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More Skills for Work and Life:

The contributions
of Families, Schools,
Jobs, and the Social
Environment

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FOREWORD

Skills are the foundation of human capital. They are the abilities that a person can use to effectively solve various problems, and they not only include knowledge or abstract reasoning, but also personality traits, beliefs, and even physical dexterities. Skills are gradually accumulated throughout life, developing even before birth, and are essential to individual and social wellbeing.

Although Latin America has made significant progress in social and economic matters, expanding, for example the coverage of basic utilities to large portions of the population that had been historically excluded, there is still a long way to go on the path to development. Higher educational coverage coexists with generally low academic achievement and high inequality among children from different socioeconomic levels. On the other hand, GDP growth has been slow in the past fifty years, especially because of the productivity problems that affect both firms and the workers themselves. Furthermore, violence levels are still high in many countries. There are also challenges faced by the region regarding the quality of the habitat, since 1 of every 4 people lives in informal settlements, where there is not much access to basic utilities such as drinking water, there are many latent or active pollution sources, and transportation infrastructure does not help in connecting people to job opportunities.

All these challenges to the economic development of Latin America are closely linked to human capital shortcomings, that is, to deficiencies in the development of cognitive, socioemotional, and physical skills of the population. This report shows that having more skills implies obtaining a better quality job and being more productive, having better physical and mental health, participating more actively in civil life, completing more years of education, and feeling greater satisfaction with one's life, among other aspects of personal wellbeing. As for social development aspects, a population with more skills will have fewer problems coordinating collective decision-making, which helps make better public policy decisions and lowers levels of social conflict. Besides, a higher level of skills for the whole population means laying sound foundations for equal opportunities and more equitable income distribution. These social issues, added to higher productivity at work, give rise to economic growth and a better general sense of wellbeing. In fact, evidence suggests that the differences in human capital (in skills) are precisely the ones that can better explain the difference between the amazing growth of Southeast Asia and the slow progress of the GDP in Latin America since 1960.

This report also emphasizes that unlike human capital measures of years of education, skills for work and life are not developed only in the educational institutions. The family, the physical and social environments (for example, the neighborhood or community), and the labor market are also contexts of crucial importance in skill accumulation. In these four institutions, the development of people's capacities takes place in a cumulative and continuous process. However, there are two stages of life that gain greater relevance in this process: early childhood and youth. Hence, investing in the youngest of people today implies high benefits tomorrow. This possibility is of utmost importance for a region such as ours —one that is relatively young and can exploit the profits of the so-called demographic dividend.

This view of the accumulation of skills in multiple contexts implies many challenges for public policies. On one side, it is no longer the educational system only that has the sole and greatest responsibility. The efforts made in the educational context, such as providing more and better resources to the schools (in particular, teachers), must be accompanied by initiatives that help families invest in the best way possible in their children, helping especially to dedicate quality time to them, in order to encourage their development from very early in life. Likewise, the educational system must connect

to the labor market in order to improve the vocational decisions of youth, providing instruction, information, and experiences that permit a transition to good jobs. These connections between the family, the school, and the labor market would benefit from an environment equipped with adequate physical and social infrastructure. In this respect, the challenge of policies is to generate horizontal coordination and cooperation schemes between all public agencies in charge of the provision of goods and services useful for families, schools, and the labor market, as well as for neighborhoods, cities or rural areas.

The challenge is big, but so will be the benefits for our children and youth. Through this new edition of the Report on Economic Development (RED), CAF seeks to make a new contribution for a public policy agenda that promotes greater human capital for the development of the region.

L. Enrique García
CAF's Executive President

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SKILLS: MEASUREMENT AND LATIN AMERICA'S CURRENT SITUATION AND OUTLOOK

Chapter 1

Chapter 1

SKILLS: MEASUREMENT AND LATIN AMERICA'S CURRENT SITUATION AND OUTLOOK¹

Introduction

In order to have a prosperous, healthy, and happy life, it is necessary to have certain tools available. Those tools are the skills that help people successfully navigate labor markets, life in society, and family life.

In the past few decades, Latin America has experienced remarkable progress on several fronts. For example, it extended social service coverage to vulnerable sectors of the population, improved its economic performance, and strengthened its democratic standing. Nevertheless, economic development has not fully taken hold. A key factor to achieving this is to improve the region's quality and quantity of human capital. Skills for work and life are the essential pillars in this improvement process.

Skills are the basis of the know-how, the habits, and the personality attributes that contribute not only to labor productivity, but also to the enrichment of personal relationships, the capacity to set ambitious goals and to plan how to reach them, the commitment to a more engaged civic life, and the maintenance of healthy habits. But the benefits of skills are not restricted to the individual level. A population with more skills will be able to better coordinate the steps necessary to providing more public goods and services, better control threats to public health (e.g., epidemics, pandemics), and have lower levels of internal conflict. That is, the positive externalities of individual skills benefit society as a whole.

In addition, facilitating the formation of skills implies leveling the playing field, which lays the foundation for equity. This is true because skills for life and work are needed to succeed in the labor market, and thus help to break the intergenerational persistence of poverty and social exclusion.

That said, the skills for life and work that are important today, may not necessarily be so in the future. Each historic era has required different skills to achieve full individual and aggregate development. For example, tens of thousands of years ago, people's physical dexterity for gathering food and protecting themselves from the dangers of nature were crucial, but now those skills are far less critical, as high levels of certain cognitive skills, such as mathematical reasoning capabilities, language development,

1. The preparation of this chapter was under the responsibility of Lucila Berniell and Dolores de la Mata, with the research assistance of Agustina Hatrick, Cynthia Marchioni, Carlos Rodríguez, and Julieta Vera Rueda.

Skills evolve in accordance with many events and investments that take place from very early in life to well into adulthood.

and socioemotional skills (character skills, such as self-sufficiency and perseverance) have the greatest influence in determining the quality of life of people and countries. That is why this report also analyzes the main technological and social changes that can explain which skills will be required in years to come.

In addition, this report stresses the importance of the various stages of skill development throughout life and within four learning contexts, which go beyond the traditional educational institutions to include the family context, physical and social contexts (e.g., the neighborhood of residence), and the labor market. It is clear that skills are not fixed or immutable, nor are they carved in stone at birth. They evolve in accordance with many events or investments made from very early in life throughout adulthood. The most critical time of life for skills development begins before birth and ends after adolescence.

In this manner, investing in today's young children may bring great benefits tomorrow. This possibility is of great importance for Latin America, a region with a relatively young population that still can get returns out of the so-called demographic dividend. Investing more in the young population (that in Latin America will continue to grow until around 2020) will better prepare youth to the labor market and to create competitive economies that can support the national social security systems. But the challenges to developing sufficient skills for life and work need to be addressed today, because skill formation is a slow, although continuous, process that starts very early in life.

Skills for Work and Life: Definitions and Measurement

What Do We Mean When We Talk about Skills? Views from Psychology, Economics, and Neuroscience

Skills are the capabilities that individuals apply to efficiently resolve different problems or face new and complex situations. Therefore, skills influence job performance, how well people get along with family and friends, how well they are integrated in civic life, and even their health habits. There are many types of skills, including reasoning ability, values, motor dexterity and functionality, and character or temperament abilities that are accumulated throughout the years, even before birth.² Thus, the concept of skills covers a wide variety of domains that include mental, physical, and emotional components.

2. This definition of skills is related to the notion of competencies, widely used in education science.

Given this multiplicity of domains, skills have been studied in many disciplines with generally complementary insights and approaches. The forerunner in the field of skill development was psychology, and the newest addition is neuroscience.³ Economics has made intermittent appearances in the field and has been active in it the last few years.

Among the many branches of psychology involved in the study of skills, personality psychology and cognitive psychology have been the most active. The former focuses on analyzing the so-called personality traits,⁴ which are thought of as relatively stable patterns of thoughts, feelings, and behaviors that underlie the decisions, actions, and expressions of an individual's character (Almlund et al., 2011). According to this view, the manner in which a person behaves is not simply a matter of chance, and an underlying logic permits understanding it. However, this does not mean that a given personality may be easily understood or that it is carved in stone. On the contrary, although certain parts of the personality or character appear early in life and have a strong biological component (such as temperament), there are others that gradually form based on the contribution of elements that appear throughout life, enabling the evolution and accumulation of traits (Almlund et al., 2011).

Cognitive psychology, the other field in psychology focused on skills development, is one of the disciplines that makes up modern neuroscience, which deals with the most complex of the body's organs: the brain. The brain is the operations center of the body—the great orchestra conductor of our thoughts and feelings— and, therefore, it has a fundamental role in the development and use of skills of all types. Although a crucial concern of neuroscience is cognition, this mental process is so vast and complex that it covers much more than intellect or intelligence, and it also includes the most varied aspects of human conduct: How do our neurons form the connections that allow us to talk, think, trust, see, or love? In order to understand the great challenge that is studying the brain, neuroscience combines, in addition to cognitive psychology, other approaches and methods that range from biology, chemistry, and medicine to computer sciences, linguistics, physics, mathematics, and economics. An important aspect of this approach is its tendency to understand human behavior with an integrality that cannot separate the physical from the intellectual aspects, or the innate from acquired characteristics. The brain thinks and feels, and it is a product of genetics as well as of multiple environmental effects that change its structure and functionality.

Economics has also contributed to the understanding of skills both conceptually and methodologically, providing new strategies for quantifying or measuring

3. Neuroscience is actually a set of disciplines that study the development of the nervous system by analyzing the impacts of genetic, environmental, and social conditions on human conduct.

4. Actually, at a conceptual level, personality psychology distinguishes two aspects related to personality: the traits (factors that are primitive or underlying) and the personality itself, which is a function of individual answers in the face of different situations that uses the personality traits as inputs (Borghans et al, 2008).

Cognitive skills may be described as the mental capabilities and processes for learning, for processing information, and for making decisions.

skills. Economics worked for many decades with its own notions of skills, such as human capital, risk aversion, or impatience (intertemporal discounting), some of which closely correspond with those used by psychology or neurosciences. For economists, human capital is strongly associated with the skills that increase labor productivity, and risk aversion and impatience are key notions to understanding economic decisions regarding consumption and saving. In respect to methodological and measurement aspects, economics has contributed to a better understanding of what constitutes the most *primitive* factors behind different skill expressions, to modeling the production function of skills, and to assessing the causal effects of certain skills on several dimensions of wellbeing of people and of countries.

How Many Skills Are There?

Many skills come up in conversation daily. Types of skills include: hard, soft, work, social, communication, negotiation, computational, numerical, and language, but the list could go on and on. However, some of these skills have characteristics in common, allowing for the formation of differentiated taxonomies or groups. A first major division proposes only two types: cognitive and noncognitive skills.

Cognitive skills are closely related to the notion of intelligence and may be described as the mental capabilities and processes for learning, information processing, and decision making (Borghans et al., 2008). Such skills include attention, memory, reasoning and calculation, problem solving, and understanding and producing language, among others. All these cognitive processes occur both consciously and unconsciously, using the preexisting stock of knowledge (usually known as crystallized intelligence), and the flexibility to create new knowledge (known as fluid intelligence).⁵ Another important classification within the cognitive dimension refers to the executive functions (Text Box 1.1).

Noncognitive skills then include everything that does not imply the use of cognitive processes. This binary classification of skills faces two major problems. First, it is extremely difficult to find a dimension in human conduct that is not supported by some cognitive process (we must remember that the brain is the great coordinator of thoughts and feelings). Second, within the noncognitive category, the skills are too diverse, especially when considering emotional aspects (management of anxiety or capacity for empathy) and physical dexterities (muscular strength or sharpness of the senses). In order to partially solve this problem but at the same time address a practicable number of skill domains, this report uses a classification

5. In addition, fluid and crystallized intelligence are configured differently throughout life. Fluid intelligence is closely connected to neurophysiological variables, for example to the development of neuronal connections. It attains its maximum development fairly early, around adolescence. During the adult years, this capability usually progressively reduces as the body gets older, at the same time that neuronal structures deteriorate. But the reduction in fluid intelligence can also be due to other factors, such as accidents, pathologies, narcotic drug consumption, etc. On the other hand, crystallized intelligence can be reinforced regardless of the age, provided that an investment is made in the accumulation of new knowledge, although, of course, that investment can be more difficult to maintain over the years.

that comprises three groups: cognitive, socioemotional, and physical skills. Nevertheless, these three development domains have gray areas, with certain dexterities or talents in common. These gray zones become evident, for example, in some of the so-called executive functions (see Text Box 1.1). In addition, and as will be clear when describing the skill formation processes, the three development domains complement one another in the progressive development of new capabilities throughout life.

The three skills domains –cognitive, socioemotional, and physical– complement one another to produce new capabilities.

Text Box 1.1 Executive Functions

Cognitive neuroscience has identified a series of brain functions that allow to focus thoughts, filter distractions, to maintain information in the short term memory that is used to make decisions, and to shift focus when necessary. These functions are crucial to inhibiting and manipulating thoughts and actions, in order to achieve specific objectives (Center on the Developing Child, 2012). These are the executive functions, which include a series of cognitive processes (attention control, working memory, inhibitory control or self-control, and planning) that are necessary to carry out actions in a coordinated and efficient manner.

These functions may be classified as subgroups of the cognitive skills, although they include also socioemotional aspects. The aspects requiring the most cognitive processes of the executive functions have been known as cold (e.g., working memory), while the hot processes describe more emotional aspects, such as inhibition or postponement of gratification (Berlinski and Schady, 2015). That is, the notion of executive functions clarifies the conceptual difficulties in distinguishing between strictly cognitive or strictly socioemotional skills.

Executive functions are quite basic, or basal, since thinking, evoking and remembering information, solving problems, as well as generating certain complex symbolic activities used in oral language, reading and writing, mathematical calculation and social behavior critically depend on them (Hermida, 2015). They are also basal since they develop mostly in the early childhood. But this development does not occur in a vacuum. Executive functions are formed in day-to-day interactions with the environment. In a favorable context that development will be optimal, though it will also occur in a less favorable context, but less strongly (Hermida, 2015).

Strategies to quantify these skills differ according to the subject's life stage. For example, in children over 2 years old, the executive functions that are usually measured are: the working memory (retaining information, such as a series of numbers or words, for a short period of time); self-control or inhibition of behaviors or answers to certain demands imposed by a specific situation (not opening a box until a bell rings, resisting the temptation to eat that delicious candy waiting by for a better reward, or inhibiting an answer that was initially accurate but that later is not); attention span or shifting attention to focus on something new, as necessary (changing the focus of attention from a color stimulus to one of quantity; Fernald et al. 2009).

Source. Authors' elaboration.

Socioemotional skills are closely related to personality and emotional regulation capabilities,⁶ both of one's own emotions and other people's.⁷ The personality is formed on the basis of temperament, which starts to emerge very early and seems to have a strong biological basis (Kagan, 2012). Socioemotional skills include perseverance, self-control, trust in others and in oneself, self-esteem, resiliency, or capacity to recover from problems, empathy, tolerance toward different opinions, etc. (Heckman and Kautz, 2013). That is, people with healthy socioemotional development are capable of understanding and managing emotions, establishing and reaching positive goals, feeling and showing empathy toward others, and establishing and maintaining positive relationships (CASEL, 2016).

Finally, the concept of physical development is closely connected to the condition of a person's health at each moment in life. In this manner, good physical skills permit the efficient use of motor dexterities and the senses to perform a specific task. While certain motor skills may play a major role in labor market performance (Prada and Urzua, 2014), complete physical development—good health—will have a key role not only at work but also in many other areas of life (Heckman, 2012), and it will be a relevant input for cognitive and socioemotional development.

In turn, the skills for both work and life include numerous types of wisdom and dexterity that may be specific to the situation at hand. For example, among the skills used at work, communication, negotiation, and creativity, are common. Among the skills used in social settings, empathy, perseverance, or self-esteem, are common. Yet both groups of skills are useful in both areas of life, since they are part of the toolbox that helps people handle new or complex situations in different environments. Beyond this, the important thing is to recognize that skills for work and life are no more than the result of vibrant, harmonious and persistent development of the cognitive, socioemotional, and physical spheres.

How Can We Measure Them?

General Challenges in Skill Measurement

It is probable that two classmates with the same grade in mathematics are not equally "intelligent," or, rather, it is probable that they do not have the same level of cognitive skills. It is also probable that two people who intend to complete a marathon and achieve it do not have equal socioemotional or physical skills.

6. Emotional regulation refers to the extrinsic and intrinsic processes responsible for monitoring, assessing, and modifying emotional reactions (Thompson, 1991). It consists of the various strategies people use to control their emotions and those of others (self-regulation and interpersonal regulation, respectively), such as for example, denying them, scaling them, intensifying them, weakening them, or hiding them.

7. Emotional self-regulation refers to the understanding and management of a person's own emotions, while interpersonal regulation refers to how people understand and try to help in the management of other people's emotions.

Obtaining quantitative measurements of skills is a complex task. In particular, translating behavioral performance to numeric measure involves the difficulty of separating the primitive factor associated to a certain skill from all other environmental aspects or other dimensions of skills that affect the conduct observed. Therefore, the main challenge in skill measurement is finding metrics that reflect the true skills –which are unobservable– as faithfully as possible.

The main challenge in skill measurement is finding metrics that reflect the true skills –which are unobservable– as faithfully as possible.

To this end, a common practice of measuring cognitive and socioemotional skills is to use performance results on tests (e.g., intelligence or educational performance tests, or tests to measure the degree of self-control to various stimuli). Other strategies include using questionnaires with direct questions on socioemotional aspects of the personality. And other skill measurements constructed on the basis of observation of real life behaviors are also common (such as educational progress, problem consumption of psychoactive substances, and suffering from physical or mental health disorders, among others).

The approach of assessing measurements through results on performance tests is not trivial. The fundamental problem is that the result obtained in a test that tries to measure performance on a certain task (mathematical calculations) depends not only on that (cognitive) skill, but also on all the rest of a person's skills (such as motivation or perseverance) as well as on the system of incentives that can encourage that person to make a greater effort to answer each question in the test (Heckman and Kautz, 2013). Notwithstanding these problems, performance tests have been and continue to be extremely useful in advancing the understanding of certain skills as well as in helping to answer crucial questions regarding how they are developed, how they change over time, and how they affect the quality of life and of work. In particular, this has been possible because of technical developments that permit a significant cleanup of some measurement problems.⁸

As for measures obtained using questionnaires with direct questions that attempt to disclose self-perceived personality or health characteristics, another two problems may be added to those above: the social desirability of the answers (the bias to say what others want to hear) and the different standards of reference from which each person answers self-perception questions. On these issues, measurement specialists have also made advances that today permit better self-reporting of measures that more faithfully reflect the true underlying skills.⁹

8. For example, once various measures that can reflect the same type of skill are available, a way to correct some of the measurement problems described is the use of special statistical techniques, which at the same time helps to reduce the number of dimensions or factors associated with that particular skill. These techniques range from factorial analysis to more sophisticated methods that impose more structure on the estimations (as Heckman et al., 2006; Cunha et al., 2010).

9. Among these developments are different survey design techniques that include negative/positive questions and various internal consistency checks, survey experiments (experiments of lists, experiments of adherence), psychological projection strategies applied to questionnaires, anchoring, and vignette techniques, etc.

Another critical aspect of the measurement of skills has to do with the time of life in which they are measured. It is not the same to measure cognitive, socioemotional, or physical skills in small children as it is in adults. Chapter 2 makes an effort to detail the most appropriate measurements to use measuring the three dimensions of skills in the first stages of life. For example, two types of cognitive skills are distinguished there: performance and executive functions. As life progresses, cognitive skills, and well as their measurement, become increasingly more complex and diversified.

Measurement of Cognitive Skills

In psychology literature, broad evidence supports the idea that intelligence is not explained by a single factor, so it can be broken down into several dimensions (Almlund et al., 2011). Specifically, there is a certain consensus that cognitive skills are ordered hierarchically, with a higher-order factor or cognitive skill called *g factor*, which is an excellent predictor of many tasks associated with cognition.¹⁰ But there are also factors or cognitive skills of a second order, which have a predictive power additional to the higher factor and may have a different impact on different tasks. Although there is less consensus on which are those second order skills (Pellegrino and Hilton, 2013), fluid and crystallized intelligence are usually included among them.¹¹

In respect to how to measure factors of a different kind, there are various alternatives. The so-called aptitude tests (that measure the IQ) are designed to measure differences in learning rates or the ability to learn, and therefore are more associated with fluid intelligence.¹² Another category is the performance tests, which are designed to measure acquired knowledge, in which crystallized intelligence plays a more leading role. Some examples of the latter tests are the standardized tests (see Text Box 1.2), the numerical skills tests, or verbal conceptualization tests, among many others.¹³

Throughout this report different metrics will be used to organize cognitive skills, among which are the results in academic performance tests (such as PISA or LLECE tests), a fluid intelligence test (Raven Progressive Matrices Test; Raven PMT), a measure of verbal skills (Brief Test of Verbal Conceptualization; BTVC), and several measures of numerical skills. Many of these measures were collected by the 2015 CAF Survey for a representative sample of people from 15 to 55 years of age in 10 large cities in an equal number of Latin American countries. See the appendix for more detail.

10. Using factorial analysis techniques, it has been found that the *g* factor explains at least half of the variability in the scores of various tests of intelligence (Borghans et al. 2008).

11. These two notions are described in greater detail in the section called "How Many Skills Are There?"

12. For example, this is the case on the Raven Progressive Matrices Test.

13. The Appendix of this chapter describes the tests of this type that have been included in the 2015 CAF Survey (with a target population between 15 and 55 years of age) and will be analyzed throughout this report. In addition, the Appendix of Chapter 2 details other measures of cognitive skills used in performance tests of small children.

Text Box 1.2 Standardized Tests in Schools As Measures of Cognitive Skills

The standardized achievement tests attempt to construct harmonized cognitive skill measurements of large groups of students of a certain age or grade. The most paradigmatic examples are the official tests (generally national) that many countries have in place to measure the level of general knowledge in the school population in different areas of knowledge (e.g., language, mathematics, and sciences). These tests are basically used to evaluate the evolution of the educational system's quality, but there are others that are intended to determine if the students exceed a certain minimum threshold of required skills, such as those required to enter higher education (high stakes tests). There are also international tests aimed at making comparisons across countries regarding average academic performance of students of the same age or who are attending equivalent school grades.

National Tests

Table 1 lists the Latin American countries that have their own national tests and details the most relevant characteristics about grades tested, subjects evaluated, and frequency of exam administration. With respect to the costs of these tests, although the numbers may vary widely from country to country, what is clear is that they are extremely profitable given the quantity of information generated, which can be used to improve education quality. In fact, recent estimates suggest that implementing a performance test in high school in Latin America would cost only 0.1% of the average expee per student in that level (UNESCO-UIS, 2016).

Table 1 National Academic Performance Tests

Country	Number of grades included	Number of components (subjects) covered	Frequency	Latest year administered (to beginning of 2015)	Name of test
Argentina	4	4	Triennial	2013	Operativo Nacional de Evaluación (ONE)
Barbados	1	2	Annual	2014	Criterion-Reference test
Belize	1	2	Annual	2014	Junior Achievement test (BJAT)
Bolivia	5	2	-	2000	Sistema de Medición de Calidad de la Educación (SIMECAL)
Brazil	4	3	Biennial	2013	Provinha Brasil
Chile	6	7	Annual	2014	Sistema de Medición de Calidad de la Educación (SIMCE)
Colombia	4	6 ^{a/}	Annual ^{b/}	2013 ^{c/}	Pruebas SABER
Costa Rica	2	6 ^{d/}	Annual	2014 ^{e/}	Pruebas Nacionales Diagnósticas de II y III Ciclo de la Educación General Básica (EGB)
Cuba	5	2	-	2002	Pruebas de Aprendizaje
Dominican Republic	3	4 ^f	Annual	2014 ^g	Pruebas Nacionales, Evaluación diagnóstica primer ciclo de educación básica y primer ciclo de educación media

Continued >

Country	Number of grades included	Number of components (subjects) covered	Frequency	Latest year administered (to beginning of 2015)	Name of test
Ecuador	4	4	-	2013	Sistema de Evaluación y Rendición de la Educación (SER)
El Salvador	5	4	Annual	2014	Prueba de Aprendizaje y Aptitudes para Egresados de Educación Media (PAES) and Evaluación de Logros de Aprendizaje en Educación Básica
Guatemala	4	2	Annual	2014	Sistema Nacional de Evaluación e Investigación Educativas (DIGEDUCA)
Guyana	4	5	Annual	2014	National Assessment
Honduras	9	3	Annual	2014	Evaluación de Rendimiento Académico
Jamaica	4	4 ^{b/}	Annual	2014	Grade 1 Individual Learning Profile, Grade 3 Diagnostic Test, Grade 4 Literacy and Numeracy Tests, Grade 6 Achievement Text (GSAT)
Mexico	8	4 ^v	Annual	2014	Factor Aprovechamiento Escolar de Carrera Magisterial, Instrumento para el Diagnóstico de Alumnos de Nuevo Ingreso Secundaria, Examen de la Calidad de Logro Educativo (EXCALE), ENLACE Educación Básica, ENLACE Media Superior
Nicaragua	3	2	-	2009	Evaluación Nacional
Panama	3	4	-	2008	Sistema Nacional de Evaluación de la Calidad de los Aprendizajes (SINECA)
Paraguay	4	4	-	2010	Sistema Nacional de Evaluación del Proceso Educativo (SNEPE)
Peru	2	4	Annual	2014	Evaluación Censal de Estudiantes (ECE)
Trinidad and Tobago	2	4	Annual	2014	National Test
Uruguay	4	3	Annual	2014	Sistema de Evaluación en Línea (SEA)
Venezuela	3	2	-	1998	Sistema Nacional de Medición y Evaluación del Aprendizaje

a/ The SABER test subjects differ according to grade. So the test given in grade 11 (SABER 11) has six components (language, English, mathematics, sciences, social studies, and philosophy); the test in grade 3 has two components (language and mathematics); the test in grade 5 has three components (language, mathematics, and science); and the test in grade 9 has four components (language, mathematics, science and economics and finance).

b/ Only SABER 11 has an established annual frequency.

c/ The last year when SABER 11 was given; the SABER tests of the lower grades were given for the last time in 2012.

d/ Diagnostic tests for second cycle General Basic Education consist of four components (language, mathematics, science and social studies), while for those in the third cycle, the components of French and English languages are added.

e/ The last year when this test was given.

f/ The diagnostic evaluation of the first cycle of basic education has only two components (reading and mathematics).

g/ The last year the diagnostic evaluations of the first cycle of basic education were given was 2013.

h/ There are different components for different grades. For grade 1 there are six components (reading, numbers, concepts, oral language, writing, and drawing); in grade 3 there are two components (language and mathematics), for grade 4 there are two components (language and mathematics), and for grade 6 there are four components (English, mathematics, sciences and social studies).

i/ There are different components according to the standardized test.

Source. Authors' elaboration based on United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2015).

International Comparison

In addition to the official national tests in each country, there are the international evaluations. In this report, extensive reference will be made of the two international initiatives with the most Latin American participation. The first test is the Program for International Student Assessment (PISA), developed by the Organisation for Economic Co-operation and Development (OECD) for evaluating students in secondary education. The second test is from the Latin American Laboratory of Evaluation of the Quality of Education (LLECE), developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) for primary education students. There are, of course, other international tests, but few are widely implemented in Latin America. Some of these less frequently used tests, administered by International Association for the Evaluation of Educational Assessment, are the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS).

PISA Tests

The object of the of the OECD's PISA is to assess the knowledge and skills acquired by students near the completion of their mandatory education (at 15 years of age). The first round of the PISA tests was held in 2000, and since then they have been administered every 3 years in a group of countries. The number of participating countries has grown with each round, and more and more Latin American countries have participated. The tests cover reading, mathematics, and sciences (in some countries other areas such as financial knowledge are included), but each year stress is placed on a specific subject area. For example, in 2009, the emphasis of the test was in reading; in 2012, mathematics; and in 2015, sciences. To assess performance with the PISA, representative samples from 4,500 to 10,000 students from public and private schools of each country are used; these students are selected at random so that nationally based inferences on the results can be made.

By the time this report was written, the latest PISA test with data available was that of 2012 where 65 countries participated. The Latin American countries that participated are Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Uruguay.

LLECE Tests

UNESCO, through LLECE, produced three regional tests focused on primary education. These tests are the First Regional Comparative and Explicative Study (PERCE, from the Spanish name; 1997), the Second Regional Comparative and Explanatory Study (SERCE, from the Spanish name; 2006), and the Third Regional Comparative and Explanatory Study (TERCE, from the Spanish name; 2013).

While PERCE assesses students of third and fourth grades on the basis of the common contents of the official curricula in the language and mathematics tests, SERCE and TERCE tests evaluate students of third and sixth grades and incorporate the area of natural sciences for the students of sixth grade. In the TERCE tests almost all countries of Latin America have participated, with the exceptions of Bolivia, Cuba, Honduras, and Venezuela.

Limitations to Inferring Skills from Achievement Tests

Academic performance or achievement tests are not exempt from criticism. There are those who say that the tests skew the incentives of educational policymakers toward investing only to improve the scores of the assessments (resulting in teaching to the test), while others claim that the results of the academic performance tests do not necessarily faithfully reflect cognitive skills. This conclusion is based on the measurement problems that prevent separating the effects of other skill dimensions and of the system of incentives under which they are managed (Heckman and Kautz, 2013).

A reflection of this last criticism is offered by two examples of performance tests in the United States. The first is the main post-high school exams used for university admissions (meant to be a bar of how well the student will perform in university), the Scholastic Aptitude Test, is capable of predicting performance in only a very limited manner, while a student's secondary school grades are actually better predictors (Almlund et al., 2011). The second example is in a recent study (Heckman et al., 2014) showing that passing the General Educational Development Test, the equivalent of minimum high school graduation standards, is not necessarily associated with the same positive results later in life that high school graduation produces. That is, although the standardized tests are extremely useful for educational policy, they cannot be the only instruments on which investment decisions in human capital by governments or families are based.

Source. Authors' elaboration.

The Big Five taxonomy is commonly used for examining socioemotional skills. The five traits in this model are: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience.

Measurement of Socioemotional Skills

Certain psychometric tools permit approximations of the socioemotional skills through self-reported surveys and reports from observers. Although there is no unequivocal agreement regarding which are the most relevant character dimensions to understand individual personalities, these tools propose different taxonomies that they then try to measure. The best known and most widely used is one that puts together five factors that make up "personality coordinates." This classification or taxonomy is known as the Big Five model, and it examines a cognitive dimension of skills that are believed to have a single higher order factor and several second-order factors, in the socioemotional dimension, these five are all of higher order. The five factors are: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience.

Nevertheless, the Big Five model is only useful for measuring socioemotional development in adults. In the case of children, the instruments that characterize this dimension of development vary markedly and are aimed at, for example, analyzing aspects of the temperament and finding indications of prosocial behavior, hyperactivity, attention deficit, or oppositional defiant disorders.¹⁴

14. Chapter 2 describes in detail the measures of socioemotional development in children.

There are other measures or taxonomies widely used for socioemotional skills in adults that, as in the case of the Big Five, are also measured based on scales constructed with direct questions (self-reporting) that are later validated.¹⁵ The Grit scale by Duckworth and Quinn (2009), the general Self-Efficacy scale (Schwarzer and Jerusalem, 1995), or the Rosenberg Self-Esteem scale, among others, use self-reporting. Several of these measures have a strong association with some dimension of the Big Five (Table 1.1).

Table 1.1 The Big Five: Definition and Associated Personality Traits

Factor	Description (according to the American Psychological Association)	Adjectives correlated to the different aspects measured	Relation to personality traits
Conscientiousness	Tendency to be organized, responsible, hard working	Efficient Organized Fussy Ambitious Not lazy Not impulsive	Perseverance or grit (determination), self-control, need for achievement, ambition, work ethics
Openness to experiences	Tendency to be open to new esthetical, cultural, or intellectual experiences	Imaginative Artistic Enthusiastic With various interests Curious With unconventional values	
Extraversion	Orientation of own interest and energy toward the outside world (people and things) more than the interior world (subjective experience); characterized by positive emotions and sociability	Friendly Sociable Self-confident Energetic Adventurer Enthusiastic	
Agreeableness	Tendency to act in a cooperative manner, not selfish	Indulgent Non demanding Altruist Good treatment Modest	Empathy, cooperation
Emotional instability (Neuroticism) ^{a/}	Unpredictability and inconsistency in emotional reactions, with sudden changes of behavior	Anxious or distressed Irritable Depressed or unhappy Shy or self-conscious Impulsive or temperamental Vulnerable to stress or not self-confident	Internal/external locus of control, low self-esteem, low self-efficacy, low optimism, mental health problems (including depression and anxiety disorders)

a/ This factor is often defined in its positive manner (emotional stability), and it will be treated that way throughout this report.

Source. Authors' elaboration based on Borghans et al. (2008) and Almlund et al. (2011).

15. The validation of these scales involves several steps, among them the analysis of the internal consistency and of the capacity of the tests to predict behaviors observed in the daily life of the study subjects. Unfortunately, this validation usually incurs some circularity problems (Heckman and Kautz, 2014).

In the measurement of physical skills, both anthropometric and self-reported measures are generally used.

In the 2015 CAF Survey, some of these scales were adopted in addition to a measure of risk tolerance.¹⁶ The Appendix describes the complete list of measures of socioemotional skills included in the 2015 CAF Survey and that will be referred to several times in this report.

Some mental health assessments could also be included in the area of socioemotional development measurements. However, mental health is more a result of life than a tool or a skill. For that reason, the two measures of mental health that were incorporated in the 2015 CAF Survey (suffering from stress, as measured through the Perceived Stress Scale [PSS] and showing symptoms of depression, measured through the depression scale of the Center for Epidemiological Studies [CES-D]), will not be treated within the group of skills but will be analyzed as results of the people's wellbeing.

Measurement of Physical Skills and Health

On the subject of physical development, measurement also varies widely according to age. The most appropriate measures for the first years of life have to do with nutritional condition and incidence or recurrence of certain diseases. These are described in detail in Chapter 2.

Given the close relationship of this dimension of skill formation with health conditions, measures may be obtained from medical records, although they are usually not available for the general population neither are comparable between countries. There are also anthropometric or biometric measures that capture certain aspects related to people's physical condition (e.g., the body mass index [BMI] measurement used for adults, or the percentage of body fat) and even demographic information (e.g., birth weight). Some of such measures are based on self-reporting. Among these, the self-reported health status is widely used, which asks the people to rank their perceived health condition on a scale from very bad to very good or excellent, for example.¹⁷ Other self-reported measures are: difficulty of performing day-to-day activities, dealing with chronic disease, sleep habits, healthy habits (food intake, physical exercise, and cigarette and alcohol consumption).

In this report some anthropometric measures will be used, as well as several self-reported measures. Some of these have been incorporated in the 2015 CAF Survey and are described in detail in the Appendix.

16. The risk tolerance measure was obtained by giving a choice of different options of fictitious lotteries, each with a different level of associated risks.

17. Self-reported health measurements have several problems. The first is the social desirability for a positive answer, that is, it is possible that in certain contexts, people tend to answer that they have a good health condition because they believe that in some way they are being evaluated through this indicator. Additionally, people may have different ideas regarding what is considered to be "good" or "bad" health. In this case the problem has to do with the frame of reference of each person. For both problems there exist techniques to obtain more accurate health measures (survey experiments, anchoring and vignette, etc.).

How Are Skills Formed?

Stages and Contexts of Skill Formation

People are not born with a predetermined and unalterable set of skills. Although genetics can play an important initial role, increasingly plentiful evidence shows that skills accumulate throughout life. However, not all periods of life are equally favorable for skill accumulation. For example, in respect to brain development—which is essential for all dimensions of skills development—two types periods with more or less accelerated changes usually stand out (the critical and sensitive periods). These periods are detailed in Text Box 1.3.

Text Box 1.3. Brain Plasticity, Critical and Sensitive Development Periods, and Skill Malleability throughout Life

The brain plays an essential role in the development of all skills. Brain development occurs gradually throughout life and is based on a continuous interaction between genetic factors and the environment in which each individual lives. Neural or brain plasticity is the set of changes that takes place in the components or connections of the nervous system, and some processes are more accelerated than others.

Brain plasticity consists of several processes. Among them are two basic developments that are well differentiated and occur unequally throughout life: synapsis generation and myelination. While synapsis generation (connection between the axon of a neuron and the dendrite of another neuron using neurotransmitters) builds bridges for the transmission of information between neurons; myelination (sheathing of the neuron axons) reinforces those bridges so it contributes to increasing information processing speed. Different than synapsis generation, which occurs in only the first 2 decades of life, myelination occurs throughout life (Lipina and Segretin, 2015).

On the other hand, only half of the neurons survive into adulthood. This is due to the fact that the brain goes through a process of reduction of neuronal connections (synaptic pruning) that arises from the need to “make efficient” the processing of information, destroying the connections between neurons that are little frequented and eliminating neurons from that pathway (Center on the Developing Child, 2007).

These processes make up the existence of the so-called critical and sensitive periods in the formation of the nervous system. Although both stages are characterized by high brain plasticity, they are two different concepts. Critical periods are those of maximum reorganization of brain structures and functions; they have more irreversible characteristics, seem to occur early in life (Wachs et al., 2014), and correspond, for example, to the neuronal pruning that takes place in the first few years of life. If for any

reason the stimuli received during the critical periods were adverse or absent, some specific skills or traits may develop less than satisfactorily, which can have an effect on the brain changes that take place later in life. In turn, sensitive periods remain open for a longer period of time.

Evidence on the existence and length of critical periods for the development of areas other than sensorial areas (e.g., higher cognitive and socioemotional) is less conclusive (Lipina and Segretin, 2015). This has led to the sensitive periods being considered of crucial importance, as their limits may also be altered by experience or, more generally, the influence of the environment and the investments made to stimulate development. This implies accepting that in sensitive periods, any lack of stimulus or the presence of negative stimulus can be reversed, although each time with greater effort.

This more flexible view of brain development, which combines the existence of both periods, implies that skills are modifiable or malleable throughout life. However, there is plenty of evidence to suggest that the first 2 decades of life are of vital importance (Lipina and Segretin, 2015), both for cognitive and socioemotional and physical development. In addition, it is necessary to add that the prefrontal cortex develops slowly, and its maturity occurs just after adolescence. Changes in the prefrontal cortex are associated with key areas for cognitive and socioemotional development (such as self-regulation, management of stress, and making of decisions), and, therefore, not only early childhood but also puberty and adolescence are periods of great relevance to investing in the development of new skills.

Source. Authors' elaboration.

That is, there are different stages in the formation of skills, but that does not mean that each one should be treated as isolated from the rest: everything that occurs in one stage of life (e.g., first few years of life) will affect the formation of skills in subsequent stages. Thus, the skills that an individual has at a particular moment in time are the result of the past contributions of different factors —and their interrelations— that have modeled them and been their foundation, and this development process never ends.

In addition to these skill formation stages, it is important to consider the elements or determinants that contribute to skill accumulation. These elements are of four different types: initial conditions, direct investments, environmental factors, and previous skills (those accumulated up to that moment in time).

Initial conditions, which can be interpreted as the health and genetic stock that an individual has at the beginning of life, are important. However, they are not carved in stone, since they can be strongly affected by environmental effects that cause different genes to express themselves (Lundborg and Stenberg, 2010).

Then there are the **direct investments**, which are those made with the explicit purpose of encouraging the formation of skills and are channeled through four fundamental contexts in which people live their lives: the family, schools, the labor market, and the environment (that may be both physical, such as the neighborhood of residence, and social, as it reflects the people with which a person frequently interacts). These institutions or contexts of skill formation have different relevance at different times in life. Text Box 1.4 (see p. 39) describes an exercise using a time use survey that shows which of these four contexts people spend their time in throughout their lives. This is important because as one spends more time in a given context the more possibilities will open up to channel investments through it. Given the importance that each of these social contexts has in personal development and their clear association with the different stages of life, this report takes them as guiding principles in the analysis of the formation of skills for work and life in Latin America and dedicates one chapter to each.

Direct investments are channeled through four institutional contexts that are fundamental in people's lives: the family, the school system, the labor market, and the social environment.

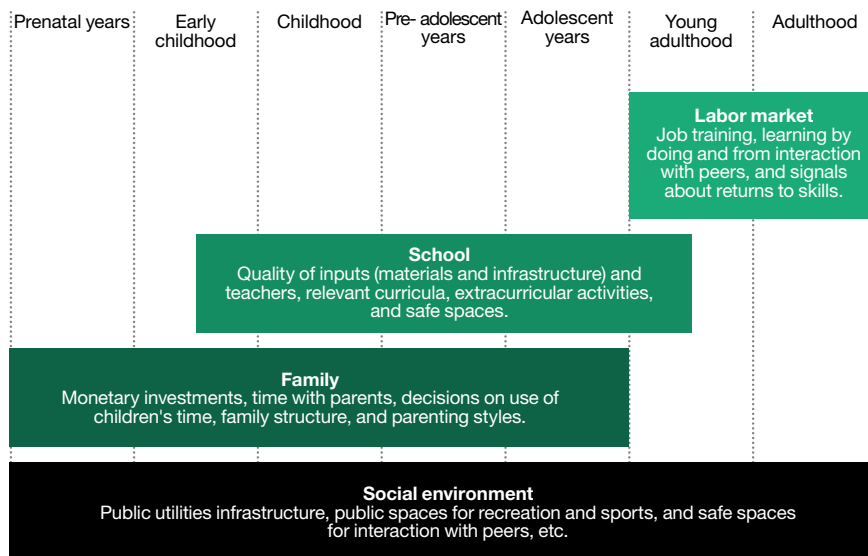
In each context of skill formation, investments of different types are channeled; ideally they complement one another in such a way as to make the most of skill accumulation. For example, the family is very important in the first few years of life (up to adolescence),¹⁸ and basically provides three types of investments: monetary resources, time with parents, and effort to design and implement a set of rules governing the interactions between the members of the household (Chapter 2). In addition, the school system invests in children not only through the transmission of curricular and extracurricular content—which is possible thanks to the existence of certain physical inputs (infrastructure and materials)—but also through the quality of everything in the school environment, particularly the teachers (Chapter 3). The labor market (Chapter 4) provides opportunities through practice and learning from peers and presents possibilities for formal training (general and specific training courses). In addition, the labor market sends signals to people who have not yet begun working (those still under greater influence of families and schools) about which skills have the highest returns and therefore about which type of investments are more appropriate.

With respect to **environmental factors** (Chapter 5), it is important to recognize their influence throughout the course of life, understanding that physical and social conditions may help or limit the formation of skills. In particular, there are three aspects that determine environmental influence in this process: the existence of infrastructure and public services that are complementary to the investments of family, school, and the labor market; the recurrent presence of certain negative shocks (e.g., economic crisis or exposure to violence or conflict) that may entangle or complicate a lot

18. The influence of parents on the formation of their children is more noticeable in the first stages of life, up through adolescence. In the transition to adulthood, many people form their own families, and in this way the direct investments of their parents lose relevance.

of the investments made in the other contexts; and fruitful (or destructive) interaction with peers.

Figure 1.1 Stages of Life and the Four Contexts of Skill Formation



Source: Authors' elaboration.

Finally, the **previous skills** (that a person has accumulated up to a given moment) also take part in subsequent skill accumulation. For example, it is intuitive to think that a person who learns quickly (is very “intelligent”) will end up accumulating greater cognitive skills than another for whom it is a little harder to learn new things (self-productivity). Furthermore, there are interactions between different types of previous skills. For example, a high level of cognitive skills will produce better results when accompanied by high levels of grit or perseverance to reach personal goals. In this case, both high cognitive and high socioemotional skills help form new skills.¹⁹

An additional concept of the dynamic of formation of skills is worth emphasizing. It is the complementarity between the level of accumulated skills and the direct investments to continue improving them. The more

19. The term “self-productivity” applied to the first of these two properties of the skill formation process, as well as the so-called cross-productivity that applies to the second, come from the literature specialized in the technology for skill formation (Cunha et al., 2012).

skillful a person is, the higher the returns on investments made in them will be; thus, such investments become more desirable and are implemented in higher amounts. This implies a type of synergy between the level of skills and investments.²⁰

This synergy between skills and investments, together with the idea of self-productivity, leads to the conclusion that the future growth of skills will be more rapid the more skills have been accumulated at each moment in time. Clearly, this is a mechanism that reinforces any inequality that may exist in the distribution of skills at the beginning of life, and that is why it is so critical to start investing as early as possible, to assure equal opportunities. Notwithstanding this accumulative nature of skill formation, it is important to emphasize that skills are malleable throughout life, although the later you attempt to change them, the more effort it will require.

Text Box 1.4 The Exposure to the Four Contexts of Skill Formation over the Life Cycle

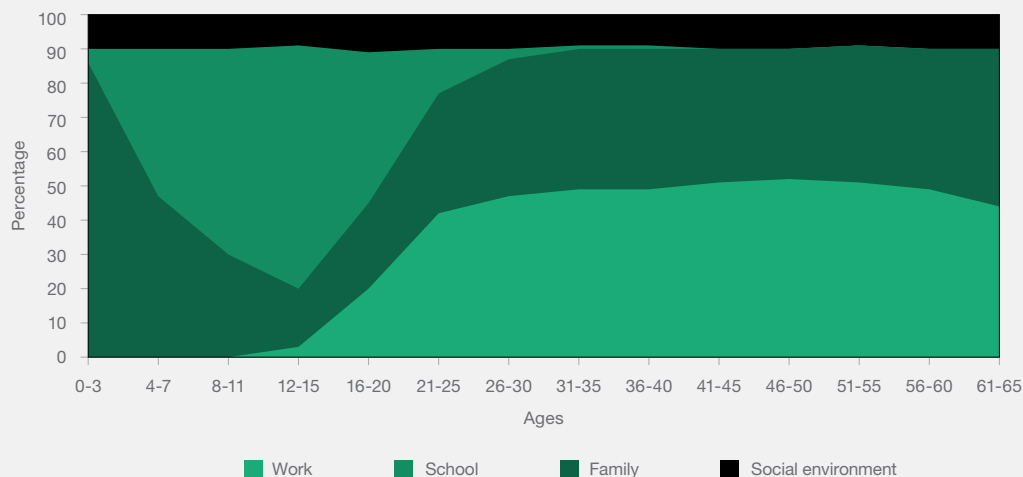
Throughout their lives, people are exposed to four contexts in which they spend great part of their approximately 16 waking hours a day. These four contexts are: family, school, work, and the environment. The more time that an individual spends in a given context (e.g., the school), the more likely that the person will be influenced by the factors specific to that context, which will accordingly affect accumulation of skills (e.g., the pedagogy of the teacher or the influence of peers).

Surveys on time use permit the quantification of the importance of each institution through different life stages. For example, using data from the Survey of Use of Time for Ecuador (EUT; 2012) all activities reported by the respondents were classified in the following categories: sleep, personal care and food, sick time, leisure, work, family, school, and environment (time in public spaces). Although these are only approximations to the conceptual definitions of each of the four skill formation contexts that are analyzed throughout this report, the results are very illustrative and warn about the proper times to channel investments through each institution.

Graph 1 (see p. 40) shows several such results. First, small children spend almost the entire day with their family, and, as they grow until age 15, the importance of the time in school increases. Second, from 15 years of age on, the importance of the school decreases in favor of the increase in work hours. Third, from 21 to 25 years the importance of family increases again, this time because the individuals start to form their own home lives, and, eventually, they may have their own children. Fourth, the relative importance of the time spent in the environment seems relatively constant throughout life. Fifth, the importance of work starts to decrease in the later years included in the graph because of retirement.

20. This property is known as dynamic complementarity (Cunha and Heckman, 2010).

Graph 1 Percentage of Waking Hours Spent with Family, at School, at Work, and in the Social Environment in Ecuador



Note. The EUT includes only people over 11 years of age. Therefore, the percentages for ages under 11 years were imputed. The assumptions used for this group are that these children: sleep 10 hours a day, have equal percentages of time spent in the social environment and at work as 12-year-old children, and attend school for 5 hours in pre-school education and for 7 hours in primary school. The gross enrollment rate is calculated from the official household survey in Ecuador (from the Socio-Economic Database for Latin America and the Caribbean, SEDLAC). For people 12 years of age and older, micro-data from the EUT 2012 were used. "Family" includes: management, organization and maintenance of the home, productive activities for consumption, construction and repairs, making and caring for clothing, care of children and disabled people of the household, and leisure time with family. "School" covers: attending classes, tutoring courses or classes, and doing homework. "Work" comprises: hours worked, job search, unremunerated activities for other households, and community and voluntary work. "Social environment" includes: commuting, running errands, making purchases, participating in political or trade activities, enjoying recreational activities in public spaces, attending social events, and visiting people or places.

Source. Authors' elaboration based on the EUT (2012).

Although Graph 1 exemplifies the importance in hours of each institution throughout life, it does not mean that, for example, the influence of the environment in skill formation will be constant (as it is a fraction of hours of exposure to this context). In fact, the setting may have very different effects in different stages of life, especially if the setting presents adverse or particularly beneficial conditions during critical or sensitive periods of development (see Text Box 1.3, p. 35). For example, high exposure to sound pollution in the first few months of life will be a determinant for the child's hearing capability (by the critical period in the development of this sense). Similarly, exposure during adolescence to a highly violent environment or to peers with high risk behaviors (e.g., drug abuse) may have a strong and negative influence on the cognitive and socioemotional development of youth (see, for example, the detail of these mechanisms in Chapter 5).

Source. Authors' elaboration.

Integral Development: Interactions between Cognitive, Socioemotional, and Physical Development

The three skill formation dimensions interact with one another, and they are continuously developing in each moment of life.

Integral development is necessary for life and work, as will be shown in this section. In addition, three dimensions of skill formation crucially interact with one another.

At each moment of life, all skill dimensions are being constructed on top of previously developed pillars. That is, integral development resembles the construction of a house, where the walls are built on the foundation and are not only made of bricks but of different elements that gradually give the walls strength and the ability to build higher. These developments by blocks, or *building blocks*, are schematically illustrated in Figure 1.2. There we can observe some development milestones of the cognitive, socioemotional, and physical bases, from the prenatal period to adulthood. The dotted lines indicate that the three dimensions of skill formation interact with one another. For example, when a child starts to understand and use language, that language can communicate dissatisfaction with caregivers; if the caregivers are capable of containing the child and give an adequate response, the child's sense of security will grow, adding to the child's ability to learn through experimenting with new words, objects or activities, at the same time that child's self-confidence and trust in others can also increase as a result of this process. All of these changes would be impossible without having a proper physical development that permits the areas of the brain and the rest of the body that take part in the acquisition of the language (see Chapter 2) to operate in coordination with the cognitive and socioemotional dimension of the child, who, little by little, will become empathic and independent.

Figure 1.2 Complementarity of the Three Skill Dimensions and the Building Blocks for Their Development

Cognitive development	Socioemotional development	Physical development	
Changes in verbal comprehension and processing speed Changes in certain types of memory	Resilience Interpersonal and negotiation skills	First signs of physical deterioration Maximum peaks of physical strength and motor skills	Adulthood
Argumentation and analysis Mathematical skills Reading and writing	Independent decisions Conflict resolution capacity Recognition of other people's feelings Identity, self-confidence, and trust in others	Changes in reproductive system Physical independence (strength, speed, coordination, and control)	Childhood and adolescence
Oral communication Recognition of figures/colors/numbers Language recognition Gross and fine motor skills	Confidence, self-esteem, and security Recognition of own emotions Recognition of rules	Bone development Muscular development Brain development	Early childhood
Health of mother and fetus			Prenatal years

Source. Authors' elaboration.

Empirical evidence shows that cognitive and socioemotional skills explain a considerable part of countries' different rates of economic growth.

Why Are Skills So Important?

This section describes why it is necessary to invest in more skills for life and work. First, we analyze how skills can be associated to the development level of countries, in order to next establish at the individual level what contributes higher skills levels both at work and in other dimensions of life.

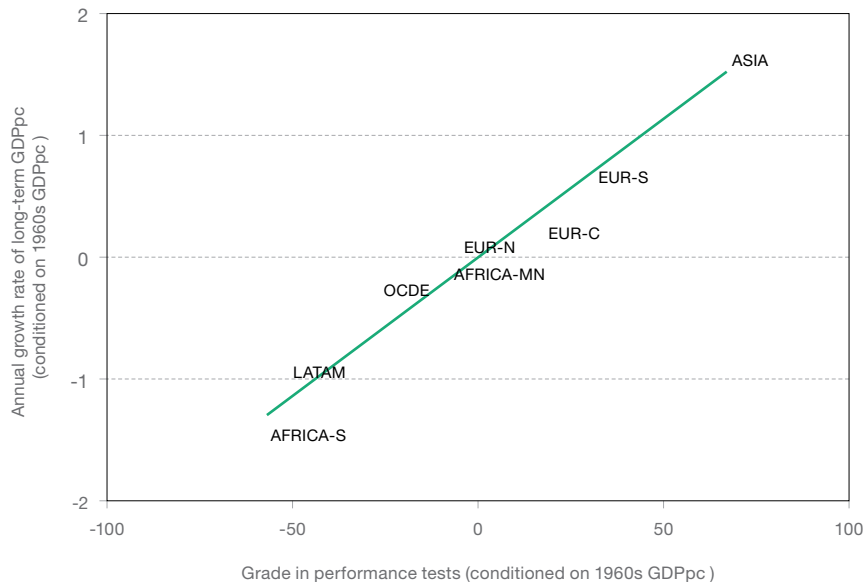
Skills and the Economic Development of Countries

Many theoretical and empirical studies have associated human capital with economic development, measured by GDP growth (Barro, 1991; Sala-i Martin et al., 2004). However, for many years the only way to approximate human capital was by years of education completed by the population, which is an imperfect measure because, for example, it implies that in 1 year of education, the same level of human capital is acquired in all countries. More recent studies have refined the measure of human capital, using the scores obtained in standardized tests (such as PISA) available for many countries. These studies attempt then to associate the level of cognitive skills with the economic development of countries.

Work by Hanushek and Woessmann (2012a) takes this approach and finds not only a positive correlation but also a causal relation between higher levels of human capital (scores in the tests) and higher long-term growth of GDP (between 1960 and 2000). The magnitude of the relation found is, in addition, very large: an increase of 1 standard deviation in the scores implies 2 additional percentage points of GDP growth (Graph 1.1). This result indicates that cognitive skills are considerably important for economic growth.

In addition, a related study (Hanushek and Woessmann, 2012b) shows that the years of education may explain a very small fraction of the differences in GDP growth between countries. In particular, the years of education of the population cannot explain the reason why Southeast Asia grew so much faster than Latin America, since both regions had similar average education levels (years of education). However, that growth difference can indeed be explained by considering the educational quality, measured by the academic achievement of the students. That is, the skills captured by the performance tests may explain to a large extent the reason why today Latin Americans are only 2.5 times richer than in 1960, while Asians are more than 9 times richer. The position of Latin America in Graph 1.1 confirms that low levels of academic performance have resulted in a low economic growth rates, a situation similar to that of sub-Saharan Africa.

Graph 1.1 Performance Test Scores and Long-Term Economic Growth in Various Regions of the World



Note. This is a graph of added variables, which relates a conditioned measure of standardized scores in academic performance tests with a conditioned measure of the average annual growth rate of the real GDP per capita (GDPpc) between 1960 and 2000. The two variables are conditioned on the development level at the initial time of the analysis (GDPpc in 1960). The regions are: Latin America (LATAM), East Asia and India (ASIA), central Europe (EUR-C), OECD countries (OECD), Middle East and North Africa (AFRICA-MN), northern Europe (EUR-N), southern Europe (EUR-S), sub-Saharan Africa (AFRICA-S).

Source. Hanushek and Woessmann (2012a).

However, the relation between educational quality and economic growth would not be explained only by the cognitive skills, but also by the socio-emotional ones. A recent study by Balart et al. (2015) breaks down the PISA scores in two parts; one attributable to cognitive skills and another one to socio-emotional skills (see Text Box 1.6, p. 55). With these two measures they make an analysis similar to that of Hanushek and Woessmann (2012a), and conclude that the effect of cognitive skills on the growth estimated by Hanushek and Woessmann (2012a) is reduced by approximately 40% when discounting the effect that socio-emotional skills have. That is, the cognitive skills and the socio-emotional skills of individuals are behind the economic growth.

Beyond the relationship between skills and GDP there are other dimensions in which skills are connected to the economic development. For example, more cognitive skills are associated to more innovation and greater productivity (Squicciarini and Voigtländer, 2014), and of course a greater inequality in the distribution of skills is associated to a higher income inequality (Heckman, 2011; Blau and Kahn, 2005).

More cognitive skills are associated with more innovation, greater productivity, and lower inequality in income distribution.

Skills and Individual Progress

Skills and Labor Market Performance

There is a long history of literature relating human capital to labor success.²¹ Usually these studies have measured human capital through the educational level reached and calculated salary return rates close to 10% for every additional year of education (Psacharopoulos and Patrinos, 2004). Yet behind these returns there are many other factors than people's educational attainment,²² which are just a first indication of the importance of having a good human capital in order to have a better work performance.

More recent evidence shows that years of education by themselves do not explain the great heterogeneity observed in salaries. Therefore, looking directly at people's skills is a more accurate manner of approximating their labor capacity and the success they will have in the labor market.

The mechanisms through which skills may affect work performance are multiple. Cognitive skills may help individuals choose occupations with more complex tasks that imply processing more information, making difficult decisions, planning sequences of actions that lead to a better-quality product or service, or finding solutions when facing new challenges. All these aspects make the worker more productive and should lead to monetary (salary) or nonmonetary (greater stability or better work environment) remunerations that speak to better quality in the occupation chosen.²³ In respect to noncognitive skills, workers with higher socioemotional development are more capable of showing predictable and harmonious conduct with coworkers, subordinates, and bosses (empathy and cooperation); less often absent from work (responsibility or diligence); and more able to quickly find a job once unemployed (resilience), among other factors associated with more success in the labor market. In addition, both cognitive skills and socioemotional skills may affect success at work through their influence on the decision to invest in education, since more education is generally associated with better labor conditions (Almlund et al., 2011).

That is, cognitive and socioemotional skills can be important for finding a good job, keeping it, and progressing in a career. Text Box 1.5 summarizes the evidence that quantifies the relative importance of these two types of skills in determining work performance in terms of labor participation,

21. This tradition goes back to pioneering works, such as that of Mincer (1974).

22. The basic problem of the measure of returns to education has to do with separating the part of education that increases labor productivity (and therefore salaries) from that part that only signals previous skills (Spence, 1973). In addition, a higher educational level may be indicative of lower financial restrictions for making this investment, or be associated to reasons that also give higher labor market returns but do not necessarily imply higher skills (e.g., social connections that can help in the labor market).

23. In competitive labor markets, wages should reflect the labor productivity level of workers.

salary, unemployment, and labor formality (as indicator of employment quality).

Text Box 1.5 Cognitive or Socioemotional Skills? Evidence on Their Contribution to Better Labor and Educational Results

In the labor market, both cognitive and socioemotional skills matter. But which one matters more? There is no unequivocal answer to this question because the results vary somewhat from country to country and according to the method or type of data used (Almlund et al., 2011). However, certain general patterns have arisen recently, based on studies for developed countries that were then replicated in other countries, among them some of Latin America. For example, these patterns indicate that the cognitive skills are relatively more important and predictive of salary level and educational achievement, while socioemotional skills have more weight on aspects such as social behavior (OECD, 2015).

Studies for Latin America, although relatively scarce (basically because there are still few surveys that incorporate modules for skill measurement in adults or are longitudinal) show results in line with those observed for more developed regions. For example, Acosta et al. (2015) use the survey Skills Toward Employment and Productivity (STEP) for Colombia and find that both types of skills matter for labor and educational development, although each one plays a different role depending on the result analyzed. According to this study, cognitive skills are much more important than socioemotional ones in the probability of having tertiary or university studies, and, in addition, are more relevant than predictors of the labor income and of the probability of having formal employment. In respect to socioemotional skills, it was found that they are important skills in order to not be disconnected from work and from education, which is important considering the scope of the NEET phenomenon —a NEET is someone who is not in education, employment, or training. Table 1 summarizes the major results from Acosta et al. (2015) and quantifies the effects of passing from the lowest decile in the distribution of each type of skill to the highest.

Table 1. Relative Importance of Cognitive and Socioemotional Skills on Labor and Education in Colombia

Labor or educational result	Increase from decile 1 to decile 10 in distribution of cognitive skills	Increase from decile 1 to decile 10 in distribution of socioemotional skills
Change in probability of being active/enrolled in education (not NEET)	6 percentage points	9 percentage points
Change in probability of having tertiary/college studies	71 percentage points	18 percentage points
Change in probability of having a job	Not significant	Not significant
Change in probability of having a formal job	28 percentage points	Not significant
Change in hourly salary	USD 1.50	Not significant

Source. Acosta et al. (2015).

Cunningham et al. (2016) use a methodology similar to Acosta et al. (2015), but with data from Peru and find a pattern similar to the one used by Colombia in the relative importance of skills: while cognitive skills are more relevant to predict labor income and the probabilities of having a formal job, socioemotional skills are more for having a job. Diaz et al. (2002), also for Peru, analyze the labor returns of cognitive and socioemotional skills and find that both are equally valued by the labor market. Specifically, an increase in 1 standard deviation both in cognitive skills and in the measure of grit (perseverance) generates, each, a 9% increase in income. Finally, Bassi et al. (2012) using data from the Survey on Trajectories and Skills for a sample of young people from 25 to 30 years of age in Argentina and Chile, find that socioemotional skills are more strongly associated than cognitive skills to labor participation, having a job and also to salaries.

Source. Authors' elaboration.

The data collected by the 2015 CAF Survey²⁴ provide a unique opportunity to analyze how different types of skills are associated to labor indicators in many cities of Latin America (10 major cities in 10 countries). In particular, with this survey it is possible to analyze the relation of cognitive, socioemotional, and physical skills to participation in the labor market, being employed, the level of labor income, and having a formal job. Table 1.2 summarizes these correlations from a simple regression analysis, with dependent variables in the columns and the control variables (skills) in the rows. To denote statistical significance, the sign of the coefficients of the associated skills is indicated, and the highest coefficient is indicated with a darker green.²⁵ All results are conditional on age, gender, educational level of the mother (as proxy of the family's socioeconomic level), and the city where respondents live.

Notwithstanding that this analysis does not establish a causal relationship, several interesting results arise from it. The first is that the three types of skills (cognitive, socioemotional, and physical) are, in general, positively correlated to the labor results. However, the relative importance of each measure changes depending on the variable analyzed. The socioemotional skills seem to be those that matter the most for the labor participation decisions and the probability of having a job, since in both cases grit is the measure showing the highest correlation. In fact, correlations between these results and cognitive skills are not statistically significant. On the contrary, it is a cognitive skill (numerical skills) the one that presents a higher correlation to salary and the

24. The Appendix offers a detailed description of this survey.

25. Here it is possible to make comparisons between the sizes of the coefficients obtained from the regression analysis, since the variables were previously standardized (expressed in the same unit of measure: standard deviations in respect to the measure).

probability of having a formal employment.²⁶ Finally, two measures (grit and physical skills) are consistently and positively correlated to the four variables of labor results. These results for 10 large cities in Latin America are in line with those of other recent studies analyzing specific countries, which are described in Text Box 1.5 (see p. 45).

Table 1.2 Skills and Labor Outcomes for People from 25 to 55 Years of Age in 10 Latin American Cities

Dimension of skills	Skill measure	Labor results			
		Active (participates in labor market)	Employed	Labor income	Labor formality
Cognitive	Raven PMT (fluid intelligence)	.	.	.	.
	Numerical skills	.	.	+	+
	BTVC	.	.	.	.
Socioemotional	Grit (determination)	+	+	+	+
	Extraversion	+	+	.	.
	Agreeableness	.	.	-	.
	Conscientiousness	.	.	+	.
	Emotional stability	.	.	.	.
	Openness to new experiences	+	.	.	.
	Tolerance to risk	.	.	+	.
	Self-efficacy	-	.	.	.
Physical	Physical skills	+	+	+	+

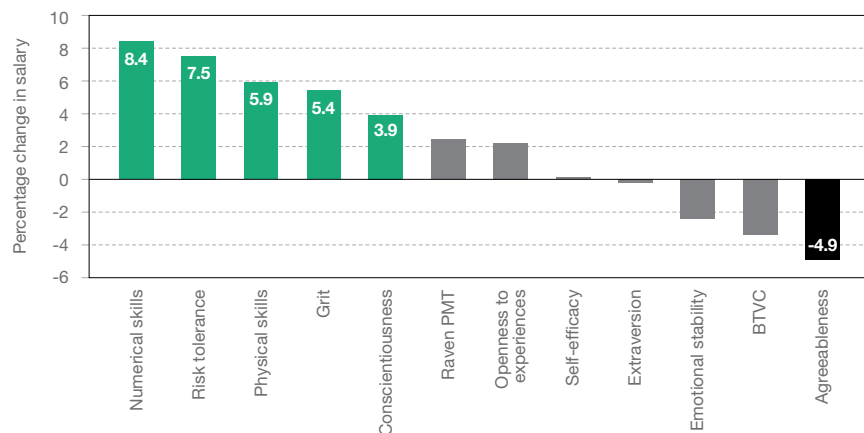
Note. The table reports the signs of coefficients (“+” if positive and significant, “-” if negative and significant, and “.” if it is not statistically significant) of four regressions estimated by ordinary least squares, with dependent variables in the columns and independent variables in the rows. The regressions control for age, age squared, gender, mother’s education (as proxy of the predetermined socioeconomic level). City fixed effects are included. For the regressions of income and formality, an additional control is included that indicates the economic sector. In the case of labor income, the variable is expressed in logarithms. An individual is considered employed in the formal sector if the employer or employee makes social security contributions. Self-reported health is used as proxy of physical skills. In the Appendix, all skills measures are described. These measures are standardized, and thus the size of the coefficients is comparable. The darker boxes correspond to the coefficient with higher absolute value. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors’ elaboration using data from the 2015 CAF Survey.

26. An interesting result is the negative correlation between agreeableness and income. This result has also been present in other studies of Latin American countries (e.g., Cunningham et al., 2016). Although this may result from measurement problems, it could also be explained by the fact that those skills may not be useful or valued in the determined social or productive context. On the other hand, this result can also be due to the fact that having a certain skill does not mean having the capacity to put it into practice in an effective manner (OECD, 2015).

Everything indicates then that individuals with greater skills earn, on average, higher salaries. But, how much more? To answer this question, it is necessary to analyze the monetary returns of each skill, which is not a simple task since the identification of these variables poses problems similar to those of estimating the return on education.²⁷ However, the 2015 CAF Survey also allows a first approximation on this subject. Graph 1.2 shows the salary increase percentage when each of the skills measured is increased by 1 standard deviation (keeping all the rest constant). The solid bars show which corrections are statistically significant. The results indicate that, for example, if two people only differ in one standard deviation in their measure of numeric skills, then the gap in their salaries is 8.4%. For comparison purposes, this difference in numerical skills is that which exists in average between individuals who completed only primary school and those who have some tertiary or college study (see Graph 1.7, p. 58). Risk tolerance, physical skills, grit, and responsibility are associated with salary increases between 7.5% and 3.9%. On the other hand, an increase in 1 standard deviation in the measure of agreeableness is associated with a salary decrease of 4.9%. Again, these results indicate that both higher cognitive skills and socioemotional and physical skills are remunerated by the local market.

Graph 1.2 Labor Income Percentage Change for One Standard Deviation Variation Change in Skills in 10 Latin American Cities



Note. The graph reports the coefficients (multiplied by 100, i.e., percentages) that are obtained from an ordinary least squares regression where the dependent variable is the logarithm of income in US dollars and the independent variables are the skill measures reported in the 2015 CAF Survey. In addition, the regression controls for age, age squared, gender, mother's education, economic sector. City fixed effects are included. All skill measures are expressed in standard deviations, so the coefficients are comparable. The green and black bars show statistically significant coefficients. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

27. See footnote 22, where the basic limitations of the return estimate are explained.

Skills and Performance in Other Aspects of Life

The 2015 CAF Survey also permits an understanding of why the three skill dimensions matter for aspects other than work and add to individual general wellbeing. Table 1.3 shows the results from relating skill measures to variables associated with different aspects of performance in life: educational attainment (completed secondary and completed tertiary or college studies), physical health (obesity), and mental health (stress and depression), even civics (voting in elections) and satisfaction with life.

Table 1.3 Skills and Other Life Dimensions for People from 25 to 55 Years of Age in 10 Latin American Cities

Dimension of skills	Skill measure	Education		Physical health	Mental health		Civil inclusion	Satisfaction with life
		Secondary completed	Tertiary or college studies	Obesity	Stress	Depression	Citizen participation (voted)	
Cognitive	Raven PMT (fluid intelligence)	+	+	.	.	.	.	.
	Numerical skills	+	+	.	.	-	+	-
	BTVC	+	+	.	-	-	.	-
Socioemotional	Grit (determination)	+	+	.	-	-	+	+
	Extraversion	+	.	.	-	-	.	.
	Agreeableness	-	-	.	-	.	.	.
	Conscientiousness	+	+	-	-	-	.	.
	Emotional stability	.	.	.	-	-	.	+
	Openness to new experiences	+	+	.	-	.	.	.
	Tolerance to risk	.	+	.	.	+	.	-
	Self-efficacy	-	.	+	-	.	.	+
Physical	Physical skills	+	+	.	-	-	.	+

Note. The table reports the signs of coefficients "+" if positive and significant, "-" if negative and significant, and "." if it is not statistically significant) of seven ordinary least squares regressions, with dependent variables in the columns and independent variables in the rows. The regressions control for age, age squared, gender, mother's education (as proxy of the predetermined socioeconomic level). Obesity reflects a body mass index (BMI) in excess of 30. Stress is the continuous variable (standardized) of the Perceived Stress Scale. Depression is the continuous variable (standardized) of the CES-D scale, and satisfaction with life is a continuous variable (standardized) in answer to the question "On a scale of 1 to 10, where 1 is not satisfied and 10 is fully satisfied, how satisfied are you with your life?" In the Appendix, all skills measures are described. These measures are standardized, and thus the size of the coefficients is comparable. The darker boxes correspond to the coefficient with the highest absolute value. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Educational results are positively correlated to a variety of cognitive, socioemotional, and physical measures.

Educational results are strongly and positively correlated to a variety of cognitive, socioemotional, and physical measures.²⁸ However, the greatest correlation is found with a cognitive measure (numerical skills). These results are again aligned with the previous evidence shown in Text Box 1.5 (see p. 45) for some developed countries and others of Latin America.

In respect to outcomes of physical health (obesity) and mental health (stress and depression), socioemotional measures are those that presents the stronger (and negative) association. In particular, the grit variable appears again as the most closely correlated to the two mental health measures, in addition to several other measures of socioemotional, and also cognitive and social skills that present a significant (and negative) correlations to these results.

Civic engagement, approximated by participation in last election (voting), also appears connected to individual skills, both cognitive (numerical skills) and socioemotional (grit). Finally, the correlation between life satisfaction and skills is less clear. Although socioemotional skills are generally positively associated with satisfaction, cognitive skills (numerical and verbal) are negatively associated. In addition, physical skills are those that are more strongly associated with satisfaction, showing once more the importance of health for the individual's wellbeing.

The Skills of the Latin Americans

What skills does the population in Latin America have, and what is its situation with respect to other regions? In order to answer these questions, it is crucial to have sufficient information to draw generalizable conclusions for each country as well as comparable data to conclude about differences between countries and over time.²⁹ Unfortunately, in Latin America the number of initiatives that collect information on skills in a systematic and harmonized manner is especially limited, particularly for socioemotional skills.³⁰

28. There are also some negative correlations: with the measures of agreeableness (in high school graduation and enrollment in higher education) and with self-efficacy (in high school graduation).

29. A simple but imperfect approximation available for comparisons between countries and over time is the average quantity of years of education in the population. As shown in Hanushek and Woessmann (2012a), the years of education offer a distorted image of the skills accumulated by the population, since the quality of the educational systems varies from one country to another and because school is not the only environment in which individuals acquire skills.

30. A very notable exception is the Young Lives study. This multi-country initiative (four countries in several regions, including Peru for Latin America) has been following the development of "young lives" individuals for almost fifteen years. These children belong to two groups: the first group consists of children born in 1994–1995 and the second of children born in 2001–2002. Currently, the fifth round of the survey is being carried out, which completes the coverage of the most important stages of development: from early childhood to the transition to adulthood. This is a project coordinated by the International Development Department of Oxford University (England) and carried out by local partners (Grupo de Análisis para el Desarrollo, GRADE, in the case of Peru). Because of its length and depth of the measures constructed, the data panel of Young Lives represents a very valuable tool to address the stock of skills and their development process from the earliest stages of life.

Although there are some useful measures to analyze the stock of physical and cognitive skills, these have limitations. Measures of physical skills generally refer to health indicators for different age groups, and many times these are provided through official and publicly available information in each country. Indicators such as life expectancy, mortality, and children's malnutrition are usually comparable between countries. In the case of cognitive skills, more countries are participating in international measurement initiatives such as PISA and LLECE (see Text Box 1.2, p. 29),, which allows for making comparisons in a certain dimension of cognitive development of youth who are in the educational system. Contrarily, socioemotional skill measures that are comparable between countries are practically nonexistent. The 2015 CAF Survey is an exception in this respect.

Measures of socioemotional skills that are comparable between countries are practically nonexistent. The 2015 CAF Survey is an exception

The first part of this section will use information sources that permit a comparative diagnosis of the skills in Latin America in respect to the rest of the world. The second part is focused on comparable data between Latin American countries, using the information collected by the 2015 CAF Survey (for the population between 15 and 55 years of age in 10 cities of the region), both in the cognitive and in the socioemotional and physical dimensions. The main objective of this analysis is to describe inequality aspects in the distribution of skills.

Latin America Compared to Other Regions

A first, albeit imperfect, approximation of the skills of people in Latin America is the average years of education in the population.³¹ The left panel of Graph 1.3 (see p. 52) presents the average years of education among the adult population (over 25 years of age) in different regions. The adult population of the region has an average of 8.7 years of education, 1 year more than the countries with middle and low income, but 2.5 years less than OECD countries. Considering that the approximated length of basic information (primary and secondary) is 12 years, an average adult in Latin America has only completed the first 2 years of secondary school.

The results of the PISA tests also offer the possibility of comparing Latin America with regions at a different economic development level.³² The panel on the right of Graph 1.3 (see p. 52) shows that in Latin America, the average student's performance in mathematics (although the pattern is identical for the case of reading or sciences) is quite lower than in richer regions. In addition, according to PISA 2012, Latin American countries are among those with the largest percentage

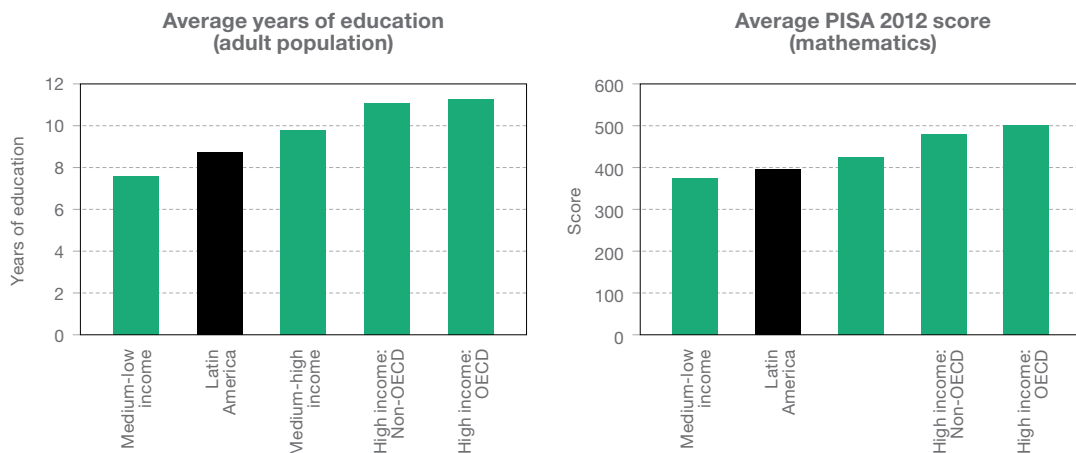
31. As shown in Hanushek and Woessmann (2012a), the years of education offer a distorted image of skills accumulated by the population.

32. Text Box 1.2 (see p. 29) shows the advantages and disadvantages of this type of test at the time of assessing the cognitive skills. In addition, and as discussed throughout this report and particularly in Chapter 2 and 3, the performance of students in standardized tests not only depends of the quality of education received in the school, but also on the bases that the student brings from home and on the influence of the environment where he lives.

of youth who do not reach the minimum competencies (associated to level 2 of 6 possible levels on this test).³³

On the other hand, in the past few decades Latin America has made great progress in different health indicators, which may be thought as associated to a better development in physical skills. Graph 1.4 shows two important indicators: life expectancy and child mortality. The region has practically converged with the levels of the countries with the highest income in these two indicators.

Graph 1.3 Quantity and Quality of Education in Latin America and Other Regions in the World



Note. The average years of education in the adult population (25 years of age or older) comes from the most recent data in the WDI (World Development Indicators World Bank) database. The country grouping follows the classification by level of per capita income in the WDI.

Source. Authors' elaboration based on the World Development Indicators (World Bank) and PISA, 2012 (OECD).

Notwithstanding this progress, there is still much room for improvement. For example, the region still has serious problems with malnutrition and growth in children less than 5 years of age. In particular, this last indicator is extremely revealing of the status of the formation of skills in the population, since there is a great deal of evidence that shows that a bad start in life regarding nutrition and growth puts at risk the subsequent development of physical, cognitive, and socioemotional skills (see Chapter 2). Graph 1.5 (see p. 54) shows the most recent data of the three indicators related to children's health —stunting, underweight, and overweight— based on a joint project of United Nations Children's Fund (UNICEF), World Health Organization (WHO),

33. Chapter 3 offers more details on the results of the Latin American countries in the PISA tests.

and the World Bank to systematize international information on children's malnutrition based on anthropometric measures (*Joint Child Malnutrition Estimates* [UNICEF, WHO, and World Bank, 2015]).

Graph 1.4 Change in Health Indicators in Latin America and Other Regions in the World



Note. Child mortality refers to children under 5 years of age. The country grouping follows the classification by level of per capita income in the WDI (World Development Indicators, World Bank).

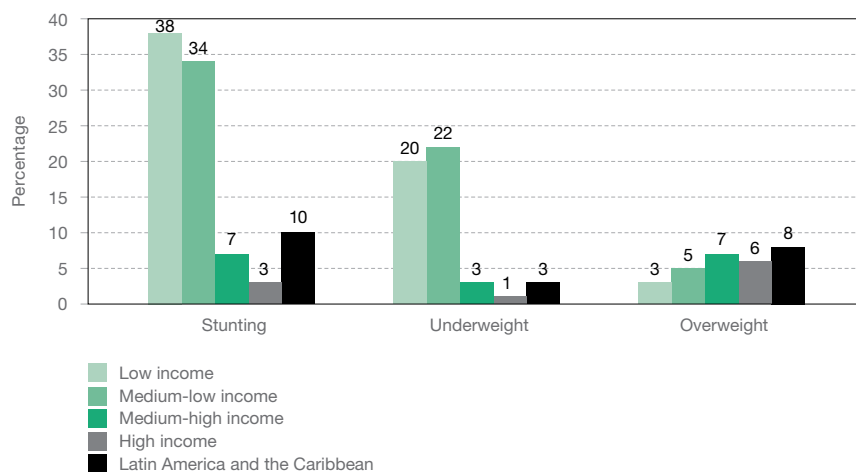
Source. Authors' elaboration based on the Global Health Observatory (GHO).

Underweight is a measure that is related to short-term nutritional problems and has to do with events of severe weight loss generated, for example, by famine or an acute process of a disease, but that can be reversed with time. Stunting results from chronic malnutrition, it is associated with health and nutrition problems and tends to leave traces that affect future development. The countries of Latin America are relatively better off in respect to low and medium-low income regions on these two measures, but worse in respect to medium-high and high income countries. However, the incidence of stunting is still unacceptable high in Latin America, since it affects 1 of every 10 children under 5 years of age. This indicator is distributed in a very unequal manner among children of families with different socioeconomic levels, disproportionately affecting the more vulnerable groups (see Chapter 2).

Incidence of overweight children may also indicate nutritional problems, many times caused by inadequate nutrition. This problem started to increase in the last few decades, initially in higher income countries but then in children of developing countries as well (Onis et al., 2010). Today,

the levels of overweight children in Latin America exceed even those of countries with higher incomes. Being overweight and especially being obese during childhood is associated with weight problems in adulthood, and it also increases the possibility of having noncommunicable diseases such as diabetes and cardiovascular diseases.³⁴

Graph 1.5 Nutritional Problems in Children under 5 Years of Age in Latin America and Other Regions of the World



Note. Stunting (moderate and severe) reflects the percentage of children who are below 2 standard deviations from median height for age of reference population World Health Organization (WHO). Underweight (moderate and severe) reflects the percentage of children who are below 2 standard deviations of the median of the weight for age of reference population (WHO). Overweight (moderate and severe) shows a percentage of children who are 2 standard deviations or more above the median of weight for the height of reference population (WHO). The country grouping follows the classification by level of per capita income in the WDI (World Development Indicators, World Bank).

Source. Authors' elaboration based on Joint Child Malnutrition Estimates (UNICEF, WHO, and World Bank, 2015).

Given the scarce comparable information between regions in respect to the socioemotional development in adult population, the only information that is reported here that analyzes the relative position of Latin America in respect to other regions is shown in Text Box 1.6. It presents the results of an exercise that breaks down the grade obtained by the students in the PISA tests in two parts: one that reflects cognitive skills and another that reflects socioemotional skills.

34. Being overweight can even affect the development of socioemotional skills during childhood and adolescence, by affecting, for example, self-esteem.

Text Box 1.6 International Comparison of Socioemotional Skills: Evidence from PISA Tests

Currently there are no harmonized information sources to compare the socioemotional skills of the Latin American population to other regions. However, a recent study (Borghans and Schils, 2012) proposes to exploit the design of the PISA tests to obtain information both of cognitive and socioemotional skills. The authors recognize that both types of skills are used to answer test questions. The hypothesis is that socioemotional skills should not have as much weight on performance at the beginning of an exam, since the extrinsic or intrinsic motivation, perseverance, and determination for the achievement of a goal, the capacity to avoid distractions, and self-control do not play yet an important role—but they may do so the further into the test one progresses. Therefore, these authors consider the performance on the first question of the test as a measure of cognitive skills. The decline in the performance on the successive questions is interpreted as a (negative) measure of socioemotional skills. This approach has the advantage of obtaining this dimension directly from the students' answers on the test, which reduces the biases of traditional measures of socioemotional skills that rely on self-report. At the same time, it has the advantage of being able to be implemented for a large number of countries (all those taking the PISA tests).

However, associating the decline in correct answers with a socioemotional development measure is not easy and cannot be done for all standardized tests. A particular characteristic in the PISAs' design makes this possible: the questions are presented randomly rather than in order of their difficulty.

Table 1 (see p. 56) presents these measures for PISA 2012 for all participating Latin American countries and for some countries of high levels of achievement in this test. Among the latter are Korea, Singapore, and Finland, which are the countries with the best global performance in the PISA tests. The Latin American countries have lower levels of cognitive skills (captured by the performance on the first question) as well as higher rates of decline (indicating lower socioemotional skills) in respect to high performing countries. In particular, Colombia, Brazil, and Uruguay have the highest decline between the first and the last questions (between 25 and 28 percentage points less of correct answers in the last question in respect to the first). It is interesting to note that these three countries do not have lower cognitive skills (according to the percentage of correct answers to the first question of the test). In fact, Uruguay has the best performance on the first question of all Latin American countries. If the countries were ordered according to the decline as percentage of performance on the first question, the countries that decline more are Colombia, Peru, and Brazil. In countries such as Singapore and Finland, the students maintain practically the same performance throughout the entire test, which indicates their high levels of motivation and perseverance.

Table 1 Performance on the PISA 2012 Tests According to Question Order and Declining Fraction of Correct Answers

Countries	First question correct (%)	Last question correct (%)	Decline (percentage points)	% decline (from correct answer on first question)
Colombia	57.2	29.3	27.9	49
Brazil	66.3	40.4	25.9	39
Uruguay	70.5	45.4	25.1	36
Mexico	65.8	41.3	24.5	37
Peru	53.8	29.4	24.4	45
Costa Rica	64.0	44.6	19.3	30
Argentina	63.2	45.4	17.8	28
Chile	68.4	51.8	16.7	24
Spain	78.6	66.5	12.0	15
United States	76.0	67.7	8.2	11
Korea	80.6	74.1	6.5	8
Singapore	83.4	78.2	5.2	6
Finland	88.0	83.5	4.5	5

Note. The probability of correct answers is calculated through a probit model with fixed effects, following the methodology described in Balart et al. (2015) and based on Borghans and Schils (2012). The decline is the difference between the probability of a correct answer in the first and in the last questions. Countries are ordered in accordance with the level of decline (in percentage points).

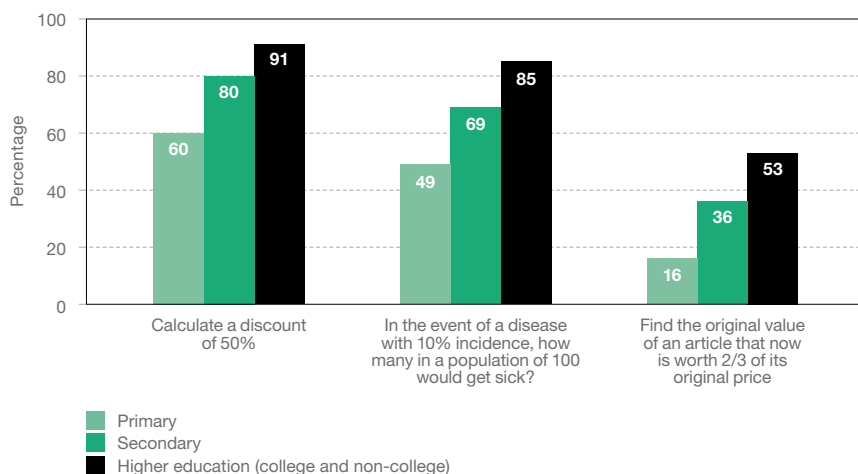
Source. Authors' elaboration based on PISA, 2012 (OECD), Balart et al. (2015), and Borghans and Schils (2012).

The Unequal Distribution of Skills in Latin America

One way to approximate the socioeconomic level of adults is to consider their education level. This subsection uses that approximation to analyze the socioeconomic gradient (inequality) in the distribution of cognitive, socioemotional, and physical skills among the population represented in the 2015 CAF Survey.

Graph 1.6 shows the percentage of people over 25 years of age, according to their educational level, who responded correctly to questions involving simple mathematical calculations. The difference in the percentage of correct answers of those more and less educated is of 31 percentage points in the simplest question ("Calculate a discount of 50%") and of 37 percentage points in the more difficult questions ("Find the original value of an article that is now worth 2/3 of its original price.")

Graph 1.6 Percentage of Correct Answers on Simple Mathematical Calculations by Educational Level in 10 Latin American Cities



There is a socioeconomic gradient in practically all measures of skills available in the CAF Survey.

Note. The graph reports the percentage of individuals between 25 and 55 years of age who correctly answered the mathematical exercises. Primary school includes those individuals who report having completed basic/primary education or less; secondary includes those who report having incomplete or complete secondary/diversified middle and professional/high school education; higher education includes those individuals who report having started or completed tertiary, college, or other higher education level. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

In addition to showing a marked inequality in the distribution of skills according to educational level, these results also make evident more general and quite serious problems in basic numerical skills of the population, since, in general, the percentages of correct answers are low even among those with high educational levels.³⁵

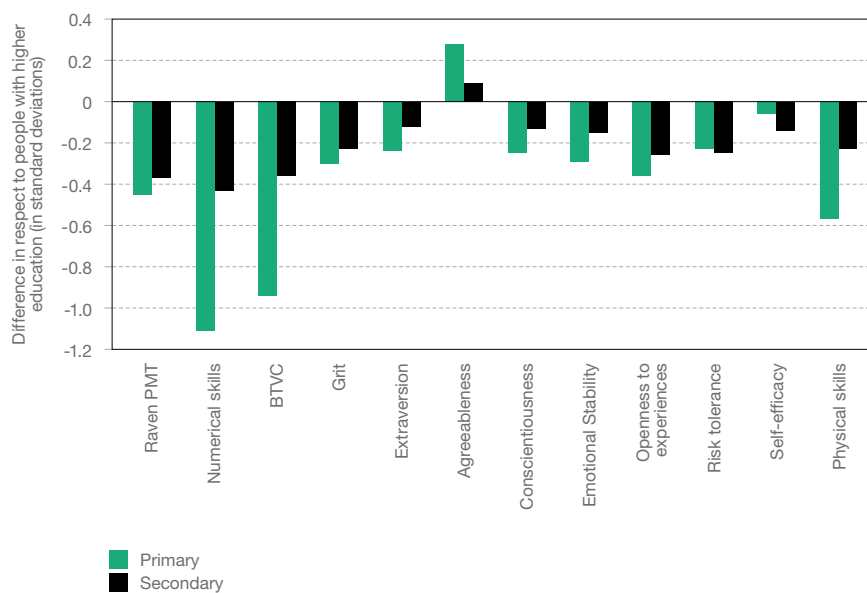
The socioeconomic gradient observed in numerical skills is present in practically all the measures of cognitive, socioemotional, and physical skills available in the 2015 CAF Survey, as shown in Graph 1.7 (see p. 58). The graph shows differences in each type of skill for people with primary or elementary education in respect to the group with a higher educational level (college or other). Differences are more evident in the measures of cognitive skills and can be of up to 1 standard deviation, such as the case of the differences between the less and the more educated in the two measures of crystallized intelligence

35. It should be emphasized that the order of the cities that results from this type of questions in the 2015 CAF Survey is almost identical to the one that results from ordering the countries to which these cities belong in accordance with the results obtained in the 2012 PISA mathematics test. The only exception between these two rankings is Sao Paulo that in the results of the 2015 CAF Survey is worst positioned than Brazil in the 2012 PISA test.

The incidence of overweight and obesity in Latin America is very similar to that observed in OECD countries.

available in the survey (numerical and verbal skills). At the socioemotional level there are also differences, always in favor of those more educated, but these are less serious than in the case of cognitive skills. The only exception is the measure of agreeableness, which is always higher for those with less education. The differences in physical skills between individuals with primary education and higher education are also substantial.

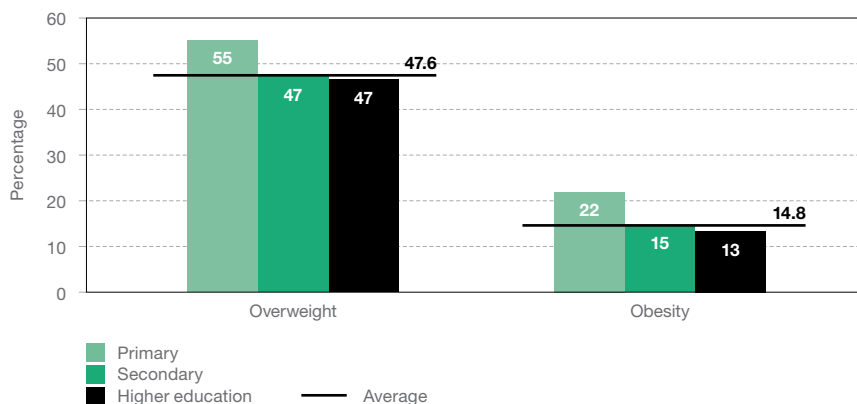
Graph 1.7 Skill Differences by Educational Level, in 10 Latin American Cities



Note. The graph reports the differences (measured in terms of standard deviations) in each one of the skills for the groups with up to primary or secondary education, in respect to individuals with higher education. Only population over 25 years of age. Primary includes those individuals who report having completed basic /primary education or less; secondary includes those who report having secondary/ diversified middle and professional/high school education incomplete or completed. The comparison group corresponds to the people with higher education (college or noncollege), whether or not they have completed that level. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

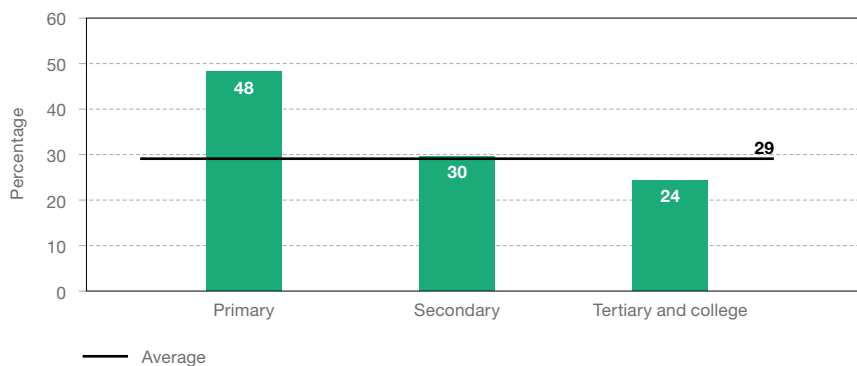
Source. Authors' elaboration using data from the 2015 CAF Survey.

The 2015 CAF Survey has additional information that provides more indirect measures of skills. Specifically, this survey collects physical and mental health measures and information that has to do with caring for personal health (smoking, excessive consumption of alcohol, sedentary life, sleep hours, and frequency of medical check-ups). Graph 1.8 shows that incidence of being overweight or obese is high in the Latin American cities, and incidence is even greater for people with a lower educational level. On average, 48% of those over 15 years of age are overweight. These values are very similar to those observed in OECD countries.

Graph 1.8 Overweight and Obesity by Educational Level in 10 Latin American Cities

Note. The graph reports the incidence of overweight and obesity for the population over 15 years of age. Overweight corresponds to a body mass index higher than or equal to 25, while obesity implies a body mass index higher than or equal to 30. Both weight and height are self-reported. Primary includes those individuals who report having completed basic /primary education or less; secondary includes those who report having secondary/diversified middle and professional/high school education incomplete or completed. Higher education includes those individuals who report having started or completed tertiary, college, or other higher education. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

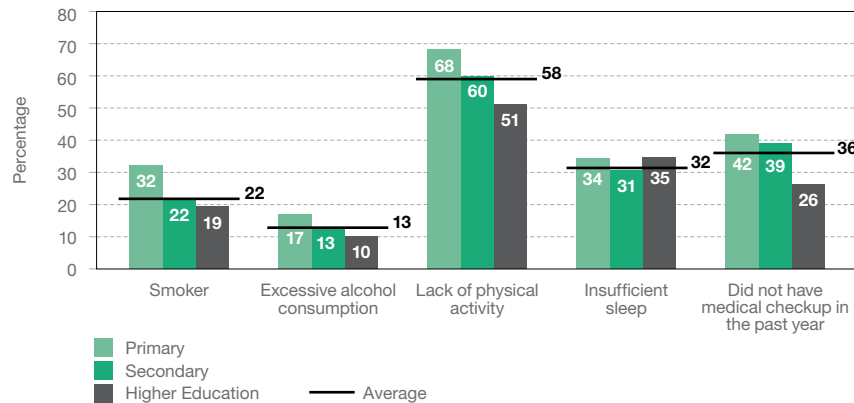
Graph 1.9 Prevalence of Depression Symptoms by Educational Level in 10 Latin American Cities

Note. The graph reports the percentage of individuals over 15 years of age who exceed the theoretical threshold for depression on the CES-D (see Appendix). Primary includes individuals who report having completed basic/primary education or less; secondary includes those who report having complete or incomplete secondary/diversified middle and professional/high school education; higher education includes those individuals who report having started or completed tertiary, college, or higher education. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Mental health inequalities should not be ignored either (Graph 1.9, see p. 59). According to the depression scale (see Appendix), 29% of people over 15 years of age have problems with depression, and the fraction is higher in persons with less education. Finally, the evidence shows that the incidence of risky health behaviors is also high in the cities surveyed in the CAF Survey, and that their distribution is unequal among groups of different educational levels (Graph 1.10). Among the population over 15 years of age, 22% smoke, 13% consume alcohol excessively, 58% do not exercise regularly, 32% do not sleep the number of hours recommended by the WHO, and 36% have not had a medical checkup in the last year.

Graph 1.10 Risky Health Habits by Educational Level in 10 Latin American Cities



Note. The graph reports the percent of individuals over 15 years of age who engage in each risky health habit. Excessive consumption of alcohol occurs if the individual responds affirmatively to the question "In the past 30 days, have you been intoxicated/drunk (that is, have you drunk so much alcohol that you have become dizzy, felt sick the next day)?" and also answers "More than 3 or 4 days a week" to the question "How frequently have you consumed alcoholic beverages in the past 3 months?" It is considered lack of physical activity if the individual answers "Do not perform this activity" to the question "In a normal week, how many days do you carry out physical activities" or to the question "In a normal week, how many days do you perform physical activities for at least 10 minutes?" Insufficient sleep is 6 hours of sleep or less (criterion defined by the WHO) in answer to the question "How many hours do you generally sleep at night?" (or in your main period of sleep) "from Monday to Friday or on work days?" Primary includes individuals who report having completed the basic/primary education or less; secondary includes those who report having complete or incomplete secondary/diversified middle and professional/high school education; higher education includes those individuals who report having started or completed tertiary, college education, or higher. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Seeing that certain population groups are systematically in worse conditions in respect to different types of skills, it appears as very likely that the association between skills is high. Table 1.4 shows the signs of the correlation coefficients for all the skill measures collected in the 2015 CAF Survey. The general pattern that arises from the table indicates that the skills are usually positively correlated with each other (out of 46 statistically significant correlations, only

5 are negative). That is, people with higher cognitive skills usually have also higher socioemotional and physical skills.³⁶ This result is not surprising since the accumulation of cognitive, socioemotional, and physical skills complement each other.

Most jobs require a wide range of skills, but the relative importance of each skill varies considerably between occupations.

Table 1.4 Correlations Between Cognitive, Socioemotional, and Physical Skills in 10 Latin American Cities

Skills	Raven PMT	Numerical skills	BTVC	Grit	Extraversion	Agreeableness	Conscientiousness	Emotional stability	Openness to experiences	Risk tolerance	Self-efficacy	Physical skills
Raven PMT												
Numerical skills	+											
BTVC	+	+										
Grit	+	+	+									
Extraversion	+	+	.	.								
Agreeableness	-	-	.	+	-							
Conscientiousness	.	+	+	+	.	+						
Emotional stability	.	+	+	+	-	+	+					
Openness to experiences	+	+	+	+	+	+	+	+				
Risk tolerance	.	.	-			
Self-efficacy	.	+	.	+	+	+	+	+	+	.		
Physical skills	+	+	+	+	+	.	.	+	+	.	+	

Note. The "+" sign indicates that the simple correlation between these two variables is statistically significant and positive. The "-" sign means that the correlation is statistically significant and negative. The rest of cross correlations (not statistically significant) are indicated with a dot.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Skills Required in the Labor Market

Most jobs require a wide range of skills. However, the relative importance of different types of skills varies considerably between occupations. For example,

36. The measure of skills that appears less correlated to the rest is Risk Tolerance, since its correlation to the remaining variables is not significant in 10 of the 11 possible cases. Those that appear a higher number of times associated to the remaining measures are numerical skills and the openness to experience, followed by grit and emotional stability.

the tasks carried out by an engineer in charge of the design of a bridge do not require a sophisticated use of their socioemotional skills to relate with other people. Whereas a person in charge of customer service in a retail store must make day-to-day use of persuasion and empathy capacities to deal with customers. While the engineer uses mathematical models to determine the strength of materials to be used in the construction of the bridge, the person in charge of sales applies basic mathematical knowledge to calculate the discounts daily. These examples show that although many occupations use the same type of skills, the intensity and complexity of their use differs between occupations.

What type of skills do the jobs in Latin America require? In this section we answer this question based on the premise that the jobs may be described as a set of well-defined tasks that imply the use of specific skills in different intensities (Acemoglu and Autor, 2011). This assumption permits the classification of all occupations identified in the 2015 CAF Survey according to the level of requirement of two large categories of skills: complex cognitive and interpersonal socioemotional. To carry out this classification it is necessary to understand the contents of skills required for each occupation, which is provided by the Occupational Information Network (O*NET). This database details the (theoretical) contents of the tasks and the skills necessary in a great number of occupations, making possible the comparison of skills requirements between occupations (see Chapter 4, Text Box 4.39). Specifically, the index of complex cognitive skill requirement is formed based on the skills contents of the following tasks: critical thought, active learning, system analysis and evaluation, decision-making, complex problem resolution, and monitoring and development of learning strategies. In turn, the index of interpersonal socioemotional skill requirement gives results from considering the skill contents of the following duties: coordination of tasks, persuasion, empathy, orientation to service, and giving instructions.³⁷

Graph 1.11 presents the requirements of both types of skills in the 39 occupations identified in the 2015 CAF Survey and in the O*NET while also considers the importance of each occupation in the total employment in the cities of Latin America surveyed. In this graph, each occupation is described by a bubble, the center of which positions the occupation in accordance with how much it requires of each skill. The size of the bubble shows the importance of that occupation relative to total employment. The skills are standardized in such a way that 0 is the average value. A first conclusion from this analysis is the great variety of skills that different occupations require. A second aspect to emphasize is the strong positive correlation in the requirements of both cognitive and socioemotional skills.³⁸ Although the occupations that require much of one skill and little of another are relatively

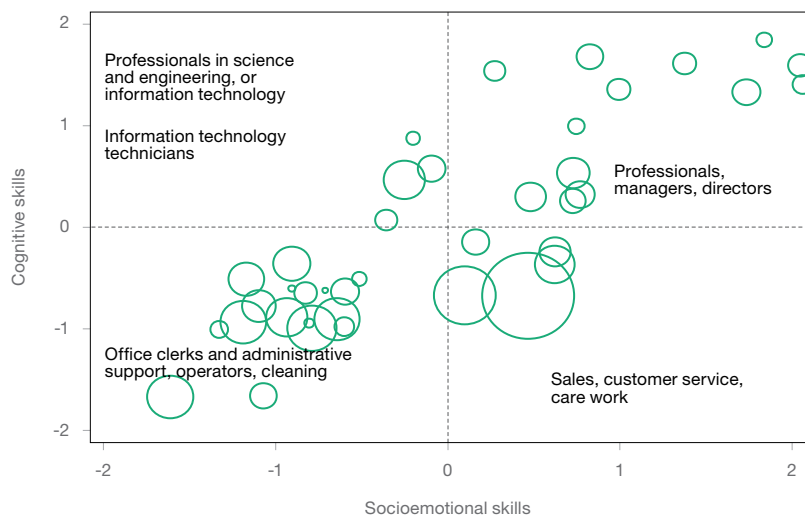
37. The cognitive and socioemotional skill requirements indexes for each occupation were built based on the aggregation proposed by Pellegrino and Hilton (2013).

38. The correlation coefficient is 0.71.

few, the size of some bubbles indicates that many people in Latin America are employed in occupations of this type, in particular in those that require few cognitive skills and many socioemotional skills.

In the main cities of Latin America 3 out of every 4 jobs require low levels of complex cognitive skills.

Graph 1.11 Cognitive and Socioemotional Skill Requirements by Occupation in 10 Latin American Cities



Note. The graph reports the distribution of occupations reported in the 2015 CAF Survey in accordance with their requirements for socioemotional and cognitive skills. The center of each circle represents the combination of skills for a specific occupation, while the size of the circle represents the share of that occupation in total employment. Of 43 occupations recorded (that correspond to occupations of the ISCO 08, two digits), the 39 occupations that also appear in the Occupational Information Network are represented. The cognitive and socioeconomic skill requirement indexes for each occupation are constructed based on the aggregation made by Pellegrino and Hilton (2013; see Chapter 4, Text Box 4.3, p. 223). The skill indexes are standardized (expressed in standard deviations in respect to the median). The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration based on data from the O*NET and the 2015 CAF Survey.

Classifying the occupations in four large groups, either above or below the average requirements in each skill dimension, permits to conclude that in the major cities of Latin America, about 3 of every 4 jobs (74%) require low levels of complex cognitive skills (Table 1.5, see p. 64). This group includes the occupations of office clerk, administrative assistant, operator, and cleaning crew—that also require low levels of interpersonal socioemotional skills—and occupations related to sales, customer service, and care work—that require a high level of interpersonal socioemotional skills. Only 18% of the jobs in the major cities of Latin America need high levels of both skills. In this group, 41% of employees have completed tertiary or college studies, while this percentage is only 14% for all those employed. In addition, for every dollar received by an employee in an occupation such as these, the rest of the

employees receive considerably less (between US\$.68 and US\$.77). Professionals such as physicians, engineers, architects, or lawyers are usually included in this group of high requirements in both dimensions, as well as those with management or executive jobs. It should be emphasized that there are no substantial differences in the average age of the employees who belong to the four groups, although some differences are observed in respect to gender composition. In particular, women are overrepresented in the occupations that require high levels of socioemotional skills, combined either with high or low requirements of complex cognitive skills.

Table 1.5 Employee Characteristics by Occupational Skill Requirements in 10 Latin American Cities

Characteristics of employees	Combination of occupational skills				All employees
	High cognitive – high socioemotional	High cognitive – low socioemotional	Low cognitive – Low socioemotional	Low cognitive – high socioemotional	
Share of total employees (%)	18	7	39	35	100
Women (%)	49	19	34	49	41
Age (years)	37	36	35	35	36
Secondary education incomplete (%)	10	14	42	35	32
Secondary education completed (%)	49	68	52	57	55
College/tertiary education completed (%)	41	18	6	8	14
Labor income (for every dollar earned in occupations with high requirements for both skills)	1	0.77	0.74	0.68	0.77

Note. The table reports characteristics of workers according to the combination of requirements of cognitive and socioemotional skills in their current occupations. An occupation has a high (low) skill requirement if its theoretical requirement is higher (lower) than the one of the average of the occupations found in the 2015 CAF Survey (as in the four quadrants of Graph 1.11, see p. 63). The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

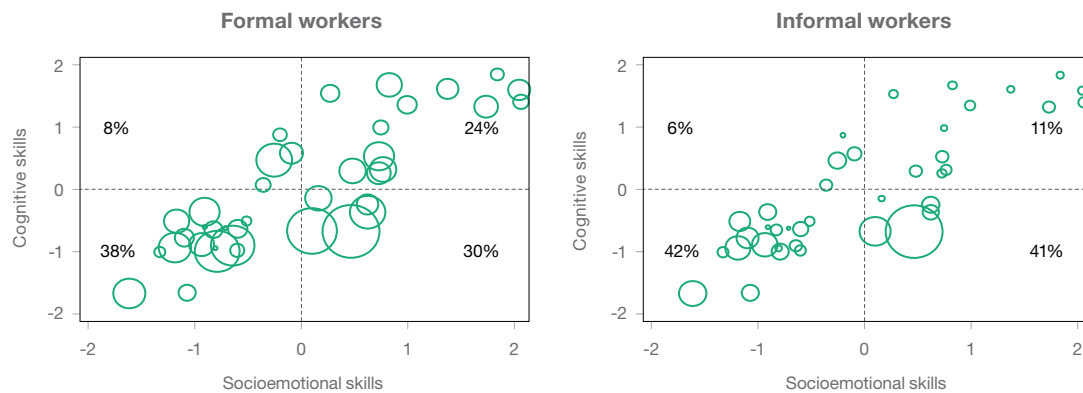
Source. Authors' elaboration based on data from the O*NET and the 2015 CAF Survey.

Currently, in Latin America around 40% of salaried workers are informal workers³⁹ and, in addition, almost 1 of every 3 people working run “their own business” —as compared to 1 of every 10 observed in developed countries, which in more than 90% of cases corresponds to a microenterprise (CAF, 2013). Graph 1.12 shows that the informal sector is characterized by requiring less sophisticated skills than the formal sector. It compares the distribution of total employment according to the requirements of cognitive and socioemotional skills in formal and informal

39. Based on the most recent data from the Labor Database for Latin America and the Caribbean (LABLAC), published by the Center for Distributive, Labor and Social Studies (CEDLAS) and the World Bank, productive informality in the region reaches 45%, while the average of the “legal” informality (workers not covered by social security) is around 30%.

occupations, and it is observed that the main difference between the two sectors occurs in the requirements of cognitive skills: while 1 of every 3 jobs (32%) in the formal sector requires high levels of these skills, only 1 of every 6 (17%) does in the informal sector.

Graph 1.12 Cognitive and Socioemotional Skill Requirements in Formal and Informal Sectors in 10 Latin American Cities



Note. The graph reports the distribution of the operations reported in the 2015 CAF Survey in accordance with requirements of socioemotional and cognitive skills. The center of each circle represents the combination of skills of a specific occupation, while the size of the circle represents the share of that occupation in total employment. Of 43 occupations registered in the 2015 CAF Survey (that correspond to occupation of the ISCO 08 to two digits), the 39 that also appear in the O*NET are represented. The cognitive and socioemotional skill requirement indexes for each occupation are constructed based on the aggregation made by Pellegrino and Hilton (2013) (see Chapter 4, Text Box 4.3, p. 223). The skill indexes are standardized (expressed in standard deviations in respect to the median). Workers are considered formal if their employers contribute to social security. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration based on data from the O*NET and the 2015 CAF Survey

What Skills Will Be Required in the Future?

The occupational structure of a country —and the implied requirements of skills— change over time. These changes may be due to multiple factors including economic reforms that dramatically affect productive structures (e.g., trade liberalization), or technological progress, which often profoundly affect some industries and occupations.⁴⁰ Occupational structure therefore results from a balance between the supply and the demand of skills and is configured of different fractions of the population occupying jobs that require

40. The dream of owning a video club no longer seems such a good idea, since new technologies have made the renting of movies (other than from streaming or pay-per-view providers) not as profitable as it was a couple of decades ago.

Recent studies maintain that the technological progress will not necessarily reduce the number of jobs, but it will affect the required skills.

different skill types and intensity of use. One of the big questions regarding the future of employment is whether the current and future accelerated technological progress and the automation of tasks will see machines and computers replace workers. Recent studies (Autor et al. 2003; Autor, 2015) have maintained that this technological progress will not necessarily reduce the quantity of jobs, but it will indeed affect the type of jobs that will be generated and thus the skills required.

In order to analyze the level of risk of automation to specific jobs, Autor et al. (2003) classify occupations as they involve the performance of routine and nonroutine tasks. The routine tasks are defined as precise activities, which in order to be carried out need to follow known procedures, and, therefore, are susceptible of being automated—that is, coded into software and performed by computers.⁴¹ The nonroutine activities, on the other hand, are those that imply the use of skills that require resilience, judgment, and common sense, which are only understood tacitly, so there is no clear rule on how and when to apply them. The lack of specific rules in these activities makes it extremely difficult to convert them into an algorithm that a machine will be able to interpret (Autor, 2015).⁴²

Because the great inventions in the computing power of modern computers make automation increasingly less expensive, the so-called automation hypothesis proposes that those occupations with a high content of routine activities will be eliminated, and the occupations that will gain importance will be those that demand nonroutine skills and are better complements with computers. Autor et al. (2003) and Autor (2015) show evidence consistent with this hypothesis in the United States. In particular, they show that the change in the occupational structure since the '90s implies an increase in the relative use of nonroutine analytical and nonroutine interpersonal cognitive skills (known as the *new economy skills*), while the use of manual skills (routine and nonroutine) and of routine cognitive skills was reduced (see Table A.1.1 in the Appendix, with the classification of these skills).⁴³

Following the same definition of routine and nonroutine skills of Autor et al. (2003), Graph 1.13 shows how much skills do the 10 large cities in the 2015 CAF Survey require in respect to the average requirements in United States. From that results it cannot be stated that jobs in Latin America are more routine than in the United States, but they do require a higher number of manual tasks (both routine and nonroutine) because the ratio between the average requirement of those skills in each city and in the United States is

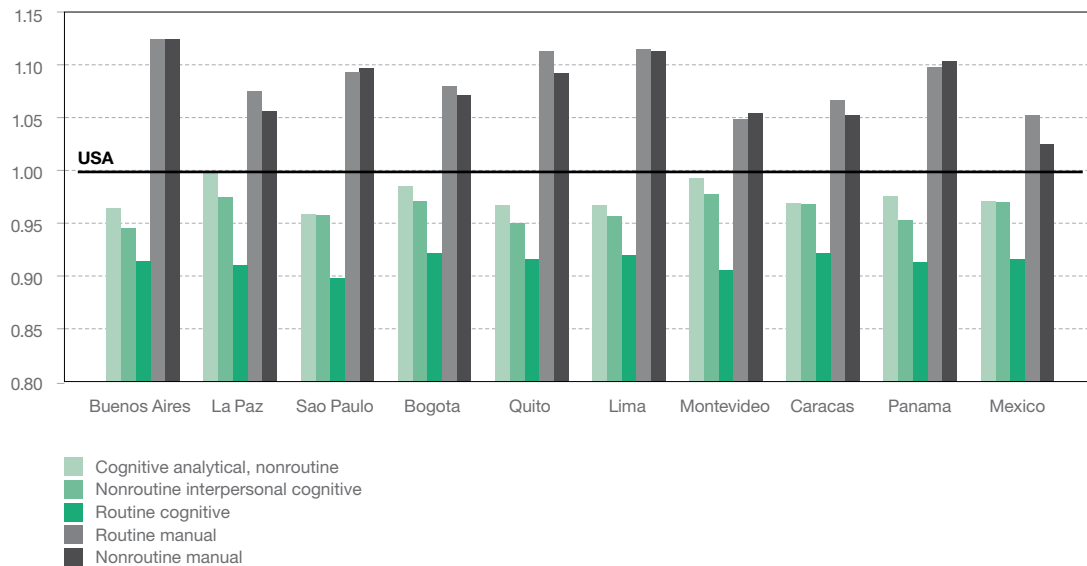
41. Some occupations are more intensive in routine areas than others. Some examples of routine tasks are the mathematical calculations involved in the basic business accounting; the recovery, classification, and storage of structured information (common activities in office work); and repetitive physical operations, typical of production line tasks (Autor et al., 2003).

42. Nonroutine activities require skills of various types, from creativity for solving problems and the capacity for adaptation to a changing environment, to visual recognition and the appropriate use of language in interpersonal interactions (Autor et al., 2003).

43. The intensity of use of some skills is measured on a comparable scale.

always higher than 1. Moreover, jobs in Latin America require less intensively nonroutine cognitive (interpersonal and analytical) and routine cognitive skills (the ratio between the average requirement of those skills in the respective city and in the United States is always lower than 1).

Graph 1.13 Skill Requirements in 10 Latin American Cities Compared with the United States



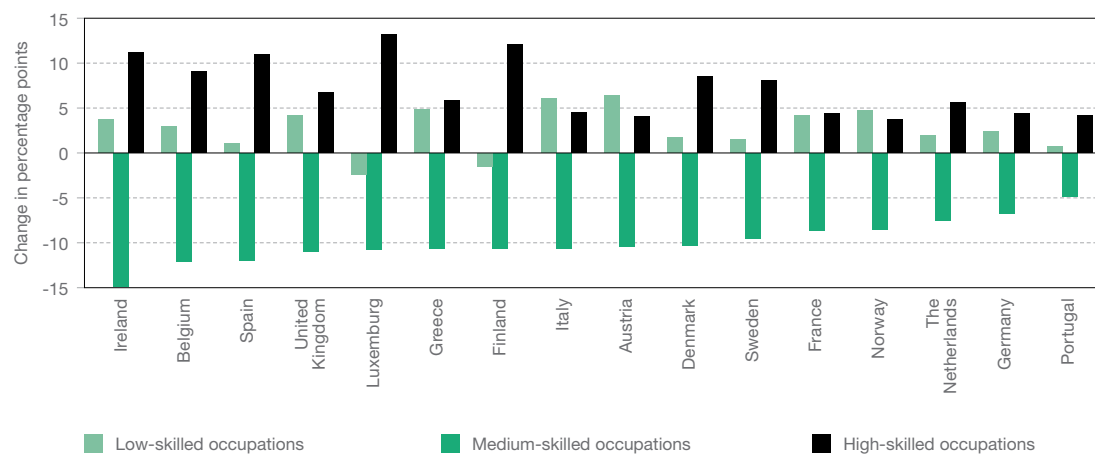
Note. The classification of tasks in the five categories is made following the proposal of Autor et al. (2003), which is detailed in Table A.1.1 of the Appendix. The values are presented as ratios in respect to the skills required in the United States. The data for the United States were obtained from Aedo and Walker (2012).

Source. Authors' elaboration using data from O*NET, the 2015 CAF Survey, and Aedo and Walker (2012).

Although the requirement of nonroutine cognitive skills is lower in Latin America, it is also interesting to understand how the situation has been changing over time. Evidence is still scarce, but some recent studies show that the evolution of the requirements of skills in the region does not seem to be the same for all countries, and there are no indications that a strong automation process is occurring. For example, the work by Aedo and Walker (2012) shows that among three countries analyzed (Brazil, Costa Rica, and Nicaragua) only in Costa Rica, from 2002 to 2009, shows a change in the occupational structure that is consistent with the automation hypothesis. Specifically, an increase is observed in the intensity of use of New Economy Skills and a reduction in manual tasks. In Nicaragua, there is no substantial change in the requirement of skills in the same period. In Brazil, on the other hand, the requirement of cognitive analytical and interpersonal skills drops between 1981 and 2009. In sum, it is not clear whether Latin America may be going through an automation process similar to that of the United States.

A phenomenon closely related to that of automation, and that was also observed in the past 2 decades for developed countries, is that of polarization of occupations (Autor, 2015; Goos et al., 2014). Since typically the jobs with more routine tasks are those found in the middle of the distribution of skills as well as in the middle of the distribution of salaries, the change in occupational structure generated by technological progress implied a simultaneous increase in the proportion of those employed in tasks of high skills (and high salaries) and also of low skills (and low salaries), while occupations with intermediate salaries and skills was reduced. Graph 1.14 shows the change in the participation of occupations that require low, medium, and high skills in total employment, in countries of the European Union in the period of 1993–2010.⁴⁴ The process of polarization is present, as evidenced by a drop in the participation of occupations that require middle skills in favor of occupations with low and high skill requirements.⁴⁵

Graph 1.14 Percentage Change in Total Employment by Skill Requirement Levels in European Union Countries (1993–2010)



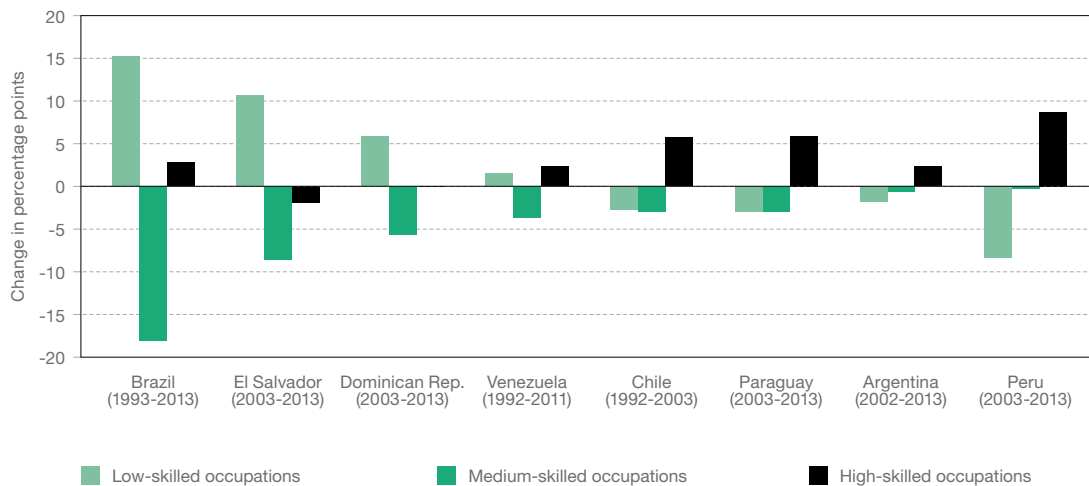
Note. Occupations with high-skill levels include: directors and general managers of companies; professionals in sciences and engineering; health-care professionals; directors and managers of production and services; mid-level professionals in sciences and engineering; mid-level professionals of legal, social, cultural and related services; and entry-level health-care professionals. Occupations with medium-skill levels include: operators of fixed facilities and machines, metallurgy officials and operators, mechanical construction workers and workers in related fields, drivers of motor vehicles and operators of mobile heavy equipment, office clerks, artisans, repairers of precision instruments, and graphic artists, construction supervisors (including electricians), employees working directly with the public, assemblers of mechanical machinery, and related occupations. The occupations with low-skill levels include entry-level jobs in: mining, construction, manufacturing, and transportation workers, workers of personal services, sellers, retailers and cashiers, and domestic and cleaning personnel.

Source. Goos et al. (2014).

44. Occupations are ordered in accordance with their average salaries in the 16 European countries in the entire period of analysis (Goos et al. 2014). In this graph, it should be noted that since the sum of the participation by each group in total employment is equal to one in a given period, the changes in the participation in time have to sum up to zero.

45. Two exceptions are Luxembourg and Finland, where incidence of low-skilled occupations in total employment has also dropped.

Graph 1.15 Percentage Change in Total Employment by Skill Requirement Levels in Several Latin American Countries



Note. The countries shown are the only ones with available information to make the calculations in the graph. For Brazil, Chile, the Dominican Republic, El Salvador, and Paraguay, the same classification criteria of occupations as that of by Goos et al. (2014) is followed, Table 2 (see Graph 1.14). In the cases of Argentina, Peru, and Venezuela the occupation codes do not follow the ISCO 88 codes; therefore the requirement of skills is approximated by the average salary of each occupation category (to 3 digits) in the base year. In this latter group of countries, the group of occupations requiring low skills are the worst-remunerated occupations, which make up the bottom 1/3 of the total employment; the group of occupations with high skills are the best-remunerated occupations, making up the top 1/3 of the total employment; the group of middle-skills jobs are the remaining occupations.

Source. Authors' elaboration based on data from household surveys of the Socio-Economic Database for Latin America and the Caribbean (SEDLAC; CEDLAS and World Bank, 2016).

However, in the case of Latin America, this polarization process does not seem to be present so far. Graph 1.15 shows how the change has been in the occupational structure in accordance with the skill requirements of each occupation for some Latin American countries.⁴⁶ Although a drop in the participation of occupations that require medium level of skills is observed in all the countries, in very few cases —only Brazil and Venezuela⁴⁷— does this accompany a simultaneous increase in the occupations of high and low skill requirements. In Brazil, the Dominican Republic, and El Salvador, a significant increase is observed —above 5 percentage points— in the incidence of occupations of low skill requirements, while in Chile, Paraguay, and Peru, an equally important increase is observed —above 5 percentage points— in the participation of high skill requirements. In Argentina and

46. For the case of Brazil, Chile, El Salvador, Paraguay, and Dominican Republic the same classification criteria used by Goos et al. (2014) is followed, Table 2 (see Graph 1.14). In the cases of Argentina, Peru, and Venezuela, the codes of occupations follow the ISCO 88 code, therefore, the requirement of skills is approximated by the average salary.

47. Two exceptions are Luxembourg and Finland, where the incidence of low-skilled occupations in total employment also decreased.

School dropout, teenage pregnancy, and the number of young NEETs may become major obstacles to the formation of quality human capital in the region.

Venezuela, no substantial changes occurred. Finally, the changes in the occupational structure experienced by Chile, Paraguay, Argentina, and Peru in the past 2 decades are qualitatively similar to those that took place during the '80s in the United States: an increase was observed in the incidence of occupations with higher skill requirements to the detriment of the other two types of occupations (Autor, 2015).

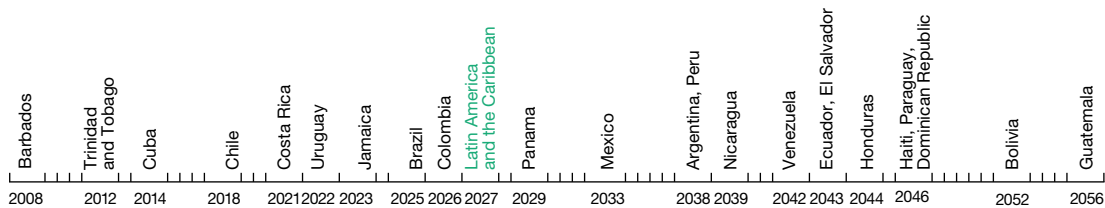
Skills of a Young Continent: Opportunities and Obstacles

Latin America has a relatively young population. The proportion of very young and older people (*dependents*) in respect to the working-age population is still declining in most countries. This demographic phenomenon, called the demographic dividend or demographic bonus, will last a few years more in the region. A young population and with low rates of dependence creates substantial development opportunities.⁴⁸ In order to take the maximum advantage of this favorable period, it is of the utmost importance to have a well-educated population of young people who will have a wide range of opportunities granting them versatility to adapt to changing environments such as, for example, those imposed by technological progress.

Nevertheless, the region is aging rapidly, and the end of the demographic dividend will arrive in more or less 10 years (Figure 1.3), though some countries are already much closer to this limit (such as Chile, Trinidad and Tobago, and Cuba).⁴⁹ Despite the progress in the access to basic education in most of Latin American countries (see Chapter 3), the region is still behind regarding skills development, especially for the poorer youth. This problem is associated to several phenomena that are still highly prevalent in Latin America: school dropout, teenage pregnancy, and the number of young NEETs. These issues may become major obstacles to improve the quality of human capital and could offset the demographic opportunity.

48. When the active age population is large, the burden of supporting the part of the population that is not economically active is distributed among more people; the more human capital they have and the more productive they are, the lesser the burden of supporting dependents. This effect is potentialized in case that working-age people have good health and are able to prolong their working years.

49. Here we use the date of the end of the demographic dividend as the time when the ratio of dependent people to the working age population reaches a minimum (and then it starts to grow again). Other definitions could possibly extend the end of the demographic dividend to the first growth period of the dependence ratio, provided that this does not reach values in excess of a certain threshold (e.g., 2 dependent people for every 3 active people).

Figure 1.3 End of the Demographic Dividend in Latin American Countries

Note. The figure indicates the year that the demographic dividend ends in each country, using population projections. The length of the demographic dividend is calculated as the period of time during which the dependency ratio (the proportion of the inactive population, approximated as individuals under 20 years of age and those over 65 years of age, and the active population, approximated as individuals between 20 and 64 years of age) drops. The year in which each country reaches the end of the demographic dividend is when the dependence ratio reaches its minimum value.

Source. Authors' elaboration based on population projects of the Population Division of the United Nations Department of Economic and Social Affairs.

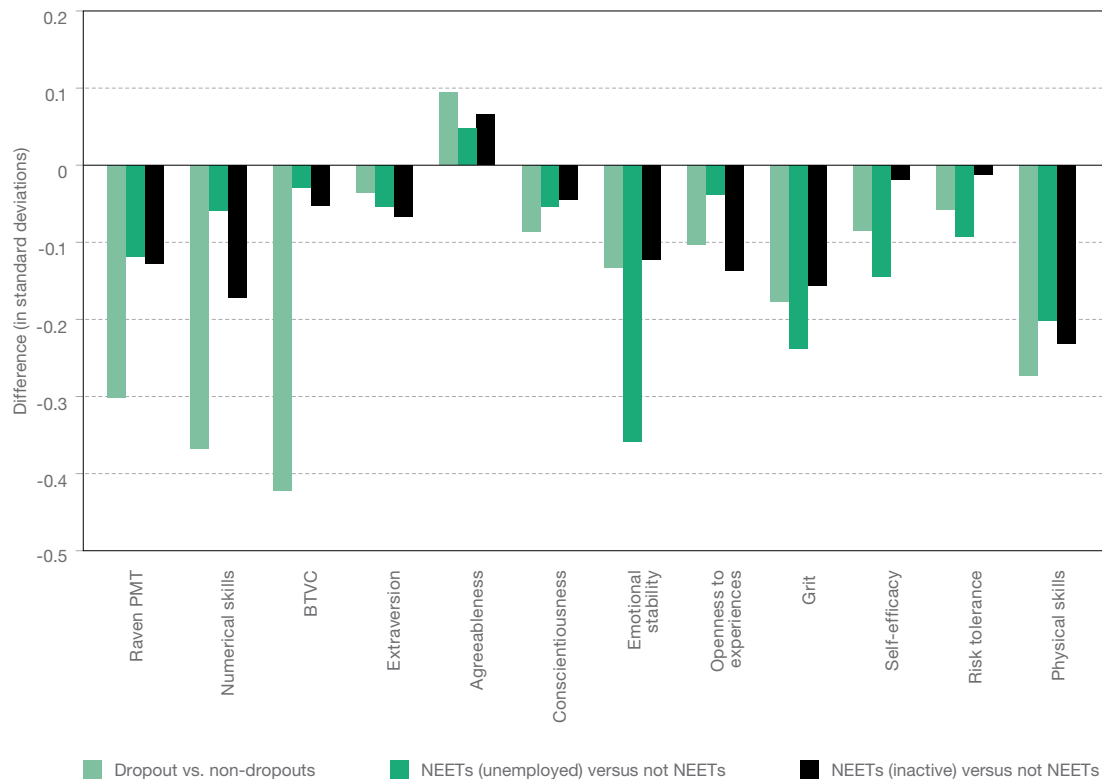
Obstacles to the Formation of Skills in Adolescence and the Transition to Adulthood

This section quantifies school dropout, teenage pregnancy, and NEET phenomena, showing that they affect a high proportion of young people in the region.

Graph 1.16 (see p. 72) shows that young people who drop out of school and those who are NEETs (either because they are unemployed or because they are inactive) have, on average, lower skills compared to those who do not drop out or are not NEETs, respectively. An interesting pattern that arises from this graph indicates that young people who dropped out of school are characterized mainly by having lower cognitive skills in respect to those who did not drop out, while they are different to a lesser extent in terms of socioemotional skills. On the other hand, NEETs are characterized by having relatively lower socioemotional skills compared to non-NEETs and the two groups are not that different in terms of cognitive skills. Both groups (dropouts and NEETs) also have lower physical skills than their counterparts (non-dropouts and non-NEETs).

Since schools and jobs are the primary channels through which adolescents acquire new skills as they transition into adulthood (as shown in Chapters 3 and 4 of this report), the separation from these contexts of skill formation poses great challenges for the design of public policies intended to support the development of youth.

Graph 1.16 Skills of Dropouts and NEETs Compared to Youth Studying and Working, in 10 Latin American Cities



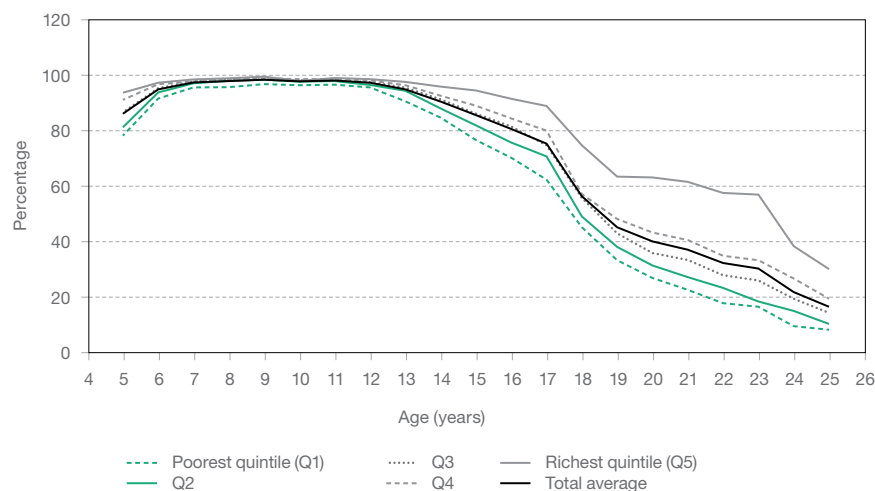
Note. The graph reports the differences in skill measures between groups (expressed in standard deviations). All the calculations are made with the population from 15 to 25 years of age represented in the 2015 CAF Survey. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

School Dropout

How large is the school dropout rate in Latin American? Graph 1.17 shows the gross enrollment rate in education, by ages for several countries in the region. The enrollment from 5 to 16 years of age —the population for which school attendance is compulsory (see Chapter 3, Text Box 3.1, p. 162)— is far from universal. On average, the dropout phenomenon starts around age 12 and approximately 25% of 16-year-olds have already dropped out of the formal education system. In addition, these data show the marked inequality existing between children and youth from families of different socioeconomic levels. In some countries the inequalities are extremely large (see Chapter 3).

Graph 1.17 Average School Enrollment Rate by Age and Socioeconomic Level, in Several Latin American Countries circa 2013



School dropout is a very complex phenomenon caused by various factors that are markedly different between men and women.

Note. Simple average of the gross enrollment rates circa the 2013 school year in the following countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Source. Authors' elaboration based on household surveys in SEDLAC database (CEDLAS and World Bank).

School dropout is a very complex phenomenon that is due to reasons of various kinds. Chapter 3 shows that, according to information from the 2015 CAF Survey, the reasons are noticeably different for men and women. For young men (from 15 to 25 years at the time of the survey), the major reported causes of dropout are economic reasons (44%) or feeling bullied or mistreated in the school (32%). For women of the same age, the main reported cause of dropout is pregnancy (36%), followed by economic reasons (25%). Teenage pregnancy is especially worrisome, given its high prevalence in the region and because without outside help for childcare, going back to school or working may be impossible for young mothers (see Text Box 1.7).

Text Box 1.7 Teenage Pregnancy in Latin America

The number of young girls who become pregnant and give birth in Latin America is very high. Approximately 1 of every 5 young women between 15 and 19 years of age is pregnant or has already become a mother. According to recent statistics that compare this with the situation in the rest of the world, our region is the second (after Africa) in teenage pregnancy rate. Graph 1 (see p. 74) shows that this problem does not diminish in importance with the passing of time, and for some countries actually it gets worse. On the other hand, the incidence of teenage pregnancy is

much higher among lower-income girls, since for them, around 1 of every 3 is already a mother or is currently pregnant (Table 1). Chapter 2 of this report further analyzes these figures.

Graph 1 Teenage Pregnancy Incidence in Several Latin American Countries



Note. The graph reports the percentage of women between 15 and 19 years of age who have at least one child or are pregnant at the time of the survey.

Source. Authors' elaboration based on national Demographic and Health Survey (DHS) of each country.

Table 1 Teenage Pregnancy Incidence by Income Quintiles

	All	Quintile of Income				
		1	2	3	4	5
Bolivia 2008	17.9	31.3	22.8	17.7	16.3	7.8
Colombia 2010	19.5	28.9	27.6	19	13.5	7.4
Dominican Republic 2013	20.5	35.1	26.3	17.1	17.1	8.7
Honduras 2011–2012	24.0	35.4	33.2	23.2	19.8	10.8
Haiti 2012	14.2	15.1	17.1	19.5	15.6	5.3
Peru 2012	13.2	25.9	18.7	13.5	7.5	3.2
Average	18.2	28.6	24.3	18.3	15.0	7.2

Note. The graph reports the percentage of women between 15 and 19 years of age who have at least one child or are pregnant at the time of the survey, by income quintiles (1 poorer, 5 richer).

Source. Authors' elaboration based on the DHS of each country.

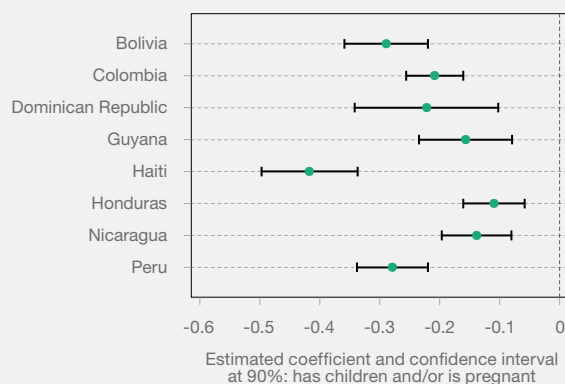
Teenage pregnancy may have an impact on the skill formation process in youth and the transition to adulthood. Pregnancy and child rearing puts at risk continuity in formal education. This is especially important in the case of many young mothers in low-income households, who do not necessarily have other childcare options, whether formal or informal. Teenage pregnancy

could also be correlated to school dropout as a consequence of low levels of skills previously accumulated and poor (previous) school performance. In this case, teenage pregnancy would only aggravate a process of low skill accumulation that was already occurring.

The data of the DHS permits to explore the association between teenage pregnancy and school attendance, comparing the probability of attending school by youth who are teenage mothers and those who are not, after discounting the effects of socioeconomic characteristics that may be associated both to school attendance and the probability of being a teenage mother. Graph 2 shows that teenage mothers have a lower probability of attending school than their peers who have no children. The drop in the probability of school attendance of young mothers in respect to women with equal characteristics but who are not mothers is extremely large: from 10 to 40 percentage points, depending on the country.

In addition, teenage pregnancy can keep young women away from the labor market, another contextual environment that can contribute to the formation of skills. Moreover, as described in detail in Chapter 2, the parenting quality of teenage parents may be low, endangering the development of children born to very young parents.

Graph 2 Difference in Probability of School Attendance for Young Women from 14 to 19 Years of Age with and without Children



Note. The graph reports the coefficients (and 90% confidence intervals), estimated by ordinary least squares on a sample of women between 15 and 19 years of age in each country. The dependent variable is school attendance and the control variable is "Have children and/or is pregnant." All regressions also control for age, marital status, socioeconomic level, urban or rural zone of residence, number of household members, and total number of children born alive. For Colombia, Bolivia, Honduras, Nicaragua, and Peru, the school attendance variable is worth "1" if the woman currently attends an educational institution or if she attended at any time of the year and "0" if she did not. For the Dominican Republic, Guyana, and Haiti, no differentiation can be made between women who are currently attending school and those who have attended at some point in the past. The years of the estimates for each country are: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Guyana (2009), Haiti (2012), Honduras (2011–2012), Nicaragua (2001), and Peru (2012).

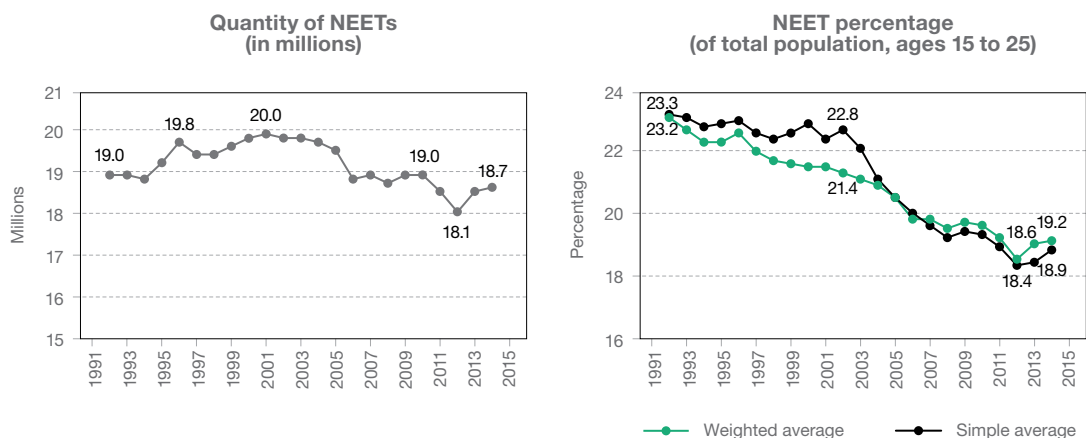
Source. Authors' elaboration based on the Demographic and Health Surveys (DHS) of each country.

Source. Authors' elaboration.

NEETs

NEETs draw a lot of attention from policymakers and the public. Notwithstanding the growing interest in NEETs, a study specially prepared for this report (Tornarolli, 2016) shows that the number of youth in this situation is not growing in Latin America. In fact, the number of NEETs (left panel of Graph 1.18) has remained stable over the past 20 years (at around 19 million youth).⁵⁰ In turn, the percentage of NEETs to total youth of the same age has reduced to some extent, reaching 19% in 2014 from 23% in 1992 (Graph 1.18, right side panel).

Graph 1.18 NEET Population in Latin America (1992-2014)



Note. The countries used in the calculations are: Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela. The weighted average weighs the data of each country by the size of the population from 15 to 25 years of age. The data come from the household surveys for each country.

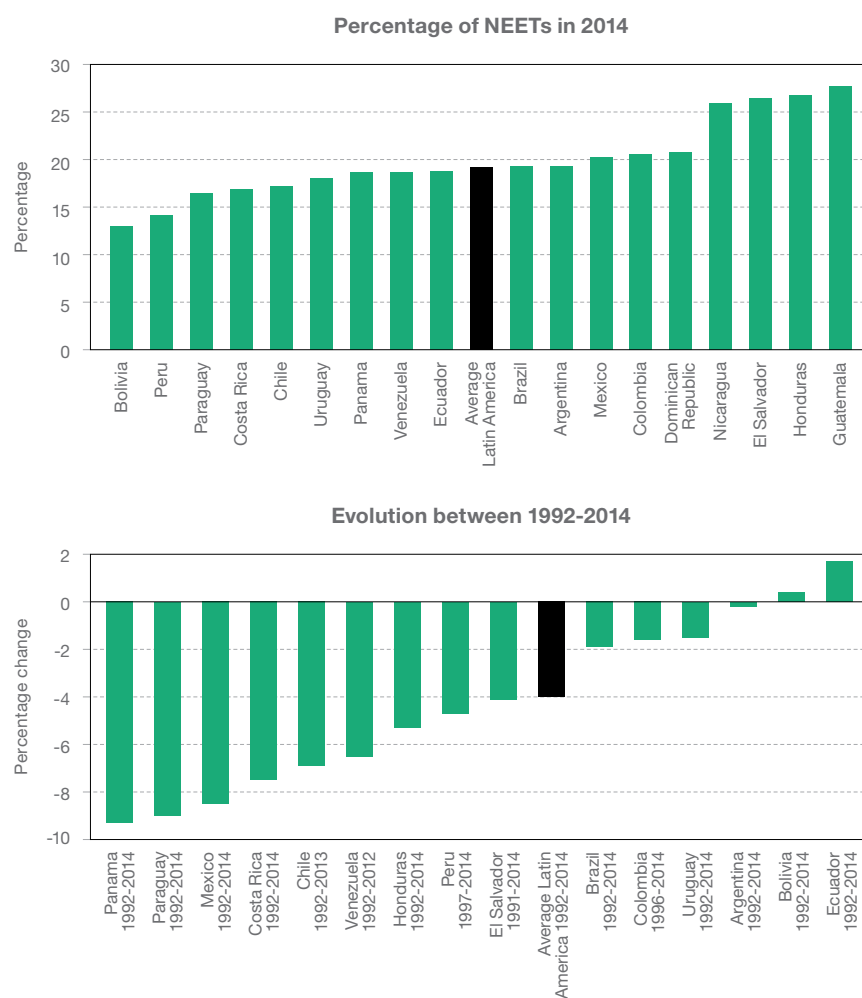
Source. Tornarolli (2016).

However, the number of NEETs is not equal in all countries, and neither are the recent changes in size (Graph 1.19). The left panel of Graph 1.19 shows that the two countries with the fewest NEETs are Bolivia (13.0%) and Peru (14.1%). This perhaps is due to the fact that in their rural areas of each country (where an important fraction of each population lives), the participation of young people in the educational system is low but around 75%–80% of youth declare themselves to be working. The countries with higher percentages of NEETs are Honduras (26.8%) and Guatemala (27.7%). Contrary to the situations in Bolivia and Peru, these Central American countries observe that the proportion of NEETs is very high in rural

50. However, according to another recent study (De Hoyos et al., 2016), the number of NEETs had indeed increased (by around 2 million) in the past 2 decades (from 1990 to 2010). The differences are due to assumptions in calculation methodologies (Tornarolli, 2016).

areas (both in absolute terms and in respect to incidence in urban areas). In most countries, the percentage of NEETs is decreasing, although there are exceptions, such as Argentina, Bolivia, and Ecuador (right-side panel of Graph 1.19).

Graph 1.19 NEET Population in 2014 and Evolution Since 1992 by Country



Note. The data come from household surveys for each country.

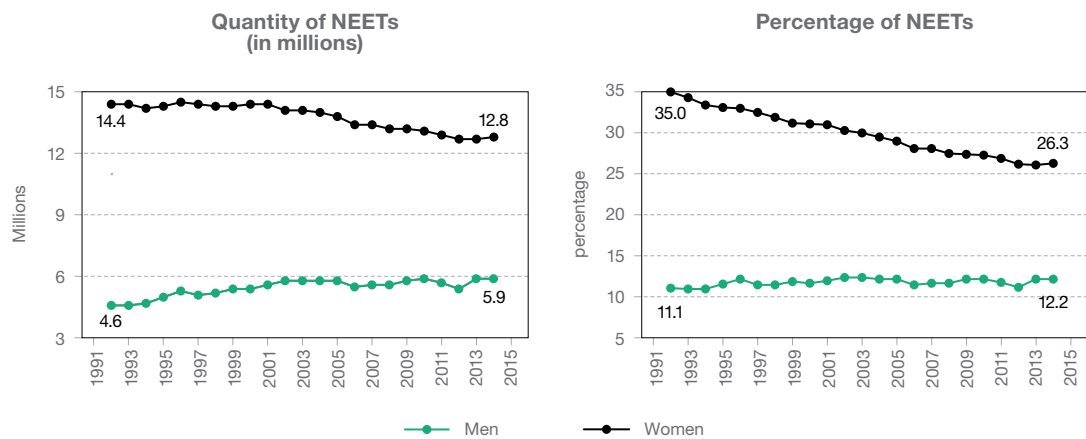
Source. Tornarolli (2016).

A remarkable aspect of this phenomenon's dynamics is the change in the relative importance of the number of NEET that are women. Both in quantity and percentage (Graph 1.20, p. 78), the phenomenon has been losing the female identity that was its strong characteristic 2 decades ago. The percentage of women NEETs went

from 35% in 1992 to 26.3% in 2014, while the percentage of NEET men did not change throughout this period and even increased slightly. However, today still most NEETs are women (approximately 2 out of 3).

Tornarolli (2015) shows that the gender gap starts to open as of 17 years of age exclusively because of differences in the insertion in the labor market,⁵¹ which is much lower for women. On the other hand, the formation of families explains almost the entire growth of the gap, since while the percentage of NEET women who have a partner increases with age; this percentage remains unaltered for NEET men. Another distinctive feature is that the NEET condition is positively associated with not having finished secondary education and belonging to poor households.

Graph 1.20 Latin America's NEET Population's Size and Percentage by Gender (1992-2014)



Note. The countries used in the calculations are: Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela. The weighted average weighs the data of each country by the size of the population from 15 to 25 years of age. The data come from the household surveys for each country.

Source. Tornarolli (2016).

Nuances of the NEET Phenomenon

The quantification of the NEETs presented up to this point responds to a static measure of this condition; that is, it takes into account whether a youth does not work and does not study at a given moment. However, this stage of life is one of transition from the educational system to the labor market and is characterized by considerable instability. In order to more precisely measure the NEET population, it is possible to adapt a dynamic view of the phenomenon and consider NEETs

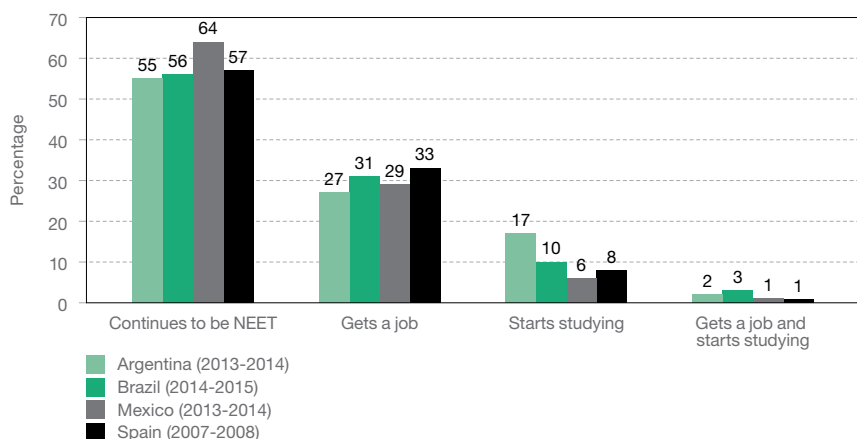
51. The rates at which women drop out of school are very similar to those of men.

as young people who remain in out of work or away from studies for a sufficiently long period of time. The possibility of utilizing the short panel structure (rotating panels that are able to follow a subset of people through time windows of around one year) of several household surveys of Latin America can add to the discussion in this respect. Tornarolli (2016) shows the path followed from one year to the next by youth who neither studied nor worked at the beginning of the period in three countries (Argentina, Brazil, and Mexico) and used Spain as international comparison case (Graph 1.21).⁵²

According to this analysis, almost half of the NEETs at a given moment (somewhat fewer in Mexico) enter the labor market in the following year or pursue some education or perform both. The situation of Argentina and Brazil in this respect is very similar to that of Spain, notwithstanding the differences in the sociodemographic contexts of these countries. Most of the youth who leave their NEET status after a year do so by entering the labor market (exclusively, without simultaneously studying).

Almost half of the NEETs at a given moment do not remain in that category the following year.

Graph 1.21 Yearly Status of NEETs in Argentina, Brazil, Mexico, and Spain



Note. The graph reports the percentage of young people who from one year to the next continue in the same condition ("Continues to be NEET"), or changes to an employment or study situation, or one that combines both.

Source. Tornarolli (2016).

An additional aspect to be considered in the NEET phenomenon is the distinction between those who do not work because they are inactive (are not looking for a job) from those who are unemployed (they actively look for a job). According to data from the 2015 CAF Survey, approximately two-thirds of the NEETs are

52. Argentina 2013–2014, Brazil 2014–2015, Mexico 2013–2014, and Spain 2007–2008 (pre crisis).

inactive and are very different from the unemployed NEETs for several reasons. The inactive NEETs are mostly women (71% against 42% in the group of unemployed NEETs) and in a greater proportion are married or have children. They have also not completed secondary education. From a perspective of those moving in or out of the category, the inactive NEETs are the ones who tend to remain in the category as time goes by, while the unemployed NEETs have a greater probability of changing their status. Text Box 1.8 shows evidence of a public policy that can help to improve the employability of NEET youth who are actively looking for work.

A third consideration regarding the NEET phenomenon has to do with understanding how and where these young people use their time. According to the 2015 CAF Survey, 44% of inactive NEETs declare to be engaged in housework and the family.

Table 1.6 Percentage of Youth from 15 to 24 Years of Age with Household Duties (i.e., they contribute to home production)

	Women			Men		
	Total	Not NEET	NEET	Total	Not NEET	NEET
Argentina 2014						
Does housework (%)	33	26	53	9	9	10
Colombia 2014						
Carries out household chores (%)	88	85	93	60	59	64
Takes care of children (%)	36	27	57	11	11	11
Takes care of sick/elderly/diabled people (%)	2	2	3	1	1	2
Costa Rica 2014						
Performs housework tasks (%)	78	76	87	49	48	57
Takes care of children or elderly people from this or other home (%)	19	13	37	4	4	5
Ecuador 2013						
Fixes and clean the house (%)	86	83	94	60	60	59
Food preparation (%)	76	71	90	33	33	32
Takes care of children and elderly people (%)	37	28	60	15	15	15
Guatemala 2014						
Cleans and fixes the house (%)	74	63	87	15	14	30
Takes care of children (%)	38	24	54	11	11	14
Takes care of older adults (%)	2	2	3	1	1	1
Takes care of sick people (%)	1	1	2	1	1	2

Source. Tornarolli (2016).

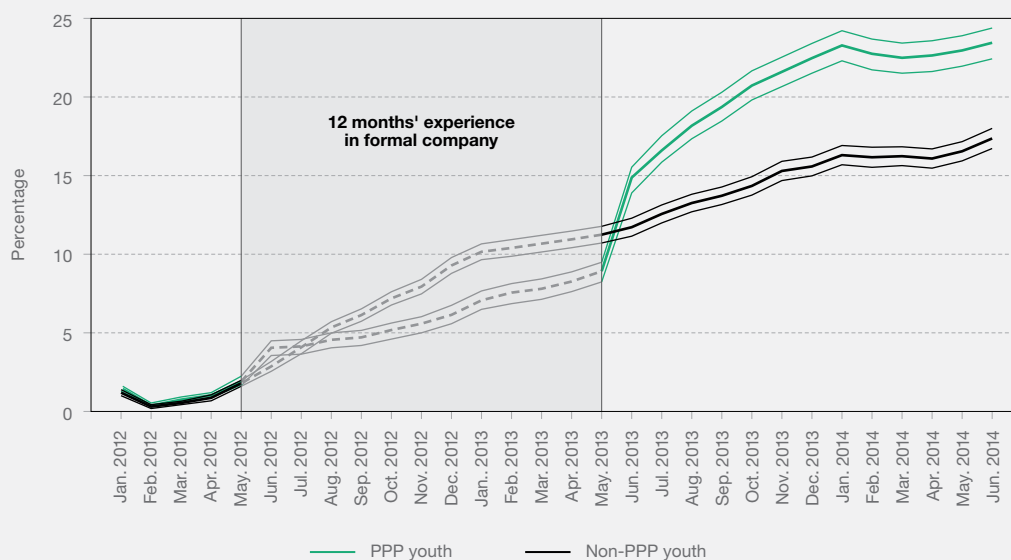
Some household surveys of the region permit a more detailed study of the participation of young people in the household tasks and care of other people. Table 1.6 presents evidence for Argentina, Colombia, Costa Rica, Ecuador, and

Guatemala based on work by Tornarolli (2016), and three conclusions are drawn from this. First, women, regardless of whether they are NEETs or not NEETs, participate more in household tasks and care of children and older people. Second, within the group of young women, those who are NEETs are the ones who get more involved in all the activities considered. Contrarily, except from very specific cases, the differences of participation in home production (household duties) are very small between men regardless of NEET status. This illustrates, once more, the great heterogeneity existing in the group of young NEETs, especially the differences that exist across genders.

Text box 1.8 Evidence from a Youth Employment Promotion Program

The First Step Program (PPP, for its initials in Spanish), in the Province of Cordoba (Argentina), provides youth who lack relevant work experience the possibility to intern for 12 months in formal-sector companies. The program evaluation done by CAF shows substantial improvements in the future formal-sector employability of youth who go through the program. Graph 1 shows the fraction of youth employed in the formal sector before and after going through the PPP, for the groups of beneficiaries and non-beneficiaries (benefits were randomly assigned). Twelve months after the completion of the program, the PPP youth had a 32% higher probability of being employed in the formal sector than the non-PPP youth. The impacts were even greater for the young people who had not completed secondary education —that is, those who were NEETs at the time of enrolling in the program.

Graph 1 Formal Employment History of Beneficiaries and Non-Beneficiaries of the PPP



Source. Authors' elaboration based on Berniell and de la Mata (2016).

Conclusions

Latin America needs to intensify its human capital development efforts. All dimensions of relative development lag in the region (slow growth of the GDP, low productivity of workers, high levels of violence, low quality of housing, among others) are fairly connected to these investment deficits. This chapter has introduced the analysis of the development of cognitive, socioemotional, and physical skills, presenting them as human capital pillars, and discussed measurement aspects accompanied by a diagnosis of the current situation and the future outlook in respect to the supply and demand of skills in the region.

A first message that arises from this chapter is that the benefits at the aggregated level of higher skills are very important. For example, increases of 1 standard deviation in the grades on the PISA tests (proxies of cognitive skills) could imply up to 2 percentage points of growth in per capita GDP. The differences between our region and others of more dynamic growth in terms of the level of skills seem to explain to a large extent the reason why Latin Americans are only 2.5 times richer than in 1960, while a group of Asian countries became more than 9 times richer over the same period. Moreover, evidence suggests that behind this relationship between skills and economic growth is not only the stock of cognitive skills since socioemotional skills appear to have also a significant influence.

Higher cognitive, socioemotional, and physical skills result at the same time in greater individual progress. The data collected by the 2015 CAF Survey show strong evidence—in line with previous studies made using data with smaller coverage— how different types of skills associate with labor indicators and other dimensions of people's wellbeing. The general pattern that arises from the analysis indicates that cognitive skills are relatively more important as predictors of salary level and educational achievement, while socioemotional skills have a greater weight in aspects of social behavior and other dimensions of wellbeing, such as health. In addition, physical skills are strongly associated with labor results, mental health, educational achievements, and satisfaction with life.

Latin America is in a certain way behind in its stock of the three types of skills, as compared to the situation observed in more developed regions. For example, the PISA 2012 tests indicate that Latin American countries are among those that have higher percentages of youth who do not reach minimum competencies in mathematics, language, or science. In the socioemotional dimension, there are not enough sources of information to make reliable international comparisons, and the little evidence that exists to suggest a significant lag in the region. In the indicators associated with physical skills, Latin America shows important progress and convergence with developed countries in several dimensions (e.g., the high incidence of child malnutrition, especially in the most vulnerable population). However, many important health problems, that affect disproportionately the poor (like stunting), remain unresolved. An additional problem for the skills in Latin America is their

unequal distribution. Within the region there is a clear socioeconomic gradient in practically all measures of cognitive, socioemotional, and physical skills.

In order to understand the current situation and how the level of skills in Latin America will evolve, it is not sufficient to look only at supply aspects (how many skills have accumulated the individuals as of today), but also the skills that are and will be demanded in the labor market need to be well understood. Jobs in Latin America are currently characterized by a low demand of complex cognitive skills, since 3 of every 4 employees are in occupations where no intensive use of them is made. This is in part a result of the great importance of the informal sector, where a set of less sophisticated skills is required than in the formal sector: while 1 of every 3 jobs in the formal sector requires high levels of complex cognitive skills, only 1 of every 6 requires them in the informal sector.

This chapter has also provided some clues on which changes can be expected in view of the increasingly accelerated technological progress. The major concern has to do with the threat of automation of tasks by computers and other machines. While in several developed countries the automation phenomenon seems to be operating—which is reflected in a polarization process of occupations, with loss of jobs that have a high routine content, typically associated to occupations with medium salaries— Latin America does not seem to be following that same path yet, or at least not with the same intensity as in the developed world. In many countries in the region, recent changes in the occupational structure are more similar to the situation that took place in the United States in the '80s than what has been observed there for the past two decades or so. Although it is impossible to guess at this stage what occupational change pattern the region will follow, a general conclusion of the analysis of the relation between occupations and skills is that people with more skills, both cognitive and socioemotional, will be better prepared to face any type of change in the demand for skills resulting from technological progress.

In its near future, Latin America has great potential as well as challenges to build quality human capital. The region has the advantage of having a young population, and for this reason it can still exploit the benefits of the demographic dividend, which will end in approximately a decade. Therefore, it is of the utmost importance to invest in young children in order to endow future workers with the necessary versatility to adapt to the changing contextual settings that will characterize the upcoming years. To this end, Latin America must firmly attack three big problems that still trouble the young people of the region: school dropout, the NEET phenomenon, and the problem of teenage pregnancy. All these challenges for youth must be resolved through addressing the importance of the family, the school, the labor market, and the social context, which will be analyzed in each of the following chapters.

Appendix

Measurement of Cognitive and Socioemotional Skills

Raven Progressive Matrices Test (Raven PMT; Raven, 1936): A nonverbal test that uses 60 items to measure abstract reasoning and is considered a nonverbal estimate of fluid intelligence. In each of the 60 items, the individual is asked to identify the missing element, through the comparison of forms and reasoning by analogies, that completes a certain pattern. In the 2015 CAF Survey, a short test of 8 items is used that has been used in other studies for Latin America.

Brief Test of Verbal Conceptualization (BTVC): Verbal conceptualization is defined as the individual's capacity to generalize, form abstractions, and find relations between verbal concepts. It is supported on the similarities and differences of the objects that the subject has assimilated, on the events or ideas that surround the test taker, and on ability to order and classify similarities. It requires, at the same time, the use of the memory, comprehension, and capacity of associative and inductive thought.

This test evaluates the ability to produce verbal concepts in an inductive manner. It is designed to be used in survey contexts. The task consists in inferring, based on the presentation of stimuli (in this case two concepts, for example "table-chair"), the relation or rule that unites them and expressing it verbally (answer, "they are both furniture"); it also assumes putting into practice three basic steps of inductive reasoning: codification, inference, and mapping.

The test consists in a selection of items of the subtest "Analogies" of the Wechsler Adult Intelligence Scale III (WAIS III). The selection of items was made by taking the first and last items considered as easy, the first two items of medium difficulty, and the first two items of maximum difficulty. The items selected were:

1. Dog – lion
2. Boat – automobile
3. Table – chair
4. Democracy – monarchy
5. Egg – seed
6. Steam – fog

The answers are classified as (1) "correct abstract," (2) "correct but functional or concrete," and (3) "incorrect." For example, for the item "dog – lion," answers such as "they are animals," "four-legged," or "mammals" receive 2 points (correct abstract). Answers "they have hair," "they have teeth," "they have claws," receive 1 point (correct but functional or concrete). Incorrect answers, such as "they are aggressive" or "dangerous" receive 0 points. The score of the test is the simple sum of all items recorded, which can be 0 (incorrect), 1 (correct but functional or concrete), or 2 (correct abstract).

Therefore, the total score ranges between 0 and 12 points. The cases of no answer are eliminated because there is no defined criterion to assign another value.

Numerical skills index: In the 2015 CAF Survey, the index is constructed from the sum of the score obtained based on a test and three questions of simple mathematical calculations. In the test, the respondent is asked to count backward from 20 to 0; if done it correctly in the time stipulated, the test taker obtains 1 point; if not, no points are assessed. The respondent is asked to resolve mathematical problems from day-to-day life. For each correct answer, 1 point is given. For each incorrect answer, no point is given. Given that each question takes the value 1 if the respondent answers correctly and 0 otherwise, the numeral skills index varies between 0 and 4.

The Big Five personality traits model: This model is based on simple language personality descriptors. For the 2015 CAF Survey, the Ten-Item Personality Inventory is used (Gosling et al., 2003), with five possible answers: (1) "completely disagree," (2) "somewhat disagree," (3) "neither agree nor disagree," (4) "somewhat agree," and (5) "completely agree." The score of each item varies from 1 to 5. The 10 items are the following:

1. Extraverted, enthusiastic
2. Critical, quarrelsome
3. Dependable, self-disciplined
4. Anxious, easily upset
5. Open to new experiences
6. Reserved, quiet
7. Sympathetic, warm
8. Disorganized, careless
9. Calm, emotionally stable
10. Conventional, uncreative

The Big Five factors are obtained as the average of two items each. Extraversion: 1, 6R; agreeableness: 2R, 7; conscientiousness 3, 8R; emotional stability: 4R, 9; openness to experiences: 5, 10R; where R means "reverse score."

Self-Efficacy (Schwarzer and Jerusalem, 1995): The scale includes 10 items with four possible answers (with their respective scores): (1) *not at all true*, (2) *hardly true*, (3) *moderately true*, and (4) *exactly true*. The total score ranges from 10 to 40. A higher value indicates higher self-efficacy.

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.

7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

Grit (Duckworth et al., 2007): The scale captures two latent factors: consistency of interest and perseverance of effort. In the 2015 CAF Survey, the measurement was based on the 8-item scale prepared by Duckworth and Quinn (2009). For each item there are five possible answers: (1) “nothing,” (2) “almost nothing,” (3) “somewhat,” (4) “plenty,” and (5) “much.” Questions 2, 4, 7, and 8 have a score from 1 (*nothing*) to 5 (*much*), while questions 1, 3, 5, and 6 have a score that goes from 5 (*nothing*) to 1 (*much*). The sum of the score of the questions should be divided by 8, leaving a scale that varies from 1 to 5. A higher value indicates more grit.

1. New ideas and projects sometimes distract me from previous ones.
2. Obstacles don't discourage me.
3. I had been obsessed with a certain idea for some time but later I lost interest.
4. I am a hard worker.
5. I often set a goal but later choose to pursue a different one.
6. I have difficulty keeping my focus on projects that take more than a few months to complete.
7. I finish whatever I begin.
8. I consider myself diligent (I solve problems).

Center for Epidemiological Studies-Depression (CES-D; Radloff, 1977): The scale was based on a short version of 10 items, with 4 possible answers: (1) “Not at all or less than one day,” (2) “1–2 days,” (3) “3–4 days,” and (4) “5–7 days.” The rest of the questions have a score that goes from 0 (*Not at all or less than one day*) to 3 (*5–7 days*). The range of the score is from 0 to 30.

1. I was bothered by things that usually don't bother me.
2. I had trouble keeping my mind on what I was doing.
3. I felt depressed.
4. I felt that everything I did was an effort.
5. I felt hopeful about the future.
6. I felt fearful.
7. My sleep was restless.
8. I was happy.
9. I felt lonely.
10. I could not get “going.”

Perceived Stress Scale (PSS; Cohen, Kamarck, Mermelstein, 1983): Its measurement was based on the scale of 10 items by Cohen and Williamson (1988). This scale has 5 possible answers: (1) “never,” (2) “almost never,” (3) “sometimes,” (4) “fairly often,” and (5) “very often.” Questions 4, 5, 7, and 8 have a score that goes

from 4 (never) to 0 (very often). The rest of the questions have a score that goes from 0 (never) to 4 (very often). The range of the score is from 0 to 40.

1. How often have you been upset because of something that happened unexpectedly?
2. How often have you felt that you were unable to control the important things in your life?
3. How often have you felt nervous and "stressed"?
4. How often have you felt confident about your ability to handle your personal problems?
5. How often have you felt that things were going your way?
6. How often have you found that you could not cope with all the things that you had to do?
7. How often have you been able to control irritations in your life?
8. How often have you felt that you were on top of things you face every day?
9. How often have you been angered because of things that were outside of your control?
10. How often have you felt difficulties were piling up so high that you could not overcome them?

Risk tolerance. The level of tolerance to risk was measured with questions that inquire whether the individual prefers and employment with secure payment over one that offers an expectation of higher remuneration but with some degree of uncertainty (fictitious lotteries). The person is evaluated in a scale that goes from 1 (*low tolerance to risk*) to 4 (*high tolerance to risk*).

Table A 1.1 Skill Requirements of Routine and Nonroutine Tasks with O*NET Descriptions

Measure of requirement (skill)	Element code	Element name	Element description	
Nonroutine cognitive (abstract)	4.A.2.a.4	Analyze data or information	Identify underlying principles, reasons, or facts when breaking down information or data into parts.	
	Analytical	4.A.2.b.2	Think creatively	Developing, designing, or creating new applications, ideas, relations, systems, or products, including artistic contributions.
	4.A.4.a.1	Interpret information for others	Translating or explaining information and how it can be used.	
	4.A.4.a.4	Establish and maintain interpersonal relations	Developing constructive and cooperative work relations with others and maintaining them over time.	
	Interpersonal	4.A.4.b.4	Guide, direct, and motivate subordinates	Providing guidance and direction to subordinates, including establishment of performance standards and monitoring.
Routine	4.A.4.b.5	Train and help others to develop	Identifying needs for development of others and advising them, training them, or helping them to improve their knowledge or skills.	
	Cognitive	4.C.3.b.7	Importance of repeating the same tasks	How important is the repetition of the same physical activity (e.g., typing) or the same mental activity (e.g., reviewing general ledger entries) repeatedly and without stopping on job performance?
		4.C.3.b.4	Importance of being exact and precise	How important it is to be exact or highly precise to do the job?
		4.C.3.b.8	Structured work vs. unstructured work	Up to what point is this work dictated to the worker instead of allowing individual determination of tasks, priorities, and objectives?
	Manual	4.A.3.a.3	Control machines and processes	Using control mechanisms or direct physical activity to operate machines or processes (without assistance from vehicles or computers).
Nonroutine manual	4.C.3.d.3	Rhythm determined by speed of equipment/machinery	How important is it that the work rhythm be marked by the speed of a machine or equipment? (Not necessarily for continuous use at all times of day.)	
	4.C.2.d.1.i	Time spent doing repetitive tasks	How much does the job require use of repetitive movements?	
	4.A.3.a.4	Operate vehicles, mechanical devices, or equipment	Running, handling, navigating, or driving vehicles or mechanized equipment, such as loading machines, passenger vehicles, or air or maritime vehicles.	
	4.C.2.d.1.g	Time spent using hands to manipulate, control, or touch objects, tools, or controls	How much does the work require the use of the hands to manipulate, control, or touch objects, tools, or controls?	
	1.A.2.a.2	Manual dexterity	Ability to move hands rapidly; the hands together with the arms; or the hands to grab, manipulate, or assemble objects.	
1.A.1.f.1	Spatial orientation	Ability to know one's location in respect to the environment or oneself.		

Note. The table shows the elements of the O*NET used by Autor et al. (2003) to construct different measures of requirements for skills/tasks for occupations.

Source. Authors' elaboration based on Autor et al. (2003).

EVERYTHING BEGINS AT HOME: THE ROLE OF THE FAMILY

Chapter 2

Chapter 2

EVERYTHING BEGINS AT HOME: THE ROLE OF THE FAMILY¹

“There are only two lasting legacies that we can leave to our children: solid roots and wings”.

Hodding Carter

Miranda came back disappointed after meeting with her former primary school classmates. She had been looking for them for months and inviting them one-by-one through Facebook to get together to celebrate the 20th anniversary of their primary school graduation and to remember the childhood years that they had shared. She reserved a table in a bar that was not very noisy, so they could talk. On the appointed day and time, her 22 former classmates who had taken their first step together in life had gathered. They drank, laughed, and remember thousands of little stories from school. Everything had come out fine, but Miranda was not happy. She felt a huge distance between what she expected from the life of her former classmates and what she heard from them that night. After primary school, Miranda learned English, began to play sports —she was a good volleyball player— and when the time came to think how her life would continue after leaving school, she had chosen to study law. When she was organizing the meeting, Miranda expected to find stories more or less similar to hers. And after all, why not? All of them had been educated by the same teachers, in the same school. They lived in the same neighborhood, watched the same television programs, and read the same storybooks. They were raised under the umbrella of the same generational era and in the same territory. But the life histories exchanged that night were quite different, speaking of: dreams not fulfilled, failed family lives, precarious jobs, health problems, problems with the law, and incomplete education. It was not the same for everyone, of course, but it was not necessary that they be, either: a single life history like that was sufficient to make Miranda fail to understand why their paths had diverged so much. Without realizing it, Miranda had set her standard for life in accordance with her own life experience, forgetting the main variable that molds individuals and places them off in a better or a worse position as they make their way through life: the family.

Introduction

The family is perhaps the most important institution in the formation of an individual's skills. The family makes the most crucial decisions, affecting the lives of children from conception through completion of basic education. These decisions range from the mother's involvement in prenatal care to choices made about schooling and college, as well as decisions about preschool care, monetary investments in learning, place of residence, family recreation and entertainment decisions, and discipline and harmonious routines in the home.

1. The preparation of this chapter was the responsibility of Raquel Bernal and the research assistance of Agustina Hatrick, Julieta Vera Rueda, and Diego Jorrat.

Families make the most crucial decisions affecting the life of their children from the time of conception through the end of the basic education cycle.

These decisions potentiate or delay the formation of skills for life. When mothers or fathers (or both) read to and talk with their children, purchase books or toys for them, or pay for their extracurricular classes, those parents are investing money and time in promoting the children's adequate development. Parents also affect skill formation when they decide what a child is allowed to do during their absence, either alone or accompanied by another main caregiver. This time that is shared is the opportunity to construct and consolidate strong, trust-based relationships with the children. When these relationships are based on continuous support and guidance, the impact on the child's self-esteem and capacity to establish solid interpersonal relationships will be positive.

This is so because during those first years of life² in which the family has a decisive influence on the skills of children is when the brain is more plastic and malleable, and it is the time when the neuronal networks establish the foundations that will permit the individual to carry out the functions necessary to do well later in life.³ In fact, this plasticity gradually decreases over the years, which implies that the formation and strengthening of certain skills becomes more difficult and requires greater investments and effort with the passage of time. In a correlation that is crucial for an individual's future, the brain is formed during the time that families have the greatest decision-making power over the child.

Also in this period, and particularly before 5 years of age, significant development differences arise between children in homes with different socioeconomic levels. This factor has a direct impact on subsequent skill formation. In some cases these socioeconomic gaps are especially important and imply lags for children in poorer homes that are difficult to eliminate later on. The main reason that explains this difference is that in poorer homes, by facing many restrictions and experiencing serious privations, less is invested in the children—who then suffer from less quality time, fewer monetary investments on their behalf, and greater difficulty in maintaining harmonious family cohabitation.

This chapter is focused on discussing the role of the family in the formation of skills of children and youth. We are going to ask ourselves what actions, investments, and decisions are in the hands of the families, and which ones have major impacts on the development of skills from the very beginning of life. When the availability of data allows it, we will present the current status of the cognitive, socioemotional and physical skill development of children and youth in Latin America and assess the quantity and quality of investments that families make. Finally, we will present a series of public policies that can promote and improve the investments of families

2. This chapter considers several stages of the initial life cycle of an individual: the prenatal period, between conception and birth; the early infancy period, from birth to 2 years of age; infancy, between 2 and 3 years; preschool stage, from 3 to 5 years of age; middle childhood, from 5 to 9 years of age; preadolescence, from 10 to 13 years of age; and adolescence, between 14 and 18 years of age. It is important to mention that these periods are approximate since not all children will develop in the same way and at the same time. However, the literature has found that these periods describe, in an approximate manner in the average population, the most important development milestones (Feldman, 2011; Durrant, 2013).

3. At age 2, the neural network is as rich in connections as that of an adult. At 3 years of age, it is twice as dense as that of an adult and remains so until around 10 years of age. The brain selects the strongest and most stable neural connections in a process called neuron pruning until the number of connections typically observed in an adult is reached (Shonkoff and Phillips, 2000).

in the formation of their children's skills. Since the optimum investment of families is subject to their financial and time restrictions, as well as to a lack of knowledge and adequate perceptions on how skills are formed, we discuss how state interventions are justified in order to remedy the restrictions to child development that are experienced in the home.

Definition of Early Child Development and Measurement

We classified the early skills of an individual, following the points made in Chapter 1, in three dimensions of development: the physical, the cognitive, and the socioemotional. As will be clearly seen further on, the recurrent emphasis during the first years of life is on the comprehensive development of these three pillars. This idea implies that the development of each dimension requires adequate simultaneous development of the other two.

Table 2.1 presents a summary of the definition of the three development dimensions of children and youth and the main indicators of each dimension.⁴

Table 2.1 Dimensions of Early Development

Dimension of development	Definition	Early indicators
Physical development	The physical formation of the body, including the brain, nervous system, muscles, and sensory system.	<ul style="list-style-type: none"> • Nutritional status • Health status • Psychomotor development
Cognitive development	1) Performance: Formation of intellectual capacities, particularly for learning, language, and problem resolution.	<ul style="list-style-type: none"> • Language • Reading and writing skills • Mathematical and problem-resolution skills
	2) Executive functions: Capacity to control behavior voluntarily and deliberately regulate cognitive processes to achieve objectives.	<ul style="list-style-type: none"> • Self-regulation • Attention • Planning • Working memory
Socioemotional development	Processes related to the management of emotions and feelings, management of social relations, and mental health.	<ul style="list-style-type: none"> • Internalized behavior Examples: anxiety, isolation • Externalized behavior Examples: aggressiveness, behavioral problems

Source. Author's elaboration.

4. Table 2.1 presents examples of the indicators typically used to measure each of the three areas of development. Many of these measurements are not available in a consistent and homogeneous manner in representative population surveys in many of the countries of Latin America. Therefore, the data presented in this chapter are from representative surveys for the entire population only in the case of some countries, while for others they come from nonrepresentative studies.

Without proper nutrition, children are not able to reach their physical potential and are more prone to suffering declines in their physical, cognitive, and socioemotional capacities.

Physical Development

The physical development of children and youth is measured through three basic dimensions: nutritional status, health status, and psychomotor development.

Nutritional Status

The nutritional status of an individual depends on the capacity of the organism to obtain, transform, and use ingested nutrients to develop and function appropriately. Nutritional status is intimately connected with feeding/eating habits and sleeping habits (particularly in babies) to health problems that interrupt nutrient absorption and distribution processes, as well as the presence of parasites or endocrinological problems. Early nutritional development is also highly correlated to the weight at birth, which, in turn, depends crucially on the eating and health habits of the mother during pregnancy (Walker and Humphries, 2005).

Without proper nutrition, children cannot reach their physical potential and for this reason are more prone to suffering decreases in physical, academic, and socioemotional capacities (Grantham-McGregor et al., 2007). Malnutrition also increases the probability of falling ill by infection, and in extreme cases it may even lead to death. The insufficiency of proper nutrients may make brain development difficult and cause a lack of energy, lower dexterity, lower physical capacities, and low concentration and attention capacity, and, therefore, less productivity in learning (Grantham-McGregor et al., 1997; Gonzalez et al., 2009; Maluccio et al., 2005).

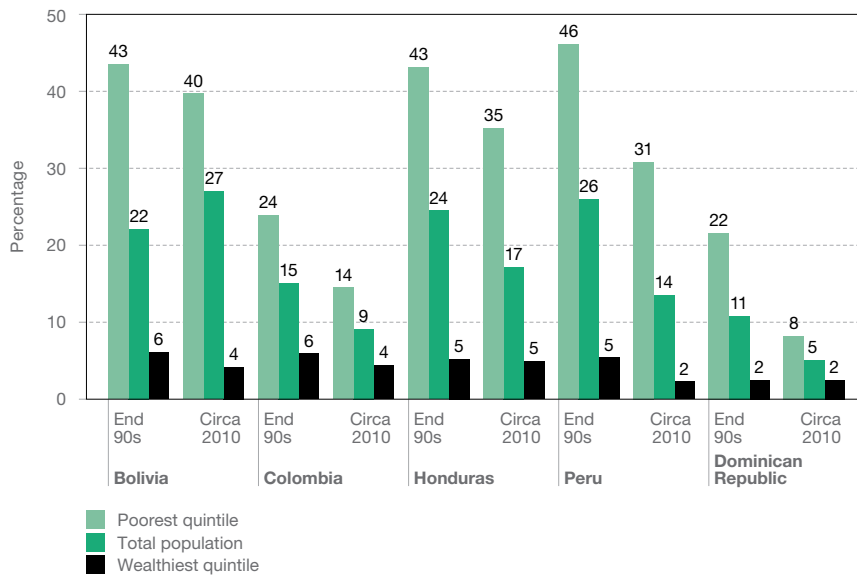
The nutritional status of an individual may be quantified according to anthropometric measures. The best known ones are weight and height, but there are others such as cranial perimeter, arm circumference, or body mass. Based on an individual's weight and height indicators, it is possible to diagnose risks of nutritional conditions (low weight for his age, low height, for his age, overweight, or obesity status for the child's age).

The indicator typically used to measure the nutritional status of children and youth is chronic malnutrition. Chronic malnutrition indicates that the individual is 2 or more standard deviations below the height average of the population of reference for the same age and sex; that is, it measures the lag in the expected growth for the age. Chronic malnutrition is closely related to eating habits and healthy routines in the home. By its association to other development dimensions and the ease of its measurement, it has been used as leading indicator of development lags prevailing in determined populations (Grantham-McGregor et al., 2007). Apart from chronic malnutrition, it is difficult to find reliable and consistent information of other physical development indicators for a large number of countries of the region.⁵

5. This statement may also be extended to other regions of the world. For example, the Millennium Development Goals and the Sustainable Development Goals are defined in terms of this indicator since there are no reliable data from representative surveys that allow measuring in a systematic manner other dimensions of child physical development.

The incidence of chronic malnutrition for a selection of Latin American countries is presented in Graph 2.1.⁶ The graph shows the chronic malnutrition rates in children under 5 years of age who come from poor homes (of the lowest quintile, or poorest 20% of the population) and rich homes (of the highest quintile, or wealthiest 20% of the population), as well as the average rates for the entire population of each country. The data discloses a marked difference in the prevalence of chronic malnutrition between the richest and poorest children, which is commonly known as the socioeconomic gradient or gap. In Bolivia, chronic malnutrition at the end of the '90s affected 43% of the children of the poorest quintile and only 6% of those of the richest quintile. This socioeconomic gap does not reduce with time in any of the countries. In addition, not only is the gap serious, but the chronic malnutrition rate reaches 1 in every 4 children in the case of Bolivia. The graph also indicates that although the gaps are not reduced, some countries have been able to reduce the overall level with time. For example, Peru went from a chronic malnutrition rate of 46% in the lowest quintile of income in 1996 to 31% in 2012.

Graph 2.1 Children with Chronic Malnutrition by Household Income in Selected Latin American Countries



Note. The graph reports the percentage of children under 5 years of age with z-scores of height for the age lower than 2 standard deviations; for the entire population and for quintiles 1 (poorest) and 5 (richest) of household income distribution. Data are from the following countries and years: Bolivia (1998 and 2008), Colombia (1995 and 2010), the Dominican Republic (1996 and 2013), Honduras (2005 and 2011), and Peru (1996 and 2012).

Source. Author's elaboration based on the national Demographic and Health Survey (DHS) from each country.

6. In this chapter, several indicators are constructed from the national Demographic and Health Surveys (DHS) of each country. The Latin American countries for which results are presented are those with consistent and comparable information through the different stages or waves in which the survey was conducted and those for which there is at least one wave available around year 2010 (circa 2010). These countries are: Bolivia, Colombia, Honduras, Peru, and the Dominican Republic. The DHS are nationally-representative household surveys.

The health conditions of a child who is constantly suffering from diseases limit proper cognitive and socioemotional development.

According to data from the *Joint Child Malnutrition Estimates* (UNICEF-WHO-The World Bank), 1 out of every 4 children in the world under 5 years of age suffers chronic malnutrition. This source indicates that the average rate is 10% in Latin America, 36% in East Africa, 35% in West Africa, 18% in the Middle East and central Africa, 37% in South Asia, 11% in East Asia, and 10% in central and eastern Europe. In the United States, this indicator is around 2% (World Bank, 2016).

The World Health Organization (WHO) has identified childhood overweight and obesity as a rising problem in several countries of Latin America. In Mexico, the percentage of overweight (including obese) children from 5 to 17 years of age is of 29% and in the United States it is 30%. Other countries of Latin America also have high childhood obesity rates, such as Chile (27%) and Brazil (15%). The average childhood obesity incidence in countries of the Organization for Economic Co-operation and Development (OECD) is 22%.⁷

Childhood obesity predicts the appearance of chronic diseases during youth and adulthood, such as diabetes, heart disease, and hypertension. In addition, obesity is associated with limitations in movement and physical activity in general, which in turn would explain the prevalence of diseases during childhood and lags in psychomotor development for children who are overweight, and these children are also more prone to having self-esteem and depression problems (Davies and Fitzgerald, 2008).

Health Status

Physical health in children and youth is critical for proper development. The body, the metabolism, and the formative processes in a person who suffers from diseases do not reach their maximum potential, and this unfulfilled potential imposes barriers on proper cognitive and socioemotional development. In addition, the prevalence of certain diseases causes deterioration in nutritional status and is associated with school absenteeism, lack of concentration, learning difficulties, and even poor adult health.

The health status of a child is determined by several factors besides genetic ones. These include feeding/eating habits, physical activity and exercise, health habits in the home (such as the use of filtered or boiled water and other practices for prevention of contagious diseases, tobacco-free environments, etc.), vaccinations, access to adequate sanitary conditions in residences and communities, and access to and utilization of health services during pregnancy.⁸

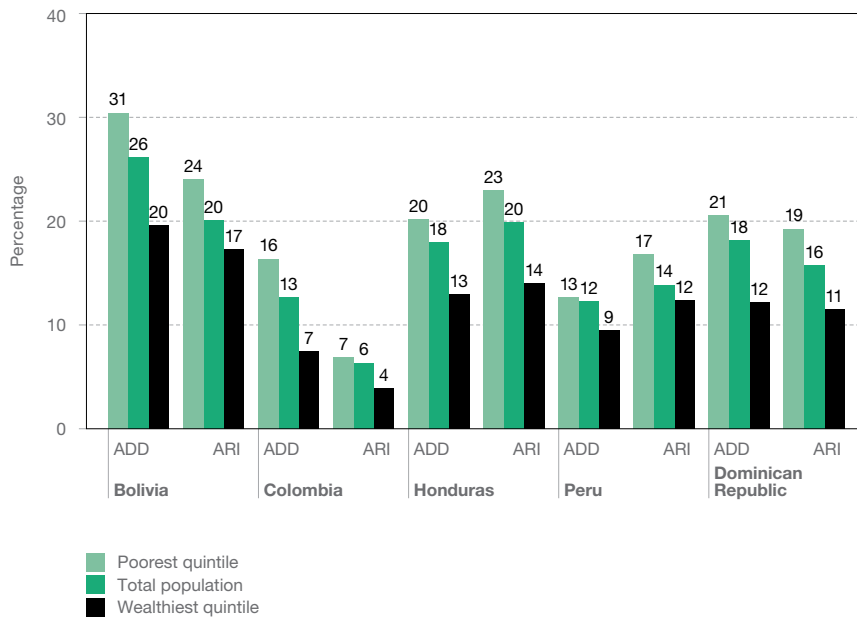
Health status in early childhood and childhood may be approximated by the prevalence of the acute diarrheal disease (ADD) and acute respiratory infection (ARI), since these are the most common diseases among children under 5 years of age. ARI can become pneumonia and is the main source of mortality in small

7. <http://www.oecd.org/health/obesity-update.htm>

8. It is important to note that some of these factors are in the hands of families but others are necessarily a responsibility of the state, such as waterworks, sewer services, and a quality health-care system (including, for example, adequate vaccination programs). The contribution by the state to the formation of skills of individuals through channels such as these is a subject discussed in Chapter 5.

children, while diarrhea is one of the top causes of child mortality in developing countries. Graph 2.2 presents these indicators for selected countries of Latin America, and for both the socioeconomic gradient is less marked than in the case of chronic malnutrition (presented in the previous graph). Although it is difficult to understand differences in the gradients, the incidence of ADD and ARI seems to depend more on the conditions of public utilities infrastructure than on typically family decisions.

Graph 2.2 Incidence of ADD or ARI in Small Children by Household Income in Selected Latin American Countries



Note. The graph reports the percentage of children under 5 years of age with prevalence of ADD or ARI during the past 15 days for the entire population and for quintiles 1 (poorest) and 5 (richest) of the household income distribution. Data are from the following countries and years: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Honduras (2011), and Peru (2012).

Source. Author's elaboration based on the DHS from each country.

Psychomotor Development

Psychomotor development refers to voluntary movement in response to oneself and objects or persons in the physical environment. Such activity is performed by the bones, muscles, nerves, and joints of the body is directed and coordinated from the cerebral cortex. Motor activity involves other abilities such as perceptual skills or even motivation of the child, which is a cognitive process (Thelen and Smith, 2006). These processes provide a clear example of the complementarity of the different dimensions of development.

Although there are several types of motor skills, during the first few years of life we usually refer to two main forms: fine motor skills and gross motor skills. Gross motor skills require the capacity to coordinate large muscles, exercise force, and make structural movements with the body (Frankenburg et al., 1992). The muscle tone that is achieved through gross motor activity is associated with the capacity for attention and concentration since, for example, it allows a child to sit straight for long periods of time. Fine motor skills, on the other hand, refer to more precise corporal movement, such as picking up a pencil or inserting smaller objects into larger objects, and involves smaller muscles and parts of the body. Fine motor skills are closely related with reading and writing skills. Some aspects of motor skills involve both gross and fine movements and may be thought of as predecessors to formal language. An example is gestures, such as taking the hand of another person, nodding the head to say yes, shrugging the shoulders, or raising a hand to say hello. In that sense, psychomotor activity is one of the first ways children learn to interact with their context.

As smaller children gradually develop their motor skills, they increasingly understand the cause-effect relationships of their movements. They observe what happens with objects when they pick them up, push them, or move them, and in this manner they progressively build a sense of their competencies, since the development of motor skills feeds curiosity and self-esteem by the mere observation of concrete achievements that result from own actions (Piaget, 1962 and 1983; Frankenburg et al., 1992; Kail, 2004).⁹

Cognitive Development

Cognitive Development: Performance

Cognitive development includes the capacity for learning, memory, language, and problem resolution. During childhood and up to adolescence, these skills refer mainly to the development of language, reading, writing,⁹ and mathematics.

The language that children develop throughout the first years of life may be categorized into two groups: capacity to recognize the object associated with a word mentioned by another person (receptive language) and capacity to name the word that corresponds to an image they are shown (expressive language). The acquisition of receptive and expressive language is clearly necessary for subsequent development of reading and writing skills. These pre-writing and pre-reading skills evolve throughout childhood until they transform into more concrete skills, such as recognizing words by looking at them, understanding words in context, and drawing conclusions from complete paragraphs. At the end of primary education, reading comprehension and argumentation skills

9. In the first years of life, emergent literacy skills are as basic as the capacity to recognize that certain signs correspond to sounds or sequences of sounds (phonetic conscience), the recognition of uppercase or lowercase letters, the recognition of sounds at the beginning and end of words, or the identification of rhymes. The phonological conscience permits the child to understand that the language has different units, such as sentences, words, syllables, and phonemes.

are developed based on texts. The capacity to express ideas in written form is developed simultaneously with the capacity to read and understand words (Duncan and Magnuson, 2015). In addition, language permits children to learn and master their position to the context at hand. Language also facilitates the establishment of relationships and the resolution of challenges and conflicts, in addition to the promotion of managing emotions to the extent that children are better able to express themselves (Durrant, 2013).

The acquisition of receptive and expressive language is necessary for the subsequent development of reading and writing skills.

Pre-mathematical skills at an early age consist of basic tasks such as recognizing figures and numbers, distinguishing and comparing objects of different sizes, and grouping objects with similar forms, all in order to later count and complete sequences —these tasks precede adding, subtracting, multiplying, and dividing. Reading, writing, and pre-mathematical skills are developed as a child faces learning opportunities in day-to-day activities or explicit instructional activities (Posner and Rothbart, 2000).

Progress in these dimensions of development during early childhood and childhood has been identified as critical to the subsequent development of skills during adolescence and adulthood. The vocabulary of a preschool-age child is a good predictor of school performance and as well as work performance during adulthood. Children from 4 to 7 years of age with the best scores in receptive and expressive language show fewer grade repetitions and school dropouts, higher rates of school graduation, lower requirements for special education, higher labor income, and higher probability of employment (Duncan et al., 2007, Blau and Currie, 2006; Connolly et al., 1992, Currie and Thomas, 2001; Bernal and Keane, 2011).

A recent study (Schady et al., 2015) presents some conclusions on the current status of the cognitive development of children in Latin America. The study compiles and harmonizes the surveys available in Chile, Colombia, Ecuador, Nicaragua and Peru, where data from the Peabody Picture Vocabulary Test (PPVT) that measures receptive vocabulary¹⁰ was collected for children over 3 years of age. The authors report the results for children living in homes in the poorest 25% of the population (poorest quartile) and the richest 25% (richest quartile) in each of those countries.^{11,12}

Graph 2.3 (see p. 102) presents the patterns by age of the child and country, separating the results for urban (upper panel) and rural areas (lower panel). The range of the standardized scores of the PPVT runs from 55 to 145 points, with

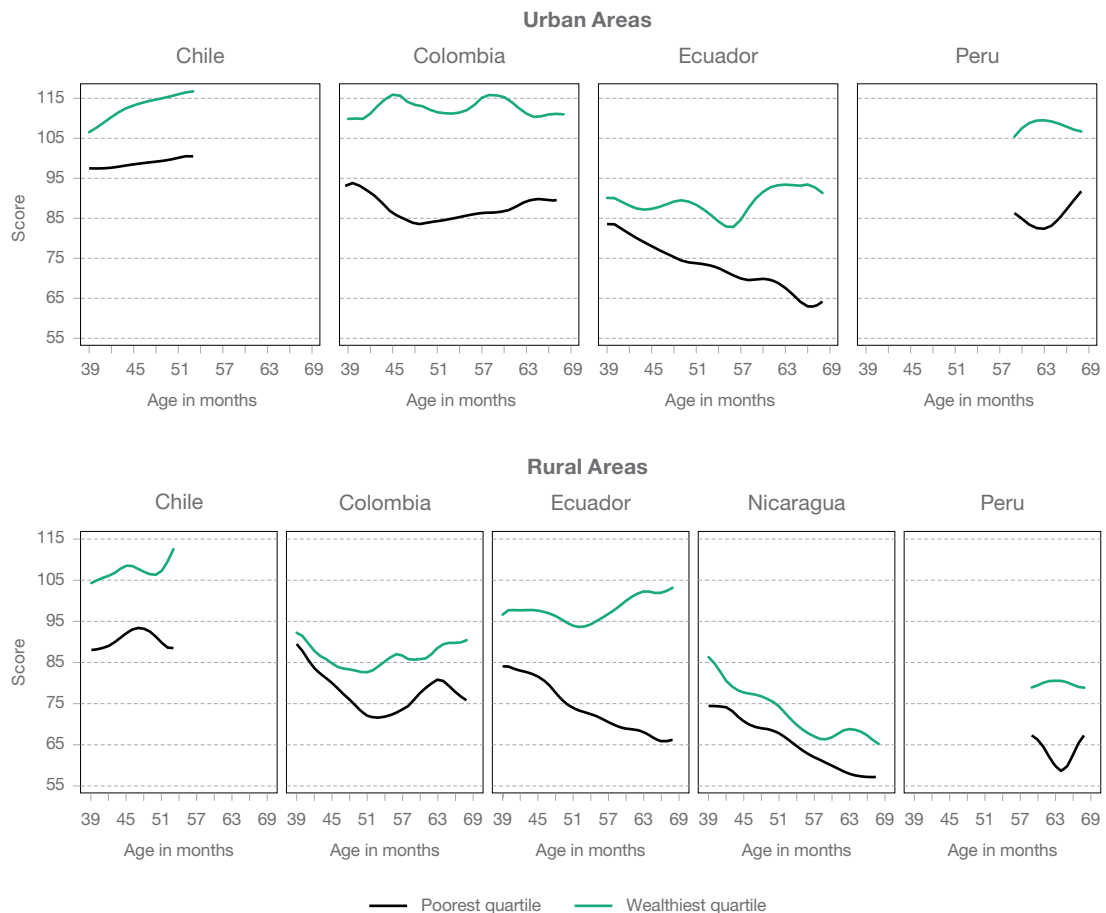
10. See Table A 2.1 (Appendix).

11. The wealth measure of homes is constructed based on the possession of durable household assets and the physical characteristics of the family's place of residence using a factorial decomposition analysis.

12. The raw scores of the test are standardized based on the norms provided by the designers of the PPVT. The norms are based on representative samples of children from Mexico and Puerto Rico. These standardized results permit comparison within each country (given that they eliminate the differences associated with the age of the child) and between countries; in addition, they provide a relative measure on how children should perform at each age. However, it is important to mention that these comparisons are reasonable to the extent that the Mexican and Puerto Rican populations of reference are appropriate for the 5 countries of the mentioned study. This is not necessarily the case due to sociocultural, language, and educational context differences, etc.

a population median of 100 and a standard deviation of 15. A child with scores between 95 and 105 is considered to have average verbal development. Above 105, the performance is considered high, and below 95, the performance is considered low.¹³

Graph 2.3 Receptive Language by Child's Age and Household Income in Selected Latin American Countries



Note. The graph reports the standardized score of PPVT according to norms provided by the test's designers for different ages (in months) of children. The quartiles correspond to the distribution of wealth. Although the confidence intervals are not presented in the graph, the differences between the two lines are significant at 95% in almost all ages and countries. Data are from the following sources: Chile, Longitudinal Survey of Early Childhood (2010); Colombia, Longitudinal Survey of the University of Los Andes (2010); Ecuador, Longitudinal Survey of Child health and Development (2003-2011); and Peru, Young Lives program (2006-2009).

Source. Author's elaboration with data from Schady et al. (2015).

13. The data represent children from different cohorts measured at the same moment of time and not scores of the same children at different ages. Therefore, the descending slopes in some countries explain that the performance of children of higher age cohorts is worse than the performance of children of younger cohorts, relative to the scores that those groups should have given their age and the performance of the populations of reference.

The results indicate that, in general, children who reside in rural areas perform worse than those in urban areas. Ecuador and Nicaragua have lower performance than the rest of the countries. In addition, significant gaps in receptive language development by socioeconomic condition are present in all the countries. For example, in Colombia the gap between the poorest 25% of children in urban zones and the richest 25% is 1.23 standard deviations at 5 years of age. This difference is equivalent to a lag of approximately 20 months in receptive language development between the richest and poorest children. The results indicate that the socioeconomic gaps of verbal skill arise at 3 years of age. At 5 years of age, when the children are preparing to enter formal education, the gaps are between 0.5 and 1.2 standard deviations, which would be equivalent to lags between 9 and 20 months.¹⁴ These results suggest that the socioeconomic gaps arise very early in life, and it is very difficult and/or very costly to reduce them as time goes by. The gaps are comparable to those reported for developed countries. For the case of the United States, for example, the differences in verbal skills between children of mothers who graduated from university and mothers who dropped out of secondary school is 1.5 standard deviations. (Heckman, 2008; Cunha and Heckman, 2007; Duncan and Magnuson, 2013).

Attention and impulse control, two types of executive function, are essential to the learning processes of children and youth.

Executive Functions

Executive functions have to do with the processes of the human psyche that allow individuals to exercise control over bodily functions, status, and processes (Baumeister and Vohs, 2004). These skills are associated with the capacity of an individual to evaluate a plan and the actions required to reach a goal and voluntarily control one's behavior to achieve the desired objective. Two critical dimensions of executive functions are attention and self-regulation. These are considered cognitive skills since they have to do more with regulatory and deliberate processes of cognitive function than with the management of emotions and feelings.¹⁵ Some of the skills generally considered within the executive functions are planning capacity, working memory, inhibitory control (or self-regulation to impulsive responses), and the capacity to sustain one's attention.

Attention and impulse control are detected in individuals from the age of two and a half years (Posner and Rothbart, 2000). These two types of executive functions are essential to the learning processes of children and youth since, in addition to improving the quality of time dedicated to homework and academic activities, the functions also increase the degree of commitment to whatever is done and promote problem-solving capacity (Raver, et al., 2009). Additionally, self-regulation is also associated with better socioemotional skills to the extent that it moderates problematic or conflict-laden relationships with other individuals (Durrant, 2013).¹⁶

14. Chapter 3 discusses the fact that further on, these gaps decrease only moderately, in the best of cases, after the children enter the formal education system.

15. However, and as is discussed in Chapter 1, certain aspects of the executive functions (warm processes) could be associated with the socioemotional dimension of development.

16. Table A.2.1 (Appendix) describes some of the instruments typically used for the measurement of executive functions.

Socioemotional Development

Socioemotional development consists of the management of emotions and feelings (emotional regulation), the management of social relations, and mental health. Socioemotional skills are usually classified into two large categories: internalized behavior and externalized behavior. Internalized behaviors are associated with the management of emotions and feelings toward oneself, and have to do with anxiety, depression, and somatic complaints or excessively introverted behavior, while externalized behavior corresponds to how individuals tend to direct their outward emotions and feelings, either with negative attitudes (such as aggressiveness, antisocial behavior, or other conduct disorders) or with positive attitudes (such as empathy and respect for others, or concern or interest for the needs of other persons). In a more general manner, emotional regulation is defined as the capacity to deliberately regulate the expressions and experiences of positive or negative emotions (Bridges et al., 2004).^{17,18}

There are certain externalized behaviors that are typical during the early years of life (preschool stage) and appear when very young children resort to aggression to exercise control in the absence of proper communication skills. As language emerges, and self-regulation and problem-resolution capacity improve, antisocial behaviors gradually reduce (Duncan and Manguson, 2015). Unlike externalized behaviors, internalized conduct increasingly develops throughout life.

Negative externalized behaviors affect the learning process and the performance of an individual, such as through conflicts with teachers (or main caregivers) or other children, social exclusion and low participation in collaborative learning activities (Newcomb et al., 1993). Internalized behaviors like depression and anxiety also affect the degree of participation and commitment of individuals in group activities (Fantuzzo et al., 2007).

Of these dimensions of development, only aggressive and antisocial behaviors significantly predict risky behaviors of an individual during youth and adulthood.¹⁹ Additionally, persistence (more than level) of aggression problems seems to be a determinant factor in juvenile and adult delinquency (Koklo et al., 2006).

Survey information representative of the Latin America's youngest children that address socioemotional and cognitive development is practically nonexistent, with notable exceptions in Colombia and Chile, which have the Colombian Longitudinal Survey of the University of Los Andes (ELCA, for its name in Spanish) and the Longitudinal Survey of Early Childhood (ELPI, for its name in Spanish), respectively. These two surveys contain information on the socioemotional

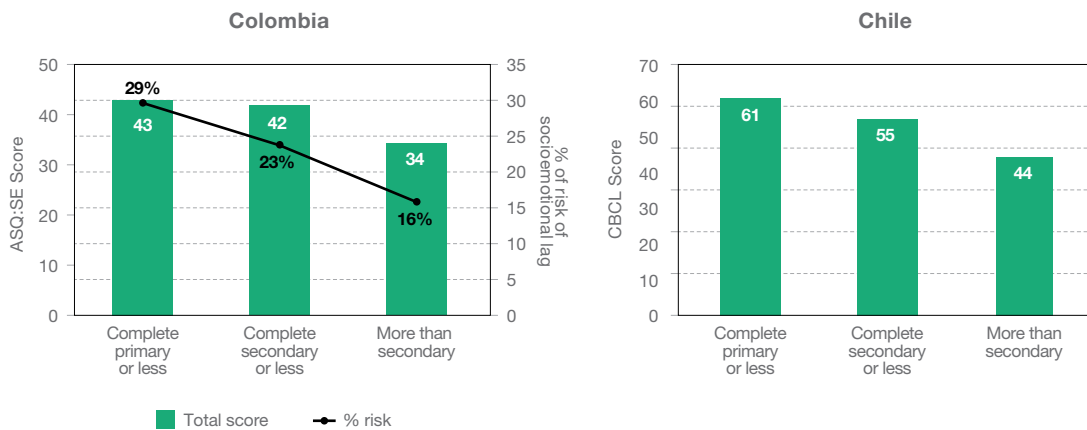
17. For example, controlling rage, sadness, joy, and other emotional reactions is a capacity that strongly predicts internalized behavior and aggression.

18. The indicators of internalized and externalized behaviors are generally collected by parental report, report of teachers, or of the youth themselves. In Table A 2.1 (Appendix), some examples are presented of instruments that measure the socioemotional development of children and youth.

19. Risky behaviors include early sexual activity and teenage pregnancy; consumption of illegal drugs, alcohol, and tobacco; and participation in criminal actions.

development of children from 0 to 5 years of age that comes from the socio-emotional component of the Ages and Stages Questionnaire (ASQ:SE) in Colombia and the Child Behavior Checklist (CBCL) in Chile.²⁰ The higher the score on either of these two tests, the higher the level of socioemotional problems of the child. Graph 2.4 reports the total ASQ:SE score and the probability of being at risk of delay in socioemotional development²¹ in Colombia and the CBCL score in Chile. Both indicators are reported in accordance with the schooling level reached by the mother, which will be taken from here forward as an approximation of the socioeconomic level of the family given the absence of a better comparable indicator between countries and surveys.

Graph 2.4 Socioemotional Development of Children by Mother’s Educational Level in Colombia and Chile



Note. The graph on the left reports the score of the ASQ:SE for children under 5 years old. A higher score indicates a higher number of socioemotional problems. The dot represents the risk of socioemotional lag based on the thresholds defined in the test methodology. Results for Colombia are based on the ELCA Survey data for urban areas (2013). The graph on the right reports the CBCL score for children ages 18 to 60 months. A higher score indicates a higher number of socioemotional problems. Data for Chile are based on urban results in the ELPI (2010).

Source. Author’s elaboration based on ELCA (2013) and ELPI (2010).

As can be concluded from Graph 2.4, there is also a socioeconomic gap in the socioemotional performance of children in homes with mothers who reached different educational levels. For example, the risk of delay in socioemotional development (Colombia) practically drops in half when the mother has a higher level of education compared to children whose mothers have less than complete primary education (29% of risk versus 16%). The socioeconomic gradient is also observed in Chile (right panel of Graph 2.4) as well as in more developed countries (Blau and Currie, 2006; Duncan and Mangusen, 2015).

20. See details in Table A 2.1 (Appendix).

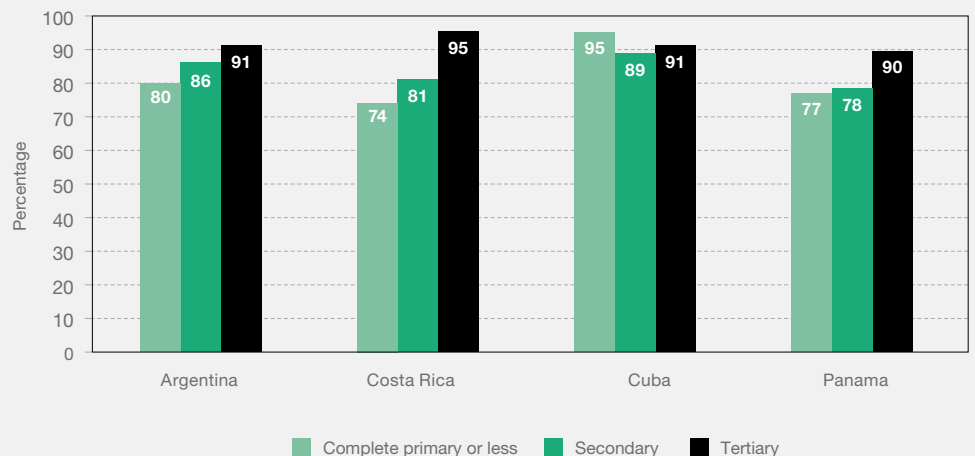
21. The classification of risk identifies children who require closer monitoring or a complementary evaluation and results from the cutoff points established in the user manuals of the tests.

Text Box 2.1 Integral Early Development Measured in the United Nations Children’s Fund’s Multiple Indicator Cluster Survey

The Multiple Indicator Cluster Survey (MICS) of United Nations Children’s Fund (UNICEF) gathers information on the development of small children and information on investments of households for the development of children’s skills. Based on the information collected for a selection of countries in Latin America, an integral early development index can be constructed for children between 36 and 59 months of age to indicate whether a child’s development matches that expected of children at that age. The word “integral” denotes that the indicator attempts to cover four dimensions of child development (literacy and numeric aptitude, physical development, socioemotional development, and willingness to learn). According to the definition of the index, a child has adequate development if the child is able to comply with the tasks associated with at least 3 of those 4 development dimensions.

The instrument is completed by parents and consists of a total of 10 items, for which the parent simply answers *yes* or *no*, depending on whether the child is able to carry out the specified activity (for example, if the child recognizes and knows the name of a specific number, from 1 to 10). Graph 1 presents the indicators for Argentina, Costa Rica, Cuba, and Panama, by educational level of the child’s mother. The results confirm that there is a socioeconomic gradient (except in Cuba) in early development. In Argentina, Costa Rica, and Panama, differences may be up to 0.7 standard deviations (a very large difference) between children of mothers with a low educational level and children of mother with college education.

Graph 1. Adequate Integral Development of Small Children by Mother’s Education Level in Selected Latin American Countries



Note. The graph reports the percentage of children between 36 and 59 months of age with adequate integral early development. Adequate development is defined as complete achievement of at least 3 of the following 4 areas: literacy and numeric aptitude (complying with 2 of 3 achievements measured), physical development (complying with 1 of 2 achievements measured), socioemotional development (complying with 2 of 3 achievements measured), and willingness to learn (complying with 1 of 2 achievements measured). Argentina (2012), Costa Rica (2011), Cuba (2014), and Panama (2013). Educational level of the mother corresponds to the highest level attended.

Source. Author’s elaboration based on Multiple Indicator Cluster Survey (MICS).

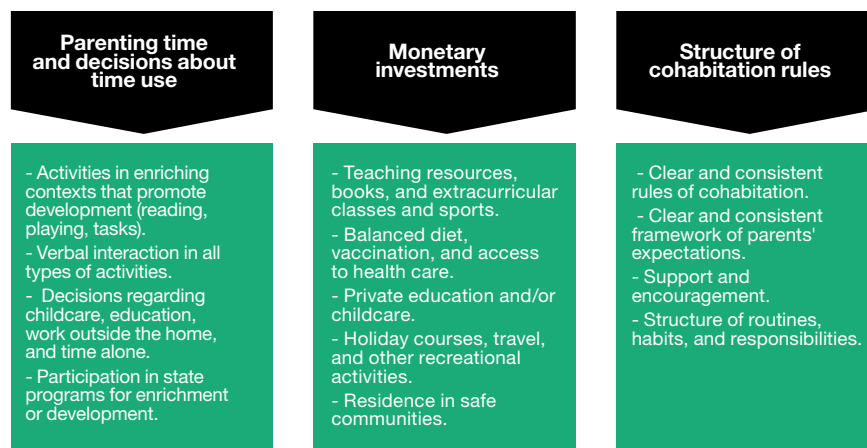
A Conceptual Framework to Understand the Role of the Family in Skill Formation

Families promote and complement skills formation and learning processes through three types of investments: **money, time, and a framework of rules and routines that establish harmonious cohabitation.**

Families, and specifically parents, promote and complement the formation of skills and the learning processes of children through a great variety of investments from even before the child’s infancy and throughout childhood, adolescence, and youth (see Figure 2.1). The first type of investment is *monetary*. Families spend on toys, books, balanced diets, vaccinations, extracurricular educational activities (lessons in music and the arts, sports, vacation, schools), travels, technology, and residences in safe communities.

Parents may also invest *time* reading to children, talking to them in ways that enrich them, playing and practicing sports with them, helping them to do their homework, and spending time with them in spaces that promote development (such as parks, libraries, or museums). When they do not spend time with their children, the parents also decide on the use of the children’s time, even though no direct monetary cost may be involved. This type of decision includes the influence that parents have on what children do when the parents are not with them. For example, parents may decide whether to enroll children in early education programs (perhaps at no cost), choose who to leave their children with when they cannot take care of them, and choose or exert influence on the activities that the children carry out independently, such as watching television or helping with the housework, putting them to work, etc.

Figure 2.1 Family Investments in Skill Formation of Children and Youth



Source. Author’s elaboration.

In addition to monetary and time investments, the third input is a framework of *rules and routines of harmonious cohabitation* in the home, which refers to the clear and explicit definition of the parents' expectations for the children, the existence of a supporting and encouraging environment, and the definition of a structure of routines, agreements, habits, and responsibilities for each member of the household.²²

Beyond this simple framework there are other specific details of the actions that families can take to develop skills of their children which are incorporated in Figure 2.2 (see p. 110). The diagram shows the interrelations behind the process of skill formation in the family context, though it excludes other institutions treated separately in this report (such as educational institutions in Chapter 3 or the labor market in Chapter 4) and tangentially mentions the role of the context (which is analyzed in further detail in Chapter 5), especially the cultural dimension.

The figure shows how the investments of families in a child's development interact with genetic characteristics and the context in which the child grows up to produce the skills necessary for life (Becker, 1991). For example, the parent may choose the investments in a child to offset or reinforce innate capabilities. This is important because many skills and functions depend crucially on the individual's *temperament*, which is basically a genetic characteristic that is difficult to change through life. Temperament consists of dimensions such as activity or inactivity, predictable rhythms or changing rhythms, extraversion or introversion, adaptability to changes, and ability to meet new situations. The investments of families in forming children's skills are generally oriented to mitigating the difficulties caused by temperament or capitalizing on its advantages. In other words, temperament affects the type and scope of the investments of parents and caregivers (Durrant, 2013).

Likewise, the *social and cultural contexts* or environments may change the nature of the investments of parents for several reasons (see Chapter 5). For example, the cultural context may influence the views on which are the proper or improper manners for raising a child or what are the desirable goals for the child's development. In particular, the differences in respect to physical contact, attachment between mother and child, social relationships, religious beliefs, and traditional gender roles may have different effects on parental behaviors and child development.²³

In addition, the quantity, characteristics, and scope of the resources invested by parents in their children depend on parents' beliefs about issues such as the subjective value of human capital and the importance of future generations (and the

22. Although designing a framework on cohabitation rules requires time, what we consider here as a separate input is the existence of this rule structure itself.

23. The interaction between genetic conditions, the cultural context, and family investments is complex. An innate characteristic may influence the development of the child, but at the same time it can have an indirect influence on development to the extent that it modifies the context and the investments. For example, a very irritable child (a temperament characteristic) may affect the degree of response of his parents by crying frequently; this new level of response becomes a factor that has influence on the child's present and subsequent development (Stright et al., 2008).

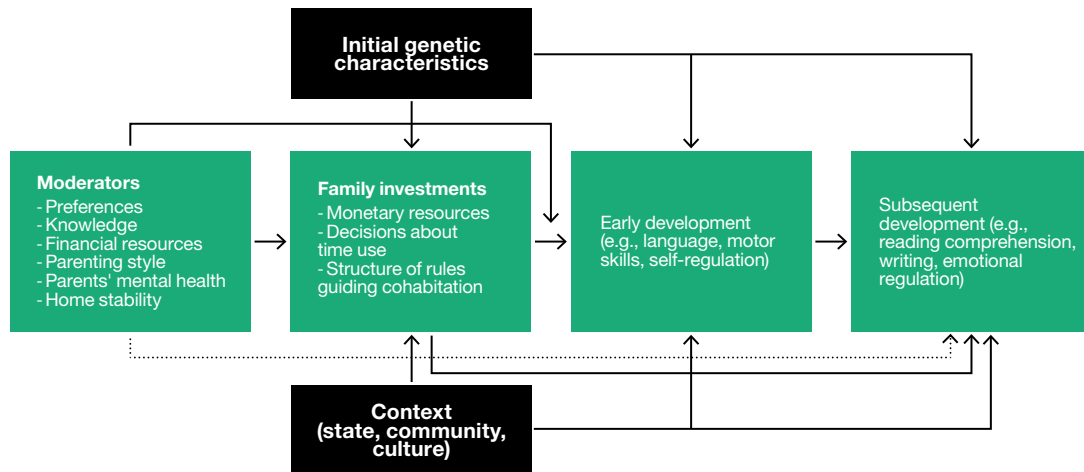
parents' degree of altruism toward future generations). Other issues of importance are the *knowledge* that parents have on the productivity of each investment in the generation of new skills (Kaushal et al., 2015) and the *financial resources* available to be able to make those investments. For example, in the case of knowledge, if a parent does not know that language begins forming very early in life, and that this happens based on simple interactions between the parent and the baby, the parent may decide not to invest much time talking or reading to the baby.

Likewise, the quantity, scope, and productivity of resources invested in children for the formation of their skills depends on, or is moderated by, other factors of the home, such as the parents' mental health; their parenting style, sensitivity, and capacity to respond to the needs of their children; and the stability of relationships in the home (Phillips, 2015; Sweeny, 2015). For example, a mother may spend much time with her children in productive activities, but at the same time be stressed, tired, or depressed. In such cases, the investment made in the children may have little effectiveness. These characteristics and circumstances in the home are *mediators* in the investment decisions of the families and seem not to have direct effects on the development of the children. For example, children in single-parent households generally have worse development results than children from two-parent households because the investments made by each type of family differ. In homes with a female head of the household, the mother leaves the house to work and therefore has less time to dedicate to her children. In addition, these mothers generally experience higher levels of stress and depression, which also affects the quality of the time they spend with their children.²⁴

Another example of a mediating factor is the education of the parents. Research has found that more educated parents spend more time with their children, read more to them, watch less television with them, talk to them in more varied vocabulary, respond with more frequency to their questions, and use less language that has the sole purpose of ordering the children to do something or telling them how they should behave. These differences in the behavior of more educated parents are the ones that explain the differential in the development of young children, and the educational level of the parents in itself ceases to be significant after controlling for the differences in the investments that they make in their children (Hofferth and Sandberg, 2001; Hart and Risley, 1995; Hoff, 2003 and 2006). That is, the warmth, sensitivity, and capacity of parents to respond to the needs of the children have an impact on the quality and productivity of the direct investments of the parents (Brooks-Gunn and Markman, 2005).²⁵

24. Once these characteristics are controlled for, the structure of the home is not statistically significant in explaining the development of children in different types of households according to the marital status of the mother (Bianchi et al., 2007; Amador and Bernal, 2012; Western et al., 2008).

25. For example, the parenting style and response capacity of the parents to their children has a direct effect on the formation of socioemotional skills to the extent that they promote the child's security and confidence and strengthen the relationship between parent and child (Durrant, 2013).

Figure 2.2 Formation of Individuals' Skills in the Family Context

Source. Author's elaboration.

Since the human development process is gradual and cumulative, the development in the early ages promotes the learning process and formation of more complex and sophisticated skills later on. Said more simply: complex skills are constructed on basic skills. This implies that the investments of families interact not only with the child's initial genetic conditions but also with the development levels up to the present moment (Cunha and Heckman, 2007). For example, sound recognition is the base on which reading and writing skills are constructed. If the development process does not occur in this cumulative manner, with the basic blocks acting as the development pillar for the more advanced blocks, it becomes more difficult, and therefore more costly, to remedy development paths in which insufficient investment has been made at the proper time (Heckman, 2013).

How Do Family Investments in Time, Money, and Rules Benefit Children?

The literature points out that the most effective monetary investments for cognitive development are those made in educational and quality extracurricular activities, such as activities provided by clubs and sports groups (Mahoney et al., 2005), materials such as books and toys for the home (Bradley et al., 2001), and experiences that expose children to new learning environments, such as travelling, attending summer school, and visiting parks, museums, and libraries (Rogoff, 1990). These particular investments affect the learning capacity of children and youth through several channels, such as by: providing positive environments of socialization with peers, providing experiences that extend the horizons of the children and therefore their curiosity and potential, facilitating socialization opportunities for cultural awareness and general knowledge, building a feeling of competence, promoting

a variety of skills (not necessarily academic), and protecting the children or youth from spending too much time without supervision in potentially risky environments (Rogoff, 1990; Eccles, 1999; Morris and Kalil, 2006). Monetary investments are also relevant to physical development. In this case, the acquisition of proper food and access to health services and recreational and sport activities is essential for the proper physical development of children and youth.

For these reasons, financial restrictions may explain part of the socioeconomic gap of a child's development at the age of entering formal schooling. Additional evidence on this issue is found when seeing that the expenses in investments for children as percentage of the total household income are significantly higher in high-income than low-income households (Kaushal et al., 2015). This evidence suggests that public interventions that reduce budget restrictions in poorer homes (such as conditional cash transfers) may noticeably affect the development of children (Paxon and Schady, 2010).

However, evidence also shows that for the proper development of children's skills, monetary investments would be less important than investments of parents' time. For example, Bernal and Keane (2011) report that if the family's income were doubled during the period in which the child is less than 5 years of age, the child's cognitive development would improve by approximately 1%, while if the time that parents invest in their children under 5 years of age were doubled, the positive effect on their cognitive development would be of more than 10%.

The type of activities parents spend time doing with their children is also important. Evidence suggests that the impact of activities such as reading and promoting verbal skills through conversation between adults and children seems to be particularly positive. In particular, highly productive conversations are those occurring in new contexts with sufficiently complex vocabulary and in which the parents are not simply telling children how to behave.²⁶ In the case of Colombia, Bernal et al. (2014) report that results on cognitive and socioemotional development of children under 6 years of age are more closely related to the type of activities that mothers carry out with their children than with the total amount of time spend with them. In particular the most stimulating joint activities seem to be reading, talking, singing, and playing games related to letters, numbers, and colors.²⁷

Although detailed data of how parents and children spend time together are not very common, several studies have found approximations that allow for important

Evidence indicates that for the proper development of children's skills, monetary investments are less important than the quality of time parents invest in them.

26. Phillips (2015) reports that children between 0 and 6 years of age of the wealthiest income quintile in the United States have spent around 1,300 hours more in activities with their parents in nonroutine contexts than their peers of the poorest quintile. Similarly, they have participated in 1,300 hours more of structured conversation with their parents and have spent 400 hours more with them in activities related to literacy and emerging reading skills (such as reading of stories or playing rhyming games). Florini and Keane (2014) use detailed data of use of time in Australia and find that the time that children spend with their parents in educational activities, including structured conversation, is much more important than any other use of time, such as, for example, the time they spend in preschool, social activities, routines that are based on television and technology, or the time of unstructured care with adults.

27. All these experiences significantly contribute to the socioeconomic performance gap at the time of entering the formal education system. West et al. (2000) report that 50% of children who are 5 years of age with a mother with college education recognize the initial sound of words, while only 20% of the children of mothers whose maximum educational level is secondary are able to do the same.

Substituting time spent with the mother for time with an alternate caregiver could result in better cognitive development when the caregiver has higher relative “quality” to offer.

conclusions to be drawn on how time spent with parents affects children’s development.²⁸ For example, it has been found that first-born children experience more interactive time with their parents than second-born children, and that mothers talk differently and less to second-born children, and that this could be a reason why better performance results are consistently observed among first-born children than among second-born children (Black et al., 2005).

Also relevant are the decisions made by parents in respect to use of children’s time, even if those decisions do not imply the use of their own time or a direct monetary cost. For example, parents may affect the use of their children’s time by registering them in early education programs (paid or free)²⁹ or deciding to substitute their own time with the child for time with an alternative caregiver, such as a family member or a babysitter. The impact that this may have depends on the specific dimension of the development and the type of the alternative caregiver chosen. In the case of cognitive development, Bernal and Keane (2011) establish that the development of the child may improve if the time of the mother is substituted by that of a caregiver of a better relative quality, for example, measured through the educational level. On the other hand, a strong bond between parents and children is particularly important on socioemotional development, and it is difficult to substitute for a relationship with a different primary caregiver (Durrant, 2013).

The *structure of the rules of cohabitation* is an especially relevant investment for the formation of socioemotional skills and executive functions. Interpersonal skills, responsibility, confidence, motivation, management of stress, independent thinking, conflict resolution, empathy, care and respect for others, honesty, and integrity benefit from the combination of *clear structure* at home and parents showing the necessary *warmth and capacity to respond* to the needs of the children. A warm, compassionate parenting style³⁰ facilitates and promotes self-confidence in the child and the child’s sense of trust in other people, independence, curiosity, interest in learning, obedience, and communication skills,³¹ among other socioemotional abilities. The example of parents acting as *behavioral role models* for their children has great importance in this respect. One of the most critical manners in which children and youth learn about social and emotional responses is their observation of their primary caregivers in day-to-day situations (Durrant, 2013).

28. To study how parents and children spend time together, the literature has resorted to approximated measures of use of time and routines between parents and children. These measures are maternal employment (Bernal, 2008), size of the family, marital status of parents (Amador and Bernal, 2008; Bianchi et al., 2007), composition of the home, and birth order (Black et al., 2005).

29. The effect of early education institutions, whether private or public, is discussed in Chapter 3.

30. Parenting style includes aspects such as emotional security, unconditional love, verbal and physical expression of affection, respect, sensitivity to the needs of children, and empathy with the feelings of the child/youth.

31. Communication ability implies proper use of language and personal relations to communicate messages effectively. For example, finding appropriate times, understanding and respecting the other person, and deciphering the relevant subjects with each conversation participant.

Furthermore, the *structure*³² of the home is closely related to discipline strategies in the home, helping the child or youth understand what is important and what is not, recognize errors and make sense of how to correct them, and obtain information that can be gradually incorporated to form the abilities of independent thought and problem resolution. The conflict resolution process within the home must be geared to the child or youth's development level so they find it logical and understandable.³³

Beyond specific activities during the time that parents and children spend together, their shared time is also an opportunity to construct and consolidate strong, trustful relationships. These relationships based on trust, support, and continuous guidance are the foundations for self-esteem and solid interpersonal relationships. They are opportunities for parents to teach and show the child how to communicate, treat others with respect, resolve conflicts, and manage stress. Parents, in addition, may recognize the temperament of their children, identify strengths to build on them, and identify behavioral challenges in order to offset them by changing the environment and developing support strategies. For example, the start of children's formal education provides an interesting case study.³⁴ The skills that parents had promoted through various strategies —such as showing care for the children, answering their questions or helping them look for answers to questions, promoting safe spaces for playing and exploration, encouraging the children to learn, and helping the children contribute in the home— will give children and youth self-confidence to face fears, resolve challenges, and manage frustration (Durrant, 2013). Furthermore, with respect to the formation of executive functions, the provision of rules in the family unit could promote attention, concentration, and persistence in the child at school. In addition, the establishment of routines regarding organized feeding/eating and sleep cycles promotes physical development (Feldman, 2011; Durrant, 2013).

Figure 2.3 (see p. 114) summarizes this section, showing the development stages, the objectives or milestones of development, and the main inputs of the family for the promotion of the child's cognitive development (first panel) and socioemotional development (second panel). In this summary, emphasis is made on how family inputs are highly relevant in all stages of socioemotional development up to adolescence and youth. While family input is essential during early childhood and childhood to basic cognitive development, the educational institution becomes highly relevant in developing more complex cognitive skills and must be explicitly

32. Here we understand the cohabitation structure as the framework that establishes clear rules of behavior and relations within the family. This structure clearly defines the expectations that parents have for their children, fix rules for conflict resolution, and guarantees a clear justification of each rule and agreement.

33. A small child is explained/shown what was done wrong, included as part of the solution (for example, cleaning up something they broke), and is explained how to act the next time a similar situation arise; that is, the child is offered a solution to the conflict. Incidentally, the child's emotions are validated and the child learns to recognize and react to their own emotional status. With older children, it is important both to teach and practice the solution proposed to the conflict; later, the adolescent/youth can independently propose solutions to the problem as long as coherent and consistent information has been provided in the home with respect to how to do it. In this manner, the youth practices problem resolution and builds autonomy (Durrant, 2013).

34. In the face of the significant change implied by the initiation of the formal school life, the child must learn to independently face circumstances, coexist with a group of peers, meet the expectations of adults unknown until that moment, and follow routines, schedules, and new structures.

and gradually complemented with the family, a subject that is discussed in more detail in Chapter 3. In addition, Figure 2.3 provides an example of how more sophisticated skills are constructed on the more basic skills.

Figure 2.3 Building Blocks of Cognitive and Socioemotional Development

Family investments	Cognitive development milestones			Period of life
School Choice, parental support, extracurricular activities, materials	Reading, writing, argumentation, analysis, mathematics used for more advanced learning			Adolescence
	Reading comprehension, text argumentation, more complex mathematical operations			Pre-adolescence
	Writing, understanding of words in context, understanding of complete paragraphs	Basic mathematical operations		Middle childhood
				Preschool
Supported reading, letter games, number games, verbal interaction, sequences	Phonographic and phonetic awareness	Alphabetical principles	Recognition of numbers, counting, and completing sequences	Early childhood
Games with small objects and blocks, puzzles, figures (language, reading)	Fine motor skills, oral communication, recognition of figures and colors, classification of objects by type			Infancy
Speaking, reading, talking about images, early stimulation, exploration	Gross motor skills	Language recognition		Early infancy
Family investments	Socioemotional development milestones			Period of life
Trusting child by promoting decision-making capacity and providing support when mistakes happen	Recognizing own identity and ability to make proper decisions independently			Adolescence
Protecting from danger while respecting and promoting independence	Self-esteem, self-confidence, self-respect, and respect for others, ability to resolve conflicts and problems			Pre-adolescence
Being a model, listening to child's point of view, encouraging child to propose solutions, providing support	Recognition of feelings of others and establishing relationships	Independence and autonomy		Middle childhood
				Preschool
Encouraging child's self-expression, including child in tasks, explaining and practice tasks	Recognition of rules and conflict resolution	Management of fears and challenges	Self-esteem and security	Early childhood
Establishing structure, teaching and validating emotions, proposing solutions	Communications skills, management of frustration, recognition of own emotions			Infancy
Responding to needs, warmth, love, physical attachment	Attachment	Confidence		Early infancy

Source. Author's elaboration

Evidence of the Impact of Family Investments in Different Stages of Life

This section further discusses the evidence on the impact of each of the possible investments done by the family on the formation of skills in children and youth; where possible, a description is added of the indicators of those family investments for countries in Latin America.³⁵ All the evidence is related to stages in the life cycle, starting with the planning for having a child.

Pre-Conception and Conception

The conditions faced by children at birth are highly correlated to conditions of their homes, including the parents' state of readiness to care for the child from before conception through the pregnancy.³⁶ The manner in which parents prepare for the child conditions the environments and investments that the child will have at birth.

This leads to our discussion of three indicators affecting children's health: incidence of desired pregnancies, the teenage pregnancy rate, and the fraction of children who grow up without one of their parents. Graph 2.5 (see p. 116) presents data on the percentage of women who are mothers of children under 5 years of age or are pregnant at the time of the survey and report that the pregnancy was desired.³⁷ For each country, the fraction of desired pregnancies at the end of the 1990s is shown along with the same indicator for 2010-2013, by level of household income (20% poorest and 20% richest) and for the average of the entire population. The data reveals several interesting things. First, there is a significant difference by level of income, indicating that the poorest households report fewer desired pregnancies than the richest households. For example, in Bolivia, 22% of pregnancies in the poorest quintile were desired (year 2008), while 52% were in the richest quintile. A second point of interest is that these rates do not seem to change in a significant manner through time and do not vary considerably between selected countries. All told, these figures indicate that 1 of every 2 children was not desired at the time of conception.³⁸

35. Unfortunately, population-representative statistics on family investments that may affect skill development in children and youth, as well as the reasons why an investment is made or not, are very scarce in the countries of the region. It is a priority for countries to start to collect this information in a systematic manner in order to be able to establish public policy goals and follow up on the achievements.

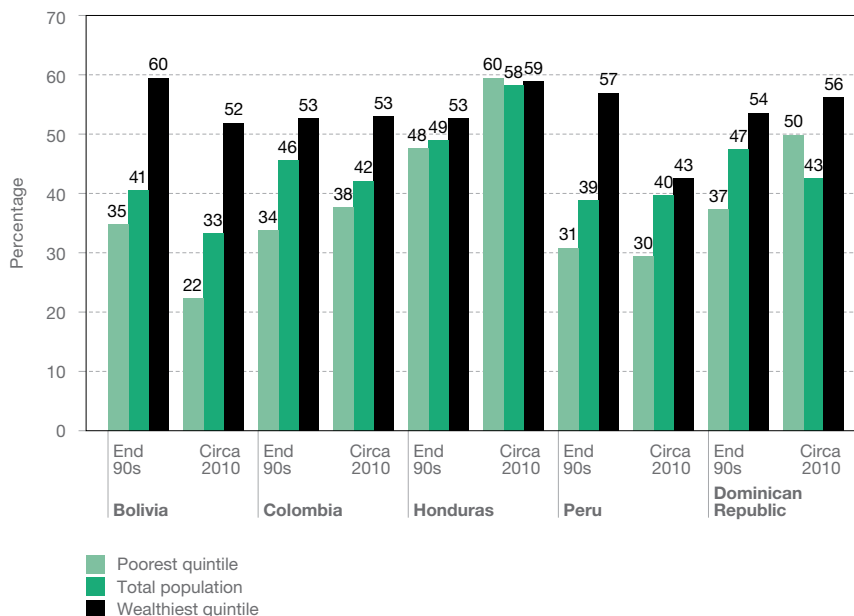
36. For example, the nutritional habits of women during pregnancy significantly determine the weight of the baby at birth.

37. In the graph, data are presented for Bolivia, Colombia, the Dominican Republic, Honduras, and Peru based on the DHS in each country.

38. In order to have a parameter of comparison with other regions of the world, the rate of intended pregnancies globally is of around 60%, 65% in Africa, 62% in Asia, 50% in North America, 55% in Europe and 44% in Latin America, as reported by Sedgh et al. (2014)

Planning for pregnancy requires certain investments from parents that will later benefit the child's development.

Graph 2.5 Percentage of Intended Pregnancies by Household Income in Selected Latin American Countries



Note. The graph reports the percentage of mothers between 15 and 49 years of age with children under 5 years of age or who are pregnant at the time of the survey and who report that the pregnancy was intended. The percentages are for the total number of women as well as those in quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. Data are from the following countries and years: Bolivia (1998 and 2008), Colombia (1995 and 2010), the Dominican Republic (1996 and 2013), Honduras (2005 and 2011), and Peru (1996 and 2012).

Source. Author's elaboration based on the DHS from each country.

Pregnancy planning requires inputs from both parents that affect the development of the child in the uterus and after childbirth. These inputs include physical aspects, such as the need to prepare the body for pregnancy³⁹ and a good health and nutritional status of the mother to be able to have a healthy pregnancy and take care of the child during the first few months of life.

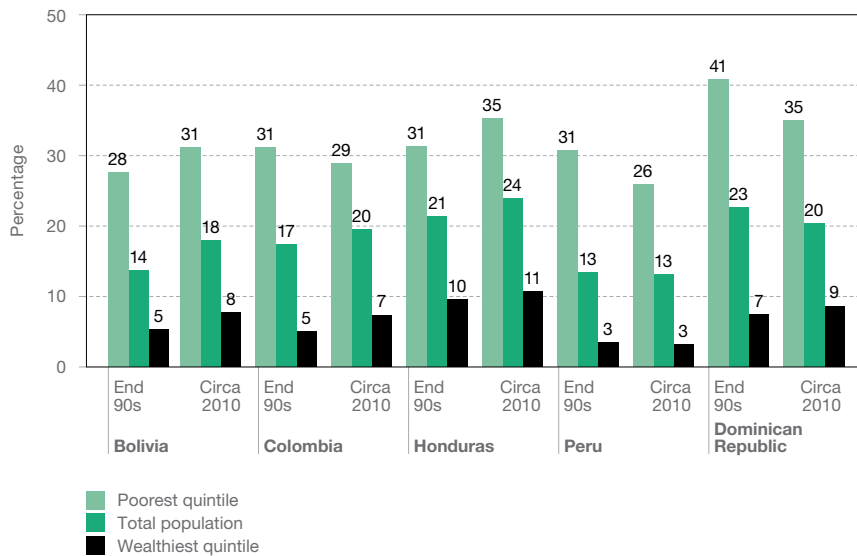
Beyond the specific physical conditions of parents, the willingness, disposition, and preparation of adults in making the necessary efforts to guarantee the wellbeing and rights of the child are critical. For parents, this means being informed about pregnancy and child-rearing, discussing the decisions and changes that will have to come about upon arrival of the baby, establishing whether they have the joint resources and time necessary to invest in the child, etc. This does not imply that

39. For example, it is well known that the main cause of spina bifida (congenital malformation that causes the neural tube to not close entirely at the end of the first month of pregnancy) is folic acid deficiency of the mother during the months prior to the pregnancy, and the recommendation of the WHO is to consume folic acid daily at least during the 3 months prior to conception.

the parents with unplanned children cannot adjust their investments in a proper manner, but it does suggest that for 1 of every 2 babies in Latin America, there exists a higher probability that the investment in them will be suboptimal, since the parents were not fully prepared for the baby's arrival.

In respect to the teenage pregnancy rates, Graph 2.6 shows very high average rates, around 20%, as well as a strong socioeconomic gradient: approximately 1 of every 3 young women in the poorest quintile becomes a mother during her adolescence, while this fraction falls to approximately 1 of every 15 for the wealthiest quintile. For example, in Peru, the percentage of girls between 15 and 19 years old who were mothers or were pregnant at the time of the survey in 2012 was 26% in the poorest quintile (1 of every 4) and of 3% in the higher quartile of the distribution (1 of every 30, approximately). The figures have changed only moderately over time.

Graph 2.6 Percentage of Teenage Pregnancy by Household Income in Selected Latin American Countries



Note. The graph reports the percentage of women between 15 and 19 years of age who are mothers or are pregnant at the time of the survey. This includes the total number of young women as well as those in quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. Data are from the following countries and years: Bolivia (1998 and 2008), Colombia (1995 and 2010), the Dominican Republic (1996 and 2013), Honduras (2005 and 2011), and Peru (1996 and 2012).

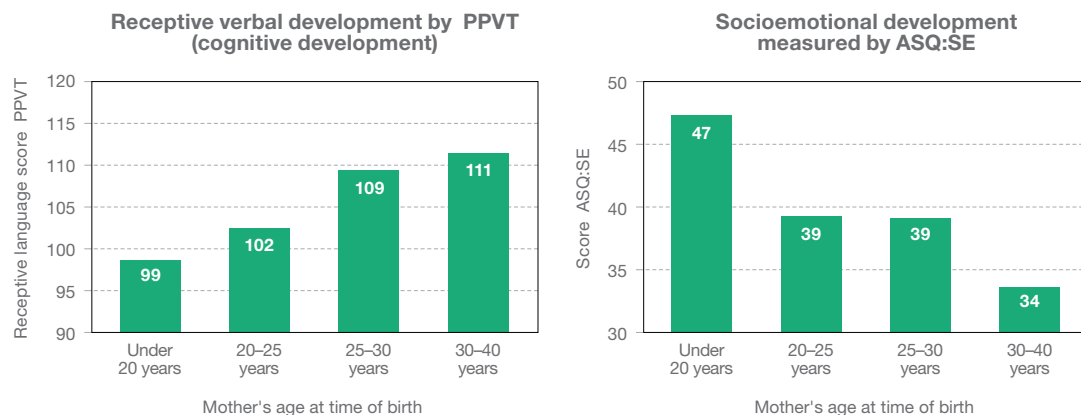
Source. Author's elaboration based on the DHS from each country.

These teenage pregnancy rates are very high, since the rate does not exceed 2% in developed countries, is close to 12% in developing countries, and is approximately 5% globally. The trends presented in Graph 2.6 are also cause for concern because children of teenage mothers are at a higher child mortality and morbidity risk. In addition, several studies (Barrera and Higuera, 2004; Florez et al., 2004;

Gaviria, 2000) have emphasized negative consequences for the teenage mother, such as lower schooling levels and lower probability of participating in the labor market, among others (Nuñez and Cuesta, 2006). In addition, teenage mothers have a higher probability of giving birth prematurely, and the mortality rate of their children is up to twice that of children of mothers over 20 years old (Kirchengast and Harmann, 2003).

The data presented in Graph 2.7 show that there is a clearly positive correlation between the age of the mother at the time of the child's birth and the child's verbal development. The difference between mothers over 30 at the time of the child's birth and the children of mothers under 20 years of age is 85% of the standard deviation, which could be associated to approximately 14 months of delay in the development as measured by this indicator.⁴⁰ Similarly, it is observed that the socioemotional problems of children under 5 years of age decreases as the age of the mother increases at the time of the child's birth. Although this exercise does not necessarily imply a causal relationship between the age of the mother and the development of the child, it does show that the variables are highly correlated.^{41,42}

Graph 2.7 Development in Children from 3 to 5 Years of Age by Mother's Age at Child's Birth in Colombia



Note. The graph reports the score in the PPVT of children from 3 to 5 years of age by age of the mother at the time of birth. A higher score indicates higher verbal receptive development. The graph reports the score of the ASQ:SE test of socioemotional development of children under 5 years of age by age of the mother at the time of birth. A higher score indicates a higher number of socioemotional problems.

Source. Author's elaboration based on ELCA (2013).

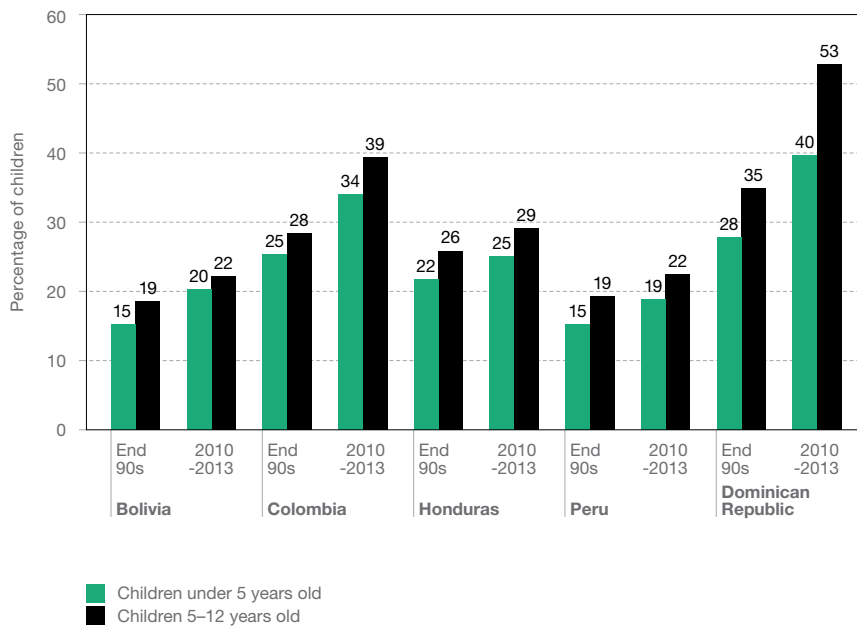
40. As was previously stated, the difference in receptive verbal development between children from homes of the quintile with the highest income and of the lowest in Colombia is 1.23 standard deviations, a difference that is associated with approximately 20 months' delay in language.

41. The results are very similar when replicating the exercise with Chilean data from ELPI (2010) for verbal development measured by the PPVT and for socioemotional development by ages measured by the CBCL.

42. In Text Box 2.2 (see p. 120), we present additional evidence that teenage mothers invest less in their children following pregnancy. The number of prenatal checkups done by younger mothers is lower than for women over 19 years of age, and they initiate checkups much later.

Graph 2.8 presents the percentage of children by age range (0 to 5 years and 5 to 12 years) whose home is in the poorest 20% of the population and whose father does not live at home. The data is shown for the end of the 1990s and the beginning of the current decade. Although the average rates differ considerably between countries, all of them show that the fraction of children who grow up with only one of their parents at home has increased with time. In some cases, the incidence is alarming. For example, in the Dominican Republic, in 2013, the fraction of children under 5 years who are growing with a single parent is 40% and 53% for children over 5 years old. In addition, the increase in these rates with time is very rapid in some countries, such as the Dominican Republic and Colombia. In the latter, the number of poor children from 5 to 12 years of age who do not live with their father goes from 28% to 39%. Based on the same survey, we know that in Bolivia, 19% of all children (regardless of socioeconomic level) under 14 years of age live with only their mother. In Colombia the figure is 33%, in Honduras, 27%; in Peru, 21%; and in the Dominican Republic, 35%. In comparison, the OECD reports figures close to 24% in the United States, 16% in Canada, and 14% in Australia (OECD Family Database).

Graph 2.8 Percentage of Children in the Poorest Quintile Not Living with Their Father, by Children’s Age in Selected Latin American Countries



Note. Data are from the following countries and years: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Honduras (2011), and Peru (2012).

Source. Author’s elaboration based on the DHS from each country.

Prenatal habits of health care, nutrition, and readiness of the future mother are indispensable to the integral development of the newborn.

These data are important because it is well established that children have better living conditions in two-parent homes than in homes with only one parent, basically because two-parent homes are made up of two potential income earners instead of just one. Evidence shows that children who are born and raised in homes with two parents perform better in the educational system, obtain better jobs, and have much higher probabilities of having two-parent families as adults (Becker, 1991; Waite, 1995; Oppenheimer, 2000). In addition, single mothers who are the head of the household show more unfavorable conditions in terms of employability, labor formality, and access to social security, which would be expected to have additional adverse implications on their children in terms of probability of poverty (Peña et al., 2014). In homes with a women head of household, the child shares less time with both parents, since the mother must work and the father generally does not live at home. In addition, with each parent having to pay for their own housing, the financial resources available for investment in the child decrease.

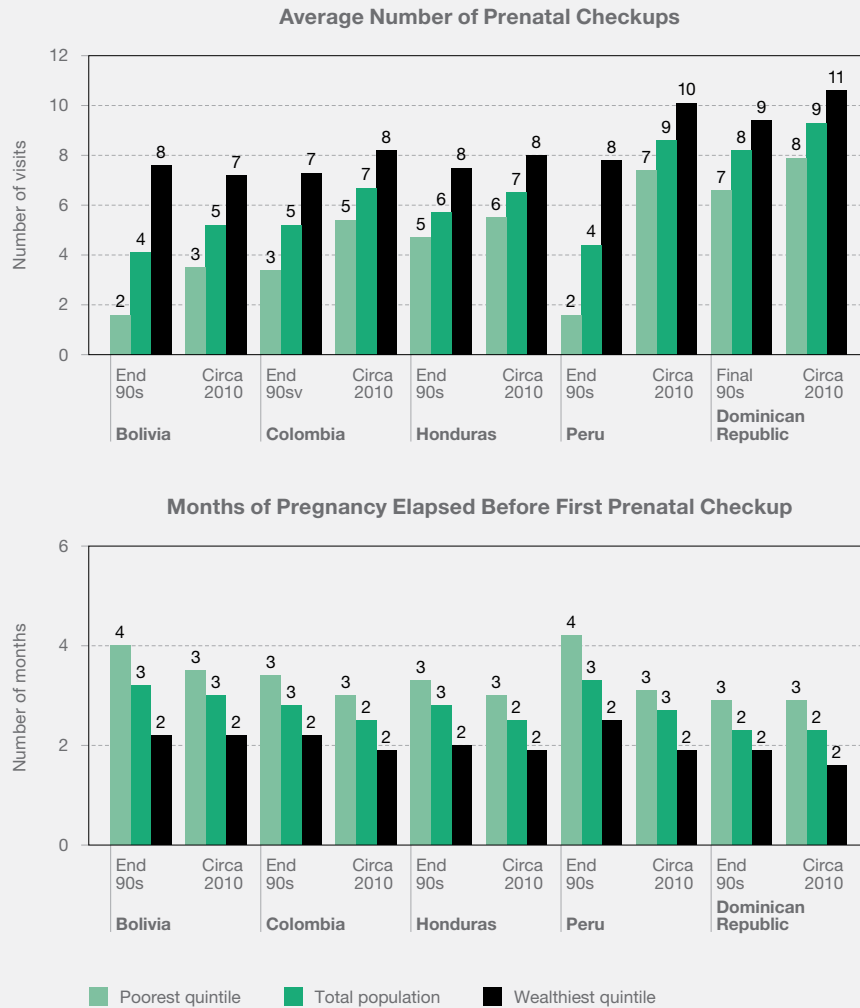
Pregnancy

Prenatal habits in terms of health care and nutrition, and the readiness of the mother are indispensable for the integral development of the newborn. In the short term, deficiencies in health and nutrition of the mother have effects on pregnancy outcomes and neonatal nutrition. The pregnant woman herself risks death by not having sufficiently good health and nutritional reserves necessary to go through pregnancy, and unfortunately maternal mortality is a problem that still predominates in developing countries (Gill et al., 2007). The key subjects in maternal mortality prevention are prenatal and obstetrical medical care for the pregnant woman and the prevention of malnutrition and anemia. In this respect, the WHO recommends a minimum of four prenatal checkups during pregnancy, a minimum condition that is very close to being met on average for the entire population of Latin America, although not yet for many mothers from the poorest households, as is reflected in Text Box 2.2.

Text Box 2.2 Prenatal Condition of Pregnant Women

Graph 1 presents two indicators of the condition of pregnant women during the prenatal period. The first indicates the number of prenatal checkups during pregnancy by level of household income. The graph reveals large differences between pregnant women in the 20% wealthiest and 20% poorest segments of the population, although some countries have advanced considerably in correcting these inequalities, as is the case in Peru.

Graph 1 Prenatal Checkups by Household Income in Selected Latin American Countries



Note. The graph on the top reports the average number of prenatal checkups during the last pregnancy in the 5 years prior to the survey for women between 15 and 45 years of age. The graph includes the total number of women as well as women in quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. The graph on the bottom reports the average number of months of pregnancy elapsed before the first checkup for those women who received at least one prenatal checkup during their last pregnancy in the 5 years prior to the survey. It is reported for the total women and for the women of quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. Data are from the following countries and years: Bolivia (1998 and 2008), Colombia (1995 and 2010), the Dominican Republic (1996 and 2013), Honduras (2005 and 2011), and Peru (1996 and 2012).

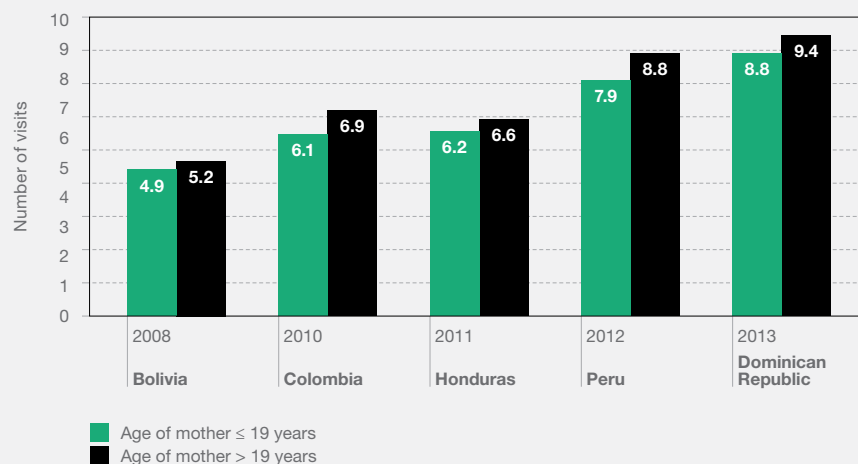
Source. Author's elaboration based on the DHS from each country.

In the upper panel of Graph 1, the most recent data indicate that pregnant women in the wealthiest households receive between 7 and 11 prenatal checkups while pregnant women in the poorest quintile have only 3 (Bolivia) to 8 (the Dominican Republic). For the general population toward the

beginning of the current decade, the average number of prenatal checkups already exceeded the minimum recommended by the WHO (four checkups) in all countries included in Graph 1. Additionally, with the exception of Bolivia, the situation has noticeably improved between the end of the 1990s and the most recent year's data on the DHS. In Peru, for example, the number of prenatal checkups of the poorest pregnant women went from 2 to 7 during this period. Additional DHS data indicate that 72% of pregnant women in Bolivia have at least four prenatal checkups, in Colombia and Honduras the figure is 89%, in the Dominican Republic, 97%; and in Peru, 94%. Based on data from the WHO, we know that in Africa this figure amounts to 48%, in Asia it is 70%, and the average in medium- and low-income countries is 67% (Global Health Observatory data repository, WHO).

The lower panel of Graph 1 presents the number of months of pregnancy that have elapsed before the first prenatal checkup. A persistent difference is observed in checkups for pregnant women of the wealthiest quintile and the poorest quintile: the difference in some cases is 2 times as much. However, improvements are observed both in the highest quintile and at the lowest between the 1990s and the most recent data. In practically all cases, the first visit of the poorest pregnant women takes place at the end of the first quarter of pregnancy, while for pregnant women from the wealthiest households it occurs always around the second month. The time of the first medical appointment is important because the first trimester of pregnancy presents a high number of risks for the fetus and the mother. For example, the mother must take vitamins and supplements very early in the pregnancy, as well as look after her own general health.

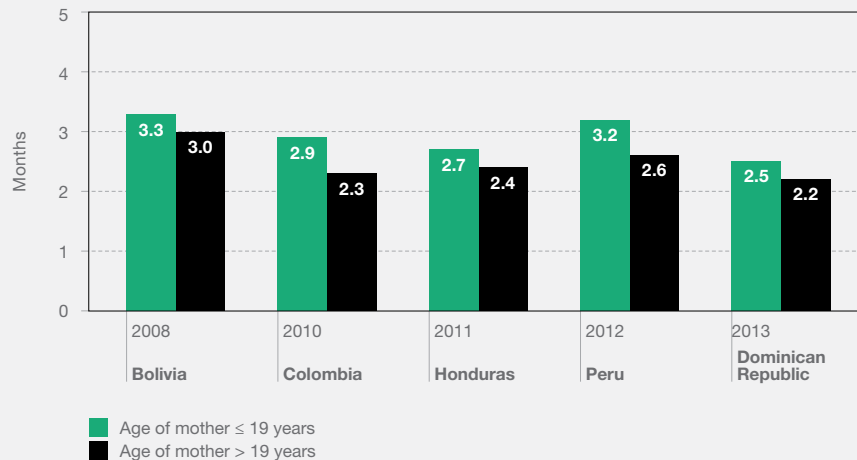
Graph 2 Average Number of Prenatal Checkups by Mother's Age at Child's Birth in Selected Latin American Countries



Note. The graph reports the average number of prenatal checkups during the last pregnancy of the 5 years prior to the survey by mother's age at time of birth. The figures are calculated on the total of women between 15 and 49 years of age at the time of the survey. Data are from the following countries and years: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Honduras (2011), and Peru (2012). Source. Author's elaboration based on the DHS from each country.

Source. Author's elaboration based on the DHS from each country.

Graph 3 Months of Pregnancy Elapsed Before the First Prenatal Checkup by Mother's Age at Child's Birth in Selected Latin American Countries



Note. The graph reports the average month of pregnancy when the first checkup took place for women who received at least one prenatal checkup, by mother's age at time of birth. The figures are calculated from all women between 15 and 49 years of age at the time of the survey. Data are from the following countries and years: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Honduras (2011) and Peru (2012).

Source. Author's elaboration based on the DHS from each country.

Graphs 2 and 3 present, respectively, the average number of prenatal checkups according to the mother's age at the time of the birth and the number of months of pregnancy elapsed before the first prenatal checkup according to the mother's age at the time of the child's birth. The graphs reveal that pregnant teenagers invest less in their children from the onset of pregnancy than do older women. In particular, the number of prenatal checkups is lower than the one shown for women over 19 years of age, and the initial prenatal checkup occurs considerably later.

Source. Author's elaboration based on the DHS from each country.

Maternal malnutrition has long-term effects on the human capital of the children, including aspects of their health. For example, it affects children's height, their schooling level attained, and their mental and physical health (Victora et al., 2008). In addition, maternal malnutrition may worsen the development difficulties of a malnourished child (Black et al., 2008), affecting body mass, metabolism, and mental health (Bhutta et al., 2008). At the same time, there is evidence on the positive effects of programs that provide enriched foods, iron, calcium, and micronutrient supplements to pregnant women, which generally improves her nutritional condition. Similarly, prevention and deworming programs are associated with lower maternal mortality and a higher birth weights (Bhutta et al., 2008).

Breast milk is the ideal food for the first few months of life.

Other programs of equal or greater effectiveness than prenatal checkups provided by the health system are those providing the mother with ongoing care by a nurse —or someone with a similar professional profile. In general, such programs consist of home visits in which the pregnant woman is advised not only on health and nutrition subjects during pregnancy but also on childbirth and postpartum recovery, the proper care of the newborn, early learning activities for the newborn, and health and nutrition for the baby —all of which constitute good parenting strategies at this phase. These programs have shown positive impacts on cognitive development as well as pre-reading skills and mathematics of children as they get older (Olds et al., 2007; Heckman, 2013).⁴³

Investments after Childbirth

In this section we will describe the evidence on the effect of investments that parents can make to promote the integral development of children, from birth through youth. Many of these investments take place before and others during or after the children receive some care in early education institutions or in formal education.

Breastfeeding, Eating Habits, and Healthy Habits

Healthy eating habits and good health and environmental conditions at home are required for the proper physical development of children, which in turn affects their cognitive and socioemotional development. These healthy conditions include, among others: breastfeeding, providing food supplementation and a balanced diet, getting the child vaccinated, having a sanitary home, accessing the health-care system, using preventive health habits, and allowing the child outlets for physical exercise.⁴⁴

Breast milk is the ideal food for the first few months of life. It has a composition of nutrients and other factors in the optimal quantities for the development of the infant.⁴⁵ Exclusive breastfeeding has been associated with a reduction in child mortality (UNICEF, 2007), a decrease of incidence of ADD and ARI (Osorio et al., 2002), and improvements in cognitive development (Sullivan and Birch, 1994; Vera-Hernandez and Fitzsimons, 2015; Victoria et al., 2015). The WHO suggests a minimum of 6 months of exclusive breastfeeding —that is, breastfeeding without giving any other foods.

Graph 2.9 presents some indicators on breastfeeding in the region. The left panel shows the median time of exclusive breastfeeding, by country. Only

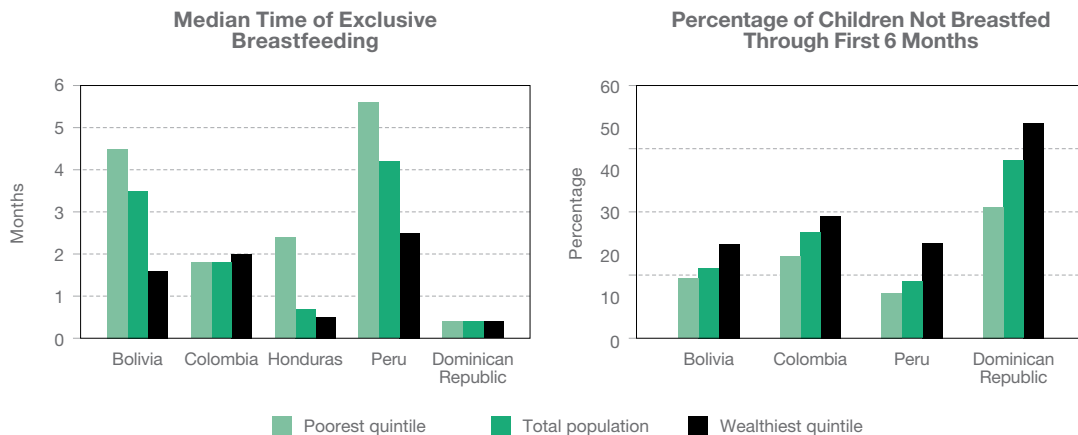
43. The last section of the chapter discusses these types of policies and programs.

44. Once again, we are reminded that it is clear that some of these investments are to be made by the family, but the state is in charge of others, such as the provision of public health services (including vaccinations) and access to recreational and sports spaces (see Chapter 5).

45. The content of unsaturated fatty acids favors the development of the brain, the content of immunoglobulin strengthens the immunological system, enzymes and hormones favor the development of organs and systems, and, in addition, breast milk has nutrients required for epidermal and nerve growth. It is not surprising, then, that it has a direct effect on child mortality and morbidity.

breastfeeding mothers from homes in the poorest 20% of the population in Bolivia (4.5 months) and Peru (5.6 months) are close to the WHO’s recommendation. In no other country does exclusive breastfeeding exceed 3 months, and the average is less than two and a half months in the 20% of wealthiest households in all countries. In the Dominican Republic, exclusive breastfeeding is practically nonexistent. Although results are not consistent through all countries in the graph, it would seem that exclusive breastfeeding tends to be higher among women in the poorest quintile of households. This seems to be associated with two factors. First, complementary food is costly (for example, powdered milk). Second, labor force participation by women with lower educational levels and who live in households of the lowest socioeconomic strata is lower than labor force participation of women with higher educational levels or who live in wealthier homes, so the probability of interrupting exclusive breastfeeding for labor reasons is lower.

Graph 2.9 Breastfeeding Patterns by Household Income in Selected Latin American Countries



Note. The graph on the left reports the median length (in months) of exclusive breastfeeding of children born in the 3 years prior to the survey and who live with their mother; information is on the entire population as well as quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. The graph on the right reports the percentage of children who were breastfed during 6 months or less and includes only those children under 5 years old who were breastfed for some time; information is on the entire population as well as quintiles 1 (poorest) and 5 (wealthiest) by household income distribution. Data for both graphs are from the following countries and years: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Honduras (2011), and Peru (2012).

Source. Author’s elaboration based on the DHS from each country.

The panel on the right of Graph 2.9 presents the percentage of children under 5 years old who were breastfed (exclusively or not) during 6 months or less, by household income level. The results indicate a significant difference according to income levels. In particular, mothers in the poorest quintile have a lower probability of ceasing breastfeeding before the sixth month than mothers of the wealthiest quintile. In the Dominican Republic, the figures are particularly high. Among the mothers of the highest household income quintile, 1 of every 2 stops breastfeeding before the sixth month and the figure is 1 of every 3 for the lowest

income quintile. In the rest of the countries, the figures are around 25% for the wealthiest quintile and 15% for the poorest quintile.⁴⁶

In Colombia, the reasons for halting breastfeeding in the first year are available from the ELCA. The main reason mentioned is the child's rejection of breastfeeding, followed by bad physical experiences (such as pain or disease) and insufficient milk production. These data reveal that it is important to teach mothers about breastfeeding challenges even before the baby's birth. For example, assistance from breastfeeding advisors in hospitals where the women give birth seems to noticeably increase the probability of exclusive breastfeeding (Vera-Hernandez and Fitzsimons, 2015; Kramer et al., 2001).

Then, as children age, a good, varied, and nutritious diet is essential for the child's growth and adequate development. Diet also has a direct effect on the mental and emotional health of children.⁴⁷ Graph 2.10 reveals that, on average, only 1 of every 4 children ate a balanced diet in the previous 24 hours preceding the survey.⁴⁸ The data reveal that the best cases are in the wealthiest quintiles in Bolivia and Colombia, where 41% to 44%, respectively, of children under 5 years of age receive a balanced diet. In those same countries, the consumption of balanced diets among children of homes from the poorest quintile is just 9% to 16%, respectively. In the Dominican Republic, the consumption of a balanced diet is just 15% among children of the wealthiest quintile and 9% among the poorest children. The ELCA also inquired about the reasons behind this phenomenon in Colombia. The answers collected indicate that children "do not like" some of the foods in a balanced diet, such as vegetables, and reveal that the family customs seem to be more important than lack of money in explaining food and nutrition deficiencies in children. This implies that unbalanced diets are not exclusively connected to poverty, but probably to lack of knowledge regarding the importance of appropriate nutrition for the development of children (Bernal et al., 2015).

Apart from feeding habits, health care is also essential for proper, integral development of children. For example, vaccinations benefit both the child and the community. The WHO recognizes the importance of vaccination for the individual in terms of preventing disease, mitigating the seriousness of disease; preventing infections, and preventing related diseases. In addition, the benefits to society are large because of the lower mortality and morbidity rates (Andre et al., 2008; Bloom et al., 2012). That said, adequate vaccination requires well-established health-care systems and public policies supporting their provision,

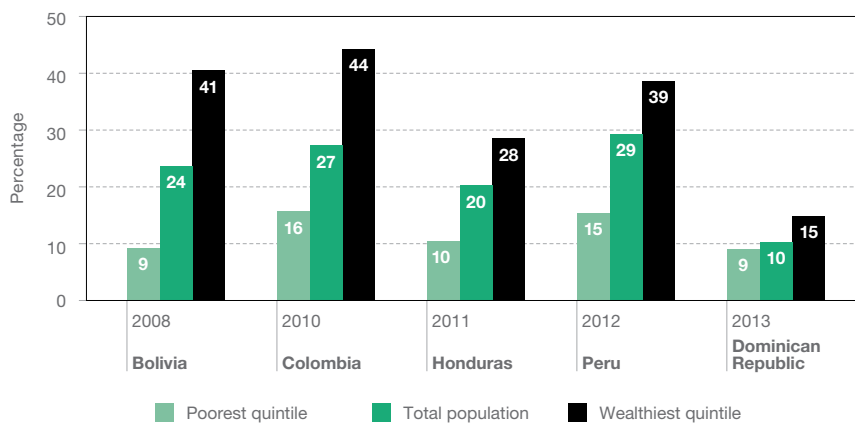
46. In order to compare against countries that promote breastfeeding, data from Save the Children indicate that in Norway, 80% of 6-month-old babies are still breastfed at least part of the time, 60% are in France, and 72% are in Sweden. All these countries have long maternity leaves (Save the Children, 2012).

47. For example, a poor diet or alterations of the normal feeding routine may harm family coexistence.

48. A balanced diet is defined as the consumption at least once a day of all food groups (grains, vegetables, fruits, proteins, and milk products). In a strict sense, a balanced diet would require the consumption of all the food groups in each meal and not only once a day.

in addition to the support of parents who value the importance of these efforts and are willing to take their children to get vaccinated.⁴⁹

Graph 2.10 Percentage of Children Eating a Balanced Diet by Household Income in Selected Latin American Countries



Note. The graph reports the percentage of children under 5 years of age who ate all food groups (grains, vegetables, fruits, meats, and milk products) in the 24 hours prior to the survey. The results show the total number of children as well as children in quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. Data are from the following countries and years: Bolivia (2008), Colombia (2010), the Dominican Republic (2013), Honduras (2011), and Peru (2012).

Source. Author's elaboration based on the DHS from each country.

Access to and use of health services directly affects the survival of the mother and child before, during, and after childbirth. Twenty-five percent of pregnant women in developing countries do not have access to a health professional, 59% of births do not have qualified assistance, and only around 50% of babies are born in establishments with reasonable sanitary conditions (UNICEF, 2008). Needless to say, prevention is an essential part of health care that results in much more cost-efficient practices than providing only curative care; however, in most cases, individuals use health services when they are already sick, and it is not a common practice in developing countries to visit health centers for merely preventive reasons.⁵⁰

49. The current anti-vaccination movements in many parts of the world hold that vaccination does not work, may be dangerous, or goes against individual rights through the imposition of mandatory vaccination. For these reasons, the utilization of other preventive methods is promoted. However, the scientific evidence is clear that the reduction in deaths and infectious diseases far outweighs the possible secondary effects of vaccination.

50. Conditional cash transfer programs in many countries of the region (for example, Colombia, Mexico, Ecuador, and Nicaragua) have included a component intended to encourage visits to health centers for preventive reasons. Based on these visits, it is possible to establish action plans for children who show some risk of early developmental delay. According to data from the ELCA (2013), the percentage of children in Colombia under 5 years of age who visit the pediatrician at least once a year without being sick is only 73% in urban zones and 44% in rural areas.

Parents are important in the promotion of physical activity in children and youth, either by acting as role models or spending time with the children in these activities.

In addition to the use of formal health services, a variety of health habits at home contribute to the adequate physical development of children, such as the home's sanitation conditions (access to water and sewerage services), physical conditions (dirt floors, for example), hygiene habits (hand washing and good oral hygiene), tobacco-free status, habits of performing physical exercise at home and outside the home, and proper sleep for the recommended number of hours.⁵¹ It is well known that physical activity has a direct effect on the health of individuals, and it affects learning and academic achievements.⁵² Parental influence in promoting exercise may be important to children and youth actually developing good exercise habits, both through parents acting as role models and providing resources to allow the children to exercise (e.g., sports gear), but most importantly, by spending time exercising with the child.

Healthy Cohabitation Rules and Routines

Situations such as physical, sexual, or emotional abuse; neglect or abandonment; physical abuse of one parent by the other; acts of violence or threats at home and the community; and mental disease within the family may generate high levels of anxiety and stress in children (National Scientific Council on the Developing Child, 2005/2014). If a child is exposed to these situations repeatedly for an extended period of time, a toxic stress level is generated that has negative effects on brain development, learning, mental and physical health, and, more generally, emotional and social development, with consequences that continue into adulthood. Text Box 2.3 discusses the mechanisms through which abuse or violence against children affects their development and wellbeing.

Scientific studies have shown that persistent fear and chronic anxiety may affect learning even once the environments become safe, since the cerebral architecture has been modified as a result of the exposure to chronic stress (Seckl and Meaney, 2004). For example, the efficiency of neural circuits is reduced and the development of the prefrontal cortex is delayed, which in humans is essential for the self-regulation, attention, and emotional control. Learning can also be affected by high production of cortisol, one of the responses of the body to situations of stress or anxiety that has a direct effect on memory (Jelinek et al., 2009). In addition, the individual may even develop persistent anxiety disorders in adulthood (Campbell and MacQuieen, 2004; Lupien et al., 2000; Nelson et al., 2011). Finally, how the individual gets along with other people may be harmed, including an inability to respond to emotions normally.

For this reason, it may be more difficult for the individual to establish healthy relations. Because of such issues, it is very important to have a healthy model of cohabitation in the home as well as a reduction —to the extent possible— in violence inside or outside the home that could be witnessed by the child (see Chapter 5).

51. Chapter 5 discusses in more detail the relationship between access to public utilities (sanitation and others) and the development of the individuals' skills.

52. Davis et al. (2011) report a positive and significant effect of physical activity on cognitive tests, academic results, and brain activity. Based on a random experiment in a sample of children between 7 and 11 years of age who were overweight and had physical inactivity in the baseline, they conclude that physical activity changed brain activation and improved the executive functions.

Parents or primary caregivers of the child play a major role in cushioning such stress through two essential mechanisms. First, by establishing a healthy, loving, sensitive, and receptive relationship in everyday situations, which prevents the formation of high levels of cortisol that naturally occur in stressful situations (Nachmias et al., 1996). Second, by intervening as soon as possible to get children out of a situation that generates stress and avoiding long-term consequences. Unlike the passive process of learning fear, unlearning it is an active process that requires that the individual be aware the situation and receive timely external and timely support (National Scientific Council on Developing Child, 2005/2014). The role of the state in supporting the parents in these tasks is also fundamental.

Text Box 2.3 Violence against Children and the Effects on the Brain and Skill Development

There have been frequent references in the literature to the effects of external deprivation and toxic stress during childhood on brain architecture and long-term skill development. For example, exposure to abuse or abandonment during childhood affects the volume, function, and connectivity of the amygdala, which is the cortical structure where fears and reactivity to stress are managed.

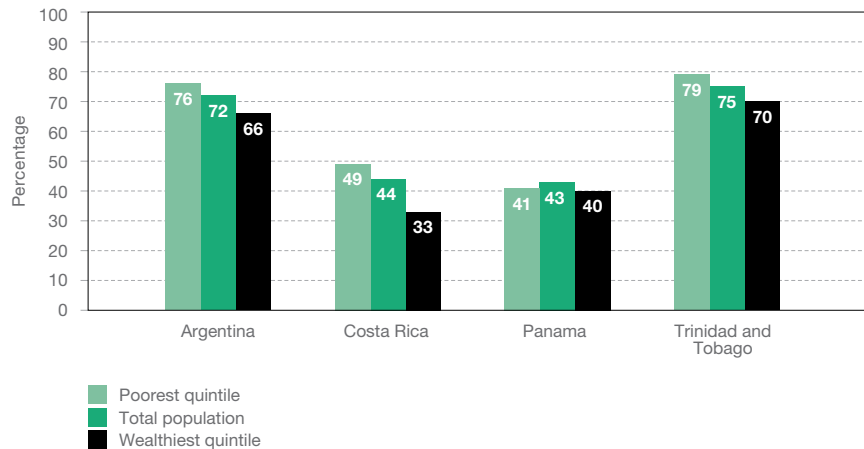
The exposure to abuse or violence during the first few years of life is associated with a reduction in the volume of the hippocampus (cortical area in charge of long-term memory and reactivity to stress); an increase in the activity of the hypothalamic-hypophyseal adrenal axis in response to stress (Campbell and MacQueen, 2004; Smith 2005); an increase in volume of the amygdala, which increases the reactivity to fear conditioning (Roozendall et al., 2009); and increases in the flow of corticotropic hormones (Makino et al., 1994). Together, these changes in the brain structure are associated with a higher risk of diseases and mental disorders, such as posttraumatic conditions, anxiety and depression, with a reduction in memory capacity —which makes learning more difficult (Jelinek et al., 2009), and with difficulties in emotional recognition and maturity. For example, children exposed to these situations have problems interpreting and deciphering gestures and facial expressions, particularly fear (Adolphs et al., 1994), so the behavior of the individual becomes extremely trustful (Bechara et al., 1995). In addition, the capacity of the amygdala to prepare the individual for negative stimulus decreases (Monk et al., 2003). Many of these effects are irreversible, since the structures of the amygdala and the hippocampus cannot return to their original conditions.

Source. Author's elaboration.

Just as witnessing domestic violence, suffering child abuse or receiving negligent care from parents are highly associated with aggressive and antisocial behaviors in subsequent stages of life (Jelinek et al., 2009), positive discipline strategies and safe environments will also have repercussions —but in a positive way— on the externalized and internalized behaviors of children. In particular, a stable family environment also contributes to the formation of skills, since it is more common for children in such families to witness caring environments and expressions of care, sensitivity, and appropriate responses to the needs of children of the adult caregivers (Brooks-Gunn and Markman, 2005).

Positive discipline strategies and safe environments have positive repercussions on the externalized and internalized behaviors of children.

Graph 2.11 Physical or Verbal Punishment of Children from 2 to 14 Years of Age by Household Income in Selected Latin American Countries



Note. The graph reports the percentage of children from 2 to 14 years of age whose parents report that they frequently yell at them, call them “dumb” or something similar, shake them violently, hit them with a belt or another object, slap their faces, hit their heads, give them a beating, or pull their ears. The results are for the total population of reference and children in quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. Data are from the following countries and years: Argentina (2012), Costa Rica (2011), Panama (2013), and Trinidad and Tobago (2006).

Source. Author's elaboration based on MICS (2006, 2011, 2012, 2013).

Graph 2.11 shows, for several countries, the percentage of children from 1 to 14 years of age whose parents report frequent negative behaviors, such as yelling at their children, calling them “dumb” or “stupid,” shaking them, punishing them by striking them with a belt or another object, slapping them on the face, hitting them on the head, pulling their ears, or beating them. The data is presented for the total population and homes in the poorest and wealthiest quintiles of the income distribution. With the exception of Panama, a significant difference is observed in the use of physical and verbal punishments according to the household income. In particular, the use of violent discipline is more common in the poorest homes. Inappropriate physical and verbal punishments are highly prevalent in all countries. For example, in Argentina, 76% of parents in the poorest quintile and 66% in the wealthiest quintile report having frequently used such punishments.⁵³ It should be stressed that in looking at these data by education of the mother and/or father, no consistent pattern is observed in favor of any educational group. This is interesting because it suggests that the knowledge on the management of discipline strategies is not acquired simply with education; it is necessary that the state provide adequate programs to teach parents the harmful effects of the utilization of physical and verbal punishments on the development of children

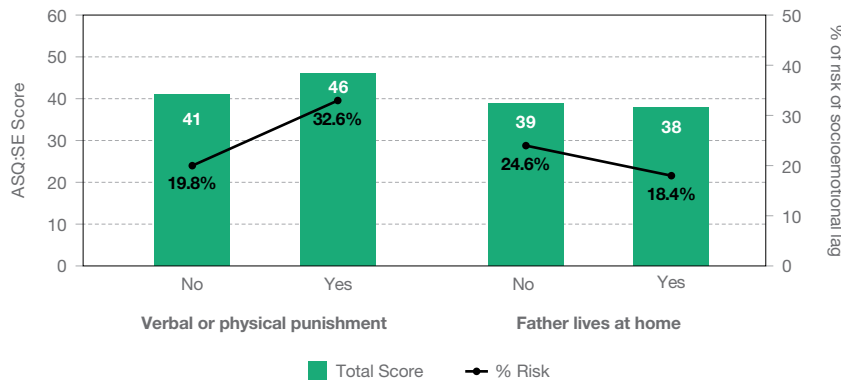
53. Understanding that this question is completed by the parents, it is plausible to assume that there is underreporting and that the figures could be even higher.

as well as effective alternative forms of punishment, such as the use of positive discipline and other strategies for managing interpersonal problems.

The state can provide assistance to help parents understand the harmful effects on the development of their children of using inappropriate physical and verbal punishments.

Graph 2.12 presents the results of the socioemotional development in Colombia (ELCA, 2013) for children under 5 years old, according to frequent use of physical punishments and presence of the father in the home. The graph suggests that frequent utilization of physical and verbal punishment as discipline strategies at home and the absence of the father are negatively associated with socioemotional development in children. The risk of lagging behind in socioemotional skills in homes with frequent use of physical and verbal punishments is 33%, compared to only 20% for infrequent use. In addition, the presence of the father is associated with a reduction of 6 percentage points in the risk of socioemotional development delay.

Graph 2.12 Socioemotional Development of Children Under 5 Years of Age by Use of Punishment and Father’s Presence in Home, in Colombia



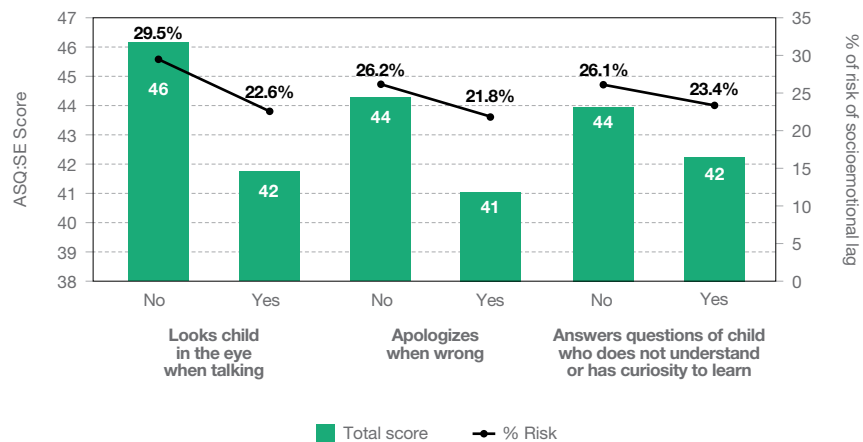
Note. The graph reports the score of the ASQ:SE for urban children under 5 years of age. A higher score indicates a higher number of socioemotional problems. The dot represents the risk of socioemotional lag based on the thresholds defined in the test methodology.

Source. Author’s elaboration based on ELCA (2013).

Data from comparable surveys of several countries with information of the use of positive disciplinary strategies of the parents, such as assured support, understandable and stable interpersonal and cohabitation rules, discussion and negotiation within the home, delegation of tasks and responsibilities to each member of the home, clear expectations of parents toward children, etc., are scarce in the region. Some information from the ELCA in Colombia allows for some conclusions in this regard. Graph 2.13 (see p. 132) measures positive parental practices based on three simple questions (if the parent looks a child in the eyes while they are talking, if the parent apologizes when wrong, and if the parent answers the child’s questions when the child does not understand something or has the curiosity to learn). The data presented in the graph indicate

that there is a correlation between the parents' treatment of the children and the children's socioemotional development. In particular, the children of parents with a higher capacity to answer questions, demonstrate sensitivity (by apologizing), and demonstrate care and interest (looking at the child during conversations) show fewer socioemotional problems than children whose parents do not exhibit these characteristics.

Graph 2.13 Socioemotional Development by How Parents Treat and Communicate with Their Children in Rural Colombia



Note. The graph reports scores on ASQ:SE and self-regulation for children under 5 years of age. A higher score indicates a higher number of socioemotional problems. The dot represents the risk of socioemotional lag based on thresholds defined in the test methodology.

Source. Author's elaboration based on ELCA (2013).

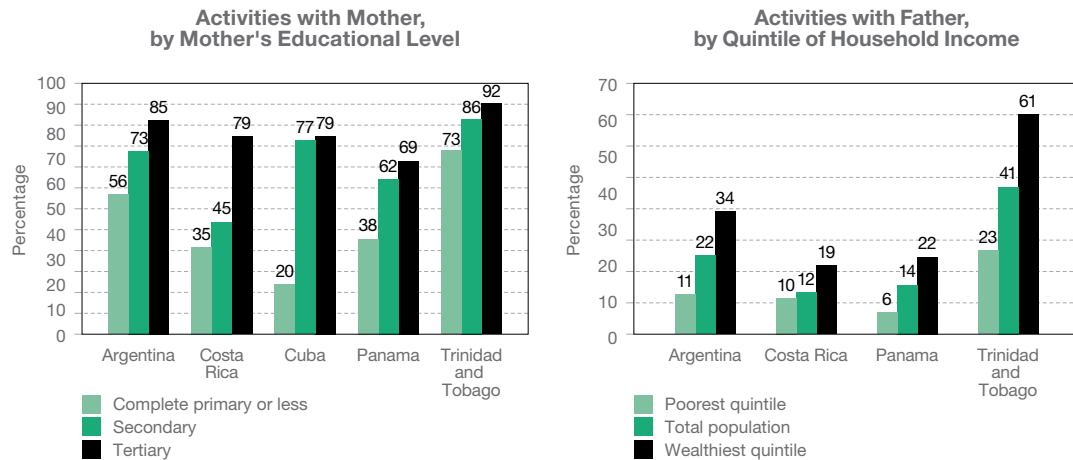
Time Spent with Children

Parents directly invest their time in their children by doing activities such as reading with them; talking with them to enrich their learning; practicing sports together; helping them do their homework; spending time together in spaces that promote development, such as parks, libraries or museums; singing; playing with blocks and puzzles; and playing other games related to numbers, letters, colors, etc.

The literature is clear that investing in children does not result simply from spending time with children, but from spending quality time with them.⁵⁴ In this case, "quality" refers to the productive routines and activities that are associated with learning. Those activities, and particularly those that are intensive in verbal interaction between the adult and the child, are most associated with better future development from childhood into youth (Bernal and Keane, 2011; Fiorini and Keane, 2014).

54. For a review of this literature, see Bernal et al. (2014).

Graph 2.14 Parents' Activities to Promote Learning in Children from 36 to 59 Months of Age in Selected Latin American Countries



Note. The graph on the left reports the percentage of children from 36 to 59 months old who did at least 4 activities with their mother that were intended to promote learning (reading or looking at drawings, telling stories, singing songs, taking a walk out of the house, playing, naming things or telling the child about them, or drawing things for the child) in the past 3 days. The mother's educational level corresponds to the highest level of education she attended. The graph on the right reports the percentage of children from 36 to 59 months old who did at least 4 activities with their father that were intended to promote learning (reading or looking at drawings, telling stories, singing songs, taking a walk out of the house, playing, naming things or telling the child about them, or drawing things for the child) in the past 3 days. The percentages are reported for all children and children in quintiles 1 (poorest) and 5 (wealthiest) of the household income distribution. Data are from the following countries and years: Argentina (2012), Costa Rica (2011), Panama (2013), Cuba (2014), and Trinidad and Tobago (2006). Note that Cuba does not appear on the graph on the right because it does not have information on level of income.

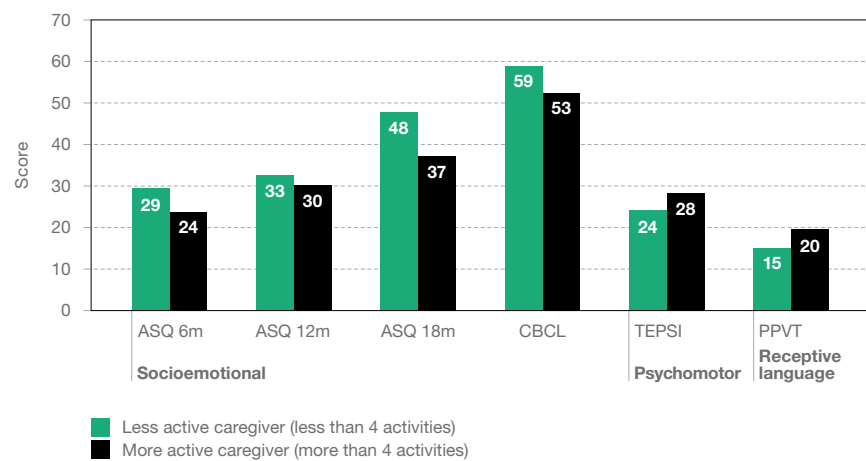
Source. Author's elaboration based on MICS (2006, 2011, 2012, 2013, 2014).

Graph 2.14 examines the frequency of activities between parents and children that promote learning. Data on the left show behaviors of mothers and on the right of fathers. In particular, we show the percentage of children from 36 to 59 months old who did at least four learning activities (such as reading, talking about drawings, singing songs, taking a walk outside the home, playing, etc.) in the past 3 days with each parent. The data on mothers are presented by the mother's education level, but because a high percentage of fathers do not report their education level, we chose to classify the results for fathers by the level of household income. The results suggest, first, that mothers dedicate more time to learning-oriented activities than the fathers. In some cases the difference are markedly different, such as in Costa Rica and Panama where fathers spend just one fourth of the time that mothers dedicate to these tasks. Second, a clear socioeconomic gradient by educational level and income level is observed; the difference between mothers with primary education and with tertiary education is of a factor between 1.5 and 4 times higher for those more educated. In Costa Rica, for example, 79% of the mothers with tertiary education report having performed at least four stimulating activities with their children in the past 3 days, while only 35% of the mothers with primary education had done the same.

Fiorini and Keane (2014) and Bernal et al. (2014) present evidence that the time parents spend with their children in structured activities, such as reading,

talking with them, singing, and playing games related to letters, numbers, and colors explain, in a causal way, the cognitive and socioemotional development of children under 6 years of age in two different contexts such as they are Australia and Colombia, respectively. The effects are of up to 0.6 standard deviations, which is approximated to 60% of the difference in verbal development existing between children of the poorest homes and those of wealthier homes.

Graph 2.15 Child Development by Quantity of Productive Interactions with Primary Caregiver in Chile

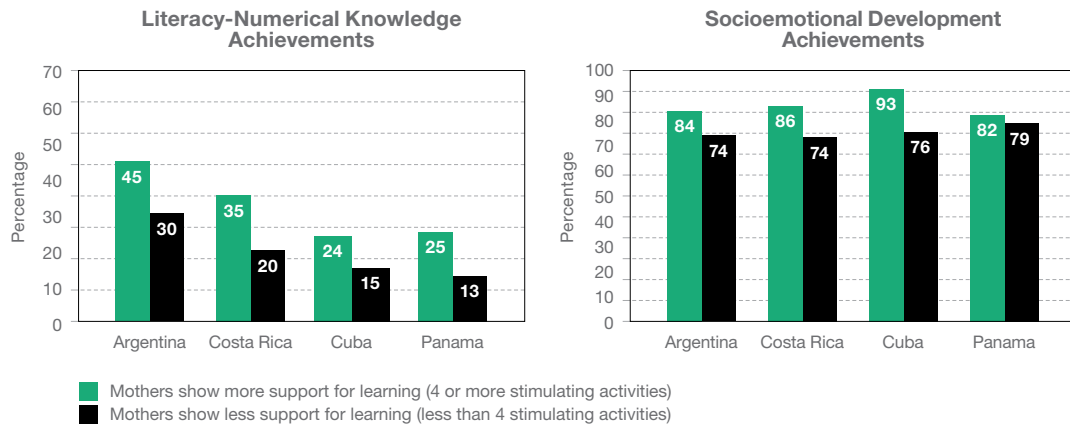


Note. The graph reports the score of socioemotional development assessment test (ASQ at 6, 12, and 18 months of age and the average CBCL score for children between 18 and 60 months), psychomotor development test (TEPSI, from the Spanish; for children from 24 to 60 months of age), and receptive language (PPVT, for children from 30 to 60 months of age). The test results are shown for children with more or less active primary caregivers, defined in accordance with the performance of activities oriented to promote learning (reading or looking at drawings, telling stories, singing songs, taking a walk out of the house, playing, naming things or telling the child about them, or drawing things for the child) in the past 7 days. For ASQ and CBCL, a higher number indicates greater socioemotional problems. Higher TEPSI or PPVT scores indicate better psychomotor or cognitive development, respectively.

Source. Author's elaboration based on the ELPI (2010).

Similar evidence is presented in Graph 2.15, which shows data for Chile on the correlation between frequency of productive activities with parents and child development. This graph shows that doing more activities such as reading, telling stories, singing, playing, and drawing with the child is associated with both cognitive development and socioemotional development, even from 6 months of age. The differences are statistically significant. In addition, a higher frequency of these activities is associated with better psychomotor development (on the TEPSI test, from the name in Spanish). A similar situation is observed in Graph 2.16 that uses the index of early child development of the MICS for four countries in the region.

Graph 2.16 Development of Children from 36 to 59 Months of Age by Quantity of Productive Interactions with Mother in Selected Latin American Countries



Note. The graph on the left reports the percentage of children from 36 to 59 months of age who meet 2 of the 3 literacy and numerical achievements of the index of early child development, for children whose mothers perform less than 4 or at least 4 learning activities with the child (reading or looking at drawings, telling stories, singing songs, taking a walk out of the house or naming/telling/drawing things to the child) in the past 3 days. The graph on the right reports the percentage of children between 36 and 59 months who meet 2 of the 3 socioemotional development achievements of the index of early child development, for children whose mothers perform less than 4 or at least 4 learning activities with the child (reading or looking at drawings, telling stories, singing songs, taking a walk out of the house, playing, naming things or telling the child about them, or drawing things for the child) in the past 3 days. Data for both graphs are from the following countries and years: Argentina (2012), Costa Rica (2011), Cuba (2014), Panama (2013).

Source. Author's elaboration based on the MICS (2011, 2012, 2013 and 2014).

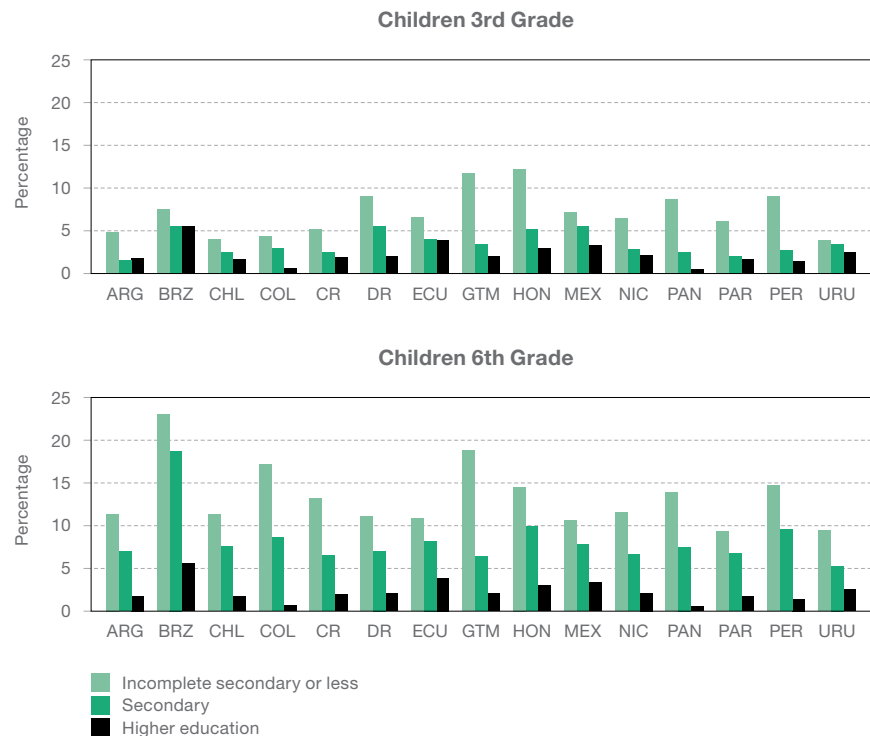
As of 6 years of age, children gradually gain relative independence from their parents. From then on, children and adolescents spend a large part of their time in educational institutions, so time in contact with parents decreases significantly (see Chapter 1). In this period, the participation of parents consists mainly in supporting the children, helping them, and being a model for them, as well as maintaining the children's safety while respecting their new independence. To construct these support networks, parents may spend time with the children to talk about friends and school, listen to their concerns, recognize their achievements, and offer help during challenging or difficult times. They can also invest time in getting to know their children's friends and getting involved in the activities of the children's educational institutions. That is, as of this stage, the parents ideally remain sufficiently close to their children while respecting their autonomy.

Based on data collected in the interviews of the Third Regional Comparative and Explanatory Study⁵⁵ and the survey of the Program for International Student Assessment (PISA) test, we present information regarding the involvement of parents with their third-grade children (approximately 8 to 9 years of age), sixth-grade children (around 11 or 12 years of age), and 15 years of age children. Graph 2.17 (see p. 136)

55. The Third Regional Comparative and Explanatory Study is a large-scale study of learning achievement that was applied in 2013 and in which 15 Latin American countries participated. The study assesses performance in several subjects of primary school students the third and sixth grades.

presents the fraction of parents who never or almost never help their children with their homework by mother's educational level. The first panel presents the data for children in third grade and the second panel for children in sixth grade. A significant difference is observed of the parents' involvement according to the educational level of the mother in all countries of the sample. For example, in Guatemala close to 12% of mothers with primary education never or almost never help their children with their homework in third grade, while only 2% of the mothers with higher education report the same. On average, around 6% of parents report that they never or almost never help their third-grade children with homework. However, when the children are in sixth grade, this figure increases significantly; it increases to 7% (Argentina) and 18% (Brazil), although still with major differences according to the educational level of the mother. For example, in Brazil, 25% of mothers with primary education do not help their sixth-grade children with homework, while 17% of the mothers with higher education do not. This reveals that there is an important percentage of parents who do not get involved in their children's academic work, and that fraction increases the higher the education of the mother and decreases as children grow up.

Graph 2.17 Percentage of Children without Parental Encouragement to Do Homework by Mother's Educational Level in Several Latin American Countries



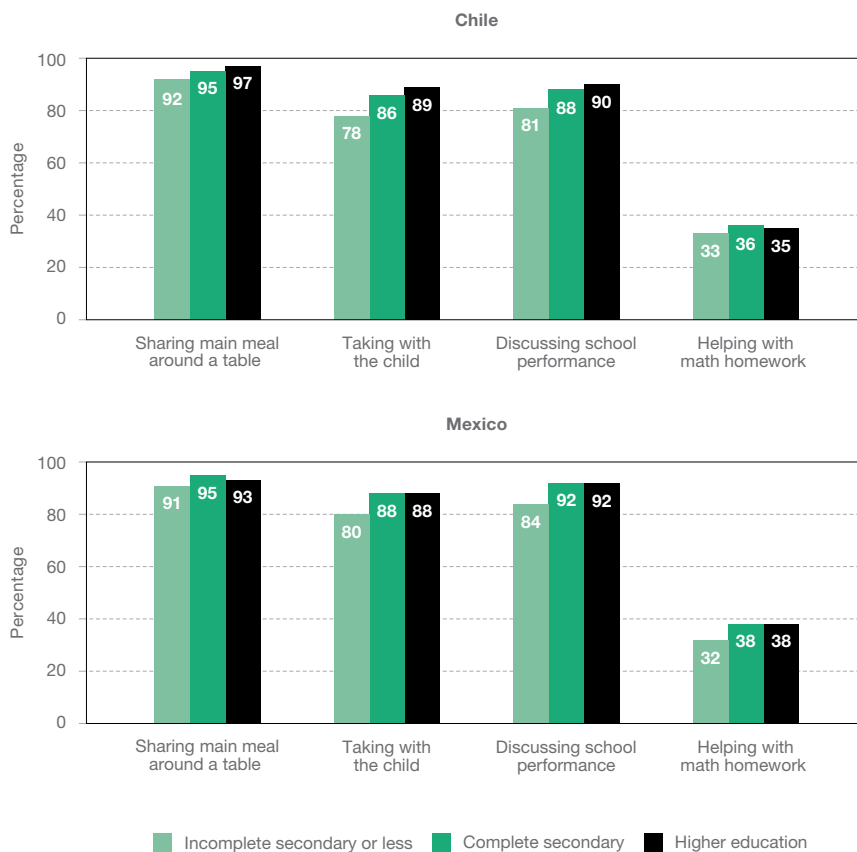
Note. The graph reports the percentage of children whose parents responded "never or almost never" to the following question: "How frequently do you carry out in your family this type of activities?: Doing the work together." The values are shown by the highest educational level the mother has completed.

Source. Author's elaboration based on the Third Regional Comparative and Explanatory Study (2013).

Based on data from PISA, we have information on the use of the time shared by parents and children only for two countries of the region: Chile and Mexico. Graph 2.18 presents the portion of parents of youth (15 years old) in these two countries who report that at least once a week, they talk about how the child is doing in school, have one daily main meal together at the same table, they spend time talking, and they help the child with mathematics homework. No large differences are observed between the involvement of parents with their children between countries, but in some cases there are differences, although not very large, according to the educational level of the mother.

A significant difference in parental involvement is observed according to the educational level of the mother in all countries analyzed.

Graph 2.18 Interaction of Parents and 15-Year-Old Children by Mother’s Education Level in Chile and Mexico

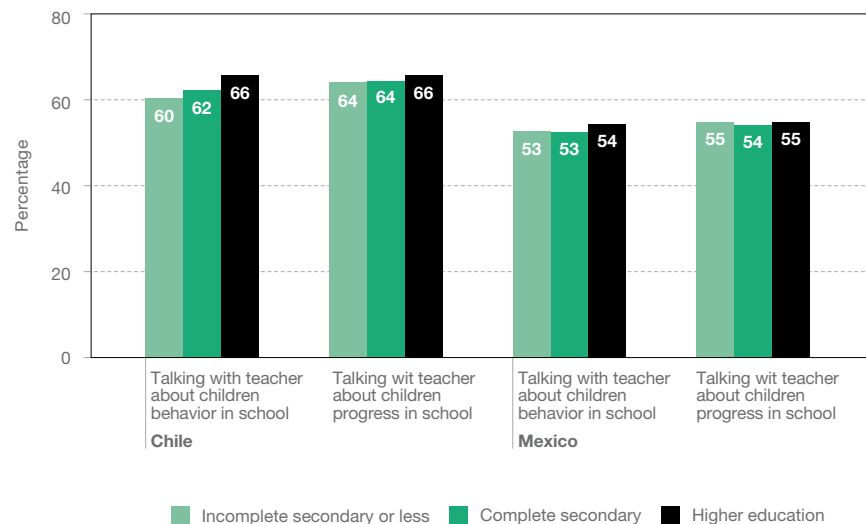


Note. The graphs report the percentage of parents (or tutors) of 15-year-olds who answer “once or twice a week,” or “every day or almost every day” to the question: “How frequently do you perform these actions with the children at home?” These values are shown according to the educational level of the mother.

Source. Author’s elaboration based on PISA (OECD, 2012).

Finally Graph 2.19 shows some data on the involvement of the parents with their children's educational institutions for Mexico and Chile. The data indicates the portion of parents who, at their own initiative at least once during the last school year, talked with teachers about the behavior and academic performance of their child. The results indicate that there are no large differences by educational level of the mother, except perhaps in the case of Chile, where the percentage of parents conversing with teachers is higher than in Mexico.

Graph 2.19 Involvement of Parents with Children's School by Mother's Educational Level in Chile and Mexico



Note. The graph reports, according to the educational level of the mother, the percentage of parents (or tutors) of 15-year-olds who performed each of the two activities.

Source. Author's elaboration based on PISA (OECD, 2012).

The possibility of investments in (quality) time may be affected by the parents' work responsibilities. Women's labor force participation increased noticeably in the past few decades, with accelerated growth during the nineties, which continued although at a somewhat slower pace as of the year 2000 (Gasparini and Marchionni, 2015). The fraction of adult women in the labor market went from 50% at the beginning of the nineties to close to 65% currently. A large part of the increase observed in the nineties is attributed to married women's participation in the labor force, many of whom were young (Elias and Ñopo, 2010). Employment rates of women who are mothers of children under 14 years of age are 70% in Bolivia, 57% in Colombia, 47% in Honduras, 64% in Peru, and 52% in the Dominican Republic. In OECD countries, this rate is

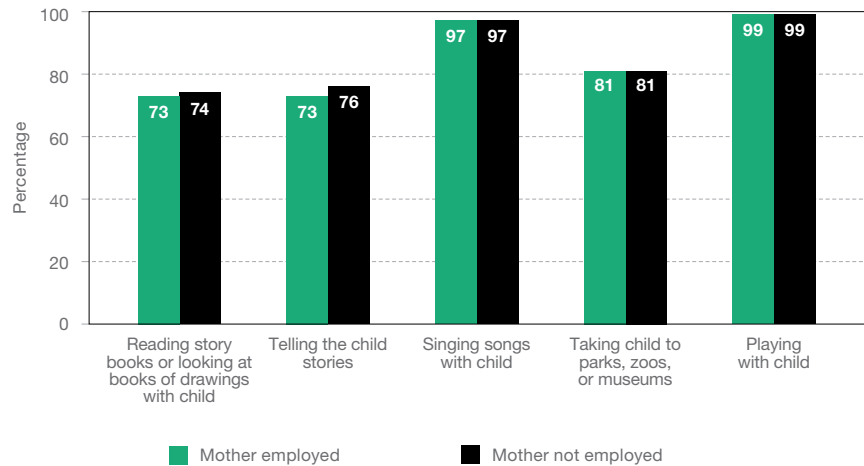
66.7%, on average (OECD Family Database). In general, evidence suggests that a mother's employment has negative effects on the early development of her child, particularly during the first year of age (Baydar and Brooks-Gunn, 1991; Bernal, 2008; Burchinal and Clarke-Stewart, 2007; Waldfogel et al., 2002). It is generally argued that the reduction of the material time with children is the main mechanism to explain this negative effect (James-Burdumy, 2005).

However, these studies do not contemplate the possibility that the working mother will effectively substitute the quantity of time by quality of time, and, therefore, mitigate or even offset these negative effects. Evidence in this respect for Latin America is still scarce because of lack of reliable data that includes information on quantity and quality of maternal time together with development variables of children and youth. Evidence for the United States (Baydar et al., 1999) shows that every hour of maternal work is associated with a reduction of 4 minutes in time spent on learning and stimulating activities with the child, 7 minutes in personal care routines, and 17 minutes in passive parental supervision. This implies that the sacrifice in terms of time is very small and mothers efficiently adjust their routines. Similar reductions are found in the case of Colombia (Bernal et al., 2004). Graph 2.20 (see p. 140) presents data of stimulating activities performed between mothers and children in Chile according to the labor status of the mother. It is observed that there are no differences in the quality of investments between working and nonworking mothers, whereby it would seem that the mothers reduce their leisure time or less productive activities with the children to maintain the same level of activities that stimulate learning.

Hsin and Felfe (2014) provide additional evidence along the same line, again for the United States. This study finds that although maternal employment reduces the quantity of time that mothers spend with their children, the quality of that time does not seem to be affected, especially in the case of mothers with higher educational levels. These mothers seem to adjust the type of time that they spend with their children, reducing the activities that are less productive for the cognitive and socioemotional development of their children (for example, nonstructured activities). The case is different with mothers with lower educational levels, since they seem to face greater difficulties to preserve the quantity of quality time that they spend with their children. On the other hand, Fiorini and Keane (2014), with data for Australia, conclude that the educational activities between parents and children are more effective for the cognitive development, particularly in the case of educated mothers. In contrast, the utilization of time in specific learning activities does not seem to affect the socioemotional development, which seems to be determined by the mother's compassion and the effective discipline. Finally, Bernal et al. (2014) show that in Colombia, the quality of maternal time has positive effects both on the socioemotional and cognitive development of children under 6 years old. This paper also finds that the quantity of maternal time, once the effect of its quality has been discounted, has positive effects on the cognitive development but negative effects on socioemotional development.

Parents are continuously deciding regarding the use of time of the children, even when they are not with them, and these decisions may be determinant for their development.

Graph 2.20 Activities to Promote Child Learning by Mother's Employment Status in Chile



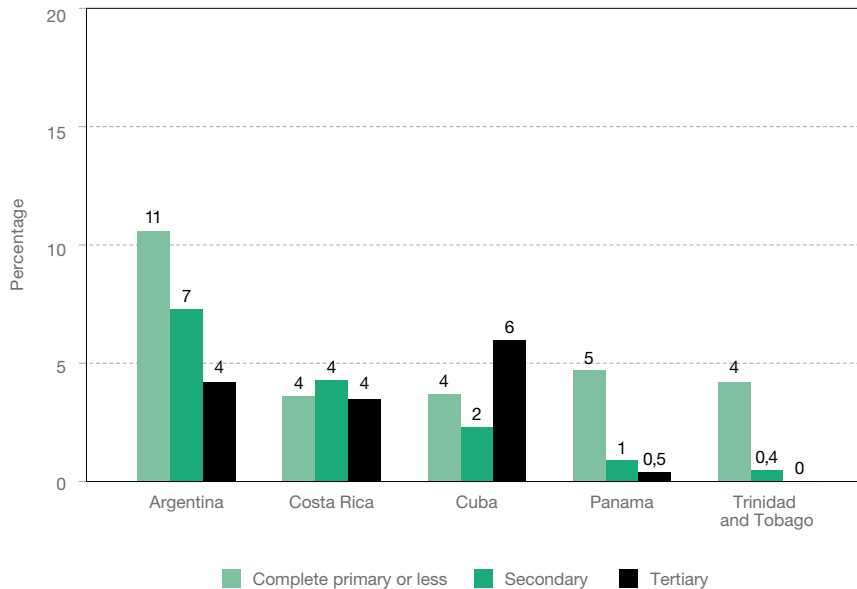
Note. The graph reports the percentage of children under 4 years of age who did activities with their mothers oriented to promote learning, in the past 7 days, according to the employment status of the mother.

Source. Author's elaboration based on ELPI (2010).

Parents are continuously deciding on the use of children's time, even when they are not with them. For example, parents decide with whom they leave their children when they cannot care for them. The impact of these decisions depends on the characteristics of the alternative caregiver (for example, the quality of care provided in public or private early education institutions) and, in particular, of the type of activities that the child or youth is performing (alone or accompanied).⁵⁶ Graph 2.21 reports on children under 5 years of age who are left alone or in the care of another child under 10 years of age for more than 1 hour (at least once in the last week), in the absence of the parents. It is observed that this figure is high, particularly in homes where the mother has low schooling. For example, in Argentina it is 11%, and in Panama, 5%, in the case of mothers with only primary education. In some cases, this figure does not change much with maternal education, as in Costa Rica. Noticeably, time shared with improvised caregivers will not be productive and may even place the children at risk (for lack of safe conditions and a favorable environment for learning).

56. Chapter 3 provides more details on the quality in early education institutions.

Graph 2.21 Inadequate Care of Children under 5 Years of Age by Mother's Educational Level in Selected Latin American Countries



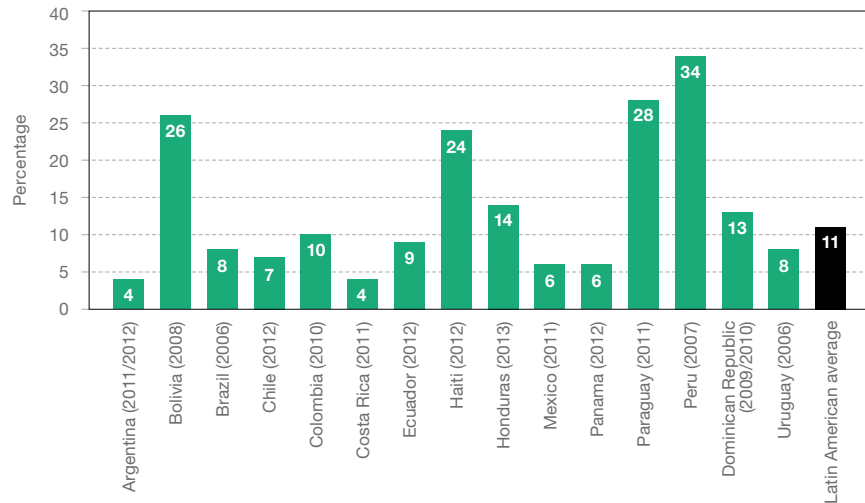
Note. The graph reports the percentage of children under 5 years of age who were left alone or in the care of another child under 10 years of age for more than 1 hour at least once in the past week. Data are from the following countries and years: Argentina (2012), Costa Rica (2011), Panama (2013), Cuba (2014), and Trinidad and Tobago (2006).

Source. Author's elaboration based on the MICS (2006, 2011, 2012, 2013 and 2014).

The decision to send small children to work will have adverse effects on skill development.

Similarly, the decision of parents to send their small children to work will have adverse effects on the production of skills, to the extent that the work competes with school attendance and with activities specifically oriented to promoting the development of the children. Graph 2.22 (see p. 142) presents figures on child labor in the region. Rates above 24% are observed in Bolivia, Haiti, Paraguay, and Peru. The Latin American average is 11%.

It should be made clear that the efforts in quantity and quality of time made by families potentially complement what the early education institutions can provide. In fact, an important component of the quality of early education mentioned in the literature is the degree of involvement by the parents. Thus, in order for parental investments in time to be as effective as possible, a certain alignment is required in terms of care, child-rearing behaviors, health, nutrition, and child development behaviors between the home and the alternate caregiver (Bernal and Camacho, 2014; Harms et al., 2003). On the other hand, Garcia (2015) reports that parents substitute early education outside the home for their time with children, particularly when facing important financial restrictions.

Graph 2.22 Child Labor for Selected Latin American Countries circa 2010

Note. The graph reports the percentage of children from 5 to 14 years of age who are subject to child labor, defined as: (a) children from 5 to 11 years of age who, during the week of reference, worked at least 1 hour or carried out at least 28 hours of domestic work, or (b) children from 12 to 14 years of age who, during the week of reference, worked at least 14 hours or carried out at least 28 hours of domestic work.

Source. Author's elaboration based on UNICEF Global Databases (2014), based on the DHS, the MICS, and other national surveys.

The Home As Learning Environment

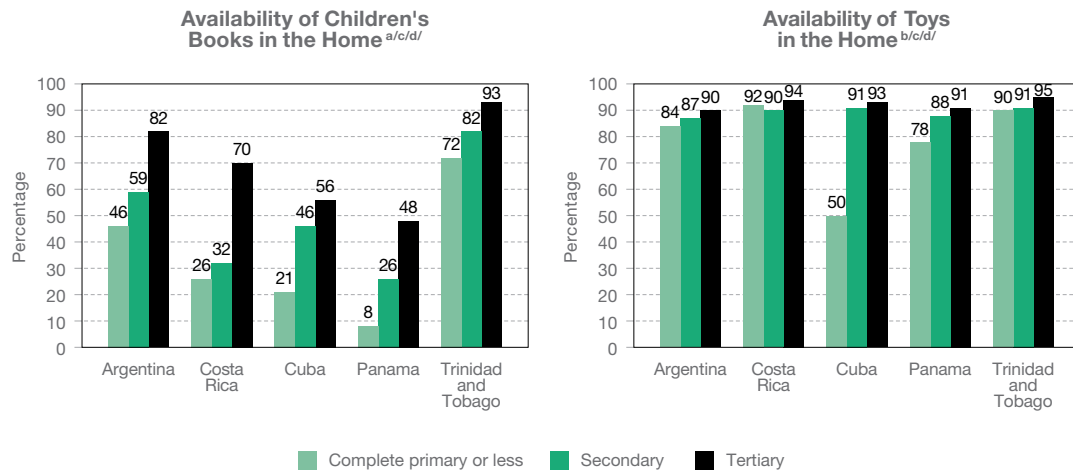
Investments of parents' time are much more productive when complementary resources for this time are present in the home, such as, material for reading, playing, learning, coloring and promotion of psychomotor development. In general, many everyday objects in the home could be used for playing, learning to classify and order things, learning colors, putting small objects into larger ones, and other similar activities. However, the parents need to be aware of those activities that promote development and can be performed frequently at home. Books are indispensable and irreplaceable, and their proper and frequent use can promote expressive and receptive vocabulary and support emergent literacy in children.⁵⁷

In addition, having an environment for reading at home complements the positive association between the materials available at home and the development of emergent literacy skills, and, in general, cognitive development (Johnson et al., 2008; Recart and Mathiesen, 2011). Spaces favorable for learning are

57. In particular, correlation studies (Griffin and Morrison, 1997) suggest that in homes with more books for both children and adults, more subscriptions to newspapers and magazines, a higher use of subscriptions to libraries, better reading habits of parents, and less time watching television, children show a better receptive vocabulary.

characterized by not only the availability of stimulating materials, but also a safe physical environment that is orderly and quiet, with the possibility of accessing various experiences (music, drawing, reading, etc.) within the family environment. A widely used scale that was conceived expressly to measure the quality of the home learning environment for children between 3 and 6 years of age is the Home Observation for Measurement of Environment (HOME) scale. It has several subscales that measure the aspects mentioned here. The literature reports a high correlation between the HOME score and the socioeconomic level of the homes and between the HOME score and the cognitive and socioemotional development of the children (Totsika and Sylva, 2009; Viguer Segui and Serra Defiles, (1996); Recart and Mathiesen, 2011).⁵⁸

Graph 2.23 Availability of Books and Toys in Homes with Children under 5 Years of Age in Selected Latin American Countries



Note. The graph on the left shows the percentage of children under 5 years of age who have 3 or more children's book in their homes. The graph on the right shows the percentage of children under 5 years of age who play at home with toys purchased by parents. In both graphs results are presented according to the highest level of education attended by the mother. Data are from the following countries and years: Argentina (2012), Costa Rica (2011), Panama (2013), Cuba (2014), and Trinidad and Tobago (2006).

Source. Author's elaboration based on the MICS (2006, 2011, 2012, 2013 and 2014).

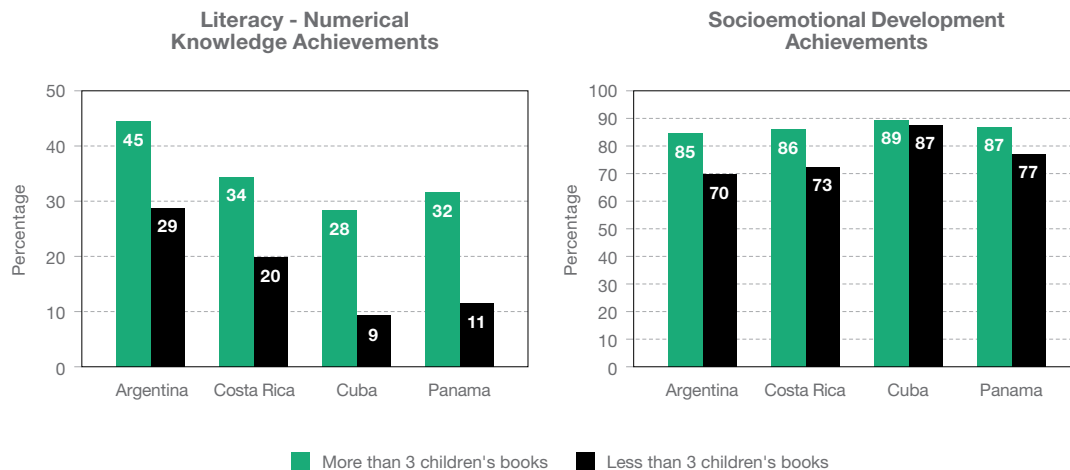
Graph 2.23 presents evidence on this subject for the case of several Latin American countries, based on the MICS. It presents indicators of availability of books and toys in homes of children under 5 years old. The results suggest differences by educational level of the mother that are important

58. Many studies that report these associations fail to implement statistical corrections that take into consideration the fact that the homes with more materials and better spaces for learning are systematically different from homes in different conditions, in terms of characteristics that also affect the development of children and youth. That is, many of these studies associate HOME with development results, when actually what guides the connection is not what is measured in HOME, but other characteristics not observed in the homes.

in the case of availability of children's books, but that are small in the case of toys purchased. A possible interpretation would be that the availability of money could explain the small difference in the purchase of toys in homes of different socioeconomic levels (educational level of the mother), while in the case of books it would not only be a matter of restriction of economic resources but also a matter of education and knowledge of the parents regarding effective ways to promote children's development. In Argentina, for example, while 82% of the homes where the mother had higher education levels, there are at least three children's books in the home, while only 46% of homes where mothers have only completed primary education have that many books.

In addition, Graph 2.24 reports the correlation between the availability of children's books in the home and the cognitive and socioemotional development of children. The correlation is for literacy and numeracy. The difference in cognitive development between one group and the other is between one third and one half a standard deviation. In the case of emotional development, the correlation is weaker but observable. Next, Graph 2.25 confirms this correlation, with a wider variety of investments and materials available in the home for the case of Chile.

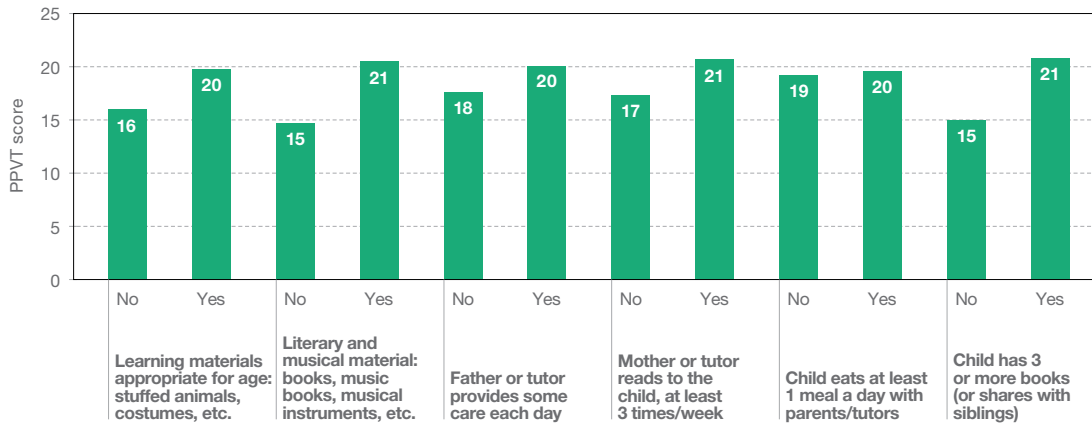
Graph 2.24 Child Development Indicators (Cognitive and Socioemotional) According to Book Availability in the Home in Selected Latin American Countries



Note. The graph on the left reports the percentage of children between 36 and 69 months old who meet 2 of the 3 literacy and numerical aptitude achievements of the early child development index, according to the quantity of children's books available at home. The graph on the right reports the percentage of children between 36 and 59 months old who meet 2 of the 3 socioemotional development achievements of the early child development index, according to the quantity of children's books available at home. Data for both graphs are from the following countries and years: Argentina (2012), Costa Rica (2011), Cuba (2014), and Panama (2013).

Source. Author's elaboration based on the MICS (2011, 2012, 2013 and 2014).

Graph 2.25 Verbal Development of Children from 30 to 60 Months of Age by Family Investments in Chile



Note. The graph reports the score on the PPVT for children from 30 to 60 months of age. A higher score indicates higher cognitive development. Data are from urban children.

Source. Author's elaboration based on ELPI (2010).

When the State Helps

The promotion of the development of children and youth is, in principle, the direct responsibility of the parents. However, the optimal investment of families in children is subject to the income and time restrictions on households and the knowledge and perceptions that parents have about the formation of skills of children and youth. State interventions based on different public policies could lift the weight of some restrictions and, in that way, help in the full development of children and youth.

Given that children do not make the decisions about the quantity of inputs, including time and monetary investments for the development of their skills, the person who makes the investment decisions is not the person who is benefits from them. There is a problem, therefore, of externalities that also justifies public intervention. In this case, children could wish that their parents had invested more in them than what the parents chose to invest.⁵⁹

59. Although it is possible that parents will have strong altruistic preferences for subsequent generations (their children and grandchildren, for example) and for that reason will wish to invest in an optimal manner in them, it is also true that literature in this field suggests that individuals tend to value the present much more than the future, even their own future (parents are "shortsighted"), not just that of their children or grandchildren.

Accordingly, state intervention can help partially or entirely resolve these problems that place family decisions very far from those that would have been optimal for the children's development. In this manner, the state may, in addition, contribute to guaranteeing the conditions necessary to promote the investment of families, with benefits not only in the individual circle but also socially, because it could help to close the intergenerational gaps by matching the opportunities between individuals that promote higher equity in the society as a whole (Tood and Wolpin, 2007).

Table 2.2 presents a summary of the types of public policy instruments that states have at hand to fulfill such objectives. In the first category are the macro policies that involve the adequate provision of infrastructure, public utilities, and health-care and social protection programs for families, children, and youth (see Chapter 5).

Table 2.2 Public Policy Tools to Promote More and Better Family Investments in Children and Youth

Type of policy	Objective	Examples
Macro policies on infrastructure, public utilities, healthcare, and social protections	Provide access to healthy spaces, to services that promote health and adequate nutrition, and to poverty mitigation programs.	<ul style="list-style-type: none"> • Provision of water and sewer systems • Access to health care and vaccinations • Access to spaces for recreation and sports
Policies that reconcile the role of workers with the role of mother/father	Partially resolve time restrictions on working parents to allow time to invest in their children	<ul style="list-style-type: none"> • Maternity/paternity leaves • Availability of days off to take care of sick children • Telework
Provision of information, knowledge, and changes to parents' perception	Provide families the information and knowledge necessary for early development so they can make optimal investments in children and change their perceptions on the potential of children and youth	<ul style="list-style-type: none"> • Home visit program • Parents' schools • Involvement by parents in educational programs • Large scale advertising campaigns
Policies of transfers, subsidies, and provision of goods and services	Partially resolve financial restrictions on parents that hinder investments in children	<ul style="list-style-type: none"> • Conditional cash transfers • Provision of food supplements • Provision of books for the home • Vouchers and scholarships
Policies to encourage the demand of services that promote development of children and youth	Promote best decisions on time use for children/youth in the absence of the parents making productive options more attractive	<ul style="list-style-type: none"> • Packages that include food, transportation, clothing/uniforms, and other benefits associated with education

Note. The examples given are not exhaustive.

Source. Authors' elaboration.

In a second group of interventions are the family policies aimed at reconciling the role of the worker with the role of the parent in such a way that it will be possible to guarantee a sufficient quantity of time for the parents to effectively invest in their children. In the third group are programs that deliver information and knowledge to parents regarding skill development, adequate parental actions, and effective investments of the families. The fourth group is policies that refer to direct delivery of subsidies or transfers, or delivery of goods and services for the promotion of child development. Finally, the last group includes policies for fostering the demand of services that promote child and youth development.

Infrastructure, Services, and Public Programs

A family may effectively invest in the children if the state guarantees the availability of some public goods. For example, guaranteeing a good nutritional status and general health requires that homes have access good sanitation infrastructure, access to the health system, and access to adequate recreation and sports facilities (see Chapter 5). That is, although families would wish to make optimal decisions on their children's health care, by the nonexistence of adequate access to a water or sewer system, it is probable that the homes will not be able to guarantee the minimum conditions required for good health conditions of children and youth. A large portion of the improvements in mortality of the past 5 decades, or of the drop in chronic malnutrition rates in the past 3 decades (Berlinksi and Schady, 2015), are due in many cases to investments by governments in public infrastructure and vaccination and deworming programs. Of these, the most important has been the provision of potable water (Plotkin and Plotkin, 2004). Vaccination campaigns also represent great savings in terms of health-care provision costs and reductions in the number of deaths that greatly outweigh the programs' costs (Ehreth, 2003).⁶⁰

Family-Friendly Policies for Working Parents

Family-friendly policies attempt to reconcile work with family life. In essence, these policies facilitate the efforts of both mothers and fathers to adequately invest in their children without affecting income levels, especially to the extent of abandoning work opportunities for family responsibilities. With these objectives, a set of family policies has been defined, which includes: (1) maternity and paternity leaves, with and without pay; (2) policies that promote part-time work; (3) policies that guarantee other benefits of the job, such as flexibility in working hours, reduction of working hours in the postnatal period, and telework; (4) policies that guarantee the ability to breastfeed even after the end of the maternity leave; (5) policies coordinated with companies to provide daycare facilities at work; and (6) policies that facilitate the care of sick children.

The key parameters of this set of policies cover the term of the benefit, the portion and duration of remuneration (total or partial) during the benefit, the eligibility criteria for the family policies, and the level of flexibility of the policy (e.g., continuous or intermittent, benefits shared with the father, cumulative or use or lose, etc.).

The choice made by policymakers on the type of family leaves of absence depends on the natural tension between the potential positive effects for children and the possible negative effects on the labor indicators of fathers and mothers. In general, the positive effects of these policies come through their impact on the physical and mental health conditions of the mother and the general health of the newborn, providing better nutrition indicators and integral development for the child in the short and medium terms, together with a greater probability of income security in homes with children, a greater stability and labor wellbeing for mothers, and

60. Chapter 5 examines these notions in detail.

Family policies, in addition to facilitating working parents' time investments in their children, also promote the inclusion and wellbeing of parents, especially of mothers.

greater gender equity in the labor market and in households (Waldfogel, 2007; Berger and Waldfogel, 2004; Ten Cate, 2003; Ruhm, 1998; Higuchi et al., 1999). In this manner, family policies—in addition to facilitating time invested by working parents in their children—also promote the inclusion and wellbeing of parents, especially of women (Peña et al., 2014). Table 2.3 presents a summary of the policies on maternity/paternity leaves in Latin America.

Table 2.3 Maternity and Paternity Leaves in Latin American Countries

	Term of maternity leave	Remuneration (% of salary)	Term of paternity leave	Remuneration (% of salary)
Argentina	90 days	100	2 days	100
Bolivia	90 days	75	-	-
Brazil	120 days	100	5 days	100
Chile	18 weeks	100	5 days	100
Colombia	14 weeks	100	8 days	100
Costa Rica	4 months	100	-	-
Cuba	18 weeks	100	Shared with mother	60
Ecuador	12 weeks	100	25 days (newborn hospital)	100
El Salvador	12 weeks	75	-	-
Guatemala	84 days	100	-	-
Haiti	12 weeks	100	-	-
Honduras	84 days	100	-	-
Mexico	12 weeks	100	-	-
Nicaragua	12 weeks	100	-	-
Panama	14 weeks	100	-	-
Paraguay	9 weeks	50	3 days	100
Peru	90 days	100	-	-
Dominican Republic	12 weeks	100	2 days	100
Uruguay	12 weeks	100	-	-
Venezuela	18 weeks	100	-	-

Note. 100% in case of minimum wage.

Source. Authors' elaboration based on Addati et al. (2014).

The data in Table 2.3 show great homogeneity in respect to length and remuneration of maternity leaves across countries. The countries with the longest maternity leaves are Chile, Cuba, and Venezuela, with 18 weeks. Approximately half of the countries included in the table have very short leaves. In addition, these family policies are considerably less generous than those offered in many

developed countries. For example, Austria and Germany offer remuneration for 24 months (96 weeks, approximately). Finland, Hungary, and France offer up to 36 months remunerated, while Canada, Ireland, Italy, Norway, and Portugal offer around 1 year with remuneration. Sweden offers 16 months remunerated and up to 36 additional months without remuneration.⁶¹ A desirable characteristic of family leaves is gender equity (parity for fathers and mothers), to avoid discrimination against women associated with very generous policies (Peña et al., 2014). Gender equity does not seem to be present in the policies of countries in Latin America.

Information, Knowledge, and Changing the Perceptions of Parents

Restrictions of information and knowledge contain two main aspects: unawareness of the importance of development during childhood and youth to adult capacities, and lack of information on the relevance of various inputs of the family on the formation of the skills of the individual.

Bernal and Fernandez (2013) report the level of knowledge on child development in Colombia based on the Knowledge of Infant Development Inventory (KIDI; MacPhee, 1981) in a sample of more than 5,000 mothers of children under 6 years of age with socioeconomic vulnerability. The authors found that the mothers accurately complete only 40% of the 58 items about development milestones, parental behaviors, child health, and protection. In addition,⁶² 40% of parents of children under 6 years of age living in vulnerable conditions believe that the children eventually develop without any effort by the parents, and 55% are of the opinion that all children develop the same skills eventually regardless of their circumstances. Furthermore, 36% believe that playing is not indispensable for proper early development. On the other hand, the data of ELCA (2013) in Colombia indicate that 70% of children under 6 who do not attend any modality of early education do not attend because of the parents' preference, not because of access restrictions. In addition, parents frequently report that they do not talk to babies because babies do not understand, or that smaller children do not learn anything because they are just babies. These figures suggest that parents do not fully understand the importance of the range of early investments in their children.

Public programs oriented at remedying general knowledge gaps and information for parents include: home -visit programs, parenting classes, efforts to directly involve parents in their children's education programs, and delivery of information to parents on the benefits of education, the importance of quality education, and the importance of investments by families for the full development of children. Information delivery may be made through various communication strategies.

61. But there are also developed countries where these policies are even less generous than in Latin America. This is the case of the United States, where only as much as 12 weeks are granted without remuneration.

62. Nores and Bernal (2013), based on data from the impact evaluation of a program of early education.

The home-visit programs and school for parents provide direct support to the parents and offer them training on child development subjects, child-rearing behaviors, health and nutrition, discipline, the challenges of maternity and paternity, prevention of child mistreatment and abuse, among others. In most cases they are instrumented through home visits but there are also group modalities. Some of the best known and most successful programs internationally are the Nurse Family Partnership (Olds et al., 1994), Promising Practices (McCormick et al., 2006), and Mother-Child Home Program in the United States. Evaluations of programs to provide support to parents reveal that the most effective ones combine new knowledge with activities done directly with their children and with strategies that form and strengthen parental capacities in a more permanent manner than interventions that simply deliver information to parents on better child-rearing behaviors (Aboud, 2007; Hamadani et al., 2006).

In Latin America, two programs stand out in this category because their impacts have been rigorously evaluated, although they are not the only ones that exist.⁶³ The first was implemented in Jamaica for a sample of children from 9 to 24 months of age with low weight for their age (Grantham McGregor et al., 1997). The intervention consisted in weekly 1-hour visits to the home by a social worker for 2 years, in which information was provided on the importance of the interaction between mother and child.⁶⁴ The program was evaluated in a sample of 129 malnourished children in Kingston, who were assigned at random to different intervention groups (Grantham McGregor et al., 1991; Walker et al., 2005; Walker et al., 2006). After the 2 years of the program, the children whose households received home visits reached a development level that was no different than that of children in the same communities without a malnutrition baseline, which implied an improvement of close to 0.8 standard deviations in cognitive development. The children of the sample were evaluated again at 8 years, 12 years and 18 years. At all stages, the effects of the program continued to be positive and significant, and up to 0.4 standard deviations. A more recent follow-up at the age of 22 years reports a gain of around 25% in the salaries of the youth who participated in the intervention (Gertier et al., 2014).

The second program is a replica of the Jamaica intervention, adapted for Colombia but offered to a larger sample: 1,420 children in around 48 municipalities. The program was based on the same curriculum and offered through weekly 1-hour home visits for 18 months. The educators (visiting workers) were women leaders of the communities who had been trained for the role (Attanasio et al., 2014). The results of the evaluation indicate improvements of cognitive development of up to 0.26 standard deviations at the end of the intervention. Based on a review of the evaluations of the programs mentioned herein, the following are the key success factors of these programs: (1) regular frequency to the visits or group meetings, of at least every 15 days; (2) visits or meetings of at least 1 hour; (3) structured

63. In Chile, for example, several programs to support parents have been implemented. Some of note are *Nadie es Perfecto* (Nobody is Perfect; currently being evaluated), and a program of home visits by nurses to parents of children under 4 years of age, which has also gone through an impact evaluation (Aracena et al., 2012).

64. The program also offered a food supplement program.

curriculum of the visits, with specific activities to be reviewed and practiced; (4) continuous supervision of the educators; (5) incorporation of life coaching for vulnerable mothers; and, (6) combinations of stimulating activities for children with training in best parental behaviors that includes routines, discipline, and formation of habits.

A similar type of program uses interventions that involve the parents in their children's education through workshops, lunches, exhibitions, and social events or individual meetings with parents at the school to get parents involved in the school. The intent is to get parents on board with the children's development goals, care for the children, parenting practices, health, nutrition, discipline strategies, and habit formation. For example, the School Management Support intervention in Mexico granted financing to schools' parent-teacher associations for investing in a better quality of education for the children. One stipulation was that the parents had to get more involved in school activities, participate in infrastructure work, and attend workshops on education and parental behaviors that were held in the schools. The intervention is associated with a reduction in grade repetition and better scores on standardized cognitive skills tests (Gertler et al., 2012).

Finally, programs that deliver information to parents on the benefits of education and the investments in children have also been positively evaluated. For example, in Brazil, parents are presented information on the quality of education in the schools based on the results of mandatory standardized official tests. Disclosing information about the quality of a school has an effect from 0.2 to 0.6 standard deviations in the standardized tests of students in private schools (Camargo et al., 2011).⁶⁵ In Chile, a program for information delivery to parents on the availability of scholarships and other financial aid for university education was evaluated. The results of the evaluation indicate that there is an increase of 6 percentage points in the probability of entering college and a decrease of school absenteeism of between 8 and 10 percentage points (Dinkelman and Martinez, 2014).

Transfers, Subsidies, and Provision of Goods and Services for Learning

The purpose of this group of policies is to partially remedy the financial restrictions that families face when choosing effective investments in their children, and perhaps also to bring partial relief to the problem of *parental short-sightedness*.⁶⁶ The state can offer monetary transfers and subsidies or directly deliver goods and services that promote the development of children and youth (e.g., delivering books or food supplements to children with malnutrition problems or to pregnant or breastfeeding mothers). Conditional cash transfer programs deliver a subsidy to a household if the condition of attending school for a certain number of days is

65. In the Dominican Republic, a similar intervention was implemented whereby youth were explained the return on investment of having more years of education. The program evaluation indicates that school absenteeism was reduced and the number of years of schooling among youth who received the information increased (Jensen, 2010).

66. This occurs when parents give little importance to the future at the time of making decisions about their children today.

met. The intention of the program is to reduce the opportunity cost of education. Fiszbein et al. (2009) summarize the evaluation of programs of this type in Latin America and conclude that positive effects are observed on school attendance, graduation, and registration. In addition, these programs reduce future school dropouts but do not help to bring back to school those individuals that already dropped out. Paxton and Schady (2010) report positive effects of conditional cash transfer programs on cognitive development and the health status of the children of beneficiaries. Some of the mechanisms through which these effects could have occurred are related to better nutrition, higher use of health-care services, and even better parental behaviors in the homes that received the transfers.

Similarly, the voucher programs for private education increase the educational alternatives for homes with financial restrictions. The voucher is an aid that is redeemable in private schools by part or the total value of the school tuition. In Colombia and Chile, programs of this type have been implemented. The results of the impact evaluations in Colombia indicate an increase of 10 percentage points in the probability of completing eighth grade and an increase of 0.2 standard deviations in the scores of standardized mathematics, reading, and writing tests (Angrist et al., 2002). In addition, an increase in the probability of graduation from secondary education and on the standardized secondary graduation test score are also reported (Angrist et al., 2006). Finally, a long-term follow-up shows that the beneficiaries of vouchers had a higher probability of being employed in the formal sector and had salaries 8% higher than non-beneficiaries (Bettinger et al., 2014). In Chile, on the other hand, evaluations do not reflect strong positive results, though they do report an increase in school segregation (Hsieh and Urquiola, 2006).

Finally, the state may remedy financial restrictions by delivering directly to families goods and services that promote the healthy development of children and youth, such as the provision of books to homes. Whitehurst et al. (1994) report that a program in the United States that delivers three books to the home with a complementary training for the primary caregiver had positive effects on the reading time at home and on emergent literacy tests. Similarly, positive effects have been found from the delivery of micronutrient supplements (or fortification of food) on iron, zinc and vitamin A deficiencies. A variety of evaluations summarized in De-Regil et al. (2013) report up to 31% reduction in anemia associated with the delivery of powdered micronutrients to homes and 51% reduction in iron deficiencies.

Fostering the Demand for Services that Promote the Development of Children and Youth

Finally, we address programs for fostering the demand for public services (or in some cases private) oriented to the promotion of child development. These include the provision of goods and services in addition to those directly associated with the program. This is the case of educational programs that also include school programs are common in Latin America. Impact evaluations available are found for Jamaica, Peru, and Chile, with results indicating increases in school attendance; lunches, transportation, delivery of uniforms and books, health-care service in situ, etc. These additional goods reduce the opportunity cost of school attendance

and, therefore, make school attendance more attractive for families. School lunch positive effects on academic performance were found only in Jamaica (Powell et al., 1198; Cueto et al., 1998). Chapter 3 continues with the discussion on these types of programs.

Conclusions

Parents invest their money and time in promoting the adequate development of their children through actions such as reading to their children, playing and talking with them, or purchasing books, toys, or extracurricular classes. Parents also decide what children and youth do with their time in the absence of the parents as well as the activities and structure of that time, such as whether the children will be with a parent or another main caregiver—all of which is important for the formation of skills of children and youth. Beyond the specific activities during the time that parents and children spend together, time shared is also the opportunity to construct and consolidate strong and trusting relationships with the children. These relations based on trust, support, and continuous guidance are the foundation for the child's self-esteem and solid interpersonal relations. These relations are also opportunities to teach and show, for example, how to communicate, how to treat others with respect, and how to resolve conflicts and manage stress.

The results presented in this chapter indicate that considerable differences in the development of children and youth exist according to the child's socioeconomic level.

In some cases, these gaps are extremely important and imply lags in the children from the poorest homes that are difficult to reduce later on. The explanation for this difference is that the poorest homes invest less in their children, because of the multiple restrictions the household face. In the most vulnerable homes, the parents dedicate less quality time to children and make fewer monetary investments in books and toys; there is also a higher probability of less healthy environments, such as more utilization of physical discipline, higher rates of abandonment, and more child labor.

In sum, investments of families during the initial stages of life are essential to setting up individuals to perform well in the future. However, optimal investments by families in their children are subject to income and time restrictions and to the knowledge and perceptions of parents regarding the formation of skills of children and youth. In this respect, active intervention by the state is fundamental because its contributions are needed to remedy the restrictions faced by the families, and, in this manner, guarantee the necessary conditions for facilitating and promoting investments of families in developing the capacities of children and youth in the region.

Appendix

Table A 2.1 Instruments for Measurement of Development of Children and Youth

Dimension	Measures	Examples and comments
Nutritional status	Weight, height, head or arm circumference, body mass; indicators for deficiency or excess	Chronic malnutrition: 2 standard deviations below height according to age and sex; overweight or obese
Health status	Prevalence of diseases, vaccination rates	ADD or ARI
Psychomotor development	Evaluation of psychomotor development milestones of the WHO, by report or observation (Wijnhoven et al., 2004); children 6 months to 2 years old	WHO short battery of questions; example: if child can sit with head up straight, if child can crawl without dragging stomach on floor, etc.
	Subscales of fine and gross motor skills of <i>Ages and Stages test</i> , by parental report (Squires et al., 2009a); children up to 65 months old	Examples for children over 4: throwing a ball a certain distance, climbing ladder of a slide, standing on one foot, solving puzzles, or using scissors or buttons
	Daberon ProEd, by direct evaluation (Danzer et al., 1991); children over 3 years old	Daberon and Bayley III gather information directly by asking child to perform activities: insert small objects into larger ones, tear paper, organize blocks in certain positions, climb stairs, etc.
	Bayley III Early Development Scale, by direct evaluation (Bayley, 2005); children up to 30 months old	
Cognitive development on performance	Peabody Picture Vocabulary Test (PPVT; Padilla et al., 1986); children over 3 years old	Association between words mentioned by evaluator and images on evaluation cards
	<i>Woodcock-Muñoz Battery III School performance and achievement</i> (Muñoz-Sandoval et al., 2005); children over 3 years old	Measures intellectual skill, specific cognitive skills, scholastic aptitude, academic performance
	<i>Peabody Individual Achievement Test</i> (Markwardt, 1989) children over 3 years old	Evaluates areas of general knowledge, reading out loud, reading comprehension, mathematical concepts, recognition of letters, writing
	Bayley III Early Development Scale (Bayley, 2005); children under 30 months old	Includes sections on receptive and expressive verbal development and section on cognition; ~ 1.5 hours of evaluation
	Subscales of communication and problem resolution of <i>Ages and Stages test</i> (Squires et al., 2009); children up to 65 months old	Parental report test
Executive functions	Head, Toes, Knees and Shoulders (HTKS; Ponitz et al., 2009); children over 4 years old	Child must do the opposite of instructions received from the evaluator; measures capacity for inhibitory control, work memory, attention
	Pencil Touch (PTT; Luria, 1966); children over 4 years old	Child must do the opposite of instructions received from the evaluator; measures inhibition of first impulse
	Card Sorting (DCCS; Zelazo, 2006); children over 4 years old	Cards have two dimensions: figures and colors; children must sort cards by the two dimensions, simultaneously and individually
	Copy of design, for persistence and sustained attention; children over 4 years old	Children must copy 8 geometric figures without help from the evaluator in maximum of 2 attempts

Continued >

Dimension	Measures	Examples and comments
Socioemotional development	Socioemotional Ages and Stages (Squires et al., 2009); children up to 60 months old	Questionnaire by parental report that evaluates self-regulation, compliance, communication, adaptive function, autonomy, affection, interactions
	Strengths and Difficulties Questionnaire SDQ (Goodman, 1997); children/youth 3 to 16 years old	Behavior screening test. Identifies emotional symptoms, behavior problems, hyperactivity and lack of attention, problems relating to peers and prosocial behaviors based on 25 items; reported by primary caregiver or self-reported
	Child Behavior Checklist (CBCL; Achenbach and Rescorla, 2000); children/youth 2 to 18 years old	Inventory for detection of behavioral problems includes identification of attention deficit, hyperactivity disorders, challenging behaviors, depression, anxiety, phobias, other behaviors of children and youth; reported by primary caregiver or self-reported
Note. This list of instruments for valuation of the development of children and youth is not exhaustive and intends only to offer some examples of commonly used instruments for measuring dimensions of early development.		
Source. Authors' elaboration.		

LET'S GO TO SCHOOL: THE CONTRIBUTION OF EDUCATIONAL INSTITUTIONS

Chapter 3

Chapter 3

LET'S GO TO SCHOOL: THE CONTRIBUTION OF EDUCATIONAL INSTITUTIONS¹

“Educating is not teaching a youngster something that he did not know, but to make of him somebody that did not exist”.

John Ruskin

Sisters Tania and Guadalupe Castellano are 15 and 4 years old. They live in the suburbs of a large city, in a neighborhood of small, one-story houses among neighbors who have known each other their entire lives. The Castellanos attend a public school that is a 10-minute walk away, but Guadalupe always asks her older sister to carry her as soon as they set out. The same scene is repeated every day: Guadalupe cries in her sister’s arms because she wants to stay at home and play. Tania, on the other hand, goes happily to school —well, as happy as a teenager can be about sitting for so many hours in front of a blackboard— but it was not always so. Until the previous year, her grades were not good, she could not produce what her professors asked of her, and she did not feel comfortable with her classmates. She had even decided to leave school for a while and try to get a job in a store in her neighborhood. Every once in a while, somewhat ashamed of how she felt, Tania would shyly talk over her ideas with her literature teacher. But when her teacher delivered Tania’s final grade for the year (that was once again low), she overcame her shyness and burst out: “I don’t know why I have to learn all this!” And, paraphrasing some Greek philosopher that he had read when he was young, the teacher said to her: “Education helps a person learn to become all that she is capable of. What are you capable of, Tania?” Tania shrugged her shoulders and flitted her eyes from side to side, indicating that she did not have the slightest idea. Her teacher responded: “Well then stay here to find out.” In part prodded by her teacher, and just as much by the gloomy image of joining her group of friends who had dropped out of school and were already regretting it, Tania decided to try one more year. Now her schoolwork is improving little by little, and her daydreams are about what she can become. This morning on the way to school, to calm down her little sister’s crying, Tania talked to her about the Greek philosopher and about learning to become what we are capable of being. Guadalupe looked at her, astonished, and only managed to ask: “What is a Greek?” And then Tania got excited, explaining what she had learned in a history class about the ancient civilization and its wise philosophers.

Introduction

School is the institution that modern society has designed to impart skill formation in children and youth. However, its role has continuously changed and evolved to meet additional challenges society insists it must resolve.

1. The preparation of this chapter was the responsibility of Felipe Barrera-Osorio and Adriana Camacho and the research assistance of Maria Camila Rivera, Simon Borrero, Diego Martin, Cynthia Marchioni, and Julieta Vera.

During the last few decades, important increases in coverage rates alongside a persistently low quality of education have characterized Latin American educational systems.

During the past few decades, the educational systems in Latin America have been characterized by two main issues: important increases in coverage rates, so more students attend school, but a low quality of that education. Primary education has reached almost universal coverage, with sustained growth observed in coverage in secondary education, and in many countries the number of children attending educational institutions in early childhood has noticeably increased. The expansion in coverage at all basic educational levels has most notably affected children and youth from low-income and vulnerable populations, particularly in rural areas. In this way, educational systems are closing the gaps between families of different socioeconomic levels and urban and rural areas —contributing to the reduction of widespread inequality in Latin America.

That said, indicators on the quality of education in both secondary (international measures like the Program for International Student Assessment, PISA) and primary (regional measures like the Latin American Laboratory for Assessment of the Quality of Education, LLECE, from the Spanish name)) grades show poor results and very slow progress over time. Concern about the low quality of the services provided is especially important given that education in the first years of life affects all subsequent skill formation.

The reasons behind the low quality of education in Latin America are multiple. Some people may think that the greater presence of the vulnerable population in schools partially explains the low results or slow progress being made, as a larger number of socioeconomically vulnerable students can require greater pedagogical efforts, for example. This is because the quality and quantity of complementary educational inputs provided at home differ depending on the socioeconomic level of the families (see Chapter 2). However, the quality problem in education in Latin America goes far beyond the recent changes to serve a wider socioeconomic range of students. In some cases, there is a noteworthy lack of resources in the schools. But even when resources are present, institutions are seriously challenged in applying them to efficiently form skills.

However, the notion of quality education as derived from standardized academic performance tests is limited. Schools face the challenge of creating and transforming a wide range of physical, cognitive, and socioemotional skills that cannot be captured by test results. For example, educational institutions have a great potential to modify socioemotional skills, such as persistence, motivation, or empathy, which recent evidence (see Chapter 1) shows are closely related to labor results and general wellbeing in adulthood. However, as has been established in this report, skill generation is jointly accomplished by educational institutions, families, the social environment, and the labor market. Therefore, the possibility of promoting the development of a varied range of skills is maximized when educational institutions are appropriately complemented by the other skill formation environments.

The importance Latin American countries assign to educational institutions could be measured through the quantity of public resources invested in education. Although these resources have grown throughout the past few years, their impact on quality education has a limit. Once a certain level of

expenditures in education is reached, the additional resources have little possibility of modifying children's learning. But other educational reforms, such as those associated with the reorganization of institutions and pedagogy or with changes in teacher incentive systems could bring about deep and sustainable impacts on skill formation. For example, given that the schools' contribution to the development of children and youth depends critically on the quality of teachers, certain reforms could attract the best teachers and motivate them to the commendable task of potentiating human capital. In particular, education in the region would improve substantially with changes in the population of teachers, with better training—in pedagogy practices and subject knowledge—and an incentive system tied to improved student learning. That is, in teachers we find both the greatest bottlenecks and the greatest opportunities for the transformation of educational systems in Latin America.

This chapter has three general objectives. First, it will show the major education trends in the region, mainly in respect to expanded coverage and quality indicators. Second, it will discuss the skills that educational institutions may effectively produce or modify. Third, it will present evidence regarding the impacts of different educational policies on individuals' skill formation.

Today we know much better than we did a few decades ago the number of children with access to education. We also have more instruments to compare their performance on mathematics and reading tests. However, we still do not know how much socioemotional development children obtain from the school environment, or how we can help the school with the task of developing it. Similar holes exist in our knowledge about the physical development of children and youth. The time has come to extend both the study and analysis of these characteristics in the education system, as well as the quantity and type of public policies that help with the integral formation of skills that improve connections between the school with the family, the labor market, and the environment—in such a way that all cognitive, socioemotional, and physical development can be maximized.

General Characteristics and Recent Evolution of Latin America's Educational Systems

This section expands on four subjects that characterize the current situation and recent evolution of educational systems in Latin America. First, an analysis is made about both the increase in coverage and the closing of access gaps that has taken place at the different education levels. Second, it shows the challenges that exist today regarding quality in primary and secondary education, quantifies school dropouts, and analyzes the motivations for both dropping out and resuming studies. Third, the general aspects of teaching (namely structure of the career and salaries) in the region are analyzed, since teachers are understood to be the most important resource in the educational

Text Box 3.1 Definition of Basic Educational Levels and Legal Attendance Requirements

In the past few decades, several governments in Latin America have expanded the total number of years of mandatory education through various regulations. Table 1 presents information on this legislation. All countries included in the table have mandated the completion of secondary education. With respect to the age that children must begin school, the requirements vary. Several countries have mandatory education from 3 years of age, among them Ecuador, Mexico, Peru, and Venezuela. Others establish mandatory education as of 4 years of age, such as Argentina, Bolivia, Brazil, Costa Rica, El Salvador, Guatemala, Panama, and Uruguay. The rest of the countries, with the exception of Cuba, set the starting age at 5 years. Table 1 also reveals the starting age for educational levels differ marginally among countries, with the most differences centering on the age that education begins.

Table 1 Current Education Laws in Latin America

Country	Age																	Current education laws	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		17
Argentina																			Law 27045/15 (amendment of Law 26206/06)
Bolivia																			Law 070 (2010) "Ley de Educación Avelino Siñani - Elizardo Pérez"
Brazil																			Constitutional Amendment 59/2009
Chile																			Law 20710 (2013)
Colombia																			Law 1753 (2015) "Plan Nacional de Desarrollo 2014-2018"
Costa Rica																			Law 2160 (2001) "Ley Fundamental de Educación"
Cuba																			-
Ecuador																			Law "Ley Orgánica de Educación Superior" (2012)
El Salvador																			Article 82 "Ley de Protección Integral de la Niñez y Adolescencia (LEPINA)"
Guatemala																			Law 12-91 (2006) "Ley de Educación Nacional"
Honduras																			Article 8 of Decree 262/11 "Ley Fundamenta de Educación"
Mexico																			Art. 3 of Law "Ley General de Educación" (1993) (latest amendment 2017)
Nicaragua																			Law 582 (2006) "Ley Gen. de Educación" (latest reform Law 861 in 2014)
Panama																			Law 47 (1946) "Ley Orgánica de Educación" and amendments
Paraguay																			Law 4088/10
Peru																			Law 28044 (2003) "Ley General de Educación"
Dominican Republic																			Law 66-97 (1997) "Ley General de Educación"
Uruguay																			Law 18437/2008 "Ley General de Educación"
Venezuela																			Law G.O. 5929 (2009) "Ley Orgánica de Educación"

■ Early education/preschool/kindergarten ■ Primary education ■ Middle school or secondary Education ▨ Mandatory education

Source. Authors' elaboration based on national legislation and the Information System on Early Childhood - Information System on Educational Tendencies in Latin America.

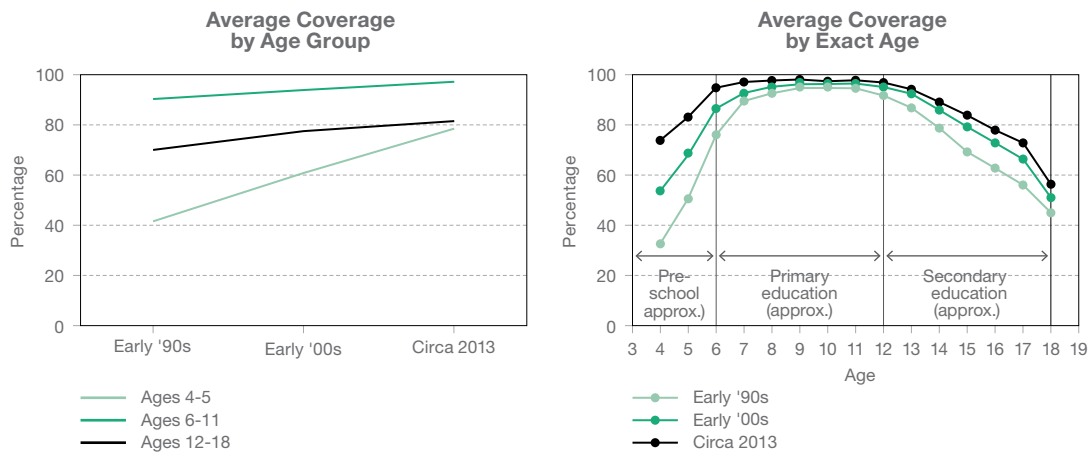
process. Finally, a quantitative analysis is made that attempts to determine the relative importance of all inputs in the formation of cognitive skills in the schools, both primary and secondary, in different countries of Latin America. This general diagnosis of the region's educational systems provides the necessary context for subsequent analysis on which public policies could be more useful in helping schools reach the objective of being truly instrumental in skill development for children and youth.

In the region, educational coverage has grown on average throughout the past 20 years at all educational levels, with preschool education having experienced the greatest growth.

Increased Educational Coverage Closing the Gaps

In the past few decades, the region's access to education has increased. Graph 3.1 presents educational coverage for three age groups within formal education: ages 4 and 5 (early or preschool education), ages 6 to 11 (primary education), and ages 12 to 18 (secondary education).² It should be noted that these ages are only approximations for what each country defines as the age ranges covered by early, primary, and secondary education, which are described in more detail in Text Box 3.1. Additionally, Text Box 3.1 analyzes the regulations on the obligatory nature of basic education, a policy that many countries have used to commit to universal educational services, thus extending coverage while reducing school dropout.

Graph 3.1 Latin America Average Educational Coverage in the Past 2 Decades



Note. The graph reports the average of the gross enrollment rate by age group (left) and exact age (right). The average gross enrollment rates are those available for the same group of countries at the following points in time: circa 1993 ("Early '90s"), circa 2003 ("Early 2000s"), and circa 2013 ("Circa 2013"). The countries used for gross enrollment at age 4 are: Argentina, Chile, El Salvador, Uruguay, and Venezuela; the countries for age 5 are: Argentina, Bolivia, Brazil, Chile, Costa Rica, El Salvador, Honduras, Mexico, Nicaragua, Panama, Uruguay, and Venezuela.

Source. Authors' elaboration based on data from Socio-Economic Database for Latin America and the Caribbean (SEDLAC; CEDLAS and World Bank, 2016).

2. It should be made clear that the graphs show the gross enrollment rates in the three educational levels, which is an imperfect indicator since, for example, a 12-year-old child who has repeated 1 year will be registered in primary not secondary school.

The left panel of Graph 3.1 (see p. 163) shows that the average coverage in education has grown throughout the past 20 years at all levels analyzed. The level with greatest progress is early education, with continuous growth both in the nineties and the first decade of 2000. The coverage rates in the ages covered by primary and secondary education have similarly grown, but while primary school is almost universal, secondary school is not. Moreover, the panel on the right shows that average coverage rates by age groups conceal certain differences for each specific age level, which is conspicuous in the cases of secondary education and for the early education. As will be seen later in the chapter, the problem of school dropout begins in secondary school, generally around age 14 or 15. As a consequence, the average coverage for ages that go from 12 to 17 mixes high enrollment rates at ages 12 or 13, with attendance rates substantially lower toward ages 16 or 17. In the case of early education, coverage is high at age 5 years and significantly lower at 4 years of age. Data on gross enrollment rates at age 3 were not comparable across countries so are not reported.

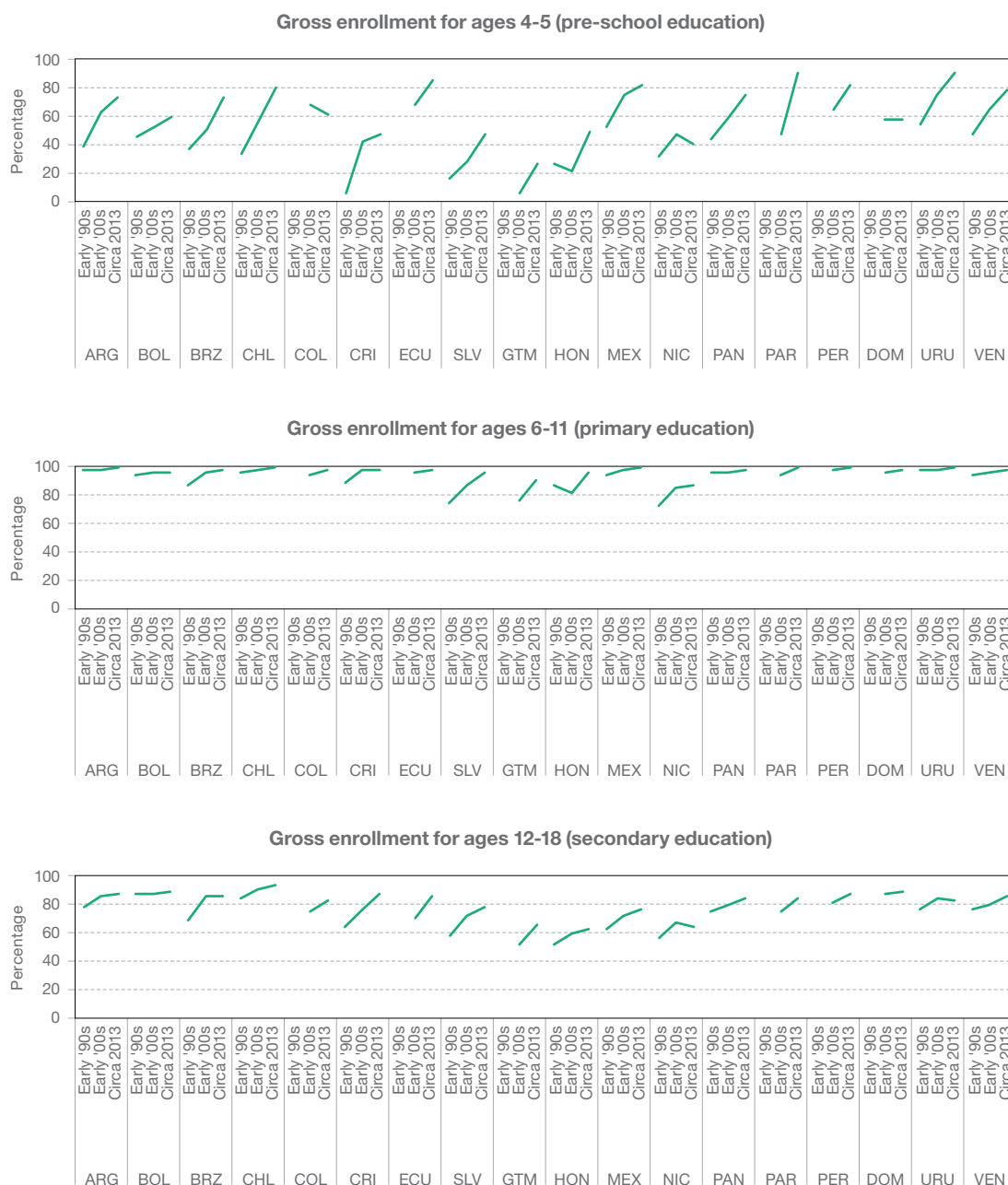
A detailed review of the data by country (see Graph 3.2) indicates that the average coverage levels differ between countries, both in their levels and their evolution in the past 2 decades. Although almost all the countries have increased coverage for the ages corresponding to early education, the changes have not occurred at the same pace. The Central American countries have made the greatest advances in coverage from ages 6 to 11, which had the lowest coverage rates at the beginning of the nineties; for this reason, we can talk about a regional convergence in respect to gross enrollment rates in primary education. Additionally, Graph 3.2 shows coverage in ages 12 to 18, indicating that almost all countries have achieved higher enrollment rates, though many had higher growth rates in the nineties than in the last decade.³

The evolution of educational coverage for a more extensive period may be analyzed based on data collected for the 2015 CAF Survey. This survey collects information on the educational levels reached not only by those interviewed but also by their parents, so the 2015 CAF Survey allows for an analysis of educational mobility between generations.⁴

3. Similar conclusions are reached by Bassi et al. (2015), who analyze the enrollment, graduation, and school dropout rates for 18 countries of Latin America between 1990 and 2010. This study finds that the enrollment and graduation rates have increased and school dropout has decreased, all of which has occurred because of the active supply and demand policies to retain students within educational institutions.

4. This measure combines two factors: the changes in educational coverage over time and the association between educational levels that people within one family achieve. That is, it is a measure that possibly captures expansions in educational coverage in the general population as well as changes in persistence between parents and children to invest (regardless of educational inputs) in years of education.

Graph 3.2 Educational Coverage by Age Group in Latin American Countries in the Past 2 Decades



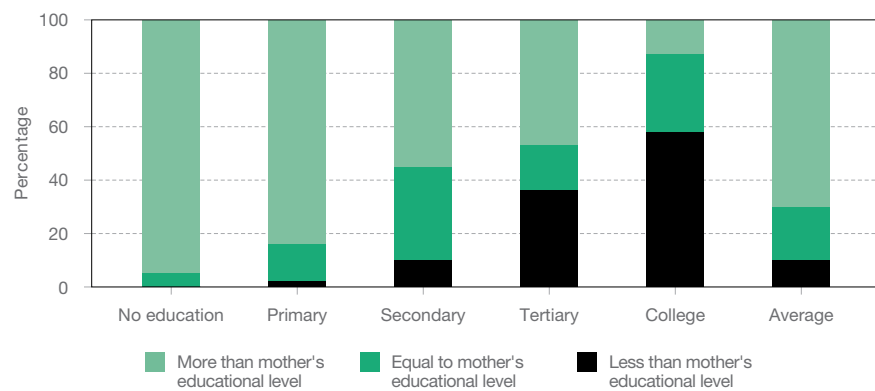
Note. Gross enrollment rates are reported by age group for the following countries and years: Argentina (1993, 2003, and 2013), Bolivia (2002 and 2013), Brazil (2002 and 2013), Chile (1992, 2003, and 2013), Colombia (2003 and 2013), Costa Rica (2003 and 2013), the Dominican Republic (2003 and 2013), Ecuador (2003 and 2013), El Salvador (2002 and 2013), Guatemala (2000 and 2011), Honduras (2003 and 2013), Mexico (2002 and 2012), Nicaragua (1993, 2001, and 2009), Panama (2003 and 2013), Paraguay (2003 and 2013), Peru (2003 and 2013), Uruguay (1992, 2003, and 2013), and Venezuela (1992, 2003, and 2011).

Source. Authors' elaboration based on data from SEDLAC (CEDLAS and World Bank, 2016).

According to the CAF Survey, 95% of people whose mothers had no education have completed at least one educational level, while 70% of the population in general surpassed their mother's educational level.

Intergenerational mobility was calculated taking into account the educational level obtained by the mothers of those surveyed and is reported in Graph 3.3.⁵ These data highlight an important achievement in Latin America: the drastic reduction of people without education between one generation and the next. Specifically, 95% of people whose mothers had no education have completed at least one educational level. The data also indicate that 70% of all those surveyed achieved a higher educational level than their mothers.

Graph 3.3 Intergenerational Mobility in Education for People from 25 to 55 Years of Age in 10 Latin American Cities



Note. The graph reports the proportion of people ages 25 to 55 who achieved a lower, equal, or higher educational level than their mothers. The 10 cities included in the 2015 CAF Survey are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

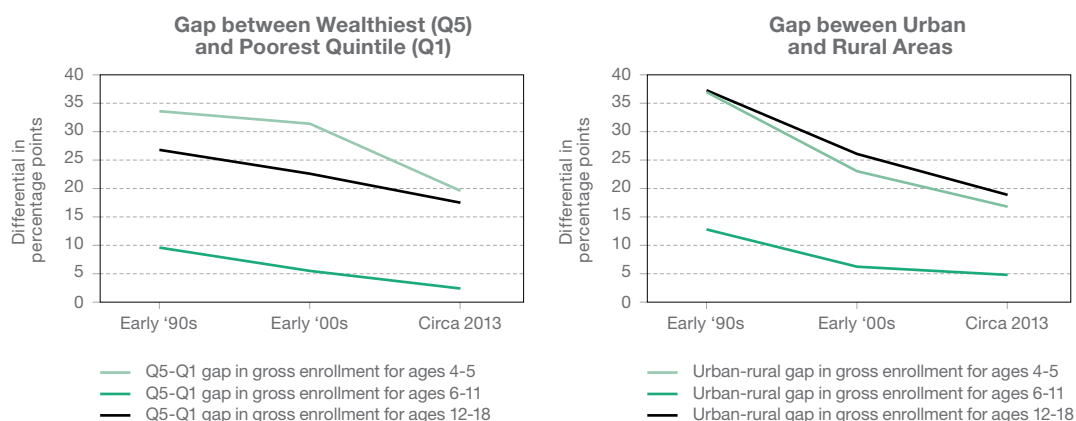
To sum up, access to education has increased significantly in the past few decades for most school levels, and this has also been the case between generations. In addition, the educational aspirations of the people seem to have increased, since according to the 2015 CAF Survey, close to 40% of the people currently registered in formal education expect to obtain a graduate degree in higher education (specialization, master's, or PhD).

An important aspect of the expansion of coverage is that it has been achieved while closing access gaps by income quintiles and by regions, although differences exist between countries. For example, Brazil, El Salvador, Guatemala, and Nicaragua seem to have closed socioeconomic gaps in primary education access, while the other countries already had low gaps and this level that did not

5. These educational levels from lowest to highest are secondary education, technical degree, college degree, specialization, and master's degree. For example, increasing two educational levels means that a person with primary education becomes a technician, one with secondary finishes college, or a technician gets a specialization or master's degree.

further reduce. In the case of secondary education, important reductions took place in Chile, Ecuador, Mexico, Panama, and Peru. The left panel of Graph 3.4 presents the evolution of the average coverage gaps, defined as the differential in percentage points of gross enrollment rates for the wealthiest quintile and the poorest quintile. Positive values of this gap indicate that coverage in the wealthiest quintile is higher than in the poorest quintile, and the wider the gap, the greater the coverage according to the families' income level. In general, the three age groups associated with the three basic educational levels show a reduction of socioeconomic gaps in the past 2 decades, with early education (ages 4 and 5) showing even more equaling out since the beginning of the 2000s. This educational level also closed gaps in higher quantities, and currently the coverage differential between the wealthiest quintile and the poorest one is as large as the differential for secondary education (ages 12 to 18).

Graph 3.4 Educational Coverage Differentials for Different Age Groups by Household Income and Urban-Rural Area in Latin America



Note. The graph uses comparable data for each age group and for countries with data available at the three points in time: circa 1993 ("Early '90s"), circa 2003 ("Early '00s"), and circa 2013 ("Circa 2013"). The graph on the left reports the average differences (in percentage points) between the gross enrollment rates in the wealthiest quintile (quintile 5) and the poorest quintile (quintile 1) of each country's income distribution. The averages include the following countries: Argentina, Bolivia, Brazil, Chile, Costa Rica, El Salvador, Honduras, Mexico, Panama, Uruguay, and Venezuela. The graph on the right reports the average differences (in percentage points) between the gross enrollment rates in urban and rural areas within each country. The averages are from the following countries: Brazil, Chile, Costa Rica, Honduras, Mexico, Nicaragua, Panama, and Venezuela.

Source. Authors' elaboration based on data from SEDLAC (CEDLAS and World Bank, 2016).

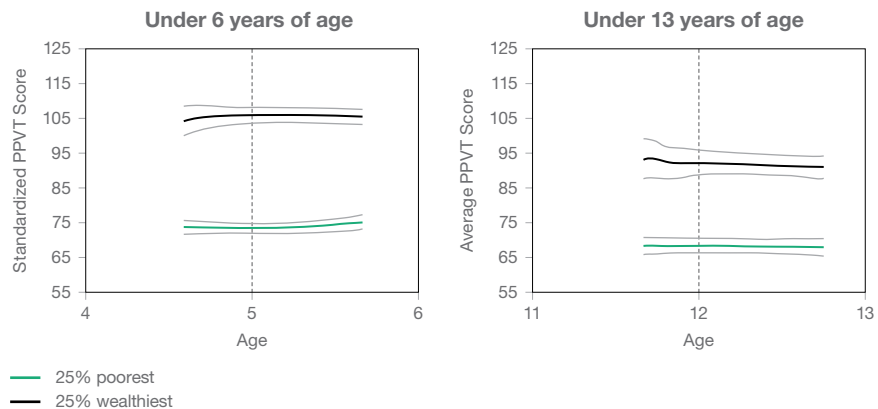
The panel on the right of Graph 3.4 shows that the reduction in gaps has not only taken place by income quintiles, but also between urban and rural areas. In the latter case, the gaps drop more for the early and secondary education levels, with these coverage gaps dropping from around 25 percentage points to close to 10 percentage points. This analysis shows that in the past 2 decades, a convergence in access to education has occurred at all three levels, with an expansion of coverage that has most benefited children and youth from less privileged backgrounds.

In the past 2 decades there has been convergence in access to education, benefiting relatively more children and youth who come from less privileged backgrounds.

This increase in coverage for more vulnerable populations raises a question about the skills that children have when they enter educational institutions. Schady et al. (2015) analyze the situation of the children's early cognitive development, measured by the vocabulary test Peabody Picture Vocabulary Test (PPVT),⁶ for five countries: Chile, Colombia, Ecuador, Nicaragua, and Peru. Some of the evidence collected in this study is shown in Chapter 2, which discusses the level of cognitive development reached by age 5, taking into account the family's wealth and the area where they live (urban or rural). In this chapter, similar data are used for Peru and Colombia to extend the analysis of the standardized PPVT score⁷ to children above age 6 as a means of understanding how basic education (in particular, primary) affects these cognitive gaps among students of different socioeconomic backgrounds.

In Graph 3.5, the panel on the left shows a comparison between the level of cognitive verbal skills of children from poor families and wealthy families, around the age they enter primary school (around age 6) with data for Peru. The panel on the right repeats the comparison for children around age 12. The conclusion is that the cognitive gaps by socioeconomic level persist after going through primary education and only close slightly, with the decrease being due to a drop in the measure of verbal capacities of the children from wealthier families.

Graph 3.5 Cognitive Development of Children from 4 to 6 and from 11 to 13 Years of Age by Household Income in Peru (PPVT Score)



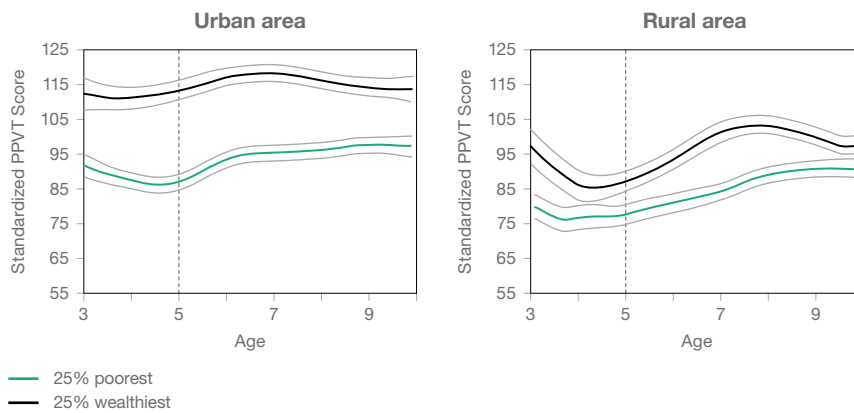
Note. This information is based on the Young Lives (Peru) study, so data for intermediate ages cannot be constructed because of the sample design. The data correspond to average results on the PPVT, by income quartile, according to the age at which the child took the test. The gray lines represent the 95% confidence intervals. The graph on the left shows the results for children from ages 4 to 6, while the right shows results for children from ages 11 to 13.

Source. Authors' elaboration using data from the Young Lives (Peru).

6. See Appendix A 2.1 in Chapter 2.

7. Both in the case of Peru and of Colombia, the PPVT tests are standardized based on the tables produced for the Mexican population, following the same methodology of Schady et al. (2015).

Graph 3.6 Cognitive Development of Children from 3 to 10 Years of Age in Urban and Rural Areas of Colombia (PPVT score)



Note. The data correspond to the average of the PPVT results by family income quartile and area (urban or rural). The gray lines represent the 95% confidence intervals.

Source. Authors' elaboration based on the ELCA (ELCA, 2010).

Graph 3.6 presents similar results for Colombia, based on data from the Colombian Longitudinal Survey of the University of Los Andes (ELCA, from the Spanish name). The results of cognitive tests for children from ages 3 to 10 are presented, according to wealth quartiles in urban and rural areas (on the left and right, respectively). Unlike in Peru, the data from Colombia indicate that the socioeconomic and rural-urban gaps seem to get smaller during primary schooling, around ages 9 or 10.

In both Colombia and Peru, the skill differential observed around age 6 between children of different socioeconomic backgrounds is not completely offset by the years spent in primary education.

In conclusion, the data show an increase in general coverage in the region (a lower rise for primary education, which already had high preexisting coverage), with high access for the vulnerable sectors of the population, from which the students, on average, begin primary school with lower cognitive development. This dichotomy reflects the significant achievements as well as the significant challenges for educational institutions, which must adapt and innovate in their use of pedagogical resources to take care of the new reality of this student population. To this issue we add two more commonly known problems: low quality of primary and secondary education and school dropout.

Latin America scores about 100 points less than the OECD countries on PISA tests, a difference that is associated with almost 2 percentage points less annual GDP growth.

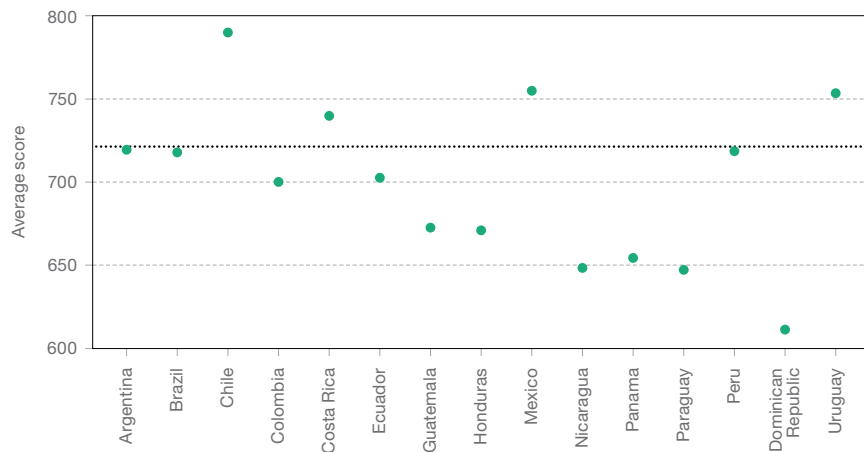
The Challenges of School Quality and School Dropout

This section reviews achievements in terms of results on standardized tests as approximations for the development of students' cognitive skills.⁸ These tests capture what is usually understood as educational quality and will be analyzed through comparable tests between countries, both for the primary level (third and sixth grades, LLECE tests) and the secondary level (students age 15, PISA tests).

To address the quality of early education services, a section on early childhood programs appears later in this chapter and discusses recent evidence (albeit scarce) for the region. This discussion shows emerging evidence about worrying patterns with quality in this educational level that deserves further study.

Graph 3.7 presents the results of the Third Regional Comparative and Explanatory Study (TERCE, from the Spanish name) tests for children in the third and the sixth grades in 2013. Chile has the best performance on the tests, followed by Costa Rica, Mexico, and Uruguay. The countries below the median (dotted line) on this test are Paraguay and the countries of the Caribbean and Central America.

Graph 3.7 Quality of Primary Education Measured by TERCE Scores in Mathematics in Selected Latin American Countries



Note. The graph reports the average score on the mathematics test for grades 3 and 5 of each country. The dotted line is the average for all countries.

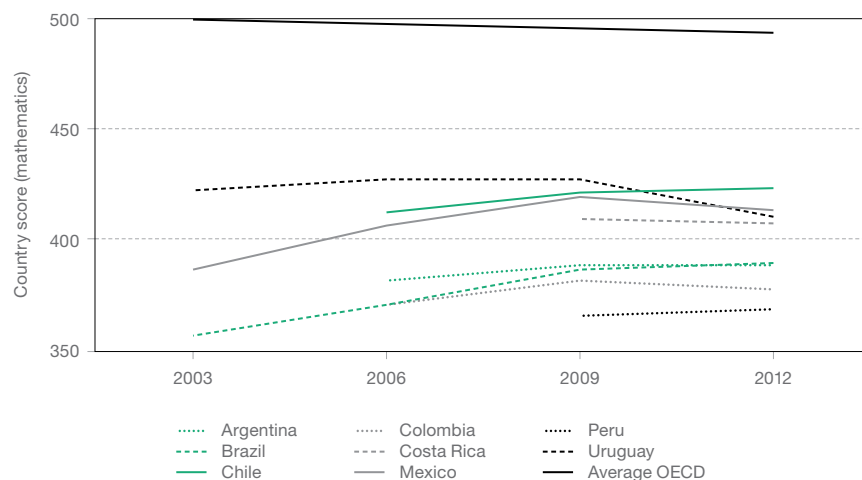
Source. Authors' elaboration based on TERCE (2013).

8. In Chapter 1, the advantages and disadvantages of the use of standardized performance tests to measure cognitive skills are discussed.

Graph 3.8 uses the results of PISA in math tests for several countries of the region in the years 2003, 2006, 2009, and 2012. All countries in Latin America have lower achievement than the average score of the Organisation for Economic Co-operation and Development (OECD) countries. In the most recent year, Chile had the best scores in the region and Peru had the lowest. On average, Latin America obtains around 100 points less than the OECD countries in these tests, a difference that, according to estimates by Hanushek and Woessmann (2012a), is associated with close to 2 percentage points less annual GDP growth in the long term. This difference of 100 points can also be considered as what is learned in approximately 2 years of formal education, so that 15-year-old students in the region would have roughly the same achievement as their peers of around 13 years of age in more developed regions. Similarly, a study prepared especially for this report (Marchionni and Vazquez, 2015) calculated the contribution of an additional year of secondary education to the PISA scores in mathematics for several countries of the region⁹ and obtained values of around 50 points for Brazil and Uruguay.¹⁰

It is important to emphasize that throughout the four rounds of the PISA tests, no major improvement in performance is observed for countries in the region. On the other hand, the order of countries' average scores on the PISA and TERCE tests is very similar.

Graph 3.8 Quality of Secondary Education Quality by PISA Scores in Mathematics for Selected Latin American Countries and the OECD Average



Note. The graph reports the average score on the PISA tests of mathematics in 2003, 2006, 2009, and 2012.

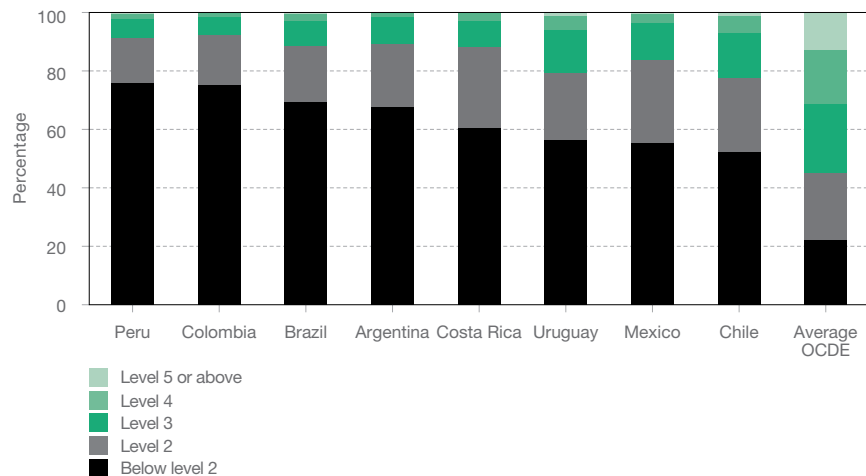
Source. Authors' elaboration based on PISA (OECD, 2003, 2006, 2009, and 2012).

9. Marchionni and Vazquez (2015) explore the exogenous variation in the exposure to years of education provided by the rules of disallowing entry to formal education according to students' date of birth, which is used to obtain results sought through a discontinuity regression model.

10. For other countries, the values of this contribution of one year of additional education are lower: 36 points for Mexico, 21 for Costa Rica, 28 for Colombia and Peru, 8 for Chile, and 4 for Argentina.

The above refers to the average score per country, but it is also important to better understand the distribution of scores, specifically the heterogeneity or inequality of results between the students. For this purpose, an analysis is made on the percentage of students who did not reach the second level¹¹ of performance on PISA in 2012, which is usually thought of as the minimum level required to operate in a modern society using the cognitive capacities of reasoning and information processing that are essential for daily life. According to what Graph 3.9 shows, the fraction of students who do not reach those standards in most countries in Latin America is dramatically high. For example, in Peru and Colombia, 3 out of every 4 students who are 15 years of age do not reach the standard, while this figure is only of 1 in every 5 students for OECD countries (excluding Chile and Mexico from the calculation). Another important point shown in Graph 3.9 is the practically nonexistent fraction of students in the region with very high performance (level 5 or more), while 13% of OECD youth reach that level.

Graph 3.9 Distribution of Students According to Performance Levels on the PISA 2012 Test in Mathematics for Selected Latin American Countries and the OECD Average



Note. The OECD average is calculated excluding Chile and Mexico. The PISA test has six performance levels, defined by certain cutoff thresholds in the scores. Level 6 is the highest level. The graph shows Latin American countries and the OECD average ordered according to the percentage of students with low achievement (below level 2).

Source. Authors' elaboration based on data from PISA (OECD, 2012).

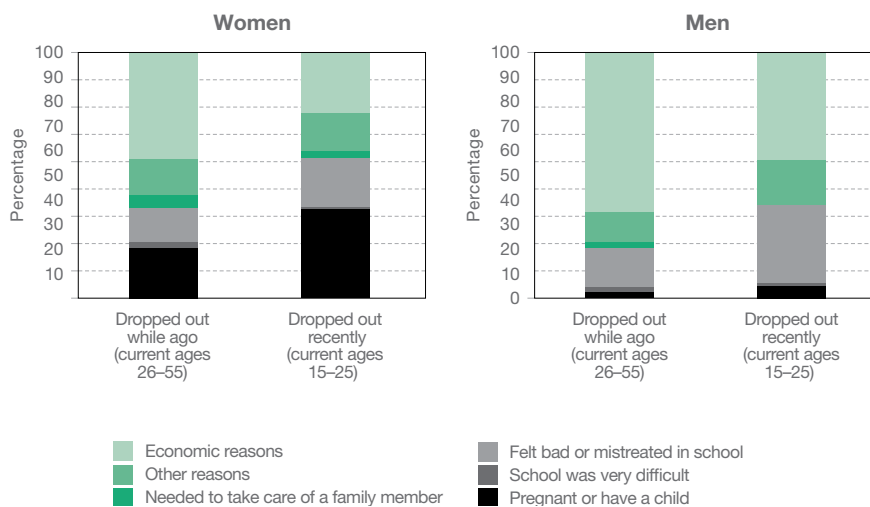
11. There are six levels associated with PISA scores. Levels 5 and 6 refer to students who have the potential for doing complex activities that require a high level of cognitive skills. Levels 3 and 4 refer to students above the minimum standards but who lack the necessary skills to perform complex cognitive activities. Level 2 is for students who have the minimum level of skills necessary to develop in contemporary society. Level 1 and below are geared to students with insufficient performance who lack the abilities to access higher education and adequately perform the activities that daily life in this society implies.

One of the possible consequences of the low academic achievement is school dropout. It is possible that successive academic failures discourage youth to continue making the effort to attend school daily. However, the reasons for early abandonment may be of another nature, and include events such as having a child, looking for a job when economic hardship affects the family, or having to take care of their children, younger siblings, or older people or family members with some kind of disability. In addition, some labor markets offer attractive salaries even to people who have not completed their secondary education, and for this reason the net profitability of completing secondary education may be negative.

For women, the most important reasons for dropping out of school used to be economic but now are related to pregnancy. For men the importance of bullying increased.

The CAF Survey 2015 shows the reasons why individuals (between ages 15 and 55 years at the time of the survey) dropped out and are currently not registered at an educational institution (see Graph 3.10). The reasons reported vary as much between men and women as they do between people who are now adults and those who are still youths. The most important reasons for women went from being economic to be those related to becoming pregnant or having a child. Although 43% of women who dropped out some time ago named the reason as economic, only 25% of those who dropped out recently gave that reason. For younger women, the most important reason behind school dropout was becoming pregnant or having children (36% of the cases). By contrast, younger and older men list economic reasons as the cause of dropping out. That said, the incidence of males dropping out because of bullying has increased, as the percentage of men who dropped out because they felt bad of mistreated at school went from 16 to 32.

Graph 3.10 Reasons Women and Men Dropped Out of School in 10 Latin American Cities



Note. Data is from the 10 cities where the 2015 CAF Survey was conducted, which are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration based on data from the 2015 CAF Survey.

Although the reasons for school dropout are varied so prevention strategies must be as well, the bottom line is that school dropout can leave a high percentage of youth struggling to enter the labor market. In addition, those who drop out and do not attend training or further education (Not in Education, Employment, or Training [NEET]) are separated from two institutions that are widely used by the state to channel the necessary investments to continue accumulating skills during adolescence and into adulthood.¹²

Table 3.1 Early School Dropouts in Selected Latin American Countries

Country	Year (most recent data)	Age at which consecutive drops in gross enrollment rate begin	First age with drop higher than 5 percentage points	Gross enrollment at 17 years of age		
				Total population at this age (%)	Poorest quintile (%)	Wealthiest quintile (%)
Argentina	2013	13	16	80.4	69.4	96.7
Bolivia	2013	15	15	84.9	72.5	90.1
Brasil	2013	13	16	81	72.3	94.3
Chile	2013	14	-	91.4	88.8	97.5
Colombia	2013	12	12	78.7	73.3	93.3
Costa Rica	2013	13	16	79.2	65.7	97.4
Ecuador	2013	13	17	77.4	72.3	90.4
El Salvador	2013	12	15	66.9	50.3	84.2
Guatemala	2011	11	13	48.8	28.9	75.7
Honduras	2013	12	13	46.1	20.2	70
Mexico	2012	12	14	63.5	52.3	75.7
Nicaragua	2009	12	13	51.6	38.2	72.6
Panama	2013	12	16	76.6	60.5	96.6
Paraguay	2013	12	14	75.1	62.9	94.2
Peru	2013	12	-	89.8	82.7	95.6
Dominican Republic	2013	15	16	87.8	84	94.7
Uruguay	2013	12	15	71.8	54.9	96.2
Venezuela	2011	13	15	81.6	73.7	88.6

Source. Authors' elaboration based on data from SEDLAC (CEDLAS and World Bank, 2016).

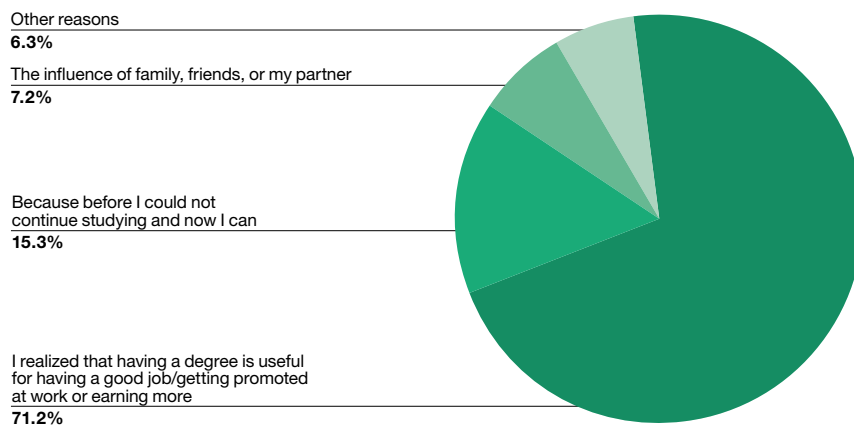
Table 3.1 shows the extent of this problem in Latin America, revealing a worrying situation. School dropout starts as early as 11 year of ages in some countries (Guatemala) and gains strength between 13 and 15 years of age in most other countries. Around 17 years of age, the gross enrollment rate is only about 50% for countries such as Honduras, El Salvador, and Nicaragua, and great gaps of school

12. See Chapter 1 for a more detailed analysis on the phenomenon of youth who are not employed and not attending school (NEET).

dropout appear by socioeconomic level. For the countries of South America, the youth of the wealthiest quintile have enrollment rates 30% higher than their peers in the poorest quintile (with the noteworthy exception of Chile, where the gap is just 10%). In the countries of Central America, the gaps are huge, as is the case in Honduras, where while 70% of teenagers from the wealthiest quintile are attending school, only 20% of the poorest quintile are.

On the other hand, the 2015 CAF Survey also indicates why those who quit school would like to return (Graph 3.11). A high percentage of those surveyed said they wish to return to formal education because they realized that a degree is important for finding a good job or being promoted and earning more money (71%), while others want to return because they were previously not in a position to study but now they are (15%) or because of family influence (7%). These reasons show the importance that information from the labor market has on the desirability of having a degree, which is in line with the high impacts found for certain policies focused on informing youth (before they drop out) about returns to education (Jensen, 2010).

Graph 3.11 Reasons Youth from 15 to 25 Years of Age Want to Return to School after Having Dropped Out in 10 Latin American Cities



Note. Data is from the 10 cities where the 2015 CAF Survey was conducted, which are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration based on data from the 2015 CAF Survey.

General Characteristics of the Teaching Career

Recent research for Latin America shows that teachers have an essential role to play now that there are higher enrollment rates and more students from low-income households in educational institutions (for example, see Araujo et al.,

Each country's system for promoting teachers has important effects on their incentives.

2014; Bruns and Luque, 2014). The opinions of parents agree with this evidence according to data from the 2015 CAF Survey: 51% of parents consider that the most important factor in their children's educational performance is the quality of teachers, followed by study habits (22% of the cases), educational infrastructure (11.7%), and extracurricular activities and study with classmates.¹³

Three critical points in teacher policies shape the teaching career: selection, training and support, and promotion (Bruns and Luque, 2014; Vegas and Ganimian, 2013). In general terms, it is critical to choose people who are self-motivated and prepared for teaching, and that, once in the formation phase, have a rigorous training. Studies indicate that when teachers first take a job, they should have a trial period of around 3 or 4 years that would allow the institution to take advantage of the opportunity to improve the teachers' learning curve. In addition, this period could reveal which teachers stand out for their exemplary performance, and use this information to secure their retention in the system. Another important aspect addressed in the current literature is the importance of remunerating teachers well and promoting learning opportunities through interactions with peers and at the workplace (Bruns and Luque, 2014; World Bank, 2013).

Each country's system for promoting teachers has important effects on their incentives. At the beginning of this century, most countries had promotion systems based largely on seniority and/or experience. Therefore, the determination of salaries was not tied to the teacher's performance (UNESCO, 2007). During the past 2 decades, some countries have undertaken major reforms to link promotion and salaries to performance (Bruns and Luque 2014; Rivas, 2015). The most significant reforms have taken place in Colombia, Ecuador, Mexico, Peru, and the State of Sao Paulo (Brazil). All these reforms are aimed at two objectives: decompressing the range of salaries and tying them to performance measures (Bruns and Luque, 2014). The latter are constructed based on direct tests of the teacher, classroom observation, perception of the school's director, and reports that the teachers themselves prepare. In addition to a reform in the teaching career, Chile implemented reforms on school bonuses tied to the performance of the entire student body (Bruns and Luque, 2014). In Colombia, the new teaching code connects promotion to content and pedagogy examinations to teachers. What little evidence exists on the impact of these reforms shows mixed results.¹⁴ The consensus is that there is still considerable room to link promotion and salaries with performance (Bruns and Luque, 2014; Rivas 2015).

By looking at comparable data, it is possible to understand more about the incentive system behind teachers' wages. For example, the relationship between the maximum wage and the entry-level wage is an indicator of the capacity to grow and progress within the teaching career. OECD data¹⁵ show that wages in

13. For those parents who are also teachers, the perception on the factors that affect performance are similar, with teacher quality in the first place of importance (in 58% of the cases).

14. For the case of Colombia, see Ome (2012). For Chile, see Eisenber (2008), and for Mexico, Santibañez et al. (2007).

15. OECD (2016), "Teachers' salaries (indicator)." Accessed on January 27, 2016.

Mexico, Chile, Uruguay, and Argentina can grow up to 2.1, 1.8, 1.7, and 1.6 times, respectively, so teachers in Mexico may double their wage during their career. In other countries, such as Peru, the ratio is considerably lower. To understand better whether these figures are low or high, they may be compared with a similar ratio for employees of national public administrations of several countries in Latin America. For example, for occupations classified as professional, this ratio is 5.5:1 in Colombia, 4.3:1 in Argentina, or 2.9:1 in Chile. For public positions classified as technical, the ratios are 2.4:1 for Colombia, 4.2:1 in Argentina, and a little over 1 to 1 for Chile (CAF, 2015). As such, the possibility for teachers to progress in terms of salary seems small when compared to other public employment. Other relevant economic indicators give further insight into wages throughout the teaching career. For example, it is possible to calculate the ratio of teachers' wages with 15 years of experience in respect to the GDP per capital of each country. Mexico, Colombia, and Chile have an indicator of 1.78, 1.6 and 1.3 to 1, respectively. However, Argentina and Uruguay have an indicator of 0.8 to 1 and Peru's is 0.9, which may indicate that the being a teacher is not very attractive in these countries.¹⁶ When the wages are relatively low in respect to other professions or when the growth of wages is flat throughout the career as teacher, the quality of professionals who will self-select to these occupation —“negative” self-selection— may be low (CAF, 2015).

In conclusion, educational systems do not tie teachers' wages to their performance, teachers' pay is relatively low, and teachers can expect little growth throughout their careers. These reasons may explain the educational sector's inability to attract the best students into the profession. In addition, it is evident that this remuneration structure gives poor incentives to applying greater effort that will lead to a better quality education.

Other Important Inputs for Skill Formation

In order to analyze the formation of cognitive skills, both in primary and in secondary schools, this section uses data from educational inputs¹⁷ and relates them to the results of standardized mathematics tests,¹⁸ namely TERCE and PISA 2012 tests (for primary and secondary schools, respectively). This analysis seeks to identify the relative importance of several groups of inputs that affect the development of cognitive skills. It is important to mention that these relations are not causal because, for example, the various correlations may indicate relations that actually go in the opposite direction (the result drives the input), or because important inputs may be omitted. Either way, these correlations show general and informative associations on the production of results on standardized tests.

16. However, it should be mentioned that these ratios are in general higher than those of the OECD average (which is 1.24).

17. The data to quantify the inputs come from the surveys accompanying the standardized tests, from which the results of academic performance are obtained (TERCE and PISA 2012). Those surveys are answered both by the students themselves, and, in certain cases, by teachers, family members, and/or directors of educational institutions.

18. The results found for sciences and languages are very similar to those of mathematics.

Table 3.2 Relationship between Educational Inputs and Primary (TERCE) and Secondary (PISA 2012) Tests Scores

Educational inputs		Primary		Secondary	
Types of inputs	Inputs	Average	Correlation with mathematics score ^{a/}	Average	Correlation with mathematics score ^{a/}
Investments prior to primary and secondary education	Attended preschool education	83%	+	88%	+
	Repeated a grade	22%	-	24%	-
Characteristics of teachers	Teacher frequently absent ^{b/}	46%	-	25%	-
	Teacher's experience (in years)	15.6	+	n.a.	n.a.
	Teachers well prepared for classes ^{c/}	n.a.	n.a.	22%	+
	Principal's experience (in years)	9.0	(not significant)	n.a.	n.a.
Time dedicated to study at home and at school	Absent from classes in month of reference	27%	-	19%	-
	School day more than 6 hours	37%	-	59%	+
	Study less than 30 minutes a day at home	69%	+	62%	+
Physical infrastructure and school capacity	Internet at school	74%	+	72%	-
	Computer room at school	67%	-	73%	+
	Library at school	69%	+	72%	+
	Number of school seats per student	84%	(not significant)	n.a.	n.a.
	Student-teacher ratio	n.a.	n.a.	24.9	-
Physical inputs at home	Household wealth (in deciles) ^{d/}	3.3	+	5.5	+
	Internet at home	33%	+	68%	-
	Computer at home	44%	+	72%	+
	Books at home	91%	+	78%	+
Sociodemographic characteristics of student and parents	Public school	83%	-	81%	-
	Father completed only primary	54%	omitted	27%	omitted
	Mother completed only primary	52%	omitted	26%	omitted
	Father completed only secondary	28%	(not significant)	41%	+
	Mother completed only secondary	30%	(not significant)	42%	+
	Father completed tertiary	18%	+	33%	+
	Mother completed tertiary	18%	+	32%	+
	Female	49%	-	52%	-
	Age (years)	11.0	(not significant)	15.8	+

Note: The abbreviation n.a. means not available.

a/ These signs result from an ordinary least squares regression, where the dependent variable is the TERCE or PISA score and all inputs listed are independent variables.

b/ Takes the value of 1 if teachers are absent "Sometimes" or "Always or almost always", and 0 otherwise. Results reported by the students in primary (TERCE) and by the principal in secondary (PISA).

c/ Takes the value of 1 if teachers arrive to classes "Poorly or not prepared" or "Slightly poorly prepared", and 0 otherwise. Reported by the school principal.

d/ For TERCE (primary), household income deciles are self-reported so the average could differ from 5.5 (the media if each decile effectively accumulates 10% of the population). For PISA, deciles are not self-reported so they are constructed based on wealth distribution within each country's sample.

Source. Authors' elaboration based on data from TERCE and PISA (OECD, 2012).

A key assumption in this analysis is that cognitive skills are determined by a series of inputs organized in six large groups:¹⁹ investments prior to primary and secondary education, characteristics of teachers, time dedicated to studying at home and at school, physical infrastructure and crowding within the educational institution, physical inputs provided at home (which complement inputs provided by the school), and sociodemographic characteristics of students and their parents. Table 3.2 shows this classification by groups of inputs (first column) with the measures included (second column). The third and fifth columns of Table 3.2 report the median of each variable for the case of primary secondary education (using data from TERCE and PISA 2012, respectively). Table 3.2 also reports the (positive and negative) signs that indicate the direction of the correlation between each variable and the results on standardized tests for both educational levels.²⁰

Twenty-two percent of students in primary and 24% of those of secondary have repeated a grade at least once.

The first group corresponds to investments that form skills which are previous to the year or educational level in question, such as early education attendance or having repeated any grade previously, and affect the current level of skill formation (see Chapter 1). On average, over 80% of children and youth included in the analysis have attended some form of preschool education. In addition, the grade repetition rate for primary students is 22% and for secondary is 24%. A positive correlation is revealed between having attended preschool education and test scores and a negative correlation is found between those results and having repeated some grade. Text Box 3.2 (see p. 181) focuses more on the discussion of the effects that grade repetition may have on the educational results of students.

The characteristics of teachers are approximated through their regular attendance at classes and their experience as teachers. On average, teachers are frequently absent from class: 46% in primary schools and 25% in secondary. Also, primary teachers have an average of 15 years' experience. The experience level of secondary teachers is constructed using data from the school principal or director, and these data reveal that 22% of teachers are well prepared to teach classes. Additionally, TERCE data reveal that the principal or director of the educational institution has on average around 9 years of experience. It should be emphasized that, as can be expected, the nonattendance of teachers is negatively associated with the results on the test, while more teaching experience is positively associated.

A third input within the production of cognitive skills is the amount of hours spent studying or within the educational institution. In these cases, the time that each student dedicates to studying both at home and in the educational institution is taken as input, as is school attendance. On average, 27% and 19% of the primary and secondary students, respectively, were absent from school at least once in

19. The cognitive skills production function for the individual i that attends the institution e at moment t , is given by the following equation: $y_{iet} = f(y_{ie0}, p_{iet}, T_{iet}, l_{iet}, h_{iet}, X_{iet})$. Where y_{ie0} corresponds to the previous investments in skills that currently determine skill formation, p_{iet} are the inputs that denote the quality of the professor, T_{iet} corresponds to time inputs, and l_{iet} corresponds to physical inputs such as infrastructure, physical resources, and crowding within the educational institution; the vector h_{iet} includes the inputs of the home that complement the inputs provided by the educational institution, and X_{iet} is the sociodemographic characteristics of the student and the parents.

20. These signs were obtained from an ordinary least squares regression, where the dependent variable is the TERCE or PISA score and all other listed elements are the independent variables.

the past month. In respect to study hours, 37% of the students of primary and 59% of secondary are in school for at least 6 hours a day, and 69% and 62% of primary and secondary students, respectively, study at least half an hour a day at home. The data suggest that a higher number of study hours outside and within the institution is associated with higher scores. Similarly, there is a negative correlation between scores and nonattendance to school.²¹

A fourth set of inputs are the physical resources available in schools such as books, computers, and the internet. On average, 74% and 72% of the primary and secondary schools, respectively, have internet access, 66% and 73% have computers, and 69% and 72% have books. There is a positive correlation between educational institutions with books and the scores obtained by their students on standardized tests, whereas the association with other inputs is not statistically significant. In addition, as crowding within the school may have an effect on learning, the capacity of the classrooms (number of seats available for each student) in primary school is taken into account. The value of 0.83, at less than 1, indicates that there are not enough seats for the students. The student-to-teacher ratio in secondary schools is 25:1. Not surprisingly, the association between student-to-teacher ratio and scores on PISA tests is negative.²²

Inputs provided by the household are analyzed similarly, as these inputs are very important to the education production function, since they may complement or substitute those provided in schools. At home, 33% and 68% of the students in primary and secondary, respectively, have an internet connection, 44% and 72% have computers, and 91% and 78% have books at home. Children's inputs at home and the wealth level are positively associated with test scores.

In turn, families make the decision to send children to public or private institutions according to their economic capacity, perceptions of quality, and geographic proximity. Therefore, given that 83% of children in primary schools attend public institutions and 81% do in secondary,²³ the state clearly plays a very important role in skill provision through public education institutions. Even so, within the group of countries analyzed, there is great heterogeneity in public school attendance. For example, Chile is quite different from many other countries because only 38% of students attend public schools. In general terms, studying in a public institution is related to lower test scores, although this result is not robust for all countries.

21. This correlation is important, especially if we take into account that around 5% of the children have been absent from school at some time in their life for more than 30 days (2015 CAF Survey). The reasons behind these long absences are: health problems (64% of cases), adverse economic conditions (15%), and insecurity problems (11%), among others.

22. It should be emphasized that the literature examining the relationship between class size and academic performance is abundant. There are studies that show that smaller classes are better for learning (Krueger, 1999; Chetty et al., 2011), others that show mixed results for the students (Jepsen and Rivkin, 2009), and others that even show negative impacts (Sims, 2009). The mixed or negative results are usually associated with the idea that when reducing the size of classes it is necessary to simultaneously extend infrastructure capacity and other educational resources, and many times these additional resources are of a lower quality. This seems especially important in the case of teachers.

23. These figures, which proceed from sample studies (TERCE and PISA) for some countries, coincide with those that result from the records of UNESCO-UIS, which reflect the situation of all students for a large number of countries.

Finally, the production function includes some sociodemographic characteristics, such as education of parents, gender and age of child or youth, and a wealth index. The educational level of the parents and the level of family wealth are positively associated with children's academic performance. In addition, younger students obtain on average lower scores on standardized tests, as do females. Text Box 3.3 (see p. 183) dedicates a more detailed analysis to gender gaps in academic performance, emphasizing the case of mathematics. This discussion examines the various reasons why almost worldwide, but even more so in Latin America, women perform worse on tests of mathematics.

Text Box 3.2 Evidence on Grade Repetition: The Cases of Uruguay and Brazil

There is widespread debate on grade repetition. On one side are those who consider that there are important individual costs that derive from allowing repetition. Specifically, this side argues that grade repetition has psychological impacts on the students, given that it stigmatizes the student and reduces self-esteem, which directly affects school performance. Additionally, repetition delays entrance to higher education and, therefore, could increase the risk of school dropout. On the other side are arguments in favor of repetition, which are related to the opportunity to review basic concepts that are important for future learning. There are also group considerations that must be taken into account, since taking those students out of class reduces heterogeneity among peers, and then makes teaching easier. However, grade repetition generates higher dispersion in terms of the ages of students, which may have an important effect on peers. Given these various considerations, grade repetition policy is controversial. It is also considered particularly important in the region because the repetition rate is around 20%.

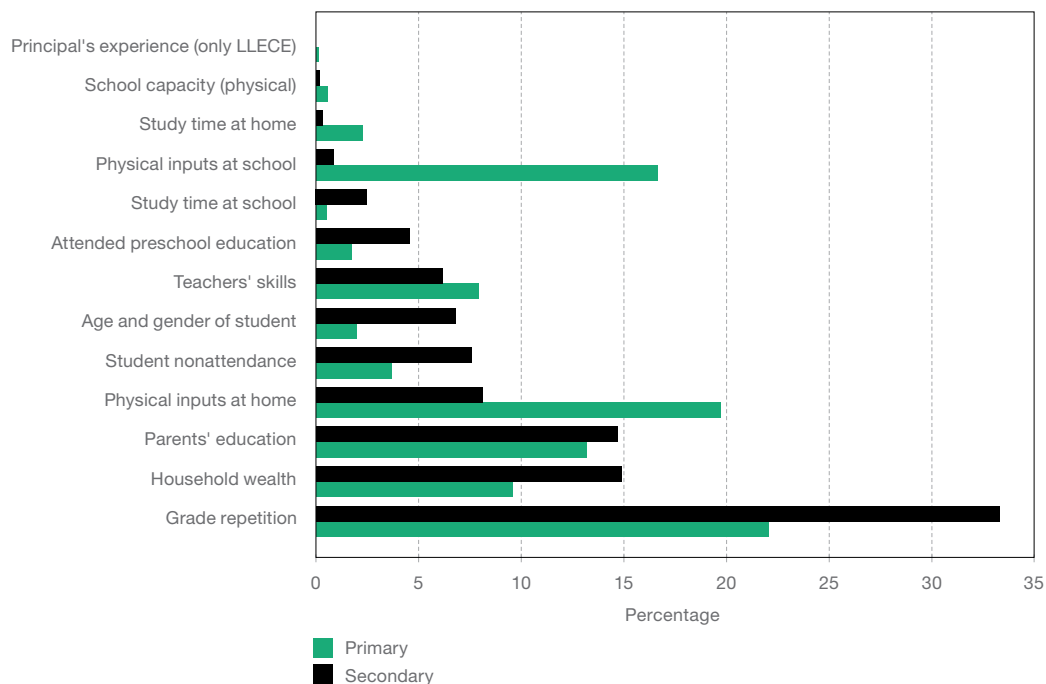
There are rigorous studies for two countries of Latin America that use changes in grade repetition regulations to find a causal effect on school dropout and performance in school. Evidence from Uruguay, provided by the study by Manacorda (2012), uses administrative data on secondary students to analyze certain characteristics of grade repetition rules that permit the author to establish that the loss of 1 year of study from repeating a grade implies a higher school dropout rate and lower educational achievement even 4 to 5 years after having repeated a grade.

On the other hand, for the case of primary education in Brazil, Koppensteiner (2014) uses the country's introduction of automatic promotion to identify what effect this policy has on test results. The mechanism analyzed indicates that not having the possibility of repeating a grade may act as a disincentive to effort. In fact, a negative effect of not allowing grade repetition is found, although of a small size (7% of a standard deviation on mathematics tests). The study for Brazil then shows that students effectively react to the threat of possible grade repetition by making more of an effort, and therefore obtain higher academic achievement.

Source. Authors' elaboration based on Manacorda (2012) and Koppensteiner (2014).

In addition to the analysis of the positive or negative associations of different inputs to cognitive skills in primary and secondary students, Graph 3.12 presents another skills production function exercise, which this time attempts to quantify the relative importance of various inputs (13 in this case). The exercise uses the dominance analysis approach of Azen and Busescu (2003).²⁴

Graph 3.12 Percentage of Primary and Secondary Academic Achievement Explained by Educational Inputs



Note. The graph shows the percentage of school results explained by each group of educational inputs. Each input corresponds to a group of variables selected according to the education production function described in Table 3.2 (see p. 178). Study time in school is measured as the number of hours that the students are at school. School capacity corresponds to the ratio of "seats per student" in primary and "teachers per student" in secondary levels. Study time at home corresponds to the number of hours studying or doing homework at home. Attendance to pre-primary education refers to whether the child attended any type of educational institution before entering primary school. Teachers' skills include absenteeism and their previous experience. Wealth of the household is an approximation, which is self-reported in primary figures and an index constructed as function of variables in secondary figures. The inputs of the school and the home correspond to having computers, books, and internet access in each of these places. For primary figures, TERCE scores are used. For secondary figures, information from PISA 2012 is used.

Source. Authors' elaboration using data from TERCE (2013) and PISA (OECD, 2012).

24. This method of decomposition of the relative contribution of the regressors in multiple regressions is also used in Chapter 4 of this report. It assigns to each independent variable a percentage of R-squared of different regressions, which is equivalent to the average of the change experienced by this parameter by including this variable in all possible models that may be carried out with combinations of all explanatory variables available. Grömping (2007) can be consulted for a review of the properties of this technique.

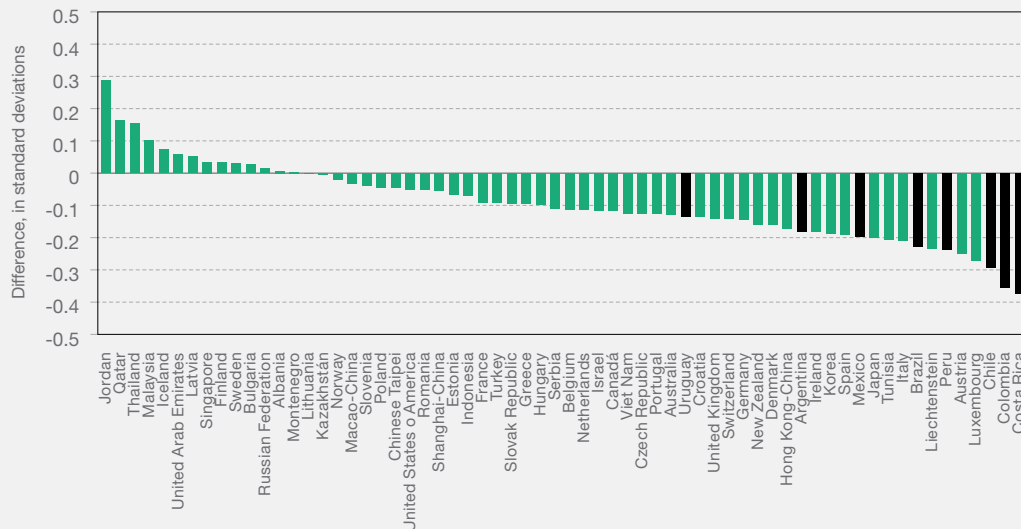
The results are summarized in Graph 3.12, which gives the percentage of dispersion of the scores that may be explained by each input. The data used are again the mathematics scores from TERCE and PISA 2012, and the inputs are ordered from higher to lower relative importance in their contribution to scores for secondary students. The sequence is very similar for primary students, with the exception of inputs at the school and inputs at home (books, computers, internet) that seem to play a noticeably more important role for primary than secondary students. In addition, the results indicate that variables related to characteristics of the home explain close to 40% of the scores for both educational levels. Repetition, which indicates previous skills, also explains a large percentage (33% in primary and 22% in secondary) of the variability of these measures of cognitive skills (see Text Table 3.2 on grade repetition). Adding the contribution of characteristics of the home and previous repetition explains approximately two thirds of the academic achievement, in the case of both primary and secondary students.

Adding the contribution of characteristics of the home and previous repetition explains approximately two thirds of academic achievement, both in primary and secondary school results.

Text Box 3.3 Evidence on the Gender Gap in Academic Performance in Latin America

Numerous empirical studies reveal a significant differential between the results obtained by boys and girls on academic performance tests, especially in the area of mathematics. Several authors attribute this difference to social, cultural, and environmental factors (Manacorda, 2012; Guido et al., 2008; Bharadwaj et al., 2012; Nollenberger et al., 2016).

Graph 1 Gap in Mathematics Results on PISA 2012 in Standard Deviations



Source. Authors' elaboration based on PISA (OECD, 2012).

Particularly, and as is shown in Graph 1 (see p. 163), the gender gap in mathematics in Latin American countries is considerably higher than in other regions. In addition, according to a recent study that uses data from PISA tests (Nollenberger and Rodriguez-Planas, 2015), this gap is not reduced after discounting the effect of characteristics of the individual, the family, and the educational center attended by the youth. In view of this evidence, the study, which was especially prepared for this report, asks: What other reasons could be behind the gender gap in mathematics? And it finds that there are several factors behind girls' lower performance in Latin America.

For example, the authors find that the different expectations parents have about their sons and daughters regarding their future in a math-related career play an important role in generating these differences in test scores. The study also concludes that the way in which children perceive themselves (self-efficacy, self-conception, and anxiety levels when solving mathematics exercises) contributes to the explanation of girls' lower results on the tests. That is, girls have less self-confidence, and that affects their performance. These two mechanisms explain the 8% and 30% of the gender gap in mathematics, respectively. Contrarily, the theory of a possible differential treatment by teachers of girls and boys, although perceived by students, does not seem to have effects on the performance gap. The number of teachers with a specialization in mathematics does not have an influence either, nor does the existence of clubs or mathematics competitions, which would improve the average results, but do not modify the gender gap. Something similar occurs when examining possible peer effects on the gender composition of classes, which does not seem to affect the performance gap between girls and boys.

On the other hand, Nollenberger and Rodriguez-Planas (2015) find that in the Latin American countries with higher gender equality in access to the labor market and higher education (measured through the Gender Gap Index of the World Economic Forum), lower gender gaps in mathematics are observed. Likewise, a higher level of economic development (measured by GDP per capita) is inversely related to the gender gap in the region.

Another dimension to be considered is the role of cultural idiosyncrasy on the different results on mathematics tests of boys and girls. Nollenberger et al. (2016) explore this subject, assessing if the gap for groups of immigrants who live in a certain country is explained by higher or lower gender equality in the country of origin. For this purpose, the authors focus on the second generation immigrants who are exposed to the same laws and institutions as individuals of the receiving country but are also influenced by their parents' country of origin. Using data from PISA tests, the authors reinforce the conclusion that the higher the level of gender equality (in this case, in the country of origin of the girls' parents), the better the girls' results relative to the boys' results. It can be said then that part of the gap can be interpreted as the result of the culture on the academic performance of students.

Source. Authors' elaboration based on PISA 2012, Nollenberger and Rodriguez-Planas (2015), and Nollenberger et al. (2016).

The Role of Educational Institutions in Skill Formation

The School as Skill Builder

This section discusses the role of educational institutions in the development of cognitive, socioemotional, and physical skills.

During the school years, physical skills consist of the nutritional and the health status of the child in general terms.²⁵ Educational institutions have a fundamental role in physical development, such as the promotion of basic health care. Schools can contribute through physical education classes and sports activities, a curriculum exclusively designed to teach health care,²⁶ and school meals programs.

The school meals programs attempt to guarantee to students adequate consumption of calories and certain nutrients, so that the children can exploit their mental and physical potential. The evidence on school meals programs is generally positive (for a summary of evidence, see Bundy et al., 2009).

In respect to physical education and sports activities in schools, the intention is usually twofold: to strengthen the physical dimension and socioemotional aspects of development of children and youth. For example, many sport programs are aimed at influencing discipline and harmonious and productive interactions among classmates.

Socioemotional skills of school-age children comprise a wide range of characteristics. Students must be able to plan and act in pursuit of their school performance and their relationships with their peers. They must have an adequate degree of attention and self-regulation of impulses, and they must be able to conceive of a sequence of steps that lead to a particular objective and have the grit to carry them out. In addition, they must be able to comply with schedules and the responsibilities of doing their homework. Another type of socioemotional skill permits students to control their anxiety and fluctuating moods, which can also be essential to success in school. On the other hand, individual beliefs make students think that their results in school depend on them and not on external factors or luck (internal locus of control), which leads them to believe more in themselves and make individual efforts. Other relevant skills are those that mediate in social relations, such as the capacity for empathy and cooperation and the skills to facilitate individual and group identities, all of which are malleable in adolescence and are critical in the school environment (OECD, 2015).

The intention for physical education and sports activities in the schools is twofold: strengthen the physical dimension of development and the socioemotional aspects of children and youth.

25. As was discussed in Chapter 2, nutritional status depends to a large extent on conditions during pregnancy, birth, daily feeding habits of individuals, as well as the general condition of the organism (health) to permit the correct assimilation of the food.

26. For example, Berniell et al. (2013) provide evidence that indicates that the health curriculum may help to complement the efforts by educational institutions and families in forming healthy habits at home.

Naturally, not only the socioemotional and physical development affect success in school and are a goal in themselves, but so is the development of cognitive skills. These skills include the knowledge (data, facts, and systems) and –perhaps still more important– the capacity to resolve problems and think critically and analytically. These two types of skill are normally associated with *crystallized* and *fluid* intelligence, respectively, and are usually measured through various instruments, among them standardized performance tests (see Chapter 1).

Text Box 3.4 The Role of Basic Cognitive Skills and Learning to Read

The capacity to persevere in an activity and repress short-term impulses (self-control) are essential for individuals to “construct learning,” which requires remaining in a given activity for a sustained time. For example, children who do not have the capacity to repress short-term impulses (playing instead of reading) have problems learning. Likewise, mental flexibility (or the capacity for exposure to new ideas) and the capacity to understand new rules are also critical during the learning process. This type of skills helps students adapt to new environments. Finally, the working memory permits individuals to retain ideas and concepts in the short term. These cognitive skills are usually categorized as *executive functions* (see Chapter 1).

One example may well illustrate the interactions between executive functions and learning. The way in which children learn to read is relatively well understood (Armbruster et al., 2009). First, it is necessary that children be able to hear the different sounds of letters and words. Children must also be able to manipulate sounds, produce rhymes, and understand that different words may start or end with the same sound, etc. In this stage of the learning process, there are various techniques to learn to read: breaking or separating words into sounds, playing with rhymes, changing words adding or removing sounds or phonemes (“*What word is ‘smile’ without the ‘s’? Mile.*”). The role of the working memory in this process is critical. The children must also have mental flexibility (such as to independently generate new words) and perseverance to persist with new exercises.

Second, it is necessary that the brain recognize the correspondence between sounds and letters. Some methods consist of splitting words into smaller units to facilitate this process. Eventually, the child starts to read complete words. Then individuals have to understand the entire text, and for this purpose it is essential to use one’s basic knowledge. Likewise, children must have a wide vocabulary that will allow them to recognize and understand the words they are reading in different contexts. A reader who already has certain fluency starts to understand the text at two levels: comprehension of what the text is saying and comprehension of the text’s structure (for example, how sentences or paragraphs are organized and constructed).

This entire process makes intensive use of the so-called executive functions, which in turn are complemented by other dimensions of development (even physical ones) to accumulate reading skills that act as the cornerstone in the construction of learning.

Source. Authors’ elaboration based on Armbruster et al. (2009).

There are two important aspects underlying the role of the school in the formation of physical, socioemotional, and cognitive skills. First, students begin school at a certain age, around 3 or 4 years of age for early education and around 6 years for primary education.²⁷ At these ages, children already have a certain stock of skills, which have been molded jointly by their family, the environment, and, in some cases, early childhood institutions. These skills are part of the basal investments that permit individuals to make the best out of the experience, in general, of being educated. Secondly, the school operates as promoter of new skills. Naturally, the capacity of the institution to change individual skills depends to a large extent on the malleability that such skills have at different stages of development. In the same way that the executive functions in the early years are developed with stability, routines, and an affectionate, healthy environment (Chapter 2) the school may reinforce those functions with similar strategies. For example, an important point of a successful school may be its capacity to maintain order and routines (Angrist et al., 2010). A school that has serious violence and discipline problems does not help children reach their maximum potential.

In adolescence, the educational institution may play a decisive role in consolidating socioemotional skills.

Decisive Schooling Periods

From the standpoint of educational institutions, there are two fundamental and well-differentiated periods for students: one that spans from the beginning of schooling to pre-adolescence and one from adolescence (which starts around 11 or 12 years of age) to the end of schooling. In the first period, emotional control, locus of control, and the so-called theory of mind²⁸ (Center on the Developing Child, 2011) begin to be consolidated. During adolescence, a window once again opens for important changes in certain socioemotional skills —given the high brain malleability at this stage— with important changes that affect the capacity for controlling impulses and making decisions during the first opportunities for independence. In this window, the educational institution may play a decisive role in consolidating a set of socioemotional skills intended to gain self-confidence, build conflict-resolution capacity, and basically provide individuals with several tools for negotiating, creating a stable identity, making decisions under pressure, and, in more general terms, developing resilience.

It is critical to note the accumulative nature of this development process.²⁹ For example, during the first school grades, the school plays an essential role in the development of the cognitive skills of reading and writing: students learn to read, in order to later read to learn. Likewise, mathematical skills are critical for analytical and problem-solving development. Then, in higher grades, individuals use the

27. The average age of entry to educational institutions of basic (primary) education in the region is 6.2 years. See Text Box 3.1 (see p. 162) for detail on the ages that define the entry to primary education in each country.

28. The theory of mind is the ability to assign or recognize, both in oneself and in others, beliefs, intentions, wishes, etc., and being able to understand that these may differ between people. The theory of mind is closely related to empathy, language development, and, in pathological cases, to autistic spectrum disorders.

29. Chapter 1 discusses a general scheme that describes the skill accumulation process from a dynamic perspective, where the different dimensions of development complement each other to gradually form blocks of simple skills on which other more complex skills will be constructed throughout the life cycle.

capacity to read, write and reason analytically to accumulate cognitive skills in other areas. It is crucial to again note the integral nature of skill formation, since, for example, the acquisition of cognitive skills is easier when certain attributes of personality or certain socioemotional skills are better developed.

Organization and communication skills, work ethic, and academic confidence start to be molded early but are fundamentally affected by the school during adolescence. The class and school environment, in general, are determinant factors in these skills (OECD, 2015). The school provides two important factors in this process: the school environment and peers, who are of vital importance in personal development during adolescence (see Chapter 5).

Some programs implemented in schools are intended to support these skill formation processes, focusing on weaker students or those with more academic or behavioral problems. Examples of these programs are extracurricular activities (either for reinforcement, remedial learning, or provision of complementary activities) that adapt pedagogy and content to the level of the students involved. Another type of intervention separates students according to their skill level on certain dimensions (for example, academic achievement in certain subjects). This type of intervention is based on the idea that it is difficult for a teacher to adapt pedagogy to the entire class's skill distribution. Therefore, extra time with some students may have beneficial results on both their cognitive and socioemotional skills. Text Box 3.5 summarizes the discussion on the impacts of prioritizing homogeneous or heterogeneous classes.³⁰

The Role of the Teacher

The essential role of the teacher on skill formation of students has already been emphasized. Two recent evaluations in the United States may offer important lessons for Latin America regarding how teachers develop different types of skills in children. Jackson (2012), using standardized tests for ninth grade in North Carolina, identifies teachers who are able to cultivate both cognitive skills and “other” skills (that include socioemotional aspects). This study also presents the correlations between cognitive skills and those other skills and estimates the long-term effect of teachers who develop both types of skills. Jackson found that there is a clear difference between teachers who are able to cultivate cognitive skills and those who cultivate other skills. Finally, this study finds that students of teachers who are capable of encouraging both skills have highly positive results in the long-term, for example, in terms of their progression toward tertiary education.³¹

A more recent evaluation explores these relations more in depth, using data from students and teachers of fourth and fifth grades in four educational districts of the United States (Blazer and Kraft, 2015). The study measures the contribution

30. Chapter 5 continues the analysis of the peers effects on the formation of cognitive and socioemotional skills.

31. Jackson (2012) also found that the “other” skills have a high correlation with positive long-term results, once the effect of cognitive skills is discounted.

Text Box 3.5 Homogeneous or Heterogeneous Environments in the School: An Inconclusive Debate

An important debate in educational policy has to do with the promotion of environments (classes, or even entire institutions) with heterogeneous or homogeneous students in terms of their skills (Epple et al., 2001). The approach that prioritizes heterogeneous environments attempts to create conditions to promote the positive peer effect on school achievement, coexistence, and social cohesion. The approach that prioritizes homogeneous environments, also called tracking, attempts to assign the students to different educational paths according to early performance (or skills). The logic behind this approach is to allow teachers to adapt their instruction to the level of each student, supporting the weakest and challenging the most advanced students.

The cost benefit analysis of the two approaches has been on the research agenda for several years, generating mixed results. For example, in Kenya, an experiment in 121 primary schools compared the relative advantages of tracking with those of heterogeneous classrooms, controlling by all other variables that may affect performance in school (it was a controlled random experiment). It was found that students from schools with tracking had better performance than those from heterogeneous schools. However, the students from schools without tracking who were assigned to classrooms with high-performance peers also benefited from interventions that include hiring contract teachers or increasing the accountability of educational institutions to parents (Kremer et al., 2011).

Similar debates exist regarding how risky behavior, such as drug use, should be controlled in the schools. The idea in these cases is that 'one rotten apple spoils the whole barrel.' On the one hand, tracking-type models, which group at-risk students to provide them with better monitoring and attention, can exacerbate bad behavior within the group. On the other hand, schemes that put together at-risk students with students not at risk may cause the former to have a bad influence on the latter, again exacerbating the problem. For example, Rodriguez-Planas (2015) finds that the Quantum Opportunity Program in the United States, which was designed to help disadvantaged youth improve their academic performance and reduce their risky behaviors, worsened the situation of students with a lower propensity to consume drugs. This is attributed to the peer effects that the program generated by promoting the interaction between individuals with different level of risk for drug use.

Source. Authors' elaboration based on Epple et al. (2002), Kremer et al. (2011), and Rodriguez-Planas (2015).

of the teachers in the production of cognitive skills (measured by standardized test results) and certain socioemotional skills (among them, those related to the students' behavior). From this study, two main conclusions are drawn: first, and in line with the study by Jackson (2012), is that teachers who are capable of inducing better results in socioemotional skills are not necessarily the same ones who induce better results in cognitive skills. Second, teachers who are capable of increasing socioemotional skills tend to provide better emotional support to students and have a better classroom management.

Regardless of the marked differences in contexts between Latin America and the United States, these two studies —both with robust statistical methodologies—

Evidence shows that programs that provide educational inputs should include elements that families cannot easily substitute.

inform us that, although we still do not fully understand the production process of noncognitive skills, it is possible that teachers qualified to produce one type of skills are not the best to produce another type. An essential question of education policy is whether each student should be matched to different types of teachers, following their most urgent individual needs, or perhaps to attempt to produce teachers who are capable of generating both types of skills. The evidence in the literature is still very scarce and too recent to offer clear conclusions in either direction.

Complementarity and Substitutability between the Family and Educational Institutions

Families may respond in a substitutive way to some school programs, such as those aimed at increasing physical skills (e.g., meal programs) and those that attempt to increase cognitive skills (e.g., provision of computers). Rigorous evidence shows that school programs that focus on inputs that are easily acquired at home (e.g., textbooks) do not improve scores on academic tests, partly because households react by reducing their own investments in these kinds of input (Glewwe et al., 2009; Das et al., 2013). Naturally, one of the conclusions of the literature is that programs for provision of educational inputs should include elements that families cannot easily substitute. The main input with this characteristic is teacher quality.

There is no rigorous evidence to determine if the same home-school substitution dynamic exists in the case of accumulation of socioemotional skills. Chapter 2 concludes that the early years of life are critical in this respect, and, therefore, so are the early actions by the families that set the basis for the subsequent role of educational institutions. Hence, schools can benefit from policies that support family investments in the first stages of life, which range from relieving financial and time restrictions in directly providing early education in care centers.³² However, the interaction between family and school in the formation of socioemotional skills continues throughout the school years, and the key seems to be that the efforts of both institutions mutually reinforce each other.

Regardless of the substitution or complementarity dynamic between the educational institution and the family, there is evidence from early educational interventions that show their efficacy in permanently modifying socioemotional skills even in the absence of effects on cognitive skills. For example, Heckman et al. (2013) found that many good outcomes in adulthood are explained to a large extent by good socioemotional development (such as, academic motivation and absence of externalized behavior),³³ which may be promoted from very early in life. In fact, this study reviews the impacts of the Perry Preschool Project, which recognizes the importance of the interaction with the family, since it includes a component within the home and another in the educational institution. The major results of the study find that the reduction of externalized behavior by the Perry Preschool

32. In Chapter 2 these public policies are arranged into five large groups of interventions.

33. These behaviors occur when children act out by expressing their thoughts and feelings of frustration through aggression, delinquency, and hyperactivity (Liu, 2004). Chapters 1 and 2 of this report also provide details on the definition, formation, and measurement of this dimension of socioemotional development.

Project explains 65% of the reduction in violent crimes when adults, 40% of the reduction in arrests, and 20% of the reduction in unemployment. Significant effects of the Perry Preschool Project on the IQ in the short term were also found, which fade in the first few years of basic education (in third and fourth grades).

Which Educational Policies Work? Evidence from Impact Evaluations in Latin America

In recent decades, the research agenda on educational policies that positively affect learning and skills of children and youth has been very active in developing countries.³⁴ An important proportion of the rigorous evidence comes from experiments and quasi-experiments performed in Latin America, which are reviewed in this section.³⁵

Before analyzing those policies, with a rather micro approach, it is important to review several changes in the educational systems in the region at a more macro level. Latin America has seen important changes in its educational policy due to decentralization processes in the eighties and nineties, and of recentralization more recently. For example, several countries changed their curricula in the last decade, shifting toward more flexible models (e.g., focused on the active learning of students) but keeping elements of the traditional educational system (e.g., emphasis on academic training by subjects). In addition, many countries incorporated important policies for measuring results, with increases in the technical capacities of autonomous organizations that carry out standardized national tests (Rivas, 2015). In terms of teacher policies, a previous section has underscored that the region has not been exempt from major changes, although the scope of these reforms has been mixed.

In the past few decades the rigorous evidence on more micro-level policies that affect the accumulation of cognitive skills has grown significantly. Most of these studies attempt to assess the causal impact of several interventions on standardized tests as a proxy of cognitive skills. The evidence of policies that affect socioemotional and physical development of students is much more scarce. The evidence in this section is organized into three large blocks of policies: those aimed at changing the *inputs* in the production of education, those aimed at changing *incentives*, and those with a systemic focus aimed at entirely changing school operations. For each policy, a brief introduction presents the possible theoretical effects on educational variables and a discussion follows on the results of rigorous empirical studies, with emphasis on those carried out for Latin American countries.

34. The use of the term “policy” in this section may cover localized interventions, carried out by government or private agents, to scaled-up public interventions.

35. Several recent articles present extensive reviews of this literature. See, for example, Murnane and Ganimian (2014) and Kremer et al. (2013).

A recent study suggests that there is a minimum annual investment per student (around USD 8,000 adjusted for purchasing power parity) that is necessary to produce quality education.

Input Policies

In order to organize the evidence, input policies are divided into policies that increase the quantity of the schools' monetary resources, policies that involve construction of educational institutions, policies that increase the time children spend at school, policies that provide inputs such as textbooks and computers, and, finally, teacher policies.

More Resources for Schools or for the Entire Educational System

Theory predicts that in order to obtain quality education, it is necessary to invest resources in the school. Nevertheless, evidence until a few years ago seemed to indicate that the cross-country correlation between quantity of resources and learning was very low or null (Bruns et al., 2011; Hanushek, 2003). Among other factors, the existence of weak incentives for educational systems to make adequate use of additional resources partially explained this result (Vegas, 2005).

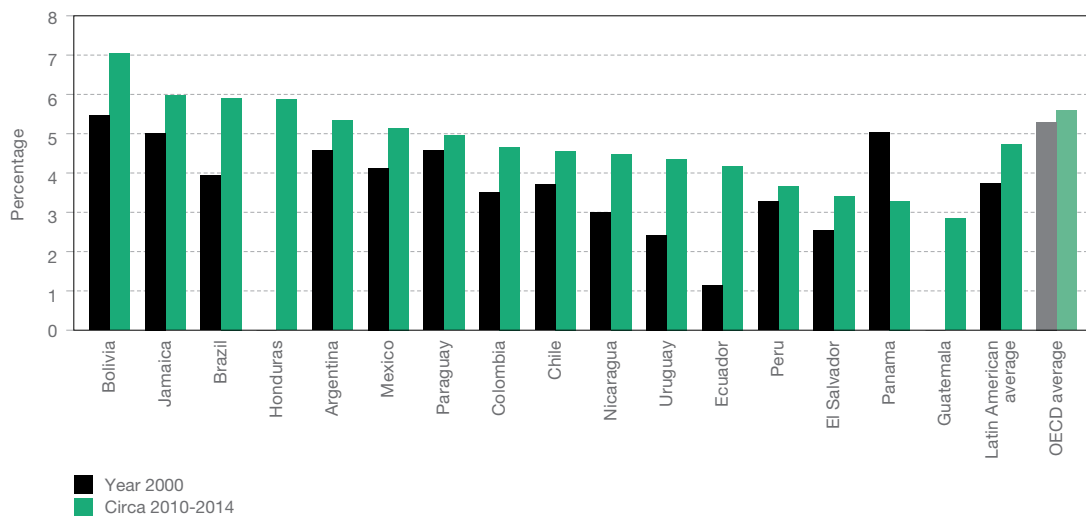
More recent studies present a more refined message. On one hand, Vegas and Coffin (2015), with secondary education data from several countries, indicate that there is a minimum investment—around USD 8,000, adjusted for purchasing power parity, per year per student— necessary to produce quality education; that is, that countries that invest below this minimum may obtain gains in academic achievement by increasing resources.³⁶ However, countries that invest above this minimum obtain very small or null gains. According to the latest data available from the UNESCO (United Nations Educational, Scientific and Cultural Organization) Institute for Statistics (UIS) database, the average annual expense per student in secondary education for several Latin American countries reaches only USD 2,300 (adjusted for purchasing power parity).³⁷ In addition, it is important to distinguish total investment (i.e., investment in education as percentage of the GDP) from the amount that actually reaches the educational institution (i.e., expenditure per student actually carried out in the school). Although there are no estimates available on the extent of these leakages, it is possible that the values are high in many countries of Latin America.

36. Specifically, Vegas and Coffin (2015) find that for expenses below USD 8,000 (adjusted for purchasing power parity), each increase of USD 1,000 (adjusted for purchasing power parity) is associated with a gain of 14 points on the PISA mathematics test. In comparison, the gap of average achievement between Latin America and the OECD countries is around 100 points. On the other hand, a study performed with data from the United States estimates the reaction of certain desirable educational results in the face of changes in the amount of resources assigned to education (Jackson et al., 2015). This study finds that an increase of 10% in the expense per student in all 12 years of basic education is associated with 0.31 additional years of education completed and an increase in future salary of around 7%.

37. These UNESCO-UIS data were consulted in June 2016, and the average was constructed with the following countries and years (all those Latin American countries that had information for any year from on 2010 were taken into account): Bolivia (2013), Brazil (2012), Chile (2013), Colombia (2014), Costa Rica (2014), Cuba (2010), the Dominican Republic (2014), Ecuador (2013), El Salvador (2010), Guatemala (2013), Honduras (2013), Jamaica (2014), Mexico (2011), Nicaragua (2010), Panama (2011), Paraguay (2012), and Peru (2014).

Another figure that shows the importance that Latin American countries assign to education financing is the public expense in education as percentage of the GDP. Also using UNESCO-UIS data, Graph 3.13 shows that Latin America generally spends around 4.7% of the GDP, while this figure is close to 5.6% for OECD countries. It should be highlighted that all the countries of the region, with the only exception being Panama, have increased their public expense in education in the past decade, since this indicator only reached 3.7% of the GDP toward the year 2000.

Graph 3.13 Public Education Expenditure as Percentage of GDP for Years 2000 and 2010-2014



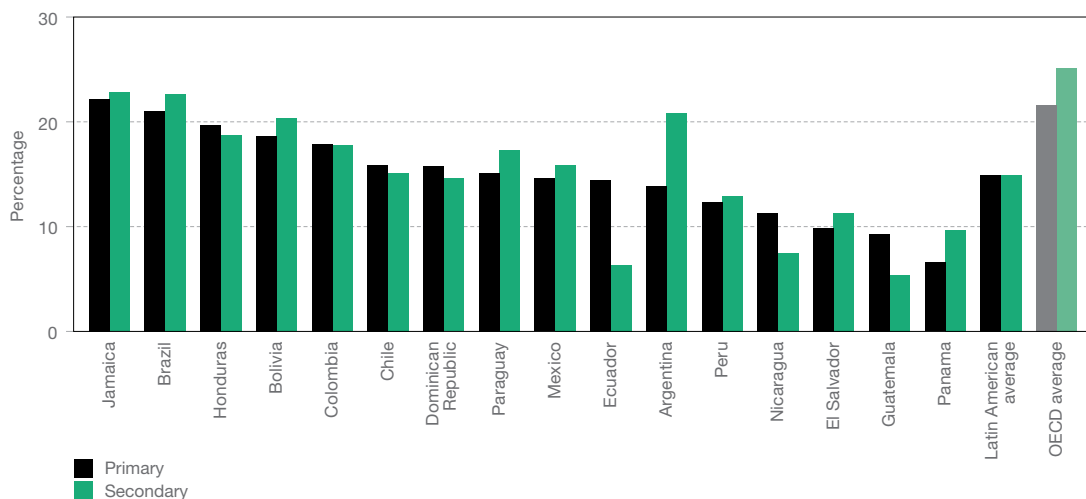
Note. For the most recent data in Latin America countries, the information from the UNESCO-UIS database was used: Argentina (2013), Bolivia (2014), Brazil (2012), Chile (2013), Colombia (2014), Ecuador (2012), El Salvador (2011), Guatemala (2013), Honduras (2013), Jamaica (2014), Mexico (2011), Nicaragua (2010), Panama (2011), Paraguay (2012), Peru (2014), and Uruguay (2011). The most recent data for OECD countries were: Germany (2012), Australia (2012), Austria (2012), Belgium (2011), Denmark (2011), Slovakia (2012), Slovenia (2012), Spain (2012), United States (2011), Estonia (2012), Finland (2012), France (2012), Hungary (2011), Ireland (2012), Iceland (2011), Israel (2011), Italy (2011), Japan (2013), Norway (2012), New Zealand (2012), the Netherlands (2012), Poland (2011), Portugal (2011), United Kingdom (2013), Czech Republic (2012), Sweden (2012), and Switzerland (2012).

Source. Authors' elaboration based on UNESCO-UIS (several years).

According to these figures, the average expense in Latin America does not seem to be very different from that of the wealthiest countries. But it is very important to bear in mind that the demographic structure in both regions is noticeably different, with our region having a much younger population. That is, even with the same expenditure by percentage of GDP, Latin America must cover a larger number of students. Graph 3.14 (see p. 194) shows new indicators of the importance of public expenditure in education, but this time measured in accordance with the expense for every student enrolled at the primary and the secondary levels, both as percentage of per capita GDP of each country. Once again the conclusion is that Latin America spends little in comparison to OECD countries. While in our region the public expense per student as percentage of the GDP is only 15%, both in primary and secondary

levels, these figures are 22% for primary and 25% for secondary in the OECD countries. In addition, the figures are conspicuously low for some countries, particularly for Central America.

Graph 3.14 Public Education Expenditure per Primary and Secondary Student As % of Per Capita GDP circa 2010–2014



Note. Latin America countries are in decreasing order according to the value of the indicator for primary education. The most recent data available per country and year were: Argentina (2013), Bolivia (2012), Brazil (2012), Chile (2013), Colombia (2014), the Dominican Republic (2014), Ecuador (2014), El Salvador (2010), Guatemala (2013), Honduras (2013), Jamaica (2014), Mexico (2011), Nicaragua (2010), Panama (2011), Paraguay (2012), and Peru (2014). The most recent data for OECD countries were: Germany (2012), Australia (2012), Austria (2012), Belgium (2012), Denmark (2011), Slovakia (2012), Slovenia (primary 2012, secondary 2011), Spain (primary 2012, secondary 2011), United States (2012), Estonia (2012), Finland (primary 2012, secondary 2011), France (2012), Hungary (2012), Ireland (2012), Iceland (2011), Israel (2011), Italy (2012), Japan (2013), Luxembourg (2011), Norway (primary 2012, secondary 2011), New Zealand (2012), The Netherlands (2012), Poland (2011), Portugal (2011), United Kingdom (2013), Czech Republic (2012), Sweden (2012), and Switzerland (2012).

Source. Authors' elaboration based on UNESCO-UIS (several years).

Construction of Schools

The construction of schools is based on the premise that the distance to the educational center is part of the opportunity cost that households face when investing in education. If a new educational institution is offered to the community, transportation time is reduced, so the opportunity cost of attending the school is also reduced. Consequently, the construction of institutions may induce families to invest more in education. On the other hand, governments may construct schools for the purpose of decreasing the student-teacher ratio, especially in urban areas.³⁸ This can also stimulate higher demand for education.

38. In rural areas, construction is usually planned where there are no existing schools.

Part of the evidence on school construction (summarized in Table 3.3) examines the construction of early childhood centers, which have been growing in the region. In particular, the first piece of evidence comes from the cases of Argentina and Uruguay, countries that in recent decades have extended educational coverage to younger children through the mass construction of new education centers. Positive impacts in the medium and long term have been observed in both countries in terms of higher test scores, lower dropout rates, and other measures of cognitive and emotional development. For example, the evaluation from Argentina shows positive effects of a moderate size on the exams of third-grade students who benefited from the expansion of the preschool education centers. Likewise, positive effects were found in self-control, measured as attention, effort, participation, and discipline in class (Berlinski et al., 2009). In turn, the expansion of the preschool level in Uruguay in the nineties indicates that at 11 years of age, the beneficiaries of the program had completed more years of education, and at 15 years, the program significantly increased the probability of the students continuing in school (Berlinski et al., 2008). In addition, this program in Uruguay decreased the probability of falling behind in school

The construction of new educational infrastructure decreases the distance to the school and, therefore, may reduce the opportunity cost of investing in education.

Table 3.3 Programs to Build Preschool or Childcare Centers

Intervention	Country	Intervention unit	Variables for measuring impacts	Time frame of impact measurements	Evaluation quality, by internal validity	Reference
Construction of schools for early childhood	Argentina	Educational institution	Test in grade 3, self-control measures	Medium term	Medium (difference in difference model, using variation between cohorts and entry of program)	Berlinski et al. (2009)
Expansion of public preschool institutions (ANEP, Administración Nacional de Educación Pública)	Uruguay	Educational institution	Enrollment in basic education, years of education	Medium term	Medium (difference in difference model)	Berlinski et al. (2008)
Expansion of public preschool institutions (ANEP)	Uruguay	Educational institution	Grade repetition, dropouts	Medium term	Medium-low	Mullin and Vairo (2015)
Program to transition from community homes to childcare centers (De Cero a Siempre)	Colombia	Educational institution	Socioemotional skills, cognitive development, nutritional and health status of children	Short term	High (randomized controlled trial)	Bernal et al. (2014)

Source. Authors' elaboration.

Those evaluations have measured medium- or long-term effects. A recent study analyzed the shorter-term impacts of a program that changed the type of care received by small children, from the community-mothering model to a model of childcare centers in Colombia (Bernal et al., 2014). This study analyzes short-term effects on socioemotional skills, cognitive development, and nutritional and health status of

Several countries are converting half-day school days into single-shift or extended-shift school days with the rationale that a safe and stimulating school environment may imply more learning and formation of socioemotional skills.

the children during their early childhood. The results indicate that the effects of the change in the type of care provided are minor and concentrated in improvements in height by age and a reduction in incidence of children overweight. These weak results may be due to a low level of quality in both systems, community childcare and care centers, and by problems associated with the transition from one system to another.

Building new school infrastructure is extremely costly. However, given the positive and significant effects in several variables and in the long term, this type of program could nonetheless result in cost-effectiveness.

The construction of primary educational institutions shows a positive response by families in terms of higher enrollment and attendance (for the case of Indonesia, see Duflo, 2001).³⁹ However, the review of the literature by Cuesta et al. (2015) presents mixed or ambiguous evidence on this type of program, thus making more research necessary to be able to reach more robust conclusions about cost-effectiveness of school construction programs.

Increasing Time in School: Single- and Extended-Shift School Days

Several decades ago, many of the region's educational systems decided to try to increase enrollment by integrating into a single institution various shifts (typically, morning, afternoon and evening). This policy implied that students had reduced exposure to the school. In contrast, several countries are currently converting half-day schooling into full-day single-shift school days in order to increase students' exposure to the educational institution. In theory, more time in school may lead to more learning and skill acquisition because of greater contact with materials and teachers. Naturally, this depends on the quality of the education (especially the teachers and the materials) to which students are exposed. Likewise, spending a longer period of time in a safe and stimulating environment, as schools should ideally be, should improve learning and the formation of socioemotional skills (particularly for those whose alternative environments would be of lower quality). Also, if the night shift (and even the afternoon shift) is replaced with a school day that starts in the morning, students may learn more because they are fresher and have more attention to devote to their studies.

39. The rigorous evidence on construction of primary schools is concentrated in Asian and African countries. The study by Duflo (2001) on Indonesia analyzes the widespread construction of schools in the seventies (around 61,000 new educational establishments) and shows that each school constructed for every 1,000 children increased average school attendance by close to 0.2 years, and this in turn had an impact on long-term salaries (20 years later). Martinez Bravo (2014) analyzes the same policy as Duflo, finding that the construction of schools resulted in more and better public goods in the communities benefited and those effects are due to the fact that current political leaders received more education when they were children. For the case of Sierra Leone, Mocan and Cannonier (2012) find that the construction of primary schools increased the average years of education and women's empowerment on subjects affecting their health (birth control practices and HIV testing) and their awareness of gender violence. In Afghanistan, Burde and Linden (2009) show that the construction of community schools increases enrollment by 47% and achievement in mathematics and language around 0.59 standard deviations (a large impact). Kazianga et al. (2013) analyze the effects of a program that constructs primary schools equipped with sex-specific latrines, canteens, take-home rations, and textbooks in Burkina Faso 2.5 years after the schools had been in use. They found huge impacts: enrollment increased 20 percentage points, results on tests improved 0.45 standard deviations on average and 2.2 standard deviations for those who would not have gone to school without this program. In addition, the results are higher for girls than for boys. Also, the authors are able to separate the causes behind the impacts observed and find precisely that the "special" characteristics of the schools constructed are responsible for a large part of the positive results.

The evidence in Latin America on the impact of these initiatives on student achievement is positive but with modest impacts, as summarized in Table 3.4 (see p. 198). There is evidence for Argentina (Lach et al., 2009), Chile (Bellei, 2009; Pires and Urzua, 2014; Valenzuela, 2005, Berthelon and Kruger, 2011), Colombia (Bonilla 2011; Garcia et al., 2013; Hincapie, 2013); Mexico (Cabrera-Hernandez, 2015) and Uruguay (Cerdan-Infantes and Vermeersch, 2007). For the cases of Argentina, Chile, Colombia, Mexico, and Uruguay, the evidence on programs that convert institutions with multiple-shift schooling to a single shift shows modest results on national standardized tests (lower than 0.1 standard deviations). For Mexico, not only the effects on test scores are modest but also are lower than for schools with poorer students, which implies in this case that more time of exposure in schools of different educational quality may widen the gaps between the rich and the poor. The studies in Colombia and Chile find positive though also small effects, on enrollment, grade repetition, and school dropout. The Argentina study finds null (or very small) effects on the labor market 30 years after the transition to a single-shift school day in the city of Buenos Aires.

It should be emphasized that these studies examine educational impacts and cognitive-skill impacts as well as other dimensions. Pires and Urzua (2014) find results on noncognitive skills. Similarly, the study by Berthelon and Kruger (2011) shows results on crime and finds that an increase in the offer of the single-shift school day openings significantly reduces the probability of becoming pregnant in adolescence, and this effect is higher for the poorest students.⁴⁰ These studies show indirect evidence of two additional effects the school may have: a “disability” effect (while the students are in an environment supervised by adults, they are unable to engage in risky behavior) and a modeling effect of socioemotional development (which will potentially equip youth with the tools to refrain from participating in certain risky behaviors).

Given the weak results on cognitive skills, as well as the high costs of implementation of the extended- or single-shift schooling, these policies may not be cost effective. However, it is necessary to consider all other benefits (e.g., reduction in criminality, teenage pregnancy and other effects that exist but so far lack rigorous evidence,) in any cost-benefit analysis in order to fully measure all impacts achieved. Unfortunately, such cost and benefit measures are not available for the region.

Finally, the number of effective hours of exposure to learning can also be increased by improving classroom management practices, which a recent study (Bruns and Luque, 2014) indicates are deficient in the region, leading to an average loss of approximately 1 of every 5 school days.⁴¹

40. All these results are in line with the evidence of Deming (2009) on Head Start.

41. Further detail follows in this chapter on this evidence and on policies that can help to reduce the problem of inefficient use of classroom hours.

Table 3.4 Programs to Introduce Single- or Extended-Shift School Days

Intervention	Country	Intervention unit	Variables for measuring impacts	Time frame of impact measurements	Size of impacts	Evaluation quality, by internal validity	Reference
Extension of school day	Argentina	Primary education institutions	School progression, labor market variables	Long term	School progression: small effects. Labor market: no effects	Medium (quasi-random assignment with a small sample)	Llach et al. (2009)
Complete school day programs	Chile	Public basic education institutions	National standardized tests	Short term	Standardized tests: small effects	Medium-low (difference in difference model)	Bellei (2009)
Complete school day programs	Chile	Public basic education institutions	Standardized tests, school progression, socioemotional skills, salaries and employment, social behavior	Medium and long term	Enrollment and dropouts: small effects. Standardized tests: small effects. Socioemotional skills: null to small effects. Labor market variables: no effects	Low (variation by cohorts, pairing method)	Pires and Urzúa (2014)
Complete school day programs	Chile	Public basic education institutions	National standardized tests	Medium term	Standardized tests: small or medium effects; heterogeneity between school types (subsidized private vs. public)	Low (variation by cohorts, difference in difference model)	Valenzuela (2005)
Complete school day programs	Chile	Municipal education institutions	Teenage pregnancy, youth criminality data	Medium term	Pregnancy: medium effects. Crime: large effects	Medium (fixed effects model)	Berthelon and Kruger (2011)
Half day to single shift	Colombia	Public basic education institutions	Grade repetition, dropouts	Short term	Grade repetition and dropouts: moderate effects	Medium (fixed effects model)	Garcia et al. (2013)
Half day to single shift	Colombia	Public basic education institutions	National standardized tests	Short term	Standardized tests: small effects	Low (correlation and weak model of instrumental variables)	Bonilla (2011)
Half day to single shift	Colombia	Public basic education institutions	National standardized tests	Short and medium term	Standardized tests: small effects	Medium (fixed effects model)	Hincapie (2013)
Number of school days	México	Primary education institutions	National standardized tests	Short term	Standardized tests: small effects	Medium (fixed effects model)	Agüero and Beleche (2013)
Complete school day programs	Uruguay	Public basic education institutions	National standardized tests	Short and medium term	Standardized tests: small effects	Medium (fixed effects model and matching)	Cerdan-Infante and Vermeersch (2007)

Source. Authors' elaboration.

Extracurricular Programs

Certain extracurricular programs offer extended school days to some students and have the potential of helping to adapt pedagogy to groups with different performance levels. For example, some programs give extra time to students who are falling behind or have problems with a specific part of the curriculum.

Evidence from around the world suggests that these kinds of activities have positive results in cognitive skills (for instance, in India, Bajerjee et al., 2007) and socioemotional skills.⁴² For the case of Latin America, extracurricular programs in music and sports (although not always provided within the school system) are expanding, and several have undergone high-quality impact evaluations. For example, CAF is conducting two impact evaluations (in Peru and Colombia) that will place special emphasis on the measurement of socioemotional aspects for low-income children's participating in soccer programs for social inclusion. Text Box 3.6 describes strong reasoning and evidence (and in the case of music, also rigorous) indicating that extracurricular activities have a promising impact on different types of skills in children and youth.

Extracurricular programs related to sports and music show promising results regarding formation in several dimensions of skills.

Text Box 3.6 Can Sports and Music Become Tools for Skill Development of Children and Youth in Latin America?

Many sports and music programs are intended to affect skills specific to those disciplines, but they can also have effects on other more general skills. In particular, impacts on general cognitive and socioemotional development depend on the similarity of the processes involved in the sports or music activity and those that characterize the general domain of skills. The transfer of cognitive competencies seems to be very plausible in the cases of learning to sing or play an instrument, since these activities are closely related to the development of fine motor skills, the perception of tone, rhythm, melody, and differentiation of sounds and creativity, all strongly connected to cognitive processes applicable to many fields other than music. Similarly, the practice of group sports can be easily associated with improvements in empathy, self-esteem, and communication and negotiations skills, etc. (relevant to socioemotional domains). In respect to physical development, both practices also have great potential to contribute to habits for a healthy life, in addition to transforming muscular and posture development and helping in daily time management routines.

In respect to sports, an increasing number of programs or projects have been evaluated with different levels of rigorousness, in general without being able to establish that the interventions had actually caused the results. Notwithstanding that detail, the theory of change behind this evidence indicates that, under certain circumstances, practice of the sport would catalyze change processes, both at the individual and group levels, which would enable positive transformations in various areas: crime prevention, reinsertion of youth at risk, higher social cohesion, reconciliation between opposing sides in warlike hostilities, and overcoming collective trauma from natural disasters. Asensio (2015) discusses in greater detail these potential effects of sports on individual and community wellbeing.

42. For example, Feife et al. (2011) present suggestive correlations.

These positive associations should respond to a greater skill accumulation of participants. In fact, studies on youth in marginal areas suggest (collected in Asensio, 2015) that sports can have a positive impact on the socioemotional development of participants, in respect, for example, to their self-esteem and empowerment, resilience, decreased risk behaviors, and, to a lesser extent, employability and social mobility. These studies also point out that in order for these achievements to occur, two conditions must exist: the programs must not be limited to the practice of the sport itself, and there must be adequate articulation between supporters, participating youth, and their families.

All this evidence is very encouraging. However, to have a better knowledge on whether sports interventions can promote integral development of children in Latin America, CAF is carrying out two experimental impact evaluations (in Peru and Colombia) of its soccer program for social inclusion known as SOMOS. This program is implemented with various local partners engaged in the task of promoting soccer as a personal and community development mechanism. The dimensions on which impacts of SOMOS will be measured cover the socioemotional and cognitive development of the beneficiary children and of the social capital of the communities where they live.

In Peru, the local partner for the evaluation is the Academia Deportiva Cantolao, the region's oldest and one of its most prestigious soccer academies. The study sample comprises over 1,700 children, of whom approximately 50% were randomly assigned to participate in SOMOS program activities. All the children (in the treatment and control groups) were surveyed before the training began using a measurement instrument comprising a set of tests intended to measure cognitive and socioemotional aspects (with self-reporting and reporting by parents). The intervention lasted for approximately 15 months, and work is currently being done on the follow-up data to determine the effects of the program, which will provide preliminary results in the last semester of 2016.

The Colombian experimental evaluation (Fútbol con Corazón, in Barranquilla) has many similarities with the one in Peru in respect to the size of the sample, impact variables, and measurement instruments, with the only difference being that no baseline is used. Two months of field work were conducted, and preliminary results are expected around the end of 2016.

In the case of music, a recent evaluation made in Peru (GRADE, 2014) and financed by the Inter-American Development Bank, shows very positive impacts of the Sinfonía por el Perú program. This musical instruction intervention starts with chorus classes for children and youth that permit their familiarization with reading and interpretation of music, to then choose, if they wish so, to specialize in an orchestra musical instrument (string, brass, percussion). Generally the participation in this activity takes place around 4 times per week, for a period from 2 to 3 hours each day in spaces specially designed to give musical instruction. Among the impacts found, it was observed that the participation in the program increased 30% the positive self-perception of children (related to self-esteem), 34% the taste for doing the homework (related to making more efforts in the school) and reduced by 29% the participation of children in physical or verbal fights, among other positive results.

Source. Authors' elaboration based on Asensio (2015); <http://deo.iadb.org/2014/en/lessons/evaluations/peru-symphony/>; and <http://www.sinfoniaporelperu.org/#impacto>.

School Meals Programs

School meals programs may have positive effects in the short term by reducing hunger and acute malnutrition in children. Malnutrition and low calorie consumption are associated with low concentration capacity and low school achievement. In addition, school meals programs may provide incentives to low-income households to send children to school, and children's adequate food intake may reduce illnesses and diseases that lead to nonattendance in school. These effects can therefore lead to higher enrollment and attendance rates. From the perspective of families, such programs may also have an income effect, freeing up money that allows for increased consumption of other goods. Additionally, these programs may help by increasing the consumption of other members of the household by a direct substitution effect. Furthermore, it is possible that certain programs will reduce the intake of calories or nutrients at home by members who are attending the educational institution.⁴³

Table 3.5 School Meals Programs

Intervention	Country	Intervention unit	Variables for measuring impacts	Time frame of impact measurements	Size of impacts	Evaluation quality, by internal validity	Reference
JUNAEB school meals program	Chile	Educational institution	Enrollment, attendance, test results	Medium term	Null (local effects)	High (regression discontinuity design)	McEwan (2010)
School breakfast program	Jamaica	Educational institution	Attendance, height and weight, test scores	Short term	Attendance, height, and weight: large positive effects. Test scores: null to small effects (mathematics tests)	High (experiment)	Powell et al. (1998)
School breakfast program	Peru	Educational institution	Enrollment, attendance, dropouts, short-term memory, test scores	Short and medium term	Enrollment: null effects. Attendance: positive and medium effects. Dropouts: null effects. Memory: null effects. Test scores: null effects (only positive for multigrade institutions)	Low (ex-post control group)	Cueto et al. (2000)

Source. Authors' elaboration.

Almost every country in Latin America has school food programs, but there are not many rigorous evaluations to measure their effects. There are impact evaluations on the provision of meals during the school day for Jamaica, Peru, and Chile. In general, when this type of program is implemented in socioeconomically disadvantaged areas they generally have positive impacts on outcomes such as a school attendance especially for countries with relatively low enrollment or attendance rates (for Jamaica, Powell et al., 1998; for Peru, Jacoby et al., 1998 and Cueto et al., 2001). Yet evaluations revealed null effects for Chile, which has high attendance and enrollment rates (McEwan, 2010). On the other hand, the

43. For example, this was observed in the case of Burkina Faso (Kazianga et al., 2009). Two studies that summarize this literature are Bundy et al. (2009) and, more recently, Frisvold (2015). In the latter study, Frisvold (2015) presents a causal evaluation of the impact of school breakfasts in the United States and finds results of higher academic performance, especially for low-income students.

Extracurricular programs related to sports and music show promising results regarding formation in several dimensions of skills.

programs' impact on standardized tests is null or small. Nevertheless, and as suggested by Frisvold (2015), although no effects are seen on average, it is highly likely that the effects of these programs may be heterogeneous, being of most benefit to students from more vulnerable households.

The three impact evaluations reported in Table 3.5 (see p. 201) for Latin American countries do not provide information on costs. However, general reviews of these programs indicate that they are moderately costly, in part because they imply recurrent costs and complex targeting mechanisms. While universal programs would perhaps be cheaper, a strong targeting would be more convenient due to the benefits of school feeding (Bundy et al., 2009). In any case, it is worth mentioning that when combined with other inputs, these programs can be crucial to achieving good educational outcomes, especially for low-income students.

More Non-Technological Inputs

Microeconomic evidence, with data from specific programs in countries such as India and Zambia (Muralidharan and Sundararaman, 2011; Das et al., 2013), indicates that additional inputs do not change students' cognitive skills, either because the incentives of the educational system to incorporate them efficiently in the learning process are very weak or because the families respond in a substitutive manner to the inputs provided in the school. For example, if the school invests more resources on textbooks, families invest less in this type of input (Das et al., 2013).⁴⁴ As was previously highlighted, a corollary of the article of Das et al. (2013) is that investments in difficult-to-substitute inputs may imply better educational impacts. A clear example of an input that cannot be substituted by families is teacher quality.

More Technological Inputs

Various countries are investing in computers and internet access given their strong potential use in training teachers and increasing students' cognitive skills. These technologies may complement or substitute inputs of other resources (particularly, teachers) in the educational process.

For example, using games and new educational materials on the computer may imply a substitution of certain functions by the teacher or of other complementary inputs, such as printed books or other teaching materials. In this manner, the use of computers may mean changes in the type of pedagogy used. A lot can be learned on this subject from a recent evaluation of a program in Costa Rica that implemented teaching reforms tied to three types of technological resources (interactive boards, a computer laboratory, and provision of one laptop per child) to support teaching geometry to around 18,000 students in 85 schools (Berlinski and Busso, 2015). The short-term effects of the adoption of these three types of

44. Glewwe et al. (2009) show specific evidence on provision of textbooks in Kenya, finding no effects on the results of standardized tests, partly because of the strategic response of the households. A rigorous study at the beginning of the eighties (Jamison et al., 1981) in Nicaragua shows that the direct provision of texts to the households with children in primary education has positive and quite significant (0.33 standard deviations) effects on standardized mathematics tests. However, given the year in which the study was performed and the technology available at that time, it is not clear if those results apply to the current situation in Latin America.

pedagogies were quite negative, with drops from between 0.16 (for interactive boards) and 0.36 (for software in each child's laptop) standard deviations for the learning measures. In addition, the largest losses were observed for the students with the highest achievement, apparently because the intervention increased their bad behavior in class and they were less motivated by the use of the new technologies in the classroom. The evaluation also found that the role of teachers as mediators in the learning process did not work well, notwithstanding that they were well trained for the task and that they seem to be very satisfied with the incorporation of this type of instruction to their teaching tasks. The core learning that arises from this evaluation says that the costs of changing from one teaching process to another may be high, and it is necessary to have them in mind at the time of deciding certain types of large-scale reforms.

The initiatives that introduce technological resources in the schools give mixed results in learning.

Other evaluations of various initiatives that introduced technological resources in the schools give mixed results (Table 3.6, see p. 204). For example, in the case of *Computadoras para Educar* in Colombia, the teacher is the mediator of the program, and although the experimental short-term evaluation has null or modest results on learning (Barrea-Osorio and Linden, 2009), another more long-term measurement (based on a quasi-experimental design) finds positive results (Sanchez et al., 2011). In the case of Peru, the program *One Laptop per Child* specifically improves computer use, but there is no evidence of improvement in academic achievement in general (Beuermann et al., 2015). In addition, a similar program in Uruguay, with a quasi-experimental evaluation (difference in differences), finds similar results (de Melo et al., 2014).

A program in India where a computer, which had specialized software that was adaptable to different skill levels, was delivered directly to the students produces positive results that are concentrated in the area of the intervention (mathematics) (Banerjee et al., 2007). Another case is in Ecuador, where the program *Más Tecnología* provides computers and Internet access to more than 300 primary schools and instructs 800 teachers and administrative personnel on the use of computers and Internet. These computers are equipped with programs for children to practice and learn Spanish and mathematics. The results of the impact evaluation disclose that students who participated in the program increased their scores on standardized tests of mathematics by 0.3 standard deviations. However, no effects were found on the language tests (Carrillo et al., 2011). Unfortunately, no evaluations measure the impacts of this type of programs on socioemotional skills of students.

Another type of program includes other technological resources. *Telesecundaria* in Mexico and Colombia is based on teaching classes through recordings in order to educate children in remote areas. In addition to the recordings through which the classes are taught, there are teachers present in the classroom to facilitate learning. For example, in Mexico, *Telesecundaria* has the same effects on learning as a traditional secondary school (Klees, 1979).⁴⁵ Naturally, the use of mass communication media versus that of new

45. In turn, Arena (1992) presents a cost-benefit analysis of this program and concludes that it is a cost-effective method to take education to remote areas, since it is able to provide at a low cost the same educational quality of any other public institution.

technologies has radically changed since the time when this study was made (1979), which suggests that this evidence should be interpreted with caution. A newer study (that is not causal) of Telesecundaria in Colombia shows that the students have a lower failure rate but a higher school dropout rate compared to students in traditional rural schools (National Planning Department, DNP, 2015).

In conclusion, the (emerging) evidence on the arrival of technological resources in education shows mixed results, and, in general, modest results in the event they are positive. The most promising results come from interventions that target certain type of students (e.g., those who need more assistance with a particular subject), from those where the technological component take into account differences in the preexisting skills of students (or when the tool can automatically detect and adjust to a student's level), and for programs where the teachers are trained in such a way that they understand, value, and use the new technologies in the school environment. On the other hand, these interventions have the potential advantages of being relatively inexpensive and having economic scalability.

Table 3.6 Programs with Technological Inputs

Intervention	Country	Intervention unit	Variables for measuring impacts	Time frame of impact measurements	Size of impacts	Evaluation quality, by internal validity	Reference
Computadoras para Educar	Colombia	Public institution (basic education)	Standardized tests	Short and medium term	Standardized tests: null effects	High (experiment)	Barrera-Osorio and Linden (2009)
Computadoras para Educar	Colombia	Public institution (basic education)	Standardized tests	Short and medium term	Standardized tests: medium effects (in medium term)	Low (weak model of instrumental variables)	Sánchez and Rodríguez (2011)
Más Tecnología	Ecuador	Educational institution	Standardized tests	Short and medium term	Mathematics test: positive and medium sized effects. Language test: negative/null effects	High (experiment)	Carrillo et al., (2010)
Telesecundaria	Mexico	Educational institution	Mathematics and language tests	Short term	Tests: small positive effects	Low (cohort comparison)	Klees (1979)
One Laptop per Child	Peru	Students	Standardized tests, skills for use of computer, cognitive skills (Raven PMT), academic effort (reported by teachers)	Short term	Standardized tests: null effects. Use of computer: positive and large effects. Academic effort: negative effects. Cognitive skills (Raven PMT): null effects	High (experiment)	Beuermann et al. (2015)
One Computer per Child (Ceibal plan)	Uruguay	Students	Standardized tests	Short and medium term	Standardized tests: null effects	Medium (difference in difference model)	de Melo et al. (2014)

Note. Raven PMT is the Raven Progressive Matrices Test.

Source. Authors' elaboration.

Teachers' Hiring, Retraining, and Assignment to Schools

A large amount of evidence shows that the quality of the teacher is essential in the educational process (for example, Huneushek and Rivkin, 2006). Good teachers are capable of adapting teaching techniques to all levels of skills and teaching under any circumstance or context. But the keys to having good teachers are many and include recruiting good candidates, incentivizing their efforts, retaining them in the teaching career, and, eventually, retraining them as necessary.

Several recent articles show that the difference between having a good teacher and a bad teacher results in students having entirely different paths in life. In the United States, long-term evidence shows very positive impacts of having been exposed to good teachers (Chetty et al., 2014), and something similar measuring shorter-term results is found in a recent study on Ecuador (Araujo et al., 2014). The evidence collected in Ecuador suggests that each additional year with a good teacher⁴⁶ implies increases close to 0.1 standard deviations in the scores on standardized tests, an impact that if it is accumulated for many years becomes large. In addition, these studies show that good teachers are capable of increasing the learning of all students, regardless of their level when they began school or their skills brought from the family environment. Furthermore, the studies show that there are long-term effects of having a good teacher in terms of results in the labor market or lower participation in acts of violence in adulthood. Once again, this is indirect evidence that educational institutions may generate both types of skills: cognitive and socioemotional.

A critical issue in the quality of human resources in the educational systems of Latin America lies in those who self-select for the teaching career. For example, the work by Bruns and Luque (2014) shows that in Latin America, those who choose to become teachers come primarily from homes with lower socioeconomic levels than other people who pursue higher education in other areas. These potential teachers generally have lower professional expectations and, notwithstanding generally attaining the pertinent accreditations to teach, have low cognitive skills on average.⁴⁷ In addition, the work of Bruns and Luque also indicates that Latin American teachers have limited classroom management skills, basically losing the equivalent to 1 of the 5 days of classes per week in activities that do not concern learning.⁴⁸

A recent study conducted in Brazil has assessed the impact of a program that introduces classroom observation measures to train teachers on class management

Recent evidence shows that the difference between having a good and a bad teacher results in students having entirely different paths in life.

46. Here a "good teacher" is represented by an improvement of 1 standard deviation in the teaching quality measured by the Classroom Assessment Scoring System instrument (Araujo et al., 2014).

47. For example, Bruns and Luque (2014) show that those who wish to become teachers have PISA scores (corresponding to year 2006) that are even lower than the students' average in the cases of Argentina, Brazil, Chile, and Mexico.

48. This loss of learning days by dedicating time to classroom management or other tasks (including time out of the classroom) exceeds good practice recommendations. In Latin America, only 65% of classroom time is used for instruction, when the standard should be 85% (Bruns and Luque, 2014).

The programs of incentives to teachers have potential to improve the formation of the students' skills, but their implementation may be complex

strategies (Bruns et al., 2016). The preliminary results of this study indicate major impacts on the use of instruction time and of better teaching practices.

An additional problem regarding teacher policies in Latin America is the allocation of teachers across schools or classrooms, because in most systems in the region teacher placement is determined by seniority rather than trying to maximize the quality of matches between teachers and classes. Teachers with more years of experience are assigned to educational environments with the best working conditions (better-prepared students, or schools located in the best places), while teachers with less experience are assigned to more difficult educational institutions or groups (with vulnerable populations, in remote places, or undesirable positions because of other characteristics).⁴⁹ Additionally, favoritism sometimes arises in the assignment of teachers to different positions or schools. For example, in Mexico, Estrada (2016) shows that discretion in the selection of teachers has led to hiring people who are at the lowest levels of the teaching quality distribution (measured through its aggregated value to the grades of the students).

In order to resolve new-teacher hiring issues, several programs have used “extra-teachers,” with fixed-term appointments (usually 1 year), whose renewal depends on their results. A program in Kenya (Duflo et al., 2011) shows that these extra-teachers, even with lower qualifications and lower salaries, produce better results on standardized tests in respect to teachers with fixed-term agreements. Evidence from India also shows positive results on standardized tests (Banerjee et al., 2007). The evidence in Latin America is more limited, with a study for Peru (Alcazar et al., 2006) and another for Chile (Cabezas et al., 2011). Cabezas et al. (2011) show, in line with Banerjee et al. (2007), that programs using tutors focused on vulnerable populations have effects on standardized test scores as well as effects on measures of socioemotional skills (e.g., in terms of self-perception).

Incentive Policies

The incentive policies that we outline here (Table 3.7, see p. 208) are basically those that intend to change the teachers' behavior. As shown in a previous section, several countries of the region have weak incentive structures for motivating teaching excellence. For example, when promotion is automatic, teachers are not evaluated, and most of them have stable, life-long agreements (Vegas, 2005; Mizala and Ñopo, 2011).

Given the prevalence of this practice, there have been many interventions around the world that have attempted to change the teachers' incentive structure by, for example, paying bonuses according to students' performance or other actions associated with the effort of teachers, such as class attendance. Evidence in several countries around the world is increasing (for the case of India, Muralidharan and Sundaraman, 2011; for Kenya, Glewwe et al., 2010; for Pakistan, Barrera-Osorio

49. There is consistent evidence showing that teachers tend to be less effective during their first 3 to 5 years of teaching (Bruns et al., 2016).

and Rau, 2015) and is mixed. In Latin America, there are rigorous evaluations of this type of interventions. Reforms studied include some programs in Mexico and Brazil. The program in Mexico implemented three types of incentives, those provided only to students, only to teachers, and jointly to both teachers and students (Behrman et al., 2015). In Brazil, the program pays teachers in bonuses, subject to students' performance (Ferraz and Bruns, 2012). A third program, again in Mexico, partially bases teacher promotions on students' results (McEwan and Santibañez, 2005). In general terms, these programs show positive results, albeit modest in size, on standardized test scores. However, there is evidence that shows potentially undesirable effects, namely encouraging students and even teachers to cheat on the tests. Up until now, there is no evidence available on the impact of this type of programs on the socioemotional skills of the students.

That said, a program in Chile called Sistema Nacional de Evaluación de Desempeño en los Establecimientos Educativos gives awards to educational institutions in accordance with rates for grade repetition and school dropout, the level of communication between parents and teachers, and —perhaps most importantly— the performance of students on standardized tests. Additionally, the different public education institutions with similar characteristics compete among themselves for this award, and the winning institution must share 90% of the award funds among the teachers in accordance with the number of hours a teacher has worked (Mizala and Romaguera, 2004). The results of this program indicate moderate results (between 0.1 and 0.2 standard deviations) on students' standardized test scores (Contreras and Rau, 2012).

In conclusion, incentive programs for teachers seem to yield positive yet small results. The monetary cost of implementing this type of programs seems low, but these interventions face another challenge, as they are usually met with resistance by certain groups within the educational community. In addition, the design and effective implementation of teaching-incentive programs need to address matters such as how large the incentive has to be, how performance is measured, and what part of it is attributable to increased teaching effort and what part is attributable to other factors, etc.⁵⁰ It is also possible that incentive systems generate other distortions in the system, such as the bias to teach to the test, the reduction of the curriculum to the subjects on which the incentive is based, or the inflation effect in the tests.⁵¹ On the other hand, before thinking about implementing incentive systems, it is necessary to make sure standardized tests have sufficient information to follow students over time and match the students to specific teachers (matched student-teacher data). These needs place constraints on the design potential of incentives programs (Barrera-Osorio and Raju, 2015). If those challenges are overcome, most of the incentive intervention designs (e.g., bonuses to institutions/teachers) would probably be cost-effective.

50. In Chapter 2 of RED 2015, these challenges are given in the context of an analysis of payment schemes for performance of public officials (CAF, 2015).

51. For a comprehensive summary of these undesirable effects, see Neal (2011).

Table 3.7 Incentive Programs

Intervention	Country	Intervention unit	Variables for measuring impacts	Time frame of impact measurements	Size of impacts	Evaluation quality, by internal validity	Reference
Incentives for teachers	Brazil	Teachers/institutions	Standardized tests	Short to medium term	Moderate effects (local effects)	High (regression discontinuity design)	Ferraz and Bruns (2012)
Sistema Nacional de Evaluación de Desempeño de los Establecimientos Educativos	Chile	Teachers in public schools	Standardized tests	Medium term	Positive effects only for a subgroup of institutions	Medium (model of fixed effects)	Mizala and Romaguera (2003)
Sistema Nacional de Evaluación de Desempeño de los Establecimientos Educativos	Chile	Teachers in public schools	Standardized tests	Short to medium term	Moderate positive effects	Medium (difference in difference and matching)	Contreras y Rau (2012)
Incentives for students, teachers, or both	Mexico	Institutions, teachers, and students	Standardized tests	Short to medium term	Considerable effects for the schemes of incentives to students, and students and teachers jointly. Null effects for the scheme of incentives only to teachers	High (experiment)	Behrman et al. (2015)
Carrera Magisterial	Mexico	Teachers in public schools	Standardized tests	Medium to long term	Small or null effects	High (regression discontinuity design)	McEwan and Santibáñez (2005)

Source. Authors' elaboration.

Systemic Policies

Early Childhood Programs

The first few years of life are critical for the development of the brain and the body in general. Adequate stimulation and safe and healthy environments are essential in this stage (see Chapter 2). Various early childhood programs have set out to change the behavior of parents and the habits of families by assisting them in their own homes or offering services in care centers in order to promote stimulating activities, provide adequate nutrition and safe environments for children. We classified early childhood programs as systemic because of the comprehensiveness of the intervention (in essence, another education level in addition to primary and secondary education) and their medium- and long-term effects.

The evidence on early childhood programs coming from the United States (Perry Preschool Project, Early Training Project, Carolina Abecedarian Project, Infant Health and Development Program, and Head Start) indicates that these programs produce fundamental changes that remain in the long term. Several of these programs extend access to preschool education through formal early childhood care centers, either through increased availability or construction of new infrastructure. There is broad consensus that these programs have positive

effects (Elango et al., 2015). Small-scale high-quality programs (demonstration programs) seem to have positive effects on cognitive skills (estimated by IQ tests and scores on exams) in the short term that later fade, while they seem to have a permanent positive impact on socioemotional skills. Moreover, that improvement of socioemotional skills seems to be a key driver of many good results observed in adulthood for those that took part in these programs as children (Heckman et al., 2013). In particular, the evidence shows a greater rate of high school graduation, better performance in the labor market, and a reduction in teenage pregnancy and criminal practices.⁵² The evaluations of these programs are the most compelling evidence that interventions set up to affect the early years through the educational system may lead to effects on socioemotional skills and wellbeing in the long run.

High quality programs in early childhood show noticeable wellbeing effects in the long term. However, their success crucially depends on the quality of the human resource in charge of the children, which is quite low in the region.

Two important aspects stand out from the accumulated evidence on educational programs in early childhood in the United States: the scale of interventions and the population on which they are focused matter greatly to the magnitude of impacts achieved (Elango et al., 2015). Large-scale programs usually imply substantial losses in the quality of the professionals in charge and the capacity to follow up or monitor closely their work with the children. This factor may be of great importance in Latin America, where professionalization of caregivers is still an unsolved problem.⁵³ For example, a recent study (Berlinski and Schady, 2015) describes information constructed using different structural quality indicators, of the professionals and the processes involved in the provision of early childhood services in Bolivia, Ecuador, and Peru. Unfortunately, in all these cases, most of the education centers fall well below the minimum standards required by these quality indicators, especially in those dimensions that most affect cognitive and language development as opposed to those that are more important in socioemotional development.⁵⁴

On the other hand, evidence for the United States seems to indicate that the positive impacts of early interventions are only observed for those children with care alternatives worse than those that the program in question is offering. That is, positive impacts are generally concentrated in populations of children from socioeconomically disadvantaged families. This aspect must be taken into account when universalization strategies are proposed for these educational services.

For the case of Latin America, high-quality evidence on early education programs is not as profuse as for the United States, especially because few studies measure long-term impacts, which seem very important according to the literature. A

52. For example, the program Head Start did not generate effects in academic achievement in grades 1 to 3, but it did produce important effects on long-term indicators, such as participation in acts of violence (Deming, 2009).

53. For example, a recent evaluation in Colombia shows that it was difficult to hire specialized personnel for early childhood centers, both because of the limited availability in certain cities and the low salaries offered (Andrew et al., 2016). The low qualification of people hired is likely the reason why the evaluation does not find significant effects of the program (in particular, it does not find marked differences between the children attending "reinforced" care centers and those attending traditional care centers).

54. The study of Berlinski and Schady (2015) uses several quality indicators based on measures constructed through classroom and education center observation techniques, such as those that arise using the Classroom Assessment Scoring System (CLASS), or Infant/Toddler Environmental Rating Scale (ITERS).

noteworthy exception is the intervention in Jamaica that showed that good quality early education activities that stimulate children (this time administered in the homes of disadvantaged families) may return considerable benefits in the long term (Gertler et al., 2013).⁵⁵

Other evaluations made in the region (Table 3.8) show encouraging results and leave open some questions. For example, the Programa Integral de Desarrollo Infantil in Bolivia positively affected fine and gross motor skills, language, and psychosocial performance, but not anthropometric measurements (Behrman et al., 2004). An evaluation of a child daycare program in Rio de Janeiro compared good-quality with poor-quality childcare centers, and the results indicate that those of good quality increase cognitive and socioemotional skills and have positive effects on the labor outcomes of mothers and on household income (Barros et al., 2011). Additionally, Colombia's Hogares Comunitarios de Bienestar program increases children's height, decreases their probability of being malnourished, and increases their cognitive and psychosocial skills, although it does not affect anemia incidence (Bernal et al., 2009). For this same program, Attanasio et al. (2013) find that beneficiaries' school attendance between 13 and 17 years of age increase. Similarly, the Hogares Comunitarios program in Guatemala increases the probability of children to eat healthy food with higher nutrient content (Quisumbing et al., 2007). Furthermore, Mexico's Programa de Estancias Infantiles improves children's language skills, reduces the incidence of certain diseases, and increases the probability that beneficiaries' mothers find work (Angeles et al., 2011). An evaluation in Ecuador finds that home visits have positive effects on cognitive and physical skills, while childcare in early childhood centers have null or even negative effects —although the centers have a positive impact on the children's mothers labor supply (Roser and Oosterbeek, 2011). It is important to note that the population of this evaluation does not come from the poorest homes. Finally, Berlinski et al. (2009) assess the effects of attending a preschool institution on cognitive tests of children in grades 3 and 6/7 as well as the effects on behavior in class, finding positive results in both measures.

Esta evidencia muestra varios hechos importantes: intervenciones de calidad en la primera infancia son efectivas en términos de los resultados cognitivos y socioemocionales de los menores; también pueden tener efectos importantes sobre la oferta laboral de las madres cuando la intervención es en centros de atención (fuera de la casa). Dados estos efectos múltiples y sobre las habilidades que perduran en el largo plazo, estas intervenciones son usualmente pensadas como costo efectivas. Sin embargo, un estudio reciente del (Berlinski y Schady, 2015) destaca que, si bien el acceso a cuidado de primera infancia ha aumentado significativamente en varios países de la región, el principal foco actual debe ser en la calidad de la atención brindada más que en pensar rápidas ampliaciones de cobertura.

55. Chapter 2 discusses the long-term impacts of the program in Jamaica in more detail.

Table 3.8 Early Childhood Programs

Intervention	Country	Intervention unit	Variables for measuring impacts	Time frame of impact measurements	Size of impacts	Evaluation quality, by internal validity	Reference
Preschool education	Argentina	Preschool education institutions	Standardized tests in grades 3 and 6/7, behavioral measures (socioemotional development)	Medium term	Standardized tests: moderate positive effects. Socioemotional development: positive effects	Medium (fixed effects model and variation within homes)	Berlinski et al. (2009)
Proyecto Integral de Desarrollo Infantil	Bolivia	Institution	Cognitive and socioemotional skills	Short and medium term	Cognitive skills: moderate effects. Socioemotional skills: moderate effects	Medium (matching model and non-parametric methods)	Behrman et al. (2004)
Child care during the day, Rio de Janeiro	Brazil	Children	Mother's job offers, household income	Short term	Job offers: large effects. Mother's employment status: large effects	High (experiment)	Barros et al. (2011)
Hogares Comunitarios de Bienestar en Colombia	Colombia	Educational institution (community home)	Nutritional, health status, cognitive development, socioemotional skills	Short term	Nutritional status: moderate positive effects. Health status: small or null effects. Cognitive development: positive short-term effects and moderate positive effects in standardized tests in grade 5. Socioemotional skills: positive effects	Medium (matching)	Bernal et al. (2009)
Hogares Comunitarios de Bienestar en Colombia	Colombia	Educational institution (community home)	Height and weight (physical development), basic education attendance, mother's job offers	Medium term	Height and weight: moderate positive effects. Attended basic education: moderate positive effects. Mother's job offers: large positive effects	Medium (instrumental variables)	Attanasio, Di Mario and Vera (2013)
Care in centers and visits to homes	Ecuador	Centers and homes	Cognitive skills, physical development (weight/height), job offers	Differential exposure to program	Cognitive skills: positive effects of visits. Physical development: positive effects of visits. Job offers: negative effects of visits. The effects of the care centers are almost opposite to visits effects	High (regression discontinuity design)	Rosero and Oosterbeek (2011)
Community Homes	Guatemala	Educational institution (community home)	Diet and nutrient consumption	Short and medium term	Diet and consumption of nutrients: moderate positive effects	Low (matching /simple comparison)	Quisumbing et al. (2007)
Programa de Estancias Infantiles para Apoyar a Madres Trabajadoras	Mexico	Childcare centers/homes	Mother's employment status, physical development of children, diet	Short and medium term	Small to null effects in all measures (but some effects differentiated in certain subpopulations)	Low (simple comparison)	Angeles et al. (2011)

Source. Authors' elaboration.

Flexible models are those which objective is to change in a systemic way the operation of a certain school.

Flexible Models

One group of programs, the flexible education models, is aimed at systematically changing the functioning of schools. They modify everything from the school's atmosphere (e.g., aspects regarding discipline rules, schedules, etc.) to its administrative management. This is the case of charter schools in the United States, or of flexible models like Escuela Nueva in Colombia. In the United States, charter schools have moved school management from the public to the private sector (or started new institutions with private administrations to serve students who were previously attending public institutions), producing positive effects in learning (for example, see Angrist et al., 2010). Balsa and Cid (2014) present an evaluation of an equivalent model in Montevideo and find similar results.

One hypothesis of the positive results in cognitive skills is that these educational institutions change the socioemotional skills of the students. In the United States, several authors have analyzed the Charter KIPSS model, which is a chain of (privately administered) schools serving vulnerable and low-income populations. The schools operate on a "no excuses" model, with a firm commitment by the family to the school and a strict code of discipline. The model emphasizes skills related to discipline, respect, and perseverance, which are generally included in traditional definitions of socioemotional skills.

Escuela Nueva, one of the flexible education models in Colombia, was implemented during the seventies in rural public institutions. This model emphasizes teamwork between students and active learning strategies, with a professor serving as a facilitator of the process. The idea is to adapt the learning process to the necessities of the students or the context. The results of this program on standardized test results are positive (Psacharopoulos et al., 1993). That said, evidence on this type of flexible model is still very scarce in Latin America, and further research is needed to arrive at more clear-cut conclusions on the viability and effectiveness of these models in the different contexts of the various countries in the region.

Conclusions

In Latin America, the achievement of a higher educational coverage, which has reduced important socioeconomic access gaps, is overshadowed by the region's low education quality. The full development of the minimum skills required for people to function fully in society at present and in years to come has not been secured in most of the region's educational systems.

This situation poses a great challenge that needs to be tackled from multiple aspects. However, according to the evidence reviewed in this chapter, a key dimension needing improvement has to do with the teachers: they are at the center of any real change in the quality of education. In particular, one area of change with potentially high impacts is the professional development of teachers *before* they teach in front of a class.

Although in the past decade and a half, many countries have attempted to consolidate and increase teacher training, most times the efforts have been without much success. However, these reforms have been piecemeal, and perhaps the lack of incorporation of key elements to success found in other parts of the world explains the failed attempts. In particular, the reforms need to tackle several dimensions: reducing the vast disparities in teacher training institutions; increasing training on the preparation and management of the classroom as well as its contents and incorporation of new technologies (especially to deal more successfully with unfavorable contexts or highly heterogeneous classrooms); and, finally, increasing the requirements and incentives to pursue a teaching career as well as remain in it once hired, through measures to retain and motivate teachers.

A second area of policy that promises highly positive effects on children's integral long-term development is the provision of high-quality early childhood care. It should be stressed here that the core of this challenge involves increasing the amount of advanced training teachers and caretakers undergo so they can provide appropriate care and early education services to vulnerable populations (where the impacts would be much greater). These policies would imply sizeable early investments that may provide huge benefits in the future.

A third area of promising policies is those that take into consideration the great diversity of skills (cognitive and socioemotional) of students and adapt teaching to the respective development levels. Once again, the cornerstone of these policies is highly trained teachers who can effectively provide differentiated teaching. Such active models of education, in which the teacher operates more like a facilitator, could allow students to progress at their own rhythm and level, although the transition costs from one teaching system to another may be high and must be considered in advance. This line of policies has the potential to be complemented by massively incorporated new technologies into education.

Finally, the types of educational programs on which there is still little systemic evidence are those that promote certain extracurricular activities (e.g., music, sports, or theater). The theory of change behind such interventions indicates that impacts may be extremely positive, especially in respect to socioemotional development but also cognitive and physical development. Nevertheless, in this as in several other areas mentioned above, the ideal is to have more rigorous evidence that will enlighten discussion on which are the best designs and what resources are needed to effectively implement reforms.

IT'S NEVER TOO LATE: LEARNING AT WORK

Chapter 4

Chapter 4

IT'S NEVER TOO LATE: LEARNING AT WORK ¹

“Anyone who stops learning is old, whether at 20 or 80.”

Henry Ford

Marcela, Alberto, and Mariano are talking in a cafe. They have known each other since they were schoolchildren. Marcela and Alberto were the top students in their class and went on to finish college. Mariano dropped out of secondary school. When they each have their second beer in hand, the question is asked: “Mariano, when are you going to get a real job?” Mariano has worked a variety of short-term jobs, so he says with resignation, “You know that finding a good job is not easy, especially without experience, contacts, or a degree.” He adds, “Plus I already forgot what little I learned in school.” “You should take a computer course to open up new opportunities,” interrupts Alberto. Mariano changes the subject and asks “And how are you two doing in your work?” The first to answer is Marcela. In her last year at college, she got an internship in a well-known company. Because of her talent and effort, she was immediately hired for a full-time job when the internship ended. “Very good, I learn a lot. My boss always sends me to training courses, but the best part is that my coworkers are great and I learn a lot from them. As for work atmosphere, it goes without saying. Certainly, workplaces offer great opportunities for learning.” Then, with less enthusiasm, Alberto answers. When he graduated from college, he had to face a harsh reality: finding a job that met his expectations was not going to be easy. Perhaps out of desperation, he ended up accepting a job that was quite different from his training, “I’m not doing so well. The work is nothing to get excited about. And I don’t interact much with my colleagues. Well...at least I have health insurance.” He finishes his second beer in one gulp and shouts to the waiter, “Three more and the bill—that Marcela will pay.”

Introduction

A large portion of a person’s life is spent at work. Someone who starts to work at around age 20 and retires past the age of 60 will have been active in the labor market around 4 times the average time spent in formal education.² Although the educational system and the family are the institutions that play an essential role in the formation of skills for life and work, learning opportunities continue to exist in

1. The preparation of this chapter was the responsibility of Fernando Alvarez and Pablo Brassiolo, with the research assistance of Giorgio Cunto, Agustina Hatrick, Federico Juncosa, and Carlos Rodríguez.

2. According to figures from the Socio-Economic Database for Latin America and the Caribbean (SEDLAC; CEDLAS and the World Bank, 2016), the average years of schooling for a sample of 18 countries in the region is 8.5 years. The indicator varies from 11.4 years in Argentina to 6.3 in Honduras. The 18 countries used to calculate the regional average are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Uruguay, and Venezuela. The figures are for 2013, with the exception of Mexico (2012), Nicaragua (2009), and Venezuela (2006).

the labor market. In fact, almost half of the human capital individuals accumulate during their lifetime is associated with investments and activities related to work.³

People accumulate skills at work through three channels. The most obvious is training programs in the workplace. Second, workers learn by being involved in certain activities or tasks, so they learn by doing. Finally, workers learn through the interaction with coworkers or supervisors in the workplace.

How a person invests in and accumulates skills through these three channels also depends on three factors. The first is that the characteristics of the worker (gender, previous skills, socioemotional characteristics, age, formal education level, etc.). The second is the characteristics of the job (size of the company, characteristics of the employment agreement, types of tasks proper of the occupation, etc.). The third arises from the interaction between the two previous factors and refers to the quality of the match between the two: the fit between workers' skills and the requirements of their job.

Based on data from the 2015 CAF Survey and using the workers' self-perception data on the evolution of their skills as a measure of skill accumulation, this chapter provides evidence suggesting the relevance of the three accumulation channels. Likewise, it points out that informal learning channels (learning by doing and interaction with fellow workers) are quantitatively more important than formal training.

The analysis also shows how much the importance of these channels is related to workers' characteristics, employer's and job's characteristics, and the quality of the match. For example, being employed in a large firm or having a college degree are positively associated with having higher skill accumulation. Some personality traits, such as having more emotional stability and a favorable attitude toward learning, also lead to higher skill accumulation. The quality of the match between the worker and the job also affects skill accumulation.

Another finding that arises from our empirical analysis is that self-employment and unemployment spells are associated with lower skill accumulation or even skill deterioration. This is due not only to a lower exposure to training programs, but also to the fact that self-employed and unemployed individuals do not benefit from an enriching labor context in which they can learn daily from colleagues and workplace activities. Furthermore, long unemployment spells could deteriorate the quality subsequent job matches, thereby affecting the dynamics of learning.

We also find that previous work history, and specifically the characteristics of the first job, matters for the dynamics of skill accumulation. Characteristics of the first job such as whether it is formal or informal employment⁴ have long-lasting effects on the quality of future jobs. Consequently, entering the labor market in an adverse context may place youth on an unproductive learning path.

3. See Heckman et al. (1998).

4. This result refers specifically to having a written labor contract.

In this chapter, skill accumulation at work is linked to the conditions of the labor market, which do not seem to be very favorable in Latin America. One reason is the region's high informality, and, within the formal sector, the abundance of very small firms with limited opportunities to learn. Another reason is the considerable risk of long unemployment periods. Finally, for those employed, there is a risk of being in an occupation that does not match one's skills. All these problems appear to be more serious for youth.

It is worth highlighting that the labor market also influences skill accumulation before a person begins working.⁵ In fact, the labor market signals what skills are needed for different occupations and what the returns to those skills are so that individuals, the family, or the school may efficiently invest in cognitive, socioemotional, and physical development that will be the best fit for children and youth as they grow and ultimately enter the labor market. Therefore, these signals guide investment decisions in human capital from very early on in life. Unfortunately, the interpretation of these signals may be affected by limited information or limited capacity to process it, which may lead to suboptimal decisions.

Public policies may play an important role in fostering skill accumulation in the labor stage. However, these policies must be well-targeted to the local and regional context and any market failures that could be limiting effective skill accumulation. This chapter ends with a review of such policy instruments in the region and a summary of the evidence available on their impacts.

The What and How of Learning at Work

The labor market plays at least three essential roles for the good operation of an economy. First, it allocates the pool of talent among different occupations.⁶ Secondly, it guides the accumulation of human capital throughout life and the occupational choice⁷ through signals about returns to investments in different skills in various occupations (see Text Box 4.1, p. 220, for a discussion on the global nature of the formation of returns on education). This role may be conditioned by aspects such as the signals' clarity and the capacity of decision-makers to interpret them (see Text Box 4.2, p. 221). Finally, the labor market is, in itself, a potential source of skill accumulation. This last role is the focus of this chapter.

5. Another role of the labor market is to allocate talent among different occupations.

6. This does not always take place efficiently, especially in economies with strong distortions, particularly in those in which workers' skills do not always correspond to the requirements of their jobs and where the allocation of factors—capital, labor and entrepreneurial talent—among firms is not efficient (CAF, 2013).

7. Obviously both in decisions about human capital accumulation and decisions related to occupations, factors other than monetary compensation are important.

The labor market is, in itself, a potential source of skill accumulation.

Text Box 4.1 Returns to Education and Schooling Decisions: A Global View

Formal education represents one of the most important ways to accumulate skills. Educational achievement -and in particular average years of education- differs substantially among countries. What explains the fact that in some countries citizens invest more in education than in others? Although the decision to invest in education has multiple significant components, a special motivation comes from returns to education.

There is evidence of the association between return to education and schooling decisions. For example, in the case of Spain, Aparicio (2016) finds that an increase of 10% in the wage gap between educated and uneducated workers leads to an increase of 2% in the probability of being attending school for youth from 16 to 18 years of age. In turn, Restuccia and Vandernbroucke (2013) find that the wage changes that occurred in the 20th century in the United States may explain 60% of the increase in years of schooling in that country for that same period.

As with price determinations, wages are determined by global economic conditions, and particularly by supply and demand forces. Consequently, returns to education are affected by elements of a different nature. It is beyond the scope of this chapter to have a comprehensive review of the determinants of the returns to education and how those factors affect people's investments in education. However, it is important to list some determinants of interest to illustrate the multidimensional and global aspects of the problem of incentives for investing in education.

Perhaps one of the determinants that has received the most attention from the demand side is technological progress. Technological progress usually changes the productivity of the various factors used in production. But this change does not have to be equal for all inputs or all types of workers. In fact, during the nineties, some literature emerged suggesting that technological progress has more strongly favored the productivity of more qualified workers, thus identifying it as a major factor for the increase in the returns on education experienced in the United States since the eighties (see for example, Autor et al., 2003).

But labor market structure can also be responsible for low returns to education. For example, Fleisher and Wang (2004) argue that lack of competition among firms seeking work is responsible for the low returns to education in China. Labor market frictions that spark informality can also distort the return to education and explain differences in schooling rates. This occurs, for example, if the return to the skills accumulated by formal education is higher by being employed in the formal sector than in the informal sector.

In turn, credit market frictions may explain the low schooling rate. This happens because the individual's education decision is limited by problems of access to credit (Solis, 2011, shows that this effect occurs in Chile), and because credit constraints may be unfavorable to capital accumulation and innovation by firms, which lowers the return to education and therefore investments in human capital.

Furthermore, there is evidence that developing economies, including those in our region, suffer various kinds of frictions that affect total factor productivity (CAF, 2013). This low productivity

of the economy implies a low return to human capital and is a major determining factor in low schooling rates (Restuccia and Vandenbroucke, 2014).

This global view of the returns to education and skill accumulation in general implies that, in the presence of other distortions, any policies that focus exclusively on education may be insufficient for promoting higher skill accumulation. As a result, a comprehensive approach should include the removal of these barriers and frictions.

Source. Authors' elaboration.

Text Box 4.2 Limitations of Information and the Decision to Invest in Training

The decisions made throughout life to accumulate human capital involve many actors. Families decide about the quality and quantity of resources to invest in children's skill formation; the education system defines curricular contents that it considers relevant; people themselves decide how much and what type of education to pursue; and firms, jointly with workers, define the quantity and type of training for jobs. An additional difficulty in all these decisions is the time gap between when an investment is made and when the accumulated capital is used, which demands guesswork about the role different skills may play in the future.

Each of these decisions is complex and requires having the necessary information and capacity to process it. But these conditions not always are met, which may mean that people have the wrong skill sets or general training levels that are too low or too high.

As pointed out by Almeida et al. (2012), the decision to invest in training is made on the basis of information about costs and expected returns on these investments, which may be erroneous or incomplete. When such information problems exist, both the quantity and the type of education may not be optimal. Likewise, any volatility in the returns on education may complicate the issue. Some studies show that macroeconomic shocks affecting returns on education have consequences on investment decisions in education.¹ If these shocks are transitory, and if the transitoriness is not correctly anticipated, training decisions may not be optimal.

Even if those who have to make human-capital accumulation decisions were capable of including and processing all the relevant information on the costs and benefits of their decisions, they could have difficulty distinguishing the quality of institutions that provide training. This, once more, could result in suboptimal investment levels or in inadequate skill formation.

Source. Authors' elaboration based on Almeida et al. (2012).

1. See, for example, Aparicio (2016) for the case of the construction boom in Spain during the past decade, or Black et al. (2005) for the case of the coal boom in the Appalachian region in the United States.

Which Skills Are Important in the Labor Market

The skill accumulation process continues throughout life; it does not end with formal education. In fact, estimates for developed countries point out that human capital increases noticeably during one's working life.⁸ Understanding the characteristics of this accumulation process in the working stage of life requires knowing which are the relevant skills in the labor market, which are susceptible to changing, and how they can be modified.

There is no consensus on which set of skills is the most relevant for work. Although years of formal education has traditionally been used to measure human capital, success in the labor market requires skills beyond one's educational level, such as technical knowledge and skill dexterity necessary to perform a task, which requires both cognitive and socioemotional skills (Heckman et al. 2006). Defining a thorough list of skills is a complex task because the portfolio of required skills may vary from one occupation to another and according to the context.⁹ Text Box 4.3 shows how occupations are characterized by a great variety of skill requirements and how the skills' relevance depends on the tasks performed in each occupation.

Beyond this heterogeneity of work skills, it seems useful to have a general taxonomy of these skills. First there are the cognitive skills, which go from the basics, such as reading, writing, and elementary arithmetic, to more complex skills (more complex reasoning and memory), such as critical thought, problem-solving capacity, creativity, and the ability to learn, manage, and communicate information, among others. A second group of work skills are socioemotional, so these abilities involve managing behavior and emotions, such as self-control, initiative, flexibility, and commitment, or interacting with others, such as communicating, collaborating, performing teamwork, showing leadership, and exhibiting conflict resolution abilities.¹⁰ The third group of skills is physical, with requirements that vary from fine motor skills (to be a good surgeon) to physical conditioning (for jobs that demand physical strength).

Knowledge and technical dexterities of workers can comprise any combination of these cognitive, socioemotional, and physical or motor skills used to achieve tasks.¹¹ These abilities and technical competencies are made up of specific knowledge and tools that are either indispensable for the performance of certain tasks or are useful in making a worker more productive. These technical competencies are extremely diverse and include dexterities from those necessary to operate a lathe to knowledge of accounting principles or even programming computers, among many others.

8. For example, Heckman et al. (1998) estimate that almost half of the human capital that individuals accumulate during their life arises from work-related investments and activities.

9. Some reviews of this literature are by Pellegrino and Hilton (2013), Benerjee et al. (2010), Almlund et al. (2011), and Borghans et al. (2008).

10. The first group of skills is usually classified as socioemotional intrapersonal and the second as socioemotional interpersonal.

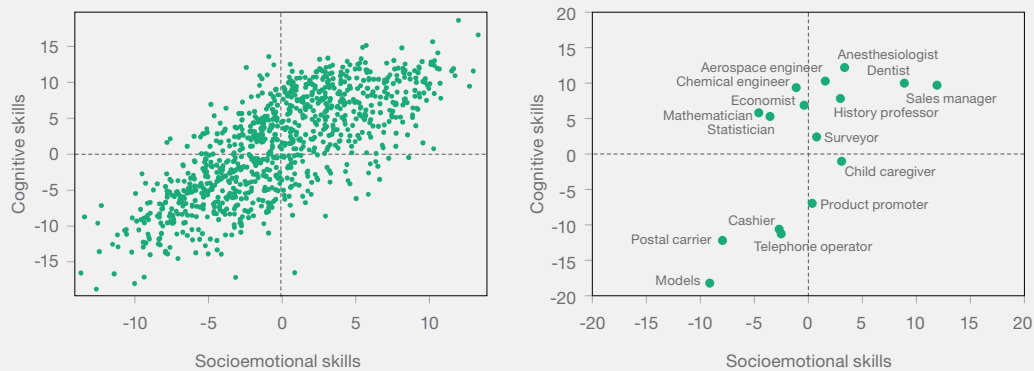
11. According to Almund et al. (2011), in psychology literature technical skills are considered to be a subset of cognitive skills.

Text Box 4.3 A Standardized Listing of Skill Requirements for Various Occupations

The Occupational Information Network (O*NET) is an information system created by the United States Department of Labor to describe around 900 occupations on dimensions such as the average characteristics of workers in each occupation (abilities, interests, values, work styles, etc.) and their ideal requirements (skills, knowledge, and educational level, etc.).

Based on this information, an index of cognitive and socioemotional skills requirements has been constructed for each occupation, using the aggregation of these skills made by Pellegrino and Hilton (2013). Graph 1 shows this classification for all occupations available in O*NET (left panel) and for some selected occupations (right panel).

Graph 1 Skill Requirements for Selected Occupations: Cognitive versus Socioemotional Skills



Note. The graph reports the distribution of occupations from O*NET according to its requirements of socioemotional and cognitive skills. Following Pellegrino and Hilton (2013), the requirement of cognitive skills is associated with the concept of fluid intelligence and is constructed based on the following items: “judgment and decision-making,” “systems analysis,” “critical thought,” “active learning,” “learning strategies” “monitoring,” and “complex problem solving.” In turn, the requirement of socioemotional skills is associated with “agreeableness” from the Big Five model on personality traits and is constructed based on the following items: “social perceptiveness,” “coordination,” “persuasion,” “negotiation,” “instruction,” and “service orientation.” The distribution shown is one of the many that can be prepared based on O*NET data.

Source. Authors' elaboration using data from O*NET.

The central message is that there is an important variety of skills whose relevance depends on the tasks performed in each occupation. This conclusion would be the same one if another aggregation of skills were used.

Source. Authors' elaboration.

Text Box 4.4 Evidence of Labor Returns on Skill Investments

Evidence on the importance of human capital of people for labor success is plentiful. Most studies put the return to investment in each additional year of education between 7% and 11% for the United States (Pellegrino and Hilton, 2013). Other studies indicate that education brings other nonmonetary benefits, such as greater sense of achievement, higher work satisfaction, possibility of holding positions of more prestige, and higher access to training (Harmon et al., 2003; Card, 1999; Ashenfelter et al., 1999). However, education level has proven to be a relatively limited measure of human capital accumulated by a worker. In a review of the literature on the determinants of labor income in the United States, Bowles et al. (2001) conclude that years of education, together with years of work experience, parents' education, and other characteristics of the family environment explain only between one fifth and one third of (the variance of the natural logarithm of) wages. Thus, it is important to more directly measure the different components of workers' skills sets.

In this respect, studies that analyze the importance of the cognitive skills, measured through the results of standardized tests, find a positive association with labor income, performance on the job and in training activities, and occupational hierarchy (Pellegrino and Hilton, 2013). If a distinction is made between basic cognitive skills and more complex cognitive skills, similar conclusions are reached. In both cases positive returns have been found, using data from various countries and different methodologies. To learn more, see Cunningham and Villaseñor's (2016) outline of some of these studies.

Knowledge about the importance of intra- and interpersonal socioemotional skills in the work environment is more limited. Analyses of the importance of the personality in the labor market tend to find that some characteristics are associated with positive results. For example, Almund et al. (2011), in a review of several studies, find that the tendencies to be organized, responsible, and a hard worker (known as "conscientiousness" in the model of the Big Five factors) is one of the personality traits that is most associated with income and performance at work. There is also evidence about the increasing importance of socioemotional skills such as initiative, persistence, and emotional stability, among others on success at work (Heckman et al., 2006; Aedo and Walker, 2012).

Evidence on the importance of technical and mechanical skills is scarce. DiNardo et al. (1997) suggest that the use of computers at work requires specific skills that translate to higher salaries for the workers who operate them. Other studies also find positive returns on knowledge of information technology (Borghans and Ter Weel, 2011) and to certifications in information technology (Vakhitova and Bollinger, 2011). However, in a review of training programs on technical skills, Betcherman et al. (2007) suggest that these types of programs have rather modest and even null results. Finally, Prada and Urzua (2014) show that mechanical skills are also compensated by the work market.

Source. Authors' elaboration

Cunningham and Villaseñor (2016) carried out a systematic review of empirical studies on the skills of workers required by employers.¹² Of the total of 27 studies included in the sample, 24 allow for a ranking of workers' skills that employers consider most important to the productive process. Taking the first five skills in the order determined by employers, almost 51% of them are socioemotional skills, 30% are complex cognitive, 7% are basic cognitive, and the rest are technical.¹³ Likewise, 15 of the studies analyzed allow for a ranking of the most serious skill gaps, understood as the difference between the skills required by employers and those that workers have, according to the employers' perception. The results are qualitatively similar. Among the five most severe skill gaps, 42% correspond to socioemotional skills, 35% to complex cognitive, 3% to basic cognitive, and the remaining 17% to technical.

Human capital accumulation efforts appear to be compensated in the labor market in monetary and nonmonetary terms.

The importance of the different skills for work has been made evident in numerous studies on returns on investment (see Chapter 1). There is evidence that human-capital accumulation efforts are compensated in the labor market both in monetary and nonmonetary terms.¹⁴ There is also evidence of a return on cognitive skills and, to a lesser extent, on socioemotional and technical skills (see Text Box 4.4).

Nevertheless, the skills that mattered yesterday are not necessarily the ones that are important today, and those that matter today could cease to be important in the future. Innovation and technological process have the capacity to modify the skills demanded by the market. Rapid advances in new information and communications technologies have led to increased use of computers to perform routine tasks, which has precipitated a drop in the demand of routine cognitive and manual skills, and an increase in the demand of complex cognitive skills and of interpersonal socioemotional skills (Autor et al., 2003; see Chapter 1).

Beyond defining the relevant skills for the labor market, it is also important to know that their development is a complex process in which the capacity to assimilate and accumulate new skills depends on the skills accumulated up to that time. This dependence on previous skill history makes the employability and the productivity of the person dependent on the entire skill accumulation cycle prior to entry to the labor market, when institutions such as the family, the schools, college, and other education centers, as well as the environment, played a critical role.

This aspect of the skill accumulation process is directly related to skill malleability. The important question here is, given the skill accumulation that

12. The review includes 27 recent studies (published between 2000 and 2015) of developed and developing countries, with evidence mainly from surveys of employers. The studies are of a qualitative nature and are grouped in two categories: those that analyze the priority that employers give different skills according to their importance for work performance and those that analyze the priority of skill gaps that employers identify as more severe. Skills are classified as socioemotional (e.g., adaptability, collaboration, commitment, control of emotions, accountability, cooperation, creativeness, among others), complex cognitive (e.g., analytical, critical thought, decision-making, innovation and problem resolution), basic cognitive (e.g., reading, writing, basic arithmetic), and technical (e.g., information technology, knowledge of sector, type of training and experience).

13. If instead of the first five only the skill on top of the ranking is considered, the relative importance of socioemotional skills increases: 79% of employers indicate the most important skill set as socioemotional skills; 17%, complex cognitive; and 4%, technical skills. Basic cognitive skills were not named by any respondents.

14. See for example the reviews of Card (1999), Harmon et al. (2003), or Pellegrino and Hilton (2013).

Individuals may accumulate skills through three channels in the labor market: formal training programs, learning from peers, and learning by doing.

people have when they are ready to enter the labor market, how malleable are the different competencies assessed by the labor market? The answer is not simple. As shown in Chapter 1, the literature in neuroscience suggests that there are “optimal stages” for the acquisition of skills —periods in which individuals are more apt to assimilate a certain skill that basically depends on the person’s level of neurobiological and psychological development.

At the time of entering the labor market, some cognitive skills are relatively fixed, particularly the more basic ones (such as reading, writing, and elementary knowledge of arithmetic) that are usually acquired during childhood, but also some of the more complex ones (such a problem resolution, among others) that are acquired during childhood and adolescence. Something similar occurs with certain socioemotional skills that are developed throughout childhood and adolescence, mainly in the family context, but the school and the environment also play relevant roles. With the arrival of adulthood, an optimal stage is triggered that allows the acquisition and improvement of dexterities and technical knowledge that are based on previously acquired cognitive and socioemotional skills (Conningham and Villaseñor, 2016). In addition, in this stage there seems to be space for improving or reinforcing some socioemotional skills, such as self-control, initiative, confidence, and problem-solving ability (Pellegrino and Hilton, 2013; Guerra et al., 2014).

How Skills Are Accumulated in the Labor Context

The labor market permits individuals to accumulate skills through three possible channels. The most obvious one, although not necessarily the most important, is the participation in training programs for work, which may be financed by the firm, the worker, and even the state or NGOs. The incentives of workers and firms to invest in training vary according to the degree of specificity of that training, as discussed in Text Box 4.5. Additionally, workers may learn through being involved in certain activities or tasks, which is called “learning by doing”. A third channel, closely related to the second, is the interaction with co-workers or supervisors in the work environment, which also offers learning opportunities. The factors that affect the operation of these three channels may in turn be classified into three determinant groups.

Text Box 4.5 Specificity of Skills: Who Pays for Training?

When decisions to accumulate human capital during the work stage are analyzed, it is important to bear in mind that the worker may acquire general skills (which increase productivity beyond the current sector, occupation, task, or firm) or skills with some level of specificity. Let’s think for teaching purposes about two extreme cases, although it is important to recognize that, in general, many skills are neither entirely specific to a firm nor absolutely general (see Sanders and Taber, 2012).

In the case of general skills, and to the extent that firms compete for the best workers, broadly speaking, the workers themselves are the ones who have incentives to invest in skills, because they are the ones who ultimately receive the benefits of that investment. In this case, firms have no incentive to finance part of the investment in the worker's general human capital since once the worker has acquired those skills, there is the risk that another company will take that employee away. In this manner, the only way that a firm will have to retain the employee would be to compensate the worker for the resulting higher productivity, whereby the firm would not be able to recover the investment costs. In this case, the economy may achieve the optimum level of investment in general skills during the labor stage, with the cost of the investment assumed entirely by the worker in the form of a lower salary during the period that the investment occurs.

This reasoning assumes that workers do not have difficulties accessing credit or other mechanisms to finance their investments in human capital while earning the lower salaries, otherwise the result could be an investment that is less than optimal. It also assumes that once the worker has accepted a low salary in exchange for training, the company in effect provides that knowledge. This argument justifies, for example, internship programs, where the workers accept jobs for low or no salaries during the term of the internship in exchange for some training that is expected to be useful in the labor market, either in the current job or in another one.

However, there are cases in which firms are indeed willing to increase the general human capital of their workers, and these occur when companies that assume the costs of the investment in the human capital of their workers do not perceive any major risks of losing these trained workers to other companies. This will be the case with labor market frictions. The existence of high-cost job searches or other types of labor market frictions could generate this type of situation and give firms incentives to invest in the (general) human capital of their workers.

In summary, in the absence of credit and contractual restrictions, workers and companies have sufficient incentives to favor the accumulation of general skills and, therefore, the intervention of public policies would not be necessary. Who ends up paying the majority of the cost from the investment in general skills depends on how competitive the labor market is: the higher the competition, the more incentives workers will have to accumulate skills (and lower those of the companies).

The other case to consider is one in which skills are valued only in the current firm, so the worker has fewer incentives to bear the costs of accumulating those skills. The reason is that once it has assumed the costs of the investment, the firm will have no incentives to remunerate the worker according to the new skill level given that these skills have value in only the current job.

Perhaps companies will indeed be willing to assume all costs of the investment in specific human capital because they can recover them through salaries lower than the worker's productivity. However, these companies are not exempt from the risk that the worker for some reason will leave the company, and for this reason they will not necessarily want to bear the costs of those investments.

The result could be that the investment in specific skills made by both companies and workers is lower than the socially optimal level. In practice, there could be reasons that lead the worker to want to invest in those specific skills, such as having certain market power over the company (by

labor regulations or specificity of the worker's human capital) in such a way that the company will share the profits of the employee's higher productivity. Another result could be that the company could have a reputation of compensating the investment in specific human capital of its workers. The company may also have an organizational structure that promotes these investments (for example, promotion schemes tied to the performance of these investments).

Source. Authors' elaboration based on Acemoglu and Autor (2011) and Sanders and Taber (2012).

People are different in many aspects; their capacity and disposition to learn is not an exception.

The first determinant is worker attributes. People are different in many aspects: their capacity and willingness to learn is not an exception. Opportunities and needs for training as well as capacity to acquire and assimilate new skills depend, among other things, on the level of worker's human capital. Formal education is a key factor.¹⁵ However, workers with the same level of education differ from one another by their accumulation of other cognitive, socioemotional, and technical skills as well as their preferences and motivations, factors that also determine skill accumulation in adults. Characteristics such as wealth level —that affects people's capacity to finance courses and reject jobs with poor accumulation expectations— age, and gender are factors that could also affect skill accumulation dynamics.

Similarly, an individual's labor history is important because a person's first job opens the door to the labor market, and the job's characteristics could condition a considerable part of the person's working life. Different explanations support this point. For example, labor history in general, and the first job in particular, may be used as signal of certain attributes of the worker. In addition, the contact networks that are created throughout the worker's employment history are important to the probability of obtaining good jobs.

The second determinant is employment attributes, understood as the combination of a specific occupation in a specific firm. Some firms have greater inclination for training of their workers. Likewise some companies offer a more advantageous environment for learning by doing and/or from peers. Large and innovative companies could have greater returns on training of their personnel (given the complementarity of the skills to technology), and they could also take advantage of certain economies of scale in training activities. They could also have more complex production processes as well to favor more enriching interactions between colleagues. Yet since formal positions tend to be more stable over time, workers may want to undergo job training or some other means of accumulating human capital. In addition to the employer's characteristics, each occupation involves certain specific tasks, and the complexity and/or characteristics of the tasks may require higher or lower training, or favor higher or lower accumulation of dexterities, knowledge, and experience.

15. Formal education can also explain certain favorable results in the labor market, since it may serve as signal of unobservable skills of workers. Furthermore, education is one of the factors that contribute to individuals' formation of contact networks, which is one of the major channels to look for good jobs.

A direct implication of the importance of job attributes is that periods of self-employment and/or unemployment go against workplace skill accumulation. Both situations imply either depreciation of human capital, or, in the best case, a relative deterioration in respect to being employed in more favorable jobs. This deterioration could occur through three channels, by lower participation in training programs, lower exposure to skilled peers, or lower exposure to challenging and enriching tasks and activities.

The third and final determinant refers to the degree of fit between the skills of the worker and the requirements of the job. This fit defines what we will call “match quality.” Mismatches or “bad matches” may vary in nature. For example, a person may be overqualified. A mathematician assigned to a position of mathematics teacher in a primary school will likely know the curriculum and, assuming the person has the necessary teaching skills, be able to transmit the knowledge efficiently. However, in an economic sense, it may be more valuable to have this person working in a different job where this knowledge would be more advantageously applied. From the perspective of this worker, despite being able to perform the job’s tasks efficiently, the excess of skills relative to what’s required for the position could imply a low return to the worker’s capacity and generate dissatisfaction, decrease motivation, and reduce effort. A worker may also have fewer skills than those required or, taken to an extreme, have a major lack of skills required for the job. This occurs when a person has a training that differs from the job requirements.¹⁶

To begin with, it is not clear what effects certain bad matches could have on the dynamics of skill accumulation of the worker¹⁷. Most likely, the answer will depend on the nature of the bad match and the channel being assessed. For example, if a person is overqualified for their current job and the duties and environment are not challenging enough, the employee will have less opportunity to learn from the experience in the performance of those tasks and any peer effects. In another example, a worker’s previous training may not be in accordance with the occupation, and therefore the work dynamics would be sufficiently extraneous to take maximum advantage of learning opportunities from peers and duties. Yet another case could be of a slightly underqualified worker who could benefit from learning derived from just doing the job. Likewise, this employee could be a candidate for receiving training to overcome these deficiencies.

There seems to be an important gap in respect to the nature and implications of the quality of occupational matches.¹⁸ A challenge in this respect is to measure the degree and quality of job matches. Text Box 4.6 (see p. 230) presents some match quality metrics used in this chapter.

Some companies have a greater inclination to train their workers. Some companies also offer a more favorable environment for learning from peers or learning by doing.

16. This could be framed as a problem of being underqualified; however, in this chapter, it is treated as a situation in which the worker would need “different training”.

17. This subject has not been sufficiently addressed in literature, either theoretically or empirically. In this respect, the descriptive analysis that is made in this chapter seeks to motivate further research on the subject.

18. In preparing this report, research was based on how the low quality of people’s education could produce low-quality matches, with important implications for aggregated productivity (see Arozamena and Ruffo, 2016).

Text Box 4.6 Measuring the Quality of Job Matches in Latin America Using the CAF Survey

The measure of the quality of the match between the skills of a worker and the requirements of the occupation entails several challenges. In order to obtain an adequate measurement, it is necessary to have information that, generally, is not available. To this lack of information is added the multidimensional nature of the skills required by an occupation and those that the individual has. In fact, it is possible that in a labor relationship, the worker may have an adequate level of some skills required for the job but an inadequate level of others. Furthermore, in respect to a specific skill, a worker and an occupation could be defined as poorly matched because the worker is overqualified, underqualified, or differently trained than what is required for the occupation.

The information gathered from the 2015 CAF Survey allows us to construct some measures of the quality of job matches. Some of these measures are based on the responses of workers and others are based on the contrast between the skills measured in the CAF Survey and those required by the occupation according to O*NET.

We call the first measure self-reported global, and it is based on the answer to the following question: “For your current job, do you consider that your qualification level (that is, your experience, knowledge, and dexterities): (a) is correct, (b) you could tackle more demanding tasks than those required by your current job, (c) you would need more training to perform the current tasks well, (d) you would need different training.” The respondent had to select one option only. We defined the worker as well matched if the response was (a), overqualified if the response was (b) and underqualified if the response was (c). Option (d) is identified as a bad match in terms of the field of work. This measure is classified as a global measure because it is not defining a specific skill.

The second measure is also self-reported, but this measure corresponds to formal education. We call it self-reported educational. In particular, this measure is based on the answer to the following question: “To what extent are the knowledge and skills acquired during your studies useful in your current job?” The possible answers go from 1 (very useful) to 4 (not useful).

Finally, the third measure combines the workers’ skills, measured by the 2015 CAF Survey, with the skills required by the occupation according to O*NET, aggregated to two digits. We call this measure the estimated measure. The first task is to select what items from O*NET correspond to some of the skills for which we have measures in the 2015 CAF Survey. The skills that we consider are cognitive skills; crystallized intelligence, measured by a test of verbal skills; and a socioemotional skill, agreeableness, based on the Big Five model. The selection of the items from O*NET for these two skills was based on Pellegrino and Hilton (2013).

Both skills are compared with O*NET data through a set of questions. To add them to the index by skill, we use the principal components technique. Then we contrast the current skill level of the worker (taken from the 2015 CAF Survey) to the level required by the occupation (based on O*NET). In this comparison, in a similar manner to Guvenen et al. (2015), the gap in skills is constructed by taking the position of the worker —in the worker’s skill distribution— and the position of the occupation —in the distribution of skills of the occupation. Finally,

for each skill a binary variable has been constructed that reflects whether the worker is underqualified (considered as being as much as 20% under the requirements) or overqualified (20% above).

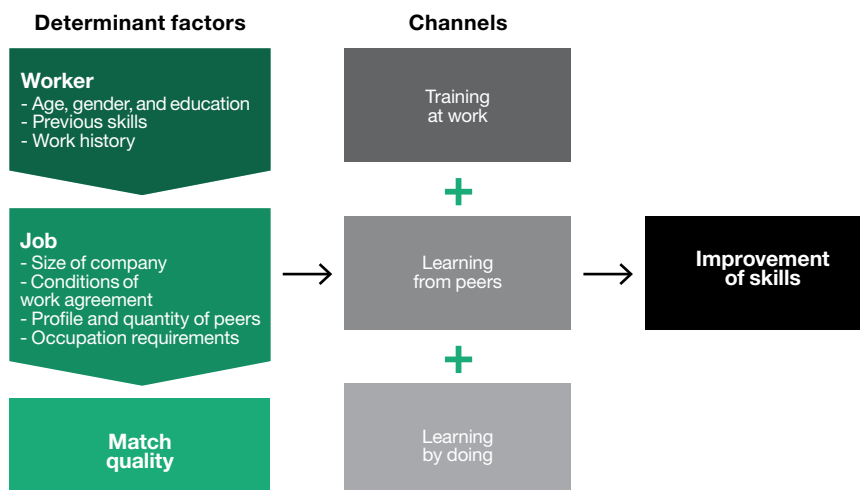
Although all these measures refer to some dimension of the quality of the match, they do not necessarily measure the same thing. Some are global while others are specific to a particular skill; and some refer to the concordance between formal education and the skills required for the job while still others allude to skills acquired through different means, including experience. As such, these measures are complementary.

Source. Authors' elaboration

In summary, workers may accumulate skills through three different channels: receiving instruction or formal training, gaining experience from doing the job, and learning from colleagues or supervisors. In addition there are three types of determinants that affect these processes: a worker's skill level, including work history; employment characteristics, including whether the person is informally employed or unemployed; and the quality of the job match. This view of the skill accumulation process in the labor stage is represented in Figure 4.1.

The informality of labor in Latin America does not favor the development of skills, especially for youth.

Figure 4.1 Skill Accumulation Process in the Labor Context



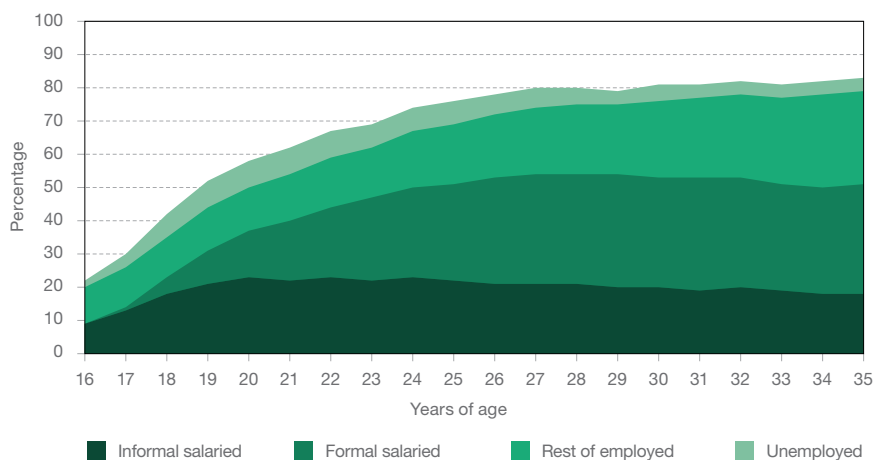
Source. Authors' elaboration.

The Labor Market and Skill Accumulation in Latin America

Since the features of the labor market are crucial for the dynamics of skill accumulation in the labor context, it is important to briefly describe the Latin American labor market's main characteristics and the human capital investment patterns of the region's firms.

The labor market in Latin America does not look favorable for skill development, especially for youth. The region is dominated by informal employment and formal employment in firms that are relatively small in respect to the formal firms in developed countries, as well as rampant mismatches between workers' competencies and the requirements of their occupations.

Graph 4.1 Distribution of People from 16 to 35 Years by Occupational Situation in Latin America (circa 2013)



Note. Formal salaried employment is considered as a job with a written contract wherein the employer contributes to the worker's social security. The category "rest of employed" includes self-employed workers, employers, and family workers who are not remunerated. Data are for the following countries and years: Argentina (2013), Bolivia (2013), Brazil (2013), Chile (2013), Colombia (2013), Costa Rica (2013), the Dominican Republic (2013), Ecuador (2013), El Salvador (2013), Guatemala (2011), Honduras (2013), Mexico (2012), Nicaragua (2009), Panama (2013), Paraguay (2013), Peru (2013), Uruguay (2013), and Venezuela (2011).

Source. Authors' elaboration using data from SEDLAC (CEDLAS and World Bank, 2016).

Youth Insertion into the Labor Market

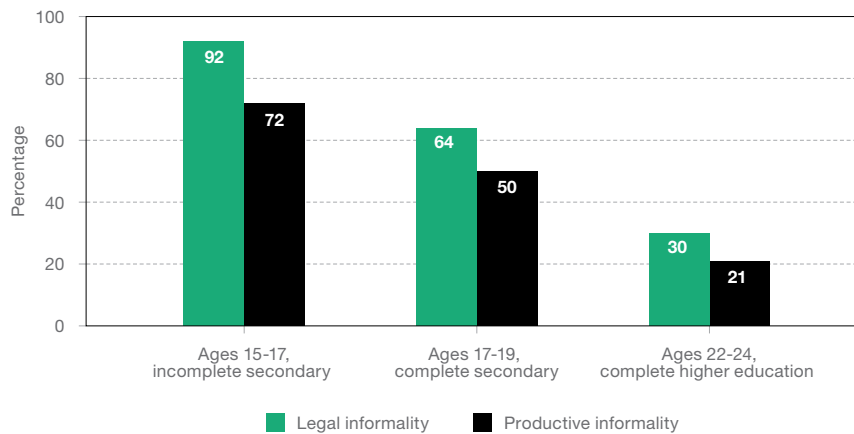
After going through formal education, most people enter the labor market. The labor participation rate, which is the proportion of persons who are

working or actively looking for a job, starts to grow from around 23% at 16 years of age until it stabilizes at around 80% between 27 and 28 years of age (Graph 4.2). Between 15 and 35 years of age, on average, more than two thirds of the people (68%) are active in the labor market, and most of them already have a job (62%), although some people remain unemployed (6%).¹⁹

Occupational informality levels are higher among youth who are entering the workforce, particularly among the workers with less formal education.

Naturally, the job position can be formal or informal, with formal employment being the jobs covered by labor rules and regulations. Most people ages 16 to 35 have informal jobs.²⁰ Of the 62% of people between the ages of 16 and 35 who are employed, only 19% are in formal salaried positions, around 24% of workers are in informal salaried positions, and 19% are self-employed or in family work or other work that is not remunerated.²¹

Graph 4.2 Labor Informality among Youth Who Do Not Attend School Anymore, by Age Group and Educational Level in Latin America (circa 2013)



Note. The definition of legal informality refers to salaried jobs in which the employer does not make contributions to social security. Productive informality refers to firms with fewer than five employees. The countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. The average is shown with the most recent data from each country.

Source. Authors' elaboration using data from surveys SEDLAC (CEDLAS and World Bank, 2016).

19. This is equivalent to an unemployment rate of almost 8% of the active population in this range of age.

20. Specifically, the definition considers a salaried job as formal if the worker declares that the employer makes contributions to social security.

21. If instead the "productive" definition of informality is used, which considers as informal employment every job in companies with fewer than five workers (ILO, 1991), the situation does not change much. Of the 62% of the population between 16 and 35 years of age that are employed, 27% work in companies with less than five workers (a figure that includes self-employed workers).

Periods of unemployment may have important negative consequences on a worker's skill accumulation, which may worsen with the length of unemployment.

Labor informality is higher among youth entering the labor market, particularly among those with less formal education. On average in the region, 92% of high school dropouts between 15 and 17 years of age who have a salaried job are not covered by labor regulations (Graph 4.2, see p. 233). At the same time, 72% of these youth work in firms with up to five workers. Informality levels are also high among youth between 17 and 19 years of age who enter the labor market upon completion of secondary education. Sixty-four percent of those who have a salaried job do not receive employer-sponsored contributions to social security, and half of those employed are in small firms. Youth between the ages of 22 and 24 who enter the labor market after finishing college have a better quality labor insertion, though even for them, the informality level reaches 30% and 21%, according to the definition used.

Characteristics of Employment and Unemployment

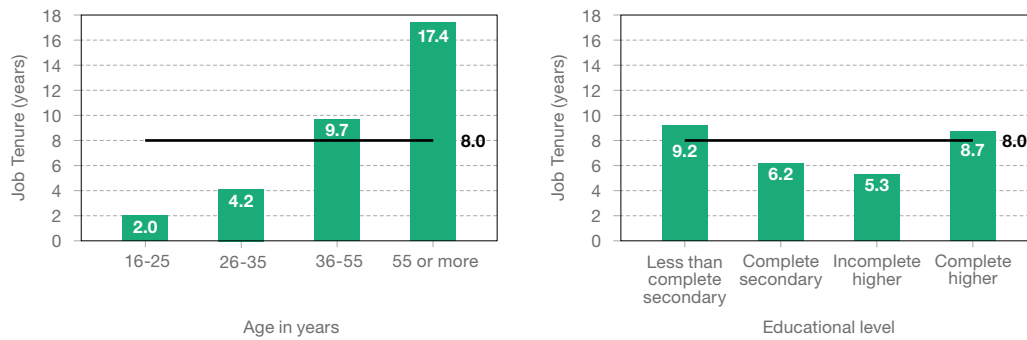
The high informality in the region noticeably exceeds that found in developed countries. For example, a recent CAF report (CAF, 2013) documents that 29% of the economically active population of the countries of Latin America are self-employed, a clear peculiarity of the informality condition in the region. By contrast, the figure in the United States reaches only 6%. To this it is necessary to add that when a person obtains a formal job, it is usually in a small firm: less than 10% of the workers in the region are in firms with more than 10 employees, while in the United States this figure exceeds 30%.

In addition to the high concentration of workers in informal jobs or in relatively small firms, another characteristic of employment relevant to the dynamics of skill accumulation is the average length of employment in a given job. Short-term jobs could translate to lower incentives to invest in skills that may have some level of specificity related to the current job. In fact, one of the outstanding characteristics of the region's labor markets is the high rate of turnover (Alaimo et al. 2015). Graph 4.3 presents the average tenure of those employed according to age group and educational level for the Latin American average. Youth between 16 and 25 years of age have an average tenure of 2 years, which increases to 4.2 years for the group of workers from 26 to 35 years of age. In both cases, the length of employment is much lower than the average for all workers (8 years).²² That is, during the phase of a person's working life, in which there is a higher propensity to acquire and accumulate new skills or reinforce existing ones, a short time spent in a job could limit this process.

22. According to statistics for 25 countries of the Organization for Economic Co-operation and Development (OECD), the average period of employment for salaried workers is 9.5 years, with periods of up to 12.2 years in the case of Italy (data obtained from OECD Stat, on May 26, 2016).

Job tenure also varies with the worker's level of education, although the differences are not as marked as in the case of the age. But the situation is peculiar, in the sense that workers at the extremes of the education distribution of (who have not completed secondary education and who have completed higher education) are the ones who tend to remain longest in the same job. Groups with an intermediate level of education (complete secondary and incomplete higher education levels) have a lower than average tenure.

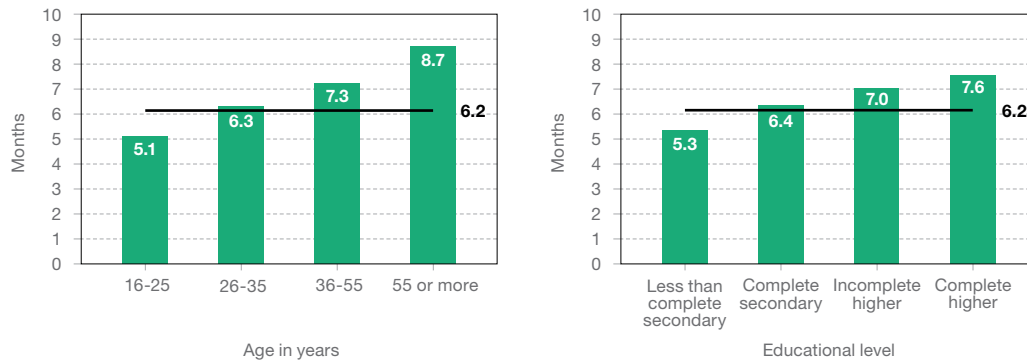
Graph 4.3 Job Tenure by Age and Educational Level in Latin America (circa 2013)



Note. The line denotes the unconditional average. The countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Source. Authors' elaboration using data from SEDLAC (CEDLAS and World Bank, 2016).

Graph 4.4 Duration of Unemployment by Age and Education Level in Latin America (circa 2013)



Note. The line denotes the unconditional average. The countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Uruguay, and Venezuela.

Source. Authors' elaboration using data from surveys SEDLAC (CEDLAS and World Bank, 2016).

Only 59% of workers in the major cities of the region say they have the proper level of qualifications to perform their current job.

People's work histories may be marked not only by time in informal and low-quality jobs, but also by periods of unemployment. These periods may have important consequences for the skill accumulation of the worker, which could grow in proportion to the length of time spent unemployed. The average length of unemployment in Latin America is 6.2 months²³ (Graph 4.4, see p. 235). This period is shorter for the youngest group of workers (5.1 months for those who are 16 to 25 years old), and longer among all older workers. Something similar occurs among the different groups of education. Unemployment periods are shorter among less educated workers and increase for more educated workers.²⁴

Mismatched: Disparities Between Workers' Competencies and Job Requirements

A relevant dimension of the labor market is the match between the skills or competencies of the workforce and the requirements of jobs, not only in terms of efficiency in the use of the productive resources in an economy,²⁵ but also because of the consequences on workers' skill accumulation processes.

The problem of the mismatches between skills of the available workforce and the requirements of occupations becomes evident when asking workers how useful the knowledge acquired during their education turns out to be for the performance of their current position. Table 4.1 shows that the perception of usefulness of knowledge acquired increases with the level of education of the worker, but a significant proportion of workers believe that knowledge does not help to better perform the job. For example, 41% of workers who did not complete their secondary education say that what they learned is of little or no use at all, as do 23% of workers who completed secondary education, and 6% of those who completed a higher level of education.

Notwithstanding the importance of formal education, competencies of workers are enriched by experiences on the job and similar informal learning sources, so it would be desirable to have a more comprehensive measure of the quality of occupational matches. One alternative is to measure matches in terms of what the workers themselves report in surveys when asked about their perception of the appropriateness of their competencies for the performance of their tasks (see Text Box 4.6, p. 230). This method of addressing the problem has the advantage of being a precise measurement in the sense that it refers to specific competencies that are relevant to a task but has the disadvantage of subjectivity inherent in self-reported measures (Hartog, 2000).

23. In OECD countries, the length of unemployment is, on average, 8.1 months (Data extracted from OECD Stat, on May 26, 2016).

24. Empirical evidence on the relationship between level of education and duration of unemployment spells is not conclusive. While some studies find a positive relationship (Moffitt, 1985; Meyer, 1990), others do not find a relationship (Ashenfelter and Ham, 1979) or find a negative relationship (Nickell, 1979; Mincer, 1991).

25. Many studies have shown that one of the problems of development in Latin America is the meager dynamism of its aggregated productivity, with the poor allocation of resources within the economies being a major cause (Pages 2010; Hsieh and Klenow, 2009; CAF, 2013).

Table 4.1 Usefulness of Knowledge and Skills Acquired in Formal Education to Current Job in 10 Latin American Cities (in percent)

Educational level	Not useful at all	Somewhat useful	Moderately useful	Very useful
Incomplete secondary	15	26	27	32
Complete secondary	8	15	28	50
Complete college	2	4	19	74

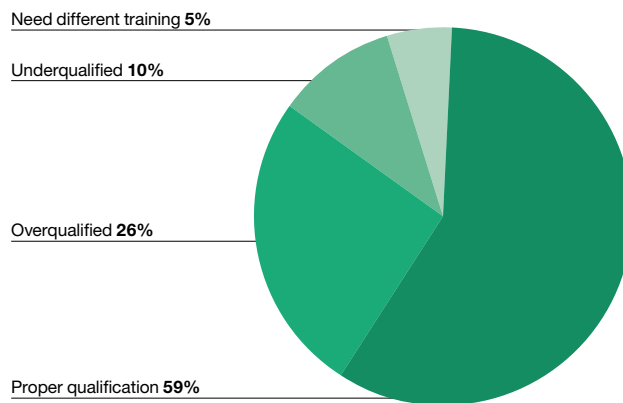
Note. Data is from the 10 cities where the 2015 CAF Survey was conducted: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas..

Source. Authors' elaboration based on data from the 2015 CAF Survey.

Forty-four percent of formal firms in the region offer some type of training.

The results of these metrics are presented in Graph 4.5 and show that a high proportion of workers consider themselves to not have the proper qualifications to adequately perform their tasks. Only 59% of workers in the major cities of the region express having a proper level of qualifications to perform their current job. The remaining 41% is distributed among those who consider themselves to be overqualified (26%), those who consider themselves underqualified (10%), and those who believe they would need different training than they currently have (5%). The differences among cities are noteworthy as well. While in Buenos Aires only 23% of workers consider themselves to be without the proper qualifications, in La Paz this figure reaches 63%.²⁶

Graph 4.5 Quality of Occupational Matches in 10 Latin American Cities

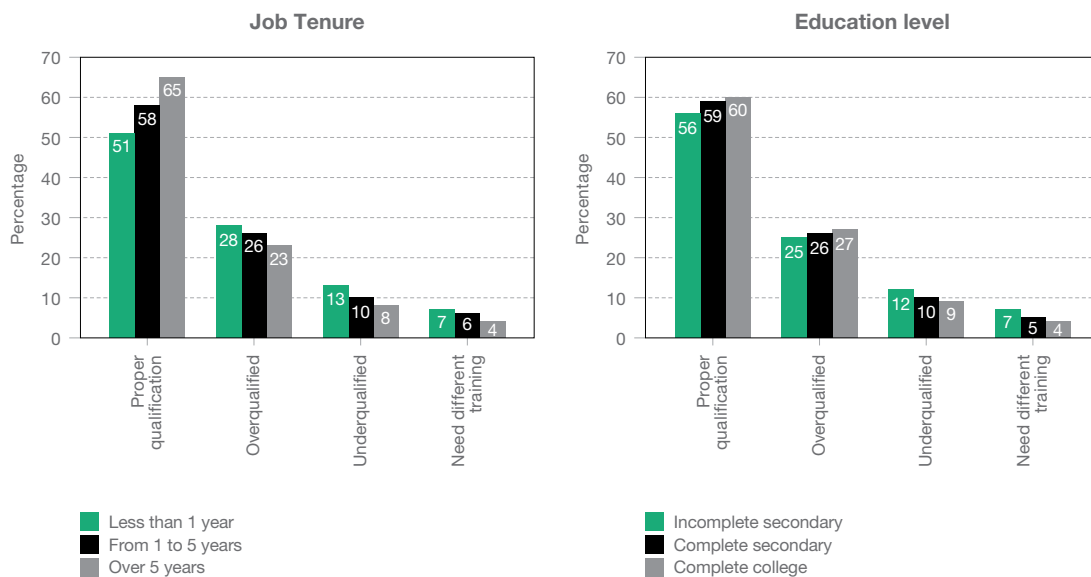


Note. The graph reports the percentages of answers to the following question: "Thinking about your current job, do you consider that your qualification level (that is, your experience, knowledge, and dexterities): (a) is correct, (b) I could tackle more demanding tasks than those required by my current job, (c) I would need more training to perform the current tasks well, (d) I would need different training." The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration based on data from the 2015 CAF Survey.

26. The data disaggregated by cities is presented in Graph A 4.1.

Graph 4.6 Quality of Occupational Matches According to Tenure at the Current Job and Educational Level in 10 Latin American Cities



Note. The graph reports the percentages of answers to the following question: "Thinking about your current job, do you consider that your qualification level (that is, your experience, knowledge, and dexterities): (a) is correct, (b) I could tackle more demanding tasks than those required by my current job, (c) I would need more training to perform the current tasks well, (d) I would need different training." The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Is the quality of matches in Latin America better or worse than that in other regions? The answer is not simple because there are various forms of measuring match quality, and even in the case of self-reported measures such as those we have used, the survey questions are not always asked in the same manner. Nevertheless, the data of the European Working Conditions Survey (EWCS) reported by Quintini (2011) suggest that match quality in the European labor markets is not better than in Latin America: 33% of workers consider that "they have a training that would permit them to perform more demanding tasks," while 13% consider that they "would need more training to be able to do their tasks well."²⁷ On the other hand, a study sponsored by CAF finds that the proportion of well-matched workers in Peru in terms of numerical and reading comprehension skills is, respectively, 15 and 5 percentage points lower

27. The question included in the EWCS 2010 is the following: "Which of the following alternatives best describes your skills in your own work: (a) I have skills that would allow me to perform more demanding tasks, (b) I would need more training to be able to do my tasks well, (c) My tasks correspond well to my current training." The question did not include an option on whether training different from the current one would be needed, as the 2015 CAF Survey did.

than the number of well-matched workers in Germany with those same skills²⁸ (Arozamena and Ruffo, 2016).

What job or worker characteristics are associated with the probability of being in an inadequate match? One of the characteristics of employment that is connected more to match quality is the length of a match. Workers who have been in the same job for a long time are more likely to report that they have the correct qualifications, something that probably reflects the fact that mismatches have been resolved in the course of the person's employment. However, even for people employed more than 5 years in their current position, a high incidence of bad matches is found: around 35%. In terms of worker characteristics, a slight association is observed between the educational level and the quality of the match. More educated workers tend to consider that they either have the correct qualifications or are overqualified more frequently than those who are less educated (Graph 4.6).²⁹

How Do Companies Invest in Training Their Employees?

The learning potential of a job depends, naturally, on the employer's training offer.³⁰ Two core questions, then, are how much companies in the region invest in job training and what the nature of that training is.

The data of the Enterprise Surveys of the World Bank indicate that in Latin America and the Caribbean, a major effort is being made on the subject of job training – matching the same level of more developed countries. Forty-four percent of the formal firms in the region offer some type of training, which affects 61% of workers. These figures are comparable to those of high-income countries that belong to the OECD and are higher than the average of all countries included in the surveys (Table 4.2, see p. 240).

The data do not permit identification of the exact reasons for this investment in training, but the fact that many companies in the region consider the existing education level of the workforce as an obstacle to their growth suggests that training may be intended to cover shortcomings in workers' human capital.

28. In these estimates the authors use two databases: Program for International Assessment of Adult Competencies and National Survey of Households of Peru. The identification of those who are well matched is based on two questions similar to the indicator presented in Graph 4.5 (see p. 237): (a) "Do you feel that you have the skills to face more demanding tasks than those that correspond to your current job?" and (b) "Do you feel that you need more training to face the tasks of your current job?" If the respondents answered both questions negatively, they were considered well matched with their job. Then, they define the maximum and the minimum numerical and reading comprehension skill levels for well-matched workers in each occupation in Germany, and apply these same thresholds in the Peruvian data to determine whether workers have higher or lower skill levels than those required by their occupation.

29. Other characteristics of the job (such as formality condition, occupation, sector of activity, or size of the company) and of the worker (such as age or gender) do not present a clear association with the quality of a match.

30. In addition to interest by companies to favor the accumulation of skills among their workers, the public sector plays a very important role promoting this type of initiative, as is shown hereafter.

Many companies in the region consider the education level of the workforce as an obstacle to their growth.

In fact, the percentage of establishments in the region that consider that the education of the workforce is a serious or very serious constraint (34%) to growth exceeds the corresponding for OECD countries (17%) and even the global average (22%).³¹

Table 4.2 Quality of Workforce and Training Efforts (in percent)

Region	Firms that offer training	Trained workers	Firms that see education levels of the current workforce as an obstacle
Latin America & the Caribbean	44	61	34
High-income OECD countries	45	57	17
All countries	36	53	22

Note. The table reports the average for each region. The most recent data as of April 2016 are used for each country.

Source. Authors' elaboration based on World Bank Enterprise Surveys data (<http://www.enterprisesurveys.org>; World Bank, 2016).

An interpretation of these results is that the high level of training in firms in Latin America responds to the need to address failures in the quality of labor, while in more developed countries, the high levels of training are quite connected to the constant technological innovations. Although this hypothesis is difficult to assess with the available information, the data of Table 4.3 support this idea. In the OECD countries included in the sample, most of the companies that offer formal training to their workers are exporters (60%), a level that does not occur in Latin America because just 25% of firms that offer training sell part of their production on the international market. Furthermore, 54% of firms from OECD countries that train their workers have some international quality certification, which is usually strongly correlated to the vocation's innovative nature, against only 35% of Latin American companies with international quality certifications that invest in training their personnel. In other words, while in the OECD countries there is a strong association between training intensity in the firm and export orientation or the propensity to innovate; this connection seems weaker in Latin America.

31. According to the Enterprise Surveys of the World Bank, for the firms of the region the inadequate preparation of workers as a limitation for growth is only exceeded by the problems of access to financing and those derived from unfair competition of informal establishments. Problems related to the state bureaucracy and corruption, taxation pressure, labor regulations, insecurity, the court system, and other deficiencies in goods and public services come in behind the problem of having an inadequately trained workforce.

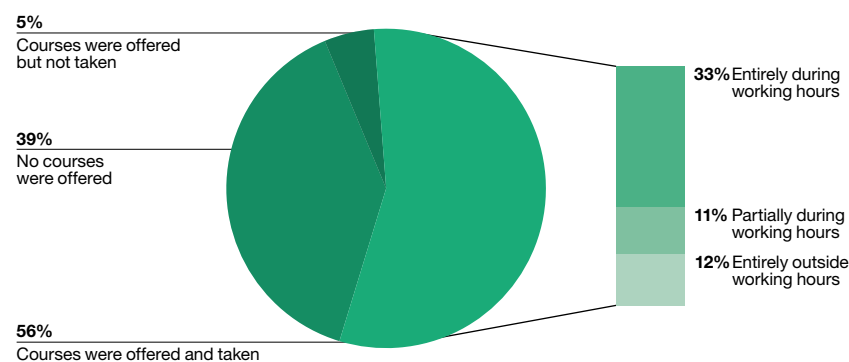
Table 4.3 Composition of Firms Offering Training According to Export Capacity and Innovation Levels (in percent)

Region	Exporter	Not an exporter	With international quality certification	Without international quality certification
Latin America & the Caribbean	25	75	36	64
High-income OECD countries	60	40	54	46
All countries	29	71	37	63

Note. The table reports the averages for each region. The most recent data as of April 2016 are used for each country.

Source. Authors' elaboration based on World Bank Enterprise Surveys data (<http://www.enterprisesurveys.org>; World Bank, 2016).

The CAF Survey contains information on the levels of training in the major cities of Latin America. The results are very much in line with those obtained in the Enterprise Surveys of the Work Bank.³² On average, 61% of workers are in jobs in which some kind of training course or another training or learning activity was offered during the past year, and most of those workers took the training (56%). Most of those courses were held during the employee's normal working hours, either entirely (33% of the cases) or partially (11%) (Graph 4.7). That is, significant efforts are being made in the region to train workers and develop their skills, and part of that effort is being made by employers.

Graph 4.7 Efforts by Firms to Train Employees in 10 Latin American Cities

Note. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

32. Unlike the content of the Enterprise Surveys of the World Bank, which contains information on companies of the formal sector of the economy, the CAF Survey is given to workers in the formal and informal sectors.

Finally, what type of skills generates or reinforces these training activities? The 2015 CAF Survey contains information on the type of skills, knowledge, and dexterities that seek to augment the training activities.³³ On average in the main cities of the region, 56% of training courses are intended to improve personal skills for professional performance, such as teamwork, communications, interaction with customers, conflict-solving capacity, leadership, and negotiation, among others. These skills could be grouped within the category of socioemotional skills, and although they are intended to increase the worker's productivity in the current job, they could be part of individual skill accumulation that the worker can apply in another job or firm. In addition, 35% of the courses are intended to strengthen technical competencies related to the performance of the worker's tasks. This group includes information technology and language courses, training on changes or innovations to the job, information on the company's processes or the job, and courses to learn to operate machinery or work tools. These activities seek to reinforce or potentiate skill used in the current job or firm that would not necessarily be useful in another job. The remaining 9% of training refers to activities not related to the job.

Channels and Determinants: A Look at the 2015 CAF Survey

The Importance of Investment Channels to Skill Accumulation

This section uses data from the 2015 CAF Survey to assess the empirical validity of the relationships suggested in the conceptual framework.³⁴ Specifically, the purpose is to answer the following questions: How do skills of people change at work, and how important are the various accumulation channel in explaining these changes? In addition, what factors of the individual, the job, and the match favor the process of investments in skill accumulation through each channel?³⁵ Here we focus on salaried workers, though we will also look at self-employed and unemployed individuals.

33. The manner that inquiries were made on participation in training activities available in the 2015 CAF Survey is different from that used in the 2014 CAF Survey. In the former case, the question asked is: "In the past 12 months, have you attended any learning or training session organized by your employer (either for the job or for the company)?" In the total sample, one third of salaried workers responded positively to this question. In the case of the 2014 CAF Survey, participation in training activities was defined in terms of two questions: "In the past year, has the company or institution for which you work offered any training course or seminar?" and "And did you take said course or seminar?" The percentage of salaried workers who answered affirmatively to both questions was 56%.

34. Although the human capital theory postulates that workers improve their skills through learning at work, this relationship is rarely analyzed empirically because of the difficulty in measuring the change in the skills throughout the working life of the worker. Instead, most studies analyze the impacts of training and other informal learning mechanisms on variables that may change as consequence of the accumulation of skills, such as wages or productivity (See for example Leuven, 2005; Leuven and Osterbeek, 2008; Dearden et al., 2006).

35. It is necessary to clarify that the analysis does not attempt to find causal relationships between these variables, but rather highlight statistical associations that can be illustrative of the phenomenon intended to be studied.

The analysis of the evolution of workers' skills is based on the perception of the workers themselves on how their skill level has changed since they began their current occupation. Specifically, the survey asked workers: "Compared with when you started your current job: 1) How do you believe that your personal skills related to your professional performance have changed (for example, teamwork, relations with coworkers, interactions with customers, leadership, decision-making, etc.)? and 2) How do you believe that your technical skills related to the performance of your duties have changed (for example, knowledge of information technology, languages, company processes, operation of machinery or work tools, etc.)?" In both cases, the answers are classified in three categories ("are worse," "are unchanged," and "are better").³⁶ The first question is used to measure accumulation of socioemotional skills, while the second may be considered a measure of the change in knowledge and technical tools for work.

Close to 4 of every 5 workers feel they have acquired new skills or reinforced existing skills.

Most of the workers said that both types of skills have improved since beginning their current job: 81% believe that their socioemotional skills have been strengthened, while 79% believe their technical skills have improved. That is, close to 4 out of every 5 workers feels they have acquired new skills or reinforced the ones they had. In contrast, 17% and 19% believe that their socioemotional and technical skills, respectively, have not changed since beginning their current job, and less than 2% of workers responded that their skills, both socioemotional and personal, have worsened.

As has been mentioned, the skills, knowledge, and dexterities of workers can be modified through formal training, learning by doing, and learning from peers. The 2015 CAF Survey contains information that may be used as measure of intensity of the use of these skill accumulation channels. To analyze the importance of training activities, a binary variable is constructed that takes the value 1 if the worker responds affirmatively to the following question: "In the past 12 months, have you attended any learning or training activity organized by your employer?" and 0 otherwise. Then, as a measure of the intensity of learning by doing, a categorical variable measures the frequency with which workers report to learn by performing their task at work, based on the question: "With what frequency do you learn new things related to the job by performing your work activities?" The possible answers are: (1) "never," (2) "sometimes," and (3) "always." Finally the measure of intensity of learning from interactions with peers is constructed based on the question: "With what frequency do you learn new things related to the job from your coworkers or supervisors?" As in the previous case, the answers range from 1 to 3, where 1 means never and 3 means always.³⁷

According to the survey's data, 1 of every 3 workers received training during the 12 months prior to the survey. In addition, in respect to the intensity of the

36. In the survey the worker could mark 10 boxes that went from -5 (have worsened a lot) up to 5 (have improved a lot). In order to simplify the analysis the answers were re-coded into three categories without modifying the results of the empirical exercise.

37. Both in the question on learning by doing and in the one referring to learning from colleagues and supervisors, workers could answer in a range from 1 to 5. In order to simplify the exercise, the answer were recoded in the range of 1-3, where 1 is "never," 2 "sometimes," and 3 "always."

learning by doing, 13% of workers say that they never learn by doing, 21% say they sometimes do, and 66% say they always do. In respect to learning from peers, 24% say they never do, 23% say they sometimes do, and the remaining 53% say they always do.

Graph 4.8 Perceived Variation in Skill Accumulation by Participation in Trainings in 10 Latin American Cities



Note. The two groups of workers are those who received training during the past 12 months and those who did not. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

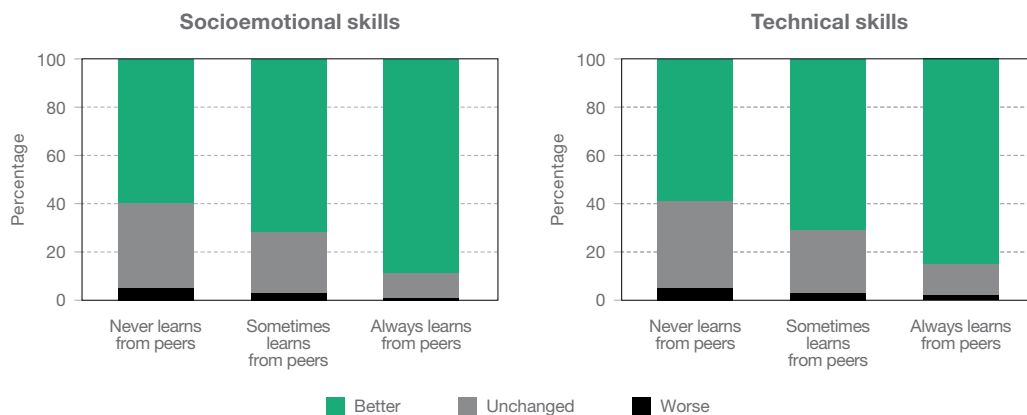
Source. Authors' elaboration using data from the 2015 CAF Survey.

How does the intensity of use of each channel of skill investments relate to the perception of skill accumulation that workers have? Graph 4.8 shows the distribution of the change in skill accumulation perceived by workers in respect to when they started their current job, making a distinction between the socioemotional (left panel) and technical (right panel) skills, according to whether the worker has received training in the 12 months prior to the survey. As is observed, a higher proportion of workers consider that their skills improved among those who participated in training activities than among those who did not. Thus, the proportion of workers who consider that their socioemotional skills improved in their current job is 81% among those who did not participate in training activities and 91% among those who did. In the case of technical skills, very similar figures are obtained. Participation in training activities is therefore associated with an improvement in workers' skills.

The same can be said of the change in the skills perceived by the worker and the two informal learning channels at work: learning by doing and learning from peers.

Graph 4.9 shows that the more frequent learning by doing is reported by the worker, the higher the growth in skill accumulation. In addition, Graph 4.10 (see page 246) shows that a higher learning frequency of learning from colleagues and supervisors is associated with a higher accumulation of both types of skills.

Graph 4.9 Perceived Variation in Skill Accumulation by Frequency of Learning by Doing in 10 Latin American Cities



Note. The frequency of learning by doing is self-reported. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

These data disclose that the three channels through which workers may accumulate skills do matter. But what channels matter the most? That is, if the workers can accumulate skills through formal training and through informal learning, which is more associated with growth of skill accumulation that the worker perceives?

In order to answer this question, the variation of the skill accumulation measures explained by the three channels is broken into the relative contribution of each, using the dominance analysis approach of Azen and Budescu (2003).³⁸ This decomposition exercise suggests that, both in the case of technical skills and socioemotional skills, the channel of learning by doing is the most important, contributing to 47% of the increase in socioemotional skills and up to 57% of the increase in technical skills. The second-most important channel is learning from peers, especially for socioemotional skills, for which the contribution is around 40%.³⁹ In other words, almost 90% of the contribution of learning channels to skill increases reported by workers is associated with informal learning at work (Graph 4.11, see p. 246).⁴⁰

Learning by doing and learning from peers account for 90% of the contributions of learning channels to reported skill variation.

38. This method attributes to each independent variable a portion of the R-squared that is equivalent to the average of change experienced by this parameter by including that variable in all possible models that can be made with the rest of the variables. For a review of the properties of this decomposition technique, as well as of alternative techniques, Grömping et al. (2007) may be consulted.

39. The model with the three channels of accumulation plus the city fixed effects explains the 21% variation of the measure of evolution of personal skills and the 15% of the variation of the measure of technical skills. From this variability explanation, more than 70% is associated with the channels and the rest to the fixed effects of city. The contributions reported in the text have been standardized to add up to 100%; in other words, they are represented as proportion of the total of the variation explained by these three channels.

40. This does not imply that the potential of formal training is not ample. In fact, there may be under-provision of this channel because of different market failures.

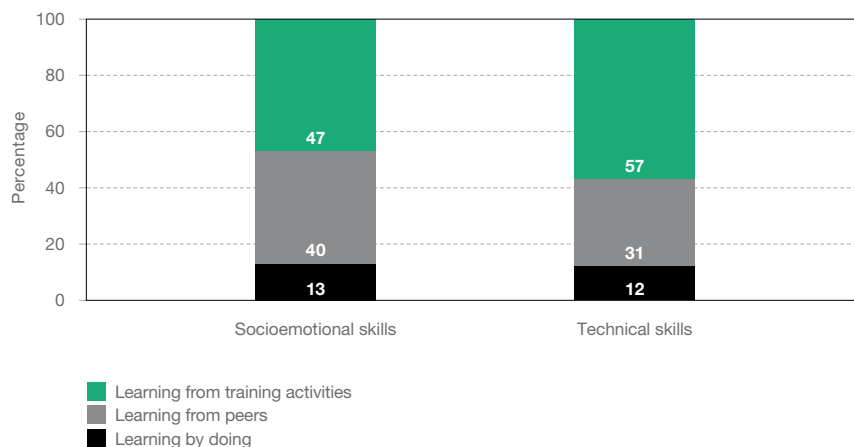
Graph 4.10 Perceived Variation in Skill Accumulation by Frequency of Learning from Peers in 10 Latin American Cities



Note. The frequency of learning from colleagues and supervisors is self-reported. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Graph 4.11 Relative Importance of Skill Accumulation Channels in 10 Latin American Cities



Note. The graph reports the relative contribution of each of skill investment channel as variation in the measures of accumulation of socioemotional and technical skills based on dominance analysis. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

The Determinants: Which Characteristics of Individuals, Jobs, and Individual-Job Matches Promote Skill Accumulation

Now we analyze which factors are associated with the investment in, and the accumulation of, skills through the 3 channels previously mentioned. We group the determinants into three categories: at the individual's level, at the job level, and at the match level.

The 2015 CAF Survey offers useful information to this end. From the point of view of the workers, the survey offers information of sociodemographic variables such as educational level, gender, and age. Additionally, there are measures of cognitive skills (based on Raven Progressive Matrix Test and on a Test of Verbal Conceptualization) and socioemotional skills (the Big Five, a measure of determination, and a measure of the "attitude toward learning").⁴¹ From the point of view of the job, the survey provides information on the size of the firm and the degree of formality of the job (based on contributions to the social security system). There are also measurements of the importance of use of certain tasks in the occupation, such as computer and internet use, teamwork, activity/task planning, use of a foreign language, negotiation activities, and writing of reports. Finally, the survey allows computing the three measures of quality of the match outlined above (see Text Box 4.6, p. 230).

In order to assess the role of these determinants, we present a set of empirical exercises based on 2015 CAF Survey data. In these exercises, the variables under analysis were the three skill accumulation channels: a binary variable for the probability of having participated in a learning session or training activity organized by the employer, a discrete variable that measures degree of "learning from peers" (coworkers or supervisors), which varies between 1 and 5 with higher values indicating higher frequency of learning, and another discrete variable that measures the intensity of "learning by doing" at job (which also ranges from 1 to 5). The independent or explanatory variables represent the factors related to the worker, the job, and the match quality. For every channel, the analysis of determinants is made jointly, that is, the three types of determinants appear in the same regression: However, for description purposes, we will present the results progressively by type of determinant.

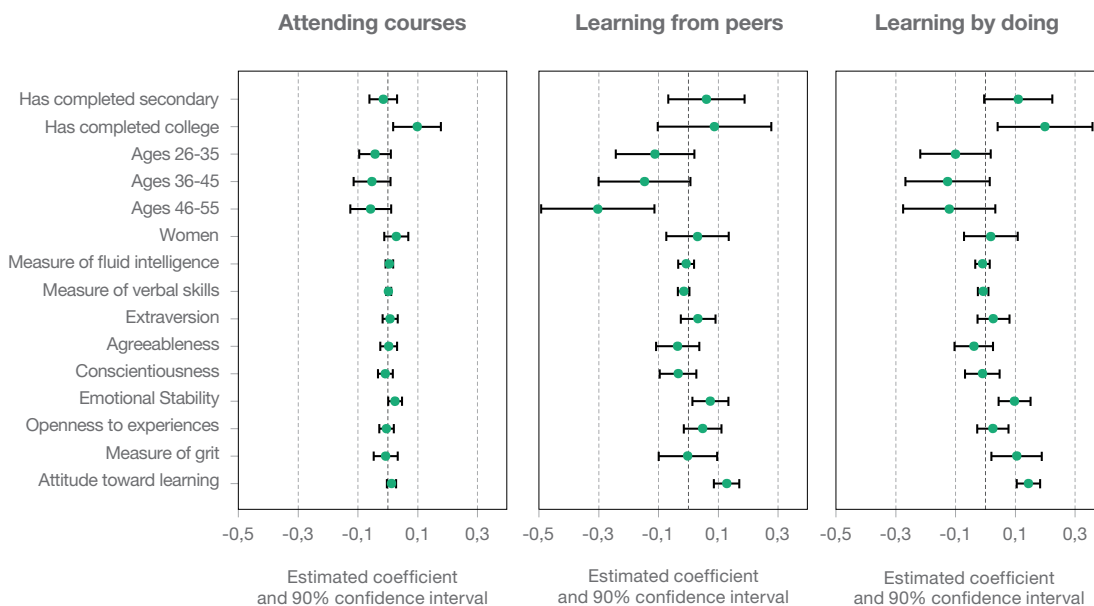
Let's start with the determinants at worker's level. Graph 4.12 (see p. 248) shows the coefficient for each of the variables at the individual's level, as well as their confidence intervals at 90% of significance. The left panel looks at the correlation with training, the one in the center to learning from peers, and the right panel shows the results with respect to the measure of learning by doing.

A higher level of education is associated with more intensive use of all three skill accumulation channels.

41. In the appendix of Chapter 1, there exist a detailed description of the instruments used in the preparation of the measures of cognitive and socioemotional skills. To measure attitudes toward learning, the answer to the following question was included in the 2015 CAF Survey: "How much do you agree with the following statement? I intend to get training and improve my performance at work." The possible answers go from 1 (strongly disagree) to 5 (strongly agree).

The first thing observed is that the level of education of the workers correlates not only to participation in training programs, but also to learning through the other two channels.⁴² For example, having completed college education is associated with a probability of attending training courses that is around 10 percentage points higher than having completed only secondary education. Age also appears to be a determining factor, in particular, younger workers seems more prone to learn from peers. No differences were found according to gender for any of the channels.

Graph 4.12 Workers' Characteristics and Skill Accumulation Channels in 10 Latin American Cities



Note. The graph reports the estimated coefficients and the 90% confidence intervals based on three ordinary least squares regressions. The dependent variables are our measures of: attending training courses, learning from peers, and learning by doing. The independent variables include measures on individual cognitive and socioemotional skills. The cognitive skills measures are the Raven Progressive Matrices Test (fluid intelligence) and the Brief Test of Verbal Conceptualization (verbal skills). The measures of socioemotional skills are: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experiences (the Big Five model), and the Grit scale (determination/perseverance to reach objectives). Attitude toward learning is also included. It is measured based on the level of agreement with the statement “I intend to get training and improve my performance at work,” with answers ranging from 1 (strongly disagree) to 5 (strongly agree). All regressions control for the worker’s tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and individual’s occupation. City fixed effects are included. The base category corresponds to men without secondary education between 15 and 25 years of age. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

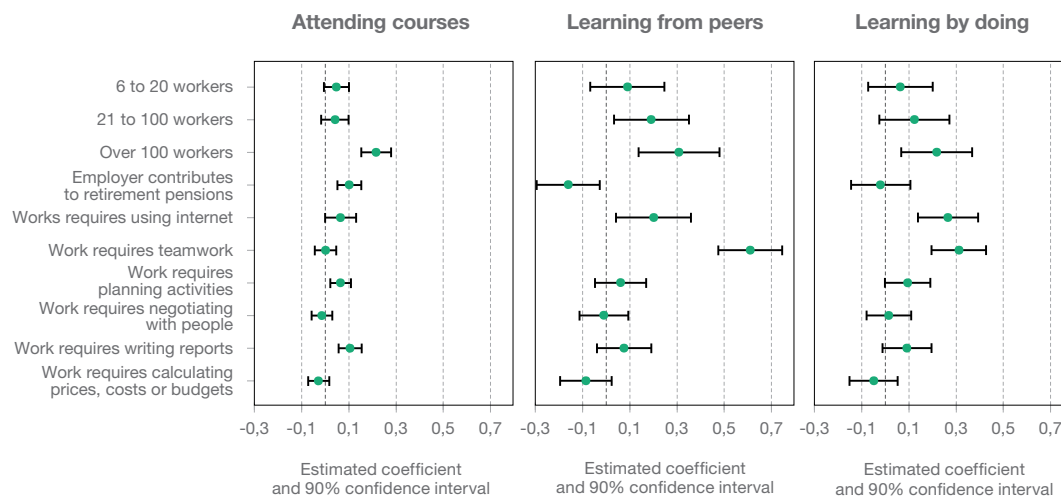
Source. Authors’ elaboration from the 2015 CAF Survey.

42. In the case of learning by peers, the coefficients of the variables reflecting the educational level of the workers are positive but not statistically different from zero.

According to the exercise, some personality traits also relates to skill accumulation. In particular the traits of emotional stability (a component of the Big Five model) and attitude toward learning are positively associated with the three channels of skill accumulation. Likewise, having more grit is associated with more learning by doing.

Now let's focus on determinants at the job level. Recall that these sort of determinants involve not only factors associated with the characteristics of the firm or employer, but also with characteristics of the occupation, such as usual tasks. Graph 4.13 shows the results regarding to this group of determinants.

Graph 4.13 Job Characteristics and the Skill Accumulation Channels in 10 Latin American Cities



Note. The graph reports the estimated coefficients and the 90% confidence intervals based on three ordinary least squares regressions. The dependent variables are our measures of: attending training courses, learning from peers, and learning by doing. As independent variables are included a set of dummies for tasks performed. Each of these variables takes the value of 1 if the person responds that at least once a week the job requires doing a particular task and 0 if the frequency is lower. All regressions control for the worker's tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and occupation. City fixed effects are included. The base category corresponds to workers in firms with less than six workers whose employers do not contribute to social security. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration from the 2015 CAF Survey.

The graph shows that the size of the company plays a role in the different skill accumulation channels. For example, a worker in a company of 100 or more employees has a probability 20 percentage points higher of attending a training course than a worker in a company with less than 6 employees. Company size is also associated with a higher frequency of learning from peers and learning by doing. The formality of the job, based on employer's contributions to retirement pensions, is associated with higher participation in courses (almost 10 percentage points) of employees but a lower rate of learning from peers.

Characteristics of the company (e.g., size) and of job tasks (e.g., teamwork) affect the different skill accumulation channels.

It is expected that skill accumulation is linked to the types of tasks involved by certain job. This is indeed verified in the analysis. The clearest association seems to exist between teamwork and learning by doing and from peers. In addition, those who must routinely write reports show higher participation in courses and higher degree of learning from peers and learning by doing (although on the latter two cases the variable is not statistically significant). Those who must use internet in their work also show higher rates of learning by the last two channels, while those who have to task planning as part of their work are more prone to participate in courses.

Finally, in respect to match quality, Graph 4.14 shows the results of the estimation based on self-reported measure; however, we also discuss results relative to other measures.⁴³

Graph 4.14 Match Quality (Self-reported) and Skill Accumulation Channels in 10 Latin American Cities



Note. The graph reports the estimated coefficients and the 90% confidence intervals based on three ordinary least squares regressions. The dependent variables are our measures of: attending training courses, learning from peers, and learning by doing. The mismatch is measured with the answer to the question: "Thinking about your current job, do you consider that your qualification level (that is, your experience, knowledge, and dexterities): (a) is correct, (b) I could tackle more demanding tasks than those required by my current job, (c) I would need more training to perform the current tasks well, (d) I would need different training." All regressions control for the worker's tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and occupation. City fixed effects are included. The base category corresponds to individuals reporting that their qualification level is correct in respect to their current job. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

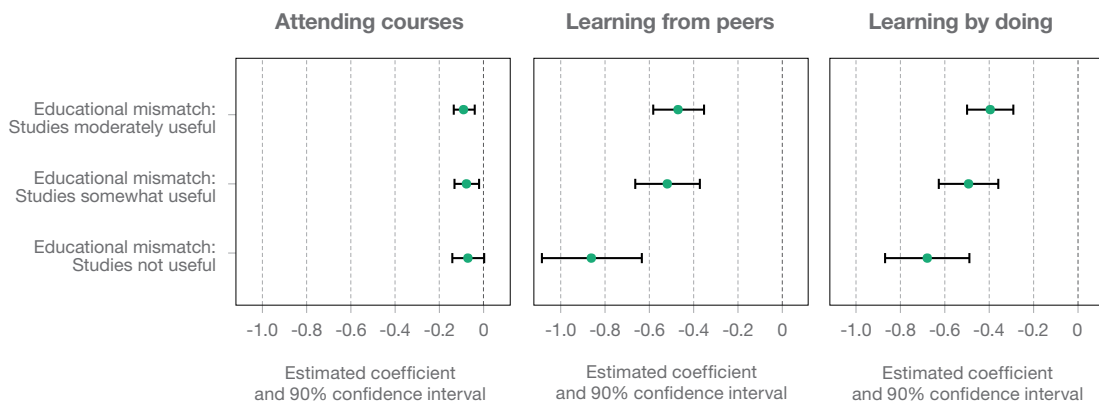
Source. Authors' elaboration using data from the 2015 CAF Survey.

Both, workers reporting as being overqualified and workers reporting as being underqualified, are more likely to take courses, relative to those reporting having the proper qualifications for the position. It is indeed reasonable to think

43. In the previous discussion on the determinants at the individual and the job levels, the specification considered this first measure of match quality (self-reported). Subsequently there is a discussion on how other measures on match quality affect the learning channels without emphasizing the other two determinants. In general, the role of the determinants at the individual and the job levels are independent to the way the match quality is measured.

that training is oriented to making up for some (moderate) aptitude deficiencies, and thus a higher rate of participation in courses should be observed for slightly underqualified workers (in respect to those considered properly matched). The positive association between training and the variable that reflects overqualification is more difficult to explain. One possible explanation is that, those who participate more frequently in training activities are more probable to self-report as overqualified. This association could also result if overqualified workers are rewarded with more training activities.⁴⁴ The graph also shows that overqualified workers seem to benefit less from learning by doing. Finally, workers who report having different training from what is required, a severe sort of mismatch, take less advantage of informal learning channels.

Graph 4.15 Educational Mismatch and Skill Accumulation Channels in 10 Latin American Cities



The graph reports the estimated coefficients and the 90% confidence intervals based on three ordinary least squares regressions. The dependent variables are our measures of: attending training courses, learning from peers, and learning by doing. The independent variable is the mismatch perceived by individuals between their current job and the knowledge they acquired during their education as measured by answering: "To what extent are the knowledge and skills acquired during your studies useful in your current job?" In all regressions, there are control variables for individual and job characteristics. Individual characteristics include: education, age, genre, cognitive skills measured by the Raven Progressive Matrices Test and the Brief Test of Verbal Conceptualization and socioemotional skills measured by the Big Five model. Job characteristics include: firm size, indicators of contributions to retirement pensions, public sector job, and activities performed. In addition, all regressions control for the worker's tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and occupation. City fixed effects are included. The base category corresponds to individuals who report that their studies are very useful for their current job. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

The analysis with the two alternative mismatch measures seems to reinforce some of these messages. For example, in line with the findings about people who

44. The reward may originate as a form of compensation for workers with low motivation because of their feelings of being overqualified for the position. It can also be associated with high performance; in such case if overqualified workers perform better, there will be a positive association between being overqualified and participating a training program.

Empirical analysis suggests that learning at work depends on characteristics of the workers, on characteristics of work environment and on the fit between workers' skills and the requirements of their occupations.

have different skill than their job requires, the occupational mismatch measure verifies that those who say that the knowledge and skills acquired during their studies are not useful in their current job, show lower learning from peers as well as lower learning by doing. In addition, the results show that the participation in courses is lower among those for whom their studies were less useful (see Graph 2.15, p. 251).

The third measure of match quality (based on O*NET and 2015 CAF Survey data) allows us to study the role of mismatch in specific skills. The Analysis shows that some forms of over-qualification (specifically crystallized intelligence as measured by the Brief Test of Verbal Conceptualization included in CAF Survey), are associated with lower learning by doing and learning from peers, although in the first case the coefficient is not significantly different from zero (see Graph 4.16).

Beyond its effects on the dynamics of skill accumulation, a match's quality may affect many other labor outcomes (See Text Box 4.7).

Text Box 4.7 Other Implications of Skill Mismatches

The implications of skill mismatches transcend the effects on the skill accumulation. For example, Guvenen et al. (2015) use data for the United States and find that being mismatched has negative effects on both current and future employment. They also find effects on the probability of changing jobs.

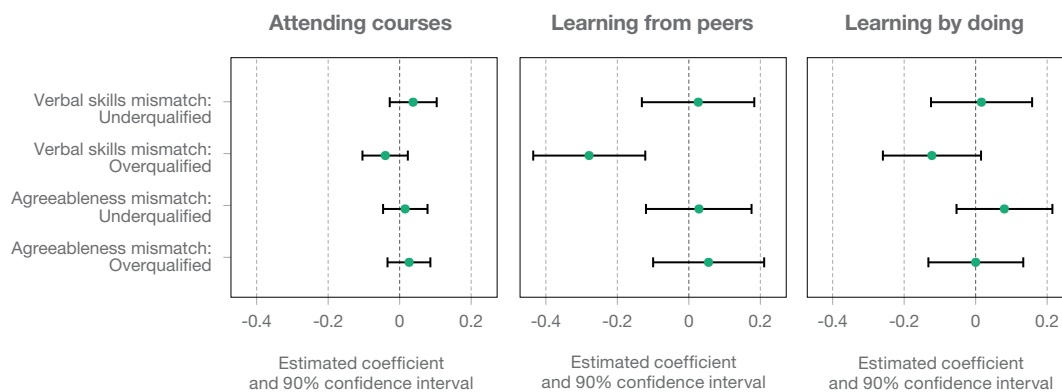
Moreover, data from household surveys permits an exploration of the consequences of educational mismatches in the region. Let us define a worker to be overeducated (undereducated) if her/his years of education are higher (smaller) than average year for her/his occupation plus (minus) one standard deviation of the distribution of the variable year of education (for the corresponding occupation). Hence the analysis indicates that that being overqualified is associated with higher salaries and with a higher probability of being in a formal employment, while being underqualified has the opposite effect on both variables. Interestingly, both overqualified and underqualified workers express a greater desire to change jobs.

Source. Authors' elaboration based on Guvenen et al. (2015) and data from SEDLAC (CEDLAS and the World Bank).

Alternatively we can consider exercises in which the dependent variables are not the learning channels but the self-reported variation rates of socioemotional and technical skills. As can be expected, the results are quite consistent. People with more education or working in larger companies, report a higher variation of both types of skills. Socioemotional traits such as perseverance, openness to experiences, and attitude toward training are also positively associated with the reported rates of accumulation of both skills. Certain tasks of the occupation are also associated with learning. For example, teamwork is associated with a higher accumulation of socioemotional skills and "writing reports or other documents,"

with the variation of technical skills. In respect to match quality, those who express having different training than needed show a lower variation of both skills compared to those who are properly matched, but the differences are not statistically significant (the results are presented in Appendix A 4.1).

Graph 4.16 Match quality (in Specific Skills) and Skill Accumulation Channels in 10 Latin American Cities (2015)



Note. The graph reports the estimated coefficients and the 90% confidence intervals based on three ordinary least squares regressions. The dependent variables are our measures of: attending training courses, learning from peers, and learning by doing. The independent variable is the mismatch between the skills of the individual and the job requirements. This mismatch is measured as the difference between the percentile of the occupation according to the O*NET and the percentile of the person in the population of the relevant city (in line with Guvenen et al., 2015). A worker is defined as overqualified (underqualified) if this difference belongs to the top (bottom) quartile of the distribution. In all regressions, there are control variables for individual and job characteristics. Individual characteristics include: education, age, sex, cognitive skills measured by the Raven Progressive Matrices Test and the Brief Test of Verbal Conceptualization and socioemotional skills measured by the Big Five model. Job characteristics include: firm size, indicators of contributions to retirement pensions, public sector job, and activities performed. In addition, all regressions control for the worker's tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and occupation. City fixed effects are included. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey and O*NET.

To sum up, the analysis of the 2015 CAF Survey supports the idea that learning on the job depends both on the characteristics of the worker and on the work environment, as well as on the degree of congruence between the worker's skills and the requirements of the occupation or tasks performed. Larger companies favor learning by any of the three channels studied. As a consequence, favoring the creation of quality jobs becomes, indirectly, a strong instrument for the development of skills during the labor life cycle stage. The condition of being a worker with a college degree is also positively associated with a better use of the labor environment as a means for skill accumulation. This indicates a clear complementarity between formal training mechanisms (educational systems) and the work environment as a vehicle for skill formation.

Preferences and other socioemotional and personality traits also influence on the job skill accumulation dynamics. The gestation of these traits takes place throughout life, which again emphasizes the complementarity of the learning

institutions (family, neighborhood, school and work). Finally, the quality of the match (job-worker) also matters. Perhaps the most important aspect to remember is that workers in occupations very dissimilar from their skills and knowledge cannot take full advantage of their jobs to improve their work skills. The labor market should then favor good matches, but unfortunately this is not always the case.

The Importance of the First Job and the Costs of Losing Formal Employment

The current and future labor situation of any person depends on her/his entire labor history. Consequently, the characteristics of the first job may have consequences on the subsequent labor outcomes, including skill accumulation dynamics. Likewise, periods of unemployment, informal employment, or self-employment may affect not only the skills that the worker accumulates during that particular labor experience, but also during subsequent jobs.

The First Job and Skill Accumulation Prospects

The difficulties youth have entering the labor market have been documented both in developed countries (Blanchflower and Freeman, 2000) and developing countries (Viollaz, 2014; Bassi and Galiano, 2009). Low salaries, unemployment, jobs in the informal sector of the economy, and high labor turnover, among others, are some of the typical characteristics of youth labor insertion.⁴⁵ The evidence suggests that the characteristics of entry into the labor market (the first job) may affect subsequent skill accumulation dynamics of the worker. Neumark (2002) and Hamaaki et al. (2013) show that the first employment affects future salaries and productivity. With data from Brazil, Cruces et al. (2012) show that going through labor informality during youth increases the probability of having an informal job in the future.

Various reasons explain the connection between the characteristics of the first job and subsequent labor outcomes. First, the existence of specific human capital could mean that once the worker has accumulated skills in a company or sector, those skills have more value if the worker remains in the same company or sector.

45. In a study commissioned for this report, Abusada et al. (2016) estimate the effect of socioemotional and cognitive skills on the quality of the labor insertion of youth. The results suggest that socioemotional skills affect the salaries of the workers with less education more than those of other workers. In respect to the length of time spent looking for a job, the results indicate that youth with high socioemotional skills tend to receive more work offers than those with low socioemotional skills, regardless of their education level. Finally, in the case of workers with less education, both types of skills contribute to increased probability of receiving a work offer, while in the case of more educated workers, only the socioemotional skills increase the probability of receiving an offer.

Second, the deterioration of certain skills because of periods of unemployment or informality during the first few steps in the labor life would also affect future labor results. Third, a good first job could mean better contact networks and, consequently, better labor opportunities in the future. Finally, starting work with an informal low quality job could have a stigma effect if employers use labor history as an indication of the worker's productivity (Berniell and de la Mata, 2016b).⁴⁶

What are the major characteristics of labor insertion of youth in the countries of Latin America? The data from the School-to-Work Transition Survey,⁴⁷ make evident the difficulties faced by many youth when starting their work life.

According to this survey, in Peru, between 53% and 78% of youth, depending on educational level, obtained a job immediately after completing or dropping out school. Around 5% to 7% were unemployed, and the rest remained outside the labor force (mostly engaged in household duties) (Table 4.4).

Table 4.4 Transition Post-Formal Education in Peru (in percent)

Occupational category post-formal education	Secondary incomplete	Secondary complete	Higher education complete	Total sample
Employed	63	53	78	62
Salaried with written agreement	4	15	30	17
Salaried with verbal agreement	49	48	31	43
Self-employed	27	24	14	22
Unremunerated / internship	21	14	25	19
Unemployed	5	7	7	6
Inactive: training	1	5	2	3
Inactive: household duties	26	23	11	20
Inactive: other reasons	6	12	2	8

Source. Authors' elaboration using data from School-to-Work Transition Survey for Peru 2012-2013 (International Labour Organization).

Among the youth who get a job after completing their education, the majority start as salaried workers (60% of the total, of which only 17% obtain a job with written contract, while the remaining 43% do not obtain one); 22% of them start as independent workers (mostly self-employed) while 21% engaged either as family workers without remuneration (more common among workers with less education)

46. Oyer (2006) and Cruces et al. (2012) mention other reasons why the characteristics of the first job could affect future work path.

47. The School-to-Work Transition Survey 2012–2013, as its name denotes, allows a characterization of post-formal education transitions of the urban population from 15 to 29 years of age in Peru. The survey covers the work history of individuals and the major characteristics of each person's work relationships since completing or dropping out of school.

or in internships (more common among those who completed higher education). Of the salaried workers, most have informal agreements (verbal), especially among workers with less education, rather than written agreements.⁴⁸

For many youth, the transition from school to the first work takes time and may include periods of unemployment or inactivity. The length of the transition varies according to the educational level of the worker. It also depends on what is the definition of the first job. With no restriction on the type of the job, this length varies from almost 3 months for those workers with college education up to 9 months for those youth with incomplete secondary education. If instead we restrict the transition from school toward a “decent jobs”, as proposed by the International Labour Organization, the transition takes more time and can be as large as two and a half years for youth with incomplete secondary education (see Table 4.5).⁴⁹

Table 4.5 Length of Transition from School to Work in Peru (in months)

Occupational category post-formal education	Secondary incomplete	Secondary complete	Higher education complete	Total sample
Until first job	9	4	3	5
Until first decent job ^{a/}	31	11	5	12

a/ A decent job refers to a salaried, remunerated job with a written employment agreement for an indefinite term, an self-employed worker satisfied with the job, or a trainee satisfied with the job.

Source. Authors' elaboration using data from School-to-Work Transition Survey for Peru 2013-2013 (International Labour Organization).

How the characteristics of the first job affect the quality of the current job? In order to answer this question, it is necessary to be able to measure the quality of the worker's current job. Among the different attributes to measure this quality, we focus on whether it favors skill accumulation. Some measures available in the data are (i) if the worker is offered training courses (the worker self-reports this benefit), (ii) if the worker has received training during the past 12 months, and (iii) if worker has a written agreement (strongly associated with the possibility of skill accumulation). The fraction of workers satisfying each of these conditions, according to educational level, is shown in Table 4.6.

48. Written employment agreements of salaried workers may be of two types: for a fixed/predetermined term and indefinite. Written agreements for indefinite time frames are not very common among youth who have just entered the labor market and are practically unattainable for those who have not completed secondary education.

49. According to this definition, a decent job must satisfy certain basic decency criteria, in terms of permanency in the job or worker satisfaction. This definition would imply that a youth has not made the transition from formal education to work if the individual does not have a job that provides a sensation of security or if the individual does not feel personally satisfied with the work. On average, for only 23% of youth, the first work experience after completing formal education is “decent.” This result is derived mainly from the nature of the agreement, since on average 80% of youth are satisfied with their first work experience.

Table 4.6 Quality Measures of Current Job in Peru (in percent)

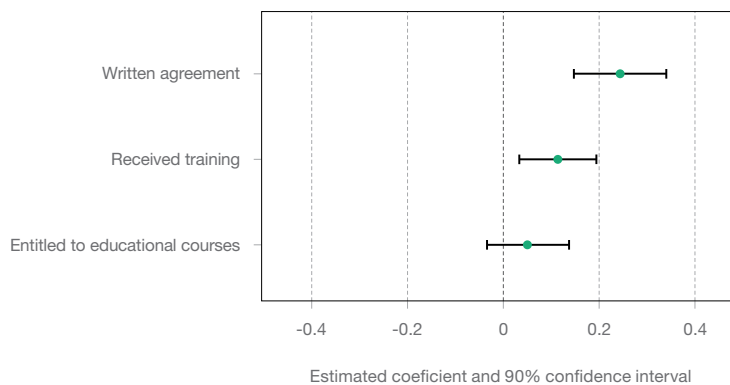
Occupational category post-formal education	Secondary incomplete	Secondary complete	Higher education complete	Total sample
Entitled to formation courses	8	19	31	20
Received training in past year	12	24	33	24
Salaried with written agreement	10	40	66	42

Note. Percent of workers.

Source. Authors' elaboration using data from School-to-Work Transition Survey for Peru 2013-2013 (International Labour Organization).

Having had a written agreement for the first job is associated with a higher probability of having a written agreement in the current job and of receiving training.

Graph 4.17 Characteristics of First Job and Quality of Current Job for Peru



Note. The graph reports the estimated coefficients and the 90% confidence intervals based on ordinary least squares regressions. The independent variable is the quality of the first job, approximated through the variable "written agreement for first job." The dependent variables that approximate the quality of the current job are: written agreement, training in the past 12 months, and entitled to educational or training courses (for the subsample of salaried workers). The regression controls for gender, age, age squared, educational level, father's education, mother's education, and indicators for the location of the respondent. The regression uses two variables that take the value of 1 if the individual has the same occupation as the mother or father and 0 otherwise. The base category corresponds to people without written employment agreements who did not receive training and are not entitled to educational courses.

Source. Authors' elaboration using data from School-to-Work Survey for Peru (International Labour Organization).

Using these quality measures of current jobs, an analysis is made regarding to the association between the characteristics of the current job and the quality of the first job, measured by the existence of a written agreement.⁵⁰ The analysis

50. Specifically, through a regression by ordinary least squares an analysis we estimated the correlation coefficient between having had a job with written agreement as the first labor experience (independent variable) and three variables indicating characteristics of the current job: having a written agreement, being entitled to training courses, and having received training during the past 12 months (dependent variables in three separate regressions).

suggests that having had a written agreement in the first job is associated with a higher probability of having a written agreement in the current job and with the probability of receiving training (compared to someone who started with a verbal or with no agreement) (see Graph 4.17, p. 257).⁵¹ That is, the characteristics of the first job are associated with the future labor path and, with the skill accumulation dynamics throughout a person's working life.

Leaving the Formal Sector and Skill Accumulation

In labor matches, the union between the parties is not “til death do us part.” On the contrary, labor dynamics are characterized by transitions between jobs of different qualities, including informal jobs. In fact, there is a major risk in developing countries of going through long periods of unemployment or self-employment, which are usually characterized by the absence of a labor environment that encourages learning. Consequently, a reasonable hypothesis is that unemployment and self-employment periods should imply deterioration, at least on relative terms, of skills.⁵²

This concern has empirical support. An important literature suggests the deterioration of skills because of unemployment (See Addison and Portugal, 1989; Jacobson et al., 1993; and Neal, 1995; among others). In general, this literature finds that time out of a job implies salary losses that can be interpreted, at least partially, as a deterioration of human capital. More recently, a study directly explores this hypothesis based on a survey that contains information on tests measuring skills in reading comprehension for workers in Sweden (Edin and Gustavsson, 2008). The study finds that 1 year out of work is associated with a drop of 5 percentage points in the distribution of scores on that test.⁵³

Recent evidence suggests that being in jobs that underutilize skills—which seems to be the case of informal low quality jobs—also damages human capital and a person's future labor outcomes (Williams, 2000; Mavromaras et al., 2015). These results are compatible with those found by Lise and Postey-Vynay (2014), who present a model that permits skills to deteriorate when they are not fully used (for example, by being employed in an occupation with low

51. Naturally, these relationships cannot be interpreted as causal. Among other reasons, because there could be non-observable worker's characteristics affecting both the type of first job and the characteristics of the current job. In order to reduce these problems, in the regression we control for characteristics of the workers (gender, age, educational level) characteristics of the parents (level of education and similarity between occupation of the worker in the first job and the occupation of the parent) and region of residence.

52. As we saw in the previous section, for salaried workers the quality of the job is an important determinant of the accumulation of skills, both socioemotional and technical. Thus, a salaried worker in a small and/or informal company accumulates less skill than one in a large formal company. In this subsection, we focus on leaving the condition as salaried and use as reference the accumulation of a salaried worker, regardless of the size of the employer. Clearly, the differences would be much more dramatic if, in contrast, we would use salaried workers in large companies.

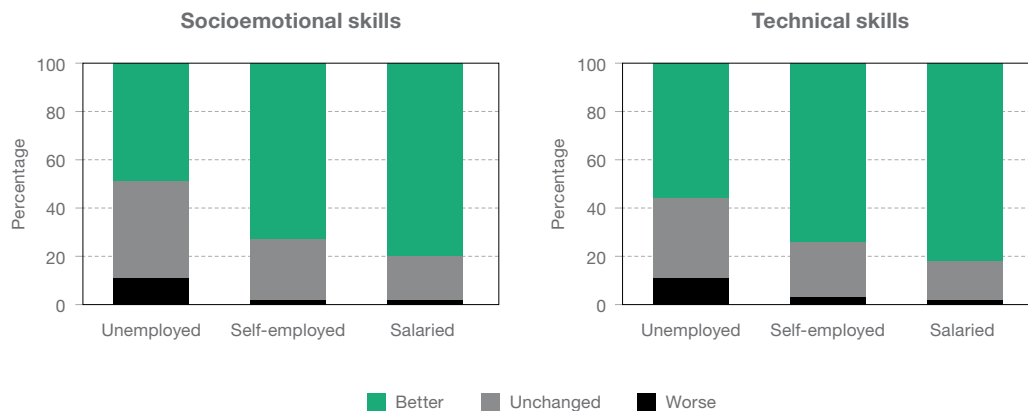
53. The authors show that this loss is associated; basically, to a depreciation in absolute terms of the reading comprehension skill more than a relative drop in respect to those who continue employed. This depreciation in the accumulation of the reading comprehension skill explains, the authors sustain, between 16% and 29% of the drop in the salaries that occurs after one year of unemployment.

requirements) and accumulate when they are used. The authors estimate the model for the United States and find differential accumulation/depreciation rates according to the type of skills. The authors find that manual skills usually adjust faster than cognitive skills, and the latter faster than the socioemotional ones. Notwithstanding these studies, this is, no doubt, an area that demands more research to clearly distinguish under what channels leaving good-quality formal jobs affects skill accumulation and which types of skills would be the most sensitive to the change.

Unemployed people perceive a lower skill accumulation pace than self-employed workers, who accumulate skills more slowly than salaried workers.

We turn now to statistical information from the 2015 CAF Survey that supports the hypothesis that leaving salaried work could imply a relative deterioration of the human capital. Graph 4.18 presents the perception regarding the variation of skills both technical (right panel) and socioemotional (left panel) for unemployed, self-employed, and salaried workers. A clear order is observed, with unemployed people showing less learning than self-employed workers, who show less than salaried workers.⁵⁴

Graph 4.18 Perceived Variation in Skills by Occupational Situation in 10 Latin American Cities



Note. The graph shows the distribution of individuals' perception on how their socioemotional skills (left panel) and technical skills (right panel) have changed in their current job. Answer are grouped in three possible categories ("are worse," "are unchanged," and "are better"), in. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey..

For example, in terms of the socioemotional skills, 80% of salaried workers say that their skills have improved. This figure is 73% for self-employed and 49% for unemployed people. Something similar occurs for socioemotional skills: 11% of

54. These differences in the variation of skill accumulation are statistically significant, even after incorporating controls for gender, education, tenure, and fixed effect for cities.

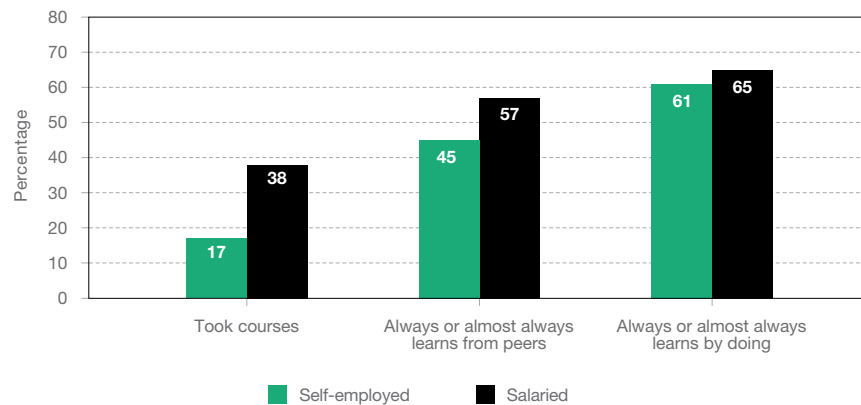
Self-employed workers participate less in training activities than salaried workers and have less opportunities to learn from peers and from learn by doing.

unemployed people say their socioemotional skills have deteriorated during their unemployment. This figure is only 2% for salaried workers.⁵⁵

An important question related to the origin of these differences in the rate perceived of skill variation. In previous sections, we have emphasized that learning in the labor stage occurs based on three channels: formal training, learning from peers, and learning by doing. It is possible that exposure to these three different channels, or the channels' quality, may explain the learning differences.

In effect, major differences are appreciated in the course participation rate and the variation of learning by peers and learning by doing, in accordance with occupational condition. Accordingly, Graph 4.19 uses salaried and self-employed workers to show (a) the percentage of people who take a training course, (b) the percentage of people who always or almost always learn from peers, and (c) the percentage of people who always or almost always learn from doing.

Graph 4.19 Occupational Situation and Skill Accumulation Channels in 10 Latin American Cities



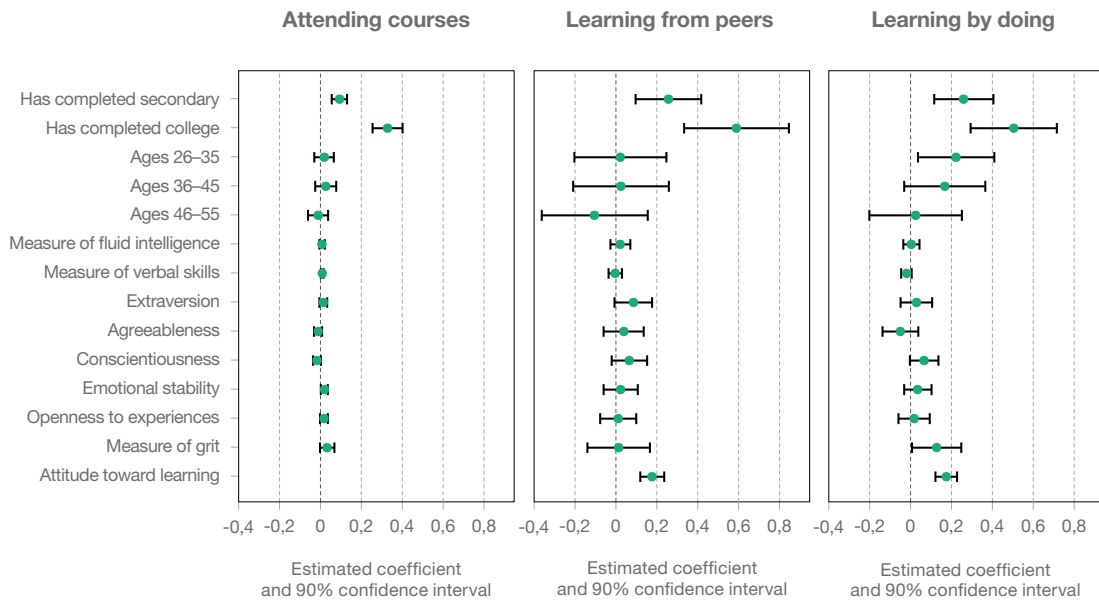
Note. The graph reports the percentage of individuals who indicate that they took courses in the previous year or indicate that they always or almost always learn by doing and from peers. Figures are shown for self-employed and salaried workers. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors' elaboration using data from the 2015 CAF Survey.

55. The fraction of those unsalaried workers who respond that their skills have improved seems high. A possible explanation is that these people may participate in training courses during unemployment or self-employment, which contributes to the response that their skills improved. The data support this possibility. For example, 20% of unemployed and 15% of self-employed people report having participated in courses to improve their skills for work during the year prior to the survey. And these workers report lower deterioration of skills than those who have not participated in courses. This suggests that job training during periods of unemployment or self-employment may be one strategy to develop or reinforce skills in workers or at least a palliative to stop skill deterioration.

The graph shows that around 17% of self-employed people participate in training activities for work; the fraction of salaried workers is almost 40%. For self-employers, a lower intensity of learning from peers and learning by doing is also observed.

Graph 4.20 Characteristics of Unemployed/Self-Employed Workers and Skill Accumulation Channels in 10 Latin American Cities



Note. The graph reports the estimated coefficients and the 90% confidence intervals based on three ordinary least squares regressions. The dependent variables are our measures of: attending training courses, learning from peers, and learning by doing. The sample is limited to unemployed and self-employed workers for the regression on attending courses and only self-employed workers for the other two. The independent variables include measures on individual cognitive and socioemotional skills. The cognitive skills measures are the Raven Progressive Matrices Test (fluid intelligence) and the Brief Test of Verbal Conceptualization (verbal skills). The measures of socioemotional skills are: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experiences (the Big Five model), and the Grit scale (determination/perseverance to reach objectives). Attitude toward learning is also included. It is measured based on the level of agreement with the statement “I intend to get training and improve my performance at work,” with answers ranging from 1 (strongly disagree) to 5 (strongly agree). All regressions control for city and gender. Additionally, the last two regressions control for worker’s tenure in the current job. The base category corresponds to men without secondary education between 15 and 25 years old. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Authors’ elaboration using data from the 2015 CAF Survey.

What characteristics of people (unsalaried) are associated with a higher incidence of use of these accumulation channels? Graph 4.20 shows the results of associating the intensity of use of accumulation channels to characteristics of the workers.⁵⁶ The clearest effect is found for education. For unsalaried workers (self-employed or unemployed) with complete secondary education, the probability of taking a

56. The analysis of the determinants of the informal learning channels at work (learning by doing and from peers) is restricted to self-employed workers, because this information is not available for unemployed workers.

Even in the case of workers outside a formal job, individual characteristics such as educational level and attitude toward learning are associated with higher skill accumulation.

course is 9 percentage points higher than for those who did not complete secondary education; the probability for someone with a college degree is 30 percentage points higher. Socioemotional traits such as willingness to learn (measured only among the self-employed) are also associated with the intensity of use of these learning channels. In addition, the score on Brief Test of Verbal Conceptualization carried out in CAF Survey is positively associated with participation in training courses for work.

It may be also interesting to explore the association of the determinants at the individual level with the reported measures on variation in technical and socioemotional skills during current labor position. The exercise (not shown in the graph) finds that the highest-educated individuals report higher variation in both types of skills. Some socioemotional traits also play a role: grit, for example, is positively associated with variation of both types of skills. Emotional stability is positively associated with variation of socioemotional skills, while openness to new experiences is positive associated to variation of technical skills (See Appendix A 4.2).

The information presented up to now suggests that periods of unemployment or of informal working go against skill accumulation either through direct deterioration or by keeping the worker from acquiring skills from being away from a labor context that favors learning. To this direct effect, an indirect effect would also occur if the length of the unemployment and/or long periods in informality affects the quality of future matches in an eventual return to formal employment. This occurs, for example, by running out of assets to finance the search for a job, which precipitates the acceptance of a job that does not conform to the worker's skills.

The connection between the length of unemployment or informality and the quality of the match, unfortunately, seems to be a little-explored topic of great relevance in respect to the evidence presented in this chapter (that suggests that the quality of matches is a determinant of the learning dynamics). The scarce existing evidence is consistent with the idea that the higher the length of unemployment or informality, the lower the probability of achieving a good match in the next formal job. For example, a study for Macedonia based on a survey of transitions from school to work finds that longer periods spent looking for a job are associated with a lower probability that the individual will attain an adequate position once employed (Atanasovska et al., 2015).

In summary, the evidence supports the hypothesis that periods of unemployment and informality can promote, either directly or indirectly, a relative deterioration of skills. This seems to apply both for technical and socioemotional skills for work. The direct impact seems to originate both in a lower training rate and in lower rates of learning from peers and learning by doing. The indirect impact could be originated in higher risks of bad matches.

These findings highlight the importance of encouraging the creation of quality jobs, the implementation of programs that attack job search frictions and reduce the length of unemployment, as well as the implementation of training programs that favor the formation of skills (or stop their deterioration) for unemployed workers and workers employed in precarious and not very challenging jobs.

When the State Helps: Job Training and Employment Programs

Various failures of labor markets and distortions of the economy may limit workers' skill accumulation

Various failures of labor markets and economic distortions may affect the operating efficiency of learning channels and thus drive suboptimal levels of investment in training, cause long periods of unemployment and informality, and reduce the quality of occupational matches, affecting in all cases the skill accumulation dynamics of workers.⁵⁷ These failures may be grouped into four categories:⁵⁸ (1) imperfections in the labor market, (2) imperfections in financial market, (3) coordination failures, and (4) failures in the decision-making process (See Text Box 4.8). The failures affect skill accumulation paths in the labor market and, therefore, justify public interventions intended at lessening their effects.

Text Box 4.8 Market Failures and Other Distortions That Justify Public Intervention

Four types of distortions can prevent the market from achieving adequate levels of skill investments, which in turn gives rise to various public policy actions.

The first type of distortion is imperfections of the labor market. It is difficult to structure employment contracts that allow to fully appropriate the returns on investment in skill formation. Companies that invest in their employees' training are exposed to the risk of losing them if competitors lure them away with better job offers, especially if the training was for general skills. In turn, workers who invest in training may be deprived of earning higher salaries if their employers have strong bargaining power, particularly in the case of skills that are specific to the job. Other labor market failures, such as job search frictions and labor market institutions and regulations can also at least indirectly affect skill accumulation dynamics by their effect on the level and quality of employment. For example, recent studies show that job search frictions and other distortions affect the level of employment and training efforts (Chen et al., 2011).

Second, there are imperfections of the financial market. Workers may not be able to invest the optimum level in training activities if they simply do not have the necessary resources. This could cause an overly low level of investment in training, not only during the labor stage but also in previous stages of people's skill accumulation. One such issue is lack of access to credit, which is studied by Caceres-Delpiano et al. (2015), who show that the expansion of state-sponsored credit for higher education in Chile affects the investment decisions in human capital of secondary- and primary-level students. In particular, it reduces secondary school dropout rates, increases expectations of parents of the possibility that their children attend college, and generates changes among the best students toward better schools.

57. Since both the intensity of the job training and the potential for informal learning at work are independent from the characteristics of companies, other frictions that affect size and innovations will also affect, at least indirectly, skill accumulation dynamics. This type of friction is beyond the scope of this chapter. For an analysis of the various distortions on characteristics of companies in the region, CAF (2013) may be consulted.

58. This categorization is based on Almeida et al. (2012) and Alaimo et al. (2015).

Likewise, unemployed people with liquidity constraints may find themselves forced to accept jobs in which the skill requirements do not match their training and work experience.¹ These mismatches, which have costs in terms of skill accumulation, could be lessened if workers could be insured against such periods of income losses. However, private voluntary unemployment insurance markets are practically nonexistent in the region, and state-sponsored unemployment insurance coverage is limited by the high level of informality (Alaimo et al. 2015).

Third, coordination failures may generate bad equilibriums leading to suboptimal investment in skill formation. This could occur, for example, if companies do not innovate due to a lower skill level of the workforce; meanwhile the workers do not improve their qualifications because the return on investment is low because of low innovation. There could also be cases in which companies do not demand certain qualifications because that profiles are rare and therefore costly, while workers choose not to develop those skills because there will be little demand for their abilities.

Fourth, there are information asymmetries and failures in the decision-making process. For example, people do not always know the actual returns on the investment in skills (myopia), especially in certain contexts where there is segregation, such as the case of youth in the city of Cordoba (Berniell and de la Mata, 2016a). If the returns perceived are lower or higher than the actual ones, the investment in human capital could be too low or too high. The lack of complete information is evident in respect to the skills that an individual has and those required by an occupation, which may affect the probability of a match between the worker and the job, or the quality thereof.² Both are determinants of skill accumulation dynamics. In addition, companies and workers could invest in a lower level of training than is optimal if neither can precisely assess the quality or pertinence of the training activities (Alaimo et al., 2015).

These different failures interact and may affect all skill accumulation channels. In addition, the failures distort the signals on which skill formation investment decisions are made, both during the labor stage and in previous stages. Likewise, failures can reduce the probability of a match or affect match quality, reducing the potential of the informal channels of skill accumulation.

Source. Authors' elaboration

1. Pollmann-Schult and Büchel (2005) analyze the impact of unemployment insurance on the quality of subsequent occupational matches and show, using data from Germany, that workers who do not receive these benefits tend to get a job earlier but have a higher probability of taking jobs for which they are overeducated compared to workers who received unemployment benefits.

2. These problems of information on the worker or the job characteristics are even more severe for young workers, especially among those who are looking for their first job, because companies cannot use the work history of the worker to infer personal characteristics.

Public Policies That Facilitate Skill Accumulation

Various public policies for the labor market may facilitate skill accumulation through different mechanisms that attenuate the effects of market failures and other distortions, whether the policies are designed with these or other objectives. This section emphasizes the major characteristics of such policies in Latin America and the Caribbean, based on a compilation of

around 70 public policy programs from 17 countries of the region.⁵⁹ The section also reviews the rigorous evidence available on the effectiveness of this type of program.⁶⁰

Types of Public Programs in the Region

The public policies of the labor market usually have a comprehensive approach that involves multiple components and various mechanisms. Nevertheless, in order to facilitate this discussion, it is convenient to classify the policies into four groups: (1) job training or instruction, (2) subsidies to private employers, (3) public sector temporary employment and income support, and (4) assistance in the job search and other employment services.⁶¹ The first category consists of all programs that explicitly seek to reinforce or update the skills of workers through job training and instruction. The three remaining categories include initiatives that, although not explicitly seeking to develop skills, promote matches or improve its quality and favor skill accumulation by activating the learning channels at the workplace. The description of these programs, as well as their relation to the market failures to which they are connected and the underlying mechanisms, are presented in Table 4.7 (see p. 266).

First, job training programs can either operate through the offer of training activities -generally intended for vulnerable groups- or modifying the incentives of workers and companies to invest in training through certain institutional arrangements. Whether they are oriented to increase the supply of training or incentivize demand, labor market programs with job training components are very common in the region, to the extent that 56 of the 70 programs compiled fall in this category. As observed in Table 4.7 (see p. 266), these programs target imperfections in the labor and financial markets providing resources for worker training.

The first type of job training component, which is very common in the region, is focused on the youth population and seeks to help youth get their first job. Most countries in the region have implemented initiatives that follow the model of the program Chile Joven, which basically consists of a classroom training period followed by an internship phase. These programs emphasize competencies in demand by the local labor market to define the contents of the training courses and internships. The emphasis of these programs on firms' skill needs addresses

Training programs operate through provision of job training or modifying the incentives of workers and companies to invest in training through certain institutional arrangements.

59. Although the set of programs surveyed does not constitute an all-inclusive record of all existing interventions, it permits for an approximated idea of the public efforts made in the region on the subject of skill formation during and for the work stage. In addition to the programs, when pertinent a mention is made of other forms of public interventions, such as regulations or services rendered by government agencies that were not included in the compilation. The list of programs compiled is presented in Appendix A 4.3.

60. It is necessary to clarify that other policies that favor innovation could affect skill accumulation dynamics by their effects on productivity and quality of the companies. Nevertheless, this section focuses on the policies of the labor market.

61. This classification is similar to those used by Card et al. (2015) and Kluge (2016) in their reviews of the evidence available on the effectiveness of the active policy programs of the labor market worldwide and in Latin America, respectively. The only difference is that it includes, among the public employment and income support, passive policies such as unemployment insurance and indemnification for termination.

information asymmetries, shifting workers' training efforts directly to the market. Newer initiatives such as Argentina's Jóvenes con Más y Mejor Trabajo and Chile Califica and Más Capaz in Chile additionally focus on developing socioemotional and life skills (Alaimo et al., 2015).

Table 4.7 Typology of Public Policy Programs That Favor Skill Accumulation

Type of program	Components	Example of programs with that component in the region	Main market failures	Objectives/mechanisms
Job training	Classroom training and internship in companies	Chile Joven and similar modalities in other countries	Imperfections in the labor market. Information asymmetries	Favor labor insertion. Promote learning by doing and learning from peers. Provide formal training. Improve match quality
	Offer of job training courses	Programs of national and subnational training agencies: Red de Formación Continua (Argentina). +Capaz (Chile)	Imperfections in the labor and financial markets	Mitigate skill deterioration
	Subsidies or tax incentives to companies to offset training costs	Franquicia tributaria (Chile)	Imperfections in the labor and financial markets	Lower costs for companies to invest in skill formation
Incentives to employment in the private sector	Labor insertion through internships or temporary placement in companies	Proempleo (Honduras)	Imperfections in the labor market. Information asymmetries	Favor labor insertion. Encourage learning by doing and learning from peers. Improve match quality
	Subsidies to employment	Argentina trabaja. Programa primer empleo (Mexico)	Imperfections in the financial market and coordination problems	Favor labor insertion. Encourage learning by doing and learning from peers. Improve match quality
	Incentives for entrepreneurship	Jóvenes emprendedores and Jóvenes creadoras de microempresas (Peru)	Imperfections in the financial market	Provide resources for entrepreneurs. Favor learning by doing
Public sector temporary employment programs and income support	Public sector temporary employment	Plan Jefas y Jefes de Hogar (Argentina)	Imperfections in the labor and financial markets	Complement income
	Unemployment insurance and severance payments		Imperfections in the financial market	Complement income and improve quality of future matches. Prevent depreciation of skills. Promote learning by doing and learning from peers
Assistance with job search and other employment services	Skill certification	Permanent programs of the National Training Agencies	Information asymmetries	Reduce information asymmetries to favor labor insertion and/or improve match quality
	Vocational advice and information	Mi Futuro (Chile)	Information asymmetries and failures in decision-making	Improve decision-making process of investment in skill formation
	Labor intermediation	Labor intermediation services provided by public agencies	Imperfections in the labor market. Information asymmetries	Provide information to favor labor insertion and match quality

Source. Authors' elaboration.

Internships are a type of institutional arrangement that facilitates labor insertion by permitting companies to completely or partially transfer the costs of a worker's training by simply offering lower salaries during the course of the internship. The length of internships is usually about 1 to 3 months. In addition to mitigating the effects of imperfections in the labor markets, when firms do not have the obligation to hire the worker upon completion of the internship, this type of arrangement may operate as a trial and mutual learning period for the company and the worker, which also mitigates information asymmetry problems.

A characteristic common to most training efforts is that they tend to favor an integral approach, for instance incorporating labor insertion and certification services.

A second type of training component consists in providing free state-sponsored training courses that are usually organized or coordinated by national training agencies (48 of the 56 programs compiled fall in this category). These programs seek to increase the employability of participants and are usually addressed to vulnerable populations. The target audiences are generally youth, people with a low educational level or low income, unemployed people, workers who have spent long periods without employment, informal workers, and people who may be more inclined to face workplace discrimination for reasons of gender, race, or other characteristics.

A third type of training component tries to promote training for personnel working in formal companies, seeking to increase productivity in certain sectors. These initiatives are usually implemented through subsidies granted to companies to partially or completely cover the training costs. Of the 56 skill formation programs found in the region, 10 follow this model.⁶²

Some countries have implemented job training programs in firms, following the model of the Becas de Capacitación de Trabajadores (PROBECAT) program in Mexico, which seeks to improve labor outcomes of youth. In other cases, special agreement programs have been designed to promote job training for youth, such as the Contrato de Aprendizaje in Paraguay, the Ley del Aprendizaje in Brazil, the Aprendices program in Chile, and labor practice modalities in Uruguay (Alaimo et al., 2015). Other training initiatives within companies are not restricted to the youth population, such as Plano Nacional de Qualificação do Trabalhador (PLANFOR) in Brazil. In Mexico the Apoyo a la Productividad program seeks to promote the acquisition of knowledge and development or strengthening of skills with the purpose of increasing labor productivity and workers' wellbeing. Notably, it covers some or all training and skill certification costs, among other components.

Another modality to promote workers' training in companies is tax incentives for employers to offset some costs of training personnel. For example, the tax exemption program in Chile allows deducting resources invested in labor training from the payment of taxes on profits, up to 1% of the levy (Alaimo et al., 2015).

62. The sum of the 48 training programs intended for workers without a job and the 10 intended for employed persons differs from the total of 56 initiatives of this type since two of these programs, PLANFOR in Brazil and the PROBECAT in Mexico, cover both types of beneficiaries.

One type of institutional arrangement that are less frequent in the region are training contracts that specify a minimum length of time a worker must remain with the company after being trained. These arrangements could mitigate companies' lack of interest in investing in general skills training because of the risk of losing the trained workers.

A characteristic common to most of the programs with job training components, whether implemented on the supply or demand side, is that they attempt to favor an integral approach by offering labor insertion or certification services in addition to training. For example, of the 56 training initiatives examined, 30 complement training with labor insertion modules, 4 do it with skill certification modules, and 10 include both. The program Jóvenes con Más y Mejor Trabajo, introduced in Argentina in 2008, is one of the most complete found in the region, incorporating components such as job training, skill certifications, insertion through internships, and labor intermediation. Only 12 of the 56 initiatives are focused solely on the training component.

In terms of the skills targeted in training programs, regardless of how the programs are implemented, most of the programs recorded (52 out of 56) focus on dexterities and tools for work and other technical skills, while in a smaller group (21 out of 56) seeks to develop socioemotional skills, either as complement to the development of technical skills or in a dedicated program module.

Second, there are interventions intended to favor employment in the private sector. As shown in Table 4.7, these programs seek to mitigate labor market frictions through legal frameworks and financial support to reduce the costs of hiring workers, therein promoting learning by doing. These programs may also solve information problems given that they provide valuable information on the worker's skills and the match quality. Another type of program offers entrepreneurial incentives, which mainly solves problems in the financial market, providing resources to entrepreneurs who would be otherwise deprived from access to credit because of lack of collateral.

Most of the programs compiled (54 out of 70) have labor insertion components.⁶³ Within this group, the most common modality, particularly for youth, is internships or temporary placement in companies. Depending on the nature of the program, the state may require interns to be hired on completion of the internship period, as in the case of the program Proempleo in Honduras.

In general, the labor insertion and skill formation programs are comprehensive, incorporating training or certification components. However, some programs (13 out of these 54) only have labor insertion mechanisms, such as Argentina Trabaja, Apoyo al Empleo in Bolivia, or Perú Trabaja, among others. Some of these programs are aimed at youth looking for their first labor experience, such as for example Mi Primer Empleo in Ecuador, Primer Empleo in Mexico or Subsidio al Empleo Joven in Chile, among others.

63. Most labor insertion programs are intended for the young population and other vulnerable groups. Labor reinsertion and retraining programs aimed at the adult population are less frequent in the region.

This category also includes self-employment assistance programs that, in general, seek to provide financial resources and training for entrepreneurs to develop their businesses.

Third, there are the public temporary employment programs and other initiatives for income support. These may favor the quality of matches for unemployed workers because they allow workers to wait longer until they find a job that is adequate for their skill profile. In this manner, these programs attack financial market failures while helping bear the cost of job search. The high informality in the region limits the scope unemployment insurance and severance payments.⁶⁴ Temporary employment or public job programs implemented in some countries, especially during periods of high unemployment, could improve the situation of workers with lower qualifications (Alaimo et al., 2015). In addition, by favoring labor reinsertion, at least temporarily, these programs can slow the deterioration of skills that occurs during unemployment.

Fourth and finally, initiatives for assistance in the job search and other employment services are worth mentioning. This incentive group includes skill certification programs, which tackle information asymmetries while generating a reliable signal to companies in respect to the skills of prospective employees, facilitating matches and improving match quality. Of the 70 programs compiled, 15 have some certification component, and in all cases this is accompanied by other insertion or training components. The certification programs allow beneficiaries, regardless of whether they have gone through previous training, to take standardized evaluations as a mechanism of officially recognizing that the worker has one or several dexterities demanded in the labor market. Initiatives of this type permit to tackle the information failures typical of the labor markets that obstruct hiring and generate occupational mismatches. It should be emphasized that notwithstanding that many of the initiatives compiled do not have skill certification modules, national training agencies usually offer these services on an ongoing basis.

There are also programs that seek to mitigate the effect that information problems have on individual training decisions —not just those made during one's working life, but also those in previous skill development stages. These initiatives generally include mechanisms for providing information on the costs and benefits of different types of training and on contents and quality of the courses offered by different training providers and institutions.⁶⁵ For example, the Ministry of Education of Chile, through its digital platform *Mi Futuro*,⁶⁶ provides information on employability and labor income outlook for various professions to students who wish to enter higher education. In

64. The level of informality of Latin American economies not only limits the coverage of unemployment insurance but also has consequences for the design of these benefits. Alvarez-Parra and Sanchez (2009) show that the optimum term of the unemployment insurance is shorter in an economy with informality.

65. Investment decisions in skill formation during the formal education years could be suboptimal if people have limited cognitive skills to analyze and resolve complex problems, even if they have all the necessary information (Almeida et al., 2012). Actually, it has been proven that deficiencies in certain socioemotional skills may lead people to dropping out and later regretting it (see Chapter 3 and the evidence outlined there). Therefore, public interventions intended to form cognitive and socioemotional skills through the life cycle also contribute to the accumulation of skills for work, both during the working life and in previous stages.

66. <http://www.mifuturo.cl/>

addition to vocational orientation, the program provides advisory services on selecting the type of educational institution and accessing financing resources.

Programs that offer advisory services in the job search or labor intermediation can also reduce the information problems and favor both occupational insertion and match quality. Among the programs analyzed, around one third has some such component. Some examples are the program Jóvenes con Futuro in Argentina, Projovem in Brazil, Jóvenes Bicentenarios, in Chile, among many others.

Do Public Interventions Work?

Evidence on interventions' effectiveness in terms of their potential to develop and strengthen skills of the labor force is poor. Available evaluations are, in the best cases, focused on the impacts on variables that are the possible result of skill accumulation for work, such as employability, salaries, formality conditions, and other characteristics of the job, and there is little no evidence on direct effects of skill measurements.

Table 4.8 Evidence on the Effectiveness of Active Labor Market Programs

Type of program	Effects	Temporal profile of effects	Comments
Training	Positive or null	Increasing	Given that training takes time, negative lock-in effects are to be expected in the short term, while long-term positive effects are expected if whenever skill accumulation is significant. No major distortions are expected by this type of program. The fiscal cost of these programs is from moderate to high; however, given that they have long-lasting effects, these programs may be socially profitable.
Employment incentives in the private sector	Positive	Increasing	Aimed at accelerating matching and increasing employment demand, these programs have positive effects in the short term, with a temporary increasing profile, especially when experience on the job alters future employability (the job ladder effect). There is a high risk of distortions, such as workers being displaced by program beneficiaries and companies having an advantage over competitors from the subsidies received. These programs usually have a high fiscal cost.
Public sector temporary employment	Null or negative	Constant or decreasing	Positive effects are expected only in the short term, except that the labor experience may involve tasks comparable to those of regular jobs. They have a high risk of distortions and have a high fiscal cost.
Assistance with job search and general employment services	Positive or null	Decreasing	Positive effects only in the short term; apparently the work experience is not sufficient to alter future employability. There may be displacement effects in low labor demand contexts. Fiscal costs are usually low.

Source. Authors' elaboration using data from Card et al. (2015).

In general, assessments of programs that can be beneficial to developing and strengthening skills of workers and to facilitating workers' labor insertion or match quality tend to show modest results. Card et al. (2015) analyze the results of

207 assessments of these programs worldwide, covering a total of 857 impact indicators.^{67 68} The most widely reported impact variable is the probability of getting a job (56% of the total estimates), followed by labor income (23%). The main results are summarized in Table 4.8.

Estimated results generally show small effects in the short term but higher effects in the midterm and long term, although this pattern seems to be driven by two types of programs: training (either in the classroom or at work) or employment subsidies in the private sector. In the case of training programs, the average long-term effect is more than three times that of those in the short term, and the percentage of programs with positive impacts that are statistically significant ranges from 35% in the short term to 67% in the long term. As for employment incentives in the private sector, long-term effects are on average up to 15 times the effects found in the short term, and the percentage of assessments with positive and significant effects goes from 37% in the short term to 88% in the long term. For the rest of the programs that set out to establish labor insertion or can improve match quality (assistance in the job search and temporary public employment), no clear pattern is observed regarding the evolution in time of the impacts.

The fiscal cost of the training programs is usually from moderate to high; however, their positive impacts in the long run may make them socially beneficial. Subsidy programs to private employment usually also have a high fiscal cost, and their cost-effectiveness depends on the achievement of positive impacts in the midterm and long term, something that does not always occur. Public sector temporary employment programs, which also have high fiscal costs, tend not to be cost-effective, and their use is usually justified by redistribution reasons. Finally, programs with job search assistance and other employment services, although they have effects that tend to disappear in time, usually have a low impact on public budgets. That said, results tend to depend on the worker's profile, with better impacts among women and unemployed workers. The authors also emphasize the countercyclical nature of the programs: they are more effective in high unemployment periods.

Evidence on the effectiveness of the programs implemented in Latin America and the Caribbean is even more limited. Kluge (2016) uses the sample of the assessments that refer to regional countries included in Card et al. (2015) and expands it with new studies, ending up with 44 evaluations that contain 152 impact estimates. Of these, about 83% refer to training programs, and the rest are distributed among assistance programs for the job search and provision of information (5%), incentives to private employment (5%), and temporary employment in the public sector (8%).

In general, assessments of programs that favor both the development and strengthening of skills of workers as well as labor insertion tend to have better results.

67. As criterion for the inclusion of studies in the review, the authors considered the impact evaluations published from 1990 forward, made on a micro-data basis and that had a control group or counterfactual design or some sort of selection bias correction. Programs in which the companies could freely choose their beneficiaries were excluded. In addition, the programs assessed had to have some component of active labor market policy (that is, unemployment insurance programs were excluded), which could be one of five types: training in the classroom or at work, assistance in the search for a job, penalties for not looking for a job, subsidized private employment, and temporary employment in the public sector. At the end of this section, the programs of penalties for not looking for a job are regrouped within the category of assistance in the search and other employment services.

68. Other reviews of this literature for programs of Latin American and the Caribbean are: Tripney et al. (2013), Kluge (2016), Vezza (2014), and Ibarra and Rosas (2009).

Programs implemented in Latin America and the Caribbean usually have higher impacts in the long term, among women, and in low unemployment contexts.

The number of assessments available in the region for each type of policy allows for representativeness by type of program only for the job training programs. Therefore, the author makes two types of comparisons. First is the analysis of the differential characteristics of all programs assessed in the region and how those characteristics are systematically associated with the impacts found. Second, the exercise is repeated focusing on the job training programs.

In the first case, the results suggest that the programs implemented in Latin America and the Caribbean usually have less impact in the short term than in the longer term. In addition, programs as a general rule have better results for women than men and tend to operate better in low unemployment contexts. No systematic differences are found between the effects of training programs versus all programs, or between the programs focused on the youth population and all others.

In the case of job training programs, the effects are ordinarily higher the longer the length of the program. In addition, the programs show higher impacts on women than men. In contrast with the findings in other regions, the review of training programs in Latin America and the Caribbean revealed that the effectiveness of training was higher in low unemployment periods and high economic growth. Finally, no significant differences are found between programs with one or with more components, which would suggest that more comprehensive programs are not more effective than less comprehensive ones. This result is surprising given that the more comprehensive programs do have more effective results when the group of programs is studied as a whole, as mentioned by the author.⁶⁹

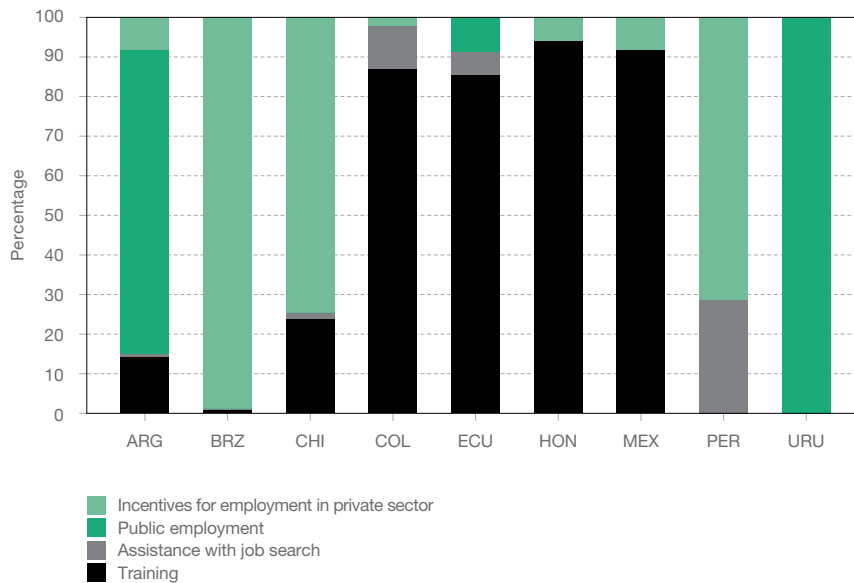
Furthermore, it is interesting to discuss the relative importance that different types of programs have on public budgets. Public spending in active labor market programs in Latin America and the Caribbean is around 0.24% of the GDP (Carutti et al., 2014), a little over one third of what the OECD countries spend (Alaimo et al., 2014). However, beyond the size of the budget, it is interesting to contrast the distribution of that budget by type of intervention (presented in Graph 4.21) against the weight of the evidence on impacts of each type of program. Up to what point are the interventions in the labor market in the region based on available evidence?

Brazil, Chile, and Peru allocate a major portion of their expense to subsidizing private employment, a type of intervention that according to existing evidence usually has highly profitable results. Also, Colombia, Ecuador, Honduras, and Mexico dedicate most of their resources to job training programs that, in general, offer positive results. Argentina and Uruguay in 2010 applied the largest proportion of their resources to the creation of public employment programs, a type of

69. A higher effectiveness of the more comprehensive training programs in respect to less comprehensive ones has in fact been found previously in a meta-analysis of job training programs in Latin America, prepared by Fares and Puerto (2009). In that case, it is stressed that there has been a marked transition in the region from in-classroom training programs toward programs that combine classroom and at-work trainings as well as programs that, in addition of this practical experience, provide other assistance services, and that these more comprehensive intervention are more likely to having positive effects on employment and/or labor income.

intervention for which the effectiveness has not been rigorously proven.⁷⁰ The increasing availability of evidence on the effectiveness of public policies in this field provides valuable information for a more efficient allocation of fiscal resources.

Graph 4.21 Percentage of Public Spending on Active Labor Market Programs by Program Type in Latin American Countries (2010)



Note. The data are limited only to programs from the central government.

Source. Authors' elaboration using data from Cerutti et al. (2014). The programs included in Cerutti et al. (2014) were regrouped according to the classification of Card et al. (2015).

Conclusions

Learning does not come to an end at the conclusion of formal education. This chapter argues that the labor market offers plenty of opportunities for skill accumulation. Skill accumulation in this phase of a person's life cycle has been traditionally explored indirectly, from the perspective of the dynamics of salaries and interpreting that, to some extent, those changes in salary reflect changes in the human capital.

70. The countries could have reasons other than skill formation or employment generation at the time of implementing public employment programs that can also be legitimate, such as providing a source of transitory assistance to the income of vulnerable families or living in poverty.

This chapter uses the 2015 CAF Survey to provide evidence on skill accumulation during the working life, based on perceptions about learning about technical and socioemotional skills as well as through different channels. Although it is not an ideal measure, since it is not based on direct measurements of skills, it offers an interesting perspective on the issues.

The first message that arises is that learning occurs at this level not only by the participation in formal training programs, but —crucially— through the performance of everyday tasks and interactions with colleagues at work. In fact, statistical analysis suggests that almost 90% of the contribution by the three channels of skill accumulation to variation in technical and personal skills, as reported by workers themselves, is associated with learning through informal channels, while the participation in training courses is only a little over 10%. This should not be surprising since informal learning channels are constantly active while the worker remains employed, while formal training occurs only periodically.

It is evident that none of these channels operates in a vacuum. On the contrary, they are strongly influenced by the labor market and the productive network of an economy. This implies that labor market policies, productive policies, and the policies for job training are closely connected and reinforce each other. What characteristics arise from the labor and productive outlooks of the region? First, a large fraction of workers are self-employed or working in the informal sector or very small companies (CAF, 2013). To these challenges, problems of match quality are added: according to the 2015 CAF Survey, over 40% of salaried workers of the 10 of the main cities in the region say they are in an occupation for which their skills are very high or very low or very different from those required for their job.

Special attention should be given to youth for whom starting on the wrong foot may have lasting repercussions for their labor perspectives, including skill accumulation. The analysis of youth labor dynamics shows that only 62% of youth find a job after completing formal education and of these, only 17% get a good-quality first job. This transition is even more difficult among youth with lower educational levels.

These conditions reduce the learning that the people may have in their working life and point to the need for policies intended to generate quality employment (and matches). On one hand are pro-entrepreneurship policies that favor company transformations and innovations (for a review of these policies, see CAF, 2013). On the other hand are policies directly aimed either at promoting investment in skill formation or improvements in matches and match quality.

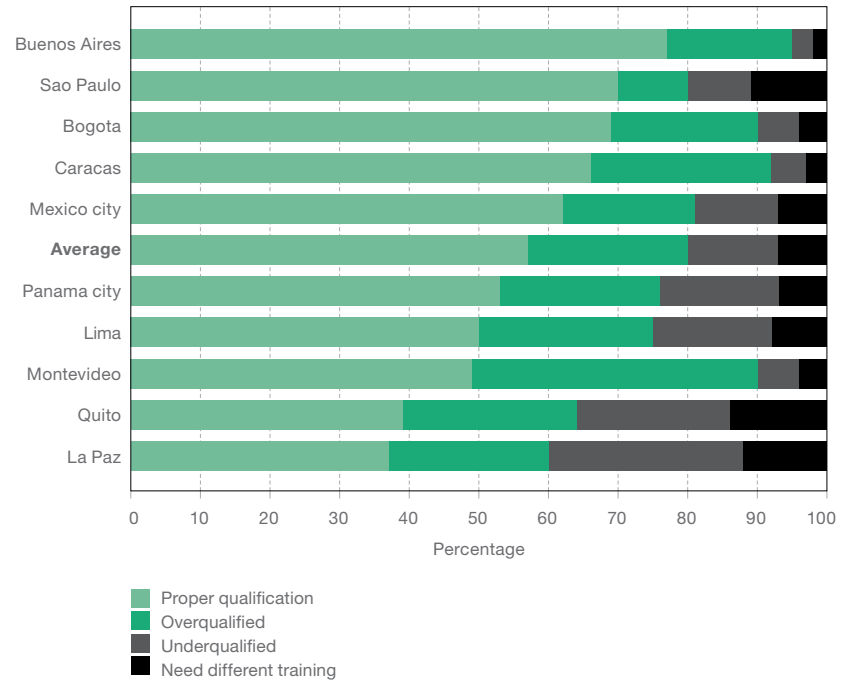
The policy options are varied. The choice of options includes internship policies, which are very common in the region and permit shared training costs and also favor labor insertion of the youngest workers; training programs, especially for unemployed and informal workers, in order to curb the deterioration of skills so common in this phase; and even unemployment insurance, to avoid having to accept a job where the quality of the match is known to be low. This list may also include labor insertion programs, certification programs (to reduce mismatch incidence), as well as the vocational advice and information programs on labor market outlook, among others.

The labor context isn't the only one that matters. Results show that learning in this phase of the life cycle relies on what happened in the previous phases. Thus, the formal education system and the family play a major role in providing people with the necessary tools to take maximum advantage of their time in the labor market. Moreover, the relationship between these prior contexts in the life cycle (family, school) and the labor context is two way, given that the labor market signals which skills matter for certain jobs and orients people's decisions in those earlier phases. Here again, intervention opportunities for public policies are identified, in view of the fact that the interpretation of these labor-market signals may be distorted by information problems.

The general message for public policies is one of comprehensiveness, recognizing the need to facilitate the interaction between the different stages of the life cycle, offset the different failures that work against the skill accumulation process, and undo the different distortions that upset the returns on investments.

Appendix

Graph A 4.1 Quality of Occupational Matches in 10 Latin American Cities



Note. The quality of the match is measured by the worker's answer to the question: "Thinking about your current job, do you consider that your qualification level (that is, your experience, knowledge, and dexterities): (a) is correct, (b) I could tackle more demanding tasks than those required by my current job, (c) I would need more training to perform the current tasks well, (d) I would need different training."

Source. Authors' elaboration using data from the 2015 CAF Survey.

Table A 4.1 Influence of Different Characteristics on Skill Accumulation Channels for Salaried Workers in 10 Latin American Cities

Independent variables	Variation of socioemotional skills	Variation of technical skills	Took a course in the past 12 months	Learning from peers	Learning by doing	
Has completed secondary	0.388*** (0.132)	0.334** (0.143)	-0.0152 (0.0282)	0.0570 (0.0774)	0.110 (0.0694)	
Has completed college	0.478*** (0.185)	0.326 (0.200)	0.0980** (0.0487)	0.0840 (0.115)	0.200** (0.0966)	
Ages 25–35	-0.253** (0.127)	-0.0396 (0.146)	-0.0429 (0.0323)	-0.114 (0.0796)	-0.100 (0.0715)	
Ages 36–45	-0.295** (0.148)	-0.275 (0.174)	-0.0528 (0.0376)	-0.150 (0.0931)	-0.126 (0.0856)	
Ages 46–55	-0.0971 (0.167)	-0.0973 (0.202)	-0.0576 (0.0416)	-0.306*** (0.115)	-0.121 (0.0937)	
Women	0.0959 (0.0986)	0.0210 (0.112)	0.0283 (0.0242)	0.0275 (0.0634)	0.0184 (0.0546)	
Measure of fluid intelligence	-0.0540** (0.0274)	-0.0472 (0.0310)	0.00541 (0.00753)	-0.0112 (0.0161)	-0.00972 (0.0147)	
Measure of verbal skills	0.00105 (0.0195)	-0.0259 (0.0219)	0.00262 (0.00490)	-0.0191 (0.0120)	-0.00746 (0.0108)	
Extraversion	0.0338 (0.0589)	0.0588 (0.0666)	0.00792 (0.0153)	0.0291 (0.0354)	0.0267 (0.0325)	
Agreeableness	0.0382 (0.0614)	0.0437 (0.0747)	0.00316 (0.0171)	-0.0390 (0.0437)	-0.0389 (0.0390)	
Conscientiousness	0.0756 (0.0625)	0.137** (0.0690)	-0.00827 (0.0150)	-0.0378 (0.0373)	-0.0103 (0.0354)	
Emotional stability	0.117** (0.0566)	0.0725 (0.0627)	0.0247* (0.0141)	0.0699* (0.0367)	0.0977*** (0.0323)	
Openness to experiences	0.127** (0.0567)	0.151** (0.0631)	-0.00415 (0.0150)	0.0439 (0.0382)	0.0251 (0.0317)	
Grit	0.287*** (0.102)	0.200* (0.102)	-0.00717 (0.0246)	-0.00510 (0.0592)	0.104** (0.0511)	
Attitude toward learning	0.292*** (0.0450)	0.267*** (0.0462)	0.0123 (0.00936)	0.124*** (0.0259)	0.144*** (0.0238)	
Firm size	6 to 20 workers	0.218 (0.142)	0.288* (0.166)	0.0471 (0.0323)	0.0930 (0.0954)	0.0635 (0.0831)
	21 to 100 workers	0.252* (0.152)	0.163 (0.188)	0.0408 (0.0354)	0.195** (0.0966)	0.122 (0.0898)
	Over 100 workers	0.380** (0.163)	0.527*** (0.177)	0.216*** (0.0384)	0.313*** (0.104)	0.217** (0.0908)

Continued >

Independent variables	Variation of socioemotional skills	Variation of technical skills	Took a course in the past 12 months	Learning from peers	Learning by doing
Employer contributes to retirement pensions	0.0632 (0.127)	0.274* (0.153)	0.102*** (0.0311)	-0.158* (0.0815)	-0.0203 (0.0759)
Work requires using a computer	-0.123 (0.164)	-0.0564 (0.173)	-0.000876 (0.0399)	-0.00900 (0.0965)	-0.0628 (0.0800)
Work requires using internet as work tool	0.0684 (0.160)	0.139 (0.169)	0.0645 (0.0398)	0.204** (0.0964)	0.264*** (0.0771)
Work requires teamwork	0.521*** (0.135)	0.182 (0.142)	0.000826 (0.0277)	0.615*** (0.0823)	0.310*** (0.0699)
Work requires planning activities and organizing your time and/or that of others	0.0515 (0.107)	0.300** (0.123)	0.0644** (0.0267)	0.0644 (0.0660)	0.0938 (0.0582)
Work requires negotiating with people, either within or outside the firm or organization	-0.0452 (0.103)	0.0628 (0.109)	-0.0137 (0.0266)	-0.00702 (0.0628)	0.0138 (0.0572)
Work requires use of a language that is not your native language	0.225* (0.122)	-0.130 (0.143)	0.0302 (0.0402)	-0.0238 (0.0877)	0.0183 (0.0753)
Work requires writing reports or other documents	0.100 (0.115)	0.346*** (0.126)	0.105*** (0.0297)	0.0791 (0.0701)	0.0910 (0.0631)
Work requires calculating prices, costs or budget	0.000411 (0.114)	-0.103 (0.126)	-0.0290 (0.0271)	-0.0833 (0.0662)	-0.0495 (0.0619)
According to your experience and knowledge you feel you could tackle more demanding tasks than those that you have in your job	0.0963 (0.113)	-0.169 (0.127)	0.120*** (0.0293)	0.00631 (0.0690)	-0.108* (0.0584)
According to your experience and knowledge you feel you need more training to face the tasks of your job	0.0175 (0.162)	-0.0619 (0.200)	0.165*** (0.0448)	0.0519 (0.111)	0.0326 (0.0982)
According to your experience and knowledge you feel that you need different training to do the tasks of your job	-0.218 (0.252)	-0.222 (0.336)	0.0269 (0.0537)	-0.441** (0.174)	-0.275 (0.172)
Constant	-2.302*** (0.549)	-1.811*** (0.600)	-0.236* (0.134)	2.150*** (0.328)	1.677*** (0.292)
Observations	2.252	2.250	2.259	2.243	2.252
R-squared	0.285	0.202	0.253	0.224	0.252

Note. Each column of the table represents a regression where the dependent variable is shown in the title of the column. The sample is limited to salaried employees. The standard errors are in parentheses. In addition, all regressions control for the worker's tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and occupation. City fixed effects are included. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas. *, **, and *** represent statistical significance at 90%, 95%, and 99%, respectively.

Source. Authors' elaboration using data from the 2015 CAF Survey.

Table A 4.2 Influence of Different Characteristics on Skill Accumulation Channels for Unemployed and Self-Employed People in 10 Latin American Cities (2015)

Independent variables	Variation of socioemotional skills	Variation of technical skills	Took a course in the past 12 months	Learning from peers	Learning by doing
Self-employed	1.177*** (0.172)	1.287*** (0.163)	-0.0352 (0.0232)		
Has completed secondary	0.465*** (0.127)	0.346*** (0.126)	0.0929*** (0.0227)	0.254*** (0.0981)	0.260*** (0.0881)
Has completed college	0.601*** (0.215)	0.977*** (0.189)	0.329*** (0.0447)	0.588*** (0.156)	0.505*** (0.128)
Ages 25–35	0.00827 (0.161)	0.219 (0.171)	0.0179 (0.029)	0.0191 (0.137)	0.223** (0.113)
Ages 36–45	0.0922 (0.174)	0.355** (0.18)	0.0255 (0.0311)	0.0217 (0.142)	0.167 (0.121)
Ages 46–55	-0.291 (0.204)	-0.0229 (0.204)	-0.0115 (0.0299)	-0.108 (0.158)	0.0245 (0.138)
Women	-0.0667 (0.122)	-0.255** (0.118)	-0.0188 (0.0211)	-0.350*** (0.0919)	-0.278*** (0.0774)
Measure of fluid intelligence	0.004 (0.0392)	0.0298 (0.0392)	0.00782 (0.00784)	0.0187 (0.0293)	0.00367 (0.0243)
Measure of verbal skills	0.0346 (0.0284)	-0.000978 (0.0254)	0.00889** (0.00408)	-0.00653 (0.0201)	-0.0204 (0.0155)
Extraversion	0.07 (0.0788)	-0.00641 (0.0706)	0.0142 (0.0119)	0.0821 (0.0562)	0.0284 (0.0471)
Agreeableness	0.0196 (0.0905)	-0.0346 (0.0771)	-0.0116 (0.0123)	0.0351 (0.0599)	-0.0505 (0.053)
Conscientiousness	0.105 (0.0695)	0.0913 (0.069)	-0.0169 (0.0119)	0.0634 (0.0527)	0.0655 (0.0425)
Emotional stability	0.118* (0.067)	0.0695 (0.0618)	0.0196* (0.0104)	0.0203 (0.0509)	0.0352 (0.0407)
Openness to experiences	0.0983 (0.075)	0.276*** (0.0704)	0.0174 (0.0117)	0.00802 (0.0537)	0.0172 (0.0463)
Measure of grit	0.303*** (0.112)	0.375*** (0.114)	0.0331 (0.0216)	0.0107 (0.0933)	0.127* (0.0733)
Attitude toward learning				0.175*** (0.0358)	0.174*** (0.0324)
Constant	-2.597*** (0.553)	-2.600*** (0.495)	-0.184** (0.0918)	1.209*** (0.432)	1.389*** (0.374)
Observations	2624	2610	2599	1869	1920
R-squared	0.199	0.18	0.162	0.118	0.208

Note. The sample is limited to self-employed and unemployed people in the first three columns and only to the self-employed in the other two. The standard errors are in parentheses. In addition, all regressions control for the worker's tenure at the current job, binary variables indicating if the individual is currently studying, economic sector, and occupation. City fixed effects are included. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

*. **. and *** represent statistical significance at 90%. 95% and 99%. respectively .

Source. Authors' elaboration using data from the 2015 CAF Survey.

Table A4.3 Labor Market Programs in Countries of Latin America and the Caribbean (2015)

Program	Country
<i>Argentina Trabaja</i>	Argentina
<i>Jóvenes con Futuro</i>	Argentina
<i>Jóvenes con Más y Mejor Trabajo</i>	Argentina
<i>Programa de Recuperación Productiva (REPRO)</i>	Argentina
<i>Proyecto Apoyo al Empleo Juvenil</i>	Argentina
<i>Proyecto Capacitación y Aprendizaje Permanente</i>	Argentina
<i>Proyecto Joven</i>	Argentina
<i>Programa Jefes y Jefas de Hogares Desocupados</i>	Argentina
<i>Programa Oportunidad</i>	Argentina
<i>Programa Apoyo al Empleo (PAE)</i>	Bolivia
<i>Mi Primer Empleo Digno</i>	Bolivia
<i>Programa de Mejora a la Empleabilidad e Ingreso Laboral Juvenil</i>	Bolivia
<i>Planfor</i>	Brazil
<i>Programa Nacional de Estimulo al Primer Empleo (PNPE)</i>	Brazil
<i>Projovem</i>	Brazil
<i>ProJovem Campo</i>	Brazil
<i>Programa Primeiro Emprego</i>	Brazil
<i>ProJovem Trabalhador</i>	Brazil
<i>ProJovem Urbano</i>	Brazil
<i>Pronatec</i>	Brazil
<i>Chile Califica</i>	Chile
<i>Chile Joven</i>	Chile
<i>Jóvenes Bicentenarios</i>	Chile
<i>+Capaz</i>	Chile
<i>Formación para el Trabajo (FORTRAB)</i>	Chile
<i>Programa de Aprendices</i>	Chile
<i>Subsidio al Empleo Joven</i>	Chile
<i>Start UP Chile</i>	Chile
<i>4 Mil Primeros Empleos</i>	Colombia
<i>Jóvenes en Acción</i>	Colombia
<i>Programa de Emprendimiento Rural</i>	Colombia
<i>Talentos para el Empleo</i>	Colombia
<i>TránsFormate</i>	Colombia
<i>Política Pública para la Juventud</i>	Costa Rica
<i>Programa de Desarrollo Nacional EMPLEATE</i>	Costa Rica
<i>Proempleo</i>	Honduras
<i>Mi Primer Empleo</i>	Honduras
<i>Programa Piloto Primer Empleo para Juventud en Riesgo</i>	Honduras

Program	Country
<i>Mi Primer Empleo</i>	Ecuador
<i>Empleo Joven</i>	El Salvador
<i>Programa de Apoyo Temporal al Ingreso</i>	El Salvador
<i>Pasantías Registradas</i>	Jamaica
<i>Programa Nacional de Juventud No-Incorporada</i>	Jamaica
<i>Programa Apoyo al Empleo (Bécate)</i>	Mexico
<i>Autoempleo para Jóvenes</i>	Mexico
<i>Programa Apoyo al Empleo (Bécate)</i>	Mexico
<i>Programa Apoyo al Empleo (Repatriados Trabajando)</i>	Mexico
<i>Programa Apoyo a la Productividad (PAP)</i>	Mexico
<i>Programa Primer Empleo (PPE)</i>	Mexico
<i>Becas de Capacitación para Trabajadores (PROBECAT)</i>	Mexico
<i>Panama ProJoven</i>	Panama
<i>ProCaJoven</i>	Panama
<i>ProcaMype</i>	Panama
<i>Jóvenes a la Obra</i>	Peru
<i>Projoven</i>	Peru
<i>Vamos Peru</i>	Peru
<i>Jóvenes Productivos</i>	Peru
<i>Trabaja Peru</i>	Peru
<i>Impulsa Peru</i>	Peru
<i>Start Up Peru</i>	Peru
<i>Democracia Transparente</i>	Dominican Republic
<i>Juventud y Empleo (PJE)</i>	Dominican Republic
<i>Entrenamiento en el Trabajo</i>	Trinidad and Tobago
<i>Programa de la Alianza por el Empleo y la Formación de los Jóvenes (YTEPP)</i>	Trinidad and Tobago
<i>Programa de Re-Entrenamiento</i>	Trinidad and Tobago
<i>Programa Multi Sectorial de Entrenamiento en Habilidades (MUST)</i>	Trinidad and Tobago
<i>Programa Nacional de Aprendizaje (PNA)</i>	Trinidad and Tobago
<i>Opción Joven</i>	Uruguay
<i>Projoven</i>	Uruguay
<i>Programa Nacional de Aprendizaje (PNA)</i>	Venezuela

Source. Authors' elaboration..

THE SOCIAL ENVIRONMENT: ENABLING OR LIMITING?

Chapter 5

Chapter 5

THE SOCIAL ENVIRONMENT: ENABLING OR LIMITING?¹

“Education is a natural process carried out by the child and is not acquired by listening to words but by experiences in the environment.”.

María Montessori

Diana and Camila are classmates in the same public school. They sit close to each other and play together during recess. Their favorite subject is mathematics. At the end of the school day, they stay at school to do their homework together. Although they are good friends, Diana and Camila only see each other in school, mostly because Diana lives in a neighborhood located in the outskirts of the city and Camila in one close to the school.

When she's not in school, Camila spends her afternoons having a good snack then going to play at a nearby park. She also likes to go to the library, which is also close by, to listen to storytellers. Diana doesn't have a park or a library in her neighborhood. Camila has invited Diana over, but Diana doesn't have time to visit because she has to take care of her younger siblings. Sometimes she also has to go get water for the family when the water to the house is cut off.

Notwithstanding that they are in the same class and they study together, Diana does not have grades as good as Camila. Why?

Introduction

The environment where the everyday life of people takes place is crucial to the development of their skills. The environment takes a very particular form: it is the characteristics of the neighborhood, with all of its physical (infrastructure) and social (people) elements. Such context frames the behavior and interactions of people and conditions the skill accumulation processes, either by promoting or limiting them. The characteristics of the physical and social environment in Latin American cities are a cause for concern. Almost 1 in every 4 Latin Americans (over 110 million people) lives in an informal settlement where disorganized urbanization has left populations with low coverage levels of basic public utility services. In addition, the vulnerability of these homes to climate-related events, such as landslides caused by rain; social problems, such as crime; and idiosyncratic events such as loss of employment or illnesses, are all obstacles to people's cognitive, socioemotional and physical development that have consequences on productivity and wellbeing.

1. The preparation of this chapter was the responsibility of Juan F. Vargas with the research assistance of Diego A. Martín.

There are three specific dimensions of the environment that influence skill development: physical space and public infrastructure, exposure to shocks, and peer effects.

There are three specific dimensions of the environment that influence the skill development. The first dimension is physical space and public infrastructure, including access to public utilities.² Access to proper physical spaces and a better quality of public utilities promotes good health and habits beneficial for people's physical wellbeing. The second dimension is exposure to shocks, which are unforeseen and abrupt changes in the constraints and incentives of households. Shocks can be of different types (economic, climate, health, or safety related), and their impact on skill development may vary according to their nature and severity. Finally, certain decisions, that facilitate or obstruct skill accumulation are shaped by the relationship of the individual who make them with the social environment. These are the so-called peer effects, which constitute the third dimension of the environment analyzed in this chapter.

These dimensions of environment are not independent from each other. For instance, the physical space promotes interaction with peers and an adequate public infrastructure can facilitate resilience to climate-related shocks. There are also phenomena that can be analyzed through the lens of several dimensions of environment, simultaneously. For example, high levels of insecurity may reduce the investments that families would wish to make in children and youth to strengthen their skills, and this problem can be associated both to an inadequate physical environment (bad lighting in the streets or the presence of abandoned properties) and to crime- and violence-related shocks that change the behavior of the people affected by them.³

The capacity of individuals and households to affect their environment is limited and depends on the type of environment and on other characteristics of the home, such as the economic situation. For the poorest homes, it is more difficult to move to less harmful physical environments (with better access to higher-quality public utilities and public spaces and with less crime) and lessen certain types of shocks, such as someone in the home losing a job. Still more difficult is to avoid exposure to less idiosyncratic shocks such as natural disasters, regardless of the economic capacity of the household.⁴

In turn, the state can more actively influence some aspects of the environment, and in this manner it can help in the skill formation process. Physical spaces and adequate public infrastructure are the responsibility of the state and, therefore, the physical dimension is the most easily affected by good public policy decisions to promote the development of cognitive, socioemotional, and physical skills. In contrast the influence of peers on individual decisions is a lot less likely to change in response to specific public initiatives because peer effects arise from complex social interactions. In the middle are shocks. The responsibility to mitigate their

2. Other basic public services such as education and health are not included. The role of public education is analyzed in Chapter 3.

3. The chapter disregards these interactions to some extent and analyzes each dimension separately and in a self-contained manner.

4. Naturally, once a natural disaster has occurred, the poorest homes usually have the highest levels of damage, precisely because of the deficiencies in their physical environment.

potentially negative effect falls both on households and the state.⁵ The former must seek safety mechanisms in case of possible stressors or disasters, while the state plays a double role: prevention and assistance in offsetting the negative effects of shocks.

This chapter discusses the mechanisms through which the various dimensions of the environment condition the development processes of cognitive, socioemotional, and physical skills throughout life, and provides empirical evidence on the importance of the physical space, shocks, and peer effects on skill accumulation in Latin America. This evidence provides a vital foundation for rigorous discussion about policy strategies the governments of the region can adopt to foster the environment's positive externalities on skill development.

Conceptual Framework

The environment interacts with other skill formation contexts, such as the family, the school, and the workplace, and it does so by either boosting or limiting the effect of investments people make as part of each context. For example, investments in parents' quality time with children are very important to skill development during early childhood.⁶ In turn, having nearby parks, libraries, and places to carry out playful and intellectual activities facilitates and encourages quality time between parents and children. This is how the environment (in this case, high-quality and easily accessible physical spaces) complements family investments.

This example of complementarity represents one of the two general mechanisms through which the environment relates to the skill formation process: the environment affects the cost of performing activities or adopting behaviors that promote or prevent skill formation. This cost must be understood not only as the monetary value of an action, but also —and especially— as that which is sacrificed or omitted when said action is carried out. In turn, by affecting the cost of performing activities that modify people's skills, the environment also affects the return on those activities or investments and, therefore, the incentive to perform them.

In effect, the condition of having parks and sport centers in the neighborhood is an incentive to be physically active and play sports. These activities, then, promote skill development —especially physical. In other words, the lack of access to appropriate physical spaces increases the cost of being active or playing sports, which therefore reduces incentives to perform such activities. This, in turn, results in diminished opportunities for skill development.

5. Although in theory shocks can also be positive (such as the arrival of remittances, the appreciation of property, the receipt of an inheritance) this chapter is focused on the effect of negative shocks on skill development.

6. See Chapter 2.

The environment affects the cost of performing activities or adopting behaviors that promote or prevent skill formation.

The second mechanism is different: the (social) environment may generate feelings of identity and thus change the preferences of individuals toward activities that are important for skill development.⁷ This is the main mechanism behind peer effects. For some individuals (especially during adolescence), the behavior of their peer group is very important. If a person's peers practice sports, it is more likely that the individual will also practice them, regardless of the costs of accessing a proper physical space to do it. The following sections provide a more in-depth analysis on specific aspects of the relationship of each environment dimension to the skill formation process.

The Physical Environment and Skill Formation

The physical space and public infrastructure influence skill accumulation differently. Access to an adequate physical space encourages (because it reduces the cost of) performing specific activities that promote dexterities and skills. On the one hand, when people do not have basic public utilities in the home, the members of the household must dedicate part of their time and effort to investments that offset those limitations, for example using their time to look for water or energy sources (such as fuel for cooking).

In the case of the physical environment, spending time in parks and sports centers facilitates gross motor development and physical skills in general; visiting libraries and cultural centers promotes the development of cognitive skills related to learning and attention; and interacting with other individuals with the same interests (in parks, libraries, or other spaces) may generate social integration dynamics and stimulate healthy practices that help the development of socioemotional skills.⁸ In addition to reducing the individual costs of performing actions that permit skill accumulation, investments in public spaces may generate social externalities associated with lower pollution, lower levels of insecurity, and an appreciation of the surrounding soil, among other benefits that increase incentives for the households to invest in skill formation activities.

In turn, public utilities may reduce incidence of diseases, especially in children—thus potentially reducing child mortality.⁹ A home without access to publicly provided electricity or gas must make an effort to substitute these services for alternative sources of power (such as coal or wood), which not only takes the time of the family members, but also generates pollution and damages the health of

7. Akerlof and Kranton (2013) show that the construction of one's own identity affects behavior in all contexts of life, which explains why individuals many times do not respond only to costs and incentives (first mechanism).

8. As will be seen later on in this chapter, these social interactions are the foundations of peer effects that can be beneficial but also harmful to skill accumulation.

9. These are gastrointestinal diseases, such as acute diarrheal disease that may be acquired through parasites that inhabit untreated water, or respiratory diseases, such as acute respiratory infections that may be acquired by inhalation of toxic gases coming from solid waste. As mentioned in Chapter 2, acute diarrheal diseases and acute respiratory infections are the two main causes of child mortality in the developing world, especially among lower-income households. The child mortality reduction once access is obtained to adequate water and sewage services may be around 65% (Esrey et al., 1991).

household members by increased susceptibility to respiratory diseases. Once again, children are the most seriously affected.¹⁰

Shocks and Skill Formation

Unexpected fluctuations in income, natural disasters, unsafe living conditions, or health problems will all affect the household economy, which will adversely affect skill investments in its members. When a shock affects the economic resources available in the home, parents' time spent with children may suffer. In turn, the lack of time and money has negative repercussions on the family's investments in the development of the children, which slows down their cognitive, physical, and socioemotional skill development.¹¹ This is even more true for more severe shocks, so much so that families frequently resort to child labor (many times requiring children to drop out of school) to offset the loss. Rigorous empirical evidence for Latin America is available on this mechanism and is discussed in this chapter.

This implies that poor households are the most vulnerable to shocks since they have practically no access to credit or other insurance mechanisms, so a drop in income causes a similar reduction in consumption and investments. Furthermore, poor families are also more vulnerable to noneconomic shocks. For example, poor urban homes are usually located in informal settlements where there is a higher risk of landslides or flooding.

Another shock that also influences the skill formation process is exposure to crime and violence. One direct mechanism is recruitment of minors by armed groups, forcing them to drop out of school (slowing the skill accumulation process in the school), and abandon home (slowing the skill accumulation process at home). Other mechanisms include the destruction of schools or public infrastructure that permits children to access them, as well as the uncertainty, fear and distress that confine the people to their homes and communities, preventing children and youth from attending school (see Text Box 5.5, p. 308).¹²

Peer Effects and Skill Formation

In early childhood the skill development of a child depends above all on the investments and decisions made by the family or other caregivers. But with the passing of years, the accumulation of cognitive, socioemotional, and physical skills becomes dependent to a large extent on the behavior of the child or youth. The individual behavior is, in turn, influenced both by the opportunities for access to specific physical environments and by day-to-day interactions with the social environment. In fact, people define their

Individual behavior is influenced both by the opportunities for access to specific physical environments and by day-to-day interactions with the social environment.

10. Chapter 2 exposes the reasons why bad health conditions obstruct skill accumulation (especially in children), and through that mechanism there may be negative consequences for long-term wellbeing.

11. The mechanisms that relate skill formation to the time parents and children spend together are analyzed in Chapter 2.

12. Violent shocks also generate financial hardships in households, with the consequences already mentioned for the formation of skills.

identity by their socialization in different scenarios, and their behavior depends largely on the comparisons with people who are physically or socially close, particularly with peers who are perceived as leaders. This identity and preference mechanism complements that of costs and incentives to explain the relationship between the environment and skill development, especially in the case of the social environment or the influence of peers. However, many times identity and incentives send mixed signals regarding what investments an individual should make.¹³

One of the most important characteristics of adolescence is the high malleability of the brain. This makes the consideration of people's behavior in respect to their peers important at this stage, since these interactions may create important changes may arise favored by that malleability (see Text Box 5.1). Social interaction promotes feelings of identity, trust, and social acceptance among adolescents and generates group behaviors framed by social rules. This influence by peers on individual behavior may be both beneficial and harmful for skill accumulation. In fact, the effect of interaction with peers on behavior is evidenced in dimensions as diverse as sports, school achievement, and the probability of excelling in scientific disciplines, as well as in the propensity to cheat, to use drugs, to participate in criminal activities, and in the age at which sexual activity is initiated, among others.¹⁴

Text Box 5.1 Malleability of the Brain in Adolescence

During adolescence, changes take place in the physical structure of the brain: the frontal lobe (associated with the memory, control of emotions, and decision-making), and the parietal lobe (associated with creativity and problem solving) are more active than in childhood and adulthood. This makes the physical structure of the brain especially vulnerable to the characteristics of environment (Giedd, 2004).

This phenomenon influences the effects that psychoactive substances may have on an adolescent brain, basically increasing the possibility of creating addictions (Whitaker et al., 2013). This is important because given the physical changes during adolescence, the subjective perception of risk is usually less than for adults, which leads to increased probability of using illegal drugs (Martin et al., 2002).

In this manner, the malleability of the brain during adolescence gains relative importance because of the consequences that certain incidental events or even intentional decisions may have in the long term on risky behavior.

Source. Author's elaboration.

13. Austen-Smith and Fryer (2005) develop a formal model that studies this individual tension between responding to the incentives of the external environment (for example to the salaries offered by the labor market) or behaving to please a group of peers.

14. For example, exposure to peers involved in illegal or criminal activities increases the probability of carrying out those activities through several mechanisms: shared rules of conduct and sense of belonging to the group, information about the costs and benefits of the criminal activity, and coercion for the initiation into criminal activity (CAF, 2014).

The Environment and Skill Formation: Evidence

Access to basic public utilities is important for disease prevention.

Rigorous empirical evidence on the relationship between the different dimensions of environment and the formation of cognitive, socioemotional, and physical skills is limited. This is because even though the environment affects skill development, people with certain levels of skills usually have the opportunity to choose different environments in which to carry out their life. As a result, it is difficult to separate the effect of the environment itself from other reasons that link the individual's previous skills to the conditions of the environment where he leaves. Therefore, the empirical observation that people who live in certain neighborhoods and are surrounded by a certain type of peers have determined skills does not necessarily take into account the influence of that environment on those skills.

In this respect, if we wished to consider the ideal experiment to understand the influence of the environment on the development of people, we should assign at random a group of people to live in a “desirable” area and compare the group's results to another group assigned to live in an “undesirable” area. Moving people to a desirable area is exactly the experiment described in Text Box 5.2. It is a type of extreme public policy intervention that simultaneously changes all the aspects of the environment of a group of people by moving vulnerable homes (with diminished capacity to choose quality environments) to neighborhoods with much better environments (in terms of physical space, safety, public goods, etc.). However, most of the existing evidence reviewed below is based on events that respond to public policy initiatives (or to shocks such as natural disasters) that change some specific dimensions of the environment but not all of them simultaneously.

Text Box 5.2 An Extreme Experiment about How Public Policy Can Generate a Radical Change in the Environment of a Home

The program Moving to Opportunity for Fair Housing in the United States provides an exceptional case study for understanding the comprehensive effects of the environment on the development of certain types skills for people of different ages. Through a lottery in 1994, the US government gave 4,600 families from poor neighborhoods the opportunity to move to safer neighborhoods with better access to public goods. Ludwig et al. (2011) assessed the impacts of this program after a decade and found that the families experienced substantial improvements in their skills with respect to non-beneficiary families, although both groups had very similar characteristics at the time the program was implemented. Adults experienced improvements in their physical and mental health, while youth engaged less frequently in risky behaviors. However, there were no significant impacts on financial self-sufficiency measures for adults or on cognitive skill measures (such as performance of mathematical knowledge tests or reading tests) for the children and youth. A longer-term assessment found children under 13 years of age at the time the program was implemented had higher levels of college attendance and earnings that were 31% higher than for non-beneficiaries. Meanwhile, for beneficiaries who had been over 13 years of age at the time of the move, there were no impacts (or there were negative impacts), possibly because of the lower adaptability of adolescents to new environments (Chetty et al., 2016).

Indeed, notwithstanding the many potential benefits, this type of program can create costs related to breaking beneficiaries away from their social networks in their community of origin. For example, Barnhardt et al. (2015) found that the homes that won a lottery that granted access to a house in a better quality neighborhood in Ahmadabad, India did not increase the families' earnings or their human capital, but they did report being more isolated from their networks and having less access to informal insurance mechanisms with respect to similar homes that had not benefited. This self-selection to participate in the housing programs can explain why the impacts that are found are moderate and appear on only a few variables. In fact, Chyn (2016) showed that the demolition of public housing in Chicago, which forced all residents to accept vouchers to transfer to better neighborhoods, did have positive long-term effects on the employment and salary of affected youth of all ages. These results are different from the findings with the Moving to Opportunity for Fair Housing program, where many potential beneficiaries did not choose to use the voucher to move to another neighborhood.

Source. Author's elaboration

Physical Space and Public Infrastructure

Physical space and quality public infrastructure are related to skill development. Access to basic public utilities is important, among other things, for the prevention of diseases. In Latin America, household surveys provide information about service coverage of public utilities (and allow for studying its relationship to health and other skill formation channels).

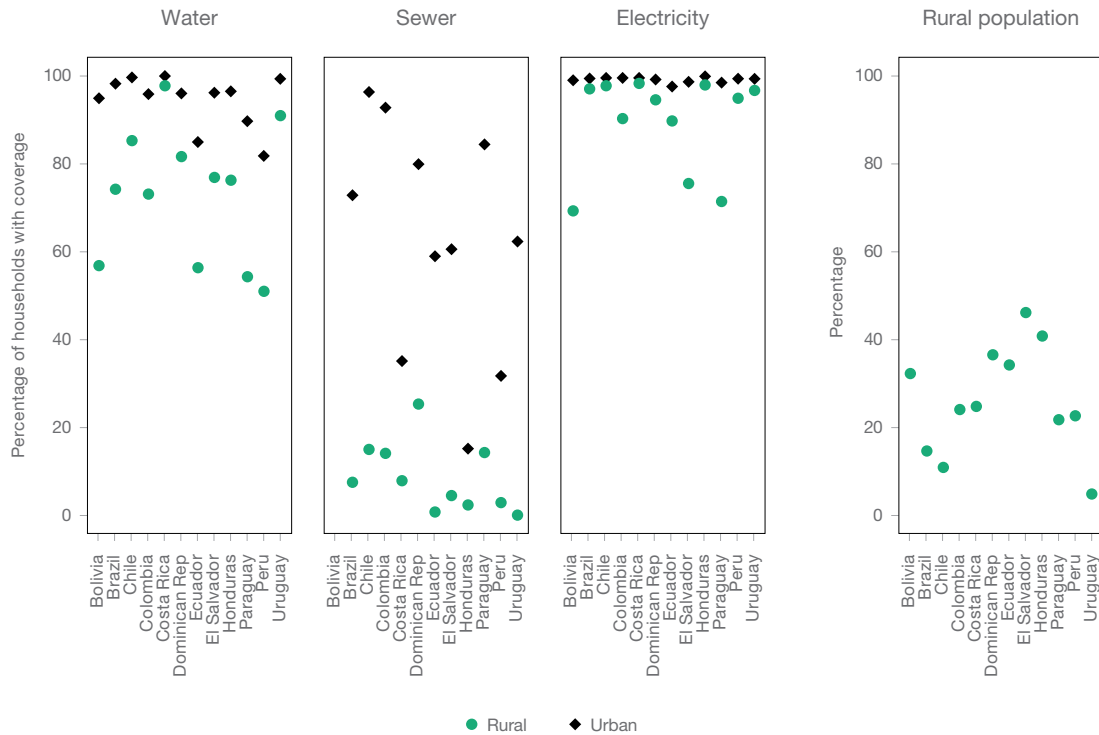
In Graph 5.1 (see p. 293), the first three panels on the left summarize water, sewer (or sanitation), and electricity coverage in urban and rural areas in various countries of the region.¹⁵ The fourth panel shows the rural population in each country. The utility with the highest coverage, both in urban and rural areas, is electricity. Most countries have close to 100% electrical coverage in urban areas, and the lowest coverage in the region is observed in rural Bolivia, where it does not reach 70%.¹⁶ Coverage variability of other utilities is high, especially for sewers. In fact, this would seem to be the public utility that most urgently needs to be tackled by governments of the region: In addition to very low provision levels in several urban areas, sanitation is almost nonexistent in many rural areas.¹⁷

15. Data from the Socio-Economic Database for Latin America and the Caribbean (SEDLAC), from the Center for Distributive, Labor and Social Studies (CEDLAS) of the National University of La Plata and the World Bank.

16. These figures, however, do not take into account the quality of the service, measured through the frequency and length of the power outages to which homes are exposed.

17. Although water and electricity coverage has increased in almost all countries between the years 2001 and 2013 (according to SEDLAC data), sewer coverage has remained constant with very few exceptions that show improvements. It would seem then that Latin America's debt to sanitation dates very far back and that the economic and social return of investing in sanitation in terms of improvements in health conditions (especially of children) and skill formation may be high.

Graph 5.1 Percentage of homes with coverage of basic public services and percentage of rural population for Latin American countries



Note. The first three panels report the average in public utilities coverage for each country in 2013 (water, sewer, and electricity, respectively). The fourth panel reports the percentage of the total population of each country that lives in rural areas.

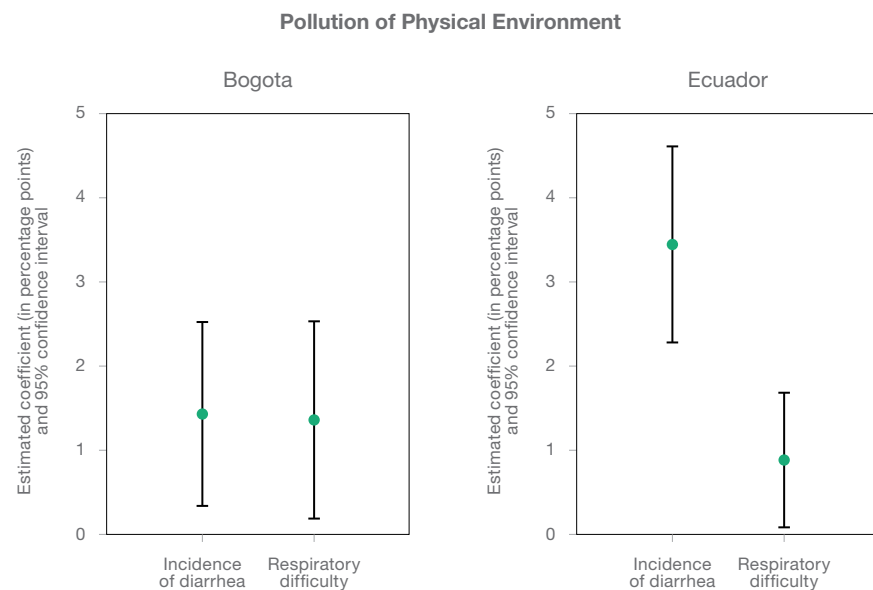
Source. Author's elaboration based on SEDLAC (CEDLAS and the World Bank, 2013); World Bank (2013).

An example of how insufficient sanitation services can increase the risk of contracting diseases is found by examining health indicators for small children, the most vulnerable group to this type of environment. Graph 5.2 (see p. 294) shows the correlation between the pollution to which a home is exposed and the incidence of diarrhea and respiratory infections in children under 5 years of age in Bogota (Colombia) and Ecuador.¹⁸ In both cases, the incidence of disease increases with the home's proximity to pollution sources. The probability of suffering from both diarrhea and respiratory infections near polluted physical environments increases by 1.5 percentage points in Bogota, while in Ecuador the exposure to pollution increases by 1 percentage point the probability that a child will suffer from diarrhea and 3.5 percentage points the probability that a child will have respiratory difficulties.

18. Data from the Multipurpose Survey of Bogota and the Ecuador Living Conditions Survey. In order to extract this information, a pollution index is constructed that statistically adds the exposure of a home to several potential sources of pollution: proximity to dump yards, factories that give off carbon monoxide, or sources of excessive noise.

The low coverage of basic public utilities in the rural areas, shown in Graph 5.1 (see p. 293), is even more disturbing if it is weighted by the percentage of the population of each country living in these areas (Graph 5.1, fourth panel, see p. 293). In effect, in most cases the countries with the lowest rural coverage are also those with the largest rural populations (i.e., El Salvador, Honduras, Bolivia, and Ecuador).¹⁹

Graph 5.2 Relationship between Physical Environment Pollution and Incidence of Diseases in Children under 5 Years of Age in Bogota and Ecuador



Note. The graph reports coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable takes the value of 1 if the person indicates that in the past 2 weeks the child has suffered either disease or 0 otherwise. The independent variable is constructed based on a question of whether the home is located near dumps, factories that give off carbon monoxide, or sources of excessive noise. The vertical axes are interpreted as changes in the probability of suffering each disease given the proximity of the home to a polluted environment. The regressions control for age, gender, number of children in the home, number of adults in the home, and household income. For Ecuador, year and urban or rural area fixed effects are included.

Source. Author's elaboration using data from the Multipurpose Survey of Bogota ((EMB) DANE, 2011) and the Ecuador Living Conditions Survey (INEC, 2006, and 2014).

While household surveys permit more or less comparable information on public utility provision, sources of information on access to physical spaces such as parks or plazas are much less common for Latin America. The evidence available is focused mainly on assessments of specific public projects for construction or

19. An exception is Uruguay, where although the coverage of sewers in rural areas is almost 0%, the rurality rate in that country is the lowest in the region (close to 5%).

improvement of public spaces, such as the public library program in Medellin or the program Barrio Mio in Lima. However, most of these assessments are not impact evaluations with methodologies that permit estimates of causal effects. This is because those interventions, generally, do not have an exogenous component, meaning that it is not possible to separate the pure effect of the intervention from the effect of other factors outside the program that may also be influencing the results observed. An exception is the program Mi Parque in Chile, which is described in Text Box 5.3.

Text Box 5.3 Mi Parque Program

The Mi Parque program began in Santiago, Chile in 2007. It is an alliance of civil society, public, and private partners that want to improve access to public spaces (especially parks and green areas) for vulnerable communities of Chile. Between 2007 and 2009, more than 50 projects were carried out on almost 400 thousand square meters, which benefited more than 150 thousand people (CAF, 2014).

An experimental impact evaluation of this program, supported by CAF, shows significant increases in the use of parks (increase of 44% with respect to eligible areas that did not receive improvements), participation in community programs (increase of 13%), the perception of safety in the park and the neighborhood (increase of 16% and 9%, respectively) and the incidence of crime in the neighborhood (decrease of 9%) (Braun et al., 2014). This suggests that investments in single dimension of the physical environment (in this case, the construction, improvement, and maintenance of green spaces) can be transmitted to other dimensions of the environment, such as the perception of safety or incidence of crime, and in this way also improve general conditions in order for people to invest in skill formation.

Source. Author's elaboration.

Unlike the household surveys of Latin America, the CAF Survey provides systematic information (which is comparable for 10 large cities in the region) on access to physical spaces.²⁰ This survey includes a set of questions on the proximity of homes to different types of physical spaces. According to the 2015 CAF Survey, two thirds of the homes in the cities of the region are located less than three blocks away from parks, plazas, or sports centers. This is the good news. The bad news is that many homes are also close to physical spaces that can be damaging to skill development: one third of homes are close to vacant lots, one fourth to squatter-occupied lots, and one half close to streets with poor lighting or places where alcoholic beverages are sold.

20. See description of this survey in Chapter 1.

If families perceive their neighborhood as unsafe, it is less probable that members of the household will carry out activities that require being outside the home to promote skill development.

In addition, according to the survey, one half of the people who live in the cities that are part of the sample express dissatisfaction with safety conditions in their city.²¹ When asked how the safety conditions of their environment affect their life, one of every three Latin Americans says that lack of safety affects their mood, and around 13% report interference with their educational decisions. These proportions reveal the existence of a negative relationship between perception of an unsafe environment (which arises, among other causes, from lack of care for the physical space evidenced by poor street lighting, litter, and a deficient maintenance of parks and plazas) and the cognitive (which depends on educational decisions) and socioemotional skills (which can be evident from people's moods). If families perceive their neighborhood as unsafe, it is less likely that members of the household will engage in activities that promote skill formation if those activities occur outside the home.

In order to provide more evidence on the relationship between the physical environment and skill formation, Graph 5.3 shows the correlation between the proximity of the home to different types of public spaces (sports centers on the one hand, and vacant lots and waste dumps on the other) and measures of skills.²² From left to right, the graphs show the correlation of the public space with the Grit scale (that measures determination/perseverance for reaching one's objectives); numerical skills; Raven Progressive Matrices Test (Raven PMT, that measures fluid intelligence) and the Brief Test of Verbal Conceptualization (BTVC, which measures verbal skills). People who live close to sports centers present higher scores in 2 of the 4 measures of skills compared to the people who live far away.²³ In turn, people who live close to vacant lots or dumps have lower scores in almost all cases.²⁴ This evidence is consistent with the fact that the quality of a physical space promotes the development of both cognitive and socioemotional skills (physical health goes without saying).²⁵

In Graph 5.3, proximity is defined as three blocks.²⁶ Graph 5.4 (see p. 298) uses the Multipurpose Survey of Bogotá and the Ecuador Living Conditions

21. The cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Mexico City, Panama City, Quito, Lima, Montevideo, and Caracas. Sao Paulo has the largest proportion of inhabitants unsatisfied with safety (77%). Buenos Aires has the lowest (28%).

22. Although the correlations reported do not have a causal interpretation, they are quite suggestive of the relationship between the physical environment and skill development. This is because the regressions control for household income, among other household characteristics, in such a way that it cannot be explained by the fact that higher-income households are located in better areas and have more resources to invest in skill development. This means that in Graph 5.3, individuals with similar income (and the same gender, similar age, and with a similar number of dependents in the home) are compared, but they are different with respect to how close their home is to certain public spaces.

23. For the case of numerical skills, the correlation also becomes significant but at 90% instead of 95% (the level reported in the graphs). In the case of the fluid intelligence (Raven PMT), proximity to sports centers is not correlated to a higher score (but neither to a lower one) in this variable, as compared to people who live far away from these physical spaces.

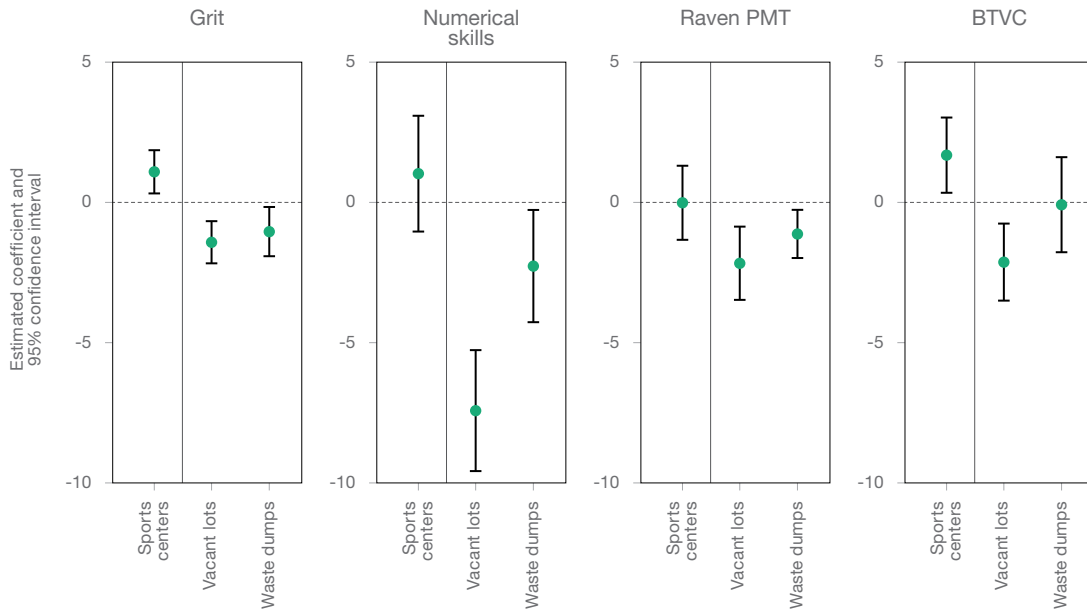
24. The only exception is the proximity to dumps that is not correlated to a lower score (but neither to a higher one) in the BTVC.

25. All indexes are normalized between 0 and 1, therefore the size of the estimator reflected on the vertical axis of each graph is interpreted in terms of differences in percentage points among those who are close and those who are far from sports centers or vacant lots or dumps.

26. This definition arises from the way the questions corresponding to the CAF Survey are worded.

Survey to corroborate the positive correlation between the proximity to adequate physical spaces and skill development (specifically physical skills), but uses a different definition of proximity. In particular, it analyzes the time elapsed when walking between the house and the closest park, and a 20-minute walk is set as a threshold.²⁷ Consistent with the findings of Graph 5.3 for proximity to sports centers, proximity to parks is also found to be correlated to the probability that the person exercises and reports having a good health condition.

Graph 5.3 Relationship between Physical Spaces and Cognitive and Socioemotional Skills for 10 Latin American Cities

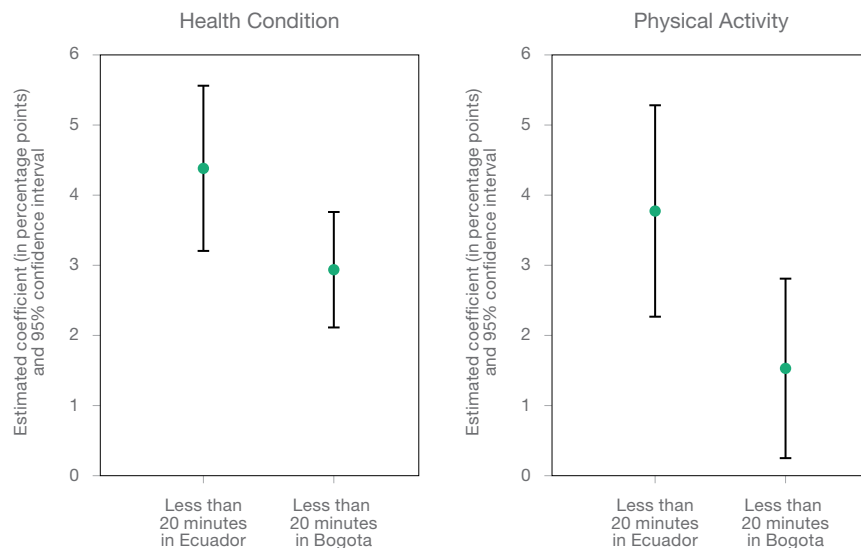


Note. The graph reports coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variables are (from left to right): Grit scale (which measures determination/perseverance to reach own objectives), numerical skills, Raven PMT (that measures fluid intelligence), and the BTVC (that measures verbal skills). Each of the variables is normalized between 0 and 1, dividing the score by the maximum value that each test can take. The independent variable is constructed based on the question: "At a distance of three blocks from your home, are any of the following spaces found?" The regressions control for age, gender, number of children in the home, number of adults in the home, and range of household income. City fixed effects are included. The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Author's elaboration using data from the 2015 CAF Survey.

27. This definition is broader than the one of the CAF Survey, in the sense that under normal conditions it is possible to walk more three blocks in 20 minutes.

Graph 5.4 Relationship between Proximity to Parks, Health Condition, and Healthy Habits in Bogota and Ecuador



Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable of the graph on the left takes the value of 1 if the individual reports a good general health condition and 0 otherwise. The dependent variable of the graph on the right side takes the value of 1 if the individual did any exercise in the past 30 days and 0 otherwise. The independent variable is constructed based on the questions: "How much time does it take the people of this household to arrive at a public park?" (for the case of Colombia) and "How many meters away from a park is your home?" (for the case of Ecuador, where a standard conversion is issued to switch from meters to minutes). The independent variable takes the value of 1 when the person lives less than 20 minutes away from a park and 0 otherwise. The vertical axes are interpreted as changes in the probability of having good health (graph on left side) or doing exercises (graph on right side) depending on the relative proximity of a park. The regressions control for age, gender, number of children in the home, number of adults in the home, and household income. For Ecuador, year and urban or rural area fixed effects are included.

Source. Author's elaboration using data from the Multipurpose Survey of Bogota (DANE, 2011) and the Ecuador Living Conditions Survey (INEC, 2006, and 2014).

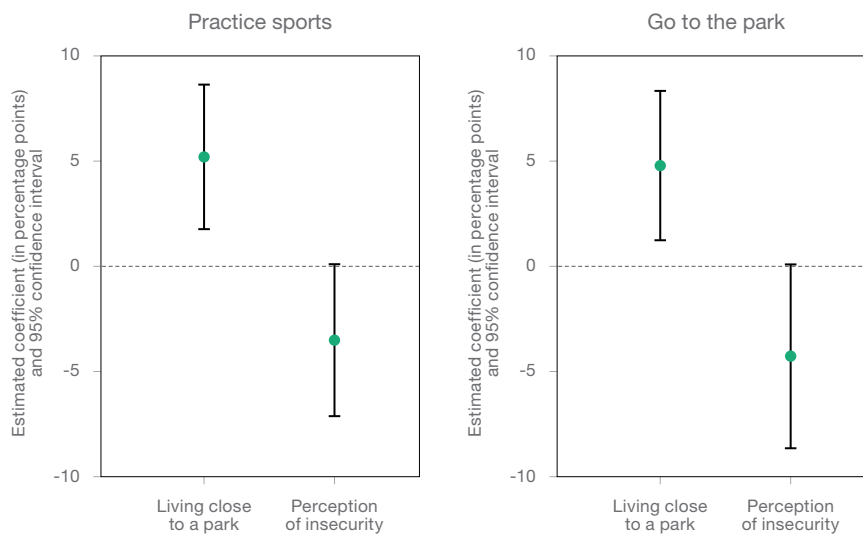
The proximity of parks and physical spaces, generally, that facilitate the performance of physical, playful, or intellectual activities is particularly important for skill development during childhood. Using data for Bogota, Graph 5.5 examines the correlation between the physical environment and the activities performed by parents with their children under 5 years of age. For example, the proximity of parks (located less than 20 minutes' walking distance) is associated with a higher probability of the parents going to the park or exercising with their children. The probability in both cases is higher by 5 percentage points with respect to the probability of carrying out this type of activities for homes that are located further from the park. Parents who perceive their neighborhood as not safe have a lower probability (almost 4 percentage points less) of performing either of these activities with their children.²⁸

28. Naturally, these activities are also important in the skill formation of children and youth over 5 years of age. However, there is no information available for other age ranges so the evidence of Graph 5.5 is focused only on children under 5 years of age.

This evidence that public investments that facilitate access to play areas and sport facilities and help reduce perceptions of insecurity (improving, for example, street lighting or its cleanliness and order) may boost family investments in children's skill formation.

Proximity to parks is associated with a higher probability of parents going to the park or practicing sports with their children.

Graph 5.5 Relationship between the House Physical Environment and the Activities Performed by Parents with Children under 5 Years of Age



Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable of the graph on the left takes the value of 1 if either of the parents practices sports with the child and 0 otherwise. The dependent variable of the graph on the right side assumes the value of 1 if either parent goes to the park with the child and 0 otherwise. The independent variable of proximity to parks is constructed based on the question: "How much time do the people of this household need to walk to arrive at the following services or establishments closest to the home?"; the value 1 is assumed if the park is at 20 minutes or less walking distance and 0 otherwise. The independent variable of perception of insecurity is derived from the question: "Which of the following problems does the area where your home is located have?"; the value is 1 if the answer is "insecurity" and 0 otherwise. The vertical axes are interpreted as changes in the probability of performing any of the two activities depending on the proximity of a park or the perception of insecurity. The regressions control for age, gender, number of children in the home, number of adults in the home, and household income.

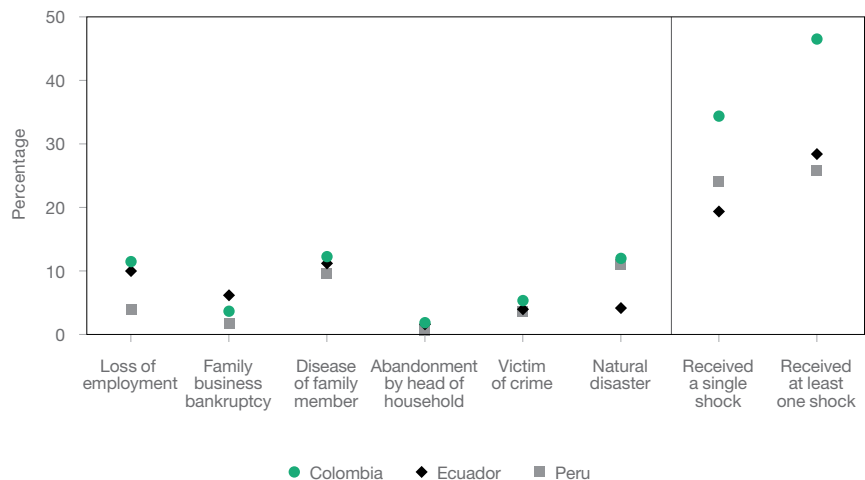
Source. Author's elaboration using data from the Multipurpose Survey of Bogota (DANE, 2011).

Shocks Are the Enemies of Skills

Existing evidence for Latin America on the correlation between exposure to shocks and development of cognitive, socioemotional, and physical skills comes largely from household surveys. However, not all public statistics agencies in the region include questions about exposure to shocks, and thus the available data for this environment dimension are rather limited.

Graph 5.6 shows the incidence of various types of negative shocks in Colombia, Ecuador, and Peru. For comparative purposes, only the questions that are equivalent in all three surveys are used. At least two important conclusions are drawn from this graph. First, the type of shocks that families receive, as well as the shocks' prevalence, is very similar between countries, with the exception perhaps of the loss of employment and exposure to natural disasters (affecting significantly more homes in Colombia and Ecuador and Colombia and Peru, respectively). Second, the probability that the homes of the region will suffer one shock per year is relatively high. It is important to point out also that many homes suffer more than one shock annually, which exacerbates the negative effects on skill development. For example, in Colombia, around one third of the homes suffered exactly one shock while almost half (47%) suffered one or more shocks in the twelve months prior to the survey.

Graph 5.6 Percentage of Homes Affected by Shocks in Colombia, Ecuador, and Peru



Note. The graph reports the percentage of households that have suffered each of the shocks specified on the horizontal axis. The surveys ask: "In the past 12 months was your household affected by any of the following problems?" The variables of "received a single shock" or "received at least one shock" are constructed based on the answers to that question. The information for Colombia comes from the Colombian Longitudinal Survey of the University of Los Andes (ELCA, for its name in Spanish) in 2010 and 2013. The information for Ecuador comes from the Ecuador Living Conditions Survey in 2006 and 2014. The information for Peru comes from the National Household Survey (ENAH0; for its name in Spanish) in 2011–2014.

Source. Author's elaboration using data from ELCA (2010 and 2013), Ecuador Living Conditions Survey (INEC, 2006, and 2014), and ENAH0 (INEI, 2011–2014).

This high incidence of shocks is distressing. Regardless of their nature, shocks may affect the skill formation process from the moment of gestation, potentially affecting the initial formation of a child's brain. Exposure to shocks generates stress, and excessive stress may prompt biological processes that result in

shorter gestation times and lower birth weights. In turn, low birth rate is a strong predictor of long-term effects on physical development, cognitive capacity, productivity, and salaries, as well as incidence of risky behavior (Camacho, 2008). Text Box 5.4 summarizes the recent evidence for Latin America on the effect of four types of shocks on intrauterine development, as measured by the birth weight of children.

Regardless of their nature, shocks may affect the skill formation process as early as gestation, during the initial formation of the brain.

Text Box 5.4 The Effects of Four Types of Shocks on Pregnancy, Intrauterine Development, and Long-Term Skills Development

Income shocks. Bozzoli and Quintana-Domeque (2014) showed that the Argentinean recession of 2002 had a negative impact on the birth weight of children born during the crisis as a consequence of the stress of the mothers during pregnancy. The effect was exacerbated for mothers with low levels of education, for whom the crisis meant, in addition to stress, lower nutritional intake during pregnancy.

Natural Disasters. Balsa et al. (2014) showed that the increase of ashes and dust in the air of Montevideo, caused by the eruption in 2011 of the Puyehue Volcano in Chile, reduced birth weights and increased the probability of premature birth in children whose mothers breathed the harmful particles. Similarly, the children of mothers in their first trimester of pregnancy during the 1970 Ancash earthquake in Peru reached lower educational levels compared to children whose mothers spent their pregnancy in unaffected neighboring areas (Caruso and Miller, 2015).

Environment. Garcia (2015) showed that gold mining in Colombia, which involves intensive use and release of metals such as mercury and arsenic, contaminates water sources close to the mines and causes mothers who live in mining municipalities to have shorter pregnancies and give birth to babies who are premature or have low birth weights. Arceo et al. (2016) showed that environmental pollution increases child mortality in Mexico.

Conflict. Camacho (2008) found that the stress caused by violence (particularly the explosion of anti-personnel mines) on the mothers during their pregnancy reduces the birth weight of children in Colombia. Duque (2014) similarly found that there is a negative effect from violent shocks (specifically, massacres) witnessed by mothers during pregnancy and for children in early childhood. For the former, violence reduces birth weights and for the latter, school performance falls.

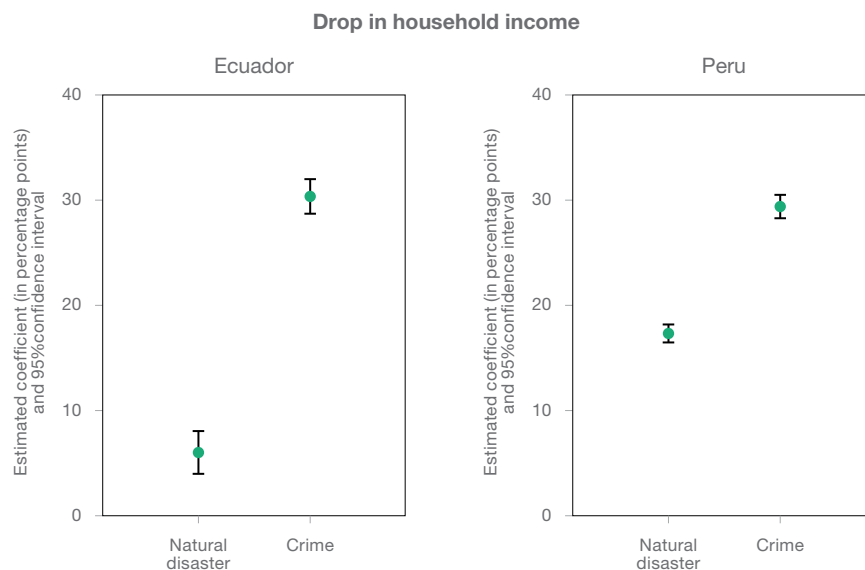
Source. Author's elaboration.

The importance of shocks in skill development starts in utero but extends to all stages of life. As discussed in the conceptual framework, notwithstanding the existence of shocks of various types and with very different magnitudes, one of the most important mechanisms through which shocks interfere with

The effect of shocks on household income generation capacity increases the incentive to take children out of the educational system and incorporate them into the household's workforce.

skill development is the household budget. Graph 5.7 shows the empirical relevance of this mechanism for Ecuador and Peru.²⁹ Households that suffered shocks such as natural disasters or crime during the 12 months prior to the survey are more likely to report having suffered an income loss caused by these shocks. Compared to homes that have not experienced shocks, the probability of experiencing a drop in household income is 7 percentage points higher in Ecuador and 17 percentage points higher in Peru. Similarly, in the two countries, the probability of suffering a household income loss is approximately 30 percentage points higher in homes where the families were victims of a crime in comparison to those who were not.

Graph 5.7 Relationship between Exposure to Natural Disasters or Crime and Loss of Household Income, in Ecuador and Peru



Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable assumes the value of 1 if the household reports having suffered a drop in household income and 0 otherwise. The independent variable is constructed based on the question "In the past 12 months was your household affected by any of the following problems?". The vertical axes are interpreted as the probability of experiencing a reduction in the household income due to exposure to each shock. The regressions control for age, number of children in the home, and number of adults in the home. Year and urban or rural area fixed effects are included. The information for Ecuador comes from the Ecuador Living Conditions Survey in 2006 and 2014. The information for Peru comes from ENAHO in 2011 and 2014.

Source. Author's elaboration using data from the Ecuador Living Conditions Survey (INEC, 2006, 2014) and the National Household Survey (INEI, 2011-2014).

29. Although present in Graph 5.6 (see p. 300), Colombia is not included in Graph 5.7 since the household survey from which the information on shocks is obtained for this country (ELCA) does not include a question comparable to the one used on the Ecuador Living Conditions Survey or National Household Survey (Peru).

Household strategies to lessen the negative effect of shocks on income include indebtedness, dissaving, sale of assets, and migration, among others. According to data from the ELCA for 2010 and 2013, over 10% of Colombian homes that experienced a shock in the 12 months prior to the survey had to resort to indebtedness, around 8% had to increase their hours worked or send a new member of the home to work, and close to 2% had to sell assets.

Although strategies for lessening shocks have the potential to influence skill formation to a higher or lower extent, an especially harmful strategy to skill accumulation is school dropout, which often involves various forms of child labor. To the extent that poor households see their income generation capacity affected, the incentive to withdraw children, partially or totally, from the educational system and incorporate them into the household's workforce increases for them.

The 2015 CAF Survey permits an inquiry on the major reasons that children are absent from school for a long period in the major cities of Latin America. Six percent of heads of households surveyed in the 10 cities of the sample state that their school-age children have had to be absent from school for at least 30 days in 1 year.³⁰ In 64% of the cases, this absence is due to health problems, in 15% of cases to economic problems, in 11% to events related to insecurity, and in 3% to natural disasters. The percentage of absences explained by reasons of insecurity is not negligible. The high prevalence of crime is, in fact, a major problem in Latin America (CAF, 2014). According to the 2015 CAF Survey, for 31% of the homes in the region, some of their members experienced some type of crime in the 12 months prior to the survey.³¹

Related to this issue, one of the most harmful shocks for skill formation is the exposure to armed violence because of its impact on child labor and the probability that affected children drop out of school. Because of its long-lasting armed conflict, Colombia provides a unique case study on the relationship between violent shocks and skill formation. Text Box 5.5 (see p. 304) summarizes the recent evidence from the country on the effect of exposure to violence on skill development and the probability that children work.

To complement to the evidence discussed in Text Box 5.5 (see p. 304), an empirical exercise was done for Colombia based on the ELCA data that estimates the correlation between violent shocks and school dropout. Because of its longitudinal structure, the survey permits the identification of children who in 2010 attended an educational institution and in 2013 no longer did, notwithstanding still being of school age. If it is assumed that these children dropped out of the educational system, this indicator can be correlated to the incidence of actions by armed groups in the community of residence of each child during the period between the two waves of

30. The highest prevalence of absences for an extended period is found in Sao Paulo (11%) and the lowest in Panama City (2%).

31. In its Report on Economic Development 2016, CAF makes a detailed diagnosis on insecurity in Latin America.

the survey (2010 and 2013). The results of this exercise are reported in Graph 5.8. The panel on the right shows that exposure to threats in the community of residence is associated with an increase of 2 percentage points in the probability of dropping out of school for males, exposure to attacks is associated with an increase of 1 percentage point, and the coercive imposition of rules (such as curfews) is associated with an increase of 0.5 percentage points in the probability of dropping out of school. This type of evidence permits an identification of age groups that are the most vulnerable to violence (children and young men), which in turn must inform public policy on which are the most potentially effective investments to mitigate the negative effects of shocks on skill development.

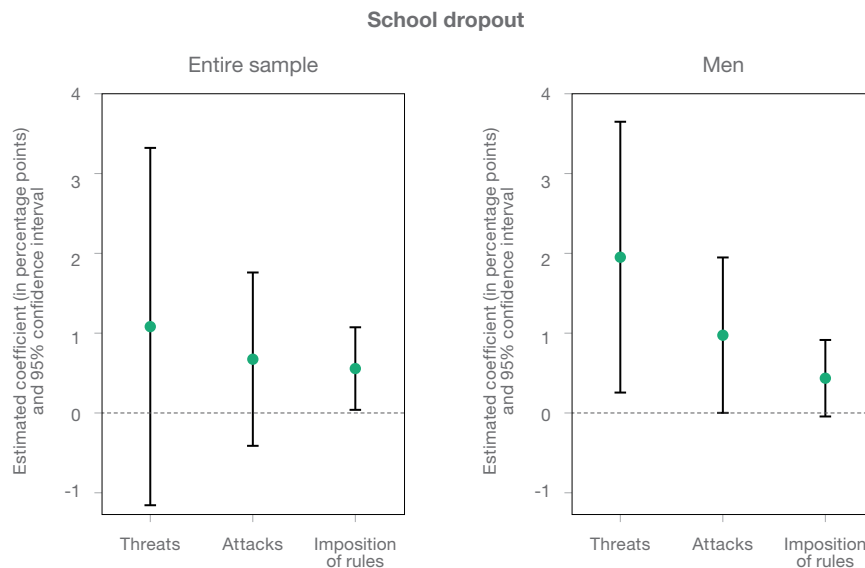
Text Box 5.5 Effects of Violence on Skill Development and Child Labor in Colombia

Rodriguez and Sanchez (2012) found that exposure to the conflict in Colombia increases school dropout and the probability of entering the labor market for children between 11 and 17 years of age. Vargas et al. (2015) further showed that in the presence of armed violence, school performance deteriorates for students who remain in school. Cardona et al. (2016) reported a possible channel for this result related to child labor. The authors show that children induced by violence to work outside the home while remaining in school have worse performances on the state tests given at the end of the high school and, therefore, they will have less opportunity to attend better higher education institutions. Finally, Gerardino (2013) showed that the conflict caused homes to reduce the probability of registering their male children in the educational system, which generated a gender gap in education attendance in favor of women.

There is also evidence that exposure to violence generates psychological effects that affect socioemotional skills and the capacity to develop these and other skills in the long term. For example, Moya (2015) showed that people displaced by violence are more risk averse and therefore make fewer investments, including investments in skills development.

Source. Author's elaboration.

Adults also experience adverse effects of shocks on their cognitive and socioemotional processes. An example of this is shown in Graph 5.9 (see p. 306), based on the Ecuador Living Conditions Survey. People who report having been exposed, in the 12 months prior to the survey, to different types of shocks are also more likely to report that in the week prior to the survey they had feelings of fear, loneliness, sadness, and depression, compared to individuals who did not experience shocks. These variables represent the mental health of people, which in turn conditions the skill development.

Graph 5.8 Relationship between Types of Violence and School Dropout in Colombia

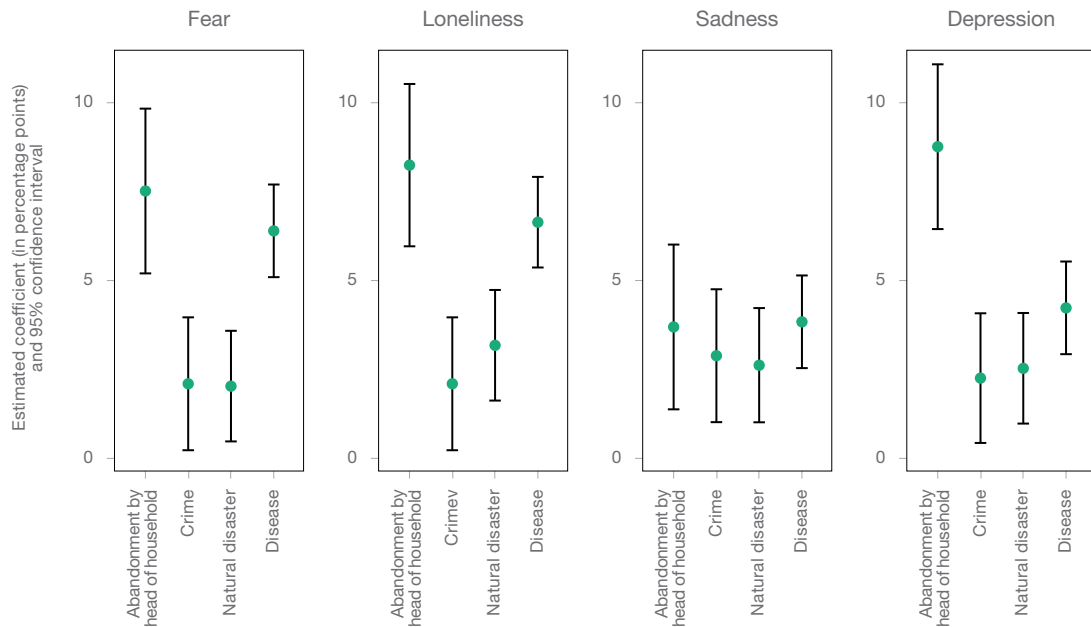
Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable is the probability of dropping out of school between 2010 and 2013 for school age children. The independent variable is the occurrence of three types of violent actions between 2010 and 2013: threats, attacks, and imposition of rules (curfews). The vertical axes are interpreted as changes in the probability of dropping out of school related to the occurrence of each of the violent actions. The regressions control for age, number of children in the home, and number of adults in the home. Urban or rural area fixed effects are included.

Source. Author's elaboration based on the Colombian Longitudinal Survey of the University of Los Andes (ELCA, 2010 and 2013).

An important part of the strategy for mitigating the negative effects of shocks on skill formation and, in general, on the wellbeing of homes is based on the supply of social programs by governments. These programs may be divided into two types: social security programs, the purpose of which is to insure the homes in case of events that affect their wellbeing, and redistributive programs, which have the long-term objective of overcoming poverty. The former affect the entire population, regardless of income, and include public insurance for health, unemployment, disability, and pensions. The latter are focused on poor homes that are precisely the most vulnerable in terms of being able to withstand the effects of shocks. These include policies such as conditional cash transfers, which are the most common social program in Latin America.³² Because of their conditional nature (that school-age children attend an educational institution and participate in nutritional monitoring), the homes that receive this type of transfer are less likely to react to shocks by having children drop out of school (Rawlings and Rubio, 2003).³³

32. Chapter 2 mentions the effects of the implementation of these programs in Latin America on several results related to skills.

33. Duque et al. (2016) find, in addition, that the program of conditional cash transfers in Colombia (Familias en Acción) succeeds in offsetting negative effects on the school achievement of children caused by exposure to climate shocks during early childhood.

Graph 5.9 Relationship between Shocks and Mental Health in Ecuador

Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable assumes the value of 1 if the individual indicates having felt in the past 7 days fear, loneliness, sadness, or depression and 0 otherwise. The independent variable assumes the value of 1 if the household has experienced any of the shocks of the horizontal axis in the past 12 months and 0 otherwise. The vertical axes are interpreted as changes in the probability of experiencing any of the four emotions conditional to having been exposed to any of the shocks. The regressions control for age, number of children in the home, and number of adults in the home. Year and urban or rural area fixed effects are included.

Source. Author's elaboration using data from the Ecuador Living Conditions Survey (INEC, 2006, and 2014).

Tell Me About the Company You Keep...

Household surveys do not gather exact information on peer effects. This is because of the nature of this third dimension of environment, which arises from social interactions between people. At most, surveys can just ask people for their opinion on the extent their behavior is influenced by their peers. But the exact calculation of peer effects involves conceptual and methodological challenges that make their estimation difficult. These challenges and some examples of how they are resolved in practice are summarized in Text Box 5.6 (see p. 308).

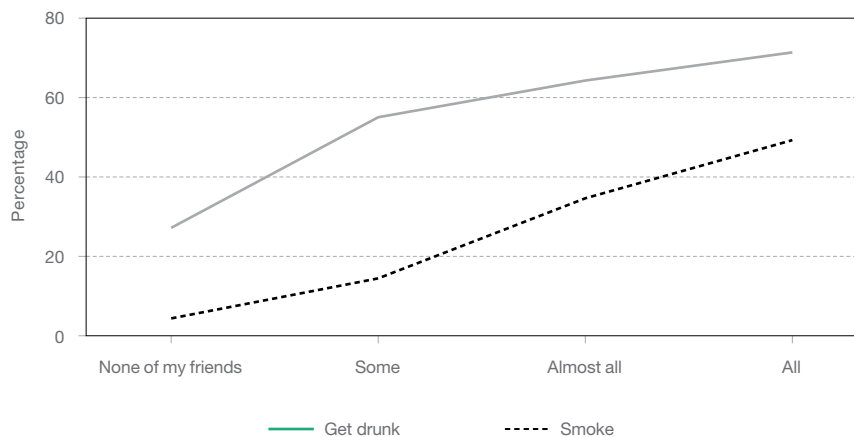
One of the most widely studied dimensions of peer effects is school performance. In the 2015 CAF Survey, heads of household who have children attending school are asked their opinion on the most important factors that influence the school performance of their children. Among the possible answers are variables associated with the physical environment where learning occurs (infrastructure, resources, and equipment of the educational institution), the individual's own study habits and those of the child's peers, the performance of extracurricular activities, and the quality of teachers. More than half of the parents surveyed in the 10 cities that make up the

sample are of the opinion that the most important factor in the school performance of their children is the preparation and quality of teachers. Only 3% of parents believe that the study habits of a child's peers are the fundamental determinant of their child's performance. This relatively low figure contrasts the evidence on the magnitude of peer effects on school achievement, which suggests that parents underestimate the importance of peers on their children's performance.

Peer effects are a double-edged sword: in the same way that they can produce positive effects on skill formation, they can also negatively affect it.

Peer effects are a double-edged sword: in the same way that they can produce positive effects on school performance and other good dimensions of skill development, they can also contribute to negative dimensions. The 2015 CAF Survey data permit an illustration of peer effects on risky habits. Graph 5.10 shows the probability that the survey respondent had been drunk (at least once in the past 30 days) or smoked (at least one cigarette per day) associated with equal behaviors in the circle of best friends. Both the probability of having been drunk and the probability of smoking increases as the proportion of best friends with the same behavior does. The continuous line in the graph shows that, although none of the best friends has been drunk in the past month, 27% of those interviewed have. Conversely, if all the respondent's best friends have been drunk at least once in that period, the probability of the respondent having been drunk is 71%. The dotted line shows that the probability of smoking one cigarette per day, regardless of the behavior of the closest circle of friends, is lower than that of having been drunk. Four percent of respondents smoke at least one cigarette a day, notwithstanding that none of their best friends do, while 49% smoke one cigarette a day, if all their best friends do.

Graph 5.10 Percentage of Youth that Declare to Get Drunk or Smoke According To The Frequency Of Drinking or Smoking Of Their Peers in 10 Latin American Cities



Note. The graph reports the percentage of respondents who affirmatively answer the question: "Have you been drunk at least once in the past 30 days (or smoked at least one cigarette per day)?" given the answer to the question "How many of your best friends have been drunk at least once in the past 30 days (or smoked at least one cigarette per day)?" The possible answers are: "all my friends," "most of my friends," "some of my friends," or "none of my friends." The 10 cities are: Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

Source. Author's elaboration based on CAF 2015 Survey.

Text Box 5.6 The Challenges of the Measuring of Peer Effects

The empirical study of peer effects presents three major challenges. The first is the difficulty of having access to information on peer networks that are relevant to the behavior studied. By definition, if the peers cannot be identified, peer effects cannot be estimated. The second challenge is the fact that, in practice, networks of peers are formed because people with similar interests, behaviors, and characteristics tend to get together. This causes the behaviors of one person and that person's peers to be similar regardless of whether the peers have any influence on the decisions of that individual. The technical name of this phenomenon is selection. The third challenge is the fact that the same way peers affect the behavior of one member of the group, that person can likewise influence peers' actions. This circularity, called reflection (Manski, 1993), makes the calculation of the influence by peers on a person difficult without the latter being contaminated by the influence of this person.

The evidence presented in Graph 5.10 (see p. 307) helps to illustrate three challenges. First, the 2015 CAF Survey inquiries about the behavior of the respondent's "best friends," assuming that these would be the peers who affect the respondent's alcohol and cigarette consumption. This may or may not be true. For example, behaviors such as smoking a cigarette a day may be more influenced by the habits of people with whom the respondents interact every day (such as coworkers) and not best friends (whom they perhaps meet less frequently). Second, one of the reasons why best friends are the respondent's closest friends is because they share the most interests, such as the "pleasure" of getting drunk once in a while. Under this interpretation, someone who does not like to get drunk probably will not reach the closest circle of friends of someone who does, and, therefore, the correlations of Graph 5.10 (see p. 307) could be simply explained by the selection of friends, not peer effects. Third, the same way it is possible that consumption of alcohol or tobacco by the friends of a specific person make it more probable that such a person will behave in a similar manner, it may also be the case that such a person is the one who initiated that behavior in the group of friends, so the correlations in the graph are the reflection of the way they were interpreted in the text.

Recent studies have found different forms of overcoming these measurement challenges and offering precise estimates of peer effects. First, although in a large proportion of studies the networks of peers are based on rather distant groups (such as friends from primary school or graduate school), instead of the empirically more relevant circles (such as best friends), some studies are indeed able to identify sufficiently close networks. For example, the Add Health database in the United States permits the production of a detailed network of friends for each of the adolescents surveyed in it. Using this information Calvo-Armengol et al. (2009) established that the size of the peer effects is proportional to the centrality of a person within the network of friends. That is, a child who is ranked high in the friendship ranking by many school mates has a higher probability of having better school performance as a result of the positive influence of his friends. Second, in order to overcome the selection problem, studies may use situations in which the group of peers is formed at random. In a study of students at Dartmouth College (in the US), Sacerdote (2001) studied the relationship between first-year students' academic average and their roommates'. The author found that an increase in the standard deviation of the academic average of the roommates is associated with an increase of 0.05 points in the individual's own average. Third, a common strategy to solve the reflection

problem is to measure the characteristics of the peers before the start of the interactions that potentially generate the group influence on each individual. With a strategy similar to that of Sacerdote (2001), Kremer and Levy (2008) found that individuals assigned to rooms in which their roommate reported having consumed alcohol in the year prior to entering college have a worse academic average.

Source. Author's elaboration.

The Program for International Student Assessment (PISA) test is a useful tool for comparing the academic performance of 15-year-old youth between countries. In addition to international comparisons, the database structure permits to study the correlation between the achievements of each student with those of different groups of reference, such as 15-year-old students who belong to the same educational institutions and are in the same grade. Schoolmates are the group of reference most widely studied in the literature of peer effects because of the importance of their influence, especially during adolescence —the exact age of students taking the PISA test.³⁴ Between schoolmates there is cooperation as well as competition, and both behaviors promote learning. Furthermore, social acceptance or popularity in school may affect self-esteem and, in turn, influence the academic results.

Graph 5.11 (see p. 310) illustrates this last point for Latin American countries and Finland, which is used as point of reference.³⁵ The PISA database includes a questionnaire that permits the construction of related indicators, such as the student's perception of their exclusion from or integration among peers at school. In this sense, Graph 5.11 (see p. 310) correlates an "exclusion index" to performance on the PISA mathematics, language, and science tests.³⁶ Regardless of the area of knowledge being evaluated, youth who feel rejected in their school have a significantly lower performance.³⁷ This correlation is very enlightening, since it is not explained by other characteristics of the students such as age, gender, mother's education, household income, or whether the school is public or private.

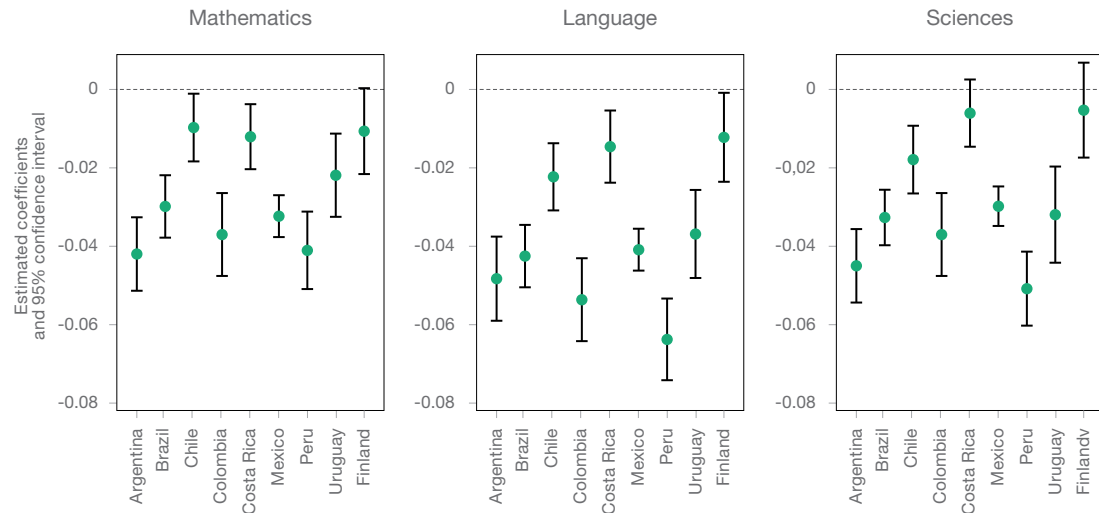
34. These are 15-year-old students regardless of the grade they are enrolled in.

35. The countries of Latin America selected are those that are in the PISA 2012 database. Finland is a point of reference because it has consistently scored first on PISA tests since their initiation, and it has become an educational model for the world for the good performance of the students of this country.

36. The index is constructed by making a statistical aggregation of the answers to questions regarding up to what point students feel like a stranger in the school, feel worried or alone in it, or believe themselves to be disliked by schoolmates.

37. The maximum value that the vertical axis takes, which measures the effect that the perception of exclusion has over the standard deviation of the test score, is zero. In addition, most of the lines within each box, which represent the statistical reliability of the estimated impact, do not overlap this value, so there is statistical reliability in saying that the effects are, mostly, negative.

Graph 5.11 Relationship between Perceived Exclusion at School and PISA Results, in Latin American Countries and Finland



Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variables are the results in mathematics, language, and sciences, measured in terms of standard deviations within each country. The independent variable is an index of perceived exclusion in the school constructed by major components (it includes three questions: feeling of not belonging in the school, feeling like a stranger in the school, and feeling lonely in the school). The vertical axes are interpreted as changes in performance (in terms of standard deviations of the population of reference) given an increase of 0.1 in the exclusion index. The regressions control for father's education, mother's education, age, gender, an indicator of public or private school, and an approximation of household income (using housing materials). School and year fixed effects are included. PISA 2003 and 2012 are analyzed given that they are the years for which the questionnaire includes exclusion perceptions.

Source. Author's elaboration based on PISA (OECD, 2003, and 2012).

Social acceptance or popularity at school can affect self-esteem, which in turn can influence academic results.

The countries in which the perception of exclusion seems to be more harmful for performance are Argentina, Colombia, and Peru, while in Chile and Costa Rica the magnitude is lower and at levels comparable to the one found in Finland.³⁸ These correlations are consistent with recent literature that shows the negative effect of bullying on the accumulation of cognitive skills (Sarzoza, 2015), and in particular on academic achievement (Vargas and Martin, 2016). In fact, the results of Graph 5.11 suggest that the school environment and social relations with peers matter for academic performance and point to the importance of developing better-qualified teachers who, in addition to being able to teach their subjects, have the necessary skills to manage youth and their emotions in order to avoid problems such as bullying or ostracism. This is a characteristic of the Finnish educational system. In fact, the estimates of Graph 5.11 for this country suggest that the association between feeling excluded and school achievement is not significantly different from zero (except for language).

38. In fact, statistically speaking and with a confidence level of 95%, the feeling of exclusion does not affect the scores the mathematics or sciences tests for Finnish students.

The PISA database also allows studying peer effects as such, or the extent to which school achievement of peers (in this case, 15-year-old students in the same school and grade) influences the school performance of a given student. This crude calculation has the problem, described in Text Box 5.6 (see p. 308), that although the classmates have an influence on the performance of a student, the student can also affect their performance. In order overcome this obstacle, the estimation summarized in Graph 5.12 (see p. 312) uses the fact that the parents' education is a good predictor of children's school achievement and, hence, replaces the average performance measure of peers for the average education of the parents.

Public policy would benefit from more studies that reveal what mechanisms are behind peer effects.

In all the countries of Latin America we analyzed, and for the three areas of knowledge evaluated by PISA, the relationship between school performance of peers and individual performance is positive and significantly different from zero.³⁹ Although there is some variability among the countries of the region, the estimation suggests that an increase in one standard deviation of the parents' average educational level for students of the same school and grade is correlated to an increase from 0.2 to 0.5 standard deviations of the students' average performance.⁴⁰ The magnitude of these effects is large, since the literature on education has found that an extra one fourth standard deviation in school results is equivalent, on average, to having an additional year of education.

Although the effects of peers estimated for Finland are also statistically significant, their magnitude is much lower than for any Latin American country: an increase of 1 standard deviation in the average education of the parents of peers is correlated to an increase of maximum 0.1 standard deviations in the average academic achievement of students. That is, unlike Latin America, academic achievement of Finland is less sensitive to the social environment in the school and therefore depends to a larger extent on each student's own effort.

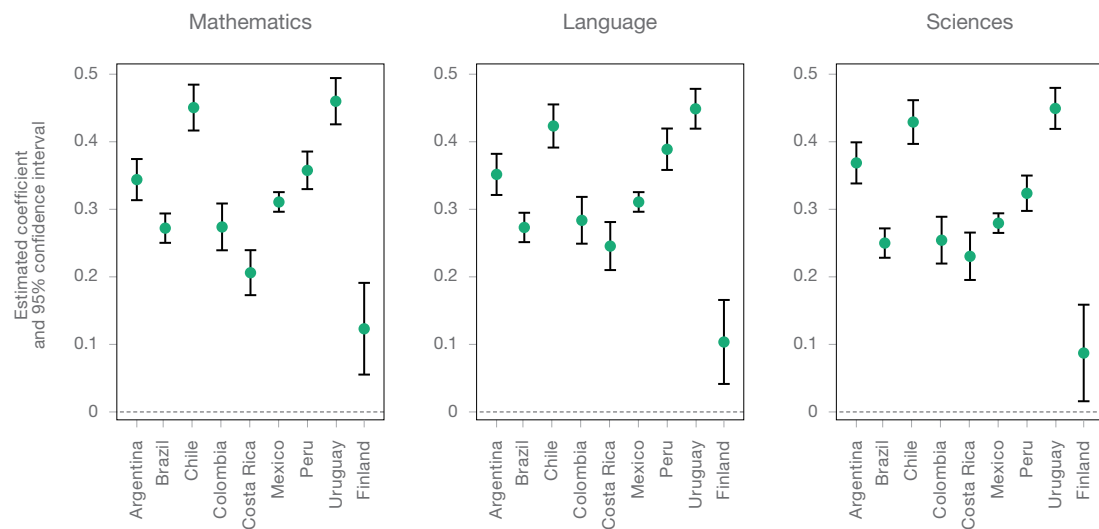
This heterogeneity in the vulnerability to the environment (that arises from comparing the Latin American countries with each other and Finland) is an important aspect to consider in the design of policies intended to exploit peer effects to promote skill accumulation. However, the first question that governments must ask themselves is whether it is worth designing instruments to take advantage of the existence of peer effects on school achievement. The answer is not obvious: although the formation of heterogeneous classes (mixing students with high and with low achievement) could increase the performance of disadvantaged students, this strategy could also lower the results of the best students compared to their results if placed in a more homogeneous classroom. This dilemma illustrates an essential issue: public policy would

39. This exercise controls for household income, gender, and age of the student. Also included are fixed effects of educational institution and year, and the errors are grouped by grade, which minimizes the selection problem in the calculation of peer effects that was discussed in Text Box 5.6 (see p. 308).

40. The countries of Latin America that present higher peer effects in the three areas evaluated by PISA are Chile and Uruguay (increase of more than 0.4 standard deviations in an increase of 1 standard deviation in the average education of peers' parents). In turn, the countries with a lower magnitude of the effects are Brazil, Colombia, and Costa Rica (an increase of around 0.25 standard deviations). The differences between these two groups are statistically significant.

benefit from more studies that reveal what mechanisms are behind peer effects as well as from rigorous assessments that could provide insight on the most effective policy instruments to take advantage of good peer influences and reduce the bad ones.

Graph 5.12 Relationship between Self-performance and Peer Performance in the PISA Test, in Latin American Countries and Finland



Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variables are the results in mathematics, language, and sciences, measured in terms of standard deviations within each country. The independent variable is the standardized average of the parents' educational level of the other students of the same grade, school, and country. The vertical axes are interpreted as changes in student's own performance (in terms of standard deviations) given an increase of 1 standard deviation in the average education of the parents of the classmates. The regressions control for father's education, mother's education, age, gender, an indicator of public or private school, and an approximation of household income (using housing materials). School and year fixed effects are included. Data from PISA (2003, 2006, 2009, and 2012).

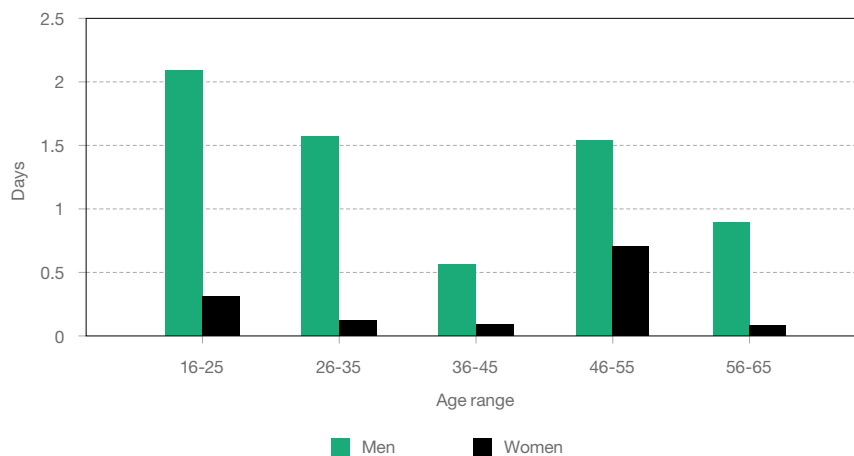
Source. Vargas and Martin (2016).

As has been previously discussed, interaction within specific social circles influences also risky behaviors that generate social costs, and the influence of peers on these behaviors is maximized during adolescence. Moreover, risky behavior in adolescence can have permanent effects on individuals, turning them into adults with socioemotional and cognitive deficiencies, low productivity (Kandel et al., 1995), and even poor health conditions (Zuckerman et al., 1989). For example, excessive drug and alcohol consumption affects the brain's development (Squeglia et al., 2014), and risky sexual behavior increases the probability of getting HIV (Wang et al., 2015) and the incidence of teenage pregnancy.

In Latin America, not many data sources permit the study of peer effects on risky behaviors. Exceptions are the studies by Salamanca (2015), Cortes et al. (2016), and Balsa et al. (2015). Salamanca (2015) uses a survey of secondary school students in Colombia to study peer effects on drug, tobacco, and alcohol consumption. Next, studying responses of students from 14 to 18 years of age from all schools in Bogota to a representative survey of all schools in the city, Cortes et al. (2016) estimate that an increase of 10% in the proportion of classmates of the same grade who are sexually active increases the probability of a student's own sexual activity by around 6 percentage points. Finally, Balsa et al. (2015) administered to schools of Montevideo a survey that allows to study of the influence of peers on the students' risk perception.

Graph 5.13 reports the frequency with which Argentinesans (according to their sex and age) report having failed to attend school or work because of drug consumption. The age peak for men is between 16 and 25 years of age, as men of this age range failed to attend school or work 2 days per year on average. To the extent that risky behavior incapacitates people to attend school or work, such behavior can hold back some skill accumulation processes. This correlation also suggests that drug users are more likely to drop out of school or leave their jobs, which could increase the incidence of the NEET (not in education, employment, or training) phenomenon, which is analyzed in Chapter 1.

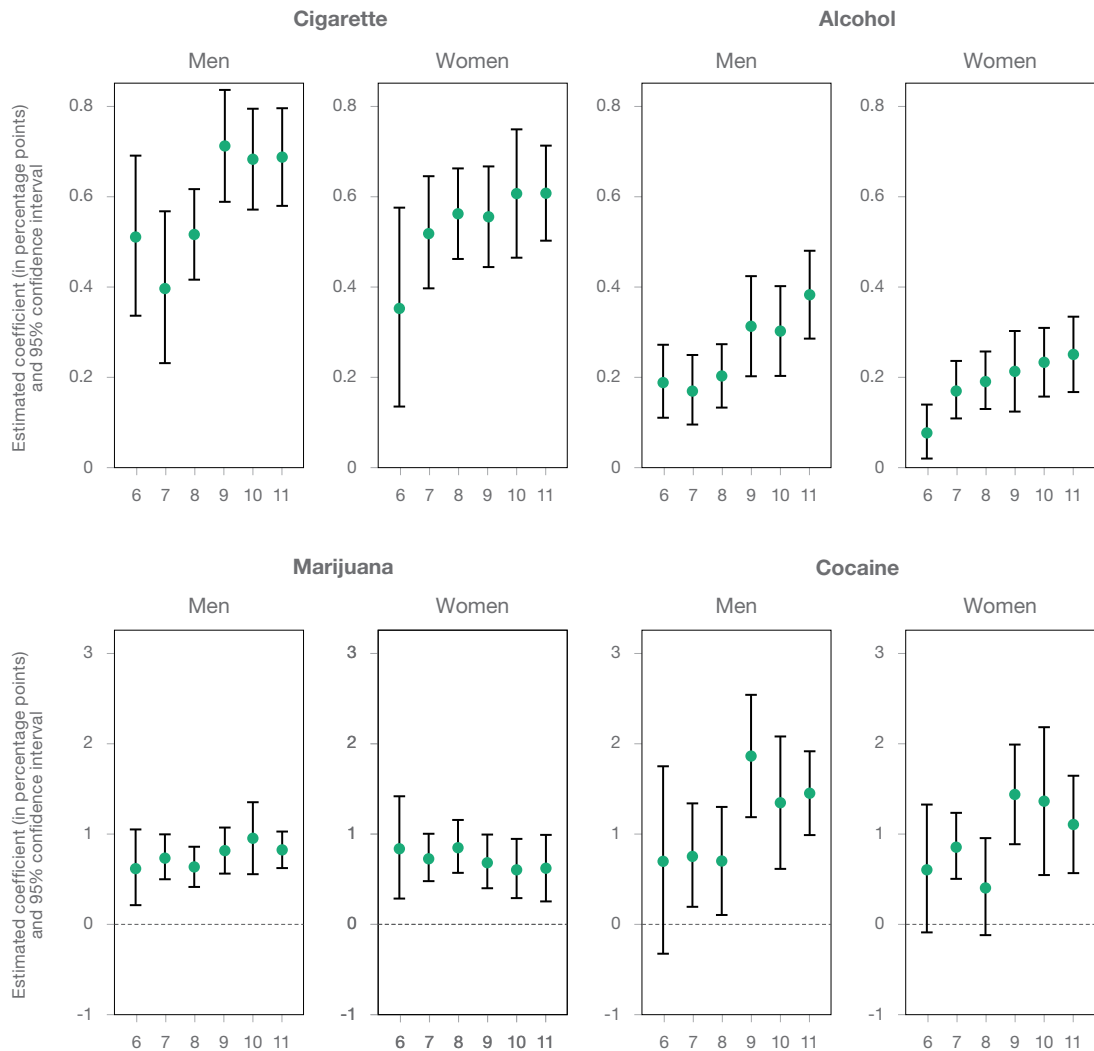
Graph 5.13 Days Absent from School or Work in Previous Year Because of Drug Consumption, in Argentina



Note. The graph reports by age and gender the answer to the question, "How many days in the past year were you absent from school or work because of drug consumption?" by age and gender.

Source. Author's elaboration based on Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas (INDEC, 2008, 2011).

Graph 5.14 Relationship between Probability of Consuming Toxic Substances and Peers Consumption, for Colombia



Note. The graph reports the coefficients and 95% confidence intervals, estimated by ordinary least squares with robust errors. The dependent variable assumes the value of 1 if the individual has consumed the substance in the past month. The independent variable is the prevalence of consumption of the same substance by other students of the same school and grade in the past month. The vertical axes are interpreted as percentage changes in the probability of consuming the substance given an increase of 1 percent in the prevalence of consumption of the same substance among students of the same grade. The regressions control for age, mother's education, single parent household, morning, evening and extended-shift school day, failing a grade, and an indicator of public or private school.

Source. Results replicated (with minor adjustments) of the analysis made in Salamanca (2015), which uses information from the National Study for the School Population in 2011 for Colombia.

The study by Salamanca (2015) is based on the National Study of the School Population in 2011 in Colombia and permits to study consumption of addictive substances by youth attending secondary school in the year of the survey.⁴¹ According to these data, the prevalence of alcohol consumption (in the 30 days prior to the survey) is 40% for men and for women, and cigarette consumption is almost 12% for men and 7% for women. The incidence of marijuana and cocaine consumption, although significantly lower, is also higher in men.

In Latin America, the ability to taking advantage of the environment is correlated to wealth

Graph 5.14 points out that the consumption of toxic substances by youth is associated with the consumption patterns of their social reference groups (in this case, students of the same school and grade in Colombia).⁴² The results show the existence of peer effects in the consumption of all substances and in all secondary grades. For example, a boy in sixth grade (the first of the secondary education cycle, and with an average age of 12 years) has, on average close to 5 percentage points higher probability of smoking cigarettes when 10% of children of his grade have smoked, while for girls the probability increase is around 4 percentage points (Graph 5.14, upper panel).

The graph shows at least three major results that are relevant for the design of public policies. First, although peer effects exist for the four substances and for students of all educational levels, the magnitude increases with the student's grade. This is consistent with the (previously discussed) findings that adolescents are more vulnerable to the effects of peers. Second, peer effects are marginally higher for men than for women, regardless of the substance analyzed.⁴³ Third and of utmost importance for the design of public policies, peer effects are much greater for illegal substances, more harmful and with worse social consequences than legal substances. The impact of the peers' consumption on the individual consumption is 6 times greater for cocaine than for alcohol. Boys in ninth grade (third-from-last grade, with an average age of 15 years) are 20 percentage points more likely to consume cocaine when 10% of their classmates consume it.

Conclusions

The physical and social environment conditions the skill accumulation processes of people through their entire life. Shocks experienced by pregnant women may cause them stress and trigger hormonal processes that affect fetal development and limit skill formation after childbirth and for the rest of the child's life. Deficient public utilities increase the risk of suffering gastrointestinal diseases and respiratory infections in children and adults, increasing the mortality of the former. The access to a quality physical space in the neighborhood encourages play and participation

41. The secondary cycle in Colombia covers students between approximately 12 and 18 years of age.

42. The graphs replicate the original exercise by Salamanca (2015), with some minor adjustments and disaggregation by sex.

43. The differences, however, are not statistically significant.

in sports and learning activities, as well as interaction with people with the same tastes and interests. By contrast, dirty areas with poor lighting and vacant lots facilitate crime, vandalism, and activities that are detrimental to skill accumulation, such as alcohol and drug consumption. Bullying in the schools as well as feelings of rejection and mistreatment among peers obstruct academic achievement, and drug consumption and early sexual activity may present high levels of “contagion” among youth.

These examples illustrate the multidimensionality and complexity of the relationship between the environment and skill formation. The environment may either encourage and boost skill formation processes or may slow and offset them. Furthermore, in Latin America, the ability to take advantage of the environment is correlated to wealth. Households with higher income may choose neighborhoods with higher-quality public utilities and access to parks, plazas, libraries, and cultural centers. In addition to being less vulnerable to shocks, these homes usually have formal insurance mechanisms and can choose to send their children to very good schools.

The challenge of public policy in Latin America is then to assist those who are the most vulnerable. To this end, policy must be aimed at reducing the gaps in the environmental conditions between rich and poor homes in such a way that both can take advantage of all positive externalities in the physical and social space so children and youth grow up to maximize skill development. Higher-quality infrastructure and public utilities with universal coverage, insurance policies, control and mitigation of environmental and violence risks, and public health approaches for prevention of negative peer effects must be the pillars that guide the efforts to secure equal opportunities in skill formation for every child and youth in the region.

Appendix Coverage and Representativeness of Surveys Used

ENAHO (National Household Survey) – Peru (INEI [National Institute of Statistics and Information Technology], 2014)

The results are representative of the whole country and include urban and rural areas, the 24 departments, and the Constitutional Province of Callao. The total sample is of 4,770 households (3,235 urban and 1,535 rural).

Ecuador Living Conditions Survey – Ecuador (INEC [National Institute of Statistics and Census], 2006 and 2014)

The results are representative nationwide and include urban and rural areas, the 24 provinces, and the four large cities (Quito, Guayaquil, Cuenca, and Machala).

ELCA (Colombian Longitudinal Survey of the University of Los Andes) – Colombia (2010, 2013)

The results are representative of homes in the poorest 4 socioeconomic strata (out of 6 strata in total) in the urban areas of various regions and municipalities with different urbanization levels as well as homes in of the first (and poorest) stratum in rural areas of economically homogeneous areas and for which the main economic activity is agricultural exploitation.

Multipurpose Survey for Bogota (EMB) Colombia (DANE [National Administrative Department of Statistics], 2011)

The results are representative of the city of Bogota for the 19 localities and of the city.

Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas – Argentina (INDEC [National Institute of Statistics and Census], 2008, 2011)

The target population for this survey covers people between 16 and 65 years of age who live in private homes located in urban localities of 5,000 or more inhabitants. The survey considers the total of the country's 6 regions, 4 groups of urban populations, 23 provinces, and 7 agglomerates.

The 2015 CAF Survey (CAF, 2015)

The results are representative at the city level for each Buenos Aires, La Paz, Sao Paulo, Bogota, Quito, Mexico City, Panama City, Lima, Montevideo, and Caracas.

PISA (Program for International Student Assessment) – OECD (2003, 2012)

The results are representative of the 15-year-old school population nationwide each participant country.

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Although Latin America has made significant progress in many social and economic matters, there is still a long way to go on the path to development. Most of the challenges to economic development in the region are closely linked to problems of human capital formation.

This new Report on Economic Development seeks to contribute to the debate on how to strengthen human capital in Latin America, focusing on its more basic components: the cognitive, socioemotional, and physical skills of the people. The RED 2016 analyses the contribution of the four contexts where skill development takes place: the family, the school, the physical and social environments, and the labor market. The report also sheds light on which are the public policies that can be implemented for the comprehensive development of individuals, and emphasizes the importance of two crucial stages of life: early childhood and youth.