators of employability or wages per career and institution (Arias Ortiz, Elacqua, and González, forthcoming). While these portals can render important benefits, careful construction of the way in which the data is constructed and presented is paramount. Employability indicators for careers with a very small number of students will lack precision and will result in noisy signals.¹⁶ In addition, given the high level of student self-selection, information that is disaggregated by institution will reveal only a fraction of the real value added of the institutions.

In terms of quality assurance, most countries have quality assurance systems based on licensing and quality accreditation processes. The initial licensing stage is compulsory, and aims to ensure that the higher education institution and higher education programs meet the minimum standards necessary for operation. Aspects such as provision of infrastructure and proof of financial solvency are usually taken into consideration. Accreditation decisions typically rely on peer review and self-assessment processes that consider such inputs as teachers' educational attainment, curricula, and student well-being.

While most of the systems analyzed in this chapter are organized around one public entity to lead the accreditation and evaluation process, a few countries delegate accreditation to private agencies (Arias Ortiz, Elacqua, and González, forthcoming). In addition, in countries with many private higher education providers, independent regulatory agencies, known as Superintendences of Higher Education, oversee the financial management of the higher education institutions.

¹⁶ For example, the Chilean government no longer publishes labor market information by university or professional institute due to the less reliable data at the institution level. See mifuturo.cl.

Some countries in Latin America and the Caribbean were early adopters of quality assurance mechanisms. Colombia and Mexico, for example, built their systems in the early 1990s, many years before Western Europe and Asia (Salmi, 2013). Recent evidence for Colombia shows that quality assurance systems can be an accurate signal of quality, with accredited programs having greater value added in terms of learning (Camacho, Messina, and Uribe, 2016).

Nonetheless, the coverage of these systems in many countries remains rather limited. In Colombia, for instance, only 13 percent of higher education institutions were accredited in 2016 according to the National Accreditation Council of Colombia, even though the system was instituted in 1992. Only 2 percent of the 5,705 private institutions in Mexico have been accredited. These low levels likely reflect the voluntary nature of accreditation and weak incentives. Only in Argentina is accreditation compulsory and as discussed earlier, public resources are rarely allocated based on accreditation or other quality performance measures. For instance, despite the rapid expansion of private providers and the low levels of accreditation, loan eligibility is, with few exceptions, not used as an incentive for quality accreditation in the region. Programs like *Ser Pilo Paga* that restrict eligibility to accredited institutions are rare, and their coverage is typically very small. Given the small benefits from accreditation, there is little incentive to invest in this process.

Increasing the incentives for accreditation by making higher education institutions more accountable for the quality of their performance is, therefore, highly recommended. Nevertheless, the capture of accrediting agencies by higher education institutions should be avoided. A recent scandal in Chile clearly illustrates this risk (González and Guzmán, 2012). If a quality assurance system is to be strengthened by increasing the consequences of nonaccreditation, then transparency and independence are essential preconditions. Transparency protocols should require accreditation agencies to publish their final reports and recommendations, as well as the names of team members. Rules to avoid conflicts of interest between accreditation agencies and higher education providers should be established.

Quality assurance systems should increasingly inform their decisions with data on outcomes, as opposed to assessment of inputs. To do so means putting more effort into gathering quality data on variables such as learning outcomes and employability of graduates, information that is rare in the region. Brazil and Colombia are notable exceptions. Both countries require higher education students to take national standardized

tests upon graduation. The tests—ENADE in Brazil and SABER PRO in Colombia—assess students in general skills common to all students and in specific skills tailored to each profession.¹⁷ These instruments offer great potential for assessing outcomes. In Colombia, for instance, measures of value added can be obtained by comparing the SABER PRO results with scores on the SABER 11, which is the standardized test students take after high school graduation.¹⁸ By using a value-added approach, these measures take into account the students' academic baseline when assessing the results. These assessments have been used to document the new and growing academic literature that analyzes the contribution of higher education to skills formation (Saavedra and Saavedra, 2011; Balcázar and Ñopo, 2016). Value-added measures have also been used to inform career choices, as they are made publicly available to prospective students. These efforts are led by ICFES, the national institution in charge of evaluating the quality of schooling in Colombia, which has a legal mandate to perform standardized tests and measure the value added of higher education.¹⁹ As a result, Colombia has become a world leader in the assessment of the relative effectiveness of higher education institutions (OECD, and World Bank, 2012).

One important metric that is systematically lacking is labor market outcomes to assess the performance of the higher education system. This is especially costly in the case of technical and technological vocational degrees, which provide education for specific fields of employment. Investing more on understanding the labor market outcomes of higher education systems is crucial. It may be argued that university education has goals that go beyond employability. Yet given the important economic investments made by individuals and the public, and the

¹⁷ In Brazil, the general skills component consists mostly of “general knowledge,” such as social studies, whereas in Colombia skills like reading and numeracy are assessed.

¹⁸ Saber 11 is mandatory for high school students in their senior year who wish to obtain their degree, and serves as an input for college entrance. It assesses academic competencies in language (Spanish), mathematics, biology, chemistry, physics, social sciences, philosophy, and a foreign language (English or French). Saber Pro is mandatory for higher education students who have completed at least 75 percent of their academic programs. It assesses the academic competencies of higher education students on program-specific areas (engineers are assessed in engineering, economists in economics, biologists in biology, and so on). It also assesses all students, regardless of their major, in quantitative reasoning, reading, writing, and English as a foreign language.

¹⁹ Mandato legal 3963 de 2009.

aspirations of graduates, higher education institutions should be able to demonstrate that they are conferring credentials and skills that are valuable in the labor market.

Unfortunately, there is a disconnect between higher education programs and the skills needs of employees. As mentioned, studies point to quality and relevance issues as reasons why so many students derive net negative returns from their higher education investments. More specific evidence shows a mismatch between the type of degrees provided and those in demand by the productive sector. For instance, Colombia faces a major deficit of technologists with a 3-year postsecondary degree.²⁰

Greater accountability on labor market outcomes should encourage more initiatives that promote a better alignment between curricula and the needs of the workforce. Rigorous evidence shows that innovative interventions that build on collaboration between employers and colleges can boost the employability of graduates. This happens in the United States, where rigorous studies show that “sectoral training” can significantly impact the earnings of the working poor (Holzer, 2014). Partnerships between employers and community colleges (2-year post secondary degrees) ensure that training is well targeted to the needs of employers, who, in turn, commit to hiring. This is usually done in sectors that are booming, with lots of employment growth and good-paying jobs for post-secondary graduates below university level (technical and technological students). Experimental evidence for three well-established sectoral programs shows these interventions can raise earnings of the working poor by as much as 30 percent after two years (Maguire et al., 2010).

Impending transformations in the labor market elevate the importance of this last point. Recent evidence suggests that long-term jobs will become less frequent (Alaimo et al., 2015). Rapid technological changes imply rapid transformations in the demand for skills. Thus, the labor market will increasingly demand continuing education from its higher education graduates and adaptability from its higher education system.

Making the Diploma Count

Higher education enrollment rates have expanded spectacularly in the region. Both private households and governments can take credit for this

²⁰ See Lora (2015). Technologists are typically trained in implemented systems, such as logistics, accounting, or administrative processes.

surge, as they have invested in advanced, specialized skills, expecting large private and social returns. These returns may, indeed, materialize if important challenges are addressed. In particular, governments must promote access while at the same time ensuring quality and relevance; otherwise, higher education will be an inefficient investment for everyone. International evidence shows that increasing years of schooling without improving student learning historically has had little or no effect on economic growth (Hanushek, 2016).

Whether governments in Latin America and the Caribbean are up to this challenge is a question yet to be answered. The challenge is not only for more financial investments but also for strong governance and institutions, as well as for a careful, evidence-based and innovative policy design.

Several trends in the region underscore the importance of these tasks. To begin with, the higher education system's expansion and diversification are unlikely to wane, given the large average returns, the aspirations of high school graduates, and the requirements of employers. Higher education is no longer a luxury, but rather a growing aspiration of the middle class. A larger, more diverse higher education system complicates the career decisions of individuals and raises the monitoring costs of the government.

Moreover, rapid technological changes go hand in hand with rapid transformations in the demand for labor. This calls for more flexibility and innovation in skills formation.

Finally, the mid-term fiscal prospects in the region are gloomy, limiting the capacity of governments to subsidize higher education. With demand growing, financial innovations are paramount.

Despite the wide variety of higher education systems across the region, a series of principles can be recommended based on evidence from rigorous evaluations reviewed and lessons learned from good practices:

- Different financing mechanisms, whether based on the supply or the demand side, are available and can be used to achieve different types of outcomes.
- Demand-side subsidies can be effective at promoting access. However, they should be carefully designed to create incentives for good student outcomes and avoid concentrating financial risks among students. Demand subsidies may also improve

quality, but they cannot substitute for a systemic, effective quality assurance mechanism.

- Supply-side subsidies are effective at promoting enrollment but can create perverse incentives in terms of efficiency and quality. Incorporating performance contracts into these subsidy programs can improve outcomes.
- Higher education is an investment, and, as such, entails some risk. Public policies should mitigate financial risks among disadvantaged students by designing sound financial instruments, ensuring they can make informed career choices, and promoting quality and relevance in the system.
- Quality assurance systems are currently too weak to meet the challenge faced by countries in Latin America and the Caribbean. Efforts to increase coverage and provide accountability instruments are essential. This implies increasing the benefits of quality performance and accreditation.
- Information on learning outcomes and labor market performance of graduates is vital to inform career choices and policy design, and to promote accountability. However, very few countries currently collect and publish this type of information, and institutions are rarely accountable for the employability of their graduates. An effort should also be made to strengthen vocational guidance and career counseling programs that help students navigate in an increasingly diverse and complex educational system.
- Technical and technological degrees are growing at a fast pace in countries such as Chile and Colombia. Employers must participate systematically in the design of curricula to ensure good outcomes.
- College readiness is vital. As reiterated throughout this volume, knowledge gaps start early and only grow wider over time. Policies simply cannot promote access and ensure quality and relevance if students are not ready to complete a higher education degree. Moreover, the inadequate academic preparation of low-income students may limit their access to higher education. However, assuring academic readiness is a long-term proposition that must be undertaken in secondary school, or before. Enhancing the quality of primary and secondary education is a prerequisite to achieving good higher education outcomes.

10 Skills Development for Adults: Toward a Lifetime of Learning

People don't—and shouldn't—stop learning. Skills accumulation during adulthood is an essential part of the development of skills in a person's life. Although acquiring skills is often associated with education, the education system is only one way in which individuals develop their skills. While people usually leave the education system at a relatively young age (early adulthood in most cases), as adults they continue to learn and accumulate skills.

Individuals spend an average of 30 to 40 years in the labor market, and investments in human capital during these years are fundamental to increase and maintain productivity. Countries need to invest in the children and youth who will be their future workers, but also pay attention to the large number of people already in the workforce, many of whom need immediate support. These workers will contribute to the growth and productivity levels of their economies today, and for many years to come.

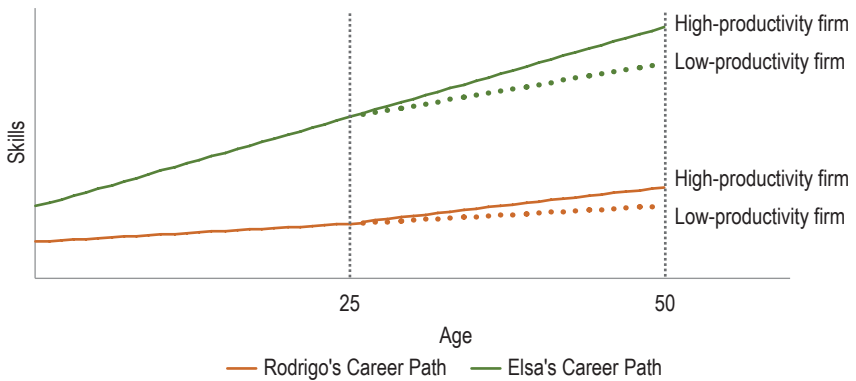
At different points in their work lives, individuals acquire skills both in the job market and through training to complement their formal education. Regarding skills accumulation on the job, the type of firm and the quality of the job match can put some individuals in a virtuous cycle and others in a vicious one. Some people may be able to start working right after leaving the formal education system. Others may have trouble finding a job, undergo further training to increase access to jobs, or even return to school. This learning could improve socioemotional and technical skills or could be an internship or apprenticeship that provides exposure and entry to a first job. After landing that first job, sector- and firm-specific skills may be developed. In a high-quality job that offers good opportunities for career development, people can continue

accumulating skills, and stay and grow in that firm, or move on to a better position in another firm. If the firm does not offer advancement opportunities, workers may find themselves at a dead end with no option to grow or accumulate new skills. Trying to move to another firm is difficult if a person is not adequately prepared. And if laid off, the individual may end up rotating from firm to firm, or even worse, unemployed or working in the informal economy with a low level of skills accumulation.

Thus, the quantity, quality, and trajectory of skills developed during a person's work life depend crucially on two main things. First, it depends on his or her initial conditions: individual characteristics and the level of education attained prior to entry into the job market. Second, it depends on the quality of firms available in the economy, the type of firm in which the person ends up working, and the type of job a person holds. As discussed in this chapter, trajectories can also be affected in important ways by skills development policies. Along the life cycle, there are ample opportunities for skills development, and adulthood is a rich and long period to invest in relevant skills to be more productive in the labor market. Increasing life expectancy makes this period even longer and, therefore, more important than ever before.

Take two workers, Rodrigo and Elsa. Elsa was born in the city, always had a good sense of humor and a great attitude. Rodrigo was born on the outskirts of the city, insecure and with behavioral issues in primary school. Elsa graduated from college, while Rodrigo did not finish high school and started working right away, earning a salary, while Elsa paid the opportunity cost of going to college (her foregone salary). At 25 years of age, they are both working. Even though Rodrigo probably accumulated skills while working, attending college gave Elsa valuable academic skills. Therefore, they start from different points in terms of their accumulated human capital (e.g., they have different skills levels). Depending on the type of firm where they end up working, they may continue to accumulate skills at different rates. Figure 10.1 simplifies their career paths, without unemployment spells or job switching, but in which it makes a difference whether, starting at age 25, Elsa and Rodrigo work at a high-productivity firm, where they accumulate skills relatively quickly, or at a low-productivity firm where skills accumulation is slower.

At age 50, after 25 years of working, if Rodrigo stays in a low-productivity firm, he cannot close the skills gap with Elsa, and the gap remains large even if both spend their working lives in high-productivity firms. Most likely, the gap would be even larger since unemployment

Figure 10.1 Elsa and Rodrigo Potential Paths in the Labor Market

Note: Figure does not reflect actual levels and is intended just for illustrative purposes.

or turnover spells affect workers like Rodrigo more than Elsa. However, working in a high-productivity firm does make a difference for both Rodrigo and Elsa (compared with working in a low-productivity firm).¹ This example illustrates the challenges faced by individuals who start from different initial skills levels. Skills development policies can play a key role in helping them find a good job and becoming as productive as possible during their working lives.²

This chapter focuses on skills development policy interventions oriented to both workers and firms. For workers, one type of policy helps workers with less initial human capital, like Rodrigo, overcome their initial disadvantage, both in terms of finding jobs (in particular, their first job), and in terms of finding high-quality jobs. The second type helps workers like Elsa adapt to the changing needs of the job market in terms of the type of skills demanded (spurred by, for example, technological change), so they can continuously improve and update their skills and remain competitive throughout their working life. For

¹ For individuals to enjoy the benefits associated with working in high productivity firms, the economy needs to have enough of those firms to provide employment to more individuals. The analysis of the determinants of the number and types of firms in an economy is beyond the scope of this chapter.

² When referring to skills development systems, this chapter refers not only to the training system, but also formal education system. For example, it discusses opportunities to learn in a workplace setting while in school (e.g., apprenticeship programs).

firms, this chapter reviews policies that help entrepreneurs develop their own skills so they can make their firms more productive. And the continuous growth of productive firms, in turn, affects the availability of higher quality jobs. Key policies that are usually part of the public policy toolbox for the labor market—labor intermediation interventions and policies to help unemployed or displaced workers re-insert themselves into the labor market—are not discussed in this chapter unless they include a skills formation element. Nor are policies to incentivize the return of individuals to the formal education system or to improve the investment climate, despite their importance for improving productivity and expanding the market for remunerative jobs in a more dynamic formal sector.³

This chapter concentrates on the effectiveness (and cost-effectiveness) of policies to develop skills beyond the formal education system, through on-the-job training, work-based learning, and informal learning schemes.

Elsa and Rodrigo in Real Life

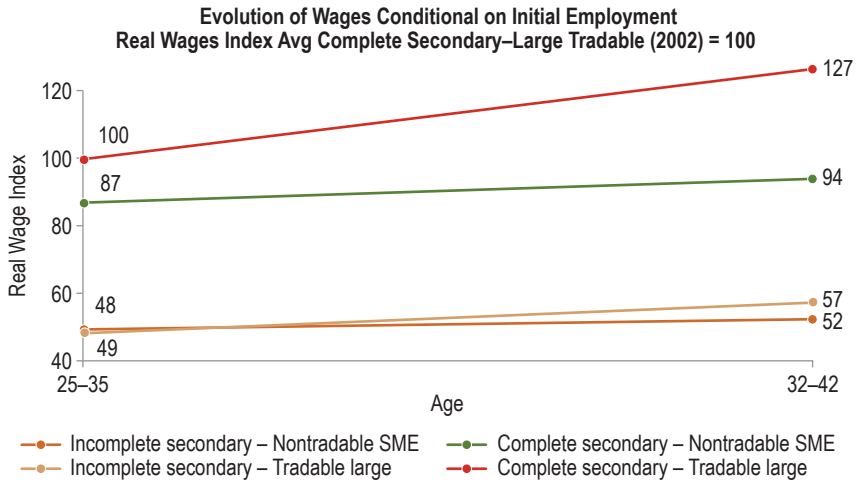
For workers to invest in their own skills accumulation, or for employers to invest in the skills formation of their employees, there must be potential gains that justify those investments. Due to a confluence of factors, including the education level of the workforce and the prevalence of small, low-productivity firms in Latin America and the Caribbean, the dynamics of the labor markets are not conducive to generating these potential gains. This has implications for the lifetime earnings of workers (even more so for those who are less educated), and eventually for the productivity of firms.

If higher skills imply higher productivity, which in turn are usually reflected in higher wages, workers like Elsa and Rodrigo should expect their wages to increase in tandem with their skills.

What is the evidence for Latin America and the Caribbean on the wage profiles of workers like Elsa and Rodrigo? Using data on formal jobs in Brazil, while salaries increase thanks to accumulating experience (either

³ Lora and Pagés (2010) argue that one of the main problems with productivity in Latin America and the Caribbean is that too many resources are allocated to too many small, low-productivity companies and the smallest companies tend to be the least productive.

Figure 10.2 Chile: Elsa and Rodrigo in Real Life



Source: Authors’ calculations based on the panel built by Carpio et al. (2011) using Chile’s Social Protection Survey for 2002 and 2009.

Notes: Only employed individuals in both 2002 and 2009 are depicted. Real hourly wages expressed as an index where the base (equal to 100) is the average wage in 2002 of individuals with at least complete secondary education working in large firms (with more than 50 employees) in the tradable sector. The categories are based on education level and sector of employment in 2002. Tradable sector includes Agriculture, Hunting, Forestry and Fishing; Manufacturing; Financial Services; Transport and Communication Services. Nontradable sector includes Electricity Gas and Water Supply; Construction; Retail, Hotels and Restaurants; Community, Social and Personal Services.

general, sector- or firm-specific experience), these returns to experience are quite different for less and more educated workers (see Chapter 4).

What about the returns to experience in different types of firms? When the *same* individuals are followed for a seven-year period in Chile, the conclusion is that the *type* of firm where the workers are first observed matters both for wage levels and for wage growth (see Figure 10.2).⁴ As found in Chapter 4, the initial gap in wages between more and less educated workers does not close over the period. In fact, this gap actually widens. However, clearly both types of workers benefit from working in more productive firms. More educated workers

⁴ Figure 10.2 presents an index of the average wages (either in formal or informal jobs) of more educated (secondary school or more) and less educated (less than secondary school) workers who were 25–35 years old in January 2002. These individuals are classified as working in potentially more productive (large and in the tradable sector) and potentially less productive (small, and medium in the nontradable sector) firms, based on their sector of employment in 2002 (other groups are not depicted).

in more productive firms enjoy an annual growth rate in average real wages that is three times higher than in less productive firms (6 percent and 2 percent, respectively). Less educated workers also experience a three times higher growth rate in real wages in more productive firms compared to that in less productive firms (4.2 percent and 1.4 percent, respectively). The figure illustrates how a relatively short period in the work life of an individual, in particular at the beginning of his or her career, can be very consequential in amplifying differences in initial conditions.⁵ It also illustrates the importance of the type of firm where individuals work.

Labor Markets in the Region: Working against Skills Formation

For workers and employers to invest in human capital development, the investment must be perceived as worthwhile; workers expect better wages and/or job conditions while employers expect to recoup their investments. Employers will invest in the *general* skills formation of their employees (i.e. skills that are useful outside the firm) only if workers are not immediately paid the full market value of their productivity – otherwise employers could not recoup their costs. In an economy, labor markets may be classified as one of two types: either they are high turnover, in which employers have little incentive to provide training, or they are low turnover, in which employers have a strong incentive to provide training (Acemoglu and Pischke, 1998). In a high turnover economy, employers understand that investing in skills that can be used in other firms may be wasted since workers do not stay long enough in the firm for employers to reap the benefits of the training. Labor markets in Latin America and the Caribbean appear to be stuck in this type of equilibrium (see Alaimo et al., 2015). A high proportion of workers, particularly those who begin with little educational background, spend much of their

⁵ Wage growth patterns must be interpreted carefully as they can reflect not only differential skill accumulation by the various groups over time (of which some suggestive evidence is presented below) but also differential changes in the returns to skills for the different groups. In addition, the issue of sorting into types of firms, which is based not only on observable skills (i.e. education) but also on unobservable skills (e.g. motivation, organization), is not controlled for in this analysis. Thus, no causality is suggested here; one explanation for these patterns is simply that the potentially more productive individuals (say, more motivated) tend to both acquire more education, find employment in more productive firms, and work harder, which ultimately pays off in higher wages over time.

working lives in low-quality jobs. The reasons for this are complex, ranging from information failures, labor market regulations, and high labor costs, to lack of access to credit markets.

