When We're Sixty-Four

Opportunities and Challenges for Public Policies in a Population-Aging Context in Latin America

Rafael Rofman and Ignacio Apella

WORLD BANK GROUP

When We're Sixty-Four

Opportunities and Challenges for Public Policies in a Population-Aging Context in Latin America

RAFAEL ROFMAN AND IGNACIO APELLA

WORLD BANK GROUP

Contents

Boxes

Figures

Tables

Acknowledgments

BACKGROUND PAPERS

Apella, Ignacio, and Gonzalo Zunino. 2018. "Envejecimiento y cambio tecnológico en LAC." http://pubdocs.worldbank.org/en/897321595858270469/Envejecimiento-y-Cambio-Tecnológico-LAC.

Barbieri, María Eugenia. 2019. "Los desafíos del envejecimiento poblacional para los sistemas de salud en América Latina." http://pubdocs.worldbank.org/en/961671595859250350/Los-desafíos-del-envejecimiento-poblacional-para-los-Sistemas-de-Salud-en-LAC.

Fanelli, José María. 2017. "La transición demográfica en América Latina. Desafíos y oportunidades macroeconómicos." http://pubdocs.worldbank.org/en/539531595858262533/La-transición-demográfica-en-LAC-Desafíos-y-oportunidades-macroeconómicos.

Filgueira, Fernando, and Rafael Porzecanski. 2018. "Ageing, the Knowledge Economy and Human Capital Creation in Latin America." http://pubdocs.worldbank.org/en/997811595858269263/the-knowledge-economy-and-human-capital-creation-in-Latin-America.

Lloyd-Sherlock, Peter, and Carlos Díaz-Venegas. 2018. "Health Policy and Population Ageing in Latin America." http://pubdocs.worldbank.org/en/374841595858265247/Health-policy-and-population-ageing-in-Latin-America.

Lloyd-Sherlock, Peter, and Carlos Díaz-Venegas. 2018. "Long-Term Care for Older People in Latin America." http://pubdocs.worldbank.org/en/802501595858267969/Long-term-care-for-older-people-in-Latin-America.

Miller, Tim. 2018. "The Demographic Revolution in Latin America: 1955–2045." http://pubdocs.worldbank.org/en/893391595861233982/The-demographic-revolution-in-Latin-America-1955-2045.

Miller, Tim. 2018. "The Rise of the Intergenerational state in Latin America: The Role of Demography and Policy in Shaping Future Public Spending, 2015–2045." http://pubdocs.worldbank.org/en/145371595858266636/The-role-of-demography-and-policy-in-defining-future-public-spending-in-LAC.

Mohpal, Aakash. 2018. "Poverty, Aging and the Life Cycle in Latin America." http://pubdocs.worldbank.org/en/496491595688195329/Aakash-Mohpal-Poverty-in-the-life-cycle.

Rofman, Rafael, and Ignacio Apella. 2018. "Envejecimiento poblacional y los sistemas de pensiones en América Latina y el Caribe." http://pubdocs.worldbank.org/en/216951595858263869/Envejecimiento-Poblacional-y-Los-Sistemas-de-Pensiones-en-LAC.

About the Authors

Ignacio Apella is an economist in the Social Protection and Jobs Global Practice at the World Bank. His work focuses on social protection, pension policy, labor economics, and health economics in Latin American countries. He is also an economics professor at the University of Buenos Aires, from which he graduated. Before joining the World, Bank, he worked as a researcher at the Center for the Study of State and Society in Buenos Aires. Ignacio is the author of many studies and books.

Rafael Rofman is program leader for Human Development in Argentina, Paraguay, and Uruguay at the World Bank. He is an economist and demographer and, before joining the World Bank, worked as an independent researcher on aging and social security policies. He has published numerous papers and books and has taught at the University of California, Berkeley; New York University; University of Buenos Aires; National University of Lujan; and Torcuato Di Tella University. Rafael has degrees from University of Buenos Aires, National University of Lujan, and University of California, Berkeley.

Abbreviations

ADL	activities of daily living
BGR	benefit generosity ratio
DDR	demographic dependency ratio
ECLAC	Economic Commission for Latin America and the Caribbean
GDP	gross domestic product
IADL	instrumental activities of daily living
LAC	Latin America and the Caribbbean
LTC	long-term care
LTCI	long-term care insurance
OECD	Organisation for Economic Co-operation and Development
SENAMA	Servicio Nacional del Adulto Mayor
SERCE	Second Regional Comparative and Explanatory Study
TERCE	Third Comparative and Explanatory Study on Education Quality
WHO	World Health Organization
YLD	years lost due to disability

All dollar amounts are US dollars unless otherwise indicated.

1 Population Aging

INTRODUCTION

Latin American countries are going through a demographic transition and, consequently, a population aging process. The number of children will decline and the number of older adults will increase in the next few decades, until the population structure begins to stabilize. The magnitude and speed of these changes will be different from country to country, resulting in a heterogeneous process. The transition in some countries (Brazil, Chile, Columbia, Costa Rica, El Salvador, and Uruguay, and most of the Caribbean states) is already quite advanced, with fertility rates at replacement level. The process in other countries is occurring somewhat later and should be completed in the next 10 to 15 years; and a few countries are further behind and will probably reach replacement-level fertility in 20 to 30 years (World Bank 2016).

Population aging is the result of a slow but sustained reduction in mortality, which leads to an increase in life expectancy, and fertility, resulting from families being able to control the number of children they have and women increasing their roles in nondomestic activities. These two trends clearly reflect long-term improvements in welfare and economic and social development and, as such, should be widely welcomed. However, this process also entails policy challenges: many public institutions—including education, health, and pension systems and labor market regulation—are designed for a different demographic context and thus need to be adapted to be effective in the new scenario.

Population aging leads to two different public policy challenges. On one hand, older populations demand more fiscal resources for social services such as health, long-term care, and pensions (and, potentially, fewer resources for education). On the other hand, the aging process produces shifts in the proportion of the working-age population that may affect long-term economic growth.

Old societies risk losing dynamism, being exposed to higher dependency and lower saving rates. However, before becoming old, societies have a great opportunity defined by the demographic bonus. This bonus is a temporary decline in dependency rates, which opens up a period during which the share of the working-age population and the population with saving capacity in the total population are at their highest levels. This phenomenon constitutes a great

opportunity in the short term because the higher savings may result in increases in the capital endowment per worker and in productivity. For this to happen, institutional, financial, and fiscal conditions must be generated that promote larger savings and investment to accelerate per capita GDP growth in a sustainable way.

This book discusses the effects of demographic change and the demands that it will place on institutions and public policies. It considers not only the fiscal effects that changes in the population age structure could have on pensions, health, and long-term care systems, but also the impacts on future economic growth, discussing how public policies (mostly on human capital formation and labor markets) will have to overcome reductions in the labor force and take advantage of opportunities generated by the demographic changes.

A CONCEPTUAL FRAMEWORK

This book is organized around a simple but consistent conceptual framework. Population aging is caused by two trends observed in most societies around the world: declines in both fertility and mortality. These declines have a direct impact on age structures (as the proportion of older individuals grows over time) and population size (as its growth rate declines and in some cases may become negative). These changes have, in turn, significant impacts on two fronts. First, fiscal accounts can be directly affected because an older population tends to demand higher spending on programs such as pensions, health services, and long-term care. Although the onset of these effects is slow, they may be quite large over the medium term if no policy or behavioral changes attempt to balance them and they may create sustainability problems. This issue is not limited to publicly provided programs; it may also create wider economic sustainability issues if some services—such as health, long-term care, or pensions—are privately managed and financed. And second, the medium- to long-term decline in the proportion of the working-age population puts at risk the possibility of ensuring sustained per capita GDP growth, which is necessary to improve population welfare. However, population aging also offers unique opportunities: as the age structure changes with the decline in fertility and mortality, the proportion of active-age individuals in society tends to temporarily grow before the aging process results in higher dependency rates. This period is usually referred to as the "first dividend" because, during a few decades, the chances for societies to produce higher surpluses reach their maximum levels. If this opportunity is exploited, savings and capital accumulation should increase, creating the conditions for the "second dividend," because higher capital stocks should result in higher productivity.

Managing the fiscal impacts of population aging and maximizing the effects of the two dividends requires policy interventions; these interventions should not just be adaptations of legal and institutional frameworks to a changing context but should try to focus on facilitating the transition to a new demographic situation, taking advantage of opportunities and reducing risks. If these efforts are successful, per capita income and welfare should continue to grow, even in a context of an aging population. Figure 1.1 presents a simple conceptual model of this process, linking the demographic processes with their fiscal and macroeconomic impacts and the main policy areas in which interventions may be necessary to ensure a sustained economic growth path in the medium and long terms.

FIGURE 1.1

A conceptual framework for the impacts of population aging
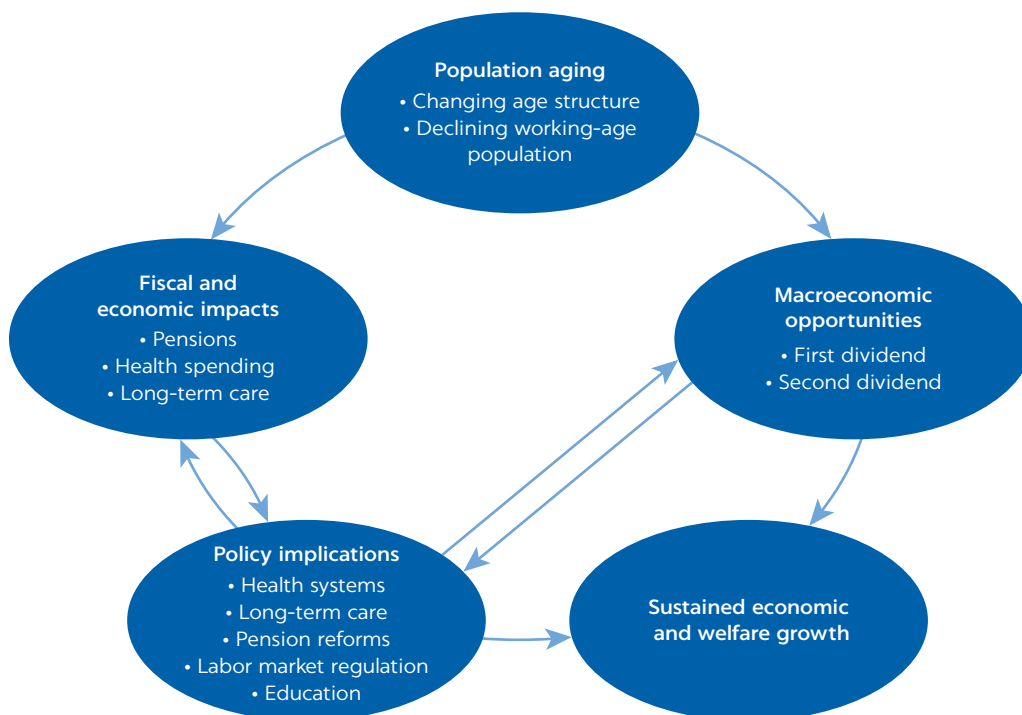
Source: World Bank.

Following this framework, the second chapter of the book presents a more detailed discussion of the demographic trends in the region and their implications. Chapter 3 focuses on the fiscal impacts of these trends, and chapter 4 discusses the macroeconomic effects and the role of the first and second dividends. Based on this foundation, chapters 5 to 7 examine the three public policy sectors more likely to bear the fiscal impacts of aging—health, long-term care, and pensions— and discuss policy options around them. Finally, chapters 8 and 9 discuss the challenges that countries in the region will need to overcome in two critical areas to take full advantage of the dividends and enter a sustained growth path: labor market trends and regulations (including lifelong learning) and human capital formation (focusing on basic education).

DEMOGRAPHIC TRENDS

All countries in Latin America and the Caribbean are in the midst of their demographic transitions, meaning that people live longer and have fewer children. Figure 1.2 shows the trajectories of life expectancy and the total fertility rate for a selected group of countries from 1955 to 2045. Changes in Latin America have been deep; on average, life expectancy at birth rose from about 52 years in 1955 to its current level of 75 years. It is projected to continue rising to reach an average of 80 years by 2045, the current life expectancy among Organisation for Economic Co-operation and Development (OECD) nations. A similar transformation has occurred in fertility. In 1955, women expected to

Total fertility rate and life expectancy at birth in Latin America and the Caribbean, 1955–2045
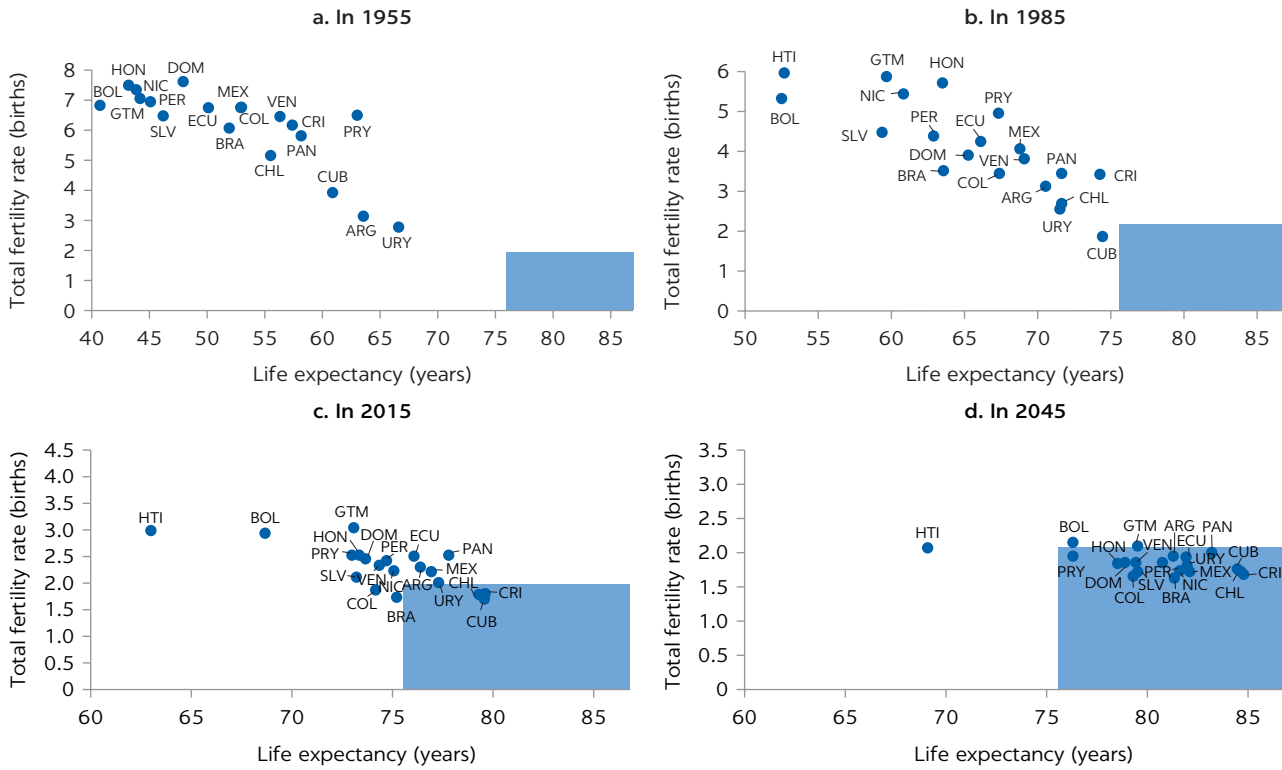
Source: World Bank calculations based on UN (2017).
Note: The shaded blue areas reflect life expectancy and fertility in Organisation for Economic Co-operation and Development countries in 2020, with life expectancy in the 80s and fertility at less than two births per woman.

have six children in their lifetimes but, by 2015, fertility had fallen by two-thirds, with an average fertility level of 2.3 births per woman.

For most countries in the region, this transformation occurred primarily in the past 50 years, with a strong concentration in the first half of that period. The transition is nearly complete in most cases, and the United Nations population forecasts show that, by 2045, most Latin American countries should converge to the demographic characteristics of the current-day OECD (the blue region in the bottom right corner of figure 1.2) with life expectancy in the 80s and fertility at less than two births per woman.

This demographic change has a clear impact on dependency rates, which are the number of children younger than age 15 for every 100 individuals between the ages of 15 and 64 (the child dependency ratio) and the number of elderly (age 65 and older) for every 100 individuals between the ages of 15 and 64 (the old-age dependency ratio), or the sum of these two rates. Figure 1.3 shows the trends at the regional level, with a downward trend in child dependency that began in the 1970s and should continue until sometime after 2050, and an increasing trend in the old-age rate, which is now accelerating and should begin to slow down toward the end of the century. The combined effects of these two opposite trends produce a medium-term decline in the total dependency rate, which should reach its minimum by 2025 and then start growing again.

Although the average trends are smooth, the heterogeneity in mortality and fertility trends mentioned above is reflected in the expected demographic

FIGURE 1.3

Dependency ratios, 1950–2100
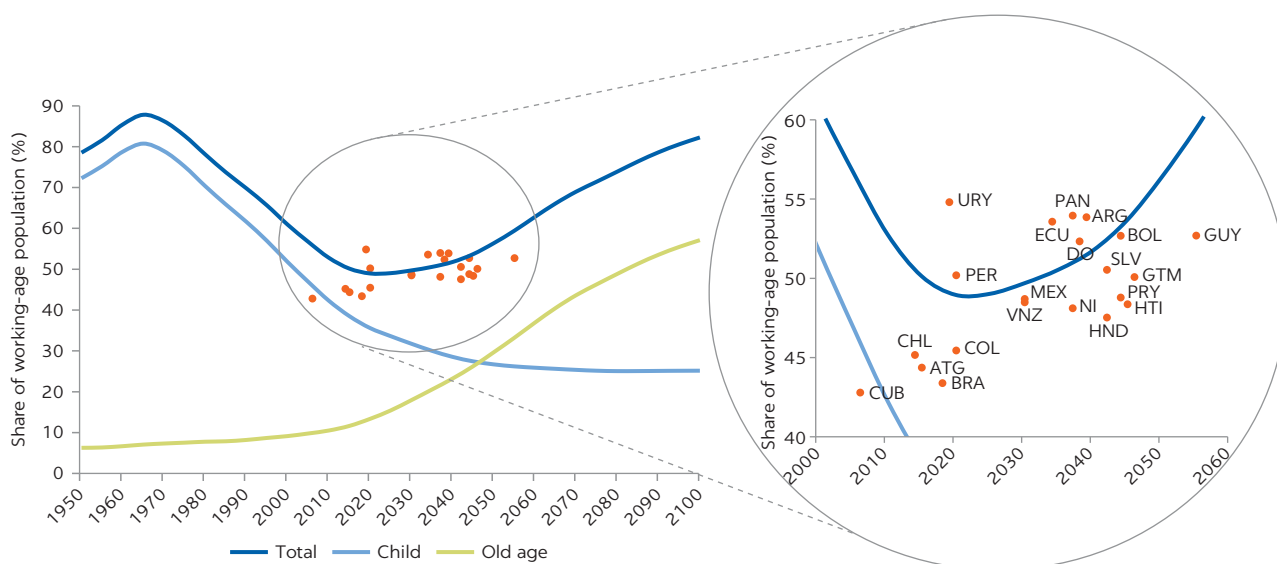
bonuses' magnitudes and timelines. The enlarged portion of figure 1.3 shows when the different countries reached (or will reach) their minimum dependency rate and at what level. Cuba, for example, had an "early and deep" bonus, reaching the minimum dependency rate at less than 45 percent in the late 2000s. At the other extreme, Guyana's demographic bonus will happen much later and with less intensity: the minimum dependency rate is expected to happen in the late 2050s, and it will be much higher than those of Cuba and other countries, at about 52 percent. The other countries can be roughly grouped into two categories, one that includes those that are currently reaching or about to reach their minimum dependency rates (Brazil, Colombia, Peru, and Uruguay, among others) and the other including those that will do so in the mid-2030s or 2040s. Even within these groups, there are significant differences in the magnitude of the bonus: Uruguay's lowest dependency rate will be 55 percent, while Cuba and Brazil will reach less than 45 percent, implying that opportunities generated by the bonus should be much larger for them.

AGING AND PUBLIC SPENDING

Public spending is the result of the aggregation of expenditures in multiple programs, institutions, and policies by public sector agencies. Although many of these expenditures have no direct connection to the age composition of the population, some programs' magnitudes are directly linked to the size of different age groups. Spending on basic education is a typical example, given that a country with relatively more children will probably confront higher demand in this sector. Similarly, spending on pension programs, health services, and long-term care is usually higher as populations become older. Of course, the relation between population aging and spending on these programs is not strict because policy design and preferences regarding coverage, magnitude, and quality of benefits should have a large effect as well.

Public spending on these programs can be decomposed into a demographic component and a policy component.[1] The impact of demography on public spending can be assessed through the demographic dependency ratio, which measures the size of the potential beneficiary population (that is, the "at-risk" population) relative to the working-age population. For example, the dependency ratio for public education is defined as the ratio of the student-age population to the working-age population.

A policy's impact is measured by the benefit generosity ratio (BGR). This indicator reflects the combined effect of two dimensions: coverage and spending per participant. The BGR measures the relative cost of benefits per person at risk in relation to the average productivity of workers in the economy. For example, the BGR for public education is the level of public spending on education divided by the school-age population, expressed as a proportion of the average productivity of the working-age population (GDP/working-age population). So, a BGR of 10 percent in education indicates that the annual public benefit per school-age individual is equivalent to 10 percent of the GDP per working-age adult. As mentioned, BGR depends on coverage and spending per participant. A country with a large youth population but no access to public education will have a low BGR, and the same can be expected in a country with high coverage but very low per capita spending.

Because the demographic dependency ratio depends on fertility and mortality trends, policy makers can do little to change it. Fertility decisions are made within families and, in most cases, space to influence them is limited (although organizing effective provision of contraceptive devices or offering high-quality, accessible childcare services may have impacts). On the other hand, the BGR is a direct consequence of policy and individual decisions. If authorities decide to make access to health services more difficult or to provide more medicines free of charge to those already covered, the BGR will change. Likewise, if individuals tend to delay retirement as their preference for work changes over time, the BGR will also change, even without policy reform.

Figure 1.4 presents the results of this decomposition for social expenditures in 18 countries in Latin America and the Caribbean. The dark blue bars show the current level of expenditures, and the light blue bars show the levels these expenditures could be expected to reach by 2045 if the demographic dependency ratio evolves as expected and no changes affect the BGR. Hence, these bars show what would happen with social spending if nothing except demography changes over time. Finally, the green bars add to the simulation a possible change in generosity. To offer a feasible scenario for the generosity level, the simulation assumes that countries could converge to the currently prevalent generosity levels in comparable OECD countries, not because the chapter predicts this will happen, but to have a reference point for this discussion.

Under the first scenario (only the demographic dependency ratio effect), median social spending among Latin American countries would rise from 12.8 percent of GDP in 2015 to 15.8 percent in 2045, with a significant range of results (from expected public social expenditures equivalent to 38 percent of GDP in Brazil to only 4.4 percent in Guatemala). In most countries social spending would tend to increase, mostly because of the increased weight of the elderly in the demographic structure and the consequent higher spending on pensions. However, in a few cases (El Salvador, Guatemala, and Paraguay) public social spending would decrease. These opposite directions are associated with the current generosity of the different social policies considered. In the first group of

FIGURE 1.4

Social spending as a percentage of GDP, by scenario, 2015 and 2045

Legend:
- 2015
- 2045 (demography effect)
- 2045 (demography and generosity)
- Average 2015
- Average 2045 (demography effect)
- Average 2045 (demography and generosity)
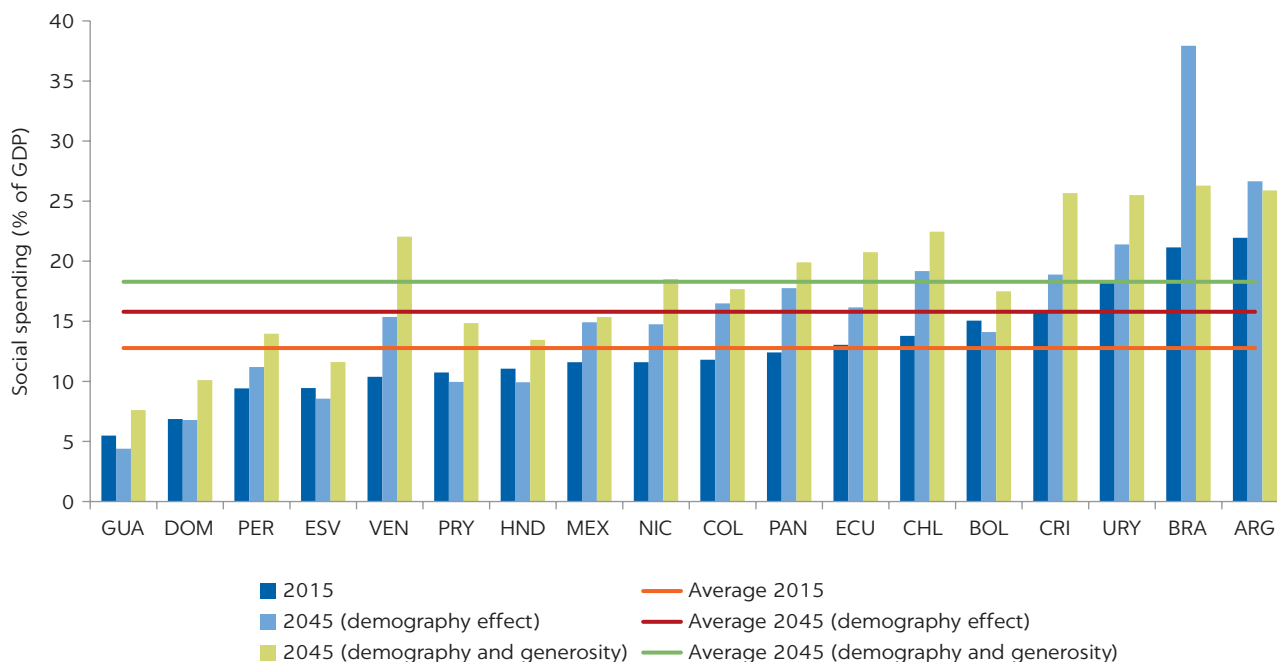
Sources: World Bank calculations based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Expenditure and Financing database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).

Note: GDP = gross domestic product.

countries coverage and benefits are high for education, health, and pensions, but in the second group pension coverage is currently low, meaning an increase in the elderly population would have a limited impact if generosity does not increase.

When considering changes in both demography and generosity, the results are quite different. If generosity ratios converge with those currently observed in OECD countries, the average public social expenditures would reach 18.3 percent of GDP in 2045. In other words, moving toward OECD standards would result in most countries in the region experiencing faster increases in public social expenditures because social policies in more developed countries tend to be more generous than in Latin America (particularly in coverage). Three exceptions to this are Argentina, Colombia, and Brazil. Argentina's case can be explained by the current nearly universal coverage of the pension system. In Colombia, coverage is lower, but per capita benefits are very high, so converging to the OECD level would adjust these two dimensions in opposite directions. In Brazil, the current combination of high coverage and very generous benefits implies that convergence with the OECD would result in significantly lower spending.

Considering each of the main social sectors separately yields some interesting results: Spending in education should tend to decline in the next few decades as a result of the demographic trends, since there will be fewer children to educate, with a reduction in spending of between 2.8 percent of GDP in Honduras to close

to 0.7 percent in Panama. However, given that coverage is still incomplete (in particular, at the secondary level) and spending per capita is low in many cases, most savings produced by the pure demographic effect will probably be compensated for (and even reversed) if generosity standards approach those of the OECD countries.

In health and long-term care, population aging will generate higher expenditures in countries where the demographic transition is advanced, but will have a savings effect in those that, by 2045, will still be moving through the demographic bonus period. However, nondemographic effects (including changes in coverage as well as service standards and technology costs) will probably be more relevant and, overall, expenditures in the sector should grow between 0.5 and 5 percentage points of GDP.

Older populations tend to have a higher incidence of chronic and degenerative conditions that require more complex and expensive treatments than infectious diseases. The demographic transition that is changing the age profile of Latin American countries is accompanied by an epidemiological transition, which is changing the causes and treatments required for health conditions affecting the population. Also, the introduction of new (and usually more expensive) technologies in the diagnosis and treatment of these diseases is resulting in a rapid increase in health-related costs in most societies.

The increasing incidence of chronic noncommunicable and degenerative conditions presents the need to redesign health systems, moving from a reactive model that is focused on diseases and acute episodes to more integrated models of care focused on prevention and primary care to improve the management of chronic conditions and ensure effective coordination between providers of health services and long-term care. To this end, several areas of current institutional structures must be reformed, including payment systems (to facilitate cross-collaboration across institutions and providers), training and awareness programs for multidisciplinary health teams, the design of integrated care programs, information systems, access to technologies and medication based on effectiveness and cost-effectiveness, and support for self-care strategies.

The public sector in which the impact of aging should be felt the most is pension systems. The demographic transition toward an older population structure should result in higher fiscal needs to finance public pay-as-you-go programs and a decline in the adequacy of funded programs' benefits. In the next few decades, countries that already have generous programs will need to adopt effective actions to improve the sustainability of their pension systems. While the financial sustainability of pure funded programs is ensured by design at the expense of adjusting benefit levels, this fact may become insufficient to satisfy the underlying policy goals (income replacement and protection against poverty), and social and political pressure may result in unplanned increases in fiscal expenditures. For pay-as-you-go or mixed programs with a public funding component, financial sustainability may be improved by increasing revenue (through higher payroll taxes or the allocation of other tax proceeds). However, this strategy would not improve the overall fiscal or economic impacts because these additional resources would come from reductions in other public policies or from tax collection increases, which in turn would have an impact on production and activity levels.

THE MACROECONOMIC DIMENSION

Fiscal pressures originating in changes in the age structure are a serious concern because they may result in unsustainable conditions for the government to adequately provide services to the population (either because they would be forced to increase taxes beyond reasonable levels or because they would need to reduce per capita spending in critical areas to balance their accounts). However, there is another dimension that is equally relevant: the macroeconomic impacts of population aging.

Latin American countries need to get rich before they get old. In aggregate terms, this means that societies need to take advantage of opportunities generated by the demographic bonus to significantly increase their growth rates before aging becomes a serious economic challenge. As discussed, the demographic trends will produce, in the medium term, an increase in the need for resources for social policies. However, countries need to increase their capital accumulation, both physical and human, as a way to leapfrog development stages to reduce the ever-growing gap with richer and more developed countries. Focusing on policies that will contain the growth of social spending and increase worker productivity—such as introducing or expanding incentives to extend the effective retirement age, promoting healthy habits that improve life quality and reduce morbidity, and increasing human capital accumulation through better education systems—is critical to achieving this objective.

Changes in the age distribution matter because individuals vary their economic behavior according to their age. Although the total dependency ratio is a good indicator of demographic trends, its usefulness for evaluating the impact that demography has on economic performance is limited, given that labor force participation rates do not present instant, discrete changes from zero to 100 percent at ages 15 and 65 but show gradual changes across ages.

The life-cycle theory helps provide an understanding of individuals' labor income, consumption, and saving patterns. People make choices about how much to spend based on their permanent lifetime income rather than current income (Modigliani 1988; Modigliani and Brumberg 1954). Indeed, individuals start consuming the moment they are born and never cease to do so. However, they start working only later in life and, at some point, may have to, or decide to, stop. Indeed, the life cycle can be divided into three stages: youth, adulthood, and elderly. During the first and the last stages, average individuals consume more than they produce, whereas in the second stage they produce more than they consume. The length of each stage differs across individuals and is affected by many factors beyond biology, for example, the economic structure of society, educational opportunity, family needs and expectations, and health. The existence of public policies, the level of wealth, the availability of financial institutions, and cultural expectations are all important determinants of the leisure-work tradeoff. In some cases, the first stage may be very short if children enter the labor force at an early age. Similarly, the second stage can be very long (if labor force participation starts early and ends late in life), short, or even nonexistent, given that some individuals or groups never join the labor market. The third stage can again be longer (if retirement happens early), shorter, or nonexistent if death occurs while the individual is still generating a surplus. An older population usually results in a greater number of dependent people—with a life-cycle

deficit—and therefore a greater demand for resources to finance this deficit caused by the consumption of goods and services and transfers.

Economic growth depends on the availability of labor and capital endowments, both physical and human, plus a residual component commonly known as total factor productivity. The demographic bonus produces a temporary increase in labor supply that may be useful for increasing production and savings, but once aging accelerates, labor supply will tend to decline and, if capital accumulation and productivity increases do not become a driving force, GDP per capita may decline or stagnate.

The demographic transition effect on the economic growth process is related to what authors call the first and second demographic dividends. The first dividend occurs when the share of the working-age population in relation to other age groups reaches a maximum level. At this point, more labor is available and GDP per capita may grow faster. The second dividend is generated by the accumulation of capital and productivity increases that occur during the first dividend. Although the first dividend is temporary (it will disappear and reverse when population aging accelerates and dependency rates begin to grow), the second dividend may have a permanent positive impact on the economy.

The second demographic dividend originates in faster accumulation of capital during the first dividend period. The proportion of the population that can be considered "prime savers" (that is, the population in ages when their saving capacity is the highest) usually peaks at the same time or slightly later than the first dividend. This situation leads to an increase in the economy's aggregated savings rate, which can be used to increase investment in physical and human capital per worker and, thus, increase productivity once the aging stage has been reached. As a result, the second dividend yields long-term benefits through increased growth in production and sustainable development.

The demographic transition is far from being a neutral process with regard to economic growth. The absence of neutrality is precisely associated with the two dividends. The first dividend affects labor factor availability, leading to conditions that favor economic expansion during the demographic bonus period. In turn, the second dividend acts on the saving conditions of the economy, indirectly affecting the capacity to invest and accumulate physical and human capital as well as total factor productivity. Although the second dividend directly affects the conditions for capital accumulation, an additional effect is expected through total factor productivity, given that productivity is closely associated with the accumulation of human and physical capital.

The demographic bonus creates an opportunity to increase savings. Individuals have different propensities to save during their lifetimes (usually low at early ages; peaking between ages 40 and 55, when they are "prime savers"; and then declining again). The demographic transition implies that, in the near future, the proportion of prime savers will be at its peak in most countries in the region and, consequently, those countries will be in better-than-ever conditions to increase national savings rates. Apella (2019) finds a positive and significant correlation between the first dividend and savings in Latin America during the period 1960–2014. This result highlights the importance of the demographic bonus—through investment in physical and human capital—to increase productivity in the medium and long terms. However, the positive impact of demography on savings does not seem to be sufficient to close the gap with more developed countries (figure 1.5). In other words, Latin American countries are not fully

FIGURE 1.5

Savings as a percentage of GDP, 1996–2017
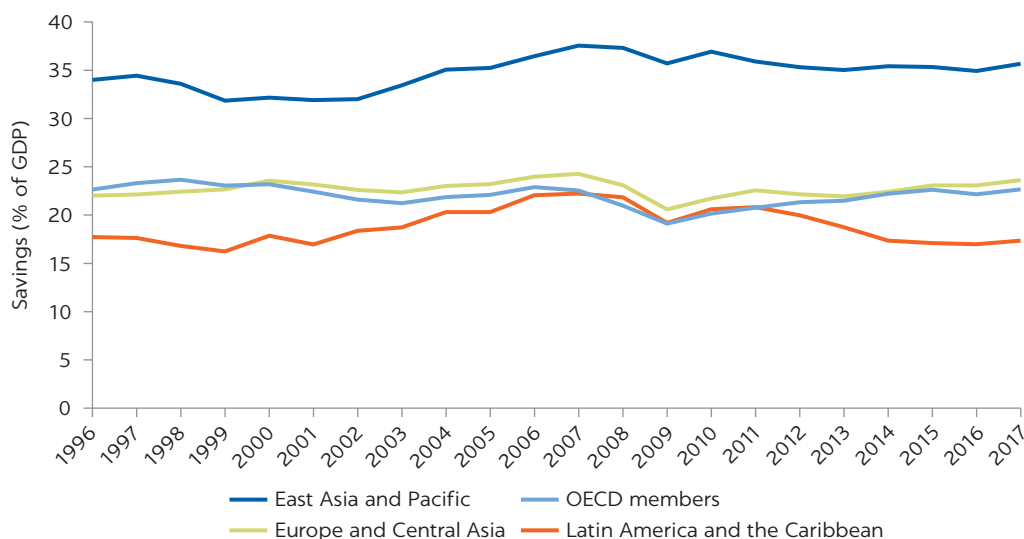
Source: World Bank, World Development Indicators.
Note: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development.

taking advantage of the first dividend, hence weakening the potential of a second demographic dividend and, consequently, making the goal of getting rich before getting old more difficult.

Productivity depends on both physical and human capital. Although the region is not saving enough to increase the stock of physical capital per worker, it might increase productivity by investing more in human capital. This type of capital not only allows an increase in labor productivity, but it may also be a driver of increasing total factor productivity. The concept of human capital is implicitly present in the traditional theory of growth through the quality of labor, and explicitly in endogenous growth models as a determinant of technological change. In this regard, the investment directed to improving labor force abilities and skills is an important source of growth.

POLICY TO INCREASE HUMAN CAPITAL AMID POPULATION AGING

Policy responses to population aging must focus on increasing productivity because the only way to ensure that per capita GDP continues to grow in a context of declining or stagnating population is to increase what each individual produces with his or her work. Because productivity is a direct consequence of capital endowment, taking advantage of the first and second dividends to increase physical capital and adopting policies that promote faster accumulation of human capital seem critical.

Human capital availability is the result of a combination of the number of workers and how skilled they are. The number of workers in the labor market may change purely because of demographic effects, but there are behavioral and regulatory factors that have important roles as well. Figure 1.6 shows 85-year

FIGURE 1.6

Labor force participation in Latin America and the Caribbean, by gender, 2015–2100
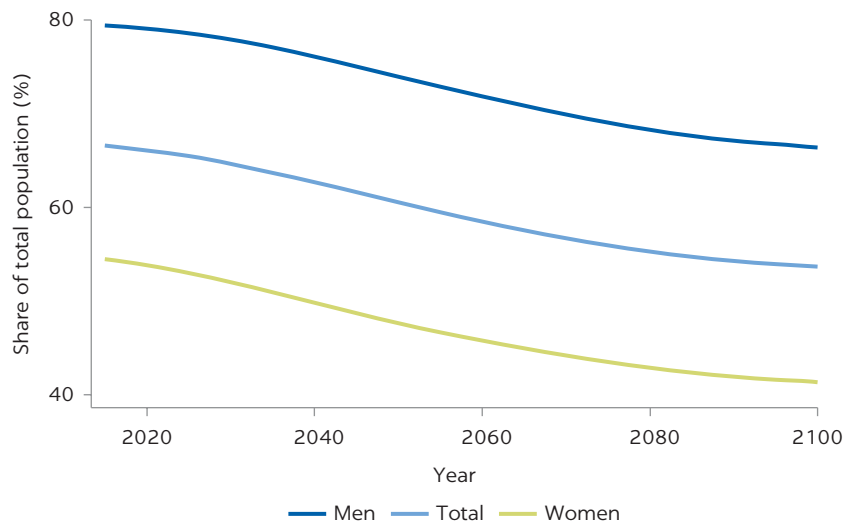
Sources: World Bank calculations based on household surveys and UN (2017).

projections of labor force participation rates by gender assuming that age-specific rates are constant. At the regional level, labor force participation rates would already be declining if only demographic effects were considered. The figure also shows a salient characteristic of labor markets in the region: gender heterogeneity is high in all countries, with lower participation rates for women. These gender gaps represent an important opportunity for policy action: if female labor force participation increases and the gaps decline (a trend that has been observed in most countries), the decline of the total labor force participation rate could be delayed, and the first dividend would be extended in time. The decline observed in fertility rates (which reduces the time dedicated to childcare by many women) and the increase in educational attainment of girls and young women are contributing to this process.

A similar effect can occur among older workers. As individuals reach older ages in better health and jobs become less physically demanding, the possibility of extending working lives and postponing retirement increases. Of course, this is a process that is heterogeneous across countries and among social groups in each country, depending on institutional factors such as labor legislation, pension policies and coverage, and accumulated skills among older adults. Increasing female and older adult labor force participation may result in longer first dividends, but it is unlikely to overcome the long-term trend in dependency rates. However, this extended first dividend may create opportunities for higher economic growth in the medium and long terms.

Extending the working life of older individuals can be achieved by increasing the statutory minimum retirement age, but the experience in Latin America and other regions shows that this is a politically difficult measure that can even produce negative fiscal impacts in the short term and create inequities among workers with similar job histories. Instead, pension systems should become more flexible, with incentives to delay retirement voluntarily and promote behavioral changes. In labor markets with high informality, more flexible benefit programs

that recognize incomplete work careers and pay proportional benefits could offer a fiscally inclusive and sustainable alternative. Pension systems could change toward multipillar programs composed of basic universal pensions that protect against poverty, funded by general revenue, complemented by contributory programs with benefits proportional to years of service and voluntary programs for those with higher incomes.

Accumulating human capital may require higher expenditures on education per capita, as shown in figure 1.4, but the efficiency of these expenditures is at least as important as their magnitude. Education outcomes in Latin America are insufficient. The World Bank's Human Capital Project has estimated that Latin American children may expect to have between 9.6 (Chile) and 6.3 (the Dominican Republic, Guyana, and Haiti) learning-adjusted years of school by the time they turn 18 years old.[2] These figures, when compared with more developed countries (Singapore has almost 13 learning-adjusted years of school, most European countries have between 11 and 12 years), explain why the gap in human capital accumulation is not declining but increasing. Figure 1.7 shows a consistent and robust relationship between educational achievement and per capita GDP across countries in the world.

As the first demographic dividend period advances in different countries, the weaknesses of education systems in providing adequate human capital to children and youth will result in missed opportunities. Most countries in the region have been able to expand education system coverage at primary levels (where attendance is almost universal) and secondary levels (where the situation has greatly improved in recent years, but coverage gaps are still about 20 percent on average). However, challenges remain in two major areas—the provision of good-quality early childhood and initial education and the quality and relevance of secondary education—and urgent policy action is needed. These areas seem to be the main bottlenecks that affect not only the chances of today's children to have a fulfilling life but also the chances of society to take advantage of demographic dividends and rapidly increase productivity and economic growth to finance the growing fiscal demands from an aging population and close the development gap with richer economies.

FIGURE 1.7

PISA scores in math and reading, by level of GDP, 2015
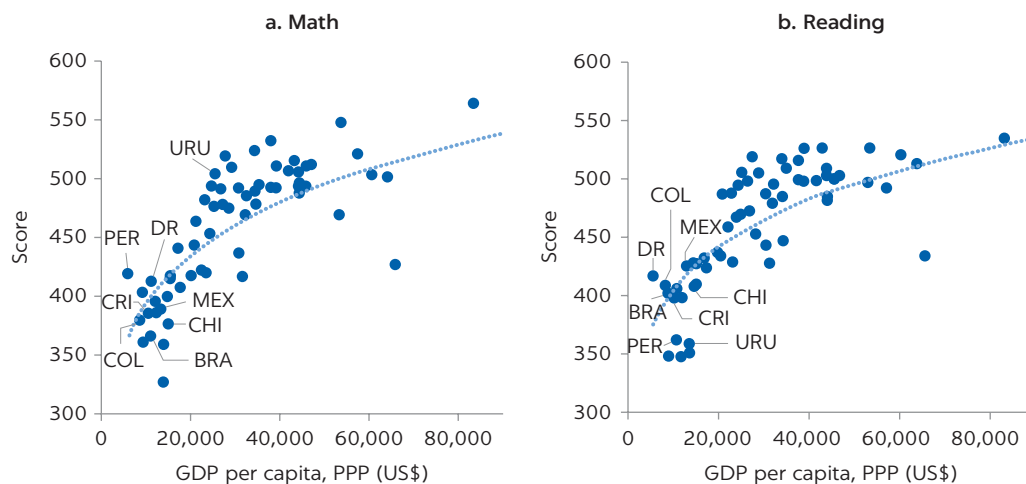
Sources: World Bank elaboration based on its World Development Indicators and the OECD (Organisation for Economic Co-operation and Development) PISA Database.
Note: GDP = gross domestic product; PISA = Programme for International Student Assessment; PPP = purchasing power parity; US$ = 2011 US dollar.

In summary, the region is going through its demographic window of opportunity, which creates positive conditions for economic growth in the short term through a larger labor force, and in the long term by increasing saving and investment in both human and physical capital, and therefore global productivity. However, the region's current savings level and education quality put it at risk of wasting the first demographic dividend and, as a consequence, missing the possibility of a second, more permanent, dividend. If the region's countries aim to replicate the experience of developed countries, such as Western Europe or Japan, or successful emerging market countries, such as the Republic of Korea, policies to change both norms and behaviors will need to be implemented sooner rather than later.

NOTES

1. A detailed methodological discussion of this decomposition is presented in chapter 3.
2. As part of the Human Capital Index calculation, the World Bank estimates the number of years a child can expect to attend school by the time he or she is 18 years old, and then adjusts it based on the country's performance on standardized learning tests.

REFERENCES

Apella, Ignacio. 2019. "Demographic Dividends and Economic Growth in Latin America. A Low-and Middle-Income Trap Equilibrium." Background paper for *When We're Sixty-Four*, World Bank, Washington, DC.

Lee, Ronald, and Andrew Mason. 2011. *Population Aging and the Generational Economy: A Global Perspective*. Cheltenham, UK: Edward Elgar.

Modigliani, Franco. 1988. "The Role of Intergenerational Transfers and Life Cycle Saving in the Accumulation of Wealth." *Journal of Economic Perspectives, American Economic Association* 2 (2): 15–40.

Modigliani, Franco, and Richard Brumberg. 1954. "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data." In *Post-Keynesian Economics,* edited by Kenneth K. Kurihara, 388–436. New Brunswick, NJ: Rutgers University Press.

OECD (Organisation for Economic Co-operation and Development). 2017. *Pensions at a Glance 2017: OECD and G20 Indicators*. Paris: OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2017-en.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

World Bank. 2016. *Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change*. Washington, DC: World Bank.

2 Demographic Trends

INTRODUCTION

Latin America is in the midst of a demographic revolution. This revolution has far-reaching social, economic, and political consequences, but it often goes unnoticed because it is a slow transformation. However, the cumulative trend is clear: fertility rates are declining across the region, the proportion of older adults is increasing, and as a result, social policies are becoming outdated. Understanding these demographic processes and how they affect institutions and policies is critical for maintaining progress in economic and social development.

The key feature of this demographic revolution for the lives of individuals is a longer life with fewer children. The changes in Latin America have been profound: life expectancy—the average years lived under current mortality conditions—rose from about 52 years in 1955 to reach its current level of 75 years, and it is expected to continue rising for at least another 80 years or so, to reach close to 87 years. At this pace, regional mortality indicators will close the gap with the highest-income countries in the world, from about 13.5 years in the 1950s to close to 3 years by the end of this century. Similarly, fertility has been declining, from an average of almost 6 children per woman in the 1950s to the current replacement level of 2.3 children.

The demographic transition has affected all countries in the region, but the timing and pace have been different. Fertility and mortality decline started early in the 1900s in some countries—including Argentina, Cuba, and Uruguay—but began decades later in others. These variations resulted in significantly different age profiles across the continent, with some countries now completing their demographic transition while others are still in the early stages. Figure 2.1 shows the proportion of youth (younger than age 15), adults (age 15–64) and elderly (age 65 and older), as well as the mean age in each country in the region as of 2019. The mean age of the population ranges from about 27 years in the younger countries to more than 35 in the older ones, where the proportion of elderly is greater than 10 percent and growing.

Discussing population aging in Latin America as a regional process is difficult because there is high heterogeneity across countries, as shown in figure 2.1.

Demographic dividend, Latin America and the Caribbean, 2019
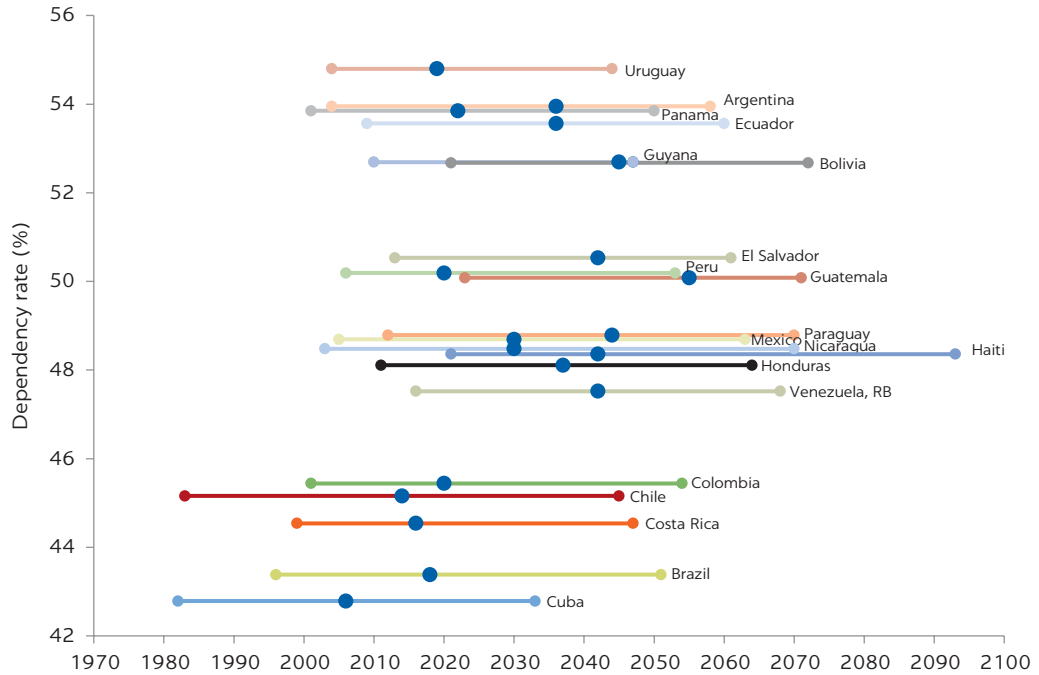
Source: World Bank calculations based on UN (2017).
Note: The dependency rate is defined as the population younger than age 15 and older than age 64 as a share of the population age 15–64. The blue dots in the middle of each line represent the mean age in the country as of 2019.

Differences about when mortality and fertility began to decline, how fast they declined, whether these trends have been stable or there were disruptions, and at what level they are expected to stabilize result in large differences in the aging process. Figure 1.3 shows a wide range in the timing and depth of the demographic bonus, a difference of more than 50 years and 10 percentage points in the dependency rate between the extreme cases. Differences among countries can be better discussed by building a typology that considers some of the most relevant variables.

Figure 2.2 shows the time and depth of the demographic bonus for each country, as well as its length, expressed as the period from when the country's dependency ratio fell below 60 percent to the year when it rose above that level again. Hence, for example, in Ecuador the lowest dependency rate will be reached in 2036, at 53.6 percent, and the demographic bonus will run from 2009 to 2060. This figure suggests that there are three groups of countries in the region. First are those with deep bonuses with maximum levels appearing around 2020. Cuba, Brazil, Costa Rica, Chile, and Colombia are in this group. This group's demographic profile is the result of high fertility rates until the 1960s, with a rapid decline thereafter. A second, larger group, includes El Salvador, Peru, Guatemala, Paraguay, Mexico, the República Bolivariana de Venezuela, Haiti, Nicaragua, and Honduras. In these cases, the bonus peak is less pronounced (at 45–50 percent) and occurs, on average, 20 years later than that of the first group. Finally, a third group includes Uruguay, Argentina, Panama, Ecuador, Bolivia, and Guyana. These countries have smaller bonuses, given that dependency rates decline only to 52–55 percent, although the timing is similar to that of the previous groups.

FIGURE 2.2

Age structure and mean age in Latin America and the Caribbean, 2019
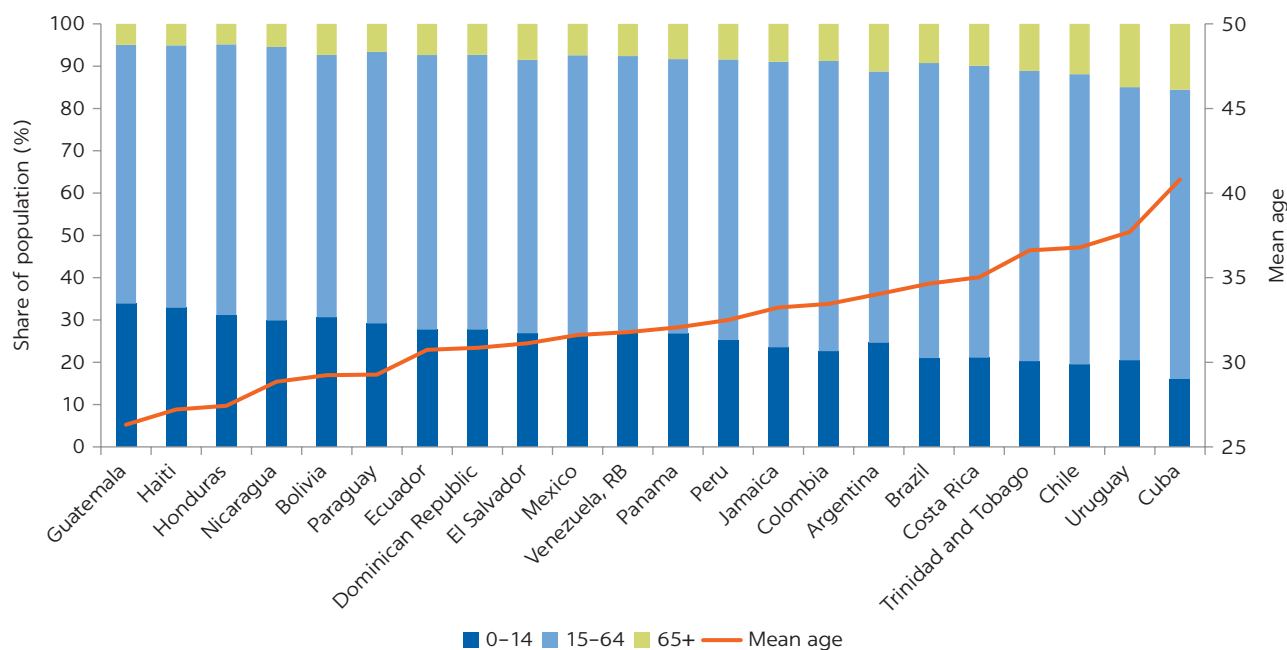
Source: UN 2017.
Note: The figure shows countries with 1 million or more inhabitants as of 2019.

This classification has a few outliers and special cases that should be noticed. First, Cuba, Argentina, and Uruguay began their fertility transitions significantly earlier (and more slowly) than other countries in the region, which is the main reason Cuba peaked so early (2006). In Argentina and Uruguay, the declining trend was interrupted in the second half of the twentieth century, and as a consequence they could be described as countries with two first dividends because dependency rates fell below 60 percent in the early 1950s but then increased again in the 1970s.

The main determinants of age structure (fertility and mortality) have already converged to about 2–2.5 children per woman and a life expectancy of 75 years in most countries. Although some variance in these indicators still exists, the wide differences shown in figure 2.1 are the consequence of events in the past. These differences are wide—from an average age of less than 28 in Guatemala, Haiti, and Nicaragua; to nearly 10 years greater in Chile, Cuba, and Uruguay; or proportions of an older population that range from 5 percent to 16 percent. However, the age structure will converge as well because countries that went through the demographic transition later will age faster to catch up with regional averages in a few decades. This rapid catch-up has significant policy implications because demographic bonuses will be shorter but more intense. Taking advantage of this opportunity is a major policy challenge for all countries, but particularly for those that are behind in the development process.

Migration has also played an important role in the region and deserves special mention. One measure of the importance of migration in a given country is the number of net migrants per 100 births. Figure 2.3 reports results for three 30-year periods: 1955–85, 1985–2015, and a forecast for 2015–45. Four countries had very high levels of net out-migrants—in excess of 10 percent of births during the

FIGURE 2.3

Net migrants per 100 births

a. The period 1955–86

b. The period 1985–2015

c. The period 2015–45
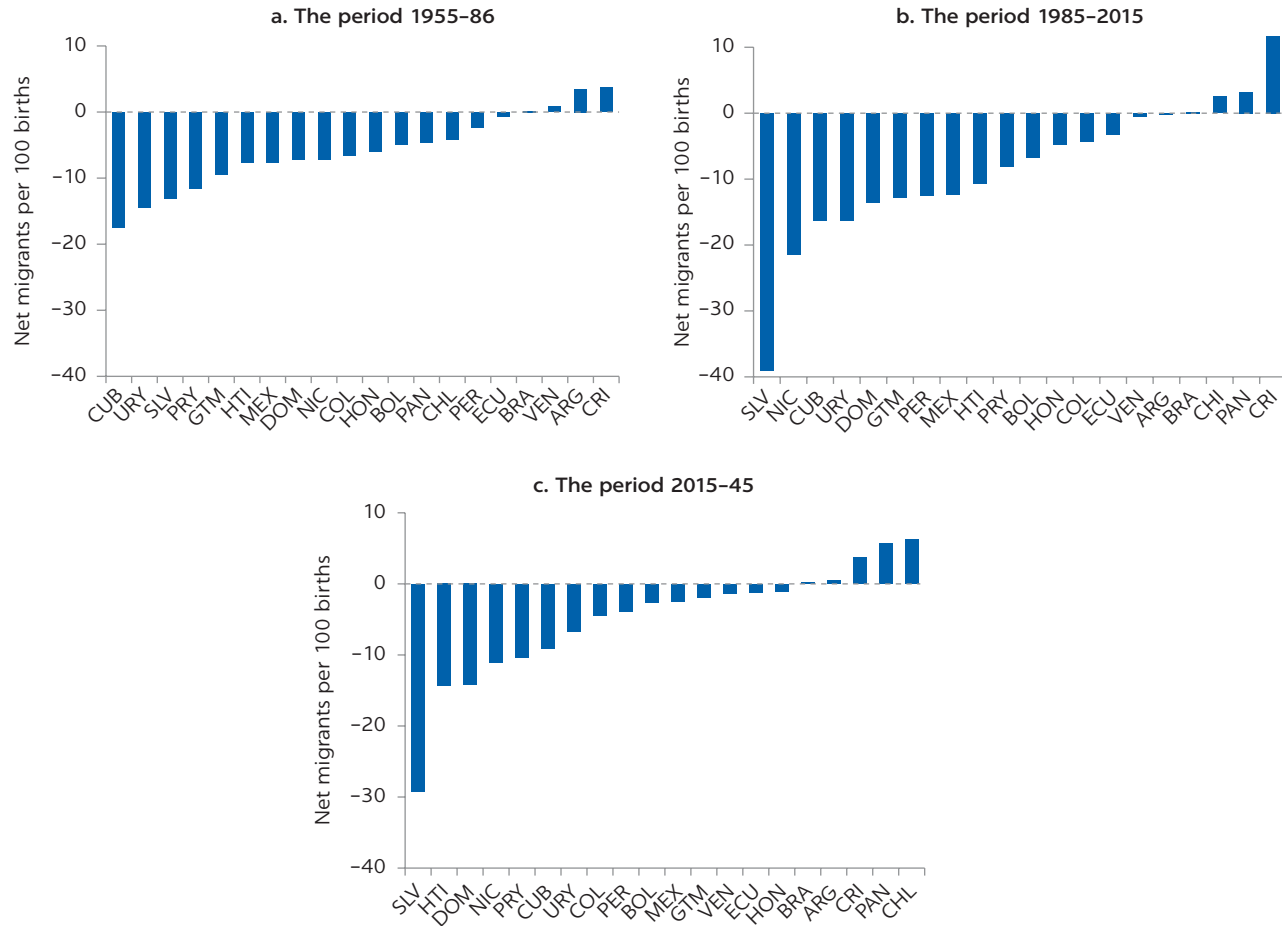
Source: World Bank calculations based on UN (2017).

period 1955–85: Cuba (17 percent), Uruguay (14 percent), El Salvador (13 percent), and Paraguay (12 percent). The number of countries with high levels of net out-migrants increased in the more recent period. During the 30-year period from 1985 to 2015, nine countries had net out-migrants in excess of 10 percent: El Salvador (an astounding 39 percent), Nicaragua (21 percent), Cuba (16 percent), Uruguay (16 percent), the Dominican Republic (14 percent), Guatemala (13 percent), Peru (13 percent), Mexico (12 percent), and Haiti (11 percent). According to United Nations projections, migration is assumed to decrease in the near future, with only five countries projected to have out-migrants in excess of 10 percent of births.

DAWN OF THE AGED ECONOMY

Perhaps the most important change in this demographic revolution is the shift in the age composition of the population. This shift has economic impacts on labor, consumer, and financial markets as well as on many other areas, such as education provision, health services (including an adjustment in epidemiological

FIGURE 2.4

Consumption and labor earnings in Latin America
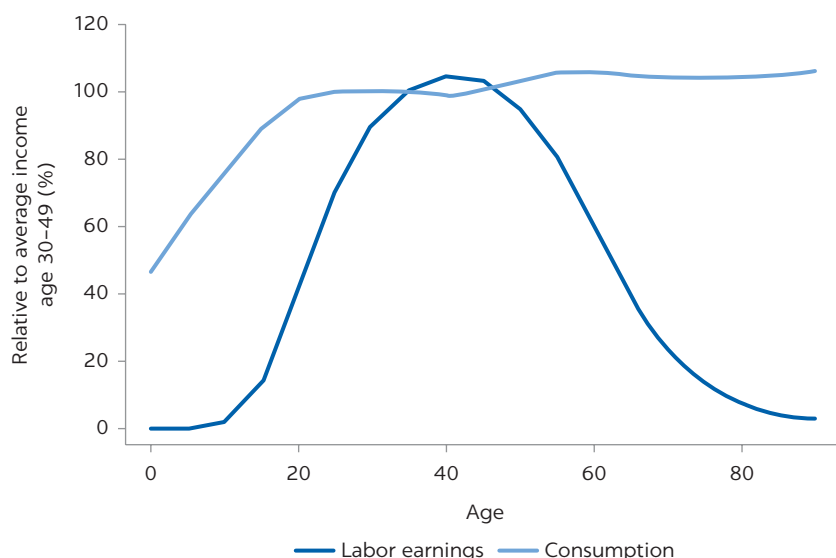
Source: National Transfer Accounts 2017 data, http://www.ntaccounts.org.

profiles), and urban design. Of course, the age pattern of economic activity—and, consequently, labor force productivity and tax collection—will also change. Changes in economic, social, and demographic behaviors are intertwined—they both shape and in turn are shaped by the environment they create. This complex evolution makes the study of demographic change and its impacts so interesting. However, this complexity needs to be acknowledged but then set aside, at least temporarily, to understand some of the underlying dynamics of these processes.

The discussion now looks at some economic implications of these changes in the population age structure. Economic activities such as consumption, labor earnings, and savings vary by age. Figure 2.4 summarizes the average age pattern of consumption and labor earnings in Latin America. As in any modern society, individuals tend to consume more than they produce in their early and late years, thus generating a "life-cycle deficit" that needs to be financed by a surplus produced by working adults and other sources, such as savings and intergenerational or international transfers.

Using a "weight-of-the-numbers" approach, the age profile of consumption for each country is held fixed and aggregate consumption by age is calculated by weighting the age profile of consumption per person by the changing population counts by age. Figure 2.5 plots the resulting pattern of aggregate consumption by youth and consumption by the elderly in Chile. In the 1950s, 1960s, and 1970s, this simple "weight-of-the-numbers" model estimates that about 40 percent of consumption expenditures in Chile were directed toward youth. From the 1980s onward, the share of consumption by youth steadily declines over time, to reach just 15 percent of total consumption. The pattern of consumption by the elderly mirrors that of youth. In the 1950s, the elderly accounted for about 10 percent of total consumption. Beginning in the 1980s, this share began to tick upward; and by the beginning of this century, it was increasing rapidly. It continues to increase, and by midcentury, the elderly will account for about one-third of all

Consumption by youth and the elderly in Chile, 1950–2100
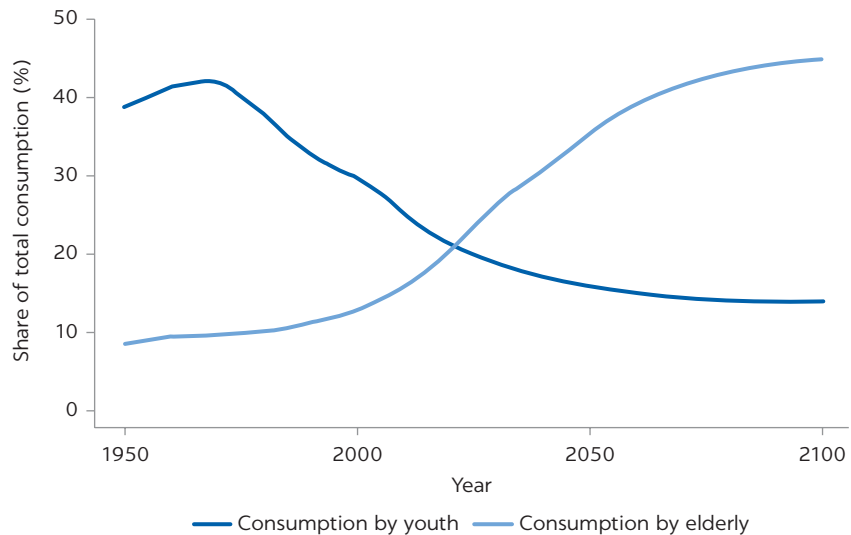
Sources: World Bank calculations based on UN (2017) and National Transfer Accounts 2017 data, http://www.ntaccounts.org.

consumption expenditures—and near the close of the century will have surpassed 45 percent of all consumption. One milestone in this transformation of consumption occurs when consumption by the elderly exceeds consumption by youth. This change point can be designated as the beginning of the Aged Economy (Miller and Saad 2017). In 2022, Chile is projected to become one of the first Aged Economies of Latin America. Within the next 30 years, most other economies in Latin America will also become Aged Economies. In fact, this is a global phenomenon—most economies around the world will become Aged Economies during this century—with the elderly claiming up to half of the resources in the economy. How will the high consumption by the elderly be supported? By large public sector tax-and-transfer programs? Through familial transfers? Extended working lives? Increased savings and use of financial markets? Since Aged Economies are a recent phenomenon, the historical evidence upon which to base the answers to these questions is limited. This is an exciting time for economic demographers interested in population aging.

Production activity also varies sharply by age. As seen in figure 2.6, labor earnings rise in the early 20s as individuals leave the education system and enter the workforce. Average earnings continue rising, in part through rising labor force participation but also because of increasing earnings per worker. In the late 50s and more pronounced in the early 60s, average earnings decline sharply, reflecting the onset of retirement from the labor market. Using the average labor earnings profile for each country based on National Transfer Accounts data (http:www.ntaccounts.org) along with changes in the population age distribution, the impact of population aging on the growth of GDP per capita can be assessed. The age profile of labor earnings is assumed to reflect the productivity of each age group, and hence, their contribution to GDP. This age distribution of the population is weighted by this age profile to yield the number of "effective workers." That is, both being in the labor market and workers' average productivity (as reflected by their earnings) are accounted for. The growth rate of

Demographic dividend and demographic tax in Cuba, 1955–2075
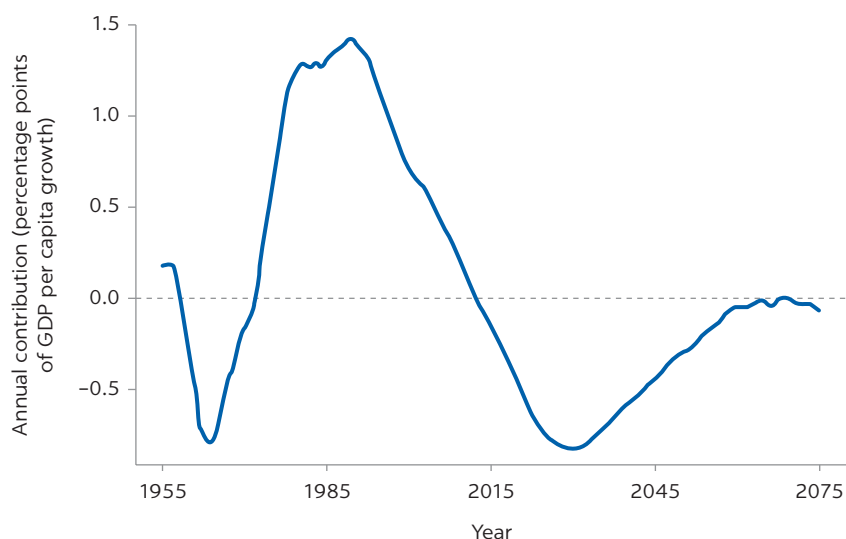
effective workers relative to the growth rate of the total population measures the impact of the changing age distribution on GDP per capita growth.[1] When the working-age population (or, more precisely, the number of "effective workers") grows more rapidly than the total population, GDP per capita rises, all else remaining equal. Conversely, when the total population grows more rapidly than the working-age population, GDP per capita falls, all else remaining equal.

The change in the fertility pattern (that marked the onset of the demographic transition) produces a "population wave" that slowly moves though the age structure. As the generation born at the peak of birth rates ages, a wave-like effect will have an impact on the structure, defining three periods of varying economic impact. In the initial period, the total population grows faster than the working-age population because of the surge in the youth population relative to the total population. During this period, the changing population age structure impedes economic growth. This is followed by a period dubbed the "demographic dividend," in which the changing population age structure accelerates economic growth. There is a surge in the working-age population relative to the total population. The difference between the rate of growth in the number of "effective workers" and the total population is a measure of the annual contribution to growth in GDP per capita. In the final period, the total population once again grows more rapidly than the working-age population because of a surge in the elderly population relative to the total population. As in the previous stages, this period, too, is temporary.[2] These two periods surrounding the demographic dividend might be referred to as the "demographic tax."

Figure 2.6 shows the results for Cuba from 1955 to 2075. The demographic tax period lasted 14 years, beginning in 1969 and ending in 1972. During this time, the growth of the youth population relative to the total population reduced annual GDP per capita growth by an average of 0.4 percentage point, or a total reduction of 6 percent, over the 14-year period. This was followed by the demographic dividend period in Cuba, when the working-age population grew more rapidly than

the total population. This period lasted 40 years, beginning in 1973 and ending in 2012. During this 40-year period the demographic dividend contributed on average 0.9 percentage point to annual growth of GDP per capita, or a total increase of GDP per capita of 42 percent over the 40-year period. Finally, as population aging increases the elderly population relative to the total population, the demographic tax period will result in a drag on GDP per capita growth. This period began in 2013, and by 2057 the annual impact will have fallen to less than 0.1 percentage point and will continue at this low level indefinitely as the elderly population continues to grow ever so slightly more rapidly than the general population because of continual declines in mortality. During this 45-year period of the second demographic tax, the growth of the elderly population relative to the total population will reduce annual GDP per capita growth by an average of 0.5 percentage point, for a total reduction of 20 percent in GDP per capita between 2013 and 2057.

Looking at countries across the region for the 30-year period from 1955 to 1985 (figure 2.7), only Cuba had a substantial demographic dividend during the period, with its changing age structure adding more than half a percentage point annually to the growth of GDP per capita. The demographic tax is evident

FIGURE 2.7

Average annual increase in GDP per capita caused by changing age structure

a. The period 1955–86

b. The period 1985–2015

c. The period 2015–45
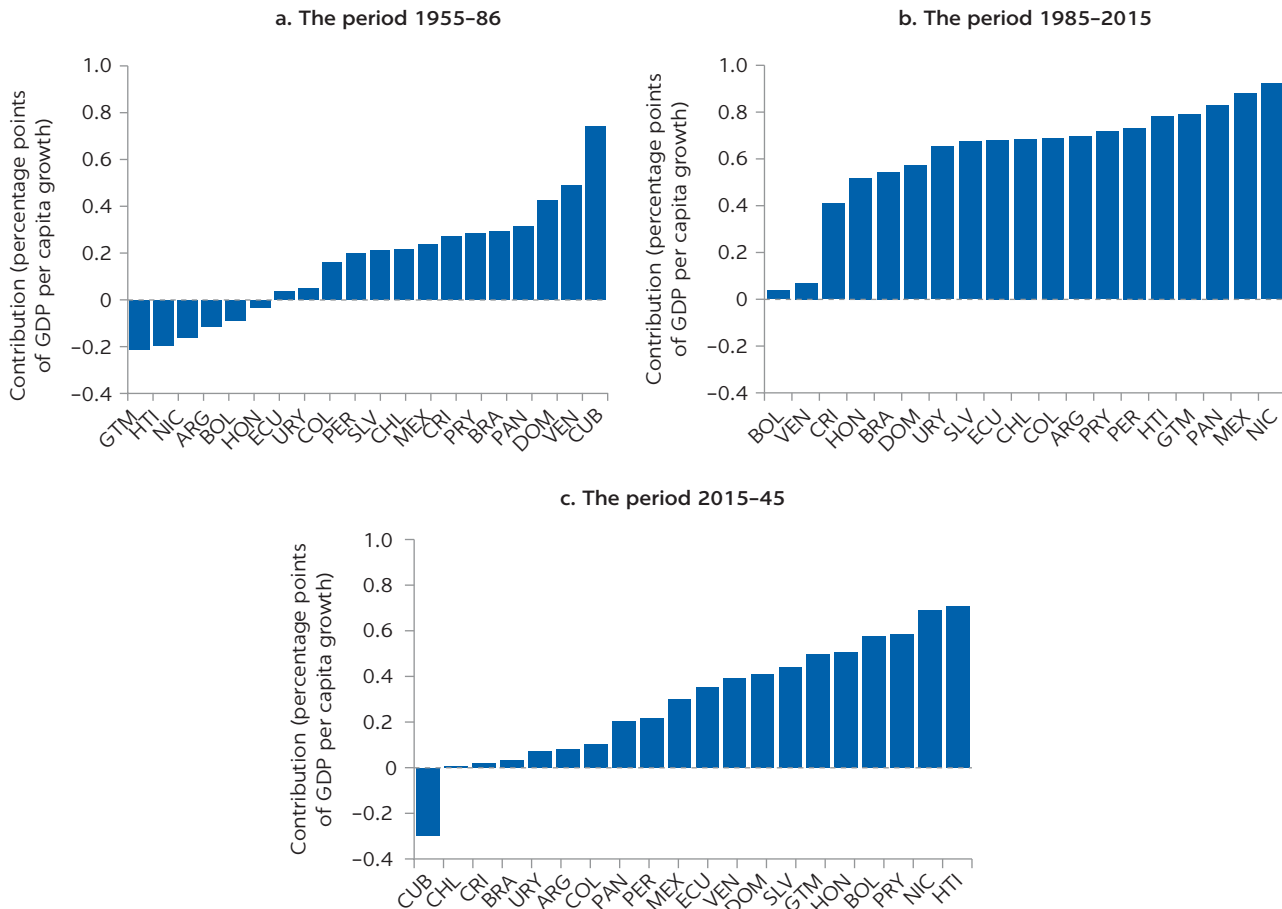
Sources: World Bank calculations based on its World Development Indicators, UN (2017), and National Transfer Accounts 2017 data, http://www.ntaccounts.org.
Note: GDP = gross domestic product.

in 6 countries, with changing age structures reducing GDP per capita: Guatemala, Haiti, Nicaragua, Argentina, Bolivia, and Honduras. During the past 30 years, the demographic dividend has been in full force in the region in virtually every country, contributing to GDP per capita growth by more than half a percentage point annually. During 30-year period from 2015 to 2045, the contribution of the demographic dividend to economic growth will fall sharply in the region. Only five countries are expected to show substantial impacts of more than 0.5 percentage point per year: Haiti, Nicaragua, Paraguay, Bolivia, and Honduras.

The impacts of the changing age distribution on the economy are transitory because the rapid changes in age distribution are transitory. The impacts are caused by the population waves moving through the age structure of the population. Once the waves subside, so will the economic impacts. Although these population impacts are transitory, other demographic impacts are permanent. When populations are dominated by youth, meeting the challenges of investing in education are difficult. This financial burden is substantially eased when, in the course of population aging, the ratio of youth to the working-age population changes from 113 youth to support per 100 working-age adults in 1955 to just 41 youth per 100 working-age adults in 2045. Conversely, the financial challenges for tax-and-transfer mechanisms to support the elderly increase in the course of population aging as the ratio of elderly to the working-age population changes from 8 elderly persons per 100 working-age adults in 1955 to 30 elderly per 100 working-age adults in 2045. The effects of these demographic changes on publicly financed education, health care, long-term care, and pensions are discussed in depth in later chapters.

DEMOGRAPHIC DESTINY

This chapter provides an overview of the demographic revolution unfolding in Latin America, examining both the historical period of the past 60 years and a forecast of the near future through 2045. With what certainty will the predictions of this forecast come to pass? Population aging is quite certain—the great transformation of societies from youth dominated to elderly dominated is inevitable. The magnitude and timing of this transformation are less certain. But there is no doubt that the elderly will become the largest demographic group in all societies throughout the world during this century.

Population aging is inevitable for two reasons. First, much of the forecast change over the next 30 years or more has already been "built in" to the system. The population waves set in motion during the previous 60 years will continue to move through the age structure, even with no further changes in fertility and mortality. The second reason that population aging is inevitable is that fertility and mortality are likely to continue to decline in the region. What is less certain is the speed of this decline and to what levels these rates will eventually fall. Once fertility begins to decline, the process of continued decline appears to be largely irreversible. Some important exceptions where the fertility decline process has stalled have occurred, mainly in Sub-Saharan Africa (Bongaarts 2008). One example in the Latin American region is Argentina, whose fertility stalled at about 3 lifetime births per woman from the 1950s until the 1990s, when the decline resumed. Current rates are about 2.35 births and falling. Similarly, once mortality rates begin to decline, the process of continuous decline appears to be largely irreversible. In the case of mortality, there are often periods of slowdown

in rates of mortality decline or even of increases in mortality rates for specific age groups in specific countries driven by public health challenges. Examples of these challenges include the AIDS epidemic, smoking, alcoholism, and opioid use. Although there are periods of slowdown in mortality decline, the long-run trend is clearly one of continual progress. Based on the historical record of confronting and overcoming public health challenges, we can be reasonably confident that the future will also be characterized by a strong downward trend in mortality rates—punctuated by periods of slowdown.

Owing to the inevitability of population aging in the region, the main findings of this chapter are reasonably certain:

- Most Latin American countries will reach the demographic conditions of current-day Organisation for Economic Co-operation and Development countries within a generation, by 2045.
- During the next 30 years, the main demographic challenge faced by most Latin American countries will be population aging.
- In most countries, the era of the Youth Society, in which youth were the largest demographic group, will end. In most countries, the era of the Aged Economy will begin, in which for the first time in history, consumption by the elderly will be larger than consumption by children. How countries adapt to this new demographic and economic reality should be a topic of concern for policy makers in the region.

NOTES

1. This analysis assumes a production function for national output such that GDP per capita = $k_t \times$ wage bill/population; where k_t reflects the impact of nonlabor factors such as capital and technology on output in year t. If it is assumed that the age pattern of production maintains its shape over time and rises at the rate of labor productivity, then GDP per capita = $k_t \times z_t \times \Sigma (p_{x,t} \times y_x) / \Sigma p_{x,t}$; where $p_{x,t}$ is the population at age x in year t, taken from UN population estimates; and y_x is the age shape of labor earnings taken from National Transfer Accounts data. Hence, the contribution of the changing age distribution to changing GDP per capita is the difference between the growth rate of the "effective worker population," $\Sigma (p_{x,t} \times y_x)$, and the growth rate of the population, $\Sigma p_{x,t}$.
2. The major impacts on economic growth are temporary, reflecting the rapid growth of the elderly population relative to the total population. The final period continues indefinitely as the elderly population continues to grow slightly more rapidly than the general population because of a continued decline in mortality.

REFERENCES

Bongaarts, John. 2008. "Fertility Transitions in Developing Countries: Progress or Stagnation?" *Studies in Family Planning* 39 (2): 105–10.

Miller, Tim, and Paulo Saad. 2017. "On the Rise and Global Dominance of Aged Economies." Unpublished manuscript, United Nations and Economic Commission for Latin America and the Caribbean.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

3 The Role of Demography and Policy in Shaping Future Public Spending

THE INTERGENERATIONAL STATE

As discussed in chapter 1, demographic changes have direct fiscal and economic impacts. As the population ages, demand for services such as pensions, education, health, and long-term care evolves, creating new pressures that need to be addressed through policy reforms.

The twentieth century witnessed the expansion and transformation of the role of government in advanced industrial economies. Government spending as a share of GDP increased more than fourfold, rising from about 10 percent at the beginning of the century to about 45 percent at its close.[1] Social spending became government's primary function. At the start of the century, education, pensions, health care, and other social programs accounted for only about 10 percent of government spending. By its end, social spending accounted for more than half of public expenditures. This spending and the taxation that supported it transferred large amounts of resources across generations: taxes targeted mainly at working-age adults were used to fund social spending targeted mainly at children and the elderly. The "rise of the intergenerational state" (Miller 2011) aptly describes this changing role of the state in advanced industrial economies. It is likely that, in Latin America, the twenty-first century will see the rise of the intergenerational state, which will bring new fiscal challenges. This shift will be driven in part by the relentless forces of population aging in the region resulting from the spread of the modern demographic life cycle: fewer children and longer lives. Social spending policies, both present and future, will also accompany this change as economies in the region become wealthier and populations older.

Population aging—the shift from a youthful to an elderly population—will reshape the demographic landscape of Latin America. Although this transformation is inevitable, its timing and pace will vary between countries. The impact of this dramatic change on the demographic landscape will depend to a large extent on the generosity of public benefits and the public policies that define them. What will social spending look like in an older and wealthier Latin America? One reasonable assumption is that school enrollment rates will

increase, health system coverage will expand, and greater proportions of the elderly will receive pensions. But will these benefits be provided by the public sector or by the private sector? And at what levels? To answer these questions, this chapter looks to the current-day Organisation for Economic Co-operation and Development (OECD) countries. The older and wealthier Latin America of 2045 will achieve levels of per capita GDP approaching those of today's OECD countries, and the region's demography will also increasingly resemble that of today's OECD. Although how political and social preferences will evolve in coming decades cannot be predicted, using current OECD levels of generosity in public benefits is a useful benchmark for simulating possible trends in this matter. But the OECD itself is by no means uniform in its response to these challenges: public benefits in education, pension, and health care vary from country to country, as does the role of state intervention in providing those services. Latin American countries are likely to be just as diverse in how they meet these challenges. Public social spending in Latin America in 2045 on education, pensions, and health care will be the product of both changes in generosity of public benefits and in demography, and forecasting this trend requires a discussion of both dimensions.

Rather than provide a detailed analysis, this chapter paints the future with broad strokes. It applies a common framework to all sectors (education, pensions, and health care) in all countries to facilitate comparison of changes across sectors and countries and over time. The analysis presents the broad trends in demography and policy that will shape the future of public social spending in Latin America, but it is no substitute for careful, country-specific forecasts. It is, rather, a useful complement to them. The analysis is presented for the three main social sectors separately (education, pensions, and health and long-term care). Each section begins with an analysis of the current situation in Latin American and OECD countries, and the roles of demography and policy in shaping current social spending. The chapter then looks to the medium term: Latin America in 2045. The demographic future of Latin America is viewed through the lens of the intergenerational state by focusing on the recipients of public transfers: the school-age population, the pension-age population, and, in the case of heath care and long-term care, mainly the elderly population.

Figure 3.1 shows public social spending as a share of GDP relative to GDP per capita for 18 Latin American countries in 2015. Spending ranges from a high of 21.6 percent of GDP in Argentina to a low of 5.4 percent in the Dominican Republic. Median spending was 12.2 percent of GDP, with half of the countries spending between 10.5 percent and 15 percent. Joining Argentina in the top quartile of high-social-spending countries were Brazil (20.9 percent), Uruguay (18.3 percent), and Costa Rica (16.0 percent). Joining the Dominican Republic in the bottom quartile of social spending were Guatemala (5.5 percent), El Salvador (9.1 percent), and Peru (9.5 percent). In general, wealthier countries allocate a greater share of GDP to social spending. But variation in GDP only explains 17 percent of the total variation in social spending.

Figure 3.2 shows the composition of public social spending in Latin America in 2015. Pension spending is a major driver of the high rate of social spending in Argentina (11.4 percent of GDP), Brazil (11.1 percent), and Uruguay (7.6 percent). These countries are well above the median level of spending in the region (3.2 percent). In Costa Rica, social spending is high because of above-average

FIGURE 3.1

Public social spending in Latin America, 2015
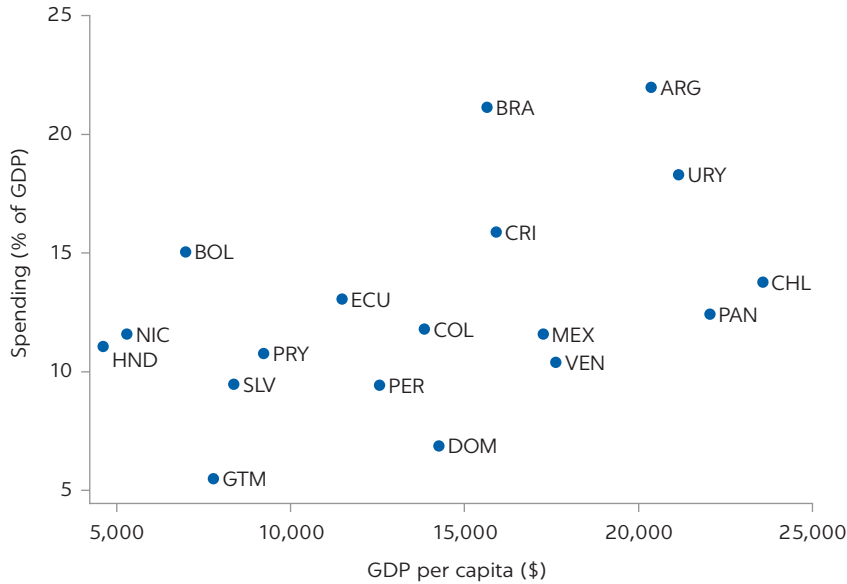
Sources: World Bank based on GDP per capita from its World Development Indicators, education data from the UNESCO (United Nations Educational, Scientific and Cultural Organization) Institute for Statistics Data Centre, pension spending data for Latin American countries from country budgetary execution data, and health data from the WHO (World Health Organization) Statistical Information System.
Note: GDP = gross domestic product; $ = constant 2011 international dollar.