Taking the example of Rodrigo and Elsa, real data for ten Latin American and Caribbean countries corroborates that more educated individuals not only have an initial advantage over less educated individuals, but that the gap grows over the course of their working lives (see Calero et al., 2017).⁶ Less educated individuals are more likely to work in informal employment or, to be self-employed at each age, and are relatively unlikely to transition into formal employment.⁷ A higher proportion of these workers exhibit low tenure in the job (but relative sector stickiness), and their earnings patterns are consistent with lower skills development over time.

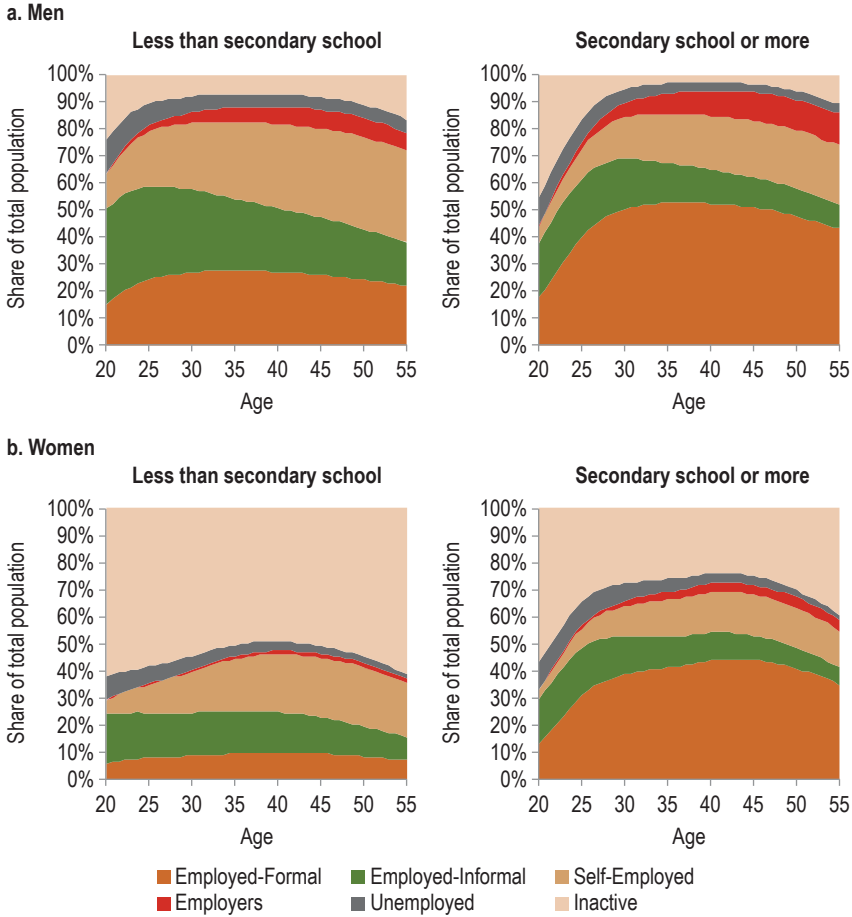
For individuals with higher educational attainment, formal employment is within reach. After age 27 (i.e., most likely once formal education is over), the proportion of men in formal employment is never below 40 percent and remains above 50 percent between the ages of 30 and 40, while for women it's never below 80 percent and remains above 40 percent between the ages of 33 and 50.⁸ On the other hand, for less educated individuals, this proportion is under 20 percent for men and under 10 percent for women. Moreover, a high proportion of the less educated group remains

⁶ Calero et al. (2017) build a *synthetic panel* that follows the same type of individuals over time, using surveys for ten Latin American and Caribbean countries from 1992 to 2014 (not all countries available for all years). As with any synthetic panel analysis, it is important to thread carefully when analyzing its results, as it cannot differentiate well the effects of aging from cohort/year effects. For example, if 25- to 30-year-old workers in 2016 experience a different labor market compared to that experienced by 25- to 30-year-old workers in 1991 (i.e., the current 50- to 55-year-old cohort) or compared to the one they will experience in the future, then the analysis may not be appropriate. Calero et al. (2017), in a limited robustness check, compare several birth cohorts at the same age, for some countries, and do not find meaningful differences in their labor market experiences. See Calero et al. (2017) for country-level results.

⁷ The term formal employment refers to employed individuals contributing to the social security or pension system, while non-contributing employed individuals are in informal employment.

⁸ For presentation purposes broad education categories are defined: less than secondary school and everybody else. This latter group is very heterogeneous, including those who have finished secondary school, as well as those who have acquired skills at the technical level, college, or beyond. Calero et al. (2017) show how the group with just secondary school education tends to fall in the middle between those with less and more than secondary school.

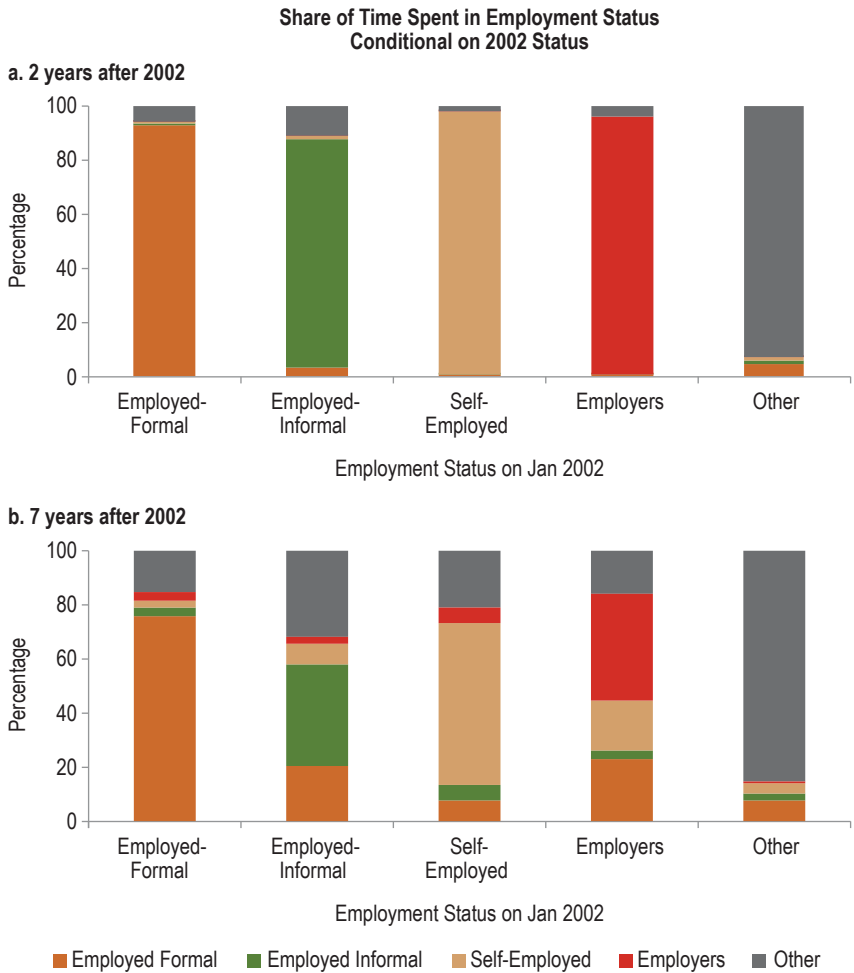
Figure 10.3 Active-Age Population Employment Status over the Life Cycle



Source: Authors' calculations based on Calero et al. (2017).
 Notes: The figure shows the shares of the active age population that are employed (formally and informally), self-employed, employers, unemployed, and inactive (outside of the labor force). Agricultural workers are excluded from the analysis.

outside formal employment over their working life (Figure 10.3). Earlier in life, informal employment is important, and over the years informality even grows as most men and women with low educational attainment resort to self-employment, which is largely a form of informality. These patterns are concerning because informal employment tends to preclude the kind of high-quality employer-employee matches conducive to investments in employer-sponsored skills formation. This concern is supported by the low tenure characteristic of informal employment. Regardless of education level, a high proportion of workers in informal employment (60 percent to

Figure 10.4 Chile: Labor Participation and Employment Status Transitions



Source: Authors' calculations based on the panel built by Carpio et al. (2011) using Chile's Social Protection Survey for 2002, 2004 and 2009.

Notes: The figure shows the share of time spent in each employment status two (top) and seven (bottom) years after January 2002, conditional on the employment status on January 2002. Group age: 20–55 years old on Jan 2002. Category “Other” includes inactive, unemployed and unpaid workers.

40 percent decreasing with age) have been in their current job for less than one year (see Calero et al., 2017).

Temporary employment in the informal sector would not be problematic if workers transitioned quickly to formal employment, but this does not seem to be the case. Returning to the data for Chile, the employment status of individuals when they first enter the job market is highly predictive of

their status two and seven years later (Figure 10.4). Individuals who started out being employed formally in 2002 remained in the formal sector 80 percent of the time over the next seven years. On the other hand, people who started out in the informal sector spent only 20 percent of the next seven years in formal employment. Similar sticky patterns emerge for other types of employment and for the shorter two-year period, as well as for other countries with higher informality rates than Chile.⁹

Returns to Skills Formation: Education Matters

Earnings and wages profiles reflect returns to skills formation, both general and sector- and firm-specific. The evidence suggests that earnings grow faster for those who start with higher levels of education (see Figure 10.5).¹⁰ While this is true for both men and women with higher educational attainment, earnings growth rates are much higher for male employees.

Where you work matters. Individuals who are either self-employed or employed in the informal sector exhibit similar average earnings and earnings growth. This is consistent with the patterns in Figure 10.3 showing people moving from informal employment to self-employment over the life cycle. Those employed in formal jobs, meanwhile, enjoy not only higher average earnings, but also higher growth of earnings in their careers compared to those in informal jobs or in self-employment.¹¹

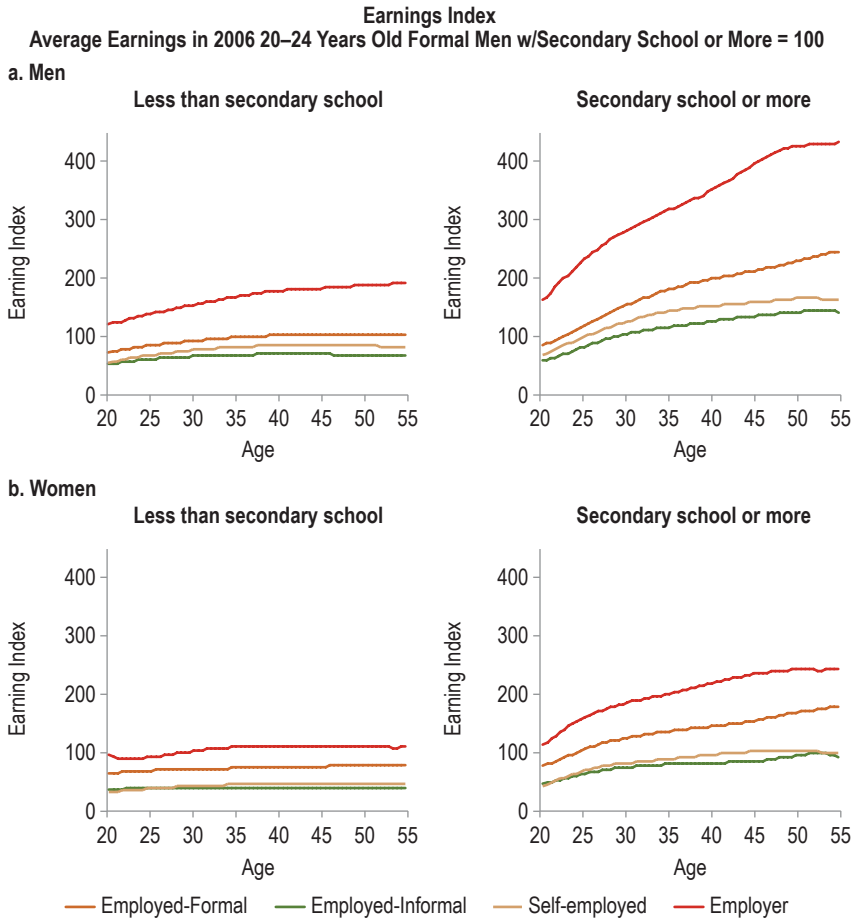
The relatively flat earnings profiles of less educated workers are consistent with slower accumulation of skills during adulthood. They are also in tune with prior results in the literature on the returns to tenure to lower educated workers (e.g., Connolly and Gottschalk, 2006; Gabriel and Schmitz, 2004), on the returns to experience and job match

⁹ One-year transitions based on panels constructed from household surveys for seven Latin American and Caribbean countries. Although for most countries it is not possible to follow individuals for as long as the seven-year results for Chile, an analysis of four-year occupation transitions for Peru and Chile shows very similar qualitative results to those presented in Figure 10.4, even though Peru has much higher informality rates than Chile.

¹⁰ A synthetic panel analysis makes strong assumptions about the comparability of the experiences of different birth cohorts. Calero et al. (2017) report birth-cohort heterogeneity around the averages shown in Figure 10.5.

¹¹ For those employed, Calero et al. (2017) also analyze the patterns of hourly wages, as measures of returns to skills. The overall patterns observed in Figure 10.5 are also replicated for hourly wages.

Figure 10.5 Life Cycle Earnings Profiles

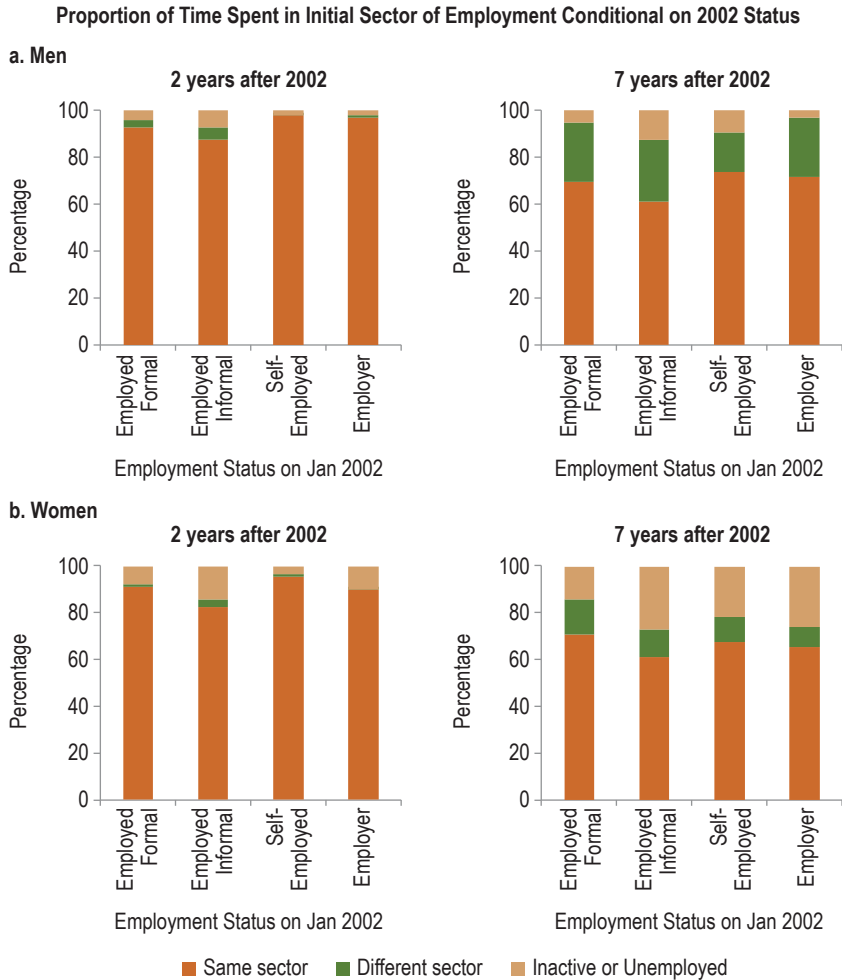


Source: Authors' calculations based on Calero et al. (2017).
 Notes: The figure shows the life cycle profiles of a real earnings index (net of expenses for self-employed and employers), where the index is set equal to 100 for the real average earnings in 2006 of 20 to 24-year-old men with secondary or more education, employed formally. The top and bottom panels show the profiles for men and women, respectively, while the left and right side panels show the profiles for those with less than secondary school education and those with secondary school or more education, respectively. Agricultural workers are excluded from the analysis.

quality in developed countries (Altonji and Williams, 2005; Devereux, Hart, and Roberts, 2013), and with the shorter average tenure in Latin America and the Caribbean compared to OECD countries (Gualavisi and Oliveri, 2016).

Do the differential growth rates in earnings by more and less educated individuals shown in Figure 10.5 reflect different returns to schooling over the life cycle? Or do they reflect the varying pace at which people

Figure 10.6 Chile: Sector Stability of Employment



Source: Authors' calculations based on the panel built by Carpio et al. (2011) using Chile's Social Protection Survey for 2002, 2004, and 2009.

Notes: The figure shows the proportion of time that individuals worked in the same sector as their sector of employment in January 2002, defining sectors at one-digit SIC codes. Adults (20–55 years old), occupied on January 2002.

with different levels of education accumulate skills? People can accumulate different types of skills: general, sector- or firm-specific. Using sector-specific experience as a measure of skills accumulation,¹² what do the data say about sector-specific experience accumulation? While the

¹² Assuming that the longer an individual spends in a particular sector, the greater the skills level in that sector.

synthetic panel data for other Latin American and Caribbean countries cannot be used, the Chile panel provides an approximation.¹³ Analyzing the amount of time men and women spend working in the same sector, conditional on initial employment status, reveals low short-term mobility across broadly defined sectors. Even in the longer run, men and women spend more than 60 percent of the elapsed time in the same sector (see Figure 10.6). Presumably, a large proportion of workers are accumulating sector-specific experience. The same analysis split by education (not presented) is almost identical, suggesting that the differential profiles for more and less educated workers presented in Figure 10.5 probably cannot be explained by differential accumulation of sector-specific skills.¹⁴

Workplace-Based Training: Room for the Region to Grow

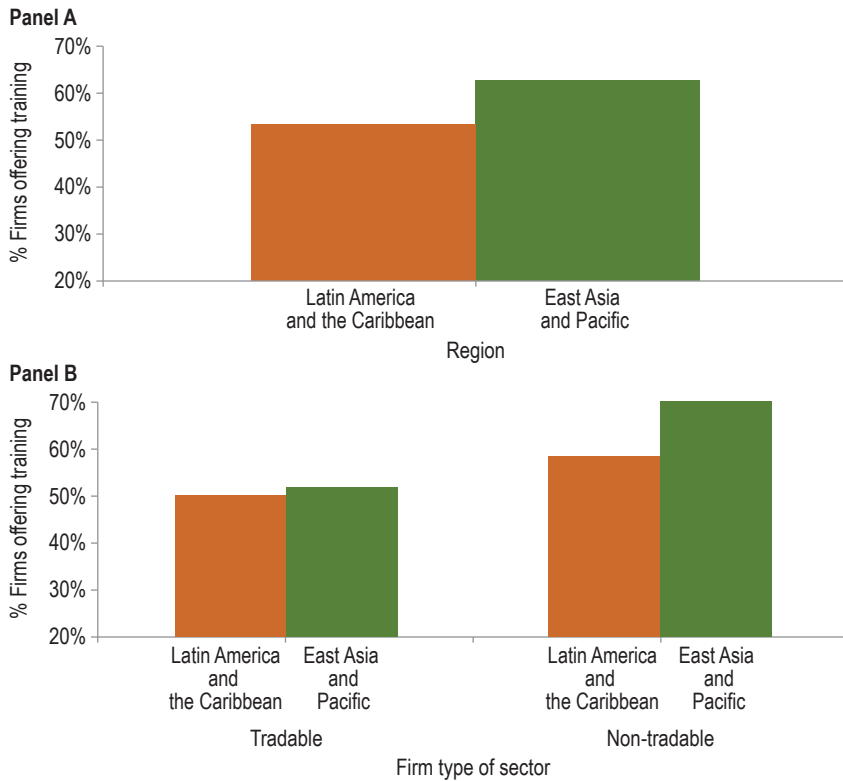
Skills acquisition during adulthood occurs mainly at the workplace. On-the-job training (OJT) has been shown (based on developed countries data) to positively impact workers' wages, firms' productivity, and innovation (Almeida, Behrman, and Robalino, 2012). However, firms in Latin America and the Caribbean do not provide as much training as firms in other benchmark regions. Figure 10.7, using data from the World Bank Enterprise Survey (WBES),¹⁵ presents the proportion of firms that report training their employees.¹⁶ In Latin America and the Caribbean, the proportion that provides training to their employees is more than 10 percentage points less than in the East Asia and Pacific (EAP) benchmark region.

¹³ The earnings patterns observed on average for Latin America and the Caribbean in Figure 10.5 are also present in Chile, making the Chile-based analyses relevant to understanding those patterns. In addition, relying on a shorter panel, the results are qualitatively similar for Peru.

¹⁴ An explanation for the differential patterns by education in Figure 10.5 is that skills other than experience are accumulated at different rates by education groups. The panel data for Chile supports this theory. It shows that participation in at least one training activity is more than double for more educated individuals compared to less educated individuals, both two and seven years after the initial period.

¹⁵ The WBES, a worldwide survey of firms, is subject to the caveats that its geographic coverage does not include most advanced economies (e.g. France, Italy, Germany, UK, USA, etc.) and that it includes only *formal* firms. However, the WBES still offers one of the few benchmarks by which to compare Latin American and Caribbean firms.

¹⁶ This measure captures only the proportion of firms that train (the *extensive margin*). The survey does not include information on the length or quality of the training provided, while the number of employees trained per firm (the *intensive margin*) is only available for the manufacturing sector.

Figure 10.7 Firms that Offer Training, by Region, and Sector Type (percent)

Source: Authors' calculations based on WBES.

Notes: The figure shows the proportion of firms that answer yes to the question whether they provide training to their employees. The top panel shows the proportion for Latin America and the Caribbean and East Asia and the Pacific, while the panel below shows, for the same regions, the proportions by the type of sector (tradable and non-tradable), following the classification used by Mano and Castillo (2015). A large share of firms in the tradable sector are manufacturing firms.

Why do firms in Latin America and the Caribbean offer less training than their counterparts in East Asia and the Pacific? The explanation may lie in the characteristics of the formal firms in each region; but which characteristics? The differences remain when the sample is sorted by economic sector, age, size, percentage of sales exported, and experience level of the manager. However, when the type of sector is considered (Figure 10.7, Panel B), the differences between the two regions largely disappear for firms in the tradable sector. In other words, firms in Latin America and the Caribbean may provide less training because differences in the productive structure (in this case, the share of firms in the tradable versus non-tradable sectors).

Blame It on Management

The productivity of firms in Latin America and the Caribbean varies widely (Busso, Madrigal, and Pagés, 2010). In Colombia and Venezuela, firms in the 90th percentile of the productivity distribution are 500 percent more productive than firms in the 10th percentile. In the other countries of the region, the difference is around 300 percent, while in the United States it is 200 percent and in China less than 250 percent. This dispersion has important consequences for workers if more productive firms pay higher wages, and offer better growth opportunities to their employees. The dispersion can be related to the different production processes and technologies used by firms, and to differences in human capital and management skills.¹⁷

Managerial skills are important in explaining the differences in productivity among firms and countries (Bloom and Van Reenen, 2007; Bloom et al., 2010; Bloom and Van Reenen, 2010; Bloom et al., 2014; Bloom, Sadun, and Van Reenen, 2016). Using the World Management Survey (WMS), Bloom and Van Reenen (2007) measure management practices in large firms in the manufacturing sector around the world and show that between 20 percent and 50 percent of the Total Factor Productivity gap between different countries and the United States (benchmark) relate to management practices. Furthermore, firms in more developed countries exhibit higher average management practices scores than in less developed countries. Comparing the distribution of management practices, Latin America and the Caribbean has on average lower management scores and more poorly run firms than more developed regions (Lederman et al., 2014). That is, relatively few firm managers in the region follow the best management practices and most would benefit from training in this area.

Skills Development Policies: A Two-Pronged Approach

The message is clear: skills development policies in Latin America and the Caribbean need to work on two fronts. First, help less educated workers

¹⁷ It may also be related to the degree of competition and young-firm destruction rates in the region. Eslava and Haltiwanger (2012) show in Colombia that young firms are not destroyed at the same rates as in developed countries. This is consistent with a lower tail of the distribution that shows less productive firms in Latin America and the Caribbean.

close the skills gap with their more educated peers and, second, boost the productivity of all workers and firms alike. These policies should aim to foster lifelong learning for all workers through the promotion, acquisition, upgrading, and certification of skills. They should also build the skills of entrepreneurs to ensure they understand the importance of training their employees and to enhance the productivity of their firms.

To improve human capital, countries need an efficient and relevant skills development system for children and adults, in which both the private and public sectors play important roles. This is particularly relevant in Latin America and the Caribbean where many workers are already in the workforce and need immediate attention. Such a system can help ensure that people enter the labor market with the skills employers need and are matched with productive jobs that maximize their potential. It should also provide workers with opportunities to enhance their human capital while at work.

Ideally, skills development systems should have the following characteristics:¹⁸ (i) Labor market intelligence is collected systematically and acted upon;¹⁹ (ii) There is an ‘unbroken thread’ between the skills needs of employers and the curriculum content of the education and training designed to meet those needs; (iii) The quality of all training can be relied upon and consistently meets the highest standards; and (iv) Public funding is prioritized to ensure the maximum benefit as part of a wider investment by both employers and individuals. Within these skills development systems, several tools can be used to provide skills to youth and adults during their life cycle, depending on the specific problem they face. Underinvestment in training by employers and individuals is

¹⁸ Countries like Australia, Germany, Korea, New Zealand, Switzerland, and the United Kingdom share some of these characteristics, but not all these countries have all of them at the same time.

¹⁹ Providing relevant skills to the labor market requires significant involvement of the productive sector in designing training systems (e.g., information in terms of market needs that help determine competency standards and the training curricula in Alaimo et al., 2015). In Australia, New Zealand and the United Kingdom, sector skills councils (generally funded by the public sector and led by the private sector) are responsible for identifying the skills required by the industry, setting competency standards, and developing proposals to integrate these standards into the training curricula. They also aim to anticipate the demand for skills at the sector level, design learning paths for each occupational profile based on information provided by the economic sector, and identify training packages to achieve these paths (Alaimo et al., 2015; González-Velosa and Rucci, 2016).

often due to a series of market failures that ultimately justify government intervention.²⁰

The rest of this chapter analyzes two types of skills development policies: (i) *skills development policies for workers*, either by helping them break into the labor market by closing the gap in initial educational disadvantages of people like Rodrigo), or by recognizing—through certification—and the updating of skills (to help workers like Elsa continuously improve and update so they can remain competitive during their work lives; and (ii) *skills development policies for entrepreneurs*: to help them develop their own skills so they can make their firms more productive.

What Works for Workers?

The education and training system can help individuals increase their productivity by providing or updating certain skills (see Figure 10.8). What this training looks like depends on each person's initial skills, experience, and labor market status (unemployed, under-employed, employed).

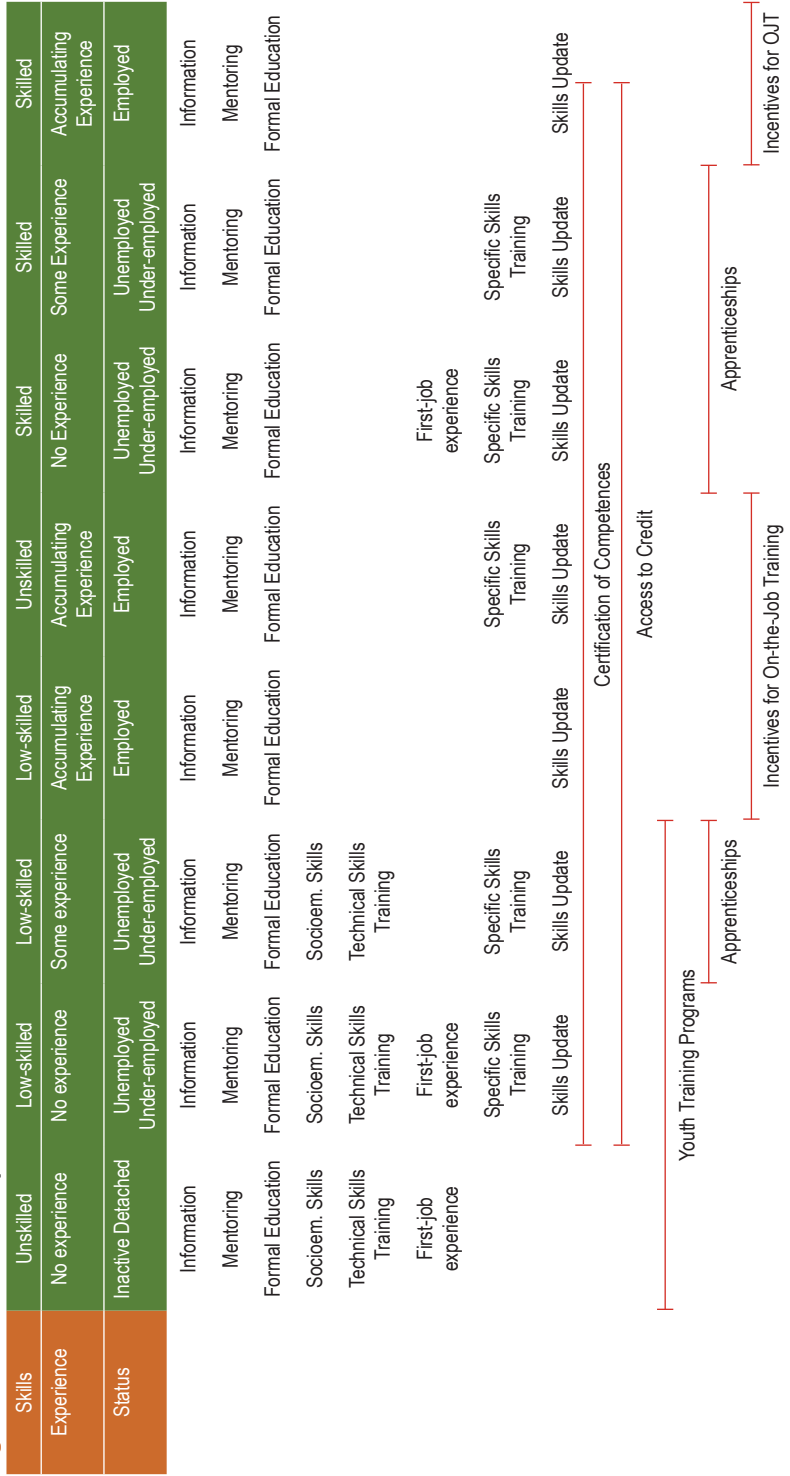
Skilled and employed individuals usually only need to update their skills. Unskilled individuals with no experience who are outside the labor market may need a bundle of services (e.g., intensive socioemotional skills training, serious mentoring, and other tools to help them reach a basic employability level). If the individual is low-skilled, with no experience and unemployed, then various forms of support may be needed to develop soft and technical skills, access information and land a first job.²¹ Those who already have experience in the labor market, but become unemployed, also need support, but their skill and experience level determine which of different bundles of skills development services they may need.²² Workers that already have or are accumulating experience in the labor market can benefit from a certification process for the competences acquired through work experience. Finally, returning to formal education

²⁰ Failures that may discourage investment in skills include: information uncertainty and information asymmetries, credit constraints, and coordination failures.

²¹ Other obstacles beyond skills, such as health issues or lack of appropriate care for household members, may limit access to jobs. However, services to support these barriers are not analyzed in this chapter.

²² ALMP play a key role in finding better jobs for the unemployed in developed countries, but are much less prevalent in Latin America and the Caribbean for skills formation, except for the types of programs discussed below.

Figure 10.8 Services to Help Individuals Reach their Maximum Potential



Source: Authors' elaboration.

Note: In the case of mentoring services and socioemotional skills, the intensity of the services varies from intensive for more vulnerable groups, to low-intensity for the more job-ready. Skilled in this diagram is a person with complete secondary school or more.

could represent a good strategy for everybody, but especially for the young and unskilled.

All individuals identified in Figure 10.8—the inactive, the unemployed, and the employed—could benefit from government-supported interventions. Just as a doctor does not prescribe the same medicine for every disease, not every individual needs the same skills development service. Different levels of vulnerability may require different levels of support. Going back to Rodrigo and Elsa, countries in the region need policies to help individuals like Rodrigo get a good job and individuals like Elsa improve and update their skills to achieve their maximum potential. Clearly, the doctor should not prescribe the same pill for people with different diagnoses; but which is the best medicine for each patient? In other words, which program or service is appropriate for whom?

This chapter analyzes programs that contain one or more of the services shown in Figure 10.8, leaving aside formal education (“back-to-school”), information, and mentoring programs. They are important pieces of the puzzle, but fall outside the scope of this chapter.

Active Labor Market Policies (ALMP)

Unlike other countries around the world, particularly in Europe, the region has little experience supporting unemployed adults looking for good jobs (Martin, 2015). While the region has had a positive experience with a limited set of ALMP, especially for the youngest workers, policies to help adult workers transition from one job to another are largely absent and should probably be implemented.

ALMP are used to “actively” increase the employment probability of job seekers (see Auer, Efendioglu, and Leschke, 2008). Globally, “human capital” style training has small short-term impacts as well as larger impacts over a longer term of up to two to three years after completion of the program (Urzúa and Puentes, 2010; Card, Kluve, and Weber, 2010, 2015).

Worldwide, these policies tend to have a greater impact on employment for women and the long-term unemployed. Similarly, in Latin America and the Caribbean, women tend to benefit more than men. While worldwide ALMP are more likely to show positive effects in a recession, in Latin America and the Caribbean the opposite is true; programs tend to work better in times of low unemployment and high growth.

A more detailed analysis of ALMP in Latin America and the Caribbean shows that they improved the chances of getting a job in the formal economy by some 70 percent.²³ Results are more mixed for indicators such as employment probability, increased earnings, and hours worked (Escudero et al., 2016). Among ALMP, those that have as a main purpose the training of individuals are more effective than those that try to help people find a job or those that provide incentives for private sector employment. Programs directed at youth (less than 25 years of age) are also more effective than those directed at older individuals.

Youth Training Programs: Help Getting Started

Since 1991, so-called *Jóvenes* programs (youth training programs) have been widely used in Latin America and the Caribbean to improve youth employability.²⁴ The model targets disadvantaged youth,²⁵ providing them with a combination of vocational training and an internship at a firm in the private sector. Some programs include socioemotional skills training.²⁶ The most generalized version of these programs lasts only three to six months. Both employers and beneficiaries receive financial incentives for participation such as wage subsidies and daily stipends, respectively. Training is competitively offered through a public bidding system that ensures quality and fosters the participation of private

²³ A recent review of ALMP in developing countries (McKenzie, 2017) also finds larger impacts on formal employment. The sample comprises several developing countries, including seven studies conducted in four countries in Latin America and the Caribbean.

²⁴ The model, started in Chile, has been replicated in several countries across the region including Argentina, Colombia, the Dominican Republic, Panama, Paraguay, Peru, and Venezuela.

²⁵ Poor youth with low levels of education and experience—high school at most—who are unemployed or underemployed.

²⁶ Using data from employer surveys, Cunningham, Acosta, and Muller (2016) investigate the role of cognitive and socioemotional skills in shaping adults' labor market outcomes in Bolivia, Colombia, El Salvador, and Peru. They confirm that cognitive skills matter for earning better wages and improving the probability of having a formal job; but so do socioemotional skills. Moreover, socioemotional skills seem to particularly influence labor force participation and tertiary education attendance. They provide examples of programs that successfully incorporate socioemotional skills in their curriculum for youth and adults (e.g., *Job Corps*, *Youthbuild* and *Year-Up* [United States], *Jóvenes en Acción* [Colombia], *Juventud y Empleo* [Dominican Republic], *Galpao Aplauso* [Brazil], and *Sustainable Transformation of Youth* [Liberia]).

training centers. Training institutions coordinate the internships and the curricula offered for each course with the private sector (Puerto, 2007; González-Velosa, Ripani, and Rosas-Shady, 2012).

Jóvenes programs in Latin America and the Caribbean have had a positive impact on labor insertion and conditions. The impact, however, is often restricted to certain subgroups of the population, or to specific regions of the country. In Panama and Colombia, these programs have favorably impacted the employment opportunity, working hours, and labor income of women. In the Dominican Republic and Colombia, men have found more employment in the formal sector. In some countries, such as Panama, results have varied from region to region (González-Velosa, Ripani, and Rosas-Shady, 2012; Ibarrarán and Rosas-Shady, 2009; Urzúa and Puentes, 2010; Attanasio, Kugler, and Meghir, 2011; Ibarrarán et al., 2014).²⁷

Randomized controlled trials (RCT) have been performed and analyzed in four programs in the region: *Entra21* in Argentina, three years after training; *Jóvenes en Acción* in Colombia, ten years after; *Juventud y Empleo* in the Dominican Republic, six years after; and *Projovent* in Peru, three years after. In general, these programs continue to have a positive impact on the quality of employment in the medium and long term (Alzúa, Cruces, and López, 2015; Attanasio et al., 2015; Kugler et al., 2015; Ibarrarán et al., 2015; Díaz and Rosas-Shady, 2016).

The direct costs of these programs are usually low because they do not last long and are aimed at helping individuals find a job. Cost-benefit analyses for Colombia and the Dominican Republic confirm their positive total benefits net of costs (Attanasio et al., 2015; Kugler et al., 2015; Card et al., 2011).²⁸

The private sector, without intervention from the State, has had success improving the skills of young people in the region. Box 10.1 describes the experience of Coca-Cola promoting skills for vulnerable youth.

²⁷ When comparing several similar programs, it is important to ask whether the participants are comparable across programs. Mitnik, Ripani, and Rosas-Shady (2016) show that only some subgroups of participants are comparable across the three youth programs they analyze.

²⁸ Approximate costs per beneficiary are: i) *Jóvenes en Acción* in Colombia: US\$750; ii) *Juventud y Empleo* in the Dominican Republic: US\$660; and iii) *Proempleo* in Peru: US\$420 (González-Velosa, Ripani, and Rosas-Shady, 2012). These calculations do not factor in the foregone earnings required to join a training course. The exception in terms of costs is the *Entra21* program whose cost is higher at US\$1,722 (Alzúa, Cruces, and López, 2015).

BOX 10.1. INSTITUTO COCA-COLA BRAZIL/COLETIVO JOVEM: QUENCHING A THIRST FOR SOFT SKILLS

Coletivo Jovem—a revamped program designed and implemented by Instituto Coca-Cola Brazil since 2015—aims to strengthen the communication, teamwork, and other “soft” skills of 16- to 25-year-olds who live in low-income urban areas of Brazil, connect them to opportunities to improve their earnings, and enhance their self-esteem. In 2016, the program trained more than 36,000 young people through 105 training centers. According to Instituto Coca-Cola, approximately one out of three graduates looking for a job six months after the program find one. Likewise, young participants also express increased confidence in their future.

How does the program work? Participants complete 32 hours of training in a two-month course that meets twice a week. They work in groups to develop a project to help Coca-Cola points of sale, other small businesses, or local nonprofits in the areas of marketing and sales, communication and technology, or events. Participants also discuss their career goals with educators and receive help finding a job in Instituto Coca-Cola’s network of more than 300 employers, or guidance to continue their studies or become entrepreneurs.

One of the program’s keys to success is that planning and implementation is done jointly with local nongovernmental or community-based organizations, which not only provide a space to deliver the training but also legitimize the program within the community. The educators are community members who are trained by Instituto Coca-Cola Brazil and often evolve to perform other roles within the program implementation team. In the latest surveys, 85 percent of respondents gave educators the highest grade (Interview with Monica Nunes, Institutional Development Manager of Instituto Coca-Cola Brazil, and Ana Tacite, Social Programs Manager of Instituto Coca-Cola Brazil, December 2016).

How is it funded? About 80 percent of the funding comes from the Coca-Cola system, while the rest comes from external partners. For instance, Google has created training content and provided funding to support the communications and technology pathway in *Coletivo Jovem*.

Going forward, *Coletivo Jovem* faces the challenge of continuing to be relevant to young people across Brazil and sharing the methodology and the lessons learned with other institutions interested in the program to scale up more quickly.

One of the issues that *Jóvenes* programs in the region face is their limited scope, especially given the severity of the youth situation. Moreover, the impact of these programs, when brought to scale, and the possible existence of displacement effects are still unknown. For this reason, broader-reaching programs should also be explored.

Apprenticeships: A Foot in the Door

Given the benefits shown for countries outside of the region, Latin American and Caribbean countries would be wise to consider using apprenticeships to help a large number of youth ease their transition from school to work.

Apprenticeships operate in several countries and combine training with employment (OECD, 2003).²⁹ Latin American and Caribbean countries have not yet used apprenticeships as a central tool to enhance the labor market opportunities of youth.³⁰ Several key differences stand out when comparing traditional youth training programs in the region to apprenticeships: (i) apprenticeships tend to not target youth with the lowest skill base; (ii) they are co-financed with the private sector; (iii) they are more costly due to the longer duration and higher intensity of the training; and (iv) at a minimum, they last one year (Fazio, Fernández-Coto, and Ripani, 2016).

Apprenticeship programs can help young people enter the labor market. In Europe and the United States, these programs have been part of broader efforts to improve the school-to-work transition. Youth in countries with dual education systems like Germany and Austria enjoy lower unemployment rates and shorter jobless spells. Apprenticeship programs seem to encourage innovation and can also help young people outside the school system. Compared to other programs with less training in the workplace, these programs provide more stable jobs with higher wages; they shorten the number of months outside the job market before the first job; and have a positive impact on socioemotional skills. Finally, program graduates can switch jobs among a wide range of occupations. Cost-benefit analyses of apprenticeship programs show that, in general, a large percentage of training firms can recoup their investments by the end of the training period, and that net benefits vary

²⁹ An apprenticeship includes structured on-the-job training and technical off-the-job training that should be certified and recognized by the industry (Fazio, Fernández-Coto, and Ripani, 2016).

³⁰ Countries like Argentina (province of Córdoba), Brazil, Colombia, Costa Rica, Chile, Peru, and Mexico have programs or laws that regulate apprenticeship-type experiences. However, these experiences do not share the main characteristics present in more established apprenticeship systems (Fazio, Fernández-Coto, and Ripani, 2016). Impact evaluations of apprenticeship-type programs in Argentina and Brazil show positive impacts (Corseuil et al., 2012; Berniell and de la Mata, 2016).

across occupations and sectors (Clark and Fahr, 2001; Reed et al., 2012; Lerman, 2017; Quintini and Manfredi, 2009; Quintini, Martin, and Martin, 2007; Eichhorst, 2015; Riphahn and Zibrowius, 2015; Backes-Gellner et al., 2016; Rupiotta and Backes-Gellner, 2015; Reed et al., 2012; Ryan, 2001; Ryan, 1998; Bonnal, Mendes, and Sofer, 2002; Rose, 2004; Halpern, 2009; Fazio, Fernández-Coto, and Ripani, 2016; Lerman, 2014; Muehle-
mann and Wolter, 2014).³¹

On-the-Job Training (OJT): Staying Competitive

Today's world of rapidly evolving technology and knowledge needs workers with the right set of skills not only to enter the labor market but also to stay competitive. Governments have turned to a variety of policies and programs to stimulate training and lifelong learning among employed workers. These efforts are even more relevant in Latin America and the Caribbean, where the evidence suggests that increasing investments in education and training have not necessarily translated into a better workforce with the right type and amount of skills (see Chapter 3).

As already mentioned, firms in Latin America and the Caribbean do not provide training on the same scale as firms in other benchmark regions. To incentivize training in the workplace, governments could use different financial instruments oriented to workers or firms. Co-financing schemes to deal with market failures have gained in popularity. Improving their availability and efficiency could increase and improve learning possibilities and skills accumulation for those who are working.

In the case of instruments directed to workers, these incentives include subsidies (e.g., vouchers), tax deductions, and loan schemes; subsidies are the most commonly used instrument. These incentives aim to increase the demand for training by making it more affordable, while offering workers the freedom to choose what suits them best. Nevertheless, the success of these instruments depends on workers having information on the type of courses they need or that are demanded by the market as well as on the variety and quality of the courses offered by providers. In practice, individuals are unlikely to have enough information to make a good choice for themselves, and providers are unlikely

³¹ See Fazio, Fernández-Coto, and Ripani, (2016) for a summary of cost-benefit analyses.

to offer high quality, market-relevant courses (Kaplan et al., 2015; IDB, forthcoming; Alaimo et al., 2015; Bassanini et al., 2005). Evidence shows that more skilled and educated workers benefit most from this type of incentive.³²

Instruments directed to firms include tax exemptions, firm subsidies, and systems in which firms need to demonstrate they have earmarked a certain level of spending for training or pay a fine to the State (“train or pay”).³³ Two important caveats: (i) fiscal policy might finance investments that would have happened anyway, and, (ii) these systems do not necessarily promote the participation of the workers most in need of training (e.g. unskilled workers, women). If the objective is to deal with equity issues, incentives directed to workers or targeted subsidies are likely to be more effective (Bassanini et al., 2005).

In the case of training vouchers, the evidence shows that they increase training participation, improve the probability that participants invest in general training, and enhance performance in non-routine analytical tasks.³⁴ Findings of workers’ labor market outcomes are less conclusive. A training voucher program for low-skilled workers in The Netherlands had no impact on either the wages or job stability of participants. Similarly, a training voucher program in Germany had no impact on wages and employment. Worse yet, a training voucher program in Chile actually lowered employment and earnings, although it did have a positive effect for women and mainly those with low levels of education. On the other hand, government-subsidized training for older workers in Germany improved their job stability (Hidalgo, Oosterbeek, and Webbink, 2014; Görlitz and Tamm, 2016; Kaplan et al., 2015; Dauth and Toomet, 2016).

In the case of tax credit incentives offered to companies, the Chilean tax exemption program, *Franquicia Tributaria*, in most cases, does not improve wages and employment; only longer programs have slightly better results (Rodríguez and Urzúa, 2011).

³² Countries outside of the region usually target subsidies at specific groups of workers (e.g., in Germany, to older and unskilled workers) (Bassanini et al., 2005).

³³ Also, firms are usually charged a mandatory contribution on payroll to finance training provided by the public sector (IDB, forthcoming; Alaimo et al., 2015; Oosterbeek and Patrinos, 2009), discussed later in the chapter.

³⁴ Despite the popularity of these types of incentives, rigorous impact evaluations of their effectiveness are unusual and most of the research has been conducted in developed countries.

Employed workers in the region need to upgrade their skills to keep pace with the fast-changing world of work. Unfortunately, the tools available to policymakers to incentivize job training in the workplace are not producing the results needed to promote greater labor productivity. Therefore, the region must continue innovating and piloting new instruments to promote more and better training in firms.

National Training Institutes: Big Players in the Training Field

In most Latin American and Caribbean countries, a compulsory payroll contribution for firms is the principal source of financing for training.³⁵ These resources fund national training institutes (NTIs) that provide free or low-cost training. NTIs were created in the mid-20th century to train active workers in technical skills. In the 1980s, as a result of stabilization measures and structural reforms enacted throughout the region, this traditional training model came under scrutiny. In the following years, these institutes were reformed to improve their responsiveness to the needs of the labor market and to include other segments of the population such as unemployed youth (Ibarrarán and Rosas-Shady, 2009). Some countries (Chile, Paraguay, Uruguay, and El Salvador) issue tenders to public or private institutions to offer courses, instead of channeling the training through NTIs. Meanwhile, in most countries (Colombia, Ecuador, Honduras, Mexico, Panama, and the Dominican Republic), NTIs still operate as training providers (Alaimo et al., 2015; Huneus, de Mendoza, and Rucci, 2013; Ricart, Morán, and Kappaz, 2014).

The amount of resources channeled to NTIs varies among countries. In some countries, the investments are substantial. For example, in Colombia, Jamaica, and Panama, investment levels are above 0.3 percent of GDP. In Chile, El Salvador, and Honduras, the numbers range from 0.1 percent to 0.2 percent of GDP, while in other countries such as Ecuador, Paraguay, the Dominican Republic, and Uruguay, the allocated resources are below the regional average of 0.1 percent of GDP (Huneus, de Mendoza, and Rucci, 2013).

Even though these investments are sizable, their effectiveness could be improved. Nowadays, training is provided to only a small fraction of employed workers; less than 15 percent of employed workers have

³⁵ Exceptions include Mexico and Colombia, where funding comes from general resources, and Chile, where tax credits are used for this purpose.

access to training from NTIs—Colombia is the exception at 24 percent. Research from a survey of formal firms in five countries (The Bahamas, Colombia, Honduras, Panama, and Uruguay) indicates that no more than 24 percent of firms use public resources to finance their training initiatives, and that most of these resources go to large firms. Thus, there is ample room to improve the allocation of the investments made by these institutes.³⁶ In the future, NTIs could invest in forecasting skills to better understand where to invest their resources, as well as to increase and improve training for employed individuals. Additionally, NTIs need to invest in their management and administrative processes, including monitoring and evaluation systems, and the design of incentives for competition and for firms' involvement in allocating resources (Bassi, Rucci and Urzúa, 2014; González-Velosa, Rosas-Shady, and Flores-Lima, 2016; Flores-Lima, González-Velosa, and Rosas-Shady, 2014).

Training Entrepreneurs: Top-Down Skills Development

Labor force skills are important for firm performance and growth, but so are management skills. Good management skills go hand in hand with firms' productivity, workers' engagement, and innovation. They also have a bearing on the skills used at work, particularly information-processing skills.³⁷ In the end, well-managed firms perform better in terms of sales, profits, and survival rates (UKCES, 2014; Bloom and Van Reenen, 2007).

Typically, policy interventions teach two types of management skills: general business skills and successful entrepreneurial attitudes. General business practices cover accounting and financial planning, separating household from business finances, human resource management, marketing, inventory management, and the like. Entrepreneurial attitudes relate more to non-cognitive skills.

It takes attitude to be a successful entrepreneur. In fact, successful entrepreneurs tend to share a number of key attitudes: motivation, competitiveness, optimism, risk taking, personal initiative, self-efficacy,

³⁶ For more information about the effectiveness of NTI's training, see González-Velosa, Rosas-Shady, and Flores-Lima (2016), Alaimo et al. (2015), and Flores-Lima, González-Velosa, and Rosas-Shady (2014).

³⁷ Information-processing skills are correlated with the likelihood of being employed and earning higher wages (OECD, 2016c, 2016a).

and entrepreneurial spirit. Entrepreneurs in micro, small, and medium enterprises (MSME) in developing countries often do not grow and remain inefficient even after participating in business training programs focused on successful business practices. One of the reasons for these failures can be traced to entrepreneurs' lack of the non-cognitive skills needed to become "Schumpeterian," and innovative. Instead, they fall into self-employment by necessity, either because the formal sector cannot absorb them or because it does not offer them the flexibility they need (de Mel, McKenzie, and Woodruff, 2009, 2010; Gielnik and Frese, 2013; Frese and Gielnik, 2014; Lederman et al., 2014; Schoar, 2010).

Policy interventions to improve entrepreneurs' skills have produced mixed results, at best. Field experiments recently conducted in developing countries find improvements in business knowledge and practices, but the effect is small.³⁸ They also find some positive impacts on business creation, but not on business expansion and survival. Moreover, the knowledge and practices acquired do not necessarily lead to better business performance.³⁹ Very few evaluations found that these policies translated into higher profits or sales.

The results are even less encouraging when it comes to employment outcomes. Programs providing a combination of vocational training and access to finance lead to better labor market outcomes than business training. Meanwhile, entrepreneurship training alone does not seem to improve these types of outcomes, probably because their principal goal is to build business and entrepreneurial skills rather than create jobs (Cho and Honorati, 2014; Grimm and Paffhausen, 2015).

Table 10.1 shows the effect of training on a variety of business skills (record keeping, marketing effort, sales and profits) and how widely the results vary. The analysis only studies programs aimed at improving business skills and in which RCTs are employed. On average, these

³⁸ McKenzie and Woodruff (2014) review business training evaluations in Africa, Asia, Eastern Europe, and Latin America and the Caribbean. Cho and Honorati (2014) and Grimm and Paffhausen (2015) conducted meta-analyses for developing countries. For developed countries, Rosendahl Huber, Sloof, and van Praag (2014) and Fairlie, Karlan, and Zinman (2015) report findings for The Netherlands and the United States, respectively.

³⁹ McKenzie and Woodruff (2014) attribute the failure of finding positive impacts to small sample sizes and to the fact that the period between the intervention and the ex-post survey is usually too short.

Table 10.1. Summary of Studies on Business Skills Training

Business Skill	Number of Studies	Effect Size	
		Range	Overall
Record Keeping	11	[0.024, 0.483]	0.107
Sales	7	[-0.041, 0.283]	0.115
Marketing Effort	4	[-0.018, 0.129]	0.055
Profits	4	[0.024, 0.245]	0.133

Source: Author's compilation.

Note: The effect sizes are reported in the following RCT studies: Berge, Bjorvatn, and Tungodden (2012), Tanzania (for Record Keeping -RK-, Sales -S-, Marketing Effort -ME-, and Profits -P-); Bruhn and Zia (2011), Bosnia and Herzegovina (for ME); Bruhn, Karlan, and Schoar (2013), Mexico (for RK, S, ME); Calderón, Cunha, and De Giorgi (2013), Mexico (for RK, S, P); de Mel, McKenzie, and Woodruff (2014), Sri Lanka (for RK, S, P); Drexler, Fischer, and Schoar (2014), Dominican Republic (for RK); Giné and Mansuri (2014), Pakistan (for RK, S, ME, P); Karlan and Valdivia (2011), Peru (for RK, S); Karlan, Knight, and Udry (2012), Ghana (for RK); Mano et al. (2012), Ghana (for RK); and Valdivia (2011), Peru (for RK, S).

interventions have positive and significant overall effects of 0.107 standard deviations (SD) on recordkeeping, 0.115 SD on sales and 0.133 SD on profits. Meanwhile, the effect of business skills training on marketing had little effect.⁴⁰

In studying why these training programs are effective for some entrepreneurs and not for others, factors that come into play include credit-constraints, discrimination, human and managerial constraints, and lack of unemployment insurance (Fairlie, Karlan, and Zinman, 2015). The only statistically significant effects are found for the unemployed, and only in the short term. However, the sample consists of entrepreneurs in the United States, and the studied constraints are likely more binding in developing countries.

Perhaps the biggest question is whether a person can be taught to be an innovative entrepreneur or whether it is a gift with which a person is born. Are the behavioral attitudes required for entrepreneurship teachable? Opinions vary on this important question. Oosterbeek, van Praag, and Ijsselstein (2010) find no impact of entrepreneurship education on the motivation of university students to become entrepreneurs in The Netherlands. However, Rosendahl Huber, Sloof, and van Praag (2014) find that a program in the same country boosted non-cognitive entrepreneurial skills, but of primary school students. They claim that these skills

⁴⁰ A limitation of this analysis is the reduced number of studies reported, due to the high heterogeneity of outcomes reported in different studies that makes the comparable sample relatively small.

are developed at an early age, and it might not be possible to change them once in college. Nevertheless, Premand et al. (2012) find a change in behavioral skills, such as optimism about the future, among university students randomly allocated to a business track in Tunisia. Similarly, adult business owners in Uganda showed a marked increase in personal initiative. A three-day training event focused on the elements of personal initiative, boosted the number of people employed by business owners, and increased their sales (Glaub et al., 2014; Gielnik and Frese, 2013).

Clearly, there is a great need for more analysis and evaluation of skills policies and programs for youth and adults. The scarcity of evidence in Latin America and the Caribbean (with the exception of the *Jóvenes* programs) means evaluations of effectiveness must be built into programs from the design stage in order to gather the solid evidence needed by policymakers to make evidence-based policy decisions. But analysis should not stop at the program level; systemic reforms should also be studied. Better evidence can help shape a new face of skills development policy in Latin America and the Caribbean, and promote a more productive region.

Toward Lifelong Learning

Countries in Latin America and the Caribbean need to put their human capital strategies at the center of their national development strategies (IDB, forthcoming). Because skills matter for productivity, countries must act now to construct a long-term, systemic vision, with two words in mind: relevance and quality (OECD, 2011; Hanushek and Woessmann, 2008; Lora and Pagés, 2010; Bassi, Rucci, and Urzúa, 2014).

Many firms in the region are informal enterprises with low productivity (Lederman et al., 2014). This work environment conditions the opportunities to develop skills in adult life, and contributes to a cycle of high job turnover, low-quality jobs, and overall low investment in skills development by both firms and workers.

Even from this fledgling starting point, developing effective skills development policies is a promising avenue for a more productive region. A good set of policies aimed at improving the skills of youth and adults should be based on a strong and structured skills development system that brings the education and training system closer to the needs of employers. Such a transformation should be based on a robust partnership between the public and private sectors that crafts

training programs based on relevant competencies and puts greater emphasis on quality assurance. The guiding light should be a strategy that links human capital development to economic and social development, implemented with a strong political will by solid institutions.

Given the importance that high-productivity firms have in the development of skills for their workers, there is also a need to develop policies oriented to increase the productivity of firms. Otherwise, there will be a limit to what skills policies can accomplish on their own.

Accessing good jobs is challenging. Good jobs are scarce and require a broad set of socioemotional and technical skills. ALMP play an important role in improving opportunities for labor market insertion and should be further expanded. Vulnerable youth, who need to strengthen their basic socioemotional and technical skills, benefit (at least modestly) from youth training programs that help them find higher quality jobs. For less vulnerable youth, who are better prepared to work in the private sector, apprenticeship programs could be a good solution. As of today, structured programs of this type are almost absent in the region. The effects of these longer-term, demand-driven approaches could be larger than the typical *Jóvenes* programs (improving skills in a practical manner, impacting career development and earnings), and reach a broader set of beneficiaries. In this sense, apprenticeships are a promising alternative that should be explored more by policymakers. Beyond helping younger workers, the region should innovate and learn more about how to help unemployed adults prepare themselves for new jobs.

Policymakers must also put greater emphasis on stimulating training and lifelong learning among the employed. There is ample room to improve the targeting and effectiveness of policies currently in place in a few countries of the region, especially programs for less-skilled workers. But more than fixing what is currently available, governments should pilot new instruments and mechanisms to incentivize private sector engagement and co-financing of training for the employed.

Management skills are important determinants of firm productivity. Existing programs aimed to improve technical and socioemotional skills show mixed results. Innovation in this area should look to find the right programs to improve the management skills of entrepreneurs. Much more learning in this area is necessary, not only in the aspects mentioned, but also on the impact of these policies on productivity and employment.

As it has been made clear throughout this book, the earlier skills are developed, the better individuals will do later in life. Thus, policymakers must attack skills gaps early, and consider broad-based policies that keep youth in school longer, and encourage the return to school of all those who could benefit from increasing their formal education. This means finding policies that keep Rodrigo in school as long as Elsa, thereby minimizing their initial skills gap. Once this happens, the skills development system can concentrate on what should be its role in an ideal world: providing both of them with learning opportunities (either formal or informal) that keep them up-to-date with new labor market demands so they can reach their potential, and navigate the inevitable changes that come during the working life of any individual. A lifelong learning approach means eliminating artificial boundaries between education and training. Policies and programs need to help individuals start, or change, careers in the middle of their lives to adapt to new opportunities that arise. Of course, skills development policies also need to recognize the large number of individuals already in the labor market who face many more years in it. Thus, policies need to maintain the right balance, supporting different types of individuals, at different stages of their lives, with appropriate policies for each group.

While Latin America and the Caribbean is still not there, policymakers must push for a lifelong learning approach that enables people to develop new skills throughout their lives and improves the region's growth and productivity. In the quest for new and improved policies and programs, evidence can point the way. Armed with more and better information, policymakers are learning better how to help their citizens learn better too.

References

- Abdulkadiroğlu, A., J. D. Angrist, S. M. Dynarski, T. J. Kane, and P. A. Pathak. 2011. "Accountability and Flexibility in Public Schools: Evidence from Boston's Charters and Pilots." *Quarterly Journal of Economics* 126(2) May: 699-748.
- Abdulkadiroğlu, A., P. Pathak, and C. Walters. 2015. "School Vouchers and Student Achievement: First-Year Evidence from the Louisiana Scholarship Program." School Effectiveness and Inequality Initiative (SEII) Discussion Paper no. 2015.06. Massachusetts Institute of Technology, Cambridge, MA.
- Abeberese, A. B., T. J. Kumler, and L. L. Linden. 2014. "Improving Reading Skills by Encouraging Children to Read in School: A Randomized Evaluation of the Sa Aklat Sisikat Reading Program in the Philippines." *Journal of Human Resources* 49(3) Summer: 611-33.
- Acemoglu, D., and J. Angrist. 2001. "How Large Are Human-Capital Externalities? Evidence from Compulsory-Schooling Laws." In B. S. Bernanke and K. Rogoff, eds., *NBER Macroeconomics Annual 2000*. Volume 15. Cambridge, MA: MIT Press.
- Acemoglu, D., and D. Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." In O. Ashenfelter and D. Card, eds., *Handbook of Labor Economics*. Volume 4B. Amsterdam: North Holland.
- Acemoglu, D., and J.-S. Pischke. 1998. "Why Do Firms Train? Theory and Evidence." *Quarterly Journal of Economics* 113(1) February: 79-119.
- Acerenza, S., and N. Gandelman. 2016. "Household Education Spending in Latin America and the Caribbean: Evidence from Income and Expenditure Surveys." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Alaimo, V., M. Bosch, D. Kaplan, C. Pagés, and L. Ripani. 2015. *Jobs for Growth*. Washington, DC: Inter-American Development Bank.

- Albert, D., and L. Steinberg. 2011. "Judgment and Decision Making in Adolescence." *Journal of Research on Adolescence* 21(1) March: 211–24.
- Alemán, X., S. Duryea, N. G. Guerra, P. J. McEwan, R. Muñoz, M. Stampini, and A. A. Williamson. 2016. "The Effects of Musical Training on Child Development: A Randomized Trial of *El Sistema* in Venezuela." *Prevention Science*, DOI: 10.1007/s11121-016-0727-3.
- Alfonso, M. 2009. "Credit Constraints and the Demand for Higher Education in Latin America." Working Paper no. 3. Education Division, Inter-American Development Bank, Washington, DC.
- Allub, L., and I. Berniell. 2016. "Time Use and Skills Development in Latin American Households." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Almeida, R., L. Anazawa, N. Menezes Filho, and L. Vasconcellos. 2015. "Investing in Technical and Vocational Education and Training: Does It Yield Large Economic Returns in Brazil?" Policy Research Working Paper no. 7246. World Bank, Washington, DC.
- Almeida, R., J. Behrman, and D. Robalino, eds. 2012. *The Right Skills for the Job? Rethinking Training Policies for Workers*. Washington, DC: World Bank.
- Altonji, J. G., and N. Williams. 2005. "Do Wages Rise with Job Seniority? A Reassessment." *ILR Review* 58(3) April: 370–97.
- Alzúa, M. L., G. Cruces, and C. López. 2015. "Youth Training Programs beyond Employment: Experimental Evidence from Argentina." Working Paper no. 177. Centro de Estudios Distributivos, Laborales y Sociales (CED-LAS), Universidad Nacional de La Plata, La Plata, Argentina.
- Andrabi, T., J. Das, A. I. Khwaja, and T. Zajonc. 2011. "Do Value-Added Estimates Add Value? Accounting for Learning Dynamics." *American Economic Journal: Applied Economics* 3(3) July: 29–54.
- Angrist, J. D., E. Bettinger, E. Bloom, E. King, and M. Kremer. 2002. "Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment." *American Economic Review* 92(5) December: 1535–58.
- Angrist, J. D., E. Bettinger, and M. Kremer. 2006. "Long-Term Educational Consequences of Secondary School Vouchers: Evidence from Administrative Records in Colombia." *American Economic Review* 96(3) June: 847–62.
- Angrist, J. D., and A. B. Krueger. 1999. "Empirical Strategies in Labor Economics." In O. Ashenfelter and D. Card, eds., *Handbook of Labor Economics*. Volume 3A. Amsterdam: North Holland.

- Angrist, J. D., and V. Lavy. 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement." *Quarterly Journal of Economics* 114(2) May: 533–75.
- Angrist, J. D., P. A. Pathak, and C. R. Walters. 2013. "Explaining Charter School Effectiveness." *American Economic Journal: Applied Economics* 5(4) October: 1–27.
- Araujo, M. C., P. Carneiro, Y. Cruz-Aguayo, and N. Schady. 2016. "Teacher Quality and Learning Outcomes in Kindergarten." *Quarterly Journal of Economics* 131(3) August: 1415–53.
- Arias Ortiz, E., and J. Cristia. 2014. "The IDB and Technology in Education: How to Promote Effective Programs?" IDB Technical Note no. 670. Inter-American Development Bank, Washington, DC.
- Arias Ortiz, E., and C. Dehon. 2013. "Roads to Success in the Belgian French Community's Higher Education System: Predictors of Dropout and Degree Completion at the Université Libre de Bruxelles." *Research in Higher Education* 54(6) September: 693–723.
- Arias Ortiz, E., G. Elacqua, and C. González. Forthcoming. "Comparative Analysis of Higher Education Systems in Selected Latin American Countries: Funding and Quality Assurance Mechanisms." Technical note. Inter-American Development Bank, Washington, DC.
- Arzola, M. P. 2010. "Impacto de la jornada escolar completa en el desempeño de los alumnos, medido con la evolución en sus pruebas SIMCE." Master's thesis. Instituto de Economía, Pontificia Universidad Católica de Chile, Santiago.
- Atkin, D. 2016. "The Caloric Costs of Culture: Evidence from Indian Migrants." *American Economic Review* 106(4) April: 1144–81.
- Attanasio, O., C. Fernández, E. Fitzsimons, S. M. Grantham-McGregor, C. Meghir, and M. Rubio-Codina. 2014. "Using the Infrastructure of a Conditional Cash Transfer Program to Deliver a Scalable Integrated Early Child Development Program in Colombia: Cluster Randomized Controlled Trial." *The BMJ* 349: g6126.
- Attanasio, O., A. Guarín, C. Medina, and C. Meghir. 2015. "Long-Term Impacts of Vouchers for Vocational Training: Experimental Evidence for Colombia." NBER Working Paper no. 21390. National Bureau of Economic Research, Cambridge, MA.
- Attanasio, O., and K. Kaufmann. 2009. "Educational Choices, Subjective Expectations, and Credit Constraints." NBER Working Paper no. 15087. National Bureau of Economic Research, Cambridge, MA.

- Attanasio, O., A. Kugler, and C. Meghir. 2011. "Subsidizing Vocational Training for Disadvantaged Youth in Colombia: Evidence from a Randomized Trial." *American Economic Journal: Applied Economics* 3(3) July: 188–220.
- Auer, P., Ü. Efendioglu, and J. Leschke. 2008. *Active Labour Market Policies around the World: Coping with the Consequences of Globalization*. Second edition. Geneva, Switzerland: International Labour Office.
- Autor, D. H., L. F. Katz, and M. S. Kearney. 2006. "The Polarization of the U.S. Labor Market." *American Economic Review* 96(2) May: 189–94.
- Avitabile, C., and R. de Hoyos. 2015. "The Heterogeneous Effect of Information on Student Performance: Evidence from a Randomized Control Trial in Mexico." Policy Research Working Paper no. 7422. World Bank, Washington, DC.
- Backes-Gellner, U., M. Kluike, K. Pull, M. R. Schneider, and S. Teuber. 2016. "Human Resource Management and Radical Innovation: A Fuzzy-Set QCA of US Multinationals in Germany, Switzerland, and the UK." *Journal of Business Economics* 86(7) October: 751–72.
- Bahr, P. R. 2014. "The Labor Market Return in Earnings to Community College Credits and Credentials in California." Paper. Center for the Study of Higher and Postsecondary Education, University of Michigan, Ann Arbor, MI. Available at http://www.soe.umich.edu/people/profile/peter_riley_bahr/. Accessed May 2017.
- Bahr, P. R., S. Dynarski, B. Jacob, D. Kreisman, A. Sosa, and M. Wieder-span. 2015. "Labor Market Returns to Community College Awards: Evidence from Michigan." Paper. Center for Analysis of Postsecondary Education and Employment (CAPSEE), Teachers College, Columbia University, New York, NY. March. Available at <http://capseecenter.org/wp-content/uploads/2015/03/labor-market-returns-michigan.pdf>. Accessed December 2016.
- Baker, A. J. L., C. S. Piotrkowski, and J. Brooks-Gunn. 1998. "The Effects of the Home Instruction Program for Preschool Youngsters (HIPPPY) on Children's School Performance at the End of the Program and One Year Later." *Early Childhood Research Quarterly* 13(4): 571–88.
- Baker, M., J. Gruber, and K. Milligan. 2008. "Universal Child Care, Maternal Labor Supply, and Family Well-Being." *Journal of Political Economy* 116(4) August: 709–45.

- Balcázar, C. F., and H. Ñopo. 2016. "Broken Gears: The Value Added of Higher Education on Teachers' Academic Achievement." *Higher Education* 72(3) September: 341-61.
- Bandura, A. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.
- Banerjee, A. V., S. Cole, E. Duflo, and L. Linden. 2007. "Remedying Education: Evidence from Two Randomized Experiments in India." *Quarterly Journal of Economics* 122(3) August: 1235-64.
- Barr, N. 2004. "Higher Education Funding." *Oxford Review of Economic Policy* 20(2) Summer: 264-83.
- Barrera-Osorio, F., P. de Galbert, J. Habyarimana, and S. Sabarwal. 2016. "Impact of Public-Private Partnerships on Private School Performance: Evidence from a Randomized Controlled Trial in Uganda." Policy Research Working Paper no. 7905. World Bank, Washington, DC.
- Barro, R. J., and J.-W. Lee. 2015. *Education Matters: Global Schooling Gains from the 19th to the 21st Century*. New York, NY: Oxford University Press.
- Barrow, L., and O. Malamud. 2015. "Is College a Worthwhile Investment?" *Annual Review of Economics* 7(1): 519-55.
- Bassanini, A., A. Booth, G. Brunello, M. De Paola, and E. Leuven. 2005. "Workplace Training in Europe." IZA Discussion Paper no. 1640. Institute for the Study of Labor (IZA), Bonn, Germany.
- Bassi, M., M. Busso, and J. S. Muñoz. 2015. "Enrollment, Graduation, and Dropout Rates in Latin America: Is the Glass Half Empty or Half Full?" *Economía* 16(1) Fall: 113-56.
- Bassi, M., M. Busso, S. Urzúa, and J. Vargas. 2012. *Disconnected: Skills, Education, and Employment in Latin America*. Washington, DC: Inter-American Development Bank.
- Bassi, M., C. Meghir, and A. Reynoso. 2016. "Education Quality and Teaching Practices." NBER Working Paper no. 22719. National Bureau of Economic Research, Cambridge, MA.
- Bassi, M., and H. Ñopo. 2016. "Do Technical Skills Pay Off in Latin America?" Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Bassi, M., G. Rucci, and S. Urzúa. 2014. "Beyond the Classroom: Preparing People to Produce." In G. Crespi, E. Fernández-Arias, and E. Stein, eds., *Rethinking Productive Development: Sound Policies and Institutions for Economic Transformation*. Development in the

- Americas series. Washington, DC: Inter-American Development Bank and New York, NY: Palgrave Macmillan.
- Baumrind, D. 2001. "Does Causally Relevant Research Support a Blanket Injunction against Disciplinary Spanking by Parents?" Paper presented at the American Psychological Association's 109th Annual Convention, August 24, San Francisco, CA.
- Becker, G. S. 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. New York, NY: Columbia University Press.
- Behaghel, L., and N. Greenan. 2010. "Training and Age-Biased Technical Change." *Annals of Economics and Statistics* 99(100) July-December: 317-42.
- Behrman, J. R., Y. Cheng, and P. E. Todd. 2004. "Evaluating Preschool Programs When Length of Exposure to the Program Varies: A Non-parametric Approach." *Review of Economics and Statistics* 86(1) February: 108-32.
- Behrman, J. R., S. W. Parker, P. E. Todd, and K. I. Wolpin. 2015. "Aligning Learning Incentives of Students and Teachers: Results from a Social Experiment in Mexican High Schools." *Journal of Political Economy* 123(2) April: 325-64.
- Bellei, C. 2009. "Does Lengthening the School Day Increase Students' Academic Achievement? Results from a Natural Experiment in Chile." *Economics of Education Review* 28(5) October: 629-40.
- Bellido, M. 2014. "Universidades en Perú - Parte 2: tipos y su conformación." Útero.Pe (blog), June 9. Available at <http://sudo.uterop.e/2014/06/09/universidades-en-peru-parte-2-tipos-y-su-conformacion/>. Accessed January 2017.
- Belsky, J. 1984. "The Determinants of Parenting: A Process Model." *Child Development* 55(1) February: 83-96.
- Berge, L. I. O., K. Bjorvatn, and B. Tungodden. 2012. "Human and Financial Capital for Microenterprise Development: Short-Term and Long-Term Evidence from a Field Experiment in Tanzania." Paper. Norwegian School of Economics (NHH), Bergen, Norway. Available at https://www.dartmouth.edu/~neudc2012/docs/paper_173.pdf. Accessed April 2017.
- Bergoeing, R., N. V. Loayza, and F. Piguillem. 2010. "Why Are Developing Countries So Slow in Adopting New Technologies? The Aggregate and Complementary Impact of Micro Distortions." Policy Research Working Paper no. 5393. World Bank, Washington, DC.

- Berlinski, S., and M. Busso. 2016. "How Much Are We Willing to Contribute for Better Educational Outcomes? Evidence from a Survey Experiment." *Economic Inquiry* 54(1) January: 63-75.
- Berlinski, S., M. Busso, T. Dinkelman, and C. Martínez A. 2016. "Reducing Parent-School Information Gaps and Improving Education Outcomes: Evidence from High Frequency Text Messaging in Chile." Paper. Inter-American Development Bank, Washington, DC. Available at https://www.povertyactionlab.org/sites/default/files/publications/726_%20Reducing-Parent-School-information-gap_BBDM-Dec2016.pdf. Accessed May 2017.
- Berlinski, S., S. Galiani, and P. Gertler. 2009. "The Effect of Pre-Primary Education on Primary School Performance." *Journal of Public Economics* 93(1-2) February: 219-34.
- Berlinski, S., S. Galiani, and M. Manacorda. 2008. "Giving Children a Better Start: Preschool Attendance and School-Age Profiles." *Journal of Public Economics* 92(5-6) June: 1416-40.
- Berlinski, S., and N. Schady, eds. 2015. *The Early Years: Child Well-Being and the Role of Public Policy*. Development in the Americas series. Washington, DC: Inter-American Development Bank and New York, NY: Palgrave Macmillan.
- Bernal, R., O. Attanasio, X. Peña, and M. Vera-Hernández. 2014. "The Effects of the Transition from Home-Based Childcare to Center-Based Childcare in Colombia." Paper. Universidad de los Andes, Bogotá, and Institute for Fiscal Studies, London. Unpublished.
- Bernal, R., C. Fernández, C. E. Flórez, A. Gaviria, P. R. Ocampo, B. Samper, and F. Sánchez. 2009. "Evaluación de impacto del Programa Hogares Comunitarios de Bienestar del ICBF." CEDE Working Paper no. 16. Centro de Estudios sobre Desarrollo Económico, Universidad de los Andes, Bogotá.
- Berniell, L., and D. de la Mata. 2016. "Starting on the Right Track: Experimental Evidence from a Large-Scale Apprenticeship Program." Paper. Development Bank of Latin America (CAF), Buenos Aires. Unpublished.
- Berthelon, M. E., and D. I. Kruger. 2011. "Risky Behavior among Youth: Incapacitation Effects of School on Adolescent Motherhood and Crime in Chile." *Journal of Public Economics* 95(1-2) February: 41-53.
- Bettinger, E. 2004. "How Financial Aid Affects Persistence." In C. M. Hoxby, ed., *College Choices: The Economics of Where to Go, When*

- to Go, and How to Pay for It*. Chicago, IL: University of Chicago Press.
- Bettinger, E., M. Kremer, and J. E. Saavedra. 2010. "Are Educational Vouchers Only Redistributive?" *Economic Journal* 120(546) August: F204–F228.
- Betts, J. R., and Y. E. Tang. 2011. "The Effect of Charter Schools on Student Achievement: A Meta-Analysis of the Literature." Center on Reinventing Public Education, University of Washington Bothell, Seattle, WA. Available at https://www.crpe.org/sites/default/files/pub_NCSRP_BettsTang_Oct11_0.pdf. Accessed March 2017.
- Blakemore, S.-J., and S. Choudhury. 2006. "Development of the Adolescent Brain: Implications for Executive Function and Social Cognition." *Journal of Child Psychology and Psychiatry* 47(3–4) March/April: 296–312.
- Blimpo, M. P. 2014. "Team Incentives for Education in Developing Countries: A Randomized Field Experiment in Benin." *American Economic Journal: Applied Economics* 6(4) October: 90–109.
- Blimpo, M. P., and D. K. Evans. 2011. "School-Based Management and Educational Outcomes: Lessons from a Randomized Field Experiment." Paper. Stanford University, Stanford, CA; and World Bank, Washington, DC. Available at http://siteresources.worldbank.org/EDUCATION/Resources/Blimpo-Evans_WSD-2012-01-12.pdf. Accessed March 2017.
- Bloom, L. 1998. "Language Acquisition in Its Developmental Context." In D. Kuhn and R. S. Siegler, eds., *Handbook of Child Psychology: Volume 2: Cognition, Perception, and Language*. Fifth edition. New York, NY: John Wiley and Sons.
- Bloom, N., C. Genakos, R. Sadun, and J. Van Reenen. 2012. "Management Practices across Firms and Countries." *Academy of Management Perspectives* 26(1) February: 12–33.
- Bloom, N., R. Lemos, R. Sadun, D. Scur, and J. Van Reenen. 2014. "The New Empirical Economics of Management." *Journal of the European Economic Association* 12(4) August: 835–76.
- Bloom, N., A. Mahajan, D. McKenzie, and J. Roberts. 2010. "Why Do Firms in Developing Countries Have Low Productivity?" *American Economic Review* 100(2) May: 619–23.
- Bloom, N., R. Sadun, and J. Van Reenen. 2016. "Management as a Technology?" NBER Working Paper no. 22327. National Bureau of Economic Research, Cambridge, MA.

- Bloom, N., and J. Van Reenen. 2007. "Measuring and Explaining Management Practices across Firms and Countries." *Quarterly Journal of Economics* 122(4) November: 1351-1408.
- . 2010. "Why Do Management Practices Differ across Firms and Countries?" *Journal of Economic Perspectives* 24(1) Winter: 203-24.
- Blyde, J., M. Busso, V. Faggioni, and D. Romero. 2016. "The Impact of Chinese Competition on Mexican Labor Outcomes." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Bobba, M., and V. Frisancho. 2016. "Learning about Oneself: The Effects of Performance Feedback on School Choice." IDB Working Paper no. 728. Inter-American Development Bank, Washington, DC.
- Bogoya, J. D., and J. M. Bogoya. 2013. "An Academic Value-Added Mathematical Model for Higher Education in Colombia." *Ingeniería e Investigación* 33(2) August: 76-81.
- Bonilla, L., N. L. Botton, and A. Ham. 2016. "Information Policies and Higher Education Choices: Experimental Evidence from Colombia." University of Illinois at Urbana-Champaign, Champaign, IL. Available at http://www.cedlas-er.org/sites/default/files/aux_files/ham.pdf. Accessed January 2017.
- Bonnal, L., S. Mendes, and C. Sofer. 2002. "School-to-Work Transition: Apprenticeship versus Vocational School in France." *International Journal of Manpower* 23(5) August: 426-42.
- Bradley, R. H. 1993. "Children's Home Environments, Health, Behavior, and Intervention Efforts: A Review Using the HOME Inventory as a Marker Measure." *Genetic, Social, and General Psychology Monographs* 119(4) November: 437-90.
- Bronfenbrenner, U. 1974. "A Report on Longitudinal Evaluations of Pre-school Programs: Volume II: Is Early Intervention Effective?" Report. Office of Child Development (DHEW), Washington, DC. Available at <http://files.eric.ed.gov/fulltext/ED093501.pdf>. Accessed January 2017.
- Brooks-Gunn, J., F.-R. Liaw, and P. K. Klebanov. 1992. "Effects of Early Intervention on Cognitive Function of Low Birth Weight Preterm Infants." *Journal of Pediatrics* 120(3) March: 350-59.
- Bruhn, M., D. Karlan, and A. Schoar. 2013. "The Impact of Consulting Services on Small and Medium Enterprises: Evidence from a Randomized Trial in Mexico." Policy Research Working Paper no. 6508. World Bank, Washington, DC.

- Bruhn, M., and B. Zia. 2011. "Stimulating Managerial Capital in Emerging Markets: The Impact of Business and Financial Literacy for Young Entrepreneurs." Policy Research Working Paper no. 5642. World Bank, Washington, DC.
- Brunner, J. J. 2009. "Apuntes sobre sociología de la educación superior en contexto internacional, regional y local." *Estudios pedagógicos* 35(2): 203-30.
- Bruns, B., and J. Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.
- Bucarey, A., and S. Urzúa. 2013. "El retorno económico de la educación media técnico profesional en Chile." *Estudios públicos* 129 (Summer): 1-48.
- Busso, M., T. Dinkelman, A. C. Martínez, and D. Romero. 2017. "The Effects of Financial Aid and Returns Information in Selective and Less Selective Schools: Experimental Evidence from Chile." *Labour Economics* 45 (April): 79-91.
- Busso, M., L. Madrigal, and C. Pagés. 2010. "Productivity from the Bottom Up: Firms and Resource Allocation in Latin America." In C. Pagés, ed., *The Age of Productivity: Transforming Economies from the Bottom Up*. Development in the Americas series. New York, NY: Palgrave Macmillan and Washington, DC: Inter-American Development Bank.
- . 2013. "Productivity and Resource Misallocation in Latin America." *B.E. Journal of Macroeconomics* 13(1) January: 903-32.
- Busso, M., and A. Micco. 2003. "Job and Worker Dynamics: The Hidden Side of the Labor Market." In Inter-American Development Bank, *Good Jobs Wanted: Labor Markets in Latin America*. Economic and Social Progress in Latin America: 2004 Report. Washington, DC: Inter-American Development Bank.
- Calderón, G., J. M. Cunha, and G. De Giorgi. 2013. "Business Literacy and Development: Evidence from a Randomized Controlled Trial in Rural Mexico." NBER Working Paper no. 19740. National Bureau of Economic Research, Cambridge, MA.
- Caldwell, B. M., and R. H. Bradley. 1984. *Administration Manual: Home Observation for Measurement of the Environment (HOME)*. Revised edition. Little Rock, AR: University of Arkansas.
- Calero, C., J. Mejalenko, O. Mitnik, and L. Ripani. 2017. "Labor Market Trajectories in Latin America and the Caribbean: A Synthetic Panel Analysis". Inter-American Development Bank, Washington, DC. Unpublished.

- Camacho, A., J. Messina, and J. P. Uribe. 2016. "The Expansion of Higher Education in Colombia: Bad Students or Bad Programs?" IDB Discussion Paper no. 452. Inter-American Development Bank, Washington, DC.
- Campbell, F., G. Conti, J. J. Heckman, S. H. Moon, R. Pinto, E. Pungello, and Y. Pan. 2014. "Early Childhood Investments Substantially Boost Adult Health." *Science* 343(6178) March: 1478-85.
- Campbell, F., E. P. Pungello, S. Miller-Johnson, M. Burchinal, and C. T. Ramey. 2001. "The Development of Cognitive and Academic Abilities: Growth Curves from an Early Childhood Educational Experiment." *Developmental Psychology* 37(2) March: 231-42.
- Canton, E. 2007. "Social Returns to Education: Macro-Evidence." *De Economist* 155(4) December: 449-68.
- Card, D. 2001. "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems." *Econometrica* 69(5) September: 1127-60.
- Card, D., P. Ibararán, F. Regalia, D. Rosas-Shady, and Y. Soares. 2011. "The Labor Market Impacts of Youth Training in the Dominican Republic." *Journal of Labor Economics* 29(2) April: 267-300.
- Card, D., J. Kluve, and A. Weber. 2010. "Active Labour Market Policy Evaluations: A Meta-Analysis." *Economic Journal* 120(548) November: F452-F477.
- . 2015. "What Works? A Meta Analysis of Recent Active Labor Market Program Evaluations." NBER Working Paper no. 21431. National Bureau of Economic Research, Cambridge, MA.
- Card, D., and T. Lemieux. 2001. "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-Based Analysis." *Quarterly Journal of Economics* 116(2) May: 705-46.
- Carpenter, S. K., N. J. Cepeda, D. Rohrer, S. H. K. Kang, and H. Pashler. 2012. "Using Spacing to Enhance Diverse Forms of Learning: Review of Recent Research and Implications for Instruction." *Educational Psychology Review* 24(3) September: 369-78.
- Carpio, S., D. Giuliodori, G. Rucci, and R. Stucchi. 2011. "The Effect of Temporary Contracts on Human Capital Accumulation in Chile." IDB Working Paper no. 253. Inter-American Development Bank, Washington, DC.
- Carretero, M. 2009. *Constructivismo y educación*. Buenos Aires: Editorial Paidós.
- Cascio, E. U. 2009. "Do Investments in Universal Early Education Pay Off? Long-Term Effects of Introducing Kindergartens into Public

- Schools." NBER Working Paper no. 14951. National Bureau of Economic Research, Cambridge, MA.
- Casey, B. J., N. Tottenham, C. Liston, and S. Durston. 2005. "Imaging the Developing Brain: What Have We Learned about Cognitive Development?" *Trends in Cognitive Sciences* 9(3) March: 104-10.
- Castleman, B. L., and B. T. Long. 2016. "Looking beyond Enrollment: The Causal Effect of Need-Based Grants on College Access, Persistence, and Graduation." *Journal of Labor Economics* 34(4) October: 1023-73.
- Cerdán-Infantes, P., and C. Vermeersch. 2007. "More Time Is Better: An Evaluation of the Full-Time School Program in Uruguay." Policy Research Working Paper no. 4167. World Bank, Washington, DC.
- Chapman, B. 2016. "Income Contingent Loans in Higher Education Financing." *IZA World of Labor* 2016(227) February: 1-10.
- Chetty, R., J. N. Friedman, and J. E. Rockoff. 2014. "Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood." *American Economic Review* 104(9) September: 2633-79.
- Chetty, R., J. N. Friedman, E. Saez, N. Turner, and D. Yagan. 2017. "Mobility Report Cards: The Role of Colleges in Intergenerational Mobility." Paper. Available at http://www.equality-of-opportunity.org/papers/coll_mrc_paper.pdf. Accessed February 2017.
- Cho, Y., and M. Honorati. 2014. "Entrepreneurship Programs in Developing Countries: A Meta Regression Analysis." *Labour Economics* 28(C) June: 110-30.
- Clark, D., and R. Fahr. 2001. "The Promise of Workplace Training for Non-College-Bound Youth: Theory and Evidence from German Apprenticeship." IZA Discussion Paper no. 378. Institute for the Study of Labor (IZA), Bonn, Germany.
- Clotfelter, C. T., H. F. Ladd, and J. L. Vigdor. 2007. "Teacher Credentials and Student Achievement: Longitudinal Analysis with Student Fixed Effects." *Economics of Education Review* 26(6) December: 673-82.
- Cobb-Clark, D. A., and S. Schurer. 2012. "The Stability of Big-Five Personality Traits." *Economics Letters* 115(1) April: 11-15.
- Comin, D. A., and B. Hobijn. 2010. "An Exploration of Technology Diffusion." *American Economic Review* 100(5) December: 2031-59.
- Connolly, H., and P. Gottschalk. 2006. "Differences in Wage Growth by Education Level: Do Less-Educated Workers Gain Less from Work Experience?" IZA Discussion Paper no. 2331. Institute for the Study of Labor (IZA), Bonn, Germany.

- Cornelissen, T., C. Dustmann, and U. Schönberg. 2017. "Peer Effects in the Workplace." *American Economic Review* 107(2) February: 425–56.
- Corseuil, C. H. L., M. N. Foguel, G. Gonzaga, and E. P. Ribeiro. 2012. "The Effects of a Youth Training Program on Youth Turnover in Brazil." Working Paper no. 042. Rede de Economia Aplicada (REAP), São Paulo, Brazil.
- Crépon, B., E. Duflo, M. Gurgand, R. Rathelot, and P. Zamora. 2013. "Do Labor Market Policies Have Displacement Effects? Evidence from a Clustered Randomized Experiment." *Quarterly Journal of Economics* 128(2) May: 531–80.
- Cristia, J. P., and M. Higa. 2016. "Cost Estimation of Selected Parenting Programs." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Cristia, J. P., P. Ibararán, S. Cueto, A. Santiago, and E. Severín. 2012. "Technology and Child Development: Evidence from the One Laptop per Child Program." IDB Working Paper no. 304. Inter-American Development Bank, Washington, DC.
- Cruces, G., C. García Domench, and L. Gasparini. 2012. "Inequality in Education: Evidence for Latin America." Working Paper no. 135. Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS), Universidad Nacional de La Plata, La Plata, Argentina.
- Cunha, F., I. Elo, and J. Culhane. 2013. "Eliciting Maternal Expectations about the Technology of Cognitive Skill Formation." NBER Working Paper no. 19144. National Bureau of Economic Research, Cambridge, MA.
- Cunha, F., and J. Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97(2) May: 31–47.
- Cunningham, W., P. Acosta, and N. Muller. 2016. *Minds and Behaviors at Work: Boosting Socioemotional Skills for Latin America's Workforce*. Directions in Development series. Washington, DC: World Bank.
- Cunningham, W., and P. Villaseñor. 2016. "Employer Voices, Employer Demands, and Implications for Public Skills Development Policy Connecting the Labor and Education Sectors." Policy Research Working Paper no. 7582. World Bank, Washington, DC.
- Das, J., S. Dercon, J. Habyarimana, P. Krishnan, K. Muralidharan, and V. Sundararaman. 2013. "School Inputs, Household Substitution, and Test Scores." *American Economic Journal: Applied Economics* 5(2) April: 29–57.
- Daude, C., and V. Robano. 2015. "On Intergenerational (Im)mobility in Latin America." *Latin American Economic Review* 24(1) December: 1–29.

- Daugherty, L., T. Miller, R. Dossani, and M. Clifford. 2013. *Building the Links between Funding and Quality in Higher Education: India's Challenge*. Santa Monica, CA: RAND Corporation.
- Dauth, C., and O. Toomet. 2016. "On Government-Subsidized Training Programs for Older Workers." *Labour* 30(4) December: 371-92.
- de Mel, S., D. McKenzie, and C. Woodruff. 2009. "Innovative Firms or Innovative Owners? Determinants of Innovation in Micro, Small, and Medium Enterprises." Policy Research Working Paper no. 4934. World Bank, Washington, DC.
- . 2010. "Wage Subsidies for Microenterprises." *American Economic Review* 100(2) May: 614-18.
- . 2014. "Business Training and Female Enterprise Start-up, Growth, and Dynamics: Experimental Evidence from Sri Lanka." *Journal of Development Economics* 106 (January): 199-210.
- Deater-Deckard, K. 1998. "Parenting Stress and Child Adjustment: Some Old Hypotheses and New Questions." *Clinical Psychology: Science and Practice* 5(3) September: 314-32.
- Devereux, P. J., and R. A. Hart. 2010. "Forced to Be Rich? Returns to Compulsory Schooling in Britain." *Economic Journal* 120(549) December: 1345-64.
- Devereux, P. J., R. A. Hart, and J. E. Roberts. 2013. "Job Spells, Employer Spells, and Wage Returns to Tenure." IZA Discussion Paper no. 7384. Institute for the Study of Labor (IZA), Bonn, Germany.
- Díaz, J. J., and D. Rosas-Shady. 2016. "Impact Evaluation of the Job Youth Training Program Projoven." IDB Working Paper no. 693. Inter-American Development Bank, Washington, DC.
- Dill, D. D. 1997. "Higher Education Markets and Public Policy." *Higher Education Policy* 10(3-4) September-December: 167-85.
- Dinkelman, T., and C. Martínez. 2014. "Investing in Schooling in Chile: The Role of Information about Financial Aid for Higher Education." *Review of Economics and Statistics* 96(2) May: 244-57.
- DiPietro, J. A. 2004. "The Role of Prenatal Maternal Stress in Child Development." *Current Directions in Psychological Science* 13(2) April: 71-4.
- Dishion, T. J., L. M. Brennan, D. S. Shaw, A. D. McEachern, M. N. Wilson, and B. Jo. 2014. "Prevention of Problem Behavior through Annual Family Check-ups in Early Childhood: Intervention Effects from Home to Early Elementary School." *Journal of Abnormal Child Psychology* 42(3) April: 343-54.

- Dishion, T. J., B. M. Bullock, and I. Granic. 2002. "Pragmatism in Modeling Peer Influence: Dynamics, Outcomes, and Change Processes." *Development and Psychopathology* 14(4) December: 969–81.
- Dobbie, W., and R. G. Fryer Jr. 2011. "Are High-Quality Schools Enough to Increase Achievement among the Poor? Evidence from the Harlem Children's Zone." *American Economic Journal: Applied Economics* 3(3) July: 158–87.
- _____. 2013. "Getting beneath the Veil of Effective Schools: Evidence from New York City." *American Economic Journal: Applied Economics* 5(4) October: 28–60.
- Dominus, S. 2015. "The Mixed-Up Brothers of Bogotá." *New York Times Magazine*, July 9. Available at <https://www.nytimes.com/2015/07/12/magazine/the-mixed-up-brothers-of-bogota.html>. Accessed May 2017.
- Drexler, A., G. Fischer, and A. Schoar. 2014. "Keeping It Simple: Financial Literacy and Rules of Thumb." *American Economic Journal: Applied Economics* 6(2) April: 1–31.
- Drotar, D., J. Robinson, L. Jeavons, and H. L. Kirchner. 2009. "A Randomized, Controlled Evaluation of Early Intervention: The Born to Learn Curriculum." *Child: Care, Health and Development* 35(5) September: 643–49.
- Duflo, E., J. Berry, S. Mukerji, and M. Shotland. 2015. "A Wide Angle View of Learning: Evaluation of the CCE and LEP Programmes in Haryana, India." 3ie Impact Evaluation Report no. 22. International Initiative for Impact Evaluation (3ie), New Delhi. Available at http://www.3ieimpact.org/media/filer_public/2015/02/24/ie_22_evaluation_of_cce_and_lep_in_haryana.pdf. Accessed March 2017.
- Duflo, E., P. Dupas, and M. Kremer. 2011. "Peer Effects, Teacher Incentives, and the Impact of Tracking: Evidence from a Randomized Evaluation in Kenya." *American Economic Review* 101(5) August: 1739–74.
- _____. 2015. "School Governance, Teacher Incentives, and Pupil–Teacher Ratios: Experimental Evidence from Kenyan Primary Schools." *Journal of Public Economics* 123 (March): 92–110.
- Duncan, G. J. 2011. "The Importance of Kindergarten-Entry Academic Skills." In E. Zigler, W. S. Gilliam, and W. S. Barnett, eds., *The Pre-K Debates: Current Controversies and Issues*. Baltimore, MD: Brookes Publishing Co.
- Duncan, G. J., C. J. Dowsett, A. Claessens, K. Magnuson, A. C. Huston, P. Klebanov, L. S. Pagani, L. Feinstein, M. Engel, J. Brooks-Gunn, H. Sexton, K. Duckworth, and C. Japel. 2007. "School Readiness and Later Achievement." *Developmental Psychology* 43(6) November: 1428–46.

- Duryea, S., and F. Soares. 2016. "Promoting Socioemotional Skills during Adolescence: A Systematic Review of Youth Programs." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Dustmann, C., and C. Meghir. 2005. "Wages, Experience and Seniority." *Review of Economic Studies* 72(1) January: 77-108.
- Dynarski, S., and J. Scott-Clayton. 2013. "Financial Aid Policy: Lessons from Research." *The Future of Children* 23(1) Spring: 67-91.
- Eberhard, J., G. Moraga, E. Nun, and A. Madariaga. 2016. "On-the-Job Training Decision in Latin America." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Eckstein, Z., and K. I. Wolpin. 1999. "Why Youths Drop Out of High School: The Impact of Preferences, Opportunities, and Abilities." *Econometrica* 67(6) November: 1295-1339.
- Eichhorst, W. 2015. "Does Vocational Training Help Young People Find a (Good) Job? Systems Combining Structured Learning on the Job with Classroom Training Can Ease Youth Unemployment." *IZA World of Labor* 2015(112) January: 1-10.
- Elango, S., J. L. García, J. J. Heckman, and A. Hojman. 2016. "Early Childhood Education." In R. A. Moffitt, ed., *Economics of Means-Tested Transfer Programs in the United States*. Volume 2. Chicago, IL: University of Chicago Press.
- Ellström, P.-E. 2011. "Informal Learning at Work: Conditions, Processes and Logics." In M. Malloch, L. Cairns, K. Evans, and B. N. O'Connor, eds., *The SAGE Handbook of Workplace Learning*. London: SAGE Publications Ltd.
- ENTELEMS (Encuesta Nacional de Trayectorias Educativas y Laborales de la Educación Media Superior). 2008. Survey. Secretaría de Educación Pública (SEP), Mexico City; and Instituto Nacional de Estadística y Geografía (INEGI), Aguascalientes, Mexico. Available at <http://bdsocial.inmujeres.gob.mx/index.php/entelems-279/encuesta-nacional-de-trayectorias-educativas-y-laborales>. Accessed March 2017.
- Ericsson, K. A. 2006. "The Influence of Experience and Deliberate Practice on the Development of Superior Expert Performance." In K. A. Ericsson, N. Charness, P. J. Feltovich, and R. R. Hoffman, eds., *The Cambridge Handbook of Expertise and Expert Performance*. New York, NY: Cambridge University Press.
- . 2009. "Enhancing the Development of Professional Performance: Implications from the Study of Deliberate Practice." In K. A. Ericsson,

- ed., *Development of Professional Expertise: Toward Measurement of Expert Performance and Design of Optimal Learning Environments*. New York, NY: Cambridge University Press.
- . 2014. “Why Expert Performance Is Special and Cannot Be Extrapolated from Studies of Performance in the General Population: A Response to Criticisms.” *Intelligence* 45 (July–August): 81–103.
- . 2015. “Acquisition and Maintenance of Medical Expertise: A Perspective from the Expert-Performance Approach with Deliberate Practice.” *Academic Medicine* 90(11) November: 1471–86.
- Ericsson, K. A., N. Charness, P. J. Feltovich, and R. R. Hoffman, eds. 2006. *The Cambridge Handbook of Expertise and Expert Performance*. New York, NY: Cambridge University Press.
- Escudero, V., J. Kluge, E. López Mourelo, and C. Pignatti. 2016. “The Effectiveness of Active Labor Market Programs in Latin America and the Caribbean: Evidence from a Meta Analysis.” Paper. International Labour Organization, Geneva, Switzerland, and Humboldt University of Berlin, Berlin. Unpublished.
- Eslava, M., and J. Haltiwanger. 2012. “Young Businesses, Entrepreneurship, and the Dynamics of Employment and Output in Colombia’s Manufacturing Industry.” CAF Working Paper no. 2012/08. Development Bank of Latin America (CAF), Caracas.
- Espinoza, R., and S. Urzúa. 2015. “The Economic Consequences of Implementing Tuition Free Tertiary Education in Chile.” *Revista de Educación* 370 (October–December): 10–37.
- Estrada, R. 2015. “Rules Rather than Discretion: Teacher Hiring and Rent Extraction.” MWP Working Paper no. 2015/14. Max Weber Programme, European University Institute, San Domenico di Fiesole, Italy.
- European Commission. 2014. “Performance Agreements and Their Relationship to Funding in Higher Education.” Paper presented at the ET2020 Country Workshop, September 25–26, The Hague, Netherlands.
- Fairlie, R. W., D. Karlan, and J. Zinman. 2015. “Behind the GATE Experiment: Evidence on Effects of and Rationales for Subsidized Entrepreneurship Training.” *American Economic Journal: Economic Policy* 7(2) May: 125–61.
- Fan, X., and M. Chen. 2001. “Parental Involvement and Students’ Academic Achievement: A Meta-Analysis.” *Educational Psychology Review* 13(1) March: 1–22.

- Fazio, M. V., R. Fernández-Coto, and L. Ripani. 2016. *Apprenticeships for the XXI Century: A Model for Latin America and the Caribbean?* Washington, DC: Inter-American Development Bank.
- Fernald, L. C., P. Kariger, P. Engle, and A. Raikes. 2009. *Examining Early Child Development in Low-Income Countries: A Toolkit for the Assessment of Children in the First Five Years of Life.* Washington, DC: World Bank.
- Fernández, M., and J. Messina. 2017. "Skill Premium, Labor Supply and Changes in the Structure of Wages in Latin America." IDB Working Paper no. 786. Inter-American Development Bank, Washington, DC.
- Ferreira, M. M., J. Botero Álvarez, C. Avitabile, F. Haimovich Paz, and S. Urzúa. 2017. *At a Crossroads: Higher Education in Latin America and the Caribbean.* Washington, DC: World Bank.
- Field, E. 2009. "Educational Debt Burden and Career Choice: Evidence from a Financial Aid Experiment at NYU Law School." *American Economic Journal: Applied Economics* 1(1) January: 1-21.
- Flores-Lima, R., C. González-Velosa, and D. Rosas-Shady. 2014. *Cinco hechos: sobre la capacitación en firma en América Latina y el Caribe.* Washington, DC: Inter-American Development Bank.
- Freeman, R. B. 2010. "What Does Global Expansion of Higher Education Mean for the United States?" In C. T. Clotfelter, ed., *American Universities in a Global Market.* Chicago, IL: University of Chicago Press.
- Frese, M., and M. M. Gielnik. 2014. "The Psychology of Entrepreneurship." *Annual Review of Organizational Psychology and Organizational Behavior* 1(2014): 413-38.
- Frisancho, V., and J. Karver. 2017. "What Works to Make Adolescents Get and Stay in School? A Systematic Review of the Evidence." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Gabriel, P. E., and S. Schmitz. 2004. "An Examination of Occupational Differences in the Returns to Labor Market Experience." *Journal of Business and Economics Research* 2(11): 93-8.
- Garces, E., D. Thomas, and J. Currie. 2002. "Longer-Term Effects of Head Start." *American Economic Review* 92(4) September: 999-1012.
- Gasparini, L., and N. Lustig. 2011. "The Rise and Fall of Income Inequality in Latin America." In J. A. Ocampo and J. Ros, eds., *The Oxford Handbook of Latin American Economics.* New York, NY: Oxford University Press.

- Gasparini, L., and L. Tornarolli. 2009. "Labor Informality in Latin America and the Caribbean: Patterns and Trends from Household Survey Microdata." *Desarrollo y Sociedad* [Universidad de Los Andes] 63 (June): 13-80.
- Gershoff, E. T. 2002. "Corporal Punishment by Parents and Associated Child Behaviors and Experiences: A Meta-Analytic and Theoretical Review." *Psychological Bulletin* 128(4) July: 539-79.
- Gertler, P., J. Heckman, R. Pinto, A. Zanolini, C. Vermeersch, S. Walker, S. M. Chang, and S. Grantham-McGregor. 2014. "Labor Market Returns to an Early Childhood Stimulation Intervention in Jamaica." *Science* 344(6187) May: 998-1001.
- Gielnik, M. M., and M. Frese. 2013. "Entrepreneurship and Poverty Reduction: Applying I-O Psychology to Microbusiness and Entrepreneurship in Developing Countries." In J. B. Olson-Buchanan, L. L. Koppes Bryan, and L. Foster Thompson, eds., *Using Industrial-Organizational Psychology for the Greater Good: Helping Those Who Help Others*. New York, NY: Routledge.
- Giné, X., and G. Mansuri. 2014. "Money or Ideas? A Field Experiment on Constraints to Entrepreneurship in Rural Pakistan." Policy Research Working Paper no. 6959. World Bank, Washington, DC.
- Ginsburg, K. R. 2007. "The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds." *Pediatrics* 119(1) January: 182-91.
- Giuri, P., M. Mariani, S. Brusoni, G. Crespi, D. Francoz, A. Gambardella, W. Garcia-Fontes, A. Geuna, R. Gonzales, D. Harhoff, K. Hoisl, C. Le Bas, A. Luzzi, L. Magazzini, L. Nesta, Ö. Nomaler, N. Palomeras, P. Patel, M. Romanelli, and B. Verspagen. 2007. "Inventors and Invention Processes in Europe: Results from the PatVal-EU Survey." *Research Policy* 36(8) October: 1107-27.
- Glaub, M. E., M. Frese, S. Fischer, and M. Hoppe. 2014. "Increasing Personal Initiative in Small Business Managers or Owners Leads to Entrepreneurial Success: A Theory-Based Controlled Randomized Field Intervention for Evidence-Based Management." *Academy of Management Learning and Education* 13(3) September: 354-79.
- Glewwe, P., M. Kremer, and S. Moulin. 2009. "Many Children Left Behind? Textbooks and Test Scores in Kenya." *American Economic Journal: Applied Economics* 1(1) January: 112-35.
- Goldberg, P. K., and N. Pavcnik. 2007. "Distributional Effects of Globalization in Developing Countries." *Journal of Economic Literature* 45(1) March: 39-82.

- González, M., and J. A. Guzmán. 2012. "Las pruebas que confirman la venta de acreditaciones a universidades privadas." Centro de Investigación Periodística (CIPER), Santiago. December 10. Available at <http://ciperchile.cl/2012/12/10/las-pruebas-que-confirman-la-venta-de-acreditaciones-a-universidades-privadas/>. Accessed January 2017.
- González-Velosa, C., L. Ripani, and D. Rosas-Shady. 2012. "How Can Job Opportunities for Young People in Latin America Be Improved?" IDB Technical Note no. 345. Inter-American Development Bank, Washington, DC.
- González-Velosa, C., D. Rosas-Shady, and R. Flores-Lima. 2016. "On-the-Job Training in Latin America and the Caribbean: Recent Evidence." In M. Grazzi and C. Pietrobelli, eds., *Firm Innovation and Productivity in Latin America and the Caribbean: The Engine of Economic Development*. Washington, DC: Inter-American Development Bank and New York, NY: Palgrave Macmillan.
- González-Velosa, C., and G. Rucci. 2016. "Methods to Anticipate Skills Demand." IDB Technical Note no. 954. Inter-American Development Bank, Washington, DC.
- González-Velosa, C., G. Rucci, M. Sarzosa, and S. Urzúa. 2015. "Returns to Higher Education in Chile and Colombia." IDB Working Paper no. 587. Inter-American Development Bank, Washington, DC.
- Goos, M., A. Manning, and A. Salomons. 2009. "Job Polarization in Europe." *American Economic Review* 99(2) May: 58–63.
- . 2014. "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring." *American Economic Review* 104(8) August: 2509–26.
- Görlitz, K., and M. Tamm. 2016. "The Returns to Voucher-Financed Training on Wages, Employment and Job Tasks." *Economics of Education Review* 52 (June): 51–62.
- Grantham-McGregor, S. M., C. A. Powell, S. P. Walker, and J. H. Himes. 1991. "Nutritional Supplementation, Psychosocial Stimulation, and Mental Development of Stunted Children: The Jamaican Study." *Lancet* 338(8758) July: 1–5.
- Griliches, Z. 1977. "Estimating the Returns to Schooling: Some Econometric Problems." *Econometrica* 45(1) January: 1–22.
- Grimm, M., and A. L. Paffhausen. 2015. "Do Interventions Targeted at Micro-Entrepreneurs and Small and Medium-Sized Firms Create Jobs? A Systematic Review of the Evidence for Low and Middle Income Countries." *Labour Economics* 32 (January): 67–85.

- Gualavisi, M., and M. L. Oliveri. 2016. "Antigüedad en el empleo y rotación laboral en América Latina." IDB Technical Note no. 1072. Inter-American Development Bank, Washington, DC.
- Guryan, J., E. Hurst, and M. Kearney. 2008. "Parental Education and Parental Time with Children." *Journal of Economic Perspectives* 22(3) Summer: 23–46.
- Hall, J. C. 2006. "Positive Externalities and Government Involvement in Education." *Journal of Private Enterprise* 22(2) Spring: 165–75.
- Halpern, R. 2009. *The Means to Grow Up: Reinventing Apprenticeship as a Developmental Support in Adolescence*. New York, NY: Routledge.
- Hanson, G. H. 2007. "Globalization, Labor Income, and Poverty in Mexico." In A. Harrison, ed., *Globalization and Poverty*. Chicago, IL: University of Chicago Press.
- Hanushek, E. A. 2016. "Will More Higher Education Improve Economic Growth?" *Oxford Review of Economic Policy* 32(4) Winter: 538–52.
- Hanushek, E. A., P. E. Peterson, and L. Woessmann. 2014. "Not Just the Problems of Other People's Children: U.S. Student Performance in Global Perspective." PEPG Report no. 14–01. Program on Education Policy and Governance (PEPG) and *Education Next*, Taubman Center for State and Local Government, Harvard Kennedy School, Cambridge, MA.
- Hanushek, E. A., and S. G. Rivkin. 2012. "The Distribution of Teacher Quality and Implications for Policy." *Annual Review of Economics* 4(1) September: 131–57.
- Hanushek, E. A., and L. Woessmann. 2008. "The Role of Cognitive Skills in Economic Development." *Journal of Economic Literature* 46(3) September: 607–68.
- Harris, D. N., and T. R. Sass. 2011. "Teacher Training, Teacher Quality and Student Achievement." *Journal of Public Economics* 95(7–8) August: 798–812.
- Hart, B., and T. R. Risley. 1995. *Meaningful Differences in the Everyday Experience of Young American Children*. Baltimore, MD: Brookes Publishing Co.
- . 2003. "The Early Catastrophe: The 30 Million Word Gap by Age 3." *American Educator* [American Federation of Teachers] 27(1) Spring: 4–9.
- Hastings, J. S., C. A. Neilson, A. Ramírez, and S. D. Zimmerman. 2016. "(Un)Informed College and Major Choice: Evidence from Linked Survey and Administrative Data." *Economics of Education Review* 51(April): 136–51.

- Havnes, T., and M. Mogstad. 2015. "Is Universal Child Care Leveling the Playing Field?" *Journal of Public Economics* 127 (July): 100-14.
- Heckman, J. J. 2006. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science* 312(5782) June: 1900-02.
- Heckman, J. J., and P. J. Klenow. 1997. "Human Capital Policy." Paper. University of Chicago, Chicago, IL. Available at <http://klenow.com/HumanCapital.pdf>. Accessed May 2017.
- Heckman, J. J., J. Stixrud, and S. Urzúa. 2006. "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics* 24(3) July: 411-82.
- Herbst, D., and A. Mas. 2015. "Peer Effects on Worker Output in the Laboratory Generalize to the Field." *Science* 350(6260) October: 545-49.
- Hidalgo, D., H. Oosterbeek, and D. Webbink. 2014. "The Impact of Training Vouchers on Low-Skilled Workers." *Labour Economics* 31 (December): 117-28.
- Hill, C. J., H. S. Bloom, A. R. Black, and M. W. Lipsey. 2008. "Empirical Benchmarks for Interpreting Effect Sizes in Research." *Child Development Perspectives* 2(3) December: 172-77.
- Hincapié, D. 2016. "Do Longer School Days Improve Student Achievement? Evidence from Colombia." IDB Working Paper no. 679. Inter-American Development Bank, Washington, DC.
- Holzer, H. J. 2014. "Improving Employment Outcomes for Disadvantaged Students." In M. S. Kearney and B. H. Harris, eds., *Policies to Address Poverty in America*. Washington, DC: Brookings Institution.
- Horch, D. 2014. "As Demand for Education Rises in Brazil, For-Profit Colleges Fill the Gap." *New York Times*, June 19. Available at https://dealbook.nytimes.com/2014/06/19/as-demand-for-education-rises-in-brazil-for-profit-colleges-fill-the-gap/?_r=0. Accessed January 2017.
- Hossler, D., M. Ziskin, J. P. K. Gross, S. Kim, and O. Cekic. 2009. "Student Aid and Its Role in Encouraging Persistence." In J. C. Smart, ed., *Higher Education: Handbook of Theory and Research*. Volume 24. Dordrecht, Netherlands: Springer.
- Hoxby, C. M. 2000. "The Effects of Class Size on Student Achievement: New Evidence from Population Variation." *Quarterly Journal of Economics* 115(4) November: 1239-85.
- Huneus, C., C. de Mendoza, and G. Rucci. 2013. "Una visión crítica sobre el financiamiento y la asignación de recursos públicos para

- la capacitación de trabajadores en América Latina y el Caribe." IDB Discussion Paper no. 265. Inter-American Development Bank, Washington, DC.
- Ibarrarán, P., J. Kluve, L. Ripani, and D. Rosas-Shady. 2015. "Experimental Evidence on the Long-Term Impacts of a Youth Training Program." IZA Discussion Paper no. 9136. Institute for the Study of Labor (IZA), Bonn, Germany.
- Ibarrarán, P., L. Ripani, B. Taboada, J. M. Villa, and B. García. 2014. "Life Skills, Employability and Training for Disadvantaged Youth: Evidence from a Randomized Evaluation Design." *IZA Journal of Labor and Development* 3(1) December: 1-24.
- Ibarrarán, P., and D. Rosas-Shady. 2009. "Evaluating the Impact of Job Training Programmes in Latin America: Evidence from IDB Funded Operations." *Journal of Development Effectiveness* 1(2) June: 195-216.
- IDB (Inter-American Development Bank). Forthcoming. "Sector Framework Document: Labor." Document. Labor Markets Unit, IDB, Washington, DC.
- Jackson, C. K., R. C. Johnson, and C. Persico. 2016. "The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms." *Quarterly Journal of Economics* 131(1) February: 157-218.
- Jacobson, L. S., R. J. LaLonde, and D. G. Sullivan. 1993. "Earnings Losses of Displaced Workers." *American Economic Review* 83(4) September: 685-709.
- Jensen, R. 2010. "The (Perceived) Returns to Education and the Demand for Schooling." *Quarterly Journal of Economics* 125(2) May: 515-48.
- Jepsen, C., and S. Rivkin. 2009. "Class Size Reduction and Student Achievement: The Potential Tradeoff between Teacher Quality and Class Size." *Journal of Human Resources* 44(1) Winter: 223-50.
- Jepsen, C., K. Troske, and P. Coomes. 2014. "The Labor-Market Returns to Community College Degrees, Diplomas, and Certificates." *Journal of Labor Economics* 32(1) January: 95-121.
- Johnson, M. H. 1998. "The Neural Basis of Cognitive Development." In D. Kuhn and R. S. Siegler, eds., *Handbook of Child Psychology: Volume 2: Cognition, Perception, and Language*. Fifth edition. New York, NY: John Wiley and Sons.
- Kahneman, D. 2013. *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux.

- Kaplan, D. S., R. Novella, G. Rucci, and C. Vázquez. 2015. "Training Vouchers and Labor Market Outcomes in Chile." IDB Working Paper no. 585. Inter-American Development Bank, Washington, DC.
- Karlan, D., R. Knight, and C. Udry. 2012. "Hoping to Win, Expected to Lose: Theory and Lessons on Micro Enterprise Development." NBER Working Paper no. 18325. National Bureau of Economic Research, Cambridge, MA.
- Karlan, D., and M. Valdivia. 2011. "Teaching Entrepreneurship: Impact of Business Training on Microfinance Clients and Institutions." *Review of Economics and Statistics* 93(2) May: 510-27.
- Kearney, M. S., and P. B. Levine. 2015. "Early Childhood Education by MOOC: Lessons from *Sesame Street*." NBER Working Paper no. 21229. National Bureau of Economic Research, Cambridge, MA.
- Kemple, J. J. (with C. J. Willner). 2008. "Career Academies: Long-Term Impacts on Labor Market Outcomes, Educational Attainment, and Transitions to Adulthood." Report. MDRC, New York. Available at <http://www.mdrc.org/publication/career-academies-long-term-impacts-work-education-and-transitions-adulthood>. Accessed January 2017.
- Kemple, J. J., and J. C. Snipes. 2000. "Career Academies: Impacts on Students' Engagement and Performance in High School." Report. Manpower Demonstration Research Corporation, New York, NY. Available at http://www.mdrc.org/sites/default/files/Career_Academies_Impacts_on_Students.pdf. Accessed March 2017.
- Kerr, S. P., T. Pekkarinen, M. Sarvimäki, and R. Uusitalo. 2015. "Post-Secondary Education and Information on Labor Market Prospects: A Randomized Field Experiment." IZA Discussion Paper no. 9372. Institute for the Study of Labor (IZA), Bonn, Germany.
- Kirkeboen, L., E. Leuven, and M. Mogstad. 2016. "Field of Study, Earnings, and Self-Selection." *Quarterly Journal of Economics* 131(3) August: 1057-111.
- Krueger, A. B. 1999. "Experimental Estimates of Education Production Functions." *Quarterly Journal of Economics* 114(2) May: 497-532.
- Krueger, A. B., and D. M. Whitmore. 2001. "The Effect of Attending a Small Class in the Early Grades on College-Test Taking and Middle School Test Results: Evidence from Project STAR." *Economic Journal* 111(468) January: 1-28.
- Kugler, A., M. Kugler, J. Saavedra, and L. O. Herrera Prada. 2015. "Long-Term Direct and Spillover Effects of Job Training: Experimental

- Evidence from Colombia.” NBER Working Paper no. 21607. National Bureau of Economic Research, Cambridge, MA.
- Kuhn, D., and R. S. Siegler, eds. 1998. *Handbook of Child Psychology: Volume 2: Cognition, Perception, and Language*. Fifth edition. New York: John Wiley and Sons.
- Laajaj, R., A. Moya, and F. Sánchez. 2017. “Motivational Effects of a Nationwide Merit Scholarship Program for Low Income Students: Quasi-Experimental Evidence from Colombia.” Universidad de los Andes, Bogotá. Unpublished.
- Lai, F., R. Luo, L. Zhang, X. Huang, and S. Rozelle. 2015. “Does Computer-Assisted Learning Improve Learning Outcomes? Evidence from a Randomized Experiment in Migrant Schools in Beijing.” *Economics of Education Review* 47 (August): 34–48.
- Lai, F., L. Zhang, X. Hu, Q. Qu, Y. Shi, Y. Qiao, M. Boswell, and S. Rozelle. 2013. “Computer Assisted Learning as Extracurricular Tutor? Evidence from a Randomised Experiment in Rural Boarding Schools in Shaanxi.” *Journal of Development Effectiveness* 5(2): 208–31.
- Lansford, J. E., L. Peña Alampay, S. Al-Hassan, D. Bacchini, A. S. Bombi, M. H. Bornstein, L. Chang, K. Deater-Deckard, L. Di Giunta, K. A. Dodge, P. Oburu, C. Pastorelli, D. K. Runyan, A. T. Skinner, E. Sorbring, S. Tapanya, L. M. Uribe Tirado, and A. Zelli. 2010. “Corporal Punishment of Children in Nine Countries as a Function of Child Gender and Parent Gender.” *International Journal of Pediatrics* 2010: 1–12.
- Lara, B., A. Mizala, and A. Repetto. 2011. “The Effectiveness of Private Voucher Education: Evidence from Structural School Switches.” *Educational Evaluation and Policy Analysis* 33(2) June: 119–37.
- Lavado, P., J. J. Martínez, and G. Yamada. 2014. “¿Una promesa incumplida? La calidad de la educación superior universitaria y el subempleo profesional en el Perú.” Working Paper no. 2014–021. Central Reserve Bank of Peru, Lima.
- Lazear, E. P. 2009. “Firm-Specific Human Capital: A Skill-Weights Approach.” *Journal of Political Economy* 117(5) October: 914–40.
- Lederman, D., J. Messina, S. Pienknagura, and J. Rigolini. 2014. *Latin American Entrepreneurs: Many Firms but Little Innovation*. Washington, DC: World Bank.
- Leme, M. C., P. Louzano, V. Ponczek, and A. Portela Souza. 2012. “The Impact of Structured Teaching Methods on the Quality of Education in Brazil.” *Economics of Education Review* 31(5) October: 850–60.

- Lerman, R. 2014. "Do Firms Benefit from Apprenticeship Investments? Why Spending on Occupational Skills Can Yield Economic Returns to Employers." *IZA World of Labor* 2014(55) May: 1-10.
- . 2017. "Skill Development in Middle-Level Occupations: The Role of Apprenticeship Training." In J. Buchanan, D. Finegold, K. Mayhew, and C. Warhurst, eds., *The Oxford Handbook of Skills and Training*. New York, NY: Oxford University Press.
- Linden, L. L. 2008. "Complement or Substitute? The Effect of Technology on Student Achievement in India." InfoDev Working Paper no. 17. World Bank, Washington, DC.
- Liu, V. Y. T., C. R. Belfield, and M. J. Trimble. 2015. "The Medium-Term Labor Market Returns to Community College Awards: Evidence from North Carolina." *Economics of Education Review* 44(C) February: 42-55.
- LLECE (Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación). 2016. "Informe de resultados del Tercer Estudio Regional Comparativo y Explicativo (TERCE): logros de aprendizaje." Regional Bureau of Education for Latin America and the Caribbean (OREALC/UNESCO Santiago), Santiago. Available at <http://unesdoc.unesco.org/images/0024/002435/243532S.pdf>. Accessed April 2017.
- Lochner, L., and E. Moretti. 2004. "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports." *American Economic Review* 94(1) March: 155-89.
- Londoño-Vélez, J., C. Rodríguez, and F. Sánchez. 2017. "The Intended and Unintended Impacts of a Merit-Based Financial Aid Program for the Poor: The Case of *Ser Pilo Paga*." CEDE Working Paper no. 24. Centro de Estudios sobre Desarrollo Económico, Universidad de los Andes, Bogotá.
- López-Bazo, E., and R. Moreno. 2007. "Regional Heterogeneity in the Private and Social Returns to Human Capital." *Spatial Economic Analysis* 2(1): 23-44.
- Lora, E. 2015. "Déficit de técnicos y tecnólogos en Colombia." *Foco Económico* (blog), May 19. Available at <http://focoeconomico.org/2015/05/19/deficit-de-tecnicos-y-tecnologos-en-colombia/>. Accessed January 2017.
- Lora, E., and C. Pagés. 2010. "The Age of Productivity." In C. Pagés, ed., *The Age of Productivity: Transforming Economies from the Bottom Up*. Development in the Americas series. New York, NY: Palgrave Macmillan and Washington, DC: Inter-American Development Bank.
- Love, J. M., E. E. Kisker, C. Ross, H. Raikes, J. Constantine, K. Boller, J. Brooks-Gunn, R. Chazan-Cohen, L. B. Tarullo, C. Brady-Smith, A. S.

- Fuligni, P. Z. Schochet, D. Paulsell, and C. Vogel. 2005. "The Effectiveness of Early Head Start for 3-Year-Old Children and Their Parents: Lessons for Policy and Programs." *Developmental Psychology* 41(6) November: 885-901.
- Lucas, R. E., Jr. 1988. "On the Mechanics of Economic Development." *Journal of Monetary Economics* 22(1) July: 3-42.
- Maguire, S., J. Freely, C. Clymer, M. Conway, and D. Schwartz. 2010. "Tuning in to Local Labor Markets: Findings from the Sectoral Employment Impact Study." Report. Public/Private Ventures, Philadelphia, PA. Available at <http://ppv.issuelab.org/resources/5101/5101.pdf>. Accessed May 2017.
- Maloney, W., and C. Molina. 2016. "A Note on Labor Market Polarization in the Developing World." Paper. World Bank, Washington, DC. Unpublished.
- Manacorda, M., C. Sánchez-Páramo, and N. Schady. 2010. "Changes in Returns to Education in Latin America: The Role of Demand and Supply of Skills." *Industrial and Labor Relations Review* 63(2) January: 307-26.
- Mano, R. C., and M. Castillo. 2015. "The Level of Productivity in Traded and Non-Traded Sectors for a Large Panel of Countries." IMF Working Paper no. 15/48. International Monetary Fund, Washington, DC.
- Mano, Y., A. Iddrisu, Y. Yoshino, and T. Sonobe. 2012. "How Can Micro and Small Enterprises in Sub-Saharan Africa Become More Productive? The Impacts of Experimental Basic Managerial Training." *World Development* 40(3) March: 458-68.
- Martin, J. P. 2015. "Activation and Active Labour Market Policies in OECD Countries: Stylised Facts and Evidence on Their Effectiveness." *IZA Journal of Labor Policy* 4(1) December: 1-29.
- McCormick, M. C., J. Brooks-Gunn, S. L. Buka, J. Goldman, J. Yu, M. Salganik, D. T. Scott, F. C. Bennett, L. L. Kay, J. C. Bernbaum, C. R. Bauer, C. Martin, E. R. Woods, A. Martin, and P. H. Casey. 2006. "Early Intervention in Low Birth Weight Premature Infants: Results at 18 Years of Age for the Infant Health and Development Program." *Pediatrics* 117(3) March: 771-80.
- McEwan, P. J., E. Murphy-Graham, D. Torres Irribarra, C. Aguilar, and R. Rápalo. 2015. "Improving Middle School Quality in Poor Countries: Evidence from the Honduran Sistema de Aprendizaje Tutorial." *Educational Evaluation and Policy Analysis* 37(1) March: 113-37.

- McKenzie, D. 2017. "How Effective Are Active Labor Market Policies in Developing Countries? A Critical Review of Recent Evidence." Policy Research Working Paper no. 8011. World Bank, Washington, DC.
- McKenzie, D., and C. Woodruff. 2014. "What Are We Learning from Business Training and Entrepreneurship Evaluations around the Developing World?" *World Bank Research Observer* 29(1) January: 48-82.
- Meghir, C., and M. Palme. 2005. "Educational Reform, Ability, and Family Background." *American Economic Review* 95(1) March: 414-24.
- Melguizo, T., F. Sánchez, and T. Velasco. 2016. "Credit for Low-Income Students and Access to and Academic Performance in Higher Education in Colombia: A Regression Discontinuity Approach." *World Development* 80 (April): 61-77.
- Meller, P. 2011. *Universitarios, ¡el problema no es el lucro, es el mercado!* Santiago: Uqbar Editores.
- Messina, J., A. M. Oviedo, and G. Pica. 2016. "Inequality and Polarization in Latin America: Patterns and Determinants." Paper. World Bank, Washington, DC. Unpublished.
- Messina, J., and J. Silva. 2016. "Wage Inequality in Latin America: Trends and Puzzles." Paper. World Bank, Washington, DC. Unpublished.
- Ministry of Education of Peru. 2016. "Plan de gestión institucional del Programa Nacional de Becas y Crédito Educativo 2016-2021: rumbo al Bicentenario." Ministry of Education of Peru, Lima. Available at <http://repositorio.minedu.gob.pe/handle/MINEDU/5345>. Accessed May 2017.
- . 2017. "¡Expande tu mente! Activando el potencial educativo de estudiantes en Perú a través de una innovación psicológica." Report. Ministry of Education of Peru, Lima. Available at <http://www.minedu.gob.pe/minedulab/pdf/expande-tu-mente-minedu-lab.pdf>. Accessed May 2017.
- Mitnik, O. A., L. Ripani, and D. Rosas-Shady. 2016. "Comparing the Results of Youth Training Programs in Latin America and the Caribbean." IDB Discussion Paper no. 484. Inter-American Development Bank, Washington, DC.
- Mo, D., L. Zhang, R. Luo, Q. Qu, W. Huang, J. Wang, Y. Qiao, M. Boswell, and S. Rozelle. 2014. "Integrating Computer-Assisted Learning into a Regular Curriculum: Evidence from a Randomised Experiment in Rural Schools in Shaanxi." *Journal of Development Effectiveness* 6(3): 300-23.
- Mohan, P., E. Strobl, and P. Watson. 2016. "In-Firm Training, Innovation and Productivity: The Case of Caribbean Small Island Developing

- States." Paper presented at the Mona School of Business and Management's Second Business and Management Conference, November 9-11, Kingston, Jamaica.
- Molleda, L., Y. Estrada, T. K. Lee, S. Poma, A. M. Quevedo Terán, C. Condo Tamayo, M. Bahamón, M. I. Tapia, M. R. Velázquez, H. Pantin, and G. Prado. 2016. "Short-Term Effects on Family Communication and Adolescent Conduct Problems: Familias Unidas in Ecuador." *Prevention Science*, DOI: 10.1007/s11121-016-0744-2.
- Montenegro, C. E., and H. A. Patrinos. 2014. "Comparable Estimates of Returns to Schooling around the World." Policy Research Working Paper no. 7020. World Bank, Washington, DC.
- Moretti, E. 2004a. "Human Capital Externalities in Cities." In J. V. Henderson and J.-F. Thisse, eds., *Handbook of Regional and Urban Economics: Volume 4: Cities and Geography*. Amsterdam: North Holland.
- . 2004b. "Workers' Education, Spillovers, and Productivity: Evidence from Plant-Level Production Functions." *American Economic Review* 94(3) June: 656-90.
- Muehlemann, S., and S. C. Wolter. 2014. "Return on Investment of Apprenticeship Systems for Enterprises: Evidence from Cost-Benefit Analyses." *IZA Journal of Labor Policy* 3(1) December: 1- 22.
- Mullis, I. V. S., M. O. Martin, P. Foy, and A. Arora. 2012. *TIMSS 2011 International Results in Mathematics*. Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Lynch School of Education, Boston College; and Amsterdam: International Association for the Evaluation of Educational Achievement (IEA).
- Näslund-Hadley, E., A. Loera Varela, and K. A. Hepworth. 2014. "What Goes On inside Latin American Math and Science Classrooms: A Video Study of Teaching Practices." *Global Education Review* 1(3): 110-28.
- Neal, D. 1995. "Industry-Specific Human Capital: Evidence from Displaced Workers." *Journal of Labor Economics* 13(4) October: 653-77.
- Nguyen, T. 2008. "Information, Role Models and Perceived Returns to Education: Experimental Evidence from Madagascar." Job market paper. Massachusetts Institute of Technology, Cambridge, MA. Available at <https://www.povertyactionlab.org/sites/default/files/documents/Nguyen%202008.pdf>. Accessed April 2017.
- Nores, M., R. Bernal, and W. S. Barnett. 2016. "Center-Based Care for Infants and Toddlers: The AeioTU Randomized Trial." Paper. Unpublished.

- Nye, B., S. Konstantopoulos, and L. V. Hedges. 2004. "How Large Are Teacher Effects?" *Educational Evaluation and Policy Analysis* 26(3) Fall: 237-57.
- OECD (Organisation for Economic Co-operation and Development). 2003. "Upgrading Workers' Skills and Competencies." In *OECD Employment Outlook 2003: Towards More and Better Jobs*. Paris: OECD Publications.
- _____. 2010. *Learning for Jobs*. OECD Reviews of Vocational Education and Training series. Paris: OECD Publishing.
- _____. 2011. *OECD Economic Outlook*. No. 89, May. Paris: OECD Publishing.
- _____. 2016a. *OECD Employment Outlook 2016*. Paris: OECD Publishing.
- _____. 2016b. *PISA 2015 Results (Volume I): Excellence and Equity in Education*. Paris: OECD Publishing. Available at <http://dx.doi.org/10.1787/9789264266490-en>. Accessed May 2017.
- _____. 2016c. *Skills Matter: Further Results from the Survey of Adult Skills*. Paris: OECD Publishing.
- OECD (Organisation for Economic Co-operation and Development), CAF (Development Bank of Latin America), and ECLAC (United Nations Economic Commission for Latin America and the Caribbean). 2014. *Latin American Economic Outlook 2015: Education, Skills and Innovation for Development*. Paris: OECD Publishing.
- OECD (Organisation for Economic Co-operation and Development) and World Bank. 2012. *Tertiary Education in Colombia*. Reviews of National Policies for Education series. Paris: OECD Publishing.
- Olson, S. L., and A. J. Sameroff, eds. 2009. *Biopsychosocial Regulatory Processes in the Development of Childhood Behavioral Problems*. New York, NY: Cambridge University Press.
- Oosterbeek, H., and H. A. Patrinos. 2009. "Financing Lifelong Learning." *Empirical Research in Vocational Education and Training* 1(1): 19-37.
- Oosterbeek, H., M. van Praag, and A. Ijsselstein. 2010. "The Impact of Entrepreneurship Education on Entrepreneurship Skills and Motivation." *European Economic Review* 54(3) April: 442-54.
- Oreopoulos, P. 2006a. "The Compelling Effects of Compulsory Schooling: Evidence from Canada." *Canadian Journal of Economics/Revue canadienne d'économique* 39(1) February: 22-52.
- _____. 2006b. "Estimating Average and Local Average Treatment Effects of Education when Compulsory Schooling Laws Really Matter." *American Economic Review* 96(1) March: 152-75.

- Oreopoulos, P., and U. Petronijevic. 2013. "Making College Worth It: A Review of the Returns to Higher Education." *The Future of Children* 23(1) Spring: 41-65.
- Oreopoulos, P., and K. G. Salvanes. 2011. "Priceless: The Nonpecuniary Benefits of Schooling." *Journal of Economic Perspectives* 25(1) Winter: 159-84.
- Ost, B. 2014. "How Do Teachers Improve? The Relative Importance of Specific and General Human Capital." *American Economic Journal: Applied Economics* 6(2) April: 127-51.
- Page, L. C., and J. Scott-Clayton. 2016. "Improving College Access in the United States: Barriers and Policy Responses." *Economics of Education Review* 51 (April): 4-22.
- Patrinos, H. A. 2007. "Demand-Side Financing in Education." Education Policy Series no. 7. International Institute for Educational Planning (IIEP), Paris; and International Academy of Education (IAE), Brussels. Available at <http://unesdoc.unesco.org/images/0018/001817/181751e.pdf>. Accessed January 2017.
- Pires, T., and S. Urzúa. 2015. "Longer School Days, Better Outcomes?" Paper. University of North Carolina, Chapel Hill, NC; and University of Maryland, College Park, MD. Available at <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx0aWFnb2ljY2NwaXJlc3xneDoyNzE0NjJmMjgyZjMzYmMy>. Accessed May 2017.
- Pradhan, M., D. Suryadarma, A. Beatty, M. Wong, A. Gaduh, A. Alisjahbana, and R. P. Artha. 2014. "Improving Educational Quality through Enhancing Community Participation: Results from a Randomized Field Experiment in Indonesia." *American Economic Journal: Applied Economics* 6(2) April: 105-26.
- Premand, P., S. Brodmann, R. Almeida, R. Grun, and M. Barouni. 2012. "Entrepreneurship Training and Self-Employment among University Graduates: Evidence from a Randomized Trial in Tunisia." Policy Research Working Paper no. 6285. World Bank, Washington, DC.
- Pritchett, L. 2002. "When Will They Ever Learn? Why All Governments Produce Schooling." Paper. John F. Kennedy School of Government, Harvard University, Cambridge, MA. Available at https://www.hks.harvard.edu/fs/lpritch/Education%20-%20docs/ED%20-%20Gov%20action/whenlearn_v1.pdf. Accessed May 2017.

- Puerto, O. S. 2007. "Interventions to Support Young Workers in Latin America and the Caribbean: Regional Report for the Youth Employment Inventory." Report. World Bank, Washington, DC. Available at <http://documents.worldbank.org/curated/en/607051468772495470/pdf/406020LAC0Young0workers01PUBLIC1.pdf>. Accessed May 2017.
- Purnastuti, L., and R. Salim. 2015. "Externalities and the Social Return to Education in Indonesia." *Australian Journal of Labour Economics* 18(1): 53-74.
- Quintini, G., and T. Manfredi. 2009. "Going Separate Ways? School-to-Work Transitions in the United States and Europe." OECD Social, Employment and Migration Working Paper no. 90. OECD Publishing, Paris.
- Quintini, G., J. P. Martin, and S. Martin. 2007. "The Changing Nature of the School-to-Work Transition Process in OECD Countries." IZA Discussion Paper no. 2582. Institute for the Study of Labor (IZA), Bonn, Germany.
- Randel, B., A. D. Beesley, H. Apthorp, T. F. Clark, X. Wang, L. F. Cicchinelli, and J. M. Williams. 2011. *Classroom Assessment for Student Learning: Impact on Elementary School Mathematics in the Central Region*. Final Report. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Rau, T., E. Rojas, and S. Urzúa. 2013. "Loans for Higher Education: Does the Dream Come True?" NBER Working Paper no. 19138. National Bureau of Economic Research, Cambridge, MA.
- Rauch, J. E. 1993. "Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities." *Journal of Urban Economics* 34(3) November: 380-400.
- Reed, D., A. Y.-H. Liu, R. Kleinman, A. Mastri, D. Reed, S. Sattar, and J. Ziegler. 2012. "An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States." Final report. Mathematica Policy Research, Oakland, CA. Available at <https://www.mathematica-mpr.com/our-publications-and-findings/publications/an-effectiveness-assessment-and-costbenefit-analysis-of-registered-apprenticeship-in-10-states>. Accessed May 2017.
- Reedtz, C., B. H. Handegård, and W.-T. Mørch. 2011. "Promoting Positive Parenting Practices in Primary Care: Outcomes and Mechanisms of Change in a Randomized Controlled Risk Reduction Trial." *Scandinavian Journal of Psychology* 52(2) April: 131-37.

- Rezende Garcia, S. R., A. L. Zuppo Abed, and T. A. Pereira da Ponte. 2014. "Avaliação integrada de matemática, habilidades socioemocionais e resolução colaborativa de problemas." Study. Mind Lab, São Paulo, Brazil. Available at http://www.mindlab.com.br/mindlab/wp-content/uploads/2014/05/Artigo_Estudo2014_Fase1_05_05_2014.pdf. Accessed May 2017.
- Ricart, C., T. Morán, and C. Kappaz. 2014. *Toward a National Framework of Lifelong Learning in Mexico*. Washington, DC: Inter-American Development Bank.
- Rindermann, H. 2007. "The g-Factor of International Cognitive Ability Comparisons: The Homogeneity of Results in PISA, TIMSS, PIRLS and IQ-Tests across Nations." *European Journal of Personality* 21(5) August: 667-706.
- Riphahn, R. T., and M. Zibrowius. 2015. "Apprenticeship, Vocational Training and Early Labor Market Outcomes in East and West Germany." IZA Discussion Paper no. 8901. Institute for the Study of Labor (IZA), Bonn, Germany.
- Roberts, B. W., K. E. Walton, and W. Viechtbauer. 2006. "Patterns of Mean-Level Change in Personality Traits across the Life Course: A Meta-Analysis of Longitudinal Studies." *Psychological Bulletin* 132(1) January: 1-25.
- Robledo, R. 2015. "The Five R's: 'Stand and Deliver' Revisited." *USA Today*, March 26. Available at <https://www.usatoday.com/story/news/education/2015/03/26/five-rs-stand-deliver-revisited/70494946/>. Accessed April 2017.
- Rodríguez, J., and S. Urzúa. 2011. "Una evaluación de los programas de capacitación en Chile con registros administrativos." Paper. Ministry of Finance of Chile, Santiago. April. Unpublished.
- Rodríguez, J., S. Urzúa, and L. Reyes. 2016. "Heterogeneous Economic Returns to Post-Secondary Degrees: Evidence from Chile." *Journal of Human Resources* 51(2) Spring: 416-60.
- Rodríguez-Planas, N. 2012. "Longer-Term Impacts of Mentoring, Educational Services, and Learning Incentives: Evidence from a Randomized Trial in the United States." *American Economic Journal: Applied Economics* 4(4) October: 121-39.
- Rohwedder, S., and R. J. Willis. 2010. "Mental Retirement." *Journal of Economic Perspectives* 24(1) Winter: 119-38.
- Rose, M. 2004. *The Mind at Work: Valuing the Intelligence of the American Worker*. New York, NY: Viking Penguin.

- Rosendahl Huber, L., R. Sloof, and M. van Praag. 2014. "The Effect of Early Entrepreneurship Education: Evidence from a Field Experiment." *European Economic Review* 72 (November): 76–97.
- Rosero, J., and H. Oosterbeek. 2011. "Trade-offs between Different Early Childhood Interventions: Evidence from Ecuador." Tinbergen Institute Discussion Paper No. 11-102/3. Faculty of Economics and Business, University of Amsterdam, and Tinbergen Institute, Amsterdam.
- Rouse, C. E. 1998. "Private School Vouchers and Student Achievement: An Evaluation of the Milwaukee Parental Choice Program." *Quarterly Journal of Economics* 113(2) May: 553–602.
- Rupietta, C., and U. Backes-Gellner. 2015. "Collective Knowledge Processing and Innovation." Paper presented at the DRUID2015 conference, The Relevance of Innovation, June 15–17, Rome.
- Ryan, P. 1998. "Is Apprenticeship Better? A Review of the Economic Evidence." *Journal of Vocational Education and Training* 50(2): 289–325.
- . 2001. "The School-to-Work Transition: A Cross-National Perspective." *Journal of Economic Literature* 39(1) March: 34–92.
- Saavedra, A. R., and J. E. Saavedra. 2011. "Do Colleges Cultivate Critical Thinking, Problem Solving, Writing and Interpersonal Skills?" *Economics of Education Review* 30(6) December: 1516–26.
- Salmi, J. 2011. "La gratuidad en la educación superior entre la teoría y la realidad." PowerPoint presentation.
- . 2013. "Tertiary Education in Latin America and the Caribbean: Challenges and Opportunities." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Salmi, J., and A. M. Hauptman. 2006. "Innovations in Tertiary Education Financing: A Comparative Evaluation of Allocation Mechanisms." Education Working Paper no. 4. World Bank, Washington, DC.
- Santelices, M. V., X. Catalán, D. Kruger, and C. Horn. 2016. "Determinants of Persistence and the Role of Financial Aid: Lessons from Chile." *Higher Education* 71(3) March: 323–42.
- Santiago, P., K. Tremblay, E. Basri, and E. Arnal. 2008. *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report*. Volume 2. Paris: OECD Publishing. Available at <http://www.oecd.org/education/skills-beyond-school/40330439.pdf>. Accessed January 2017.
- Santibañez, L. 2006. "Why We Should Care if Teachers Get A's: Teacher Test Scores and Student Achievement in Mexico." *Economics of Education Review* 25(5) October: 510–20.

- Schady, N., J. Behrman, M. C. Araujo, R. Azuero, R. Bernal, D. Bravo, F. López Boo, K. Macours, D. Marshall, C. Paxson, and R. Vakis. 2015. "Wealth Gradients in Early Childhood Cognitive Development in Five Latin American Countries." *Journal of Human Resources* 50(2) Spring: 446-63.
- Schneider, M., and E. Stern. 2010. "The Cognitive Perspective on Learning: Ten Cornerstone Findings." In H. Dumont, D. Istance, and F. Benavides, eds., *The Nature of Learning: Using Research to Inspire Practice*. Paris: OECD Publishing.
- Schoar, A. 2010. "The Divide between Subsistence and Transformational Entrepreneurship." *Innovation Policy and the Economy* 10(1): 57-81.
- Schochet, P. Z., J. Burghardt, and S. McConnell. 2008. "Does Job Corps Work? Impact Findings from the National Job Corps Study." *American Economic Review* 98(5) December: 1864-86.
- Schurer, S. 2016. "Education and Non-Cognitive Skill Development in Adolescence." Paper. School of Economics, University of Sydney, Sydney, Australia. Unpublished.
- Scott-Clayton, J. 2015. "The Role of Financial Aid in Promoting College Access and Success: Research Evidence and Proposals for Reform." *Journal of Student Financial Aid* 45(3) Fall: 7-22.
- Scott-Clayton, J., and S. Baum. 2013. "Redesigning the Pell Grant Program for the Twenty-First Century." Hamilton Project Policy Brief no. 2013-04. Brookings Institution, Washington, DC.
- Sénéchal, M., and J.-A. LeFevre. 2002. "Parental Involvement in the Development of Children's Reading Skill: A Five-Year Longitudinal Study." *Child Development* 73(2) March-April: 445-60.
- Sharma, D. 2011. "The Impact of Financial Incentives on Academic Achievement and Household Behavior: Evidence from a Randomized Trial in Nepal." Ph.D. dissertation. Ohio State University, Columbus, Ohio.
- Shonkoff, J. P., and A. S. Garner. 2012. "The Lifelong Effects of Early Childhood Adversity and Toxic Stress." *Pediatrics* 129(1) January: e232-e246.
- Sicherman, N., and O. Galor. 1990. "A Theory of Career Mobility." *Journal of Political Economy* 98(1) February: 169-92.
- Siegel, J. J. 2008. *Stocks for the Long Run: The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies*. Fourth edition. New York, NY: McGraw-Hill.
- Slavin, R. E. 1995. "A Model of Effective Instruction." *Educational Forum* 59(2) Winter: 166-76.

- Snilstveit, B., J. Stevenson, D. Phillips, M. Vojtkova, E. Gallagher, T. Schmidt, H. Jobse, M. Geelen, M. G. Pastorello, and J. Eyers. 2015. "Interventions for Improving Learning Outcomes and Access to Education in Low- and Middle-Income Countries: A Systematic Review." Systematic Review no. 24. International Initiative for Impact Evaluation (3ie), London.
- Solís, A. 2017. "Credit Access and College Enrollment." *Journal of Political Economy* 125(2) April: 562-622.
- Solon, G. 1992. "Intergenerational Income Mobility in the United States." *American Economic Review* 82(3) June: 393-408.
- Spear, L. 2009. *The Behavioral Neuroscience of Adolescence*. New York, NY: W. W. Norton and Co.
- St. Pierre, R. G., J. I. Layzer, B. D. Goodson, and L. S. Bernstein. 1997. "National Impact Evaluation of the Comprehensive Child Development Program: Final Report." Abt Associates, Cambridge, MA. Available at <http://www.abtassociates.com/reports/D19970050.pdf>. Accessed February 2017.
- Stampini, M., S. Duryea, S. Insfrán, and X. Alemán. 2016. "Do Socio-emotional Skills Predict Dropout from Youth Programs?" Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Steinberg, L., S. Graham, L. O'Brien, J. Woolard, E. Cauffman, and M. Banich. 2009. "Age Differences in Future Orientation and Delay Discounting." *Child Development* 80(1) January/February: 28-44.
- Stephens, M., Jr., and D.-Y. Yang. 2014. "Compulsory Education and the Benefits of Schooling." *American Economic Review* 104(6) June: 1777-92.
- Stevens, A. H., M. Kurlaender, and M. Grosz. 2015. "Career Technical Education and Labor Market Outcomes: Evidence from California Community Colleges." NBER Working Paper no. 21137. National Bureau of Economic Research, Cambridge, MA.
- Stormshak, E. A., G. M. Fosco, and T. J. Dishion. 2010. "Implementing Interventions with Families in Schools to Increase Youth School Engagement: The Family Check-Up Model." *School Mental Health* 2(2) June: 82-92.
- Strehl, F., S. Reisinger, and M. Kalatschan. 2007. "Funding Systems and Their Effects on Higher Education Systems." OECD Education Working Paper no. 6. OECD Publishing, Paris.
- Székely, M. 2012. "Analysis of IDB Operations for Technical and Vocational Education and Training at the Secondary Level." Report. Inter-American Development Bank, Washington, DC. Unpublished.

- Székely, M., and P. Mendoza. 2016a. "Declining Inequality in Latin America: Structural Shift or Temporary Phenomenon?" *Oxford Development Studies*, DOI: 10.1080/13600818.2016.1140134.
- . 2016b. "Patterns, Trends and Policy Implications of Private Spending on Skills Development in Mexico and the United States." Paper. Inter-American Development Bank, Washington, DC. Unpublished.
- Tenti Fanfani, E., coord. 2010. "Estado del arte: escolaridad primaria y jornada escolar en el contexto internacional. Estudio de casos en Europa y América Latina." Study. International Institute for Educational Planning (IIEP - UNESCO), Buenos Aires. Available at http://www.buenosaires.iipe.unesco.org/sites/default/files/SEP%2520Mx%2520Estado_arte%2520jornada%2520escolar.pdf. Accessed May 2017.
- Thompson, R. A., and H. A. Raikes. 2007. "The Social and Emotional Foundations of School Readiness." In D. F. Perry, R. K. Kaufmann, and J. Knitzer, eds., *Social and Emotional Health in Early Childhood: Building Bridges between Services and Systems*. Baltimore, MD: Brookes Publishing Co.
- Thorn, K., L. Holm-Nielsen, and J. S. Jeppesen. 2004. "Approaches to Results-Based Funding in Tertiary Education: Identifying Finance Reform Options for Chile." Policy Research Working Paper no. 3436. World Bank, Washington, DC.
- Toivanen, O., and L. Väänänen. 2016. "Education and Invention." *Review of Economics and Statistics* 98(2) May: 382-96.
- Topel, R. 1999. "Labor Markets and Economic Growth." In O. C. Ashenfelter and D. Card, eds., *Handbook of Labor Economics*. Volume 3C. Amsterdam: North Holland.
- Torres, J., and J. M. Agüero. 2017. "Stylized Facts about the Quantity and Quality of Parental Time Investments on the Skill Formation of Their Children." IDB Working Paper no. 777. Inter-American Development Bank, Washington, DC.
- Tuttle, C. C., B. Gill, P. Gleason, V. Knechtel, I. Nichols-Barrer, and A. Resch. 2013. "KIPP Middle Schools: Impacts on Achievement and Other Outcomes." Final Report. Mathematica Policy Research, Washington, DC. Available at file:///C:/Users/cathyc/Downloads/KIPP_middle.pdf. Accessed March 2017.
- UKCES (UK Commission for Employment and Skills). 2014. "The Labour Market Story: Skills Use at Work." Briefing paper. UKCES, London. Available at <https://www.gov.uk/government/uploads/>

- system/uploads/attachment_data/file/343457/The_Labour_Market_Story_-_Skills_Use_at_Work.pdf. Accessed May 2017.
- UNESCO-UIS (UNESCO Institute for Statistics). 2012. "International Standard Classification of Education: ISCED 2011." UNESCO-UIS, Montreal, Quebec, Canada. Available at <http://www.uis.unesco.org/Education/Documents/isced-2011-en.pdf>. Accessed May 2017.
- UNICEF (United Nations Children's Fund). 2016. UNICEF Global Databases. Data and Analytics Section and Research and Policy, UNICEF Division of Data. Available at <https://data.unicef.org/about-us/>. Accessed May 2017.
- Urquiola, M. 2006. "Identifying Class Size Effects in Developing Countries: Evidence from Rural Bolivia." *Review of Economics and Statistics* 88(1) February: 171-77.
- Urzúa, S., and E. Puentes. 2010. "La evidencia del impacto de los programas de capacitación en el desempeño en el mercado laboral." IDB Technical Note no. 268. Inter-American Development Bank, Washington, DC.
- Valdivia, M. 2011. "Training or Technical Assistance? A Field Experiment to Learn What Works to Increase Managerial Capital for Female Microentrepreneurs." CAF Working Paper no. 2011/02. Development Bank of Latin America (CAF), Caracas.
- van IJzendoorn, M. H., and F. Juffer. 2005. "Adoption Is a Successful Natural Intervention Enhancing Adopted Children's IQ and School Performance." *Current Directions in Psychological Science* 14(6) December: 326-30.
- Van Ryzin, M. J., E. A. Stormshak, and T. J. Dishion. 2012. "Engaging Parents in the Family Check-Up in Middle School: Longitudinal Effects on Family Conflict and Problem Behavior through the High School Transition." *Journal of Adolescent Health* 50(6) June: 627-33.
- Vegas, E., G. Elacqua, E. Martínez, M. S. Bos, and K. Hruskovec González. 2016. "Education and Early Childhood Development Sector Framework Document." Education Division, Inter-American Development Bank, Washington, DC. Available at <http://www.iadb.org/en/sector/education/sector-framework,18217.html>. Accessed April 2017.
- Vegas, E., and A. Ganimian. 2013. "Theory and Evidence on Teacher Policies in Developed and Developing Countries." IDB Working Paper no. 438. Inter-American Development Bank, Washington, DC.
- Verdisco, A., S. Cueto, and J. Thompson. 2016. "Early Childhood Development: Wealth, the Nurturing Environment and Inequality: First

- Results from the PRIDI Database.” IDB Working Paper no. 716. Inter-American Development Bank, Washington, DC.
- Verdisco, A., S. Cueto, J. Thompson, and O. Neuschmidt. 2015. “Urgency and Possibility: First Initiative of Comparative Data on Child Development in Latin America.” Report. Inter-American Development Bank, Washington, DC. Available at <https://publications.iadb.org/bitstream/handle/11319/6849/PRIDI.%20Urgency%20and%20Possibility..pdf?sequence=1>. Accessed January 2017.
- Volman, V. 2016. “Financiamiento educativo en la región de América Latina y el Caribe: 2000 a 2015.” Report. Education Division, Inter-American Development Bank, Washington, DC. Unpublished.
- Waldinger, F. 2012. “Peer Effects in Science: Evidence from the Dismissal of Scientists in Nazi Germany.” *Review of Economic Studies* 79(2) April: 838–61.
- Walker, S. P., S. M. Chang, M. Vera-Hernández, and S. Grantham-McGregor. 2011. “Early Childhood Stimulation Benefits Adult Competence and Reduces Violent Behavior.” *Pediatrics* 127(5) May: 849–57.
- Walker, S. P., C. Powell, S. M. Chang, H. Baker-Henningham, S. Grantham-McGregor, M. Vera-Hernández, and F. López-Boo. 2015. “Delivering Parenting Interventions through Health Services in the Caribbean: Impact, Acceptability and Costs.” IDB Working Paper no. 642. Inter-American Development Bank, Washington, DC.
- Walters, C. R. 2015. “Inputs in the Production of Early Childhood Human Capital: Evidence from Head Start.” *American Economic Journal: Applied Economics* 7(4) October: 76–102.
- Wayne, A. J., and P. Youngs. 2003. “Teacher Characteristics and Student Achievement Gains: A Review.” *Review of Educational Research* 73(1) Spring: 89–122.
- Webster-Stratton, C. 1998. “Preventing Conduct Problems in Head Start Children: Strengthening Parenting Competencies.” *Journal of Consulting and Clinical Psychology* 66(5) October: 715–30.
- WHO Multicentre Growth Reference Study Group. 2006. *WHO Child Growth Standards: Length/Height-for-Age, Weight-for-Age, Weight-for-Length, Weight-for-Height and Body Mass Index-for-Age: Methods and Development*. Geneva, Switzerland: World Health Organization.
- Wolf, P., B. Gutmann, M. Puma, B. Kisida, L. Rizzo, N. Eissa, and M. Carr. 2010. *Evaluation of the DC Opportunity Scholarship Program: Final Report*. Washington, DC: National Center for Education Evaluation

- and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Woodward, A. L., and E. M. Markman. 1998. "Early Word Learning." In D. Kuhn and R. S. Siegler, eds., *Handbook of Child Psychology: Volume 2: Cognition, Perception, and Language*. Fifth edition. New York: John Wiley and Sons.
- Wooldridge, J. M. 2010. *Econometric Analysis of Cross Section and Panel Data*. Second edition. Cambridge, MA: MIT Press.
- World Bank. 2016. *World Development Report 2016: Digital Dividends*. Washington, DC: World Bank.
- Worth, J., J. Sizmur, R. Ager, and B. Styles. 2015. "Improving Numeracy and Literacy: Evaluation Report and Executive Summary." Education Endowment Foundation, London.
- Ysseldyke, J., and D. M. Bolt. 2007. "Effect of Technology-Enhanced Continuous Progress Monitoring on Math Achievement." *School Psychology Review* 36(3) September: 453-67.
- Zick, C. D., and W. K. Bryant. 1996. "A New Look at Parents' Time Spent in Child Care: Primary and Secondary Time Use." *Social Science Research* 25(3) September: 260-80.
- Zill, N. 2001. "Does *Sesame Street* Enhance School Readiness? Evidence from a National Survey of Children." In S. M. Fisch and R. T. Truglio, eds., *"G" Is for Growing: Thirty Years of Research on Children and Sesame Street*. Mahwah, NJ: Lawrence Erlbaum Associates.

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