FIGURE 3.2

Public spending on education, health care, and pensions as a percentage of GDP in Latin America, 2015
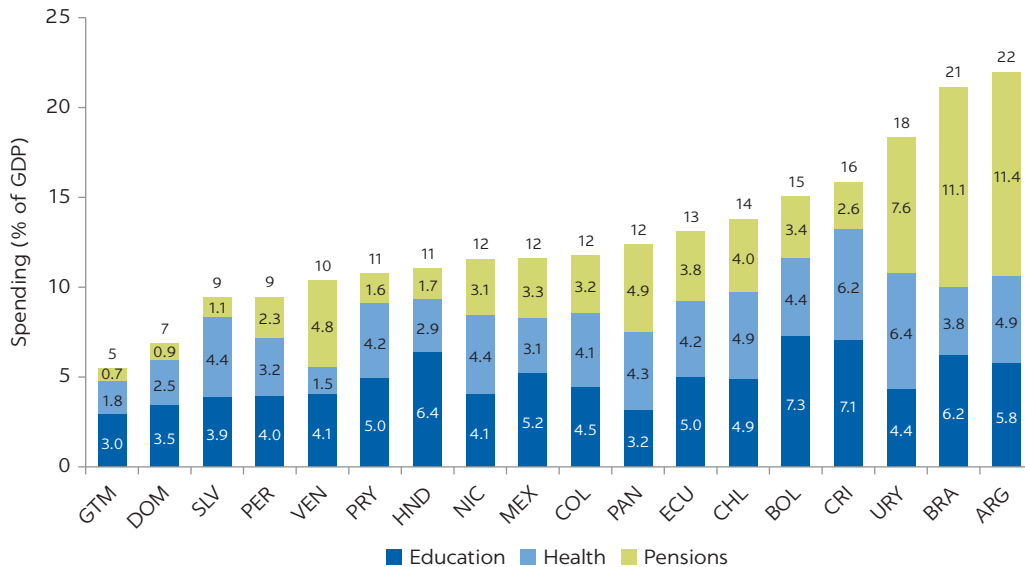
Sources: World Bank based on GDP per capita from its World Development Indicators, education data from the UNESCO (United Nations Educational, Scientific and Cultural Organization) Institute for Statistics Data Centre, pension spending data for Latin American countries from country budgetary execution data, and health data from the WHO (World Health Organization) Statistical Information System.
Note: GDP = gross domestic product.

spending on both health care (6.2 percent vs. the median of 4.2 percent) and education (7.1 percent vs. the median of 4.9 percent).

Chile and Bolivia provide an interesting contrast. Chile's per capita GDP ($23,600 in 2015) is more than triple Bolivia's ($7,000). Their public social spending levels as a percentage of GDP are similar, with Chile at 13.8 percent and Bolivia at 15.0 percent (both are above-average levels). In Chile, social spending is high because of above-average spending on health care (4.9 percent) and pensions (4.0 percent), while in Bolivia social spending is above average because of spending on education (7.3 percent).

This chapter focuses on public spending in Latin America using OECD nations as a comparison group. Figure 3.3 compares public spending on education, pensions, and health care as a percentage of GDP and per capita GDP for 18 Latin America countries and 30 OECD countries. Two Latin American countries were excluded from the analysis for lack of complete data on public spending: Cuba (lacking pension data) and Haiti (lacking education data). Of the 35 OECD member countries as of 2015, 5 were excluded from the analysis as outliers based on GDP per capita: one high-income country (Luxembourg) and four lower-income countries (Chile, Latvia, Mexico, and Turkey). Note that although Chile and Mexico are excluded from the OECD analysis, they are included in the analysis of Latin America.

OECD countries are wealthier, and their economies allocate a higher share of GDP to social spending, than do their Latin American counterparts. Median social spending in OECD countries was 21 percent of GDP in 2015, whereas for Latin American nations the median was 13 percent. Both groups exhibit considerable diversity in social spending, with half of OECD countries falling in the range of 17 percent to 25 percent of GDP for social spending and half of Latin American countries falling in the range of 10 percent to 15 percent. Not only do OECD countries allocate a greater portion of their economic resources to social spending, they are also wealthier. Per capita income in France is the same as the median for OECD countries ($42,000), and per capita income in Colombia is the same as the median for Latin American countries ($14,000 per capita). Per capita

FIGURE 3.3

Public spending on education, pensions, and health care in Latin America and OECD countries, 2015 and 2045
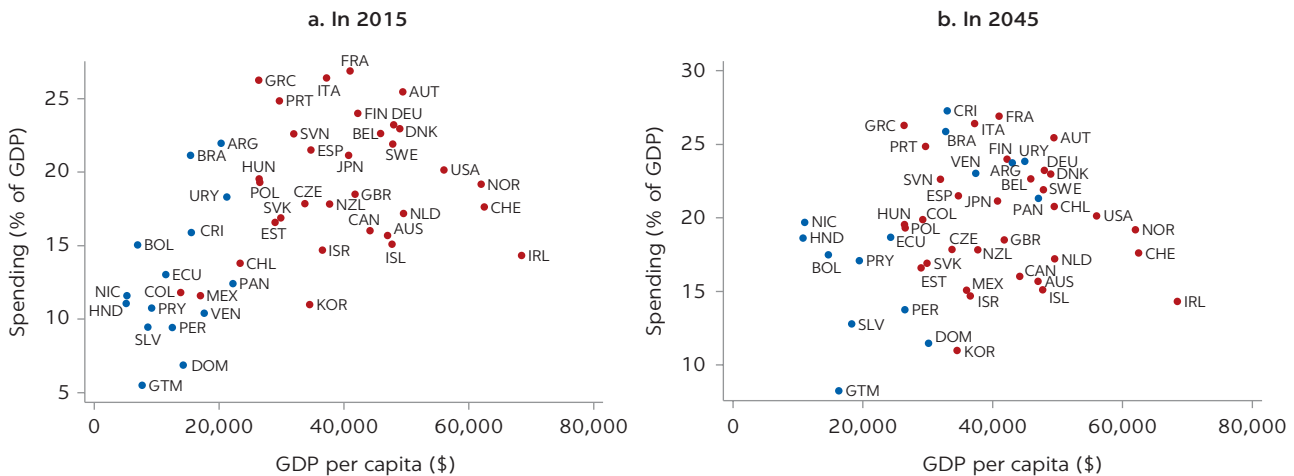
Sources: World Bank based on GDP per capita from its World Development Indicators, education data from the UNESCO (United Nations Educational, Scientific and Cultural Organization) Institute for Statistics Data Centre, pension spending data for Latin American countries from country budgetary execution data, and health data from the WHO (World Health Organization) Statistical Information System.

Note: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development; $ = constant 2011 international dollar.

income is twice as variable in Latin America as in the OECD. Half of Latin American countries fall within plus or minus 32 percent of the median, whereas in OECD countries half fall within plus or minus 17 percent of the median. Incomes in Latin America vary from a low of $5,000 in Honduras to a high of $23,000 in Chile; incomes in OECD nations vary from a low of $26,000 in Greece to a high of $69,000 in Ireland.

PUBLIC SPENDING ON EDUCATION, PENSIONS, AND HEALTH CARE

Public spending on education, pensions, and health care as a share of GDP can be broken down into a policy component and a demographic component. The impact of demography on public spending is measured by a single variable: the demographic dependency ratio (DDR). The DDR measures the size of the beneficiary population (that is, the "at-risk" population) relative to the working-age population. For example, the DDR for public education is defined as the ratio of the student-age population to the working-age population. For convenience, these are expressed per 100 working-age persons. For example, a DDR of 30 for public education means there are 30 school-age persons for every 100 working-age persons.

Policy impact is measured by the benefit generosity ratio (BGR). The BGR reflects the combined impact of two policy dimensions: coverage rates and benefits per participant. The BGR measures the relative cost of the public benefit per person at risk. "Generosity" is a relative concept; it is measured by comparing the size of benefits to the average productivity of the workers in the economy. For example, the BGR for public education is the level of public spending on education divided by the school-age population expressed as a proportion of the average productivity of the working-age population (GDP/working-age population). A BGR of 10 percent in education, then, indicates that annual public spending per person of student age is 10 percent of GDP per working-age adult.

Aggregate public spending is the product of two factors: the BGR representing policy impacts and the DDR representing demographic impacts, as shown in the following equation:

$$\frac{S}{GDP} = BGR \times DDR$$

$$\frac{S}{GDP} = \frac{\frac{S}{B}}{\frac{GDP}{W}} \times \frac{B}{W}$$

in which

S = aggregate spending on public education, pensions, or health care

GDP = gross domestic product

B = population "at risk" of receiving a benefit (that is, student-age population, pension-age population, or population likely to need health care)

W = working-age population (defined in this analysis as the population age 20–64).

Aggregate public spending on each of these three sectors as a share of GDP and the DDRs are known quantities. Hence, the BGR can be calculated as a residual. The DDRs are defined using specific age groups for receipt of benefits: for education, age 6–22; for pensions, age 65 and older; for nonelderly health care, age 0–64; for elderly health care, age 65 and older; and for long-term care, age 85 and older. Neither alternative specifications for these age groups nor for the working-age population (20–64) materially affects the results of the analysis.

Providing plausible forecasts of future spending requires venturing opinions about both future demography and future policy. The demographic future of Latin America for the next several decades is well defined: the older populations and the working-age populations of 2045 are already born. The proportion of youth in the population will decline sharply in all countries, reflecting the long-term consequences of slowing population growth. How fast and how far the youth population will decline are uncertain. But demography is only part of the story. What about future policies? The main assumption behind the baseline forecast is that, as Latin American countries become wealthier, the generosity of their public sector benefits will come to resemble those of OECD nations. This analysis observes the cross-sectional relationship in the 48 countries regarding GDP per capita and the BGR and uses that relationship as the basis for the forecast. Implicit in this method is the assumption that, in the coming decades, the public sector in Latin America will come to resemble the public sector in OECD countries. That means that the important role of the public sector in promoting equality, universal coverage, and access to health care, education, and old-age support in OECD countries will be adopted in Latin America. But that equality and universality have been achieved by OECD countries using an array of means because of different social choices about the relative roles of the public and private sectors in funding education, health care, and pensions. It would be expected that countries in Latin America would also pursue a variety of approaches, with different mixes of public and private funding. The case of pensions provides an indication of the likely direction of this social choice. A defined contribution plan suggests an inclination for lower public sector involvement than a defined benefit plan. For health care and education, these tendencies are assumed to be revealed by the relationship between GDP per capita and public benefits. Those Latin American countries with above-average public benefits given their level of GDP per capita are assumed to more closely resemble OECD countries with high levels of public benefits. Conversely, those Latin American countries with below-average public benefits given their level of GDP per capita are assumed to more closely resemble OECD countries with lower levels of public benefits. In all Latin America countries, though, the levels of average public benefits in the areas of education and health care for the elderly are projected to increase, reflecting the greater role of the public sector in their provision among OECD countries.

PUBLIC SPENDING ON EDUCATION

The proportion of youth in the population will decline sharply in all countries in Latin America and the Caribbean because of a long-term drop in population growth. The declining school-age population has a favorable fiscal impact in relation to public funding of education. Figure 3.4 shows trajectories for

FIGURE 3.4
Demographic child dependency ratio
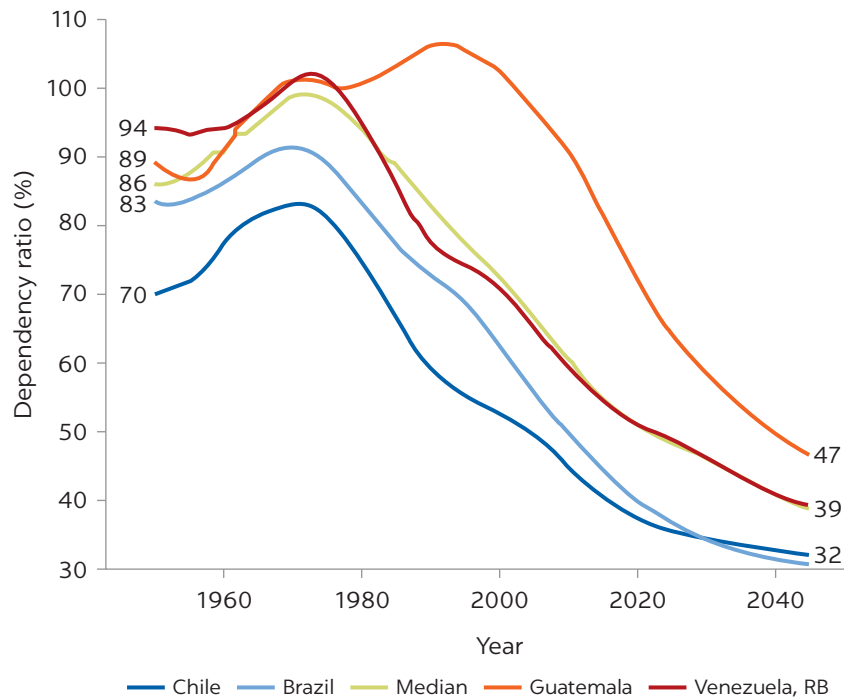
Source: World Bank calculations based on population data from UN (2017).
Note: The dependency ratio is defined as the school-age population (age 6 to 22) per 100 working-age persons (age 20 to 64).

demographic dependency in Chile, Brazil, Guatemala, and the República Bolivariana de Venezuela. By 2015, both Chile and Brazil had already experienced large declines in dependency ratios, with the burden cut in half in both countries. In the coming decades, both will show more modest declines of a third or less. By contrast, Guatemala, where low fertility set in later, has yet to experience a significant decline in the dependency ratio, but is projected to do so over the course of the next 30 years. The dependency rate will fall from 81 school-age youths per 100 working-age adults to 47 by 2045. The República Bolivariana de Venezuela's path, also shown in figure 3.5, closely resembles the median for the region. The dependency rate peaked in the early 1970s and then began a steady decline. A smaller, but still significant, decline in dependency (about 30 percent) is forecasted for the period 2015–45.

Figure 3.5 breaks down public spending on education into policy and demographic components. Panel a presents historical data for 2015, and panel b presents an illustrative forecast for 2045. The DDR in education, shown on the horizontal axis, is defined as the school-age population (age 6–22) divided by the working-age population. In 2015, the demographic challenge of educating youth was twice as great in Latin American countries as it was in OECD nations. The median DDR in Latin America was 55 school-age youths per 100 working-age adults, whereas in OECD nations that number stood at just 30. The vertical axis represents policy choices and economic conditions on coverage and benefit levels as reflected in the BGR. In 2015, Latin American

Demographic and policy contributions to public spending on education in Latin America, 2015 and 2045
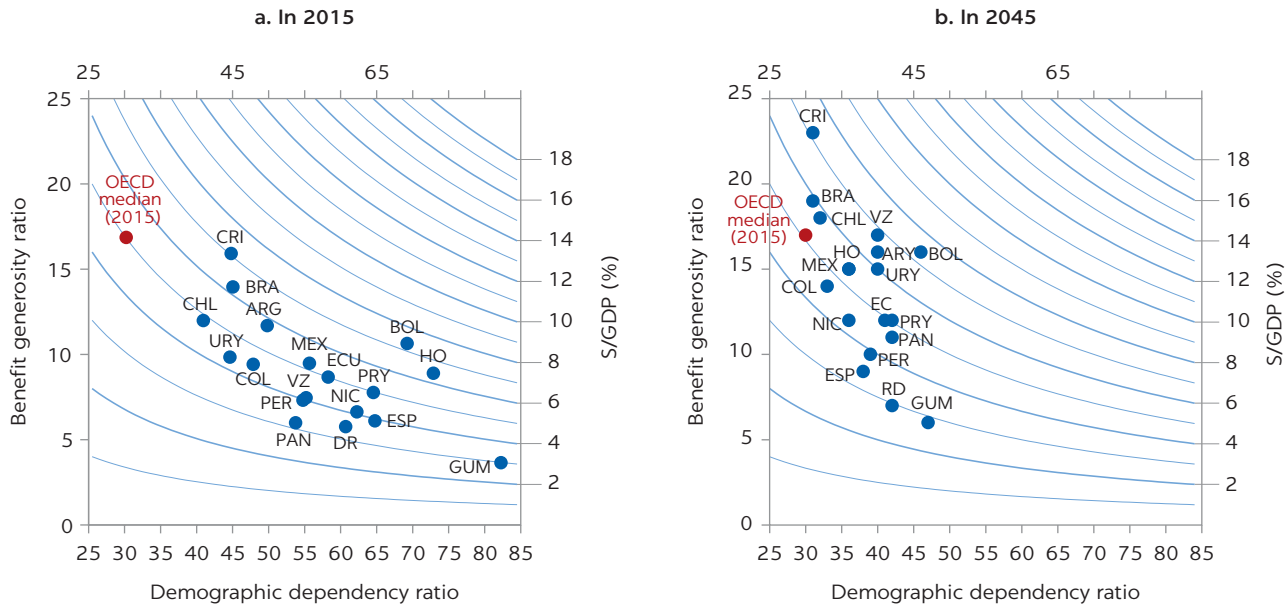
Sources: World Bank calculations and forecasts based on education spending data from the UNESCO (United Nations Educational, Scientific and Cultural Organization) Institute for Statistics Data Centre and population data from UN (2017).
Note: The x-axis shows the school-age population (age 6–22) per 100 working-age persons (age 20–64). The left y-axis shows education spending per school-age person as a percentage of GDP per working-age adult. The lines show isoquants of public education spending as a share of GDP. For reference, OECD countries in 2015 are shown in red in both panels. OECD = Organisation for Economic Co-operation and Development; S/GDP = spending on education/gross domestic product.

countries lagged far behind OECD nations in education investment on youth. Public spending per school-age youth in Latin America was about half the level as in OECD nations, reflecting both lower rates of school enrollment and less spending per enrolled student. The median BGR—that is, annual public education spending per youth as a percentage of GDP per working-age adult—was 9 in Latin America. In OECD countries, the ratio is about 17, or almost double that for Latin America.

Aggregate public spending on education is represented by the isoquant lines. All the possible demographic and policy combinations that could yield the same level of aggregate spending are considered. For example, in 2015 both Paraguay and Germany allocated about 5 percent of their GDP to public spending on education. The outcomes, though, were vastly different. Paraguay has a youthful population: there were about 64 school-age youths per 100 working-age persons. That means that, despite its percentage of GDP, the generosity level of public education is quite low, with just 7.8 percent of GDP per working-age adult allocated to each youth. In Germany, there are only about 27 school-age youths per 100 working-age persons, less than half as many as in Paraguay. This means that Germany can invest heavily in its youth's education, more than double Paraguay's level at 18.5 percent of GDP per working-age adult. In 2015, though governments in Latin America were making efforts equivalent in magnitude to those of OECD governments, that is, allocating on average 5 percent of GDP to public spending on education, the demographic differences between the countries meant vastly different outcomes for students.

Given the results presented in figure 3.5, it is possible to suggest that as the school-age population decreases, in relative terms, there is a chance to increase the investment per student without having to move to a higher isoquant curve. In other words, a reduction in the child dependency rate frees up resources to increase investment per student without increasing total sectoral spending.

PUBLIC SPENDING ON PENSIONS

Growing elderly populations have a decidedly unfavorable impact on the funding of pensions. Figure 3.6 shows some sample paths for four Latin American countries as well as the median for the region. The median ratio of elderly to working-age persons is projected to more than double by 2045, rising from 12 elderly persons per 100 working-age adults to 23. If pension generosity stays at current levels, the share of GDP allocated to funding public pensions will double. Because of rapid declines in fertility, some countries are subject to particularly intense demographic pressures on their pension systems: Chile shows the largest absolute increase, with the number of elderly persons per working-age adults rising from 17 per 100 in 2015 to 39 in 2045; Colombia shows the largest relative increase (2.7-fold, climbing from a ratio of 12 elderly persons per 100 working-age adults in 2015 to 32 by 2045). The increases in other countries are more modest, but still large. Uruguay, for instance, has already gone through the

FIGURE 3.6

Demographic old-age dependency ratio
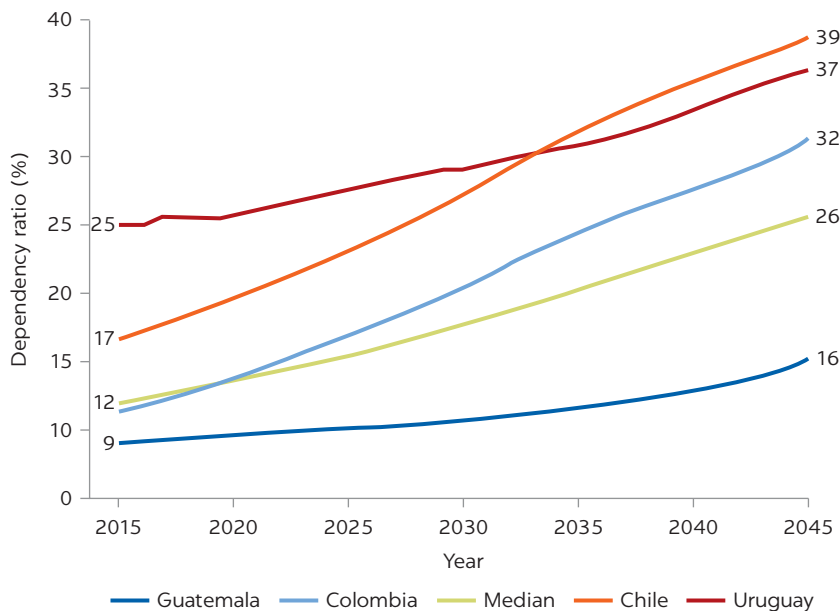
Source: World Bank calculations based on population data from UN (2017).
Note: The dependency ratio is defined as the elderly population (age 65 and older) per 100 working-age persons (age 20–64).

transition to an aged country, and Guatemala will not begin rapid population aging until the second part of the century.

Figure 3.7 breaks down public spending on pensions into policy and demographic components for Latin America's 18 countries (see box 3.1). The horizontal axis shows the DDR in pensions defined as the pension-age population (age 65 and older) divided by the working-age population. In 2015, the demographic challenge faced by OECD nations regarding pension funding was more than twice as onerous as the challenge faced by Latin American countries. The median DDR in Latin America was just 12 pension-age adults per 100 working-age adults, whereas in OECD nations that figure stood at 30.

The vertical axis represents policy choices and economic conditions on coverage and benefits per retiree as reflected in the BGR. Whereas Latin America lagged far behind OECD countries in the generosity of education benefits, pension benefits in Latin America are (on average) roughly as generous as they are in OECD countries. In fact, the median BGR for pensions in Latin America in 2015 was about 27 percent of GDP per working-age adult, or slightly higher than the median level for OECD nations, which stood at about 26 percent. However, these averages mask considerable diversity in benefit generosity within both Latin America and the OECD. In Latin America, El Salvador had the lowest BGR (just 7 percent); Brazil had the highest (85 percent). Diversity was also great among OECD nations, with a BGR of just 9 percent in Iceland and of 53 percent in Greece, the highest level of all OECD nations.

FIGURE 3.7

Demographic and policy contributions to public spending on pensions in Latin America, 2015 and 2045
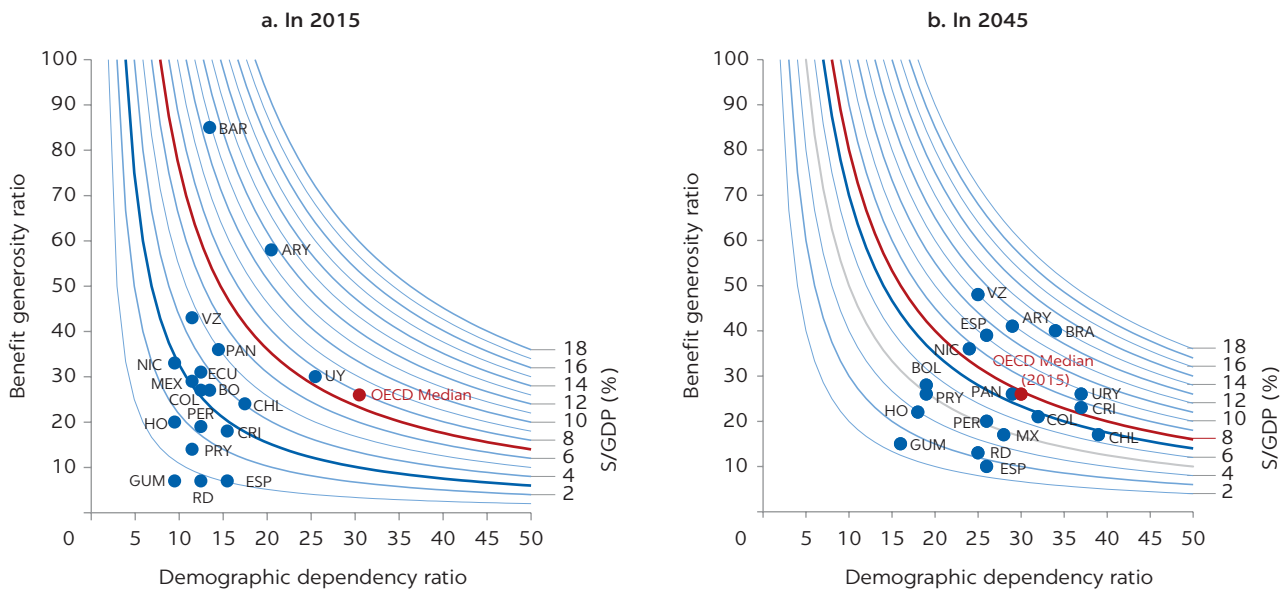
Sources: World Bank calculations and forecasts based on pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017), and population data from UN (2017).
Note: The x-axis shows the elderly population (age 65 and older) per 100 working-age persons (age 20–64). The left y-axis shows pension spending per elderly person as a percentage of GDP per working-age adult. The lines show isoquants of pension spending as a share of GDP. In 2015, median pension spending among OECD countries was 8 percent of GDP. In Latin America, median pension spending was 3 percent of GDP in 2015 (blue isoquant, panel a); it is projected to rise to a median of 7 percent of GDP by 2045 (blue isoquant, panel b). For reference, OECD median in 2015 is shown in red in both panels. OECD = Organisation for Economic Co-operation and Development; S/GDP = spending on pensions/gross domestic product.

BOX 3.1

Forecasting pensions

As with public education forecasts, the assumption for future pension generosity is that as Latin American countries become wealthier and reach levels of GDP per capita comparable to current-day Organisation for Economic Co-operation and Development (OECD) countries, their pension policies will come to be as generous, or close to as generous, as those of current-day OECD nations. But unlike the cases of education and health care, the historical data for 2015 show no relationship between GDP per capita and benefit generosity ratios (BGRs) for pensions. This is partly because of the variation in the types of public pension plans adopted in each country (defined contribution, defined benefit, mixed, and parallel systems) and partly because of large variation in the generosity of benefits associated with variations in gross replacement rates among defined-benefit plans.

The method for forecasting the BGR for pensions is to identify different target levels based on the four different pension plan types. For defined-contribution, mixed, and parallel systems, a single target level is chosen based on the OECD experience. There is little variation between the levels of generosity in those three systems. For defined benefit systems, the target level is based on the gross replacement rate of the defined benefit pension system currently in effect in Latin American and Caribbean countries and the relationship observed among OECD countries between the gross replacement rate and BGRs. Once an appropriate target is defined based on plan type (defined benefit, defined contribution, mixed, or parallel) or gross replacement rate (in the case of defined-benefit plans), the Latin American country is assumed to move toward its pension target level as its GDP per capita grows; that is, once the country reaches the median GDP per capita among OECD nations ($42,000), it is assumed to have reached its OECD pension target for benefit generosity. If the country's current benefit generosity is greater than its eventual target, it is assumed to reach the lower target level within 30 years, independent of growth in GDP per capita.

The role of demography in shaping aggregate pension expenditures in 2015 is evident. Argentina, at 58 percent, has a BGR similar to that of Greece, at 53 percent. Because it has a more youthful population than Greece, Argentina can fund its pension program at 11 percent of its GDP while Greece must allocate 17 percent. Similarly, the República Bolivariana de Venezuela, at 43 percent, has a benefit generosity level identical to Italy's (43 percent). Because of its more youthful population, the República Bolivariana de Venezuela can fund its pension program at 5 percent of GDP, whereas in Italy it takes 16 percent.

Over the next three decades, Latin America will face greater fiscal pressures in funding pensions as a result of population aging, which will sometimes be offset and sometimes be reinforced by changes in pension generosity. The average net result is a dramatic increase in the share of GDP allocated to public pensions. Median pension expenditures in Latin America are forecast to rise from the current level of 3.2 percent of GDP to 6.7 percent in 2045, a figure approaching current-day OECD levels of 7.8 percent.

Note that while for public education, the generosity forecast is uniformly upward, the forecast for pension benefit generosity is mixed, with some countries showing sharp declines, others sharp increases, and others more modest changes. For all countries demography will drive the fiscal cost upward, but policy will complement that upward drive in some countries and counter it in others. Figure 3.8 illustrates this effect by showing the absolute growth of public

Growth in public spending on pensions in Latin America between 2015 and 2045 in three scenarios
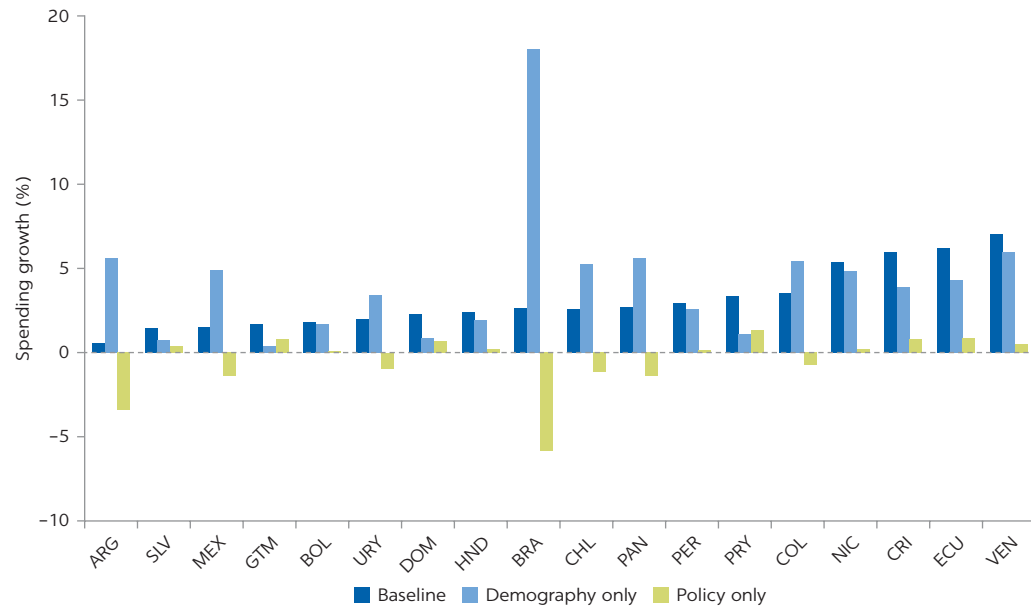
Sources: World Bank forecasts based on GDP per capita from its World Development Indicators, population data from UN (2017), and pension spending data for Latin American countries from country budgetary execution data and for Organisation for Economic Co-operation and Development countries from OECD (2017).
Note: In the baseline forecast, both demography and benefit generosity change. In the demography-only scenario, only the demographic dependency ratio changes while the benefit generosity ratio remains fixed at its 2015 value. In the policy-only scenario, the benefit generosity ratio changes while the demographic dependency ratio remains fixed at its 2015 value. The baseline forecast is not the sum of the two other scenarios because of interaction effects between changing demography and changing benefit generosity.

spending on pensions in percentage points of GDP between 2015 and 2045 in three scenarios: one driven purely by demography, another by policy, and a third by the combined effect of demography and policy (here termed the baseline scenario).

The difference between scenarios is most striking for Brazil. If pension benefits were to remain at current levels of generosity, population aging in Brazil would lead to an astounding 18 percentage point increase in public spending as a share of GDP. The baseline model assumes that the future generosity of pension benefits will fall toward levels in line with those of OECD countries; that is, measures currently in effect as well as yet-to-be legislated reforms will effectively reduce Brazil's pension benefits by half. Thus, the strong impact of population aging in Brazil is projected to be offset by a reduction in pension generosity that will lead to a 2.6 percentage point increase in spending, which is the median increase among Latin American countries. The case of Argentina is similar. Benefit generosity is projected to fall in line with that of OECD nations, and the large increase in pension expenditures caused by population aging in Argentina (5.6 percentage points) will be offset nearly entirely by a projected reduction in pension benefits (30 percent). Despite the considerable pressures of population aging, Argentina is projected to have the smallest increase in pension spending among Latin American countries (less than 1 percentage point). Similar offsets are projected for Chile, Colombia, Mexico, Panama, and Uruguay.

In other countries, projected increases in pension benefits with increases both in coverage and in benefit per person covered heighten the fiscal impacts of population aging. In Costa Rica, the projected increase in pension generosity adds a 2 percentage point increase on top of the demographic impact, resulting in an overall increase of 5.9 percentage points, one of the largest projected for Latin America. Similar increases are expected in Paraguay (2 percentage points) and Ecuador (1.9 percentage points). Moderately large increases caused by expansion of pension benefits are also seen in the Dominican Republic (1.4 percentage points), Guatemala (1.3 percentage points), and the República Bolivariana de Venezuela (1.1 percentage points). Although population aging is the major driver of future pension costs, policy changes as reflected in increases or decreases to the generosity of pension benefits are projected to play an important role in shaping that impact.

PUBLIC SPENDING ON HEALTH AND LONG-TERM CARE

Figure 3.9 shows average public expenditures per person by age for health care and the health care component of long-term care in high-income and upper-middle-income countries. The data are derived from the National Transfer Accounts project. Three features are particularly striking. First, older health care users tend to use more health care. As a result, population aging can be expected to increase health expenditures. Second, expenditure patterns in high-income and upper-middle-income countries on the

FIGURE 3.9

Per capita spending on health care, by age, in high-income and upper-middle-income countries
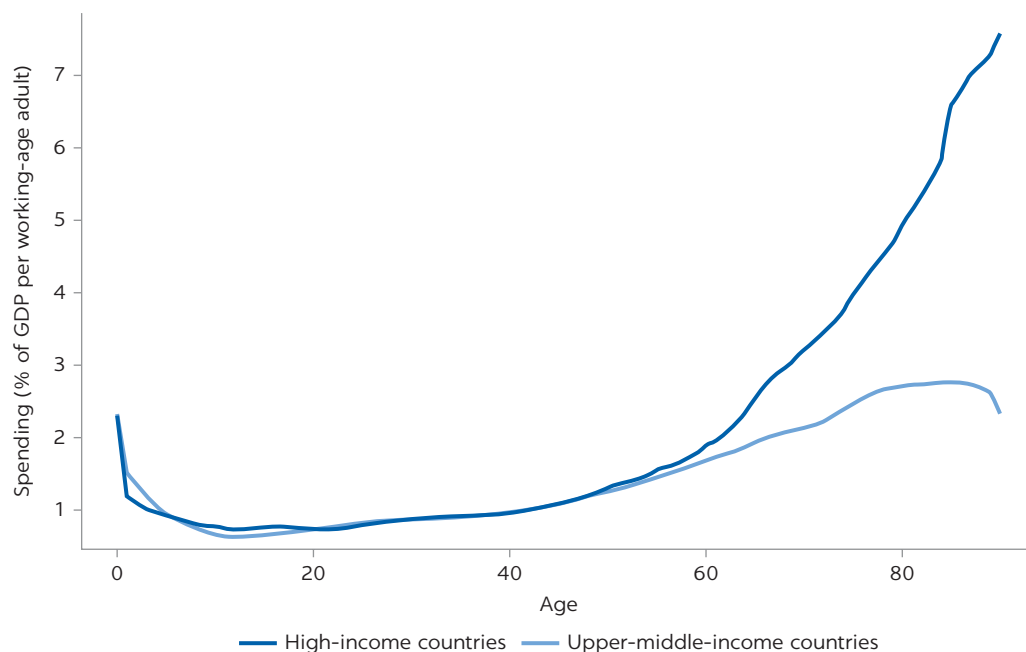
Sources: World Bank calculations based on data on health care public consumption by age from the National Transfer Accounts (Lee and Mason 2011).
Note: GDP = gross domestic product.

nonelderly are strikingly similar. As seen in the figure, from birth until about age 50 the two lines are nearly identical. Third, the differences with the onset of old age are significant, due in part to the health component of long-term care, but also to more intensive health care interventions for the elderly in high-income countries.

Based on these patterns, three different sets of spending for the health sector were modeled: health care spending on the nonelderly (age 0–64), health care spending on the elderly (age 65 and older), and long-term care spending (age 85 and older). As with the previous sectors, public expenditures as a share of GDP are broken down into two multiplicative components: a policy and economic component represented by the BGR and a demographic component represented by the DDR. For education and pensions, the target population is relatively well defined by crude age divisions: school-age population (age 6–22) and pension-age population (age 65 and older). The same principle is used to define crude age divisions for the health sector: nonelderly health care (age 0–64), elderly health care (age 65 and older), and long-term care (age 85 and older).

Figure 3.10 presents this breakdown for the 2015 data and for the projection for 2045 for health care spending on the nonelderly. In 2015, the share of GDP allocated to nonelderly public health care was about 4.2 percent among OECD countries, or slightly lower than in Latin American countries, where the median share was 3.6 percent. The dependency ratio in Latin America was

FIGURE 3.10

Demographic and policy contributions to public spending on health care for the nonelderly in Latin America, 2015 and 2045

Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), and age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011).
Note: The x-axis shows the nonelderly population (age 0–64) per 100 working-age persons (age 20–64). The left y-axis shows health care spending per nonelderly person as a percentage of GDP per working-age adult. The lines show isoquants of health care spending on the nonelderly as a share of GDP. In 2015, median health care spending on the nonelderly among OECD countries was 4.2 percent of GDP (red dot). In Latin America, median health care spending on the nonelderly was 3.6 percent of GDP in 2015; it is projected to remain at this level in 2045 (isoquant, panel b). For reference, the mean of OECD countries in 2015 is shown in red in both panels. OECD = Organisation for Economic Co-operation and Development; S/GDP = spending on health care for nonelderly/gross domestic product.

22 percent higher than in OECD countries, at 165 nonelderly persons per 100 working-age persons. The benefit generosity ratio in OECD countries was slightly higher (a median of 2.4) than in Latin America and the Caribbean (a median of 2.1). By 2045, population aging will move the dependency ratio downward, or closer to OECD levels. Reduction in fiscal pressures caused by population aging will be offset by slight increases in health care spending generosity. This means that the share of GDP allocated to nonelderly health care spending in Latin America will remain unchanged, at 3.6 percent.

Figure 3.11 shows the breakdown of health care spending on the elderly. The pattern here is strikingly different from the one for the nonelderly. In 2015, there was a large gap between OECD and Latin American countries regarding spending on health care for the elderly, with medians of 2.6 percent and 0.6 percent of GDP, respectively. Latin America had a median dependency ratio of 12 elderly persons per 100 working-age adults, or less than half the ratio (30) for OECD countries. The gap in the generosity of health care benefits for the elderly was no smaller. Latin America had median health care benefits for the elderly of 4.9 percent of GDP per working-age adult, whereas the figure for OECD countries was 8.4 percent. By 2045, median spending on health care for the elderly is expected to reach 1.6 percent, or more than double its share in 2015 (0.6 percent) but still below today's OECD levels (2.6 percent). This large increase in spending is due both to more elderly people in Latin America and to higher levels of health expenditures per elderly person. Population aging doubles the median dependency ratio from 12 to 26 elderly persons per 100 working-age adults, or near

FIGURE 3.11

Demographic and policy contributions to public spending on health care for the elderly in Latin America, 2015 and 2045

Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), and age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011).

Note: The x-axis shows the elderly population (age 65 and older) per 100 working-age persons (age 20–64). The left y-axis shows health care spending per elderly person as a percentage of GDP per working-age adult. The lines show isoquants of health care spending on the elderly as a share of GDP. In 2015, median health care spending on the elderly among OECD countries was 2.6 percent of GDP (red dot). In Latin America, median health care spending on the elderly was 0.6 percent of GDP in 2015 (isoquant, panel a); it is projected to reach 1.6 percent of GDP in 2045 (isoquant, panel b). For reference, the mean of the OECD countries in 2015 is shown in red in both panels. OECD = Organisation for Economic Co-operation and Development; S/GDP = spending on health care for the elderly/gross domestic product.

OECD levels. Median health care expenditures for the elderly will climb from 4.9 percent to 6.1 percent of GDP per working-age adult, an increase of 24 percent, which is still lower than that observed among OECD countries (8.9 percent). Although the proportion of the elderly in Latin American countries is projected to approach the proportion in OECD countries, those countries will still lag in GDP per capita, which will mean expenditures per elderly person will be below current levels in OECD countries.

Figure 3.12 shows the breakdown of long-term care spending on the elderly. The panels include both the health care and social components of long-term care spending. Among OECD countries, median expenditures on long-term care were 1.3 percent of GDP in 2015, ranging from a high of 3.7 percent in the Netherlands to a low of 0.2 percent in Estonia. The median dependency ratio stood at 3.7 elderly persons age 85 or older per 100 working adults, ranging from a low of 1.5 in the Republic of Korea to a high of 6.7 in Japan. The median long-term care benefit was 33 percent of GDP per working-age adult, with an interquartile range from 16 percent in the United States to 52 percent in Korea. There are no data on long-term care in Latin America, so spending is assumed to be zero in all countries. By 2045, median expenditures on long-term care in Latin America are projected to be 0.7 percent of GDP, or about half the current level of OECD countries. Some countries, such as Chile and Uruguay, are projected to spend as much as 2 percent of GDP on long-term care. This level is due, in part, to economic growth: as those countries reach OECD levels of GDP per worker, they are assumed to reach the median level spent by OECD countries per elderly person

FIGURE 3.12

Demographic and policy contributions to public spending on long-term care in Latin America, 2015 and 2045

Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, public expenditures for long-term care (both health and social components) for OECD countries from the OECD's Health Status database, and population data from UN (2017).
Note: The x-axis shows the elderly population (age 85 and older) per 100 working-age persons (age 20–64). The left y-axis shows long-term care spending per elderly person as a percentage of GDP per working-age adult. The lines show isoquants of long-term care spending on the elderly as a share of GDP. In 2015, median long-term care spending on the elderly among OECD countries was 1.3 percent of GDP (red dot). In Latin America, median long-term care spending on the elderly was assumed to be close to zero in 2015; it is projected to reach 0.7 percent of GDP in 2045 (isoquant, panel b). For reference, the median of the OECD countries in 2015 is shown in red in both panels. OECD = Organisation for Economic Co-operation and Development; S/GDP = spending on long-term care/gross domestic product.

on long-term care (33 percent of GDP per working-age adult). Population aging in those countries also plays a considerable role. By 2045, Chile is projected to have 6.8 elderly persons age 85 or older per 100 working-age adults, and Uruguay to have 6.2. These figures are similar to the ones in current-day Japan (6.7 persons age 85 or older per 100 working-age adults). Chile and Uruguay are the exceptions. Most Latin American countries are projected to spend less than 1 percent of GDP on long-term care, and most are projected to allocate significantly less to long-term care than OECD countries (a median of 1.3 percent of GDP). This result is mostly due to low levels of projected spending on long-term care per elderly person, given that most Latin American countries are not projected to reach OECD levels of GDP per capita by 2045.

Figures 3.13 to 3.15 show the evolution of the DDR for the three populations and two care types analyzed: health care for the nonelderly (age 0–64), health care for the elderly (age 65 and older), and long-term care (age 85 and older). As seen in figure 3.13, the median dependency ratio for nonelderly health expenditures will decline from 165 persons younger than age 65 per 100 working-age adults to 145 persons, which means a modest 12 percent reduction in spending. The largest decline will be in Guatemala, with a drop of 22 percent in spending resulting from a reduction in the dependency ratio from 199 persons under age 65 per 100 working-age adults to 155. At the other extreme are countries such as Chile, where the drop in spending is just 6 percent because declines in dependency slide only from 146 to 137. Although population aging brings a modest drop in health care spending among the nonelderly in Latin America, it brings significant upward pressure on health care and long-term care spending on the elderly.

Figure 3.14 shows that the mean dependency ratio for health care spending on the elderly doubles from 12 elderly persons per 100 working-age adults to 26. All else remaining equal, this means the share of GDP allocated to funding health care for the elderly will double. Chile will experience the largest increase in

FIGURE 3.13

Demographic dependency ratio for health care spending on the nonelderly, 2015–45
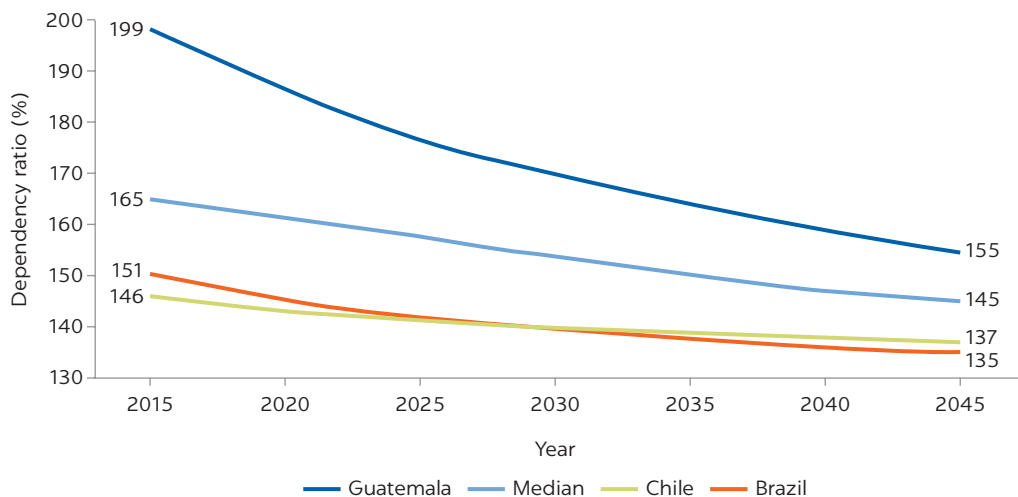
Demographic dependency ratio for health care spending on the elderly, 2015–45
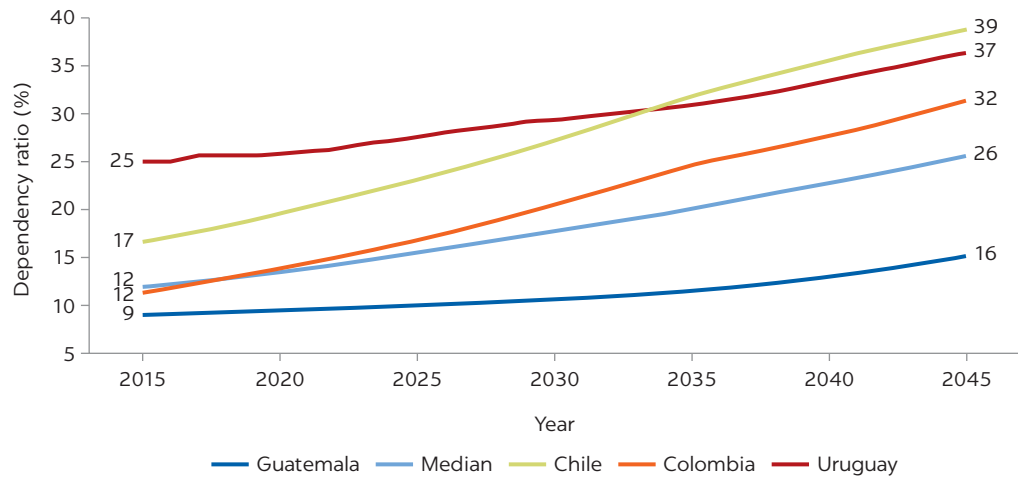
Source: World Bank calculations based on population data from UN (2017).
Note: The dependency ratio is defined as the elderly population (age 65 and older) per 100 working-age persons (age 20–64).

dependency, with a jump from 17 to 39 elderly persons per 100 working-age adults. The pressure is even greater when it comes to long-term care.

Figure 3.15 shows the median dependency ratio for long-term care increasing from 1.2 elderly persons age 85 or older per 100 working-age persons to 3.4, or a nearly threefold increase over 30 years. Chile will once again experience the largest increase. The size of its population age 85 or older relative to its working-age population will increase threefold, from 1.9 to 6.8, a proportion similar to the one in current-day Japan. For most countries, the demographic pressure will lead to a doubling of health care expenditures for the elderly; even greater demographic pressure is expected to lead to a tripling of expenditures on long-term care.

There is greater uncertainty about future health care benefits than about pension and education benefits because the role of technology is so uncertain. Technologies can be cost-saving or cost-enhancing, and it is impossible to know what sort of technology will prevail during the next decades in Latin America. Furthermore, the great diversity in public provision of long-term care in OECD countries heightens uncertainty in forecasting long-term care for Latin America. As with public education, cross-sectional data show that BGRs for both non-elderly and elderly health care spending tend to rise with income. Figure 3.16 shows a weak positive relationship between generosity of health care benefits for the nonelderly and increases in GDP: a $10,000 increase in GDP per working-age adult would increase health spending on the nonelderly by just 0.2 percentage point of GDP per working-age adult. This nearly negligible effect is consistent with the results shown in figure 3.9: there is very little difference between high-income and upper-middle-income countries on health care spending for the population under age 50 relative to GDP per working-age adult. Figure 3.17 shows the strong positive relationship between health care spending on the elderly and GDP per working-age adult. A $10,000 increase in GDP per working-age adult would raise health care spending on the elderly by

FIGURE 3.15

Demographic dependency ratio for long-term care spending, 2015–45
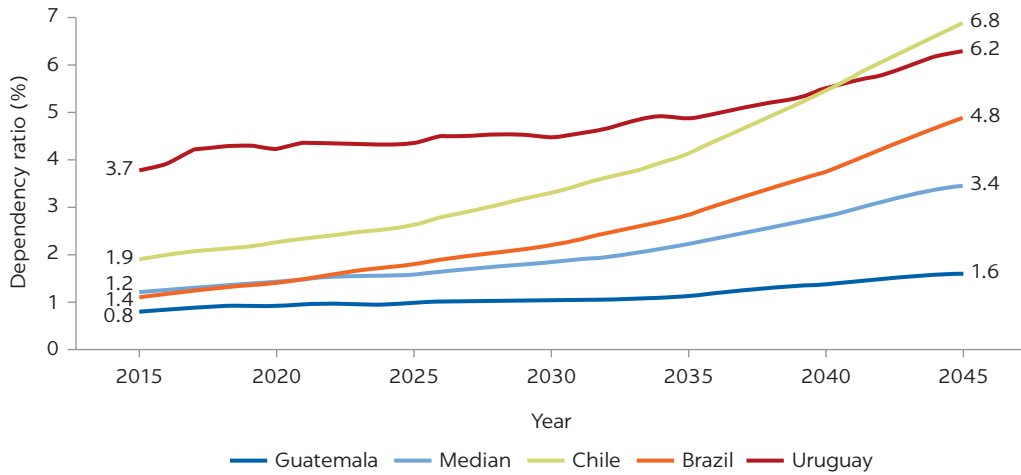
Source: World Bank calculations based on population data from UN (2017).
Note: The dependency ratio is defined as the older segment of the elderly population (age 85 and older) per 100 working-age persons (age 20–64).

FIGURE 3.16

Generosity of public spending on health care for the nonelderly and GDP per capita in Latin America and OECD countries, 2015

Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), and age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011).
Note: Latin American countries in 2015 are shown in blue; OECD countries in 2015 are shown in red. The gray line shows the regression of the generosity ratio on GDP per capita. The solid blue line represents the forecast based on that regression line for Brazil from 2015 to 2045. GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development; $ = constant 2011 international dollar.

Generosity of public spending on health care for the elderly and GDP per capita in Latin America and OECD countries, 2015
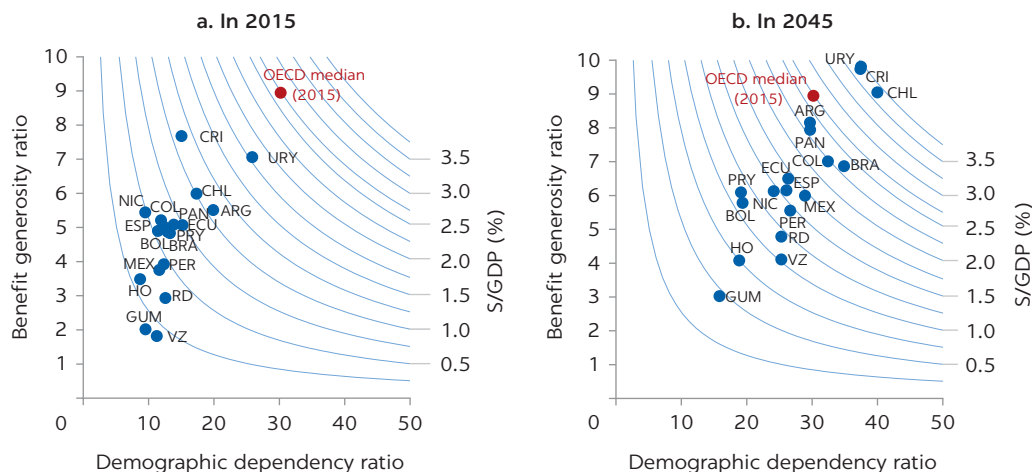

Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System population data from UN (2017), and age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011).
Note: Latin American countries in 2015 are shown in blue; OECD countries in 2015 are shown in red. The gray line shows the regression of the generosity ratio on GDP per capita. The solid blue line represents the forecast based on that regression line for Brazil from 2015 to 2045. GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development; $ = constant 2011 international dollar.

1.1 percentage points of GDP per working-age adult. The estimated cross-sectional relationship between GDP per capita and benefit generosity is used to forecast BGRs among Latin American countries in 2045. This "closing-the-gap" method for forecasting is agnostic about the future role of technological change. New technologies, changes in tendencies, and the impact of income are all wrapped up in a single metric called "closing the income gap." The path projected for Brazil is shown in the figures. Increasing income there is expected to drive health care spending to the level of current-day Spain for spending on the nonelderly (figure 3.16) and of current-day Switzerland for spending on the elderly (figure 3.17).

As stated, in the absence of data on long-term care spending in Latin American countries, it is assumed that those countries are currently spending nothing on long-term care. Because of this problem with data, a regression model is not used to estimate the relationship between long-term care spending on persons age 85 and older and GDP per working-age adult. Instead, it is assumed that when Latin American countries reach the OECD median GDP per working-age adult ($42,000), they will also reach the median OECD spending on long-term care of

33 percent of GDP per working-age adult. But there is great diversity between OECD countries in the public provision of long-term care, and other target values would also be plausible for Latin American countries.

The combined impact of demographic pressure as the population ages and more and more generous health care benefits as Latin American countries move toward OECD levels of income will yield a 1.7 percentage point increase in health care expenditures between 2015 and 2045. But the size of these increases varies greatly, from a low of less than 1 percentage point in Bolivia, Guatemala, Honduras, and Peru, to a high of about 3 percentage points in Argentina, Brazil, and Panama. In Costa Rica and Uruguay, that increase will reach 4 percentage points, and in Costa Rica 5.

Health care presents an additional challenge that public education and public pensions do not. The overall fiscal challenge is coupled with the transformation brought on by an aging population. Figure 3.18 illustrates this shift in spending toward the elderly. Using data on total health expenditures, population age structure, and average spending per person by age in upper-middle-income countries, it is estimated that about 14 percent of public health care and long-term care spending is currently directed toward the elderly in Latin America. The baseline projection indicates that, by 2045, this share will more than triple: about 46 percent of public health care expenditures will be directed to the elderly. In 2015, only one country in Latin America (Uruguay) allocated more than a quarter of its public health and long-term care spending to the elderly. In 2045, nearly all the countries in the region will spend more than a quarter of their health budgets on the elderly. By 2045, several countries will have reached the current median share for OECD countries: Chile is projected to allocate 58 percent of expenditures to the elderly, the República Bolivariana de Venezuela 54 percent, and Uruguay 54 percent. Meeting the needs of the elderly will require

FIGURE 3.18

Proportion of public health care spending directed toward the elderly, 2015–45
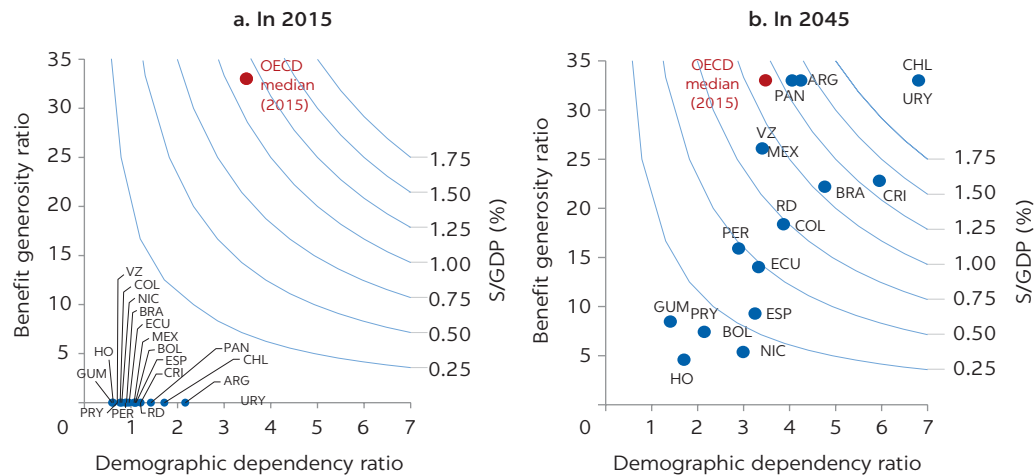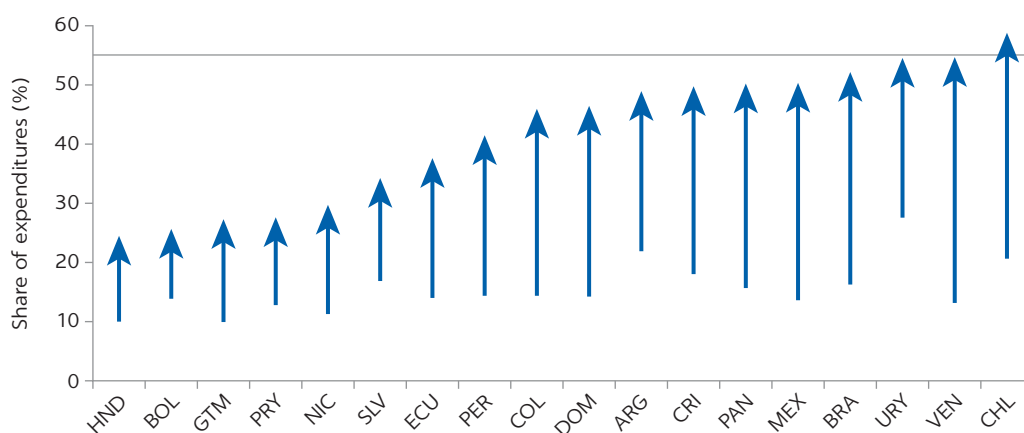

Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), and public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database.

Note: Arrows show change in the combined proportion of public health care and long-term care spending directed toward the elderly between 2015 (tail of arrow) and 2045 (head of arrow). The horizontal gray line marks the median proportion of public health care spending and long-term care spending allocated to the elderly in the OECD (55 percent).

a thorough restructuring of the health care system in the region, with greater emphasis on chronic diseases.

Median public spending on health care and long-term care among OECD countries in 2015 stood at 6.9 percent of GDP, with about half (55 percent) of these total expenditures directed toward the elderly. Among Latin American countries, median spending stood at 4.2 percent of GDP, with an estimated 14 percent of these total expenditures directed toward the elderly. Spending on health care and long-term care is expected to increase rapidly in the region in the coming decades, climbing to 5.5 percent of GDP, with 46 percent of these expenditures directed to the elderly. The median overall spending increase is moderate (1.7 percentage points) compared with the increase in pension spending (2.6 percentage points). A number of countries are projected to increase health care and long-term care expenditures substantially: Chile (by 5.0 percentage points), Uruguay (by 4.0 percentage points), and Costa Rica (by 3.8 percentage points). Key to understanding this dynamic is the enormous redirection of health-system resources toward the elderly, a shift from 14 percent to 46 percent in three decades. This remarkable transformation is the product of both population aging and increased spending per elderly person driven by increases in GDP per capita.

Regarding the future generosity of benefits, especially health care benefits, an educated guess is the only route. In health care in particular, how future technology will increase or decrease costs is uncertain. Previous evidence suggests that technology will lead to cost hikes of between 0.5 percent and 2.0 percent greater than GDP growth. Over a 30-year period, that wide range implies that health costs could span from a low of 16 percent greater to a high of 82 percent greater—which is quite a range. There is also debate in the literature about whether, all else remaining equal, rising incomes raise or lower demand for health care. The model used by the OECD for its long-range forecasts assumes that rising incomes tend to lower health care demand (using an income elasticity of 0.8). In this chapter, rising income, which leads to the closing of the income gap between Latin America and the OECD, is assumed to drive health care expenditures decisively upward. The health care forecasts yielded in this chapter are in the same range as forecasts based on alternative and more complex methodologies. The health care forecast offered here is roughly as good as other forecasts, but none is very good.

THE FUTURE OF PUBLIC SPENDING IN LATIN AMERICA

The future of public spending will be shaped by a combination of demography and policy change. Any projection is based on assumptions about future demography (more certain) and future benefit generosity (less certain). The discussion begins by estimating what public expenditures would be in a world in which policy, measured by BGRs, does not change and the only impact is demography. This scenario is then compared with one in which policy as well as demography change.

Figure 3.19 shows the composition and overall level of spending on education, public health, and pensions under the demography-only scenario in which BGRs are set at 2015 levels. Under this demography-only scenario, median social spending among Latin American countries in 2045 is 15.6 percent of GDP, well within the range of current spending by OECD countries. In the demography-only

FIGURE 3.19

Social spending by sector in 2045, attributable solely to demographic change

Sources: World Bank forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).

Note: The distribution of public social spending as a percentage of GDP in OECD countries in 2015 (minimum, first quartile, median, third quartile, and maximum) is marked on the right on the y-axis.

scenario, six Latin American countries are projected to be below the current range of OECD spending: Guatemala, the Dominican Republic, El Salvador, Honduras, Peru, and Paraguay. At the other extreme, Brazil is projected to spend significantly more than any OECD country spends now. Population aging alone, it appears, is enough to bring most Latin American countries into the OECD range of social spending.

Figure 3.20 shows the projections for Latin America and the Caribbean combining demographic and policy changes. With both demographic changes and changes in the policy and economic environment considered, social spending levels in Latin America in 2045 look very similar to those of current-day OECD countries. The medians are nearly the same: 18.1 percent in Latin America in 2045 and 20.8 percent in today's OECD. The interquartile ranges are the same, at 8 percentage points. Even the maximums are similar, with 26 percent of GDP allocated to social spending in Brazil in 2045 compared with 29 percent in France in 2015.

El Salvador, Honduras, Peru, Paraguay, and Mexico are projected to reach the first quartile of OECD spending, matching the levels of social spending in Korea, Australia, and Canada. Bolivia, Colombia, Nicaragua, and Panama fall within the second quartile with social spending levels similar to those in Switzerland, the United Kingdom, and the United States. Ecuador, the República Bolivariana de

FIGURE 3.20

Social spending by sector in 2045, attributable to demographic and policy changes

Sources: World Bank forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).

Note: The distribution of public social spending as a percentage of GDP in OECD countries in 2015 (minimum, first quartile, median, third quartile, and maximum) is marked on the right on the y-axis. GDP = gross domestic product.

Venezuela, and Chile reach the third quartile of social spending with levels similar to those of Norway, Spain, and Japan. Finally, Uruguay, Costa Rica, Argentina, and Brazil fall within the fourth quartile of social spending, matching spending levels of Sweden, Italy, and France.

Similarity in overall levels of social spending is coupled with similarity in the distribution of spending across social sectors, that is, on education, health, and pensions. The 48 countries (18 Latin American countries and 30 OECD countries) were sorted into three clusters according to spending patterns (in 2045 for Latin America and in 2015 for the OECD). Figure 3.21 shows the three types of spending patterns.

In pattern 1, pensions dominate spending. As panel a of figure 3.22 shows, this spending pattern characterizes a third of OECD countries (Slovenia, Portugal, Austria, Spain, Finland, Hungary, Poland, France, Italy, and Greece) and four Latin America counties (Brazil, Argentina, Ecuador, and the República Bolivariana de Venezuela). Consider Brazil. In 2045, Brazil is projected to lead Latin America in public social spending. Its spending patterns will closely resemble those of Portugal today, with spending concentrated mainly on pensions (the distribution is 14 percent of GDP on pensions, 7 percent on health, and 6 percent on education).

FIGURE 3.21

Three patterns of public social spending in Latin America in 2045 and OECD countries in 2015
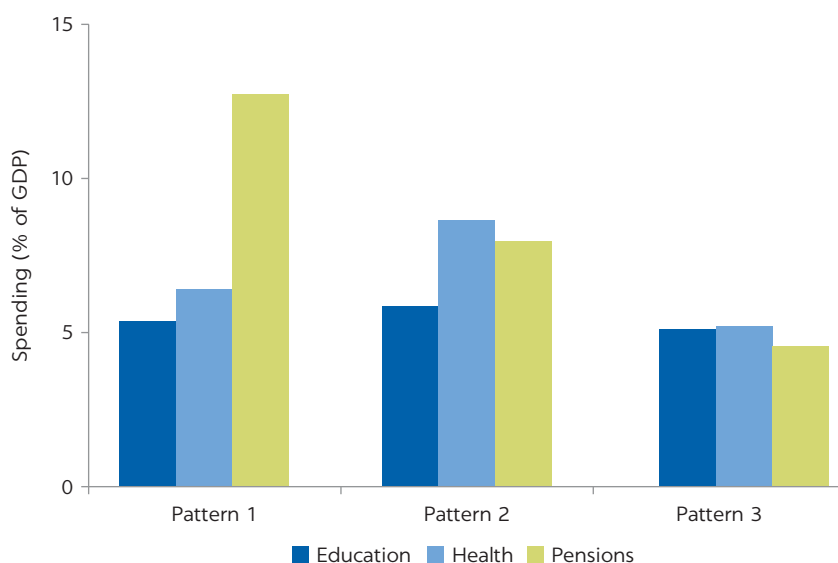
Sources: World Bank calculations based on health care spending data from the WHO (World Health Organization) Statistical Information System, public expenditures for long-term care (both health and social components) from the OECD's Health Status database, and pension spending data from OECD (2017).
Note: Latin American countries in 2045 and OECD countries in 2015 were grouped into three clusters with similar patterns of public social spending by minimizing the Euclidian distance from the nearest cluster center using the "k-means" algorithm in R. GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development.

In pattern 2, health care spending equals or exceeds pension spending, both of which exceed education spending. As panel b of figure 3.22 shows, this spending pattern characterizes about a third of OECD countries: the United States, the United Kingdom, Switzerland, Sweden, Belgium, Germany, Norway, the Netherlands, Denmark, the Czech Republic, and Japan. Pattern 2 spending prevails in five Latin American countries: Panama, Chile, Costa Rica, Uruguay, and Nicaragua. Costa Rica's spending pattern in 2045 will resemble Sweden's current pattern, with high levels of spending relatively balanced across sectors (9 percent of GDP on health, 9 percent on pensions, and 7 percent on education).

Finally, in pattern 3 spending across the three sectors is balanced at relatively low levels. As panel c of figure 3.22 shows, this spending pattern characterizes about one-third of OECD countries: Ireland, Israel, Australia, New Zealand, Estonia, Korea, Canada, the Slovak Republic, and Iceland. Half of Latin American countries are characterized by pattern 3 spending: Mexico, Paraguay, Peru, Honduras, Bolivia, El Salvador, Colombia, the Dominican Republic, and Guatemala. Mexico's spending pattern in 2045 will resemble Ireland's current pattern, with balanced spending at relatively low levels (5 percent of GDP in each of the three sectors).

This information is useful for two reasons. First, comparison between OECD and Latin American countries regarding public spending patterns facilitates discussion and dialogue. The fact that, within a generation, Costa Rica's spending patterns will resemble Sweden's should give the countries something

Public social spending by pattern

a. Pattern 1

b. Pattern 2

c. Pattern 3

■ Education ■ Health ■ Pensions
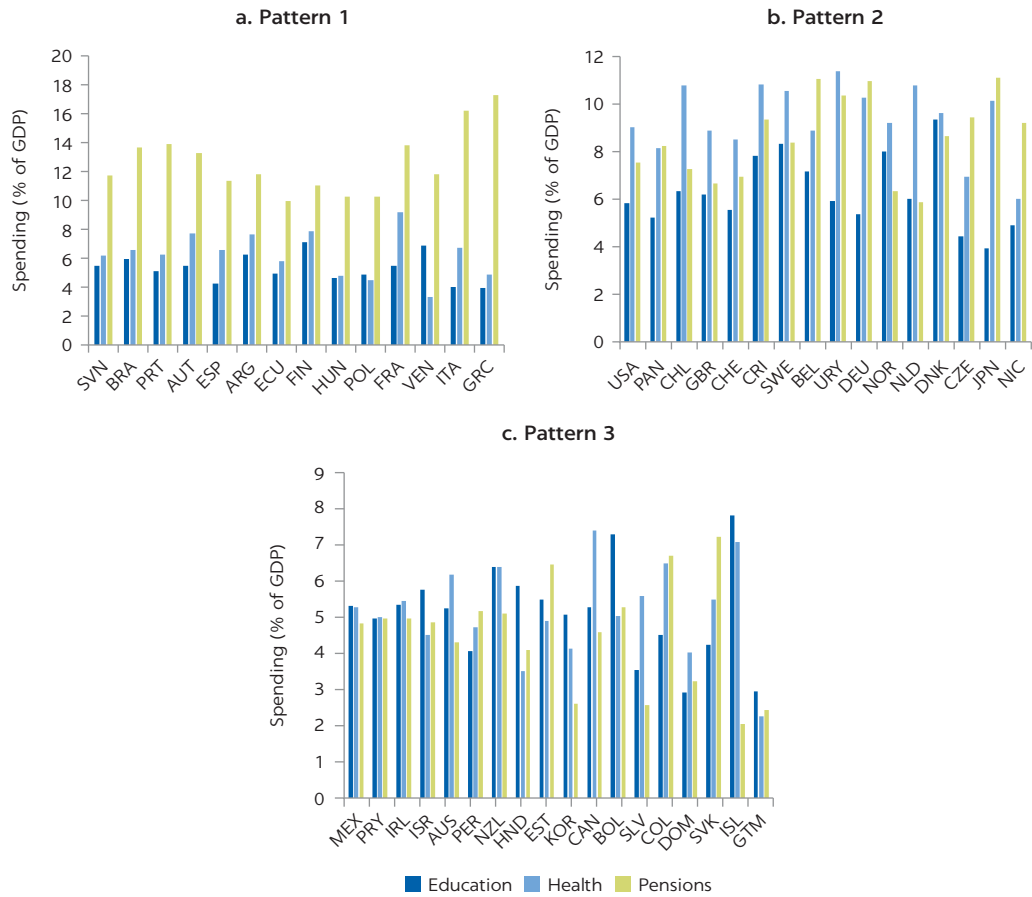
Source: World Bank calculations.
Note: Latin American countries (for 2045) were assigned to one of three patterns of public social spending in Organisation for Economic Co-operation and Development countries in 2015 based on the "nearest" cluster as measured by Euclidian distance. The OECD countries with a "balanced" spending pattern (panel c) in 2015 were Austria, Canada, Estonia, Iceland, Ireland, Israel, the Republic of Korea, New Zealand, and the Slovak Republic. The OECD countries with a "health care dominant" spending pattern in 2015 (panel b) were Belgium, the Czech Republic, Denmark, Germany, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States. The OECD countries with a "pensions dominant" spending pattern in 2015 (panel a) were Austria, Finland, France, Greece, Hungary, Italy, Poland, Portugal, Slovenia, and Spain. GDP = gross domestic product.

to talk about. What are the fiscal challenges facing Sweden? What is the role of the private sector in complementing state actions in these sectors? What types of tax systems has Sweden developed in concert with these spending patterns? Of course, OECD nations continue to face fiscal pressures resulting from population aging—a problem that has not been solved anywhere. Dialogue between "sister nations" about solutions to common (future and present) fiscal challenges would benefit both countries. The second reason for presenting these data is to show that the forecast methodology used in this study yields predictions for Latin America that reflect the diversity currently observed in Europe.

The analysis now turns to the fiscal challenges likely to be faced by Latin America over the next generation and their likely sources. The focus is on two fiscal challenges: an overall increase in social spending and a shift in that spending away from youth and toward the elderly. Figure 3.23 shows the projected increase in spending on pensions, health care, and education measured

FIGURE 3.23

Fiscal challenge in Latin America, 2015–45

Sources: World Bank forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).
Note: The figure shows the projected rise in spending on pensions, health care, and education. GDP = gross domestic product.

in percentage points of GDP. The 18 Latin American countries can be grouped into three levels of fiscal challenge: six severe, seven substantial, and five moderate. The six countries facing severe fiscal challenges are Costa Rica (9.8 percentage points of GDP), the República Bolivariana de Venezuela (8.9 percentage points of GDP), Chile (8.6 percentage points of GDP), Ecuador (7.7 percentage points of GDP), Panama (7.5 percentage points of GDP), and Uruguay (7.1 percentage points of GDP). Of those six, in four countries the severe challenge is due to expected increases in health care and long-term care spending, which account for 59 percent of the increase in Chile, 57 percent in Uruguay, 43 percent in Panama, and 39 percent in Costa Rica. Two of the countries face severe fiscal challenges caused mainly by expected pension spending: Ecuador, where pensions will account for 80 percent of the increase in social spending, and the República Bolivariana de Venezuela, where that figure is 79 percent.

Seven countries face moderate fiscal challenges: Nicaragua (6.5 percentage points), Colombia (5.9 percentage points), Brazil (5.4 percentage points), the Dominican Republic (4.6 percentage points), Peru (4.4 percentage points), Argentina (4.3 percentage points), and Paraguay (4.1 percentage points). In three of those countries, health care and long-term care would account for a

substantial share of the increase in overall social spending. In Argentina, they can be expected to account for 65 percent of the increase; in Brazil, 51 percent; and in Colombia, 40 percent. In the other countries, the fiscal challenge will stem mainly from pensions: 83 percent of the projected increase in social spending in Nicaragua; 80 percent in Paraguay; 67 percent in Peru; and 68 percent in the Dominican Republic.

Five countries are facing mild fiscal challenges: Mexico (3.7 percentage points), Honduras (3.0 percentage points), El Salvador (2.6 percentage points), Bolivia (2.5 percentage points), and Guatemala (2.1 percentage points). Increases in health care spending would be relatively large compared with pensions in Mexico (the former accounts for 59 percent of the overall increase in social spending) and in El Salvador (where the figure stands at 44 percent). In the other countries, the fiscal challenge will stem mainly from pensions. In Honduras, the projected increase in pension expenditures accounts for 82 percent of the overall increase in social spending, and in Guatemala 81 percent.

What are the relative roles of population aging and policy in these future fiscal challenges? One way to assess those roles is to examine the fiscal challenges in the absence of policy change. Figure 3.24 presents these data. Three scenarios are illustrated: the combined (baseline) scenario in which both demography and benefit generosity change; a demography-only scenario in which benefit

FIGURE 3.24

Growth in social spending in three scenarios

Sources: World Bank forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).
Note: In the combined (baseline) forecast, both demography and benefit generosity change. In the demography-only scenario, only the demographic dependency ratio changes while the benefit generosity ratio is set at the 2015 value. In the policy-only scenario, the benefit generosity ratio changes while the demographic dependency ratio is set at its 2015 value. The baseline forecast is not the sum of the two other scenarios because of the interaction effects between changing demography and changing benefit generosity.

generosity levels remain constant at 2015 values; and a benefit-generosity-only scenario in which the population age structure is set at 2015 values. The median increase in social spending in the baseline scenario is 5.0 percentage points of GDP. The alternative scenarios show smaller fiscal challenges: 3.0 percentage points if only demography changes and 3.4 percentage points if only policy changes. Four key points can be drawn from this sensitivity analysis. First, in those eight countries with the largest fiscal challenges (Chile, Colombia, Costa Rica, Ecuador, Nicaragua, Panama, Uruguay, and the República Bolivariana de Venezuela), population aging and changes in BGR reinforce each other, leading to large increases in expenditures. Second, in those countries facing the smallest fiscal challenges (Bolivia, El Salvador, Guatemala, Honduras, and Paraguay), demographic change is mildly favorable, offsetting the impact of rising benefit generosity. Third, Brazil stands out as an example of the great impact of demographic change (via pensions), as well as the important role of policy because declining benefit generosity largely offsets the increase in the number of pensions paid. Fourth, a number of countries would be projected to face severe fiscal challenges caused solely by demographic change: Brazil, Panama, Chile, Colombia, Argentina, and the República Bolivariana de Venezuela. This sensitivity analysis shows, then, that both demography and policy and economic environment factors have a considerable influence on spending outcomes.

Another fiscal challenge Latin America will face in the medium term is the shift of public spending away from youth and toward the elderly. Spending on the elderly is composed of spending on pensions, the portion of health care used by the elderly (age 65 and older), and long-term care spending. Spending on youth is composed of spending on education plus that portion of health care used by youth (age 0–19). Figure 3.25 presents the ratio of public spending on the elderly relative to youth. In 2015, there were just four Latin America countries in which more public spending was directed to the elderly than to youth: Argentina (1.9 times greater), Brazil (1.7 times), Uruguay (1.6 times), and Panama (1.2 times). Median public expenditures on the elderly were 60 percent of public expenditures on youth. By 2045, however, most Latin American countries will be spending more on the elderly than on youth. Median public expenditures on the elderly are projected to be 1.7 times greater than spending on youth in 2045—a seismic shift in spending patterns on the part of governments in the region.

Population aging is responsible for the bulk of this transformation. Figure 3.26 provides data on the ratio of public spending per elderly person relative to public spending per young person. In 14 of the 18 countries, that ratio falls over time. In other words, in 2045 governments will be spending less per elderly person than per young person in relative terms. The dramatic increases in aggregate spending on the elderly relative to youth are driven, then, by large increases in the number of elderly persons relative to young persons. Any decline in spending per elderly person is due mainly to a decline in pension spending. Even with those declines, governments in the region have spent, and will continue to spend, much more on the elderly on a per capita basis than on youth. In 2015, the median in Latin American countries was three times more spending per elderly person than per young person. Mainly because of declines in pension generosity, spending per elderly person will be about 2.6 times as great as spending per young person by 2045—a level comparable to OECD countries in 2015.

Ratio of public social spending on the elderly in Latin America to public social spending on youth, 2015 and 2045
Aggregate

Source: World Bank forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).
Note: Bars represent the ratio of public social spending on the elderly (health care, long-term care, and pensions) to public social spending on youth (health care and education) in 2015 (blue bars) and projected to 2045 (green bars). The elderly are defined as those age 65 or older, while youth are defined as those younger than age 20. As noted in the main text, the distribution of health care spending between youth and the elderly is not directly observed in each country but rather is based on typical age patterns of public expenditures in upper-middle-income countries. The distribution of public social spending on the elderly relative to youth in OECD countries in 2015 (first quartile, median, and third quartile) is marked on the right y-axis

CONCLUSIONS

As noted, this chapter paints the wealthier and older Latin America of 2045 with broad brushstrokes. It by no means provides the long-range forecasts of social spending in each country so urgently needed.

The key findings may be summarized as follows:

- Within a generation, the intergenerational economy will emerge in Latin America. Social spending will reach OECD levels, about 18 percent of GDP, or an average increase of 5 percentage points of GDP.
- Spending diversity across social sectors of the sort characteristic of today's OECD countries is forecast for Latin America.
- For the region as whole, the fiscal challenge represented by pensions (3.4 percentage points of GDP) will be about twice as great as the challenge

FIGURE 3.26

Ratio of public social spending per elderly person in Latin America to public social spending per young person, 2015 and 2045

Per capita

Sources: World Bank forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011), public expenditures for long-term care (both health and social components) for Organisation for Economic Co-operation and Development countries from the OECD's Health Status database, and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).
Note: Bars represent the ratio of public social spending per elderly person (health care, long-term care, and pensions) to public social spending per young person (health care and education) in 2015 (blue bars) and projections for 2045 (green bars). The elderly are defined as those age 65 and older, while youth are defined as those younger than age 20. The distribution of health care spending between youth and the elderly is not directly observed in each country but rather is based on typical age patterns of public expenditures in upper-middle-income countries. The distribution of public social spending per elderly person relative to spending per young person in OECD countries in 2015 (first quartile, median, and third quartile) is marked on the right y-axis.

represented by health care (1.7 percentage points of GDP), but the variability is considerable between countries. Health care will account for more than 40 percent of future social spending growth in 7 of the region's 18 countries. Note that in the two most populous countries, Brazil and Mexico, the fiscal challenge from health care and long-term care exceeds that of pensions.

- Regarding education, the main fiscal challenge will be to maintain the share of GDP so that education investment reaches OECD levels as the population ages and budgetary pressure on pensions and health care might crowd out education spending.

- Public social spending will shift decisively away from youth and toward the elderly. In 2015, median public social spending on the elderly was just 60 percent of spending on youth. By 2045, median public social spending on

the elderly is projected to be 1.7 times more than spending on youth. That shift is mostly the result of population aging, but it is also due to a significant shift of health care resources toward the elderly population.

- Finally, it is important to understand that population aging is fundamentally changing the demographic landscape in Latin America and, with it, the constraints under which current policy decisions are made and will be made in the future. The fiscal impacts of policy decisions on pensions and on health care will intensify as the population ages. Although demography defines the landscape and serves as a powerful constraint, social spending is ultimately a product of policy choices.

How accurate will this forecast of social spending in the Latin America of 2045, an older and wealthier Latin America, turn out to be? The population of those who will be elderly in 2045 has already been born, and it is a relatively straightforward process to forecast their numbers over a 30-year period. The same holds true for the size of the workforce. Children are another matter, though. The question is how far and how fast fertility will fall. A much more rapid decline in fertility would mean the region's education spending would reach OECD levels sooner. Although it would have no impact whatsoever on overall spending projections, it would mean that an important educational milestone would come to pass sooner.

Forecasts about the generosity of benefits, especially in health care, are best viewed as an educated guess because public policy plays such an important role in investment in education, health care, and pensions. Although the changing generosity of benefits is partly driven by economic development—for example, rising school enrollment rates or increasing worker participation in pension plans—policy decisions about questions such as who qualifies for coverage and the generosity of that coverage ultimately will determine benefit generosity in education, health care, and pensions. Nevertheless, although future policies in Latin America are likely to be creative and innovative, they will be subject to both political-economic and demographic constraints. This chapter tries to capture political-economic constraints by restricting possible future policies on benefit generosity to those currently in place in OECD nations as reflected in the BGRs. The demographic constraint was placed at the core of the forecast methodology by attributing changes in future expenditures to just two factors: benefit generosity and demographic dependency.

This forecast presents one possible, even probable, future, but not a certainty. It is built on the strong foundation of demographic change and on a reasonable hypothesis about the direction and magnitude of future change in generosity of public benefits. Although merely illustrative, it is built on plausible assumptions, such as the expectation that social spending in Latin America will reach OECD levels within a generation. It is also probable that the strategies Latin America adopts to address population aging will be as diverse as those adopted by OECD nations. Which strategies best handle Aged Economies has yet to be determined. After all, the Aged Economy is a recent phenomenon, so little observational data are available. Dialogue between increasingly wealthy and aged Latin American nations and long-standing wealthy and aged OECD nations has never been more important.

NOTE

1. See table 1 in Miller (2011) based on data from Tanzi and Schuknecht (2000) and OECD. Stat (Organisation for Economic Co-operation and Development) 2009 data.

REFERENCES

Lee, Ronald, and Andrew Mason. 2011. *Population Aging and the Generational Economy: A Global Perspective*. Cheltenham, UK: Edward Elgar.

Miller, Tim. 2011. "The Rise of the Intergenerational State: Aging and Development." In *Population Aging and the Generational Economy: A Global Perspective*, edited by Ronald Lee and Andrew Mason, 161–84. Cheltenham, UK: Edward Elgar.

OECD (Organisation for Economic Co-operation and Development). 2017. *Pensions at a Glance 2017: OECD and G20 Indicators*. Paris: OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2017-en.

OECD (Organisation for Economic Co-operation and Development)/IDB (International Development Bank)/World Bank. 2014. *Pensions at a Glance: Latin America and the Caribbean*. Paris: OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2014-en.

Tanzi, V., and L. Schuknecht. 2000. *Public Spending in the 20th Century: A Global Perspective*. Cambridge, UK: Cambridge University Press.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

4 Demographic Transition and Macroeconomic Challenges and Opportunities

INTRODUCTION

Population aging has fiscal consequences that require policy reform. However, these fiscal consequences are not the only economic impacts that can be expected from the demographic transition process. As populations get older, their age structures change, with a first stage during which the proportion of the active-age population grows before increased numbers of the elderly become the prevailing trend. This relatively short period, known as the "demographic bonus," presents an opportunity to accelerate economic growth before the aging process settles in. Following the conceptual framework presented in this introduction, this chapter discusses this effect as well as the opportunities to increase a country's capital endowment and productivity, usually referred to as the "second demographic dividend."

The macroeconomic effects of the demographic transition in Latin America on the region's development and public policies occur in two distinct stages: the demographic bonus (and the consequent first dividend), then the changes in the population structure that lead to aging. Although the demographic profiles of countries in Latin America are diverse, the region has some common characteristics that are worth considering. The economies that encompass the bulk of the population and GDP have two common characteristics: first, they are middle- or upper-middle income; and second, they have been in the demographic bonus period for a while, which means that, in many cases, they are starting to exit it and move into a demographic tax period. The main development challenge faced by countries in the region is thus how to speed up growth to move from middle to high income, considering the evolving demographic context (Bloom et al. 2015; Bussolo, Koettl, and Sinnott 2015; Canning, Raja, and Yazbeck 2015; Cotlear 2011; Sheiner 2014; World Bank 2016a, 2016b).

The current challenge is to leverage the benefits afforded by what remains of the first dividend without overlooking the fact that, as the population ages, the labor force will shrink in relative terms while the share of retired workers will increase. The rise in the dependency ratio can only be accommodated if actual salaries and accumulated assets are sufficiently high. Of course, the wealthier the economy, the easier it is to meet that condition. Countries now benefiting

from the first dividend must, therefore, get richer before they get older if they hope to meet future challenges.

This chapter discusses the relationship between the demographic transition and the macroeconomy. It focuses on factors related to growth that are of great importance for middle-income economies preparing for population aging. The aim is to provide both a stylized and far-reaching perspective of this relationship and an analytical framework to shed light on the opportunities and the challenges of the pre-aging and aging stages of the demographic transition under way in the region. The discussion identifies those areas in which specific policies and reforms in the economy's institutional framework could improve the prospects of sustained and inclusive growth in the medium and long terms. The two main focuses are, first, how to leverage the remainder of the first dividend; and, second, how to bolster opportunities after the first dividend has come to an end while also limiting the threats of an aging society.

The chapter is structured as follows: The next section addresses the relationship between the demographic transition and the macroeconomy, with an emphasis on the aspects most relevant to the region's demographic stage. At the core of this relationship is the concept of life-cycle deficit, which allows further exploration of the tie between the current and the next stages in the demographic transition—that is, aging. The "consumption support ratio" and the information provided by National Transfer Accounts are used to classify the demographic stages, each of which has a different set of macroeconomic consequences.[1] The subsequent section further analyzes the interaction between the demographic transition and the macroeconomy during the remainder of the first dividend and the first stage of aging. Understanding the dynamics of the macroeconomic variables during these stages is fundamental for designing policies that can effectively tackle the challenges of population aging. The analysis focuses on savings, demographic dividends, and other aspects that, though largely overlooked in the literature, are key to income distribution and to the role of adult cohorts. Countries further along in the demographic transition, such as Japan and the Republic of Korea, are used as points of comparison. The next section addresses the demographic transition as a source of structural changes. The discussion asserts that such changes occur as a matter of course in economies in which restrictions are already in place and where structural transformations related to the development process are under way. Based on the stylized concepts and facts described in the earlier sections, the areas and policies in which actions conducive to getting richer before aging are identified. The ultimate purpose of the chapter is to contribute to the design of public policies pertinent to the double structural change associated with aging and development. The final section presents concluding remarks on policy priorities.

THE MACROECONOMY

Why does the demographic transition have macroeconomic effects on growth? Through what channels are those effects produced during the bonus and the aging stages? This section and the one that follows address these questions. In addition to providing new analysis, the discussion presents some stylized facts for countries in the region to clarify concepts and link them to the empirical evidence. The analysis begins with the notions of the dependency ratio, "effective

consumers" and "effective workers," and the life-cycle deficit, then shows the incidence of the demographic transition on the aggregate life-cycle deficit and, therefore, on savings, investment, and funding.

The dependency ratio and aging

The macroeconomic effects derived from the demographic transition are felt for long periods. Because the demographic transition itself is long, it can be broken down into three stages: (1) a "young" economy: a society in which those younger than age 15 account for more than 30 percent of the population and those older than age 65 account for less than 15 percent; (2) a demographic window of opportunity: cohorts younger than age 15 constitute less than 30 percent of the population, but the elderly do not yet exceed 15 percent of the population; and (3) an aged economy: the elderly exceed 15 percent of the population.

The behavior and decisions of the cohorts in each group are key to three aspects of the macroeconomy: growth-affecting factors; macroeconomic balance–determining factors, which are essential to sustained growth; and the political economy, a result of the distributive effects associated with the changes in the population structure.

As an economy comes close to being older, those seeking to guide it should pay special attention to the intertemporal consequences of the decisions made at a given point. As the dependency ratio variation shown in figure 4.1 illustrates, the assumption that the future will repeat the present is, during the demographic transition, mistaken by definition. Even barring economic shortsightedness, two essential obstacles will persist. First, markets will fail in the intertemporal allocation of resources, as demonstrated by the relative financial underdevelopment of the region's countries as a rule (de la Torre, Ize, and Schmukler 2012). Such failures mean governments have to intervene and regulate the market to improve intertemporal resource allocation and overcome shortsightedness or market failures. Hence, the second obstacle: the political economy. Because the institutions and public policies used for intertemporal resource allocation to adapt to the demographic transition have distributive effects, the rules of the game are dramatically affected by the political power of stakeholders. The most glaring examples are social security systems, which are often a source of macroeconomic imbalance rather than a tool for better intertemporal resource allocation (IDB 2016). One imbalance with intertemporal consequences is, as is explained shortly, the sustainability of public debt. In a context of market and institutional failure, then, the behavior of the active and of the dependent cohorts is not necessarily coordinated. The right macroeconomic policies and reforms could well improve resource allocation.

One useful and widespread indicator demonstrating the link between economy and demography is the dependency ratio, or the ratio of the population that is not in the labor force (the dependent part) to the population that is in the labor force (those age 15 to 64). The dependency ratio captures the relationships between three age groups: the dependent—youth and the elderly, on the one hand—and working-age adults, on the other. Panel a of figure 4.1 shows the variation in the dependency ratio through the demographic transition. For the period after 2015, the United Nations mean forecasts for 2017 were used.[2] In light of the macroeconomic analysis below, the age 25–64 segment is used to reflect the weight of an age segment in which saving is positive. The "S" dependency accounts for people who save.

Latin America and the Caribbean dependency ratio, 1950–2100

a. Latin America and the Caribbean

b. Bolivia and Brazil

Dependency ratio: Younger than age 15
Dependency ratio
Dependency ratio: Older than age 65
Dependency ratio S

Brazil   Bolivia
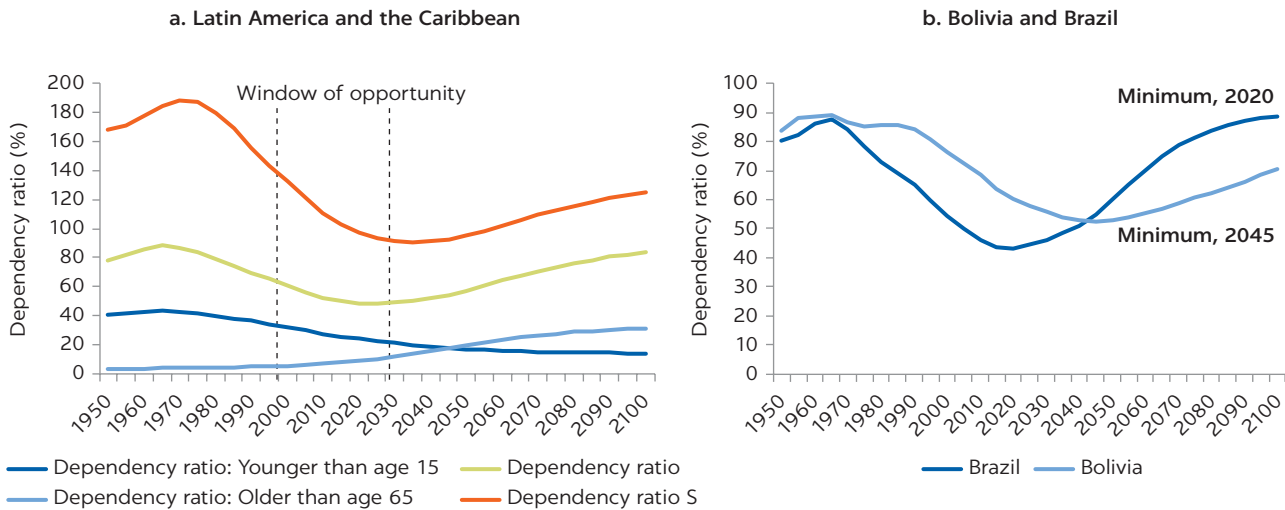
Source: World Bank based on UN (2017).
Note: The dependency ratio is the population not in the labor force as a share of the population that is in the labor force (those age 15 to 64).
Dependency ratio S accounts for people who save.

Because of the demographic transition, the dependency ratio for the period shown begins at a peak, plummets, and then peaks again until it finally levels off—although, as figure 4.1 shows, that leveling off is not expected to happen before 2100. As panel b of figure 4.1 shows, however, the dependency ratio will flatten out in a transition-advanced country such as Brazil sooner than in Bolivia, where the transition is less advanced. The demographic transition is a key driver of the dependency ratio insofar as both fertility and mortality rates drop from relatively high to relatively low levels. Those lower rates mean variations in the share of the population younger than age 15 and older than age 65. For the region as a whole, the highest and lowest levels will be separated by 55 to 60 years; the highest dependency ratio for the Latin American region, which was recorded in 1965, will not be reached again until 2100. The difference between the two highest levels is essential: the first is explained by the weight of the young population and the second by the weight of the older population. And since youth and elderly consumption and income patterns are different in both level and composition, the differences between their peaks have first-order macroeconomic consequences. These are two points to consider in the "S" dependency ratio. For the region as a whole, the lowest level is slightly tilted to the right, with a steeper decline during the bonus stage, pushing up savings.

The average regional behavior conceals major differences. Panel b of figure 4.1 shows the evolution of the dependency ratio in Brazil (an "adult" economy) and in Bolivia (a "young" economy). The lowest dependency ratio comes 25 years earlier in Brazil than in Bolivia. Latin America's youngest societies, which also have the lowest per capita income, are moving toward the lowest point, but they still have a long way to go. Bolivia, for instance, will not reach the lowest point until 2045. To fully grasp the macroeconomic dimension of population aging, economic indicators more precise than the dependency ratio, which is purely demographic, are described below.

Life-cycle consumption and nonlabor earnings

a. Per worker in Brazil

b. Share of nonlabor income per worker in total income (age 25–64)
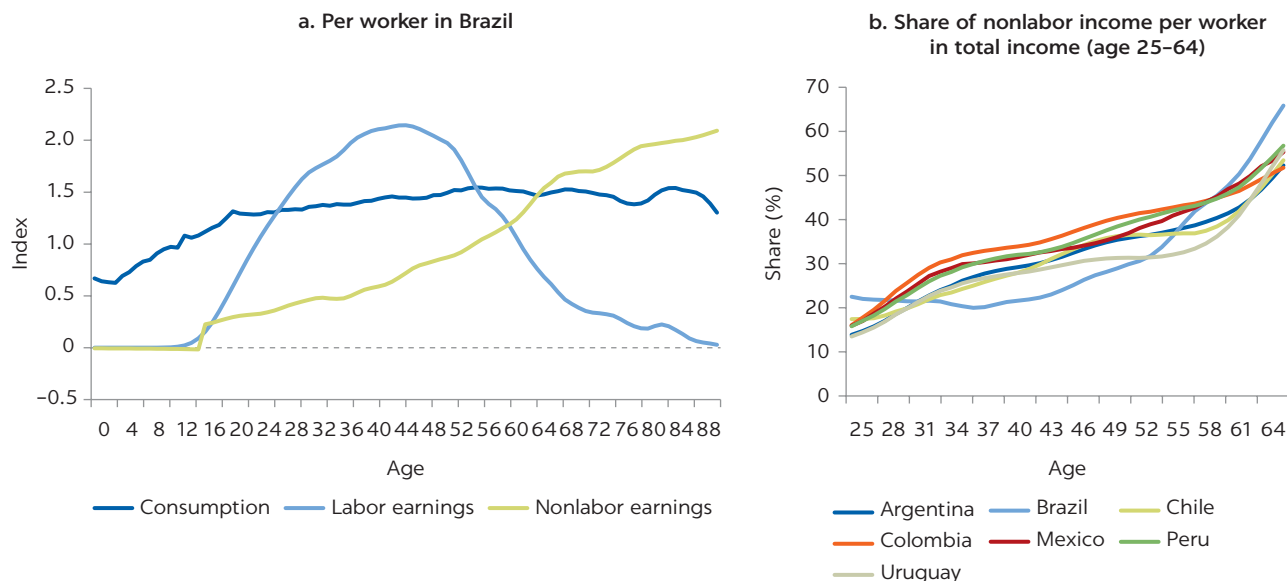
Source: World Bank based on data from the National Transfer Accounts, http://www.ntaccounts.org.

Life-cycle deficit and demand for life-cycle wealth

As discussed in chapter 2, the life-cycle deficit measures the difference between consumption and labor earnings. The deficit varies throughout an individual's life. For cohorts of people too young to form part of the working-age group, consumption exceeds labor earnings, yielding a deficit that must be funded by transfers from other cohorts. In the working-age period, when an individual is part of the labor market, earnings tend to exceed the amount strictly necessary to fund that individual's consumption. That surplus increases with age and reaches its highest point during middle age. It then falls off and finally disappears, becoming a deficit when the individual retires. The life-cycle deficit pattern is similar in all the region's countries, though labor earnings and consumption may vary widely. Panel a of figure 4.2 shows the Brazilian deficit by age. The composition and level of consumption change over a lifetime. For example, young people consume more education and old people spend more on health. That difference has a fiscal effect, given that those kinds of goods and services are largely provided by the state, as well as wider economic effects, given the impacts of changes in demand.

Life-cycle deficits do not necessarily imply that individuals cannot fund their consumption because they may resort to nonlabor earnings generated from the ownership of physical or financial assets. Given that assets accumulate value over a lifetime, the share of nonlabor earnings in the cohort's total earnings increases with age, as illustrated in panel b of figure 4.2. Panel a compares the rise in nonlabor earnings to consumption. Significantly, the increase in capital income in Brazil is particularly fast and remains steady through older ages. These two features are less dramatic in other countries in the region.

The bias toward capital income as people grow old has two direct consequences. First, older individuals use that income to fund a greater share of their consumption and savings. Second, if the wealth distribution in each cohort is very unequal, a large number of elderly retired people will own hardly any or no

FIGURE 4.3

Support ratio, 2015–50
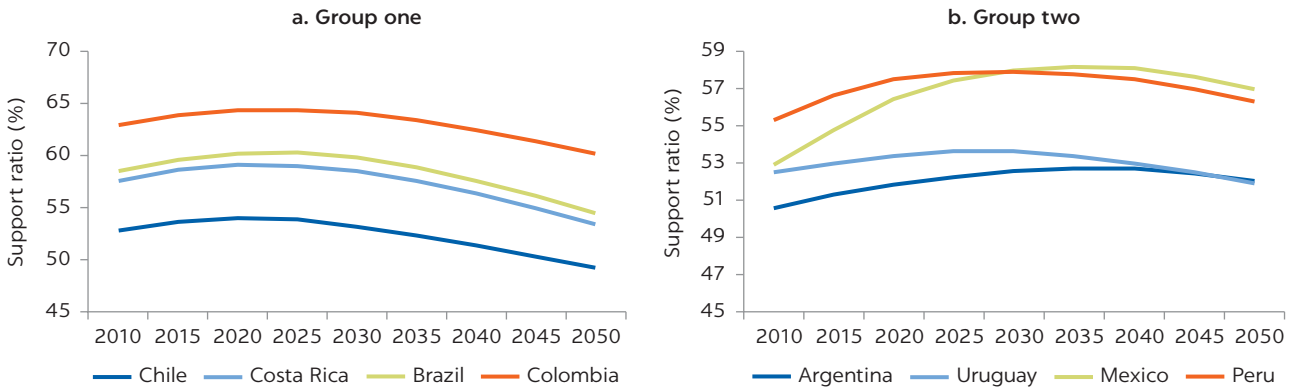
a. Group one — Support ratio (%)

b. Group two — Support ratio (%)

Legend a: Chile, Costa Rica, Brazil, Colombia

Legend b: Argentina, Uruguay, Mexico, Peru

Sources: World Bank based on data from UN (2017) and the National Transfer Accounts, http://www.ntaccounts.org.
Note: The support ratio is the number of effective workers as a share of the number of effective consumers.

assets, which generates dependency on family or public sector transfers to fund consumption. Wealth distribution will thus influence savings and public accounts and should be considered when assessing the macroeconomic effects of the demographic transition.

Support ratio

Different behavioral patterns by age should be considered in aggregating all cohorts and in assessing the macroeconomic effects of each cohort's decisions. The literature on growth and demography speaks of "effective consumers" and "effective workers."[3] The ratio of those groups is different from the dependency ratio because each cohort is weighted on the basis of its labor earnings and behavior in relation to consumption. Effective consumers are the sum of the consumption of each cohort weighted by the consumption age profile.[4] Similarly, to estimate effective workers, the participation of cohorts is weighted by the labor earnings profile, that is, the per capita labor earnings of each cohort equally standardized to consumption.

The support ratio is thus a simple indicator of how the aggregate life-cycle deficit evolves. It is defined as the ratio of effective workers to effective consumers. The ratio is lower in younger and elderly societies and peaks during the demographic bonus. Its pathway is similar, then, to the pathway of the dependency ratio.

Figure 4.3 shows the estimated evolution of the support ratio in the region's countries until 2050 using National Transfer Accounts information on consumption and labor earnings profiles by age.

The support ratio increases during the bonus period. Depending on the country, it peaks in the 2020s or the 2040s and then starts to fall off, although, as illustrated in figure 4.3, the pace varies between countries. The support ratio level also varies by country. During the bonus period, the ratio increases because the share of the working-age population with labor earnings rises relative to the overall population. The conditions for raising per capita income are optimum at

this stage. The bonus brings changes in other areas as well: fiscal space grows as higher income generation expands the tax base (explained further below). The higher the labor earnings of the cohort whose relative size grows, the greater the macroeconomic effect. The magnitude of the increase in labor earnings depends on the unemployment rate, working hours, the participation rate (of women and older people in particular), and productivity.

Aging drives a temporary increase in the support ratio but, as illustrated in figure 4.3, that increase is reversed as the first dividend comes to an end. The growth rate may be negatively affected if the share of effective workers shrinks while the share of retired effective consumers rises. Effects strongly depend on context, however: retirement age, characteristics of the social security system, and, significantly, assets accumulated by the middle-age and elderly populations all matter. This effect is aggravated not only as the population ages but also as life expectancy increases—the longer people live, the more consumption years of retired people need to be funded, whether by individuals' savings or by resources taken from the rest of society. Longer lives increase the actual value of the demand for pensions.

As long as income does not change significantly across cohorts, the drop in the number of active workers will bring an equivalent drop in the share of labor earnings in income. Aging raises the weight of older cohorts in the population, and those cohorts obtain more income from nonlabor sources. Because people with higher incomes are less prone to consumption, savings are favored. A distribution biased toward those whose income is derived from assets is negative because they are more prone to "squandering," which, in turn, leads to low economic growth and a somewhat unequal consumption distribution. Contexts in which asset holders tend to invest abroad—Argentina and the República Bolivariana de Venezuela, for example—are less favorable to growth and macroeconomic balance. Indeed, that tendency is so marked that, in recent years, those countries have become creditors to the rest of the world. Among the causes for this situation is a weak institutional framework, reflected in the fragility of the financial system. A robust financial system is crucial to making the most of the opportunities offered by demographics. To summarize, if, as the literature shows (Gourinchas and Rey 2013), beneficiaries of nonlabor earnings save little or place their wealth abroad in safe but low-income-producing assets, the likelihood that countries become richer before aging is null.

THE MACROECONOMIC CONSEQUENCES OF AGING

United Nations forecasts suggest that several countries in the region are completing their demographic bonus period and entering an accelerated aging process, and demography will represent a tax on economic growth (UN 2017). The median age of the Latin American population will rise from 29.2 years in 2015 to 41.1 years in 2050, and in countries such as Brazil and Chile it will reach 45.1 years. In what remains of the bonus stage, it is important to get ready for population aging.

The essence of the macroeconomic challenge is to find a way to grow without losing the capacity to support the consumption of the older population as its share of the population grows and without undermining the well-being of future generations. To achieve this goal, preserving the value of wealth is fundamental
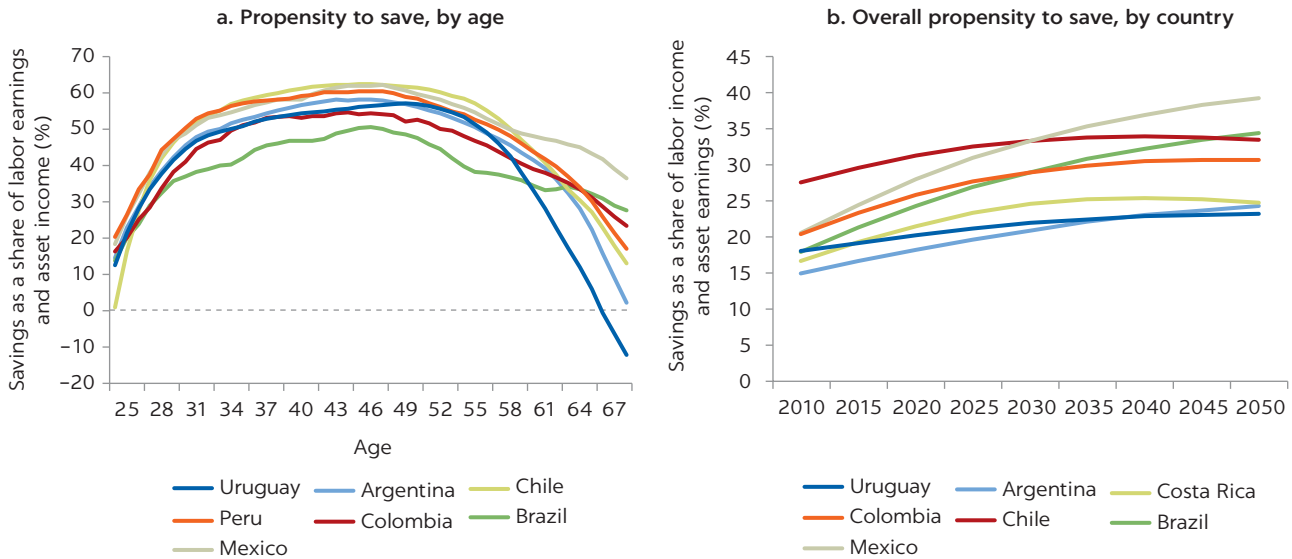
Propensity to save

Sources: World Bank based on data from UN (2017) and the National Transfer Accounts, http://www.ntaccounts.org.

(Dasgupta 2009). Insofar as this is a problem of intertemporal resource allocation between generations, its macroeconomic implications are tied to macroeconomic variables that act as a bridge between the present and the future, variables such as savings, deficits and surpluses, and growth (Fanelli 2015). What follows is a detailed discussion of savings and the first and second demographic dividends, which sheds light on the relationship between growth and aging.

Saving profile by cohort and aggregate savings

As with the life-cycle deficit, savings vary with cohort age. The term "propensity to save," which understands savings as a portion of labor earnings and asset income, sheds light on this variation. Despite differences between countries, figure 4.4 shows that the propensity to save peaks after age 40. It remains high for some time and then gradually falls off after age 50. Although the propensity to save tends to drop substantially as retirement age approaches, that trend varies from country to country, according to institutional factors.

Those in the top-saving age are known as "primary savers." They range in age from 30 to 58—although, as figure 4.4 shows, saving becomes positive at about age 25. Figure 4.4 also shows how saving eventually falls off among the elderly but tends to be positive for some years after the minimum retirement age. This happens because old people, at least the richest of them, have asset-derived income. If they earn a pension as well, saving becomes easier. Saving at an older age favors the hypothesis that people do not consume all their assets before dying, whether because they want to leave an inheritance or because they want to be protected in case they live longer. If demography were the only operating force, the propensity to save during the bonus stage would increase in Latin America, as is shown to be the case in panel b of figure 4.4. The propensity to save rises during that period and falls at the beginning of the demographic tax period. Hence, the evolution of the dependency ratio is relevant when considering national savings trends.

The propensity to save of each of the economies shown in figure 4.4 is quite different, however. Chile and Argentina have the highest and lowest propensities to save, respectively, with differences of more than 10 percentage points of GDP at the beginning of the simulation exercise. The rest of the countries fall in between those extremes. Because of a more favorable demographic evolution and support ratio, all else remaining equal, Argentina evolves toward aging with a better downward saving rate than Chile. Mexico is best positioned in wealth accumulation. It begins with a higher saving rate that is less affected by aging. The falling fertility rate is an important factor, but the saving path is mostly affected by the overall weight of the adult population.

In light of the stylized facts presented here, it seems safe to conclude that demography has an impact on economies' capacity to grow. More specifically, if demography increases the share of workers and the share of savers during the bonus period, the effect on growth should be beneficial. The opposite effect could be expected once the bonus period closes and population aging begins. The theory of the "two demographic dividends" is based on these facts (Lee and Mason 2006, 2012).

The demographic dividends

The first demographic dividend is due to the increase in the number of effective workers in relation to the overall population during the bonus period. Even if mean economic productivity does not vary, earnings per effective consumer would rise as a result of the expected increase in the support ratio.

However, the support ratio trajectory shown in figure 4.3 indicates a transient effect that will be reversed when the window closes. The first dividend increases when participation of working-age cohorts in the labor market increases, when unemployment and underemployment are low, and when human capital is accumulated. But the dividend is not automatic. The economy must be dynamic enough to create jobs as the labor supply increases.

Figure 4.5 shows the evolution of the support ratio during the first dividend in several countries, as it moves from the lowest support ratio observed to the highest predicted level, and the resulting average economic growth. The dividend period is expected to be the longest in Brazil, Mexico, and Peru (60 years), and the shortest in Uruguay (35 years). Korea is presented as a benchmark because it has successfully gone through the entire demographic bonus period. It has the highest growth rate during the demographic bonus, followed by Mexico. Significantly, the forecast indicates that the first dividend period will last longer in a number of Latin American countries than it did in Korea.

The second dividend is related to an increase in productivity resulting from the increased savings during the first dividend period. If more savings mean more accumulation of productive capital, the productivity per effective worker will increase. The greater the propensity to save, the greater the effect; but that propensity varies by country. The profiles of the propensity to save by age and the resulting aggregate levels are illustrated in figure 4.4.

Expectations for the evolution of life-cycle deficits must be considered in assessing the second dividend because those deficits affect the need for accumulating wealth. The overall present value of the difference between consumption and labor earnings generated during a lifetime is a function of the life-cycle deficits generated at each age and the discount rate. This difference is called the "demand for life-cycle wealth," which can be accumulated through different

FIGURE 4.5

Support ratio during the demographic bonus period and economic growth
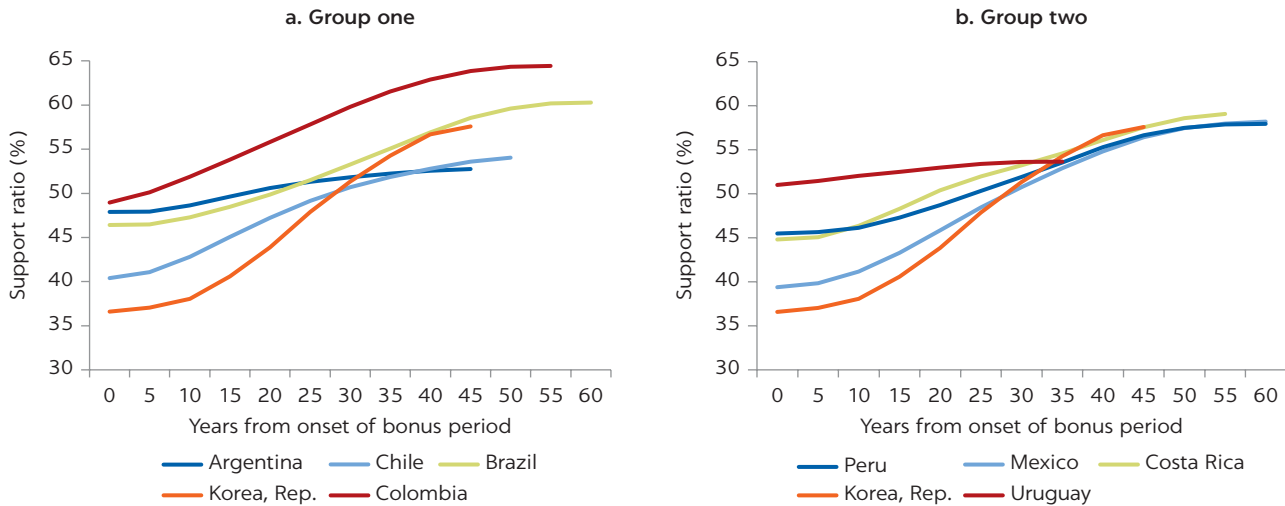
Sources: World Bank based on data from UN (2017) and the National Transfer Accounts, http://www.ntaccounts.org.
Note: The support ratio is the number of effective workers as a share of the number of effective consumers.

mechanisms, such as savings or pension rights. This demand changes with time as the demographic profile evolves. As an example, Mason et al. (2017) estimate the demand for life-cycle wealth for Mexico, finding that the overall demand for pension wealth was twice expected labor earnings after age 45 in 1950, and that demand grew systematically until it was 3.3 times as much in 2000 and will be 7.6 times as much in 2050 because of aging.

Significantly, the second dividend, unlike the first, is not automatic. For starters, it will be small if society saves little and, in Latin America, the saving rate is generally low (IDB 2016). Along these lines, the generosity and breadth of the social security system are particularly relevant. Second, savings should turn into productive investment in profitable projects. Developed financial markets are key to this process, and the region is sorely lacking in them (Didier and Schmukler 2016). Third, profitable investment projects are necessary. Because many countries in the region are middle-income economies, the marginal productivity of capital should, according to convergence theory, be high. Other growth factors, especially institutional quality (Acemoglu 2009), must be considered. Poor financial markets may lead to capital outflows being targeted to safe assets instead of productive investments.

REVERSAL OF THE FIRST DIVIDEND AND CONSEQUENCES OF AGING

Aging and longer lives will undoubtedly contribute to increased aggregate life-cycle deficits as the number of retirees as a share of the overall population grows. As figure 4.6 shows, the first dividend reverses as the support ratio increases. Panel a of figure 4.6 includes Japan, showing a hypothetical future trajectory for the countries in the region if the economy's sole driving force were demography. Panel b of figure 4.6, along with the region's reversion rates, shows

FIGURE 4.6

Reversal of the first dividend
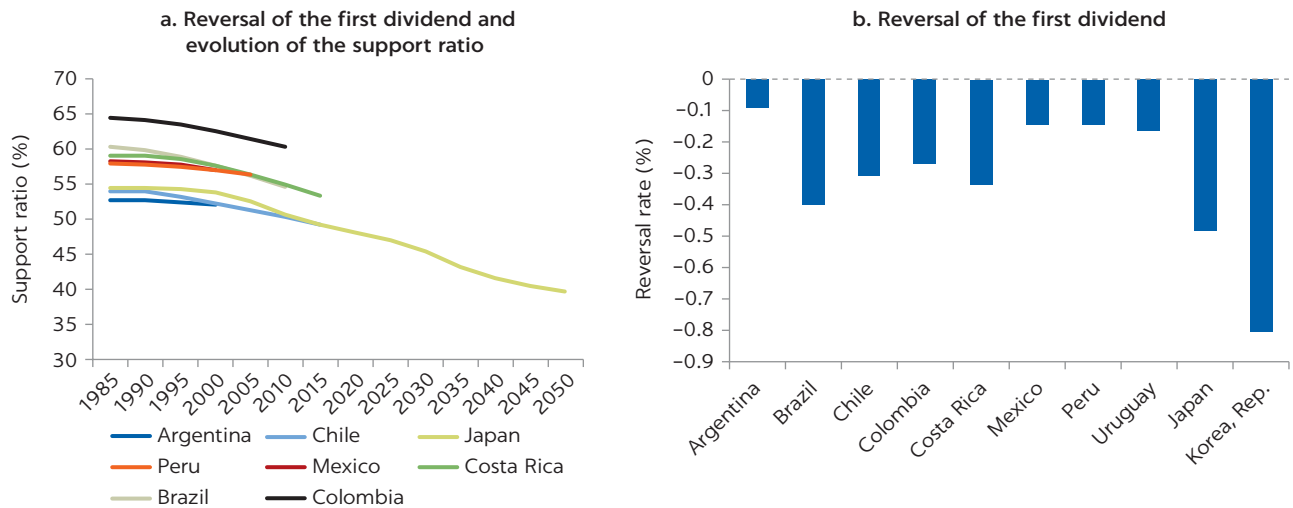
a. Reversal of the first dividend and evolution of the support ratio

b. Reversal of the first dividend

Sources: World Bank based on data from UN (2017) and the National Transfer Accounts, http://www.ntaccounts.org.
Note: The support ratio is the number of effective workers as a share of the number of effective consumers. Panel b shows the percentage decline in annual economic growth since the reversal of the first dividend.

the extent to which the first dividend was reversed in Korea, a country that benefited greatly from the first dividend.

As people live longer, they consume for longer with no labor earnings (see Japan's evolution, as shown in panel a of figure 4.6). As mentioned, a longer life leads to a reduction in the support ratio at each point in time. Living longer also drives up individual demand for pensions and aggregate demand. To balance out the higher demand for pensions and society's wealth restriction—that is, to avoid consuming the wealth of future generations—society needs to generate greater wealth today. Low savings in middle-income (as opposed to wealthy) countries such as Argentina and Brazil that also have generous social security systems may prove lethal for public debt sustainability in a context of longer life expectancy (see Clements et al. 2015).

If people are planning to fund their old age themselves through nonlabor earnings, they must save and accumulate assets to increase their income. Incentives to delay retirement could be created, provided social security regulations allow for it. Funding a longer consumption period with transfers could lead to a downward trend in consumption by young cohorts resulting from an increase in social security contributions or to the reallocation of fiscal space to the detriment of other expenses, such as education. In that case, old-age consumption would displace consumption of the rest of society, with a potential cost to human capital accumulation. Spending on education could decrease naturally as the share of the youth population drops. As mentioned, one option for countries with natural resources would be to consume those resources, which, in macroeconomic terms, would be inconsistent with Hartwick's rule (1977) and would result in genuine savings of less than observed savings (Hamilton 2008).

An alternative would be to try to mitigate the increase in the support ratio by acting on labor earnings rather than on consumption. One option for doing so would be to increase the retirement age (Sheiner, Sichel, and Slifman 2007). The retirement age could be reset to reflect longer life expectancy (which has

Adult population and labor and nonlabor support ratios in selected countries
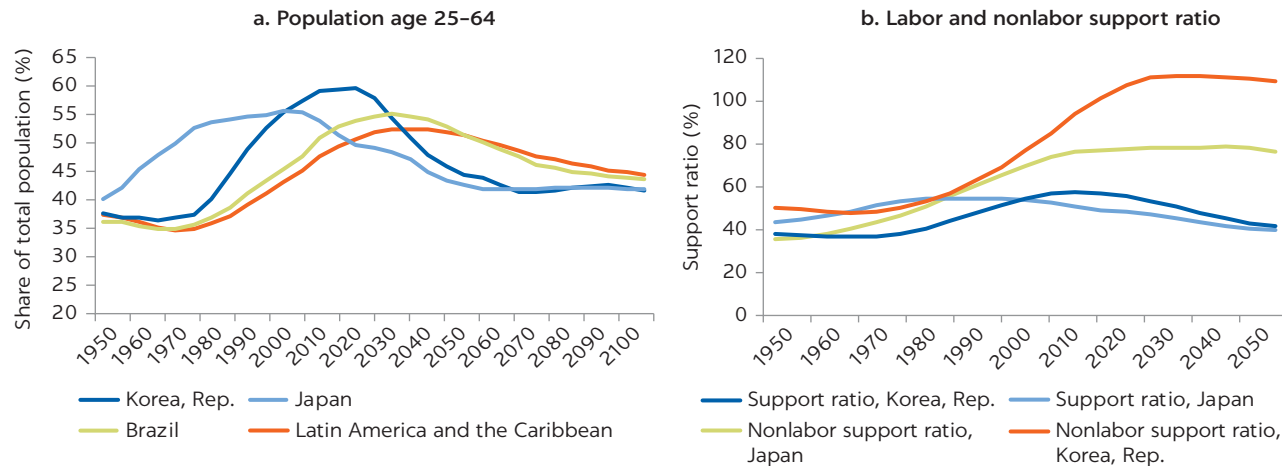
a. Population age 25–64

b. Labor and nonlabor support ratio

Korea, Rep.   Japan
Brazil   Latin America and the Caribbean

Support ratio, Korea, Rep.   Support ratio, Japan
Nonlabor support ratio, Japan   Nonlabor support ratio, Korea, Rep.

Sources: World Bank based on data from UN (2017) and the National Transfer Accounts, http://www.ntaccounts.org.
Note: The support ratio is defined as the ratio of effective workers to effective consumers.

already been proposed in older countries such as Sweden). Greater female participation in the labor market could also help offset aging in the region.

Each of these alternatives could, potentially, produce nonreversible changes in the economic structure. The degree of those changes will vary with preexisting structural context and institutional framework. A more detailed analysis is presented in the next section.

STRUCTURAL CHANGES, RESTRICTIONS, AND POLICIES

Some of the economic consequences of the demographic transition, such as the first dividend, are transient, while others are irreversible, such as the increase in the demand for life-cycle wealth. A reversible change (the first dividend) may cause irreversible changes (the increase in per capita income caused by the second dividend). When consequences are irreversible, three factors must be considered to assess the ultimate impact on the economic structure. The first factor is the characteristics of the economic structure in which the demographic change takes place because transformations in middle-income economies are often related to the development process. As explained previously, in macroeconomic terms, the demographic transition in countries such as the ones in Latin America come up against two structural changes—one demographically induced and one developmentally induced. The second factor is the reaction of individuals to aging. Aging appears to be linked to behavioral change on the part of individuals in relation to important macroeconomic variables, such as saving, capital-output ratio, investment profile, personal wealth, the decision to participate in the labor force, the propensity for emigration, labor performance capacity, and consumption preferences. The third factor is the institutional and policy reaction and the capacity for collective action on the part of the various groups involved.

This section deals with the restrictions on and with the structural and behavioral transformations of cohorts considered important to the region and with public policies and institutional reforms that may help prepare for aging.

Savings of adult cohorts, nonlabor earnings, and consumption support

This discussion points to the consequences for the macroeconomy of the evolution of the set of cohorts age 25 to 64, which, as observed, has a positive saving rate. Figure 4.7 shows the evolution of that group of cohorts in four cases: Japan, Korea, Brazil, and Latin America and the Caribbean as a whole.

Aging is under way in the four cases illustrated in figure 4.7; it is responsible for the change in the participation of those age 25–64 in the total population. The population age 65 and older will account for 19.5 percent of the population by 2050, rising from 7.6 percent in 2015. Youth, meanwhile, will drop from today's 43 percent of the population to less than one-third (29.3 percent) by 2050. These changes mean that the participation of adults age 25–64 will grow until peaking and then decline. Not until 2060 will the proportions of those cohorts return to 2015 levels.

In designing aging-oriented public policies, it is crucial to understand that for a long time, the youth population—rather than the adult population—will be displaced by the elderly. Analyzing the evolution of the adult population as a whole is key to the macroeconomy for the two reasons mentioned above: the adult population yields positive savings, and, within the group of adult cohorts, the share of total revenues from capital income generated by previously accumulated assets grows with age. The following three observations are relevant for public policies.

First, the paths, whether observed or projected, for Japan and Korea show a significant decrease in the adult population—that is, in primary savers—with aging. After the adult group peaks, it will shrink for 40 years (in Korea) or for 50 years (in Japan), before leveling off at about 41 percent of the population. The drop was steeper in the years closer to the peak. Second, a comparison of Korea and Japan with Latin America and the Caribbean and Brazil—which is older than the region's average—shows that the labor force participation of prime savers will always be lower, which may help explain why saving rates in Japan and Korea tend to be higher. A weak point in the region is its low saving rate compared with the rest of the world, which limits the ability to generate future nonlabor earnings. Third, after peaking, the drop in the labor force participation of the group age 25–64 is less steep in the region and in Brazil than in Korea and Japan. For that reason, Latin America could face fewer problems for several decades with regard to drops in future savings.

Important for designing policies is understanding the impact of behavior on the shape of the curves shown in figure 4.7. The "youth society" will vanish in the region, but that does not mean that the elderly will displace adult savers. Despite variations between countries, the percentage of the nonelderly adult population will start to decline in the region by 2060. Until then, making the most of adults' saving capacity will be as important as adapting policies and institutions to accommodate a society with more retirees.

Thus, the challenge for current policy is to prepare for an adult society that is rapidly becoming less youthful before aging accelerates. In 2050, the region's adult population (those age 25–64) will still account for 51 percent of the total

population. Panel b of figure 4.7 shows the trends expected for the support ratio in two aged countries, Japan and Korea. After peaking in the 1980s and 2010s, the support ratio will decline and return, by 2050, to its value of 100 years earlier, or even lower. But of course, there would be a fundamental difference with serious economic consequences: in 1950, the dependency ratio was high because of the proportion of children; and in 2050, it will be high because of the weight of the elderly population. The elderly, unlike children, may have planned their life-cycle deficits and accumulated wealth. This factor can be analyzed with projected nonlabor earnings, estimating what will happen if National Transfer Accounts profiles stay the same but aging sets in.

In a world in which people do not plan to consume all their wealth before dying, it may be useful, in assessing consumption support capacity, to consider the evolution of the nonlabor support ratio, defined as the ratio of nonlabor earnings to consumption. This is presented in the green and blue lines in panel b of figure 4.7, showing that as society ages and the support ratio based on labor earnings falls, the support ratio based on nonlabor earnings rises dramatically, to reach a stationary level long after aging begins. The combined capacity to support consumption (that is, the sum of the labor and nonlabor support ratios) can be maintained or even increased despite drops in the labor support ratio as long as the nonlabor support ratio increases. And the nonlabor support ratio may increase if nonlabor earnings rise or if the propensity for consumption drops and—as mentioned previously—both will happen when the share of the older working-age population increases. When the elderly population primarily displaces youth, there is no increase in the propensity for consumption because the youth displaced by the elderly have a very low or even a negative propensity to save.

An essential policy lesson, therefore, is that Latin America should make the most of the time remaining until the participation of the primary saver cohorts begins to decline. A political economy restriction must be considered regarding reforms in the social security and pro-saving systems. The Japanese and Korean experiences show that aging leads to higher income participation of adult cohorts with a high nonlabor earnings ratio. The same holds true in the demography-based forecasts for Latin America. And because assets are required to obtain nonlabor earnings, if the intracohort wealth distribution is too unequal, aging may seriously affect the income distribution. Under these conditions, it will be harder to introduce policies to favor saving incentives if they bear a fiscal cost. Those expecting to receive state transfers because they do not have any wealth may anticipate that savings will result in lower state pensions, and they will be unlikely to support reforms along these lines. Why support a reform that will lead to less generous social security if more induced savings will only bring about a rise in assets for those with saving capacity, who will later become the wealthiest? This scenario would introduce an intertemporal inconsistency into the budget for political economy reasons that, due to a paradox, would be very difficult to manage: if there are no savings today, transfers will not be high tomorrow, because not only growth but also the tax base to support the social security system will be low. This vicious circle could easily lead to growth traps.

Accumulation, productivity, and employment

As noted, the rise in capital inflows relative to the total income associated with the larger weight of adult cohorts can only materialize through asset

FIGURE 4.8

Investment rate
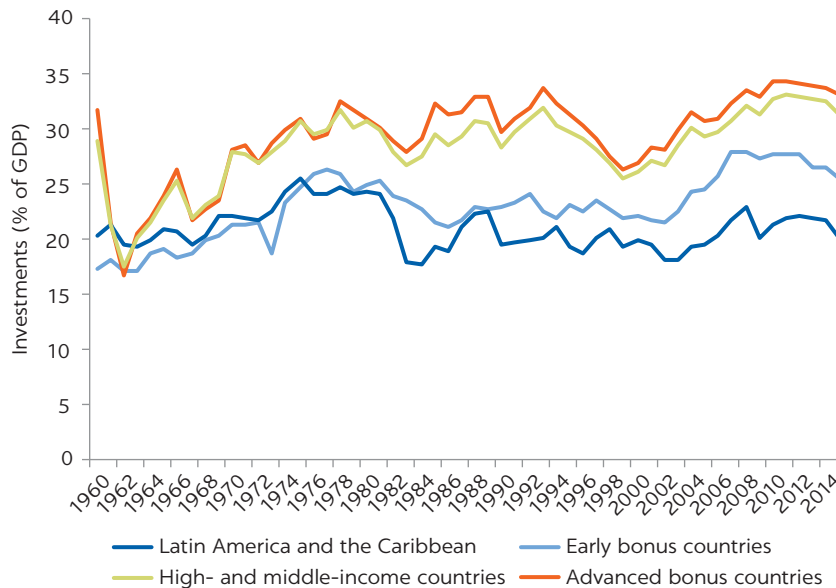
Source: World Bank, World Development Indicators.
Note: GDP = gross domestic product.

accumulation, whether in the domestic economy as productive capital, or—as is increasingly the case—in a net international position. This asset accumulation is not happening in Latin America as it did in Korea and Japan, where saving and capital accumulation rates during the demographic bonus period were very high.

The World Bank offers statistics on the investment rate of countries at various stages of the demographic transition. As figure 4.8 illustrates, the investment rate in Latin America is lower than in countries that, according to World Bank classification (2016b), are at the advanced and early stages of the demographic dividend. In Argentina and Brazil, the rate is even lower than the Latin American average.

Net international foreign investment position and genuine savings are two additional indicators. A positive net international foreign investment position may reflect a country's weak domestic institutional framework and not a high saving rate. Argentina and the República Bolivariana de Venezuela, for instance, are the only large economies in the region with creditor positions, although Argentina is incurring debt again. On the other hand, savings rates, net of revenues from natural resources, are also low. Albrieu and Fanelli (2017) show that these revenues are an important financing source, which has consequences for debt sustainability during the aging period.

The region needs to implement policies to increase savings rates and the pace of accumulation to maintain the support ratio and avoid a rise in the propensity for consumption. Weak accumulation in the future could be offset, however, by the fact that when the working-age population declines, the capital-to-output ratio improves. A smaller work supply "automatically" drives up the amount of capital per worker.

Other features of the aging process will also affect the evolution of productivity and require policy interventions. The increase in nonlabor earnings will be

offset by the fact that, if the capital-to-labor ratio rises, returns drop. A drop in profitability could be worsened if the cohorts of retired workers grow in the future and a large percentage of retirees simultaneously decide to sell their assets to fund consumption. There are some ways to offset that effect. The first way would be to access international markets, as Japan did. When aging set in, the country began to export capital and became an international creditor. If aging were to lead many countries to export capital at the same time, an excess of savings could be generated, pushing the international interest rate down. Some authors suggest that an excess of savings caused by demographics could be one reason for the currently low international interest rates (Aksoy et al. 2015).

It is difficult to assume that asymmetries in the progression of the demographic transition between young and economically lagging countries on the one hand, and older and richer nations on the other, do not generate mutual advantages for international trade in financial assets. Aging countries have savings and younger countries have highly profitable investment projects (Fanelli 2015). Macroeconomic instability and, particularly, weak institutions generate transaction costs, making asset transactions less profitable. The policy conclusion that follows is that countries with asymmetric demographies can strongly benefit from improving their financial systems' capacity to join international markets. They would also greatly benefit from improvements in the international financial architecture, a global public good that has not received enough attention. The Group of Twenty, which brings together young and old countries, as well as countries in the bonus period, could be the right setting in which to discuss how to provide the global public goods needed to exploit the benefits of the asymmetric demography.

Technical progress is another way to avoid the reduction in rates of return as a result of capital accumulation. Total factor productivity (Daude and Fernandez-Arias 2010) in the region tends to be low because of poor investment in science and technology. Policies aimed at stimulating total factor productivity would have a beneficial effect on the capacity of nonlabor earnings to fund consumption during aging. The region is also characterized by informal jobs and underemployment. If the region's economies create jobs so that workers find "modern" jobs, global economic productivity might increase.

CONCLUSIONS

This chapter reviews the links between population aging and the macroeconomy in Latin America and the Caribbean. The links are multiple and vary depending on demographic stage as well as on the specific features of each economy and how they relate to the international economy. Analyses of this sort are not common in public policy design. Though the importance of demography for growth and debt sustainability is well documented, it is not properly considered in macroeconomic discussions, in part because its consequences are felt only gradually. The consequences of changes in the population structure are somehow "concealed" from the perception of both policy makers and the broader public, even though, as this analysis shows, preparedness for aging is central to the development of sustainable strategies for countries currently in the bonus stage.

The region's countries have the advantage of being able to learn from the experiences of economies at more advanced stages of the demographic

transition. There are four main challenges for benefiting from this learning, however. First, when Latin American countries exit the bonus stage and accelerate aging, per capita GDP will probably be lower than it was when the transition took place in developed countries. In 2010 constant dollars, per capita GDP in Japan at that juncture was $30,000 and in Korea $22,000—either of which would certainly constitute an optimistic ceiling for Latin America. Second, policy choices and behavioral responses from economic agents and individuals will only be known as aging advances. Reactions vary from country to country because of institutional and cultural factors. Some features, however, are common to the whole region, such as a large number of informal jobs and heavy reliance on natural resources. Third, Latin America will age in an international demographic context different from the one in which many other countries aged. The region will age in a framework of global demographic asymmetries, with young and relatively poor countries at one extreme and old and relatively rich ones at the other (Fanelli 2015). These asymmetries matter because they have an impact on international capital flow incentives and, therefore, on the allocation of worldwide savings, with an incidence on yields. Last, even if private reactions and optimal policies were known for sure, the political economy shows that collective action may lead to nonoptimal policy responses attributable to the pressure exerted by groups with different capacities to organize collectively. Reforms in social security systems and changes in income distribution based on the distribution of wealth may well be needed, but they might be politically infeasible.

Even if the region's policy makers become aware of these demographic and macroeconomic challenges, they will have to set policy priorities given that the fiscal space is as limited as the capacity to design, implement, and assess policies' results. One policy priority would be to offset, to the extent possible, the "concealed liabilities" of demography and make the most of its "concealed assets" as potential increases in savings through at least 2050. Another priority would be to join international markets to benefit from demographic asymmetry and, potentially, to increase labor participation, particularly among women, to consolidate per capita income, taxation, and fiscal space.

The next four chapters focus on these challenges: how to manage fiscal pressures and introduce reforms that increase the impacts of the first and second dividends, focusing on the five policy areas that seem to be most relevant in this context: health (chapter 5), long-term care (chapter 6), pensions (chapter 7), education (chapter 8), and labor markets (chapter 9).

NOTES

1. See National Transfer Accounts, "Applications," accessed August, 2017, http://ntaccounts.org/web/nta/show/Applications.
2. See World Population Prospects 2017, accessed September 2017, https://esa.un.org/unpd/wpp/.
3. The methodology and information provided by the National Transfer Accounts—such as profiles per consumption cohort, labor and nonlabor earnings, government benefits, and taxes paid by each cohort—are very useful.
4. φ_a parameters are defined as a cohort's per capita consumption standardized by the average per capita earnings of cohorts age 30–49. The National Transfer Accounts data provide information on consumption and labor earnings profiles for the baseline year and for a set of Latin American countries. This chapter uses per capita GDP because it best fits this macroeconomic analysis.

REFERENCES

Acemoglu, D. 2009. *Introduction to Modern Economic Growth*. Princeton, NJ: Princeton University Press.

Aksoy, Y., H. Basso, T. Grasl, and R. Smith. 2015. "Demographic Structure and the Macroeconomy." VOX CEPR´s Policy Portal. http://voxeu.org/article/demographic -structure-and-macroeconomy.

Albrieu, R., and J. M. Fanelli. 2017. "Fiscal Sustainability, Demography, and Redistribution in Latin America." Presentation at the Workshop on Methodological Advances in Fiscal Incidence Analysis: Commitment to Equity Institute (CEQ), Universidad de San Andrés, November 7–8.

Bloom, D. E., S. Chatterji, P. Kowal, P. Lloyd-Sherlock, M. McKee, B. Rechel, L. Rosenberg, and J. P. Smith. 2015. "Macroeconomic Implications of Population Ageing and Selected Policy Responses." *Lancet* 385 (9968): 649–57.

Bussolo, M., J. Koettl, and E. Sinnott. 2015. *Golden Aging: Prospects for Healthy, Active, and Prosperous Aging in Europe and Central Asia*. Washington, DC: World Bank.

Canning, D., S. Raja, and A. S. Yazbeck, eds. 2015. *Africa's Demographic Transition: Dividend or Disaster?* Washington, DC: World Bank.

Clements, C., K. Dybczak, V. Gaspar, S. Gupta, and M. Soto. 2015. "The Fiscal Consequences of Shrinking Populations." Staff Discussion Note, International Monetary Fund, Washington, DC.

Cotlear, Daniel. 2011. *Population Aging: Is Latin America Ready?* Directions in Development Series. Washington, DC: World Bank.

Dasgupta, P. 2009. "The Place of Nature in Economic Development." In *Handbook of Development Economics,* vol. 5, edited by D. Rodrik and M. Rosenzweig, 4977–5046. Amsterdam: North Holland.

Daude, C., and E. Fernandez-Arias. 2010. "On the Role of Productivity and Factor Accumulation in Economic Development in Latin America and the Caribbean." Working Paper Series 155, Inter-American Development Bank, Washington, DC.

de la Torre, Augusto, Alain Ize, and Sergio Schmukler. 2012. *Financial Development in Latin America and the Caribbean: The Road Ahead*. Washington, DC: World Bank.

Didier, T. R. Llovet-Montanes, and Sergio Schmukler. 2016. "Benchmarking Intra-Regional Financial Flows in Latin America." Unpublished manuscript, World Bank, Washington, DC.

Fanelli, J. M., ed. 2015. *Asymmetric Demography and the Global Economy: Growth Opportunities and Macroeconomic Challenges in an Aging World*. New York: Palgrave Macmillan.

Gourinchas, P. O., and H. Rey. 2013. "External Adjustment, Global Imbalances, Valuation Effects." In *Handbook of International Economics,* vol. 4, edited by G. Gopinath, E. Helpman, and K. Rogoff, 585–646. Amsterdam: Elsevier.

Hamilton, K. 2008. "Wealth, Saving and Sustainability." Unpublished manuscript, Environmental Department, World Bank, Washington, DC.

Hartwick, J. M. 1977. "Intergenerational Equity and the Investing of Rents from Exhaustible Resources." *American Economic Review* 67 (5): 972–74.

IDB (Inter-American Development Bank). 2016. *Ahorrar para desarrollarse: Cómo América Latina y el Caribe puede ahorrar más y mejor*. Washington, DC: IDB.

Lee, R., and A. Mason. 2006. "What Is the Demographic Dividend?" *Finance and Development* 43 (3). http://www.imf.org/external/pubs/ft/fandd/2006/09/basics.htm.

Lee, R., and A. Mason. 2012. *Aging, Economic Growth, and Old-Age Security in Asia*. Cheltenham, UK: Edward Elgar.

Mason, Andrew, Ronald Lee, Michael Abrigo, and Sang-Hyop Lee. 2017. "Support Ratio and Demographic Dividends: Estimates for the World." Technical Paper 2017-1, Population Division, Department of Economic and Social Affairs, United Nations, New York.

Sheiner, L. 2014."Macroeconomic Impact of Population Aging: The Determinants of the Macroeconomic Implications of Aging." *American Economic Review: Papers and Proceedings* 104 (5): 218–23.

Sheiner, L., D. Sichel, and L. Slifman. 2007. "A Primer on the Macroeconomic Implications of Population Aging." Finance and Economics Discussion Series, Divisions of Research and Statistics and Monetary Affairs, Federal Reserve Board, Washington, DC.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

World Bank. 2016a. *Development Goals in an Era of Demographic Change: Global Monitoring Report 2015/2016*. Washington, DC: World Bank.

World Bank. 2016b. *Live Long and Prosper: Aging in East Asia and Pacific*. Washington, DC: World Bank.

5 The Challenges for Health Systems

INTRODUCTION

Increased longevity has allowed us to reconsider our perceptions and rigid notions of what it means to be elderly and of how lives evolve, recognizing the active role seniors play in society. Nevertheless, living longer lives also presents several organization and funding challenges for health systems in Latin America and the Caribbean. As a population ages, the incidence of chronic noncommunicable diseases and the extended impairment of the functional capacity of individuals seems to increase, given that these diseases are more common among older individuals (Beard et al. 2015; WHO 2015b). Conditions such as cardiovascular diseases, cancer, obstructive pulmonary disease, dementia and Alzheimer's, and the consequences of diabetes are becoming more prevalent among the causes of burden of disease, both in mortality and morbidity. Furthermore, aging is associated with an increased likelihood of having more than one chronic illness at a time, a condition known as multimorbidity.

The higher incidence of chronic noncommunicable diseases and multimorbidity are clearly linked to higher health care costs (Medici 2011). With regard to the discussion presented in chapter 3, health system finances may be affected by population aging through two channels. First, older individuals tend to demand more health services, so the change in dependency rates will increase expenditures. Second, the current generosity levels in most countries in the region are well below those of more developed economies as a consequence of existing restrictions on accessing services (insufficient coverage of public health insurance programs) and less use of complex, more costly treatments. As a result, the simulation in chapter 3 indicates that health care spending for the elderly could, on average, nearly triple in the next few decades.

The link between age and health care costs is heavily influenced by the characteristics of the health system and the different incentives and approaches to intervention that they have regarding care for the elderly and the final stage of life. Estimates for Organisation for Economic Co-operation and Development (OECD) countries show that the evolution of health care spending between 1990 and 2002 varied greatly between countries and, although the variation can be explained by the different configurations of the health systems, overall

three-quarters of the increases are due to the generosity of benefit packages provided rather than the aging of the population itself (Hagist and Kotlikoff 2005). This outcome implies a need to rethink the design of health systems to make them more equitable and effective in dealing with the challenges posed by an aging population.

This chapter discusses the effects of population aging on health expenditures and health systems in Latin American and the Caribbean, based on the projections of public spending on health to 2045 presented in chapter 3. To that end, the next section of this chapter analyzes the estimates for 18 countries in the region, breaking them down into two explanatory factors related to the demographic and the generosity effects, the last one represented by changes in benefit packages provided by health systems. This discussion is followed by a section that describes the implications of the demographic effect for the region using mortality and morbidity profiles and, on that basis, an examination of present and future needs. The subsequent section suggests recommendations that can be implemented by health systems to better meet the challenges of the aging population. The chapter closes with main conclusions.

HEALTH EXPENDITURE PROJECTIONS AND POPULATION AGING

Expected increases in health expenditures can be explained by two sets of drivers: demographic and nondemographic factors. The first factor is related to changes in the population age structure and, in particular, a greater proportion of older adults and the resulting shift toward health profiles associated with chronic noncommunicable diseases. The second set of factors includes income levels, the sector's relative prices, technological advances, and the incentives and operational structures generated by health systems.

Health spending has increased rapidly around the world over the last two decades, outpacing growth in gross domestic product (GDP); the average real annual variation in health spending is 4 percent, whereas average growth of the global economy is 2.8 percent (Xu et al. 2018). Projections to 2050 indicate that this trend will continue in the coming years, although at a lower rate than between 1995 and 2016 (1.8 percent).[1]

The public sector is also playing a larger role as a source of funding in what has been called the financing transition. This trend indicates that countries are moving from a state of low health care spending, mainly paid for by out-of-pocket expenditures, to a state of larger outlays and more concentrated financing. This transition can be explained by social and political changes that demand that government play a more active role, and by economic growth, which allows more income to be earmarked for spending on health services and public programs (Fan and Savedoff 2014).

The projections for health care spending in relation to GDP for 18 countries in Latin America corroborate the trend. Median health care spending as a percentage of GDP would rise in the region to 5.3 percent from 4.2 percent between 2015 and 2045, with a median increase of 1.1 percentage points, as shown in figure 5.1. Although all countries in the region would experience this trend, it is particularly marked in Chile (2.8 percentage point increase), Costa Rica (2.4), and Uruguay (2.0). In contrast, Guatemala (0.3 percentage point increase), Honduras (0.5), Bolivia (0.5), and Paraguay (0.6) would register the lowest

FIGURE 5.1

Public health expenditures in Latin America, 2015–45
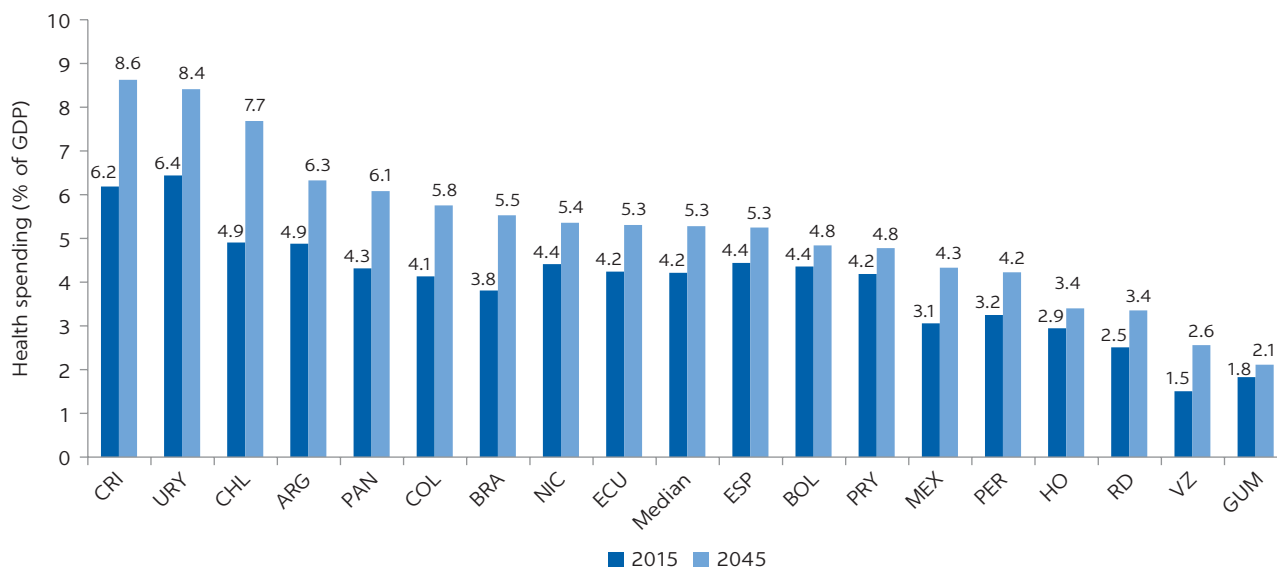
Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), and age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011).
Note: GDP = gross domestic product.

increases—not even 1 percentage point—with health care expenditures as a percentage of GDP ranging from 2.1 percent to 5.0 percent.

As discussed in chapter 3, these projections can be decomposed into two set of determinants: the demographic dependency ratio and the benefit generosity ratio:

• The demographic component is the effect of changes in population composition by age group, in particular, the redistribution from younger to older adults and the resulting patterns of disease and mortality.
• The benefit generosity component is the effect of sector policies on coverage and benefits. Although it is hard to predict how these policies will evolve in the medium term, a useful baseline for the discussion is to assume that they will tend to mirror today's prevalent models in OECD countries. The evidence about the relationship between income and health care spending supports this hypothesis: as countries grow, health expenditures increase, though to what extent is unclear. This component includes the trends in systems design and technological advances.

Figure 5.2 provides an analysis of the projections presented in figure 5.1 by breaking down the growth in public expenditures on health as a share of GDP between 2015 and 2045, taking into consideration the following: (1) the demographic effect alone, that is, the increase of the population of older adults in the population structure with no change to the benefits package; and (2) the benefit generosity component added to the demographic effect, supporting the hypothesis that as GDP grows, countries tend to resemble OECD countries. The breakdown shows that if demographic factors alone were considered as drivers, the median increase for the 18 countries as a whole would be only 0.2 percentage

FIGURE 5.2

Expected variation in public expenditures on health, 2015–45
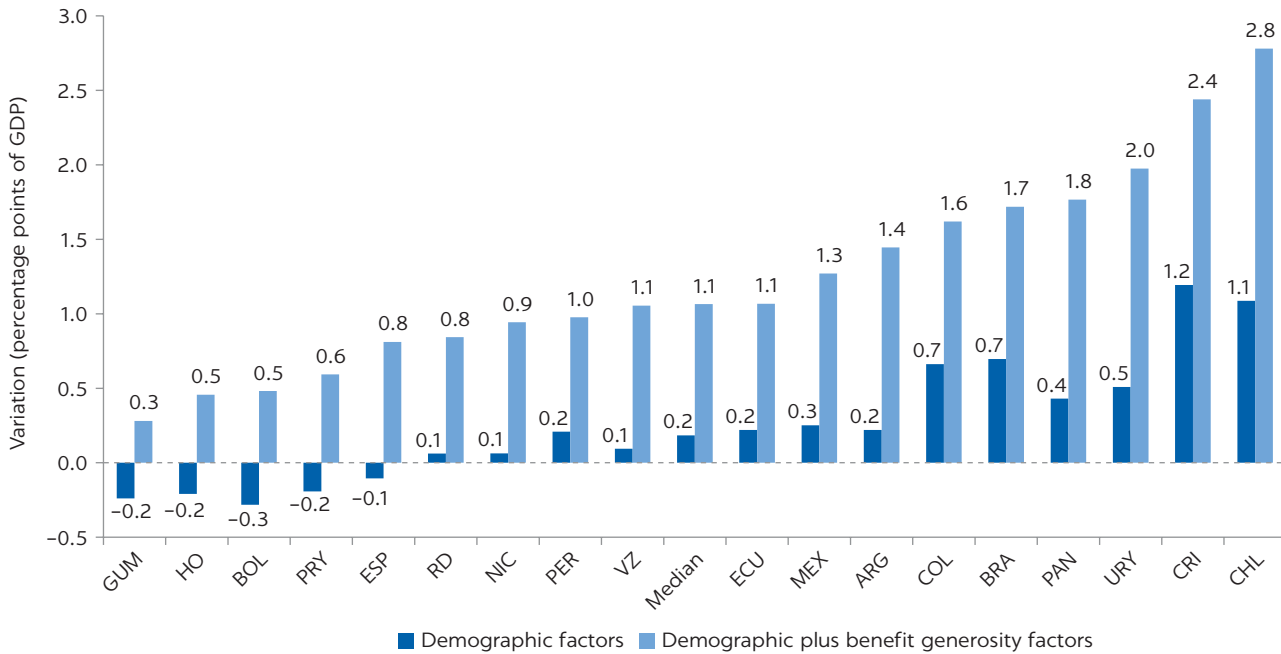
Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, health care spending data from the WHO (World Health Organization) Statistical Information System, population data from UN (2017), and age profiles of public health care spending for high-income and upper-middle-income countries from the National Transfer Accounts (Lee and Mason 2011).
Note: GDP = gross domestic product.

point, whereas if the effect of the generosity of benefits is added, the increase climbs to 1.1 percentage points.

The analysis by country shows that in all cases, the combined effect of the demographic and benefit generosity components should yield an increase in the percentage of public expenditures on health in relation to GDP. Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, and Uruguay stand out, with values between 1.1 percentage points (Ecuador) and 2.8 percentage points (Chile). Except for Chile and Costa Rica, the demographic component alone never exceeds 1 percentage point, and in Bolivia (–0.3), El Salvador (–0.1), Guatemala (–0.2), Honduras (–0.2), and Paraguay (–0.2), the demographic component is even negative.

The projections and breakdown for the 18 Latin American countries support the conclusion that the effect on the increase in health care spending of the generosity of benefit packages in the region is greater than the effect of population aging. This conclusion is consistent with findings in OECD countries, where variables such as national revenue, the sector's relative prices, technological advances, and the structure of the health systems have been shown to shed more light on health care spending trajectories than the population aging trend.

National income data show that as individuals and countries increase their incomes, the demand for health services also grows. This correlation would explain, in part, the increase seen in health sector spending. However, the degree to which income growth drives the increase in health care spending is unclear; that is, whether increased spending on health is a luxury or a necessity is uncertain.

Some estimates suggest a higher income elasticity per unit (Hagist and Kotlikoff 2005; Musgrove, Zeramdini, and Carrin 2002), although more recent studies estimate an elasticity of less than 1—between 0.70 and 0.95—even in middle- and low-income contexts (de la Maisonneuve and Oliveira Martins 2013; Fan and Savedoff 2014; Xu, Saksena, and Holly 2011).

Other, nondemographic drivers of health care expenditures are the incorporation of technology, price increases, and the organization of health system funding, insurance, and provision of services, as well as the sector's institutions and policies. The OECD estimated that these elements accounted for half of the increase in public expenditures on health between 1990 and 2009 (de la Maisonneuve and Oliveira Martins 2013).

Discrete analyses of the influence of technology, prices, and organization of health systems on health expenditures are complex, given that these factors tend to be interconnected. Although technology has been presented as one of the primary drivers of increases in health care spending, evidence shows that the relationship between the factors is dynamic and complicated (Sorenson, Drummond, and Khan 2013), and that the development, incorporation, and spread of technology cannot be considered separately from economic growth and the generosity of coverage by insurance systems (Smith, Newhouse, and Freeland 2009).

The influence of nondemographic factors on increases in health spending has implications for public policy. An excessive focus on population aging as an unavoidable phenomenon and as the cause of increased expenditures in the sector has distracted policy makers from other major factors, specifically the ones associated with incorporating innovative technologies and pharmaceutical products without analysis of costs or expected outcomes, the over- or underutilization of available products and services, and misguided incentives for the general public, health professionals, and health care providers caused by sector regulations.

In 2010, the World Health Organization (WHO) estimated that between 20 percent and 40 percent of world health resources were being wasted, indicating extensive inefficiency in health systems, regardless of a country's income level (WHO 2010). Major areas of inefficiency can be grouped into the following five categories: (1) inappropriate or costly use of human resources; (2) extremely costly pharmaceutical products used without adequate rationale, along with a failure to use generic drugs and a lack of quality-control policies; (3) overuse of health care procedures and equipment (induced demand) without adequate analysis of cost-effectiveness; (4) suboptimal scale and quality of health care services, as well as poor planning and coordination of inpatient services and emphasis on curative, rather than preventive, services; and (5) lack of clarity in guidelines for allocating and controlling resources (Chisholm and Evans 2010).

In Latin America, efficiency and outcomes could be improved with current budgets. The region's countries are on average less efficient than OECD countries, particularly with regard to equal access to health care services. However, the region's performance on mortality rates of children under five and life expectancy is good (Izquierdo, Pessino, and Vuletin 2018).

Hence, even though the demographic factor does not appear to be the main cause of the increase in health expenditures by itself, it creates a pattern of increased consumption of health services associated with chronic noncommunicable diseases. That tendency—along with inefficient, fragmented health

systems with poor coordination between actors and a focus on treating acute episodes rather than promoting health and disease prevention—raises pressure to procure resources to fund the system.

The next section analyzes health needs resulting from population aging (including the effects of demographic and epidemiological changes) and proposes possible health system strategies to meet the challenges of serving an aging population (the benefit generosity component).

MORTALITY AND MORBIDITY PROFILES OF AN OLDER POPULATION

According to the theory of the epidemiological transition, as nations modernize, the social, economic, and health conditions of their populations tend to improve. Circumstances that would have helped spread parasitic and infectious diseases are mitigated by improved sanitation and hygiene, medical technology, and better living conditions and lifestyles. As a result, the probability of dying from a communicable parasitic or infectious disease drops, while the possibility of surviving to an older age rises. The end result is a change in causes of death, a redistribution of mortality from youth to adults, and an increase in life expectancy.

The epidemiological transition recognizes three stages. The first is the age of pestilence and famine, characterized by a high and fluctuating mortality rate that impedes sustained population growth and a life expectancy at birth that fluctuates between 20 and 49 years and is unlikely to increase. In the age of receding pandemics, the second phase, mortality rates decline as epidemics become less frequent. The population grows exponentially, and life expectancy reaches almost 50. Finally, in the third phase, the age of degenerative and man-made diseases, mortality rates continue to decline and eventually stabilize at a relatively low level, while life expectancy approaches and exceeds age 70. During this last stage, chronic and degenerative diseases replace infectious diseases as the leading causes of death and morbidity.

There are multiple reasons behind the shift in patterns of disease and mortality from infectious diseases to chronic noncommunicable diseases: environmental and biological factors; economic, social, political, and cultural changes; improvements in living conditions and standards (for example, sanitation services, nutrition, and hygiene); advances in medical technology and public health policies; greater understanding of infectious diseases and the use of antiseptic procedures and pasteurization; and lower rates of fertility, larger lapses between births, and improved child survival rates. All of these factors increase life expectancy and, hence, contribute to an aging population.

Different models of the transition are tied to different patterns, rhythms, and determining factors, but three stand out: First is the classic model, which describes the experience of developed countries. It is characterized by a progressive transition from high rates of mortality and fertility to low rates, coupled with a process of modernization and revolutions in the medical sector and public health arena. Second is the accelerated model, for which Japan is the most emblematic example, where the transition was achieved very quickly, followed by the modernization and rapid adoption of advancements in the health sector. Third is the contemporary or delayed model, which is seen in today's developing countries, including several countries in Latin America. Central to this model,

FIGURE 5.3

Mortality by type of cause in Latin America and the Caribbean, 1990, 2017, and 2045, and comparison with OECD countries, 2017
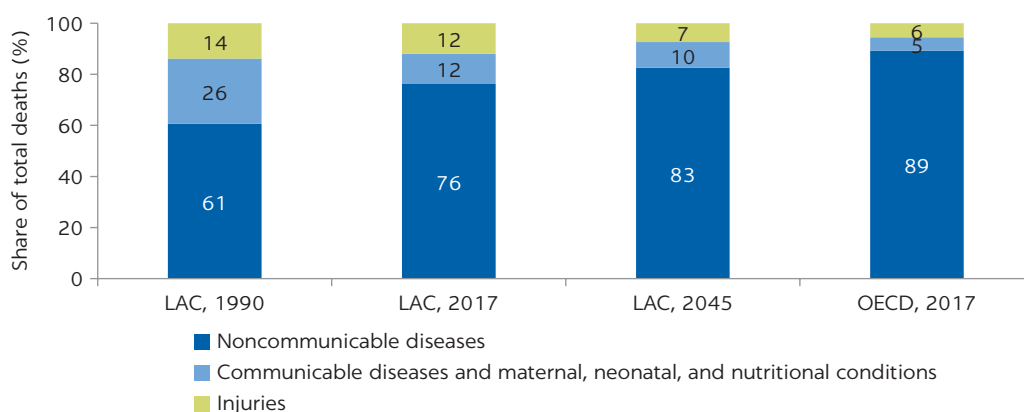
Sources: World Bank based on data from IHME (Institute for Health Metrics and Evaluation) Global Burden of Disease Study 2017 Results and WHO (World Health Organization) Projections of Mortality and Causes of Death, 2017–2060.
Note: LAC = Latin America and the Caribbean; OECD = Organisation for Economic Co-operation and Development.

which did not take hold until after World War II, is the implementation of public health measures to reduce mortality while fertility rates remain high (Omran 2005).

The scale of the reduction in mortality suggests we are entering a fourth phase of epidemiological transition, the age of declining degenerative diseases, characterized by a rapid decline in mortality rates, now concentrated in old age, at an equal rate for men and women. In other words, although the causes of death are similar in this phase and the previous one, the risk of death from those causes is distributed toward older adults (Olshansky and Ault 1986).

Figure 5.3 shows the distribution of deaths in three main groups: (1) noncommunicable diseases; (2) communicable diseases, and maternal, neonatal, and nutritional conditions; and (3) injuries. The information shows the evolution of patterns of mortality in Latin America and the Caribbean between 1990 and 2017, and a comparison with current patterns in OECD countries, as well as a projection for the region for 2045.[2]

The data show that, although noncommunicable diseases accounted for more than half of all deaths in Latin America and the Caribbean throughout the period under analysis, their relative share has been increasing, jumping from 61 percent to 76 percent from 1990 to 2017. Meanwhile, the relative weight of communicable diseases and maternal, neonatal, and nutritional conditions has dropped from 26 percent to 12 percent in the same period. Injuries remain about 14 percent, though its share fell from 1990 to 2017.

The WHO projections for Latin America and the Caribbean for 2045 suggest that noncommunicable diseases as a cause of death will approach current rates for OECD countries, with a difference of only 6 percentage points (83 percent versus 89 percent). This projection supports the hypothesis that as countries in the region develop, their epidemiological profiles will begin to resemble those of more developed countries. Nevertheless, by 2045 communicable diseases will have twice the share in the region as in the OECD countries for 2017, indicating ongoing health challenges associated with more vulnerable socioeconomic

conditions. On the other hand, in 2045 the incidence of injury will be very similar to its current incidence in OECD countries.

Table 5.1 breaks down by country the growing relevance of noncommunicable diseases as a cause of death in Latin America and the Caribbean. In most cases, the incidence of noncommunicable diseases as a cause of death increased from 1990 to 2017; it remained steady in those countries that recorded levels exceeding 80 percent in 1990. In 2017, noncommunicable diseases accounted for more than 60 percent of deaths in all the countries presented in the table. At the same time, communicable causes of death fell by more than 30 percent in all countries except Uruguay and Argentina; in all cases they were below 25 percent by 2017.[3]

The extent of the change has not been the same in all countries because some countries had already registered an increased proportion of noncommunicable diseases as a cause of death in 1990. By 2017 some countries in the region had mortality profiles very similar to those of OECD countries, indicating that the epidemiological transition is almost complete in several cases, and the patterns of health care needs in these countries are very similar to those in OECD countries.

Figure 5.4 shows the percentage of deaths distributed among three major groups of conditions (noncommunicable, communicable diseases, and injuries)

TABLE 5.1 Mortality by type of cause in selected Latin American countries, 1990 and 2017

Percentage of total deaths

COUNTRY	NONCOMMUNICABLE DISEASES		COMMUNICABLE DISEASES		INJURIES	
	1990	2017	1990	2017	1990	2017
Chile	74	86	13	7	12	7
Uruguay	86	86	7	7	7	7
Costa Rica	75	84	13	5	12	11
Argentina	83	81	10	12	7	7
Mexico	59	79	26	8	15	13
Colombia	56	78	19	9	25	13
Nicaragua	44	77	44	13	12	10
Panama	68	77	18	13	13	10
Paraguay	63	77	27	12	10	11
Brazil	60	76	26	12	14	12
Ecuador	55	74	31	12	14	14
El Salvador	52	73	26	11	22	16
Venezuela, RB	62	73	22	10	16	18
Honduras	48	72	35	12	17	16
Dominican Republic	52	72	37	16	11	13
Bolivia	41	70	48	20	12	9
Peru	43	70	42	20	15	9
Guatemala	32	60	56	24	12	16

Source: Data from IHME (Institute for Health Metrics and Evaluation) Global Burden of Disease Study 2017 Results.

FIGURE 5.4

Mortality by type of cause in selected Latin American countries and comparison with OECD countries, 2017
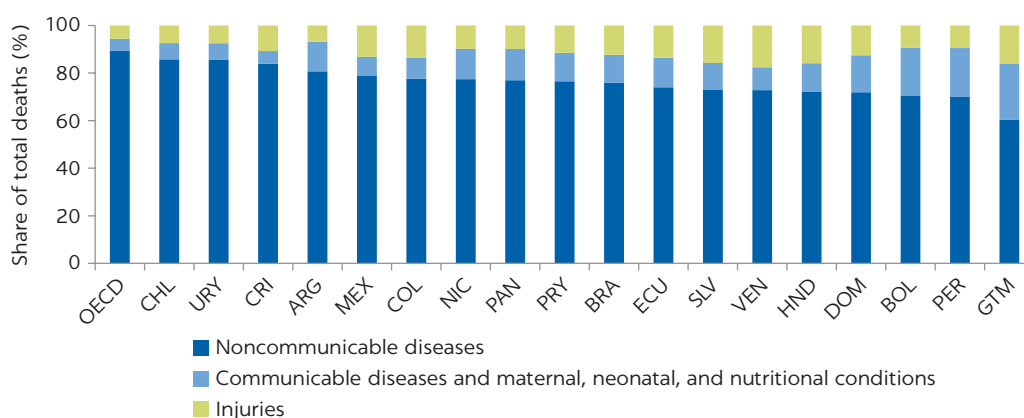
Source: World Bank based on data from IHME (Institute for Health Metrics and Evaluation) Global Burden of Disease Study 2017 Results.
Note: OECD = Organisation for Economic Co-operation and Development.

for 18 countries in Latin America and the OECD in 2017. The same figure shows that, although the relevance of noncommunicable diseases is higher in OECD countries—where they account for 89 percent of deaths—Chile, Uruguay, Costa Rica, and Argentina are very close to that level, with percentages of deaths from noncommunicable diseases in excess of 80 percent, which indicates very similar profiles even now. However, the Dominican Republic, Bolivia, Peru, and Guatemala continue to register an incidence of close to 15 percent for communicable diseases, supporting the conclusion that they are still making the transition to OECD health profiles.

Although there are no projections by country for the weight of the different causes of death, it is likely, given the evolution registered between 1990 and 2017 and the projected trends for the region in 2045, that countries that have yet to achieve OECD health profiles will do so in the coming years, albeit at different rates, if they take public policy measures to reduce communicable diseases and maternal, neonatal, and nutritional conditions. The change in mortality patterns to an increased incidence of noncommunicable diseases means greater likelihood of survival to a more advanced age. Likewise, medical innovations have allowed chronic diseases and some of their complications to be controlled and treated, thereby delaying death and further contributing to survival to more advanced ages.

Figure 5.5 shows the change in the distribution of mortality by age group for 1990 and 2017 in Latin America and the Caribbean, as well as a projection to 2045 and a comparison with the current distribution of death for OECD countries. In each year analyzed, the improvements for the under-five age group were significant, dropping by almost 70 percent from 1990 to 2017. In fact, a reduction in the number of deaths can be seen in all age groups younger than age 70. Looking at the groups older than age 70, in 1990 the largest number of deaths occurred in the 75–79 age group, while in 2017 the largest number of deaths were in the 80–85 age group. For OECD countries, the age group with the largest share of mortality in 2017 was the 85–89 group, with some 17 percent of all deaths.

Distribution of deaths by age group, Latin America and the Caribbean, 1990, 2017, and 2045, and comparison with OECD countries, 2017
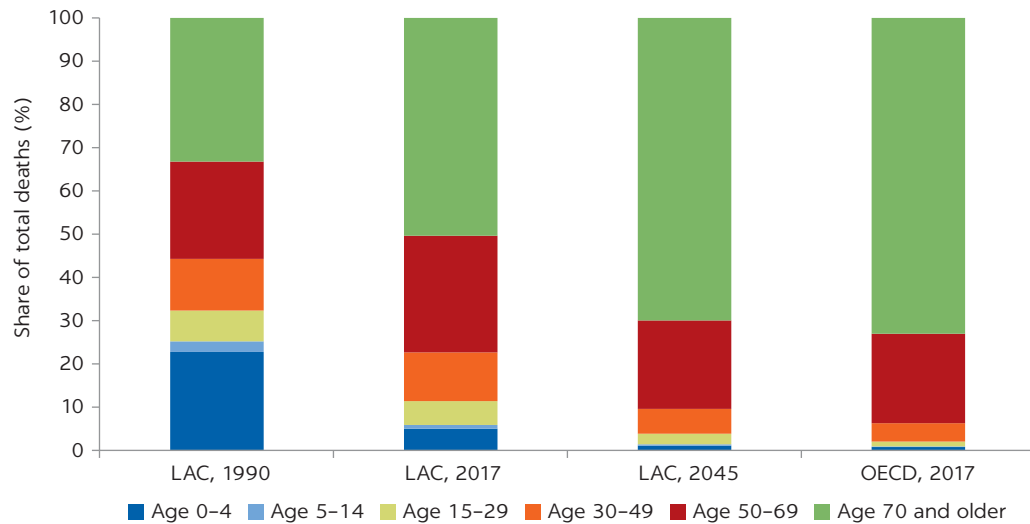
Sources: World Bank based on data from IHME (Institute for Health Metrics and Evaluation) Global Burden of Disease Study 2017 Results and WHO (World Health Organization) Projections of Mortality and Causes of Death, 2017–2060.
Note: OECD = Organisation for Economic Co-operation and Development.

WHO projections for 2045 indicate that the trend toward survival to more advanced ages will continue in the region in the years to come. It is estimated that in 2045, 70 percent of all deaths will be concentrated in the population older than age 70, an increase of 40 percent over 2017 levels. By comparison, the distribution projected for the region in 2045 is practically the same as the current distribution in OECD countries, where the population older than age 70 accounts for 73 percent of all deaths.

The specific mortality patterns for the older adult population can be found in table 5.2. The five leading causes of death for the population group older than age 60 in Latin America and the Caribbean are shown in the table for 1990 and 2017, with a comparison with 2017 figures for OECD countries. These five causes account for almost 80 percent of deaths in this age group for all years analyzed.

It appears that cardiovascular diseases, cancer, diabetes and other kidney diseases, neurological diseases, and chronic respiratory diseases are the leading causes of death for the entire period under analysis. Although cardiovascular conditions ranked first from 1990 to 2017, far surpassing the other causes of death, their relative share of the total number of deaths has fallen from 42 percent in 1990 to 34 percent in 2017. However, the share of the other causes of death has increased. Diabetes and other kidney diseases have had the most significant percentage increase, jumping 4 percentage points, from 7 percent in 1990 to 11 percent in 2017. This category is followed by neurological diseases, which include Alzheimer's and other types of dementia, Parkinson's, multiple sclerosis, and others. The increase in these diseases as a cause of death was 3 percentage points, rising from 6 percent to 9 percent between the first and last years analyzed.

Although a comparison of the mortality profiles of the over-60 age groups in the region and their counterparts in OECD countries shows that the five leading causes of death are the same, the share of deaths each cause represents varies.

TABLE 5.2 Main causes of death in population older than age 60, LAC 1990, 2017, and 2045, and OECD 2017

Percent

ORDER	LAC, 1990	LAC, 2017	LAC, 2045[a]	OECD, 2017
1	Cardiovascular diseases	Cardiovascular diseases	Cardiovascular diseases	Cardiovascular diseases
	42	34	30	36
2	Cancer	Cancer	Cancer	Cancer
	17	19	18	24
3	Diabetes and kidney diseases	Diabetes and kidney diseases	Diabetes and kidney diseases	Neurological disorders
	7	11	13	15
4	Neurological disorders	Neurological disorders	Respiratory infections	Chronic respiratory diseases
	6	9	8	6
5	Chronic respiratory diseases	Chronic respiratory diseases	Chronic respiratory diseases	Diabetes and kidney diseases
	6	7	8	5
Others	Others	Others	Others	Others
	22	20	23	14
Total	**100**	**100**	**100**	**100**

Sources: Data from IHME (Institute for Health Metrics and Evaluation) Global Burden of Disease Study 2017 Results and WHO (World Health Organization) Projections of Mortality and Causes of Death, 2017–2060.

Note: LAC = Latin America and the Caribbean; OECD = Organisation for Economic Co-operation and Development.

a. LAC, 2045 figures are for the population group older than age 70.

Neurological diseases account for a larger percentage of deaths in OECD countries, though the increase from 6 percent to 9 percent in Latin America and the Caribbean between 1990 and 2017 should be noted. Another difference is the higher incidence of deaths from diabetes and other kidney diseases in Latin America and the Caribbean than in OECD countries.

WHO projections to 2045 for those age 70 or older in Latin America and the Caribbean predict that cardiovascular diseases, cancer, and diabetes will continue to be the main causes of death. Although neurological diseases are not among the five leading causes of death, their incidence is expected to have the largest increase, rising 28 percent between 2016 and 2045.[4]

Mortality profiles of older populations in Latin America and the Caribbean are already beginning to mirror those in OECD countries. The ranking of causes of death is expected to change in the future, particularly the incidence of neurological conditions. Population aging leads not only to new mortality profiles but also to the progressive impairment of bodily functions and, thus, greater vulnerability and fragility. Other indicators must be considered regarding quality of life. To this end, the years lost due to disability (YLD) indicator can be used to measure the number of years of healthy life lost due to disability.[5]

Table 5.3 presents the five leading causes of disability, measured in terms of YLD, for population groups age 60 or older in 1990 and 2017 in Latin America and the Caribbean, and 2017 in OECD countries. These causes account for 60 percent of YLD in all regions and periods of analysis. In Latin America and the Caribbean, musculoskeletal disorders—such as rheumatism, osteoarthritis,

TABLE 5.3 The five leading causes of disability measured as YLD in the population older than age 60, LAC 1990 and 2017, and OECD 2017

Percentage of total YLD in cohort

ORDER	LAC, 1990	LAC, 2017	OECD, 2017
1	Musculoskeletal disorders	Musculoskeletal disorders	Musculoskeletal disorders
	17	17	22
2	Sensory organ diseases	Sensory organ diseases	Sensory organ diseases
	17	16	11
3	Diabetes and kidney diseases	Diabetes and kidney diseases	Cardiovascular diseases
	10	11	10
4	Cardiovascular diseases	Cardiovascular diseases	Diabetes and kidney diseases
	8	8	9
5	Mental disorders	Mental disorders	Unintentional injuries
	8	8	8

Source: Data from IHME (Institute for Health Metrics and Evaluation) Global Burden of Disease Study 2017 Results.
Note: LAC = Latin America and the Caribbean; OECD = Organisation for Economic Co-operation and development; YLD = years lost due to disability.

and neck and back pain—are the principal cause of disability for groups older than age 60 for all periods analyzed, accounting for almost 17 percent of the burden of morbidity. These pathologies are followed by diseases affecting the sensory organs, such as blindness and other vision impairments and hearing loss, which represent an average of 16 percent of the disability burden for the period studied. Diabetes and other kidney diseases are the third- largest cause of disability, followed by cardiovascular and mental disorders, including depression.

Disability profiles in Latin America and the Caribbean show that leading causes of death in the region are practically the same as in OECD countries, with musculoskeletal disorders and sensory organ disorders accounting for 30 percent of the YLD. The differences are found in mental disorders, which rank among the top causes of disability in Latin America but not in OECD countries. Unintentional injuries—including falls—are among the leading causes of disability in OECD countries. The ranking of cardiovascular diseases and diabetes as causes of disability varies between Latin American and OECD countries.

The disability profiles of the over-60 age group in Latin America and the Caribbean already mirror profiles for OECD countries, and that is not likely to change in the coming years. Some indicators do not focus solely on mortality. They show specific epidemiological patterns at more advanced ages, when a number of conditions converge, accentuating functional limitations and impairments in what is called multimorbidity. Preventing the accumulation of functional impairments and disabilities is paramount.

In summary, the data presented in this section show that the Latin America and the Caribbean region is going through the epidemiological transition. Some countries have completed this transition; their disease and mortality profiles are very similar to those in more developed countries, and the projections for causes of death by 2045 show that the profiles in the region will increasingly resemble those of more developed countries. Evolution toward the fourth phase of the

epidemiological transition is evident as well, specifically in mortality rates at increasingly advanced ages, decreases in mortality rates from cardiovascular diseases, and increases in other pathologies such as neurological diseases, diabetes, and cancer. In the same vein, and based on an analysis of disability rate indicators, epidemiological patterns increasingly suggest the accumulation of cognitive fragilities and impairments, which pose challenges for treating multimorbidities rather than specific pathologies.[6] The health system must be redesigned to tackle the challenges of more complex and costly heath needs. The next section outlines possible strategies for addressing the specific problems of an aging population.

THE BENEFIT GENEROSITY COMPONENT

Historically, health systems around the world have been designed to care for those affected by acute episodes and to provide maternal and child health needs. In dealing with these events, health systems have favored hospital settings to provide access to advances in medicine (Ham 2010). Traditional health systems are largely reactive. Their response to individuals seeking assistance for acute events is fragmented and disconnected; an acceptable response to the problem at hand is provided in many (but not all) cases; but, once the specific issue is resolved, individuals go unattended until the next acute event occurs.

This approach made sense when the challenge was to provide specialized care to patients with life-threatening conditions. As effective public health interventions to reduce premature mortality have become more available, the focus has shifted to improving quality of life and optimizing functional capacities.

As discussed in the previous section, old age is characterized by a series of chronic and complex conditions that cannot be adequately addressed through a reactive, fragmented, and uncoordinated health model that focuses on individual pathologies. Instead, a proactive and person-centered model that ensures continuity of care and maximizes the participation of individuals and their caregivers is the most adequate response. This necessary shift requires creating coordinated interdisciplinary teams that provide sustained quality care based on the appropriate use of technologies, medications, and services, and the best available knowledge (WHO 2017).

In many countries in the region, the challenge posed by the epidemiological transition is compounded by a serious level of inefficiency in existing systems caused by inadequate financing mechanisms (with high fragmentation, lack of clear prioritization strategies, and insufficient financing for services covering the most vulnerable), poor coordination across providers, and access restrictions. Correcting some of these issues is a precondition for some of the more challenging reforms that the system needs in coming years.

Changing the approach to health services calls for new patterns of investment, administration, and provision. Care needs to be integrated, which requires coordination at all system levels, taking into account all the needs of the population and creating effective networks that tie health care and long-term care services (Rechel et al. 2009). Some recommendations can, however, improve results and approaches to the chronic conditions and comorbidities that affect the aging population. Six crucial aspects are identified for which it is important to obtain efficiency gains in the medium and long terms to manage the expected increasing costs in health services provision (Ham 2010; Oliver, Foot, and Humphries 2014;

Oxley 2009; Rechel et al. 2009; WHO 2015a). These include (1) managing care services to avoid unnecessary hospitalizations; (2) implementing case management systems to avoid inefficiencies, duplication of services, and inadequate information flows; (3) improving prescription guidelines and reviewing medication provision systems; (4) integrating information systems to generate electronic medical records with simple access by service providers; (5) rationalizing insurance programs to limit fragmentation and coordinate care services; and (6) focusing public policies on preventive interventions instead of curative ones.

CONCLUSIONS

Population aging presents several challenges related to the increase in mortality and morbidity from chronic and degenerative conditions. Those conditions are associated with more complex and costly health care needs, insofar as they require a greater number and variety of diagnostic services, treatments, medical consultations, hospitalizations, and medications.

The global increase in health expenditures is often attributed to population aging. However, when the increase is broken down, it can be seen that an aging population alone is not the main driver of health care spending. It stems, rather, from several nondemographic components, such as income levels, the sector's relative prices, technological advances, and the different health system frameworks that generate particular incentives and operational structures.

This trend can also be expected in Latin America and the Caribbean. The mortality and morbidity profiles of elderly people in the region coincide with expectations for an older population; in some cases, the patterns are already very similar to the ones in OECD countries, which suggests that, as predicted by the theory of the epidemiological transition, the evolution toward the health profiles found in more developed countries has already occurred.

The higher incidence of chronic noncommunicable and degenerative diseases associated with population aging—a trend expected to continue in the coming years—requires reorienting health systems, shifting from a reactive model centered on illness and acute episodes to an integrated care model focused on the elderly and their caregivers, prioritizing the optimization of capacity trajectories.

Rather than expand acute inpatient care services, primary care and prevention should be strengthened to better manage chronic conditions and ensure effective coordination between different health care providers, settings, and long-term care services. Several strategies can be implemented simultaneously: reforms in payment systems, training and awareness-raising of interdisciplinary health teams, comprehensive care programs, better information systems, greater access to technologies and medications based on effectiveness and cost-effectiveness, and support for self-care strategies that empower individuals to take care of themselves and stay healthy, regardless of baseline condition.

A longer life span is one of humanity's great achievements, and it need not be associated with poor health, impairment, or limitation. It is crucial, however, that health systems incorporate the measures necessary to respond to these challenges in an effective manner; otherwise, the change in health spending would be significant because of the system's inefficiency in providing health care services to a population with chronic and degenerative conditions.

ANNEX 5A MORTALITY DATA

TABLE 5A.1 **Mortality by cause type, Latin America and the Caribbean by country, 1990, 2000, 2010, and 2017**

Percentage of total deaths

COUNTRY	1990			2000			2010			2017		
	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES
Antigua and Barbuda	82	11	7	81	12	6	83	10	7	84	9	6
Argentina	83	10	7	81	11	8	80	12	7	81	12	7
Bahamas. The	71	16	12	68	21	11	76	12	12	78	11	11
Barbados	85	9	6	83	11	5	85	10	5	86	9	5
Belize	59	28	13	61	22	17	64	19	17	67	17	16
Bolivia	41	48	12	53	35	12	65	25	10	70	20	9
Brazil	60	26	14	68	17	14	73	13	14	76	12	12
Chile	74	13	12	80	10	10	84	7	9	86	7	7
Colombia	56	19	25	60	14	26	72	11	17	78	9	13
Costa Rica	75	13	12	79	9	12	82	6	12	84	5	11
Cuba	81	7	12	82	8	10	86	7	8	86	7	8
Dominica	82	11	7	83	11	6	84	9	7	85	9	6
Dominican Republic	52	37	11	60	28	12	67	20	13	72	16	13
Ecuador	55	31	14	61	24	16	68	15	17	74	12	14
El Salvador	52	26	22	62	18	20	71	12	17	73	11	16
Grenada	80	13	7	78	14	8	83	10	6	85	10	5
Guatemala	32	56	12	44	42	14	55	27	18	60	24	16
Guyana	61	27	12	64	24	12	69	18	13	73	15	12
Haiti	44	43	13	46	43	11	15	11	74	61	27	12
Honduras	48	35	17	59	24	17	67	15	18	72	12	16
Jamaica	80	15	5	80	14	6	82	10	8	84	8	8
Mexico	59	26	15	71	16	13	76	10	14	79	8	13
Nicaragua	44	44	12	62	25	13	73	15	12	77	13	10
Panama	68	18	13	70	17	12	72	15	12	77	13	10
Paraguay	63	27	10	67	20	12	74	14	12	77	12	11

(continued)

TABLE 5A.1, *continued*

Percentage of total deaths

COUNTRY	1990			2000			2010			2017		
	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICA-BLE	COMMUNI-CABLE	INJURIES
Peru	43	42	15	59	29	12	66	23	11	70	20	9
Puerto Rico	78	12	10	82	10	8	84	8	8	80	7	13
St. Lucia	77	14	9	78	12	10	82	9	9	84	8	8
St. Vincent and the Grenadines	75	17	8	76	16	8	80	12	8	82	10	8
Suriname	64	23	12	68	21	11	72	16	12	76	13	11
Trinidad and Tobago	79	12	9	79	13	8	81	8	11	84	7	8
Uruguay	86	7	7	86	7	7	85	7	8	86	7	7
Venezuela, RB	62	22	16	66	15	19	68	12	20	73	10	18
Virgin Islands (US)	80	9	11	84	7	8	87	5	8	88	5	7
Total	61	26	14	68	18	14	69	13	18	76	12	12

Source: IHME (Institute for Health Metrics and Evaluation) data.
Note: The communicable diseases category also includes maternal, neonatal, and nutritional conditions.

TABLE 5A.2 Mortality rate by cause of death per 100,000 persons, Latin America and the Caribbean by country, 1990, 2000, 2010, and 2017

Rate expressed per 100,000 people

	1990			2000			2010			2017		
COUNTRY	NONCOM-MUNICABLE	COMMUNI-CABLE	INJURIES	NONCOMMU-NICABLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICABLE	COMMU-NICABLE	INJURIES	NONCOM-MUNICABLE	COMMUNI-CABLE	INJURIES
Antigua and Barbuda	522.3	72.4	44.5	496.7	75.4	39.6	478.6	58.3	39.6	534.6	59.6	39.1
Argentina	635.3	73.6	56.5	620.5	83.4	58.1	605.6	94.1	53.2	606.5	93.4	51.2
Bahamas, The	388.8	88.1	67.9	407.2	126.0	66.9	452.9	73.7	71.6	523.7	74.2	72.6
Barbados	772.4	84.1	50.5	765.3	104.8	47.3	711.9	85.0	45.1	806.7	87.5	44.8
Belize	302.0	145.9	66.6	330.6	117.7	93.4	289.3	86.3	78.2	317.5	79.5	77.7
Bolivia	402.7	466.8	113.1	380.0	247.8	82.7	395.4	149.1	61.9	405.9	117.5	53.6
Brazil	387.2	166.8	88.0	401.5	101.5	83.2	430.6	78.0	80.0	483.7	74.7	78.6
Chile	440.8	78.5	73.6	422.8	52.5	51.8	482.5	39.9	52.6	537.5	42.8	46.5
Colombia	289.0	98.5	130.4	292.3	68.0	128.8	322.9	48.0	77.2	359.4	41.0	62.4
Costa Rica	285.3	48.9	46.8	297.6	33.6	47.0	344.8	26.7	51.3	424.5	27.1	54.5
Cuba	536.9	48.3	80.2	557.8	52.7	67.9	666.1	51.4	61.1	762.6	61.1	68.0
Dominica	651.2	83.2	55.3	674.9	85.7	51.0	730.4	79.9	61.3	848.5	89.3	60.1
Dominican Republic	281.8	201.8	61.5	302.5	144.1	61.5	370.7	111.8	69.1	461.3	100.0	80.3
Ecuador	282.6	157.4	71.4	290.0	113.4	74.3	363.5	77.9	89.6	387.5	65.1	71.0
El Salvador	327.7	164.8	136.7	345.3	100.5	113.1	445.0	77.8	107.6	497.0	77.5	107.6
Grenada	694.4	113.0	59.9	452.4	80.8	44.5	672.2	83.9	49.7	874.8	101.7	52.9
Guatemala	276.7	476.9	104.0	266.3	254.5	85.2	278.5	138.8	88.8	317.5	123.9	85.1
Guyana	418.5	182.4	79.9	436.4	166.3	81.4	489.5	126.6	95.8	544.5	113.9	90.4
Haiti	571.9	556.8	163.6	487.5	454.8	121.2	460.2	337.9	2,274.1	454.1	201.8	93.6
Honduras	277.1	205.5	98.2	300.3	123.2	88.8	314.4	71.6	84.3	336.9	56.7	74.1
Jamaica	446.9	83.7	26.3	506.2	87.4	38.8	510.8	65.1	50.1	609.4	59.7	59.9
Mexico	297.2	132.1	76.3	315.9	72.4	55.7	384.5	49.6	69.8	442.5	45.6	73.9
Nicaragua	217.7	221.0	61.5	238.9	95.3	51.8	260.5	54.5	41.5	280.5	46.3	35.5
Panama	289.0	77.5	57.1	301.1	74.3	51.7	337.6	72.5	57.8	372.6	63.8	47.6
Paraguay	281.5	119.8	43.6	298.5	91.1	54.9	361.0	68.9	59.9	361.2	56.3	54.2

(continued)

TABLE 5A.2, *continued*

Rate expressed per 100,000 people

COUNTRY	1990			2000			2010			2017		
	NONCOM-MUNICABLE	COMMUNI-CABLE	INJURIES	NONCOMMU-NICABLE	COMMUNI-CABLE	INJURIES	NONCOM-MUNICABLE	COMMU-NICABLE	INJURIES	NONCOM-MUNICABLE	COMMUNI-CABLE	INJURIES
Peru	270.1	264.1	94.7	276.1	136.2	58.1	314.2	109.2	50.2	299.5	86.8	40.5
Puerto Rico	559.9	84.6	70.5	596.0	72.6	59.9	645.0	62.0	62.2	754.2	62.6	124.9
St. Lucia	503.9	89.3	60.1	453.0	67.6	59.2	521.4	59.2	58.5	630.1	60.8	62.5
St. Vincent and the Grenadines	476.0	109.2	51.6	524.0	111.3	57.7	589.4	87.5	62.4	724.4	88.9	67.5
Suriname	439.6	159.0	85.4	461.0	141.8	78.3	485.6	105.2	82.9	574.2	97.1	79.4
Trinidad and Tobago	545.4	79.2	61.7	597.7	98.3	57.5	591.3	60.3	81.1	691.9	60.1	67.7
Uruguay	825.0	64.7	67.8	813.3	66.1	70.0	797.9	65.9	70.8	839.6	66.7	73.2
Venezuela, RB	301.0	107.9	76.1	307.3	67.7	89.6	341.3	58.0	100.5	407.7	53.7	98.4
Virgin Islands (US)	495.2	57.8	66.6	632.9	54.4	62.3	852.3	49.3	75.1	1,056.9	55.0	85.7
Total	373.9	157.6	85.4	379.1	100.8	76.1	414.6	76.9	111.2	456.9	69.4	71.5

Source: IHME (Institute for Health Metrics and Evaluation) data.
Note: The communicable diseases category also includes maternal, neonatal, and nutritional conditions.

NOTES

1. Based on 2019 data from Global Expected Health Spending, 2017–2050 published by the Institute for Health Metrics and Evaluation. For more information, please see http://ghdx.healthdata.org/record/ihme-data/global -expected-health-spending-2017-2050.
2. Annex 5A presents this data by country for 1990, 2000, 2010, and 2017. Mortality projections to 2045 are available at the regional level only.
3. Table 5A.1 presents the relative causes of death for all countries in the Latin America and the Caribbean region for 1990, 2000, 2010, and 2017. In 1990, just 8 countries registered noncommunicable diseases as the cause of 80 percent or more of all deaths, whereas by 2017 the figure had nearly doubled to 15 countries. In the final year analyzed, noncommunicable diseases accounted for more than 60 percent of all death in all countries, whereas communicable diseases barely surpassed 20 percent in just a few countries. Likewise, Table 5A.2 presents the data for mortality rates per 100,000 inhabitants, supporting the evidence of the increase in noncommunicable diseases as a cause of death.
4. According to estimates of mortality in Projections of Mortality and Causes of Death 2017–2060 from WHO (World Health Organization), neurological diseases will rank sixth as a cause of death in the over-70 age group in 2045, accounting for 6 percent of total deaths in that group.
5. The YLD indicator is one of the components of the burden of disease indicator, the disability-adjusted life year (DALY). The DALY measures premature deaths and nonlethal health consequences due to diseases and injuries. It is, algebraically, the sum of the years of life lost due to premature death (YLL) and the years lived with a disability adjusted to the severity of the disability (YLD). The YLL is calculated as the difference between the age of the individual at the time of death and their life expectancy, while the YLD is calculated based on assumptions about the severity of the disability and the time lived with it.
6. At stake in the health of an aging population are specific epidemiological patterns involving a series of conditions that cannot be tackled as an individual pathology. A common conceptual framework for the measurement of those patterns would enable longitudinal and cross-country analyses that combine indicators of the evolution of functional capacities and severity of disabilities. Data on functional measures should be collected to analyze the life expectancy trends of older adults; trends in the prevalence of chronic diseases should not be the sole focus of analysis (Chatterji et al. 2015). A measure based on disease burden data for 2017 would shift the focus of aging analysis by analyzing the disease burden of conditions associated with aging rather than chronological age itself (Chang et al. 2019).

REFERENCES

Beard, John, Alana Officer, Islene Araujo de Carvalho, Ritu Sadana, Anne Margriet Pot, Jean-Pierre Michel, Peter Lloyd-Sherlock, et al. 2015. "The World Report on Ageing and Health: A Policy Framework for Healthy Ageing." *Lancet* 387 (10033): 2145–54.

Chang, Angela Y., Vegard F. Skirbekk, Stefanos Tyrovolas, Nicholas J. Kassebaum, and Joseph L. Dieleman. 2019. "Measuring Population Ageing: An Analysis of the Global Burden of Disease Study 2017." *Lancet* 4 (3): 159–67.

Chatterji, Somnath, Julie Byles, David Cutler, Teresa Seeman, and Emese Verdes. 2015. "Health, Functioning and Disability in Older Adults. Current Status and Future Implications." *Lancet* 385 (9967): 563–75.

Chisholm, D., and D. Evans. 2010. "Improving Health System Efficiency as a Means of Moving towards Universal Coverage." World Health Organization, Geneva.

de la Maisonneuve, C., and J. Oliveira Martins. 2013. *Public Spending on Health and Long-Term Care: A New Set of Projections*. Paris: OECD Publishing.

Fan, V., and S. Savedoff. 2014. "The Health Financing Transition: A Conceptual Framework and Empirical Evidence." *Social Science and Medicine* 105 (March): 112–21.

Hagist, Christian, and Laurence Kotlikoff. 2005. "Who's Going Broke? Comparing Growth in Healthcare Costs in Ten OECD Countries." Working Paper 11833, National Bureau of Economic Research, Cambridge, MA.

Ham, C. 2010. "The Ten Characteristics of the High-Performing Chronic Care System." *Health Economics, Policy and Law* 5 (1): 71–90.

Izquierdo, A., C. Pessino, and G. Vuletin, eds. 2018. *Better Spending for Better Lives: How Latin America and the Caribbean Can Do More with Less*. Washington, DC: Inter-American Development Bank.

Lee, Ronald, and Andrew Mason. 2011. *Population Aging and the Generational Economy: A Global Perspective*. Cheltenham, UK: Edward Elgar.

Medici, A. 2011. "How Age Influences the Demand for Health Care in Latin America." In *Population Aging: Is Latin America Ready?*, edited by D. Cotlear, 135–89. Washington, DC: World Bank.

Musgrove, P., R. Zeramdini, and G. Carrin. 2002. "Basic Patterns in National Health Expenditure." *Bulletin of the World Health Organization* 80: 134–46.

Oliver, D., C. Foot, and R. Humphries. 2014. *Making Our Health and Care System Fit for an Ageing Population*. London: King's Fund.

Olshansky, S., and B. Ault. 1986. "The Fourth Stage of the Epidemiologic Transition: The Age Delayed Degenerative Disease." *Milbank Quarterly* 64 (3): 355–91.

Omran, A. 2005. "The Epidemiologic Transition: A Theory of Epidemiology of Population Change." *Milbank Quarterly* 83 (4): 731–57.

Oxley, H. 2009. "Policies for Healthy Ageing: An Overview." Organisation for Economic Co-operation and Development, Paris.

Rechel, B., Y. Doyle, E. Grundy, and M. McKee. 2009. "How Can Health Systems Respond to Population Ageing?" Policy Brief 10, World Health Organization, Copenhagen.

Smith, S., J. Newhouse, and M. Freeland. 2009. "Income, Insurance, and Technology: Why Does Health Spending Outpace Economic Growth?" *Health Affairs* 28 (5): 1276–84.

Sorenson, C., M. Drummond, and B. B. Khan. 2013. "Medical Technology as a Key Driver of Rising Health Expenditure: Disentangling the Relationship." *ClinicoEconomics and Outcomes Research* 5: 223–34.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

WHO (World Health Organization). 2010. *Health Systems Financing. The Path to Universal Coverage*. Geneva: WHO.

WHO (World Health Organization). 2015a. *WHO Global Strategy on People-Centred and Integrated Health Services*. Interim report. Geneva: World Health Organization.

WHO (World Health Organization). 2015b. *World Report on Ageing and Health*. Geneva: World Health Organization.

WHO (World Health Organization). 2017. *Global Strategy and Action Plan on Ageing and Health*. Geneva: World Health Organization.

Xu, K., P. Saksena, and A. Holly. 2011. "The Determinants of Health Expenditure: A Country-Level Panel Data Analysis." Results for Development Institute (R4D), Washington, DC.

Xu, Ke, Agnes Soucat, Joseph Kutzin, Callum Brindley, Nathalie Vande Maele, Hapsatou Toure, Maria Aranguren Garcia, et al. 2018. *Public Spending on Health: A Closer Look at Global Trends*. Geneva: World Health Organization.

6 Long-Term Care for Older People

INTRODUCTION

Population aging will unavoidably create additional demand for long-term care (LTC) because a growing number of elderly citizens will require different levels of attention. Across high-income countries, LTC is recognized as an important public policy issue. That has not been the case in Latin America until very recently, and the current public resources used to finance these services are limited. Predicting the evolution of this sector is particularly difficult, given that it depends on a combination of health status, self-perception of ability to live independently, existence of family networks that can provide some basic services, and characteristics of services offered by the state.

LTC systems in Latin America are quickly developing on an ad hoc basis, and governments are failing to effectively manage that development, leading to poor service provision as measured by cost-effectiveness, quality, and equity. A specific problem is the unnecessary hospitalization of older people because of the limited availability of care in other settings. Poor provision has a substantial impact on the welfare of both older people and those who are forced to care for them. This chapter not only draws attention to these problems but also describes some promising interventions, including examples from the region and beyond.

The chapter is structured as follows: The next section shows current and projected levels of LTC demand in Latin America and the Caribbean, based on demographic trends and data on the functional status of older populations. The subsequent section examines how LTC services are currently provided in Latin America and the Caribbean and compares that provision to wider international experience. The section identifies key weaknesses in current models and provides examples of cost-effective interventions, and is followed by a section that examines in greater detail funding and resource implications for LTC in Latin America and the Caribbean. Its broad approach considers indirect and opportunity costs associated with caring for older people. The final section summarizes key policy recommendations.

DEMAND FOR LONG-TERM CARE

Estimating care needs for older populations is not easy because these needs cannot be reduced to a single indicator. The most widely used indicator measures older people's ability to perform basic tasks, called activities of daily living (ADLs) and instrumental activities of daily living (IADLs). ADLs are the ability to eat, get dressed, get in and out of bed, use the toilet, and bathe or shower; IADLs include a wider set of activities, such as being able to use a telephone. Surveys vary in how they assess ADLs and IADLs and, as a result, comparisons must be treated with caution.

Table 6.1 presents data on the percentage of older people with at least one ADL limitation for four Latin American countries, and for China and the United States. Two features stand out regarding the need for care. First, limited functioning is highly concentrated among people age 80 or older, rather than age 60 to 69, in all countries. Second, there is considerable variation across countries: in Chile, as in China and the United States, about one-third of women age 80 or older have limited functioning, but in Mexico and Costa Rica more than half of women do. Among people age 70–79, national variations are even larger. Levels of dependency for Mexicans in this age group are roughly double those in Chile, which suggests people's ability to do things for themselves can be improved, even at very old ages (Abbott et al. 2011; Sudré et al. 2012).

The proportion of people age 60 and older with care needs in 2017 in Brazil, Mexico, and Chile was estimated to be between 13 percent and 21 percent (Lloyd-Sherlock and Díaz-Venegas 2018).

The only country in Latin America with robust data on the evolution of old-age disability over time is Mexico. Those data are based on the first and second rounds of the Mexican Health and Aging Study, a longitudinal survey that uses the methodology of the US Health and Retirement Study (http:/hrsonline.IRS.UMICH.edu). According to the two rounds of the Mexican Health and Aging Study, between 2001 and 2012 the rate of old-age disability in Mexico rose

TABLE 6.1 Percentage of people age 60 or older reporting at least one ADL limitation

COUNTRY AND YEAR	MEN			WOMEN			TOTAL, 60 AND OLDER
	60–69	70–79	80 AND OLDER	60–69	70–79	80 AND OLDER	
Brazil, 2013	8.48	14.33	34.54	10.33	18.04	40.79	15.45
Mexico, 2001	6.60	13.24	34.34	10.42	15.54	42.18	14.57
Mexico, 2012	10.29	20.05	35.33	17.51	28.31	51.96	21.19
Chile, 2013	6.65	11.97	25.54	8.24	13.94	33.33	13.13
Costa Rica, 2009	13.15	19.10	40.11	24.32	26.09	52.76	32.40
China, 2011	8.96	12.65	25.42	8.00	14.57	31.55	12.15
United States, 2002	17.52	22.19	35.87	20.65	23.91	45.13	26.33
United States, 2012	13.79	18.10	31.91	16.98	20.03	41.38	22.10

Sources: Brazil: National Health Survey, https://ww2.ibge.gov.br/home/estatistica/populacao/pns/2013_vol3/default_microdados.shtm. Mexico: Mexican Health and Aging Study, http://www.mhasweb.org. Chile: National Socioeconomic Characterization Survey, http://observatorio.ministeriodesarrollosocial.gob.cl/casen-multidimensional/casen/basedatos.php. Costa Rica: Costa Rican Longevity and Healthy Aging Study, http://www.creles.berkeley.edu/. China: China Health and Retirement Longitudinal Study, http://charls.pku.edu.cn/en. United States: Health and Retirement Study, http://hrsonline.isr.umich.edu/index.php?p=avail.
Note: ADL = activities of daily living.

sharply, from 14.6 to 21.2 percent. This troubling trend has major implications for health and social service demand. Outside Latin America, trends in later-life disability are mixed. Some countries, such as Spain, report an increase in disability rates over time; and others, such as China, report a decrease (Feng et al. 2013; Palacios-Ceña et al. 2012).

Using current data on old-age disability incidence, figure 6.1 shows a posible trend until 2050. Assuming that no changes in incidence by age will happen, the total number of individuals affected by disability would grow from the current 12.3 million to about 32 million in 33 years. As alternative scenarios, a reduction and an increase of incidence by age of 25 percent is presented in figure 6.1.

The number of people with at least one ADL limitation provides a general indicator of likely LTC needs. It is useful, however, to complement that indicator with others, such as severity of care dependency. One person with complex care needs may require more support than 10 people with more limited disability. Indicators of the severity of care dependency are usually based on how many ADL limitations a person has. Using that criterion, in Chile the rate of severe dependency among people age 60 and older (12.4 percent) was roughly double the rate of light dependency (6.6 percent) (Chile 2010). It is also useful to look at particular forms of functional limitation rather than to view all ADLs and IADLs in the same way. Table 6.2 includes data on ability to prepare a meal and ability to bathe or use a toilet in Mexico. The implications of those two needs for caregiving and policy are quite different. Help with food preparation is less intensive and demanding than help with bathing and using a toilet, which is rarely a culturally accepted form of family support. When family support is unavailable, a daily visit from a community volunteer might suffice to meet food preparation needs. In the case of bathing and using a toilet, family caregivers may require training or assistance. They may even be exposed to physical harm, especially if the task requires lifting.

FIGURE 6.1

Population with one or more ADL limitations in Latin America and the Caribbean, by scenario of change in age-specific incidence
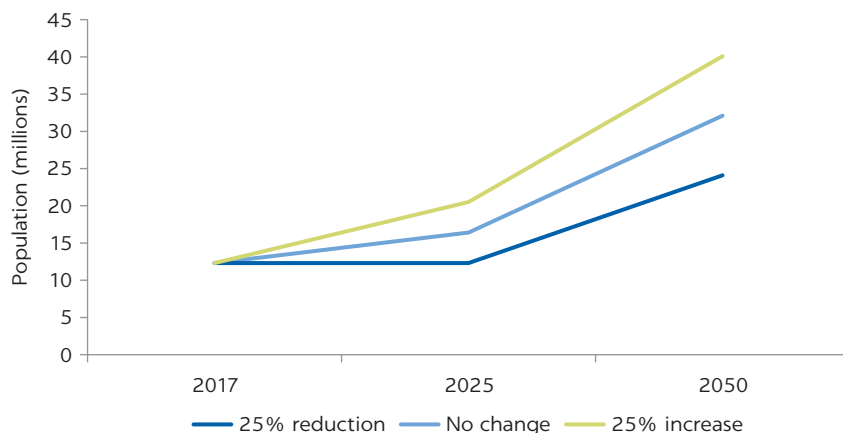
Sources: World Bank based on health surveys and UN (2017).
Note: ADL = activities of daily living.

TABLE 6.2 **Functional limitations among people age 60 and older in Mexico, 2010**
Percent

GROUP	SHARE WITH AT LEAST 1 ADL	SHARE UNABLE TO PREPARE A MEAL	SHARE UNABLE TO BATHE SELF OR USE TOILET
National	26.9	10.6	12.5
Age 60–69	18.2	5.3	5.7
Age 70–79	31.0	11.3	14.7
Age 80 and older	47.5	26.8	30.6
Men	29.6	12.4	13.6
Women	23.8	8.5	11.2
Urban	26.9	10.7	12.4
Rural	26.9	10.3	12.6

Source: INAPAM 2012.
Note: ADL = activities of daily living.

Conditions such as dementia produce particularly intense care needs. The number of people with dementia in the region is expected to rise from 7.8 million in 2013 to more than 27 million by 2050 (Custodio et al. 2017). Dementia is not the only condition that leads to complex and intensive care needs in later life. Frailty, multimorbidity, and an array of specific conditions also cause severe levels of care dependency. A study in Brazil, for instance, finds that 7.1 percent of people age 65 or older had Parkinson's disease (Barbosa et al. 2006). If this is representative of Latin America, some 3.4 million older people would have had the condition in Latin America and the Caribbean in 2015.

MODELS OF LONG-TERM CARE PROVISION

The previous section presents an approximate estimation of the potential demand for LTC services in the region, as well as its possible evolution in coming decades. Although being able to roughly estimate demand is important, actual spending in the sector depends on supply, because many individuals in need of services may end up without access to them. Using the model of demographic dependency and benefit generosity ratios presented in chapter 3, it could be argued that although the dependency rate was growing, actual expenditures were extremely low because existing programs' generosity was very low. Given the expected increase in demand, if generosity starts to improve and approach the levels currently prevailing in more developed countries, spending in this sector could reach about 0.6 percent of GDP by 2045.

LTC services in the region have traditionally been provided by family members. However, declining fertility, increased population mobility, and higher rates of female participation in salaried work are changing living arrangements and the potential supply of family caregivers for older people (Lloyd-Sherlock and Redondo 2009). The proportion of older people living on their own increased between 2006 and 2015 in all 17 countries for which data are available. That does not mean that states should develop universal public LTC systems at expensive residential facilities. The experience of high-income countries has shown that

TABLE 6.3 Long-term care options for older people

Intensive institutional care	Long-term hospitalization
	Nursing homes
Less intensive institutional care	Residential homes
	Short stay or respite care
	Sheltered housing
Community services	Day centers
	Nurse and professional caregiver visits
Support for home care	Paid home help
	Cash benefits for caregivers
	Support groups for caregivers
Unsupported family care	

Source: World Bank.

that approach is not only unsustainable but also inadequate to respond to the needs of those who need simpler services. LTC policies should, rather, encompass a wide portfolio of interventions. This section examines how LTC is currently provided in Latin America and compares that provision to wider international experience.

Table 6.3 presents the most common forms of LTC provision as a continuum, ranging from intensive, residential care to more limited interventions such as home help or support groups. In all countries, family support, usually performed by women on an unpaid basis, is the primary form of LTC. In most high-income countries, meanwhile, there has been a rapid scaling up of professional services. Initially, these services mostly took the form of residential institutions, such as nursing homes. By 2004, there were more than 18,000 residential LTC facilities in the United States, housing a population of 1.2 million to 1.6 million people (Spillman and Black 2005). As populations continued to age, concerns arose about the cost and sustainability of that approach to providing LTC (Hagist and Kotlikoff 2005). Furthermore, the quality of LTC institutions was uneven and regulation often ineffectual. These concerns prompted efforts to find alternatives to the extremes of fully independent living and permanent institutionalization, with an emphasis on services in domiciliary and community settings. There has subsequently been a pronounced shift away from more intensive approaches: in some countries, home care accounted for nearly one-third of public LTC spending by 2004 (Hagist and Kotlikoff 2005).

Outdated models

Since 2010, LTC services in many parts of Latin America have expanded rapidly, and, to a lesser extent, have become more diversified; Navarro and Rodríguez Velázquez 2015). Residential institutions are still the cornerstone of care in Latin America and the Caribbean, which is less and less the case in high-income countries. The number of residential care homes has grown rapidly throughout the region. Nonresidential services have not developed as quickly.

In most Organisation for Economic Co-operation and Development (OECD) countries, LTC services are provided by the private sector, whether on a

privately or publicly funded basis. Similarly, in Latin America private sector residential services have proliferated, as have nursing agencies offering home care. Nongovernmental organizations and private charities also play a large role in some countries. In Brazil, for instance, religious organizations provided residential care to 57,000 older people in 2016 (Camarano 2017). Direct public provision in Latin America is typically limited to a small number of residential homes, often for indigent older people; those with challenging conditions such as dementia are rarely admitted.

Private, for-profit institutions already play an important role as LTC service providers in Latin America, and that is likely to become increasingly the case. The sector is highly segmented, with high-end providers offering expensive residential and domiciliary services to wealthier older people and much more basic levels of care to others. The sector is weakly regulated; even when standards have been set, states must play a more proactive role in enforcing them by, for instance, offering training, developing accountability mechanisms, and carrying out rigorous unannounced inspections and then publishing their results (WHO 2015a). There is often a gap between aspirations and reality in LTC quality control. A key dilemma is how to maintain standards and manage costs to ensure service providers obtain reasonable profit margins. There are often large information asymmetries between service users and providers. Few truly understand what constitutes "good care," which means that families have trouble making informed choices (Lloyd-Sherlock et al. 2017).

Gaps in family care

In many Latin American countries, families are required by law to provide for the care needs of vulnerable members of all ages. They could, in theory, be prosecuted if they fail to comply. In practice, states have limited ability to enforce such laws, and prosecutions are almost unheard of. These laws mostly serve to reinforce the mistaken belief that families offer an effective safety net and that state intervention is only required in exceptional circumstances. This chapter argues that family and public LTC support should be seen as complements, not alternatives.

Gathering credible evidence on the quality and quantity of family care is challenging. Few household surveys include items on this form of caregiving. Furthermore, eliciting reliable information is difficult, given that responses to surveys are strongly influenced by norms of acceptable behavior. Nevertheless, there is evidence of large gaps in family care. A 2010 survey in Chile showed that 36 percent of severely dependent older people reported receiving no care support, even though most lived with family members (SENAMA 2010). Similarly, national data for Brazil in 2013 showed that more than half of older Brazilians with care needs received no support (Camarano 2017). This finding may be, in part, because increasing proportions of older populations are living alone or with only an elderly spouse. Even so, living with adult relatives is by no means a guarantee of care. Separate studies show that access to home care and professional LTC services is particularly limited for socioeconomically disadvantaged older people (Lima-Costa et al. 2017).

When provided, family care may well not meet acceptable standards. Unpaid family caregivers, who are almost always women, often lack basic knowledge about how to care for a frail older person. Furthermore, they are exposed to high levels of stress. A survey of family caregivers for people with dementia in

Colombia finds that 55 percent had been providing care for more than three years and few knew much about dementia (Córdoba, Poches, and Báez 2012). The risks of that situation range from unintentionally inappropriate practice to neglect and even elder abuse. A survey of older people in Mexico with long-term disabilities, but not significant cognitive impairment, living at home finds that 32 percent reported having experienced some form of abuse during the previous year (Giraldo-Rodríguez, Rosas-Carrasco, and Mino-León 2015).

Supporting home care

Lack of external support exacerbates low-quality family care. High-income countries increasingly seek to treat family and professional care as complements, not alternatives. Finnish policy, for example, emphasizes respite services for people who care for older relatives as part of a wider policy goal to ensure that at least 90 percent of people age 75 or older can keep living at home. The 2006 Family Caregiving Act grants family caregivers three days of respite care each month, during which dependent relatives are temporarily admitted to a local nursing home. There is evidence that short respite periods reduce caregiver stress (Colombo et al. 2011; Salin, Kaunonen, and Astedt-Kurki 2009).

In Latin America, services supporting family caregivers are underdeveloped, and the vast majority of caregivers receive no support (Córdoba, Poches, and Báez 2012). Brazil, for example, has neither national nor regional public policies or programs to support home care for older people (Lima-Costa et al. 2017). A number of interventions, often local and on a pilot basis, have attempted to develop home support (Flores Castillo 2012; Lloyd-Sherlock et al. 2017). A pilot program to provide respite to caregivers has been tested in Chile, and a scale-up to the national level is under consideration (Silva et al. 2017).

Another approach to providing home caregivers with support is legislation requiring flexible contracts and working hours, as well as unpaid leave, to workers with family care responsibilities. In 2004, two-thirds of OECD members required employers to offer care leave unless there were compelling business reasons for it to be denied. In Latin America, where much paid work is in informal small-scale activities, and where regulation of employers tends to be limited, the challenges of introducing paid care leave would be particularly great and could potentially lead to employment discrimination against women.

Cost-effective interventions to increase older people's autonomy and ability to care for themselves are no less important than providing support to caregivers. In high-income countries, Meals on Wheels is widely available to frail older people living at home. The service not only provides nutrition and food security to people unable to prepare their own food, but also daily social contact. Meals on Wheels can act as a bridge to mainstream health and social services when needs arise. Similarly, most high-income countries have extensive programs through which nurses and social workers visit frail older people, especially those living alone, on a daily basis. It is believed that such cost-effective programs can substantially reduce rates of hospitalization and admission to nursing homes. There are few such programs in Latin America, though the need for them is urgent.

Assistive devices are another means for reducing care dependency. Evidence from high-income countries shows that equipping homes with assistive technology, such as grab rails for showers and toilets, can be highly cost-effective (Lansley, McCreadie, and Tinker 2004). In Latin America, governments have

done little to educate their populations about the potential benefits of such technologies. Manufacturers are not duly regulated. Grants and subsidies to purchase these technologies should be provided to lower-income families.

For those who can afford it, an increasingly common form of LTC is to employ a paid caregiver (Sousa et al. 2010), sometimes by extending the duties of an existing domestic worker from childcare and housework. Sometimes trained nurses are hired through private agencies at high cost. Poorer households cannot afford this form of care without government-funded support. As with care homes, the standards and quality of paid home care, regardless of form, should be more closely regulated with proactive measures. Many paid caregivers are not trained to meet the demands placed on them. In response to the need for more qualified paid caregivers, several Latin American state agencies and nongovernmental organizations have set up training programs (Flores Castillo 2012) that, as an additional benefit, generate employment for women with few other qualifications. There is some evidence that the quality of care provided by those trained in these programs is poor, and that they may increase older people's exposure to abuse (Lloyd-Sherlock, Penhale, and Redondo 2018).

In all countries, support for home caregivers should be part of a wider strategy of integrated health and social services provided at the community level. Despite the obvious benefits of a "joined-up" approach, the LTC and health sectors are poorly coordinated in OECD countries (Colombo et al. 2011). Inadequate community care for older people significantly exacerbates avoidable hospital stays and care home admissions (Fialho et al. 2014; Silva et al. 2017; WHO 2015b). Older people in Italy who lived alone were more than twice as likely to be admitted to a hospital as those living with a nonprofessional caregiver (Landi et al. 2004). In the United Kingdom, patients older than age 65 account for 80 percent of hospital stays of two weeks or longer (Wright et al. 2014). Evidence there suggests that a lack of family support at home is one of the main causes for delayed discharging among older people (Landeiro, Leal, and Gray 2016). These factors demonstrate the importance of integrated care at the community level, where primary health care professionals act as intermediaries between mainstream health services and home care. For this integrated approach to succeed, primary health care professionals need more training and a greater awareness of geriatric health issues. No less important is cooperation between government health and social service agencies.

MEETING THE COST OF LONG-TERM CARE

In high-income countries, many policy debates on LTC focus on its growing cost to governments and the need to minimize its fiscal impact. Although crucial, this fiscal interpretation of "cost" is narrow, and it obscures some important points. First, LTC always has a "cost," be it fiscal for states, out-of-pocket spending for individuals, time and opportunity losses for unpaid or exploited caregivers, or—if care is inadequate—quality-of-life losses for older people. The critical issue, then, is how these costs should be distributed between public and private domains, between generations, and between men and women. Informed debate is required.

In Latin America, the primary cost to the state is unnecessary hospitalization. Some OECD countries have been able to reduce the average amount of time people of all ages spend in hospitals by using technology to decrease recovery time, and more efficient discharge protocols. For care-dependent older people, the

availability of suitable LTC services in the community could have a large effect on discharge rates. Reduced functioning in later life has a clear relationship with hospital admission. The rate of functional decline in old age is much lower in some countries than in others, which indicates scope for improvement through health promotion for people of all ages. Furthermore, the availability of community LTC services can reduce delayed hospital discharging.

Another LTC funding consideration is whether public spending crowds out family support. Research from a number of countries, including the Republic of Korea, indicates that publicly funded care does not reduce the probability of receiving family support or of living independently (Kim and Lim 2015). In practice, whether state funding crowds out family care or bolsters it depends on the form that that funding takes. Public funding of interventions that promote older people's independence and support family caregivers is likely to have a positive effect, whereas funding that emphasizes hospitalization and residential care is likely to have a negative one.

In most Latin American countries, public sector funding of LTC is fragmented and uncoordinated. Some funding is provided through the mainstream health sector either on a default basis (unnecessarily long hospital stays, for example) or as an extension of health-service entitlements in cases of disability, frailty, and dependence. At least on paper, social health insurance often funds a range of LTC services. Additional funding is often provided by government agencies outside the health sector, such as ministries of social welfare and social development. Some publicly funded pension programs include additional support for older people with care needs. Funding is often provided at the local, rather than national, government level, which leads to further fragmentation. There is often little, if any, coordination between different agencies, and there is considerable confusion about their specific responsibilities. In Brazil, for example, a large number of government agencies provide different assistive devices (Camarano 2017). Box 6.1 provides a case study of LTC funding and provision in Chile. Responses to growing care needs are often uncoordinated and ad hoc; there are no national strategies or lead agencies. A more effective model of public sector LTC financing is impossible without more effective institutional structures that encourage cooperation between sectors and coordination between central and local governments.

Global lessons about national long-term care insurance

There is considerable interest around the globe, but particularly in China and other Asian countries, in establishing national LTC insurance (LTCI) programs. Care needed in later life represents a significant financial risk that could potentially be pooled across groups or spread over the course of an individual life by means of insurance mechanisms (Barr 2010). High-income countries such as Germany and Japan have a number of LTCI programs. The most instructive case for Latin America is Korea, which set up a national LTCI program in 2008.

Korea's LTCI program is funded primarily by payroll taxes. It mainly provides in-kind services, rather than cash payments, including both domiciliary and institutional care. When the program was established, there were concerns that professional LTC services would not be able to meet demand. Other public initiatives were established alongside LTCI to encourage the development of public and private sector provision. The resulting increase in the supply of professional LTC services and in service use reduced pressure on unpaid family

BOX 6.1

Funding long-term care services in Chile

In Chile, a number of government agencies working in sectors such as public health, social insurance, and social development have long-term care (LTC) responsibilities. The Ministry of Health is responsible for health services, which can include LTC, and for providing assistive devices. It is also responsible for evaluating older people's functional status and, on that basis, their entitlement to publicly funded LTC services. The Servicio Nacional del Adulto Mayor (SENAMA), a part of the Ministry of Social Development, is, to a larger and larger extent, the lead LTC agency. Public funding for SENAMA reached $29 million in 2016 (Villalobos Dintrans 2017), or about $83 for every Chilean age 60 or older with a limitation on activities of daily living. That figure is still considerably less than the estimated $1.6 billion (0.45 percent of GDP) it would require to establish a universal publicly funded LTC system comparable to systems in other Organisation for Economic Co-operation and Development countries (Matus-López and Cid Pedraza 2014). By way of comparison, the Republic of Korea spends about 1.1 percent of GDP on LTC and the United Kingdom 1.8 percent.[a]

More than 60 percent of SENAMA's budget is spent on subsidies for care homes, which theoretically are targeted according to the age, functional status, and socioeconomic profile of residents. The quality of these providers is often substandard and regulation is inadequate (Dirección de Presupuestos 2015). One problem is that the Ministry of Health, not SENAMA, is responsible for regulating almost all care homes, and there is little coordination between the two agencies.

In 2013, SENAMA set up a pilot program to support home care for older people (Matus-Lopez and Cid Pedraza 2015). A total of 182 caregivers were provided with training in domiciliary LTC before being deployed to support family caregivers on either a voluntary or paid basis. The program was managed at the local government level in seven districts by nongovernmental organizations, local government agencies, and religious organizations. Agencies were paid $32.40 per month for each older person to whom services were provided. A range of services was offered for home visits, for a minimum of two hours per beneficiary. By 2014, 1,761 older people had benefited from the program and the total budget, including operational costs and caregiver training, was $630,300. Though a very promising intervention, it has been applied only on a limited scale. Other initiatives have been piloted, but they too remain very limited. An initiative offering publicly funded respite care, for example, had reached only 700 caregivers as of 2016 (Chile 2016).

a. Based on the OECD (Organisation for Economic Co-operation and Development) Health Status database.

caregivers. However, this rapid expansion in provision was skewed toward residential care, including large numbers of hospitals specializing in LTC that compete with less intensive services for LTCI funds (Caruso Bloeck, Galiani, and Ibarrarán 2017). The rapid service expansion has not always been accompanied by effective regulation or quality oversight (Rhee, Done, and Anderson 2015).

A key lesson from Korea is that funding policies play an important part in shaping LTC systems. They can unintentionally provide incentives for institutional care, even in cultures that emphasize filial duty and family solidarity. In Japan, for instance, the proportion of older people in residential care is higher than in most other OECD countries because of a decision to eliminate LTCI co-payments for residential care (Campbell 2014). In the United States in the past decade, publicly funded LTC has been shifting away from nursing home care and toward home- and community-based services (Feng et al. 2011). Despite these efforts, the bulk of total LTC spending in the United States still goes to institutional care, partly because of intense lobbying by private sector nursing home operators.

International experience shows that LTCI should not be viewed as a panacea for resourcing LTC services. Although it can reduce pressure on unpaid family caregivers, it can also lead to unnecessarily high rates of residential provision. Private finance may not be enthusiastic about participating in national LTCI programs, given the uncertainty about future levels of risks and costs of care. LTCI is not an attractive option for Latin American countries for additional reasons. Widespread informal employment in the region not only promotes inequality but also reduces the coverage of any social insurance system. Like health and pension insurance, universal coverage would require substantial tax-based subsidies for those unable to make regular contributions. In a context of poorly regulated private health service markets, LTCI would likely face the same problems of inefficiency and poor governance that social health insurance has (Lloyd-Sherlock et al. 2018), and relationships between LTCI and related areas of health insurance would likely be difficult. Economic instability and limited trust in social insurance programs further reduce the potential for LTCI in the region. Cultural preferences to age at home and receive support from family are likely to limit enthusiasm for contributing to such programs (Caruso Bloeck, Galiani, and Ibarrarán 2017).

In the absence of large-scale LTCI programs, the most promising approach to funding LTC in Latin America is careful allocation of tax revenue. As the previous section shows, a number of simple and cost-effective interventions could, with suitable public funding, be scaled up quickly. No less important than increasing the overall amount of state funding is improving institutional coordination and allocative efficiency. In theory, delegating financial responsibility to local government may generate some benefits, such as flexible service provision. In practice, though, it reflects indifference to LTC on the part of central governments and exacerbates fragmentation and the undermining of upward accountability. Each level of government faces particular challenges in identifying roles and allocating responsibilities to different health and social development agencies. This chapter recommends that central governments assume greater overall responsibility for LTC, ideally in the form of a cross-sectoral national agency with the resources, expertise, and authority to oversee, regulate, and coordinate the work of local and national government agencies as well as nongovernment LTC providers, including informing and sharing best practices. The substantial financial burden of an effective central LTC agency will be more than offset by the savings resulting from reduced use of hospital services and avoidable admissions to care homes.

Another policy debate is whether public resourcing should focus mainly on cash or in-kind services. Cash benefits have the advantages of being relatively easy to deliver and of enabling families to exercise choice about the services they receive (Caruso Bloeck, Galiani, and Ibarrarán 2017). In-kind services reduce family choice but may channel funding toward more cost-effective services. For a number of reasons, governments in Latin America should not rush into supporting LTC with new targeted cash-transfer programs rather than direct budgetary support to public and private providers. Experience suggests that cash transfers targeted to people with disabilities on the basis of functional impairment are both challenging and resource intensive (Mishra and Kar 2017). Korea opted for in-kind services rather than cash benefits because of concerns that families lacked sufficient knowledge of LTC to make informed decisions and that payments might be misappropriated by other family members. Such fears are supported by studies showing a strong correlation between dependency in

later life and the risk of financial abuse by family members (Johannesen and LoGiudice 2013). In Korea, funding of in-kind services emphasized residential services over home care support, but that tendency could be averted by more careful policy design. Indeed, direct funding of providers would give states considerably greater leverage over the future mix of LTC service.

Another potential drawback to establishing LTC cash-transfer programs is that they operate in parallel with widespread pension programs. Rather than establish new programs, social pension programs could be built on to support both LTC and health in general. Box 6.1 provides an example of how pension delivery can be combined with basic public health interventions. The same principle can be applied to LTC by (1) providing messaging about heath and care issues at the point of pension collection or during the electronic-transfer process, (2) offering free health and LTC needs assessments at pension collection locations, (3) triggering home visits when a retiree delegates another person to collect their pension or when they fail to collect it for more than two consecutive months, or (4) offering retirees discounts for services, such as simple home adaptations. Pilot and feasibility studies of interventions of this kind, as well as evaluations of existing stand-alone caregiver cash-benefit programs, are urgently needed.

CONCLUSIONS

More than 12 million older people are in need of LTC in Latin America and the Caribbean. That figure is expected to grow, even under the most optimistic projections for the evolution of disability at older ages, because of the rapid increase in the older population and the even more rapid increase in the population older than age 80. By 2050, some 24 million to 55 million people are expected to need LTC.

The bulk of LTC costs in Latin America is borne by unpaid family caregivers, most of them women in low-income households. Another indirect cost of LTC is the low pay and poor working conditions endured by many paid care workers. But the ones who pay the highest cost of all—in enduring abuse, neglect, and shortened life expectancy—are the older people who do not receive the care they require. Although states make substantial contributions to paying LTC costs, their efforts are inefficient because of a focus on hospital care. Improving the functional status of older people and the care they receive in their communities would reduce the cost states pay for unnecessary hospital and nursing home admissions. This chapter shows that even marginal reductions in elderly hospitalization rates can generate substantial savings. States should prioritize integrated community care and support for family caregivers over avoidable hospitalization.

An effective LTC-funding system requires sound institutional structures, unlike the current fragmented and uncoordinated structures. National agencies with the resources and authority they need must be established to promote intersectoral cooperation at all levels of government, to impose robust regulation, and to enforce standards, regardless of provider type. These agencies should not be unnecessary extensions of welfare bureaucracies but champions of efficiency, good practice, and service quality.

Addressing the drivers of poor health and functional decline in later life while strengthening community and family support can substantially reduce

pressure on hospitals. The less tangible costs of nonintervention include unnecessarily large burdens on unpaid family caregivers in the form of women not participating in the workforce and the health costs associated with the stress of unsupported caregiving. Unless policy makers take concerted action, the cost paid by older people who do not receive adequate care and by caregivers who are exploited and unsupported will increase exponentially.

This book identifies three clear and complementary priority objectives:

- Scale up simple, cost-effective health and LTC interventions provided largely at the community level by reallocating expenditures from much less cost-effective health care options
- Strengthen institutional structures to improve regulation and stewardship in an increasingly pluralistic and complex LTC system
- Coordinate the development of LTC policies and health care reforms designed to strengthen primary care and reduce the use of hospital services for chronic and LTC services

REFERENCES

Abbott, Robert D., Aya Kadota, Katsuyuki Miura, Takehito Hayakawa, Takashi Kadowaki, Tomonori Okamura, Akira Okayama, Kamal H. Masaki, and Hirotsugu Ueshima. 2011. "Impairments in Activities of Daily Living in Older Japanese Men in Hawaii and Japan." *Journal of Aging Research* 2011 (June). doi:10.4061/2011/324592.

Barbosa, Maira Tonidandel, Paulo Caramelli, Débora Palma Maia, Mauro César Quintão Cunningham, Henrique Leonardo Guerra, Maria Fernanda Lima-Costa, and Francisco Cardoso. 2006. "Parkinsonism and Parkinson's Disease in the Elderly: A Community-Based Survey in Brazil (The Bambuí Study)." *Movement Disorders: Official Journal of the Movement Disorder Society* 21 (6): 800–8. doi:10.1002/mds.20806.

Barr, Nicholas. 2010. "Long-Term Care: A Suitable Case for Social Insurance." *Social Policy & Administration* 44 (4): 359–74. doi:10.1111/j.1467-9515.2010.00718.x.

Camarano, A. 2017. "Cuidados Para a População Idosa: Demandas e Perspectivas." World Bank, Washington, DC.

Campbell, John Creighton. 2014. "Japan's Long-Term Care Insurance Program as a Model for Middle-Income Nations." In *Universal Health Coverage for Inclusive and Sustainable Development: Lessons from Japan*, edited by Naoki Ikegami, 57–67. Washington, DC: World Bank.

Caruso Bloeck, Martín, Sebastián Galiani, and Pablo Ibarrarán. 2017. "Long-Term Care in Latin America and the Caribbean? Theory and Policy Considerations." Inter-American Development Bank, Washington, DC.

Chile. 2010. "Servicio Nacional del Adulto Mayor." Gobierno de Chile, Santiago.

Chile, Dirección Sociocultural. 2016. "Programa Chile Cuida: Derechos, Protección Social, Cuidados, Familia, Género, Trabajo Y Territorio." Gobierno de Chile, Santiago.

Colombo, Francesca, Ana Llena-Nozal, Jérôme Mercier, and Frits Tjadens. 2011. *Help Wanted? Providing and Paying for Long-Term Care*. Paris: Organisation for Economic Co-operation and Development.

Córdoba, Ara Mercedes Cerquera, Daysy Katherine Pabón Poches, and Diana Marcela Uribe Báez. 2012. "Nivel de depresión experimentada por una muestra de cuidadores informales de pacientes con demencia tipo Alzheimer." *Psicología desde el Caribe* 29 (2): 360–84.

Custodio, Nilton, Ana Wheelock, Daniela Thumala, and Andrea Slachevsky. 2017. "Dementia in Latin America: Epidemiological Evidence and Implications for Public Policy." *Frontiers in Aging Neuroscience* 9: 221. doi:10.3389/fnagi.2017.00221.

Dirección de Presupuestos (DIPRES), Ministerio de Hacienda. 2015. "Informe Final De Evaluación Programa Fondo De Servicios De Atención Al Adulto Mayor." Ministerio De Desarrollo Social, Servicio Nacional Del Adulto Mayor.

Feng, Qiushi, Zhihong Zhen, Danan Gu, Bei Wu, Pamela W. Duncan, and Jama L. Purser. 2013. "Trends in ADL and IADL Disability in Community-Dwelling Older Adults in Shanghai, China, 1998–2008." *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 68 (3): 476–85. doi:10.1093/geronb/gbt012.

Feng, Zhanlian, Mary L. Fennell, Denise A. Tyler, Melissa Clark, and Vincent Mor. 2011. "The Care Span: Growth of Racial and Ethnic Minorities in US Nursing Homes Driven by Demographics and Possible Disparities in Options." *Health Affairs (Project Hope)* 30 (7): 1358–65. doi:10.1377/hlthaff.2011.0126.

Fialho, Camila Bruno, Maria Fernanda Lima-Costa, Karla Cristina Giacomin, Loyola Filho, and Antônio Ignácio De. 2014. "Capacidade funcional e uso de serviços de saúde por idosos da Região Metropolitana de Belo Horizonte, Minas Gerais, Brasil: Um estudo de base populacional." *Cadernos de Saúde Pública* 30: 599–610. doi:10.1590/0102-311X00090913.

Flores Castillo, Atenea. 2012. "Cuidado y subjetividad: Una mirada a la atención domiciliaria." Economic Commission for Latin America and the Caribbean, Serie Mujer y Desarrollo 112. https://repositorio.cepal.org/bitstream/handle/11362/5839/1/S1200015_es.pdf.

Giraldo-Rodríguez, Liliana, Oscar Rosas-Carrasco, and Dolores Mino-León. 2015. "Abuse in Mexican Older Adults with Long-Term Disability: National Prevalence and Associated Factors." *Journal of the American Geriatrics Society* 63 (8): 1594–600. doi:10.1111/jgs.13552.

Hagist, Christian, and Laurence Kotlikoff. 2005. "Who's Going Broke? Comparing Growth in Healthcare Costs in Ten OECD Countries." Working Paper 11833, National Bureau of Economic Research, Cambridge, MA.

INAPAM (Instituto Nacional de las Personas Adultas Mayroes). 2012. "Modelos de Atención Gerontológica." INAPAM, Mexico City. http://www.inapam.gob.mx/work/models /INAPAM/Resource/Documentos_Inicio/Libro_Modelos_de_Atencion_Gerontologica _(web).pdf.

Johannesen, Mark, and Dina LoGiudice. 2013. "Elder Abuse: A Systematic Review of Risk Factors in Community-Dwelling Elders." *Age and Ageing* 42 (3): 292–98. doi:10.1093/ageing/afs195.

Kim, Hyuncheol Bryant, and Wilfredo Lim. 2015. "Long-Term Care Insurance, Informal Care, and Medical Expenditures." *Journal of Public Economics* 125 (Supplement C): 128–42. doi:10.1016/j.jpubeco.2014.12.004.

Landeiro, F., J. Leal, and A. M. Gray. 2016. "The Impact of Social Isolation on Delayed Hospital Discharges of Older Hip Fracture Patients and Associated Costs." *Osteoporosis International* 27 (2): 737–45. doi:10.1007/s00198-015-3293-9.

Landi, Francesco, Graziano Onder, Matteo Cesari, Christian Barillaro, Fabrizia Lattanzio, Pier Ugo Carbonin, and Roberto Bernabei. 2004. "Comorbidity and Social Factors Predicted Hospitalization in Frail Elderly Patients." *Journal of Clinical Epidemiology* 57 (8): 832–36.

Lansley, Peter, Claudine McCreadie, and Anthea Tinker. 2004. "Can Adapting the Homes of Older People and Providing Assistive Technology Pay Its Way?" *Age and Ageing* 33 (6): 571–76. doi:10.1093/ageing/afh190.

Lima-Costa, Maria Fernanda, Sérgio Viana Peixoto, Deborah Carvalho Malta, Célia Landmann Szwarcwald, and Juliana Vaz de Melo Mambrini. 2017. "Informal and Paid Care for Brazilian Older Adults (National Health Survey, 2013)." *Revista De Saude Publica* 51 (suppl 1): 6s. doi:10.1590/S1518-8787.2017051000013.

Lloyd-Sherlock, Peter, and Carlos Díaz-Venegas. 2018. "Long-Term Care for Older People in Latin America." Background paper for *When We're Sixty-Four* World Bank, Washington, DC.

Lloyd-Sherlock, Peter, Bridget Penhale, and Nelida Redondo. 2018. "The Admission of Older People into Residential Care Homes in Argentina: Coercion and Human Rights Abuse." *Gerontologist* 59 (4): 610–18. doi:10.1093/geront/gny014.

Lloyd-Sherlock, Peter, Anne Margriet Pot, Siriphan Sasat, and Fernando Morales-Martinez. 2017. "Volunteer Provision of Long-Term Care for Older People in Thailand and Costa Rica." *Bulletin of the World Health Organization* 95 (11): 774–78.

Lloyd-Sherlock, Peter, and Nélida Redondo. 2009. "Institutional Care for Older People in Developing Countries: The Case of Buenos Aires, Argentina." *Journal of Population Ageing* 2 (1): 41–56.

Matus-López, Mauricio, and Camilo Cid Pedraza. 2014. "Costo de un sistema de atención de adultos mayores dependientes en Chile, 2012–2020." *Revista Panamericana de Salud Pública* 36: 31–36.

Mishra, Aswini Kumar, and Atasi Kar. 2017. "Are Targeted Unconditional Cash Transfers Effective? Evidence from a Poor Region in India." *Social Indicators Research* 130 (2): 819–43. doi:10.1007/s11205-015-1187-z.

Navarro, Sandra Huenchuan, and Rosa Icela Rodríguez Velázquez. 2015. "Necesidades de cuidado de las personas mayores en la Ciudad de México." CEPAL.

Palacios-Ceña, Domingo, Rodrigo Jiménez-García, Valentín Hernández-Barrera, Cristina Alonso-Blanco, Pilar Carrasco-Garrido, and César Fernández-de-Las-Peñas. 2012. "Has the Prevalence of Disability Increased over the Past Decade (2000–2007) in Elderly People? A Spanish Population-Based Survey." *Journal of the American Medical Directors Association* 13 (2): 136–42. doi:10.1016/j.jamda.2010.05.007.

Rhee, Jong Chul, Nicolae Done, and Gerard F. Anderson. 2015. "Considering Long-Term Care Insurance for Middle-Income Countries: Comparing South Korea with Japan and Germany." *Health Policy* (Amsterdam) 119 (10): 1319–29. doi:10.1016/j.healthpol.2015.06.001.

Salin, Sirpa, Marja Kaunonen, and Päivi Astedt-Kurki. 2009. "Informal Carers of Older Family Members: How They Manage and What Support They Receive from Respite Care." *Journal of Clinical Nursing* 18 (4): 492–501. doi:10.1111/j.1365-2702.2008.02550.x.

SENAMA (Servicio Nacional del Adulto Mayor). 2010. "Resultados Segunda Encuesta Nacional Calidad de Vida en la Vejez (2010)." http://www.senama.gob.cl/storage/docs/Resultados -Segunda-Encuesta-Nacional-Calidad-de-Vida-en-la-Vejez-2011.pdf.

Silva, Alexandre Moreira de Melo, Juliana Vaz de Melo Mambrini, Sérgio Viana Peixoto, Deborah Carvalho Malta, and Maria Fernanda Lima-Costa. 2017. "Use of Health Services by Brazilian Older Adults with and without Functional Limitation." *Revista De Saude Publica* 51 (suppl 1): 5s. doi:10.1590/S1518-8787.2017051000243.

Sousa, Renata M., Cleusa P. Ferri, Daisy Acosta, Mariella Guerra, Yueqin Huang, Ks Jacob, At Jotheeswaran, et al. 2010. "The Contribution of Chronic Diseases to the Prevalence of Dependence among Older People in Latin America, China and India: A 10/66 Dementia Research Group Population-Based Survey." *BMC Geriatrics* 10: 53. doi:10.1186/1471 -2318-10-53.

Spillman, B. C., and K. Black. 2005. "The Size of the Long-Term Care Population in Residential Care: A Review of Estimates and Methodology." Report to the US Department of Health and Human Services, Office of Disability, Aging, and Long-Term Care Policy, Washington, DC. http://aspe.hhs.gov/daltcp/reports/2005/ltcpopsz.htm.

Sudré, Mayara Rocha Siqueira, Annelita Almeida Oliveira Reiners, Janete Tamami Tomiyoshi Nakagawa, Rosemeiry Capriata de Souza Azevedo, Luciane Almeida Floriano, and Lia Hanna Martins Morita. 2012. "Prevalence of Dependency and Associated Risk Factors in the Elderly." *Acta Paulista de Enfermagem* 25 (6): 947–53. doi:10.1590/S0103 -21002012000600019.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

Villalobos Dintrans, Pablo. 2017. "Envejecimiento y cuidados a largo plazo en Chile: Desafíos en el contexto de la OCDE." *Revista Panamericana de Salud Pública* 41:e86.

WHO (World Health Organization). 2015a. *WHO Global Strategy on People-Centred and Integrated Health Services. Interim Report*. Geneva: World Health Organization.

WHO (World Health Organization). 2015b. *World Report on Ageing and Health*. Geneva: World Health Organization.

Wright, Pandora Naomi, Geraldine Tan, Steve Iliffe, and Dan Lee. 2014. "The Impact of a New Emergency Admission Avoidance System for Older People on Length of Stay and Same-Day Discharges." *Age and Ageing* 43 (1): 116–21. doi:10.1093/ageing/aft086.

7 Population Aging and Pension Systems

INTRODUCTION

Pension systems are public policies, implemented and overseen by the state, to smooth consumption over the course of the life cycle of individuals, protecting them against income loss when they retire from the labor market and minimizing poverty among the elderly. All the Latin American and Caribbean countries have pension systems in place to meet these objectives. However, as with other social policies, a wide range of approaches to the design, structure, and scope of these systems are implemented across the region.

As discussed in chapter 1, pension systems have a double role in the population aging debate. On the one hand, there is a clear financial aspect because more elderly people implies more resources necessary to finance their daily living. However, a second and equally important aspect relates to the first and second dividend and the macroeconomic impacts of aging: as populations get older, their labor forces tend to decline, and dependency rates grow. If pension systems promote early retirement and limit the participation of older individuals in the labor market through restrictive regulations, they will not only be expensive programs to finance but also be a restriction on possible financing sources.

Pension systems are directly affected by population aging because larger elderly populations result in more demand for the systems that must be financed through fiscal resources if pension systems are public, or through market mechanisms if they are private. Although policy analysts usually differentiate between these two scenarios, it is important to note that they have a common challenge: whether through fiscal transfers or through market transactions, a larger population of retirees implies, all else remaining equal, that resources that could be used for other purposes (such as accumulating human or physical capital) must be used to finance consumption by elderly people.

This chapter discusses design issues and performance indicators for pension systems in Latin America, then focuses on the impact of aging on these indicators as well as on potential policy responses. The next section provides an overview of the origin and current design of the systems. It is followed by a section that presents a review of their performance, considering basic indicators. The subsequent section deepens the discussion presented in chapter 3, disentangling the

pure demographic effects from those linked to the generosity of the systems. The discussion presents two scenarios. The first scenario looks into the possible impact of population aging on fiscal accounts under the current rules of the game. The second scenario also considers the impact of a convergence of pension system design toward current standards in comparable Organisation for Economic Co-operation and Development (OECD) countries. The next section discusses the relevant policy implications of these programs.

PENSION SYSTEM DESIGN IN THE REGION

Pension systems in Latin America are characterized by heterogeneity of both design and performance. According to Mesa-Lago and Bertranou (1998), the Latin American and Caribbean countries can be placed into three groups based on degree of social security system development: pioneers, intermediates, and latecomers. The pioneers are the countries that implemented their social security systems during the first three decades of the twentieth century—Argentina, Brazil, Chile, Cuba, and Uruguay. The pension systems that emerged during that period covered organized labor. Additional and less powerful sectors were gradually added, though the expansion of coverage was fragmented. The overall system was poorly coordinated and uneven in coverage and access to rights and benefits, making these countries' systems the most stratified in the region.

The intermediate countries—Bolivia, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru, and the República Bolivariana de Venezuela—implemented social security programs in the 1940s and 1950s. Their systems are less stratified than the ones in the pioneer countries. The latecomer group consists of the Dominican Republic, El Salvador, Haiti, Honduras, Guatemala, and Nicaragua. Social security programs in these countries were implemented in the 1960s and 1970s. Most of the Caribbean countries that gained independence in the 1970s and 1980s also form part of this group. Generally speaking, this group's systems are more uniform than are the others in the region.

Pension systems are an important component of social security programs. The main objective of pension systems is to finance consumption and to reduce poverty among the elderly, an age group vulnerable because of the fall in labor earnings with old age. Pension systems can be contributory or noncontributory. Contributory systems make use of contributions (usually in the form of labor taxes), so that the working-age population finances retirement benefits; noncontributory plans have no explicit link between payments and benefits. Because contributory plans are financed by labor taxes, informality clearly affects them by excluding some (or many) workers from the system and limiting the available resources. Also, most governments tend to adopt flexible approaches regarding access to benefits by informal workers, resulting in additional fiscal demands that are not always properly financed.

A noncontributory system, meanwhile, is usually funded by general income and is not dependent on labor market conditions. Although such systems may provide universal coverage and be unaffected by labor market cycles, they may generate fiscal sustainability issues and, potentially, negative incentives for private long-term saving decisions.

In Latin America, pension systems are organized either as pay-as-you-go or defined benefit plans; fully funded or defined contribution (collective or individual) plans; or some combination. Defined benefit plans should aim, in theory, to maintain financial balance. Contributions of active workers are

supposed to finance retirees' benefits. If revenue is not sufficient, some parameters may be adjusted (contribution rates increased, expenditures [that is, benefits] reduced, retirement age or vesting periods increased), or other financing sources (usually general revenue funds) may be used to cover the gap. The financial sustainability of these systems depends on two indicators: the replacement rate, which relates the value of average benefits to the average salaries to be replaced; and the dependency ratio, which relates the number of beneficiaries to the number of contributing active workers.

In funded systems, benefits are financed by retirees' past contributions. The systems may be individual (each individual finances his or her own benefits) or collective, wherein groups of participants share the cost and risks of participating in the program. Several pension systems in Latin America were created as funded programs in the early twentieth century, but by the 1950s virtually all were publicly run, defined benefit programs. These systems were, in most cases, quite generous—because medium-term demographic trends were usually ignored—and hence were hard to sustain over time. All systems have been through a number of reforms, almost invariably to reduce their benefits and adjust spending or increase revenue, as populations age and systems mature. In the last two decades of the past century, financial difficulties worsened and 10 countries reacted by introducing structural reforms that shifted (either fully or partially) the systems toward fully funded programs.

The first country to introduce a reform of this sort was Chile. In 1981, it shifted from a defined benefit system to an individual-funded program to fund pensions. Starting in the 1990s, structural reforms were introduced in Peru (1993), Argentina (1994), Colombia (1994), Uruguay (1996), Bolivia (1997), Mexico (1997), El Salvador (1998), Costa Rica (2001), and the Dominican Republic (2003–05). Although each reform had its own direction and characteristics, they shared a common goal of reducing the fiscal impact of pension systems in the medium term, transferring risks from the state to individuals. Countries that did not implement funded programs adopted large-scale parametric reforms.

Although the literature tends to speak of a single model of structural reform in Latin America (the Chilean model), in practice the 10 countries that undertook structural pension reforms in Latin America followed three clearly distinct approaches, which can be categorized as substitutive, parallel, or mixed. Table 7.1 shows which countries undertook each reform model, the date of implementation, and the four main designs.

The substitutive model was implemented in five countries: Bolivia, Chile, the Dominican Republic, El Salvador, and Mexico. In these cases, all workers entering the labor force were forced to join the new system, which was organized as a funded system with individual accounts, managed by commercial firms, while those who were already in the system at the time of the reform had some type of transitional arrangement.

Colombia and Peru applied a "parallel model"—the old public system was not shut down entirely, but a new funded plan was created; the two systems coexist, and workers may choose (with some restrictions) which one they prefer.

Finally, the mixed model was implemented in four countries: Argentina (in 1994, until 2008, when it was eliminated), Chile (in the 2008 reform), Costa Rica, and Uruguay. Under this approach, the public, pay-as-you-go model continued to provide a basic pension (first pillar), while a private system was instituted to provide a complementary pension (second pillar) for all or some participants. Outside Latin America, this model was also adopted in at least 12 countries in Western and Eastern Europe (Mesa-Lago and Hohnerlein 2002; Müller 2003).

TABLE 7.1 Classification of pension systems in Latin America and the Caribbean

No reforms (maintains defined benefit)	Substitutive (to individual fully funded)
Argentina 2008	Chile 1981–2008
Brazil	Bolivia 1997
Ecuador	Mexico 1997
Guatemala	El Salvador 1998
Honduras	Dominican Republic 2003–05
Nicaragua	
Paraguay	
Venezuela, RB	
Parallel	Mixed
Peru 1993	Argentina 1994–2008
Colombia 1994	Chile 2008
	Costa Rica 2001
	Uruguay 1996

Source: World Bank.

PERFORMANCE

Although most of the political debate around pension policies in Latin America in recent years has been about the effectiveness of these structural reforms, it is interesting to observe that the correlation between the design principles and performance is, at best, weak. The performance of pension systems can be assessed according to three criteria: (1) coverage, or access to benefits on the part of the elderly; (2) adequacy, or the amount of average benefits and whether they are sufficient to replace consumption and avoid poverty; and (3) fiscal and economic sustainability, or the ability of individuals, the state, and society to meet the financial obligations that the system imposes in the short, medium, and long terms.

These three criteria compete, insofar as coverage and benefits cannot be expanded without affecting the financial needs of earnings-protection plans. The main challenge facing those who design and implement pension programs is to strike a politically and socially acceptable balance, with programs that respond to policy objectives in the selection of recipients; the level of monetary benefits; the institutional arrangements to manage revenue collection, benefit granting, and payments; and the financial sources for the system.

Coverage

Because of widespread labor market informality, many contributory pension systems do not reach a large number of workers and, as a result, coverage of the working population (or active coverage) is low, limiting coverage of the elderly as well. Labor market performance is, then, paramount for pension systems to operate adequately, given their contributory nature. Figure 7.1 shows the percentage of the working-age population contributing to pension systems in Latin America between the early 1990s and about 2015.

The average coverage rate of the working-age population has been between 32 percent and 42 percent of the labor force in the past 25 years or so. The stability of this indicator, with relatively minor changes during a period

FIGURE 7.1

Contributors to a pension system, 1990–2015
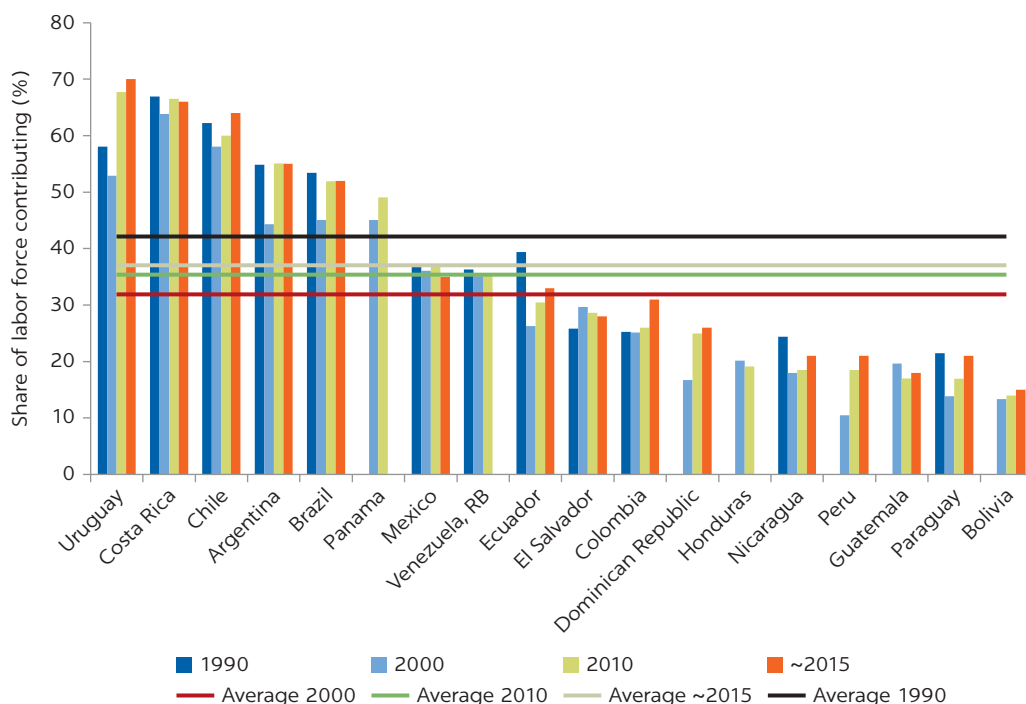
Sources: Rofman and Oliveri 2011; 2015 calculations based on household surveys.

that includes positive and negative macroeconomic contexts, is telling, given that it shows the structural characteristic of informality. However, as discussed in previous chapters, the region is far from homogeneous. Five countries have consistently had 50 percent or greater coverage rates, seven countries have not been able to approach the 30 percent mark, and the rest have moved somewhere in between these two groups.

Low coverage of the labor force unavoidably has an impact on coverage of the elderly because the systems are designed as contributory (with some caveats). Figure 7.2 shows the percentage of the population age 65 and older that receive a pension benefit. Old-age coverage has barely changed in 25 years. In the early 1990s, average coverage was 55 percent. A decade later, it declined 2 percentage points; by 2010 it had grown to 64 percent; and by 2015 it was close to 75 percent. The improvements observed since 2000 can be attributed almost completely to the introduction and expansion of noncontributory programs; by 2015, coverage of contributory programs in the region was close to 58 percent. In the Dominican Republic, Nicaragua, Honduras, Guatemala, and El Salvador, coverage is still less than 20 percent. A second group of eight countries has coverage levels between 40 percent and 70 percent. Finally, the coverage rate in Bolivia, Argentina, Chile, Brazil, and Uruguay—a group that includes countries with the largest contributory and noncontributory plans— ranges from 87 percent to 96 percent.

Most of the countries in the region have some sort of noncontributory program to protect those who, for different reasons, are not able to qualify for contributory programs. Differences in coverage of workers and the elderly are mainly explained by this (most notably, in Bolivia, with low coverage of its

FIGURE 7.2

Percentage of the population age 65 or older that receive a pension benefit
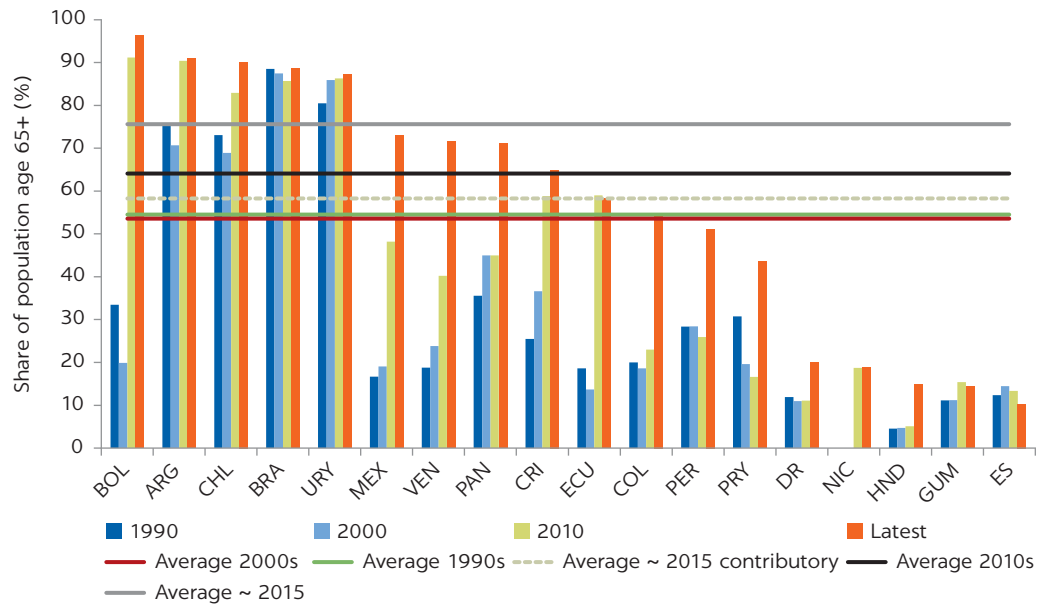
Sources: Rofman and Oliveri 2011; 2015 calculations based on household surveys.

contributory system but with an almost universal noncontributory program), but there is also a wide range of approaches, from some that are almost universal to others that are strictly targeted to the extreme poor. The earliest noncontributory programs emerged in the middle of the past century in several countries, but they were limited in scope. Only since about 2005 have they expanded and become a relevant component of social expenditures (Rofman, Apella, and Vezza 2013).

Adequacy

Although coverage is a critical performance indicator for pension systems, the adequacy of benefits is just as important. Are the funds received by beneficiaries sufficient to meet the system's objectives—that is, replace labor earnings, ensure basic consumption, and protect against poverty? The adequacy of pension benefits can be assessed by comparing the pension amounts and labor earnings of the working-age population.

Figure 7.3 shows the theoretical gross replacement rates for an average worker with a high contribution level for each country's pension system. These gross replacement rates are the percentage of the salary a worker who has a contributory history that makes him or her eligible for a contributory pension should expect to receive, according to the system's rules. The average replacement rate for Latin America and the Caribbean is 62 percent, though figures again vary widely from country to country. Pension systems in Paraguay, the República Bolivariana de Venezuela, Nicaruaga, and Ecuador are very generous, with replacement rates greater than 80 percent of labor earnings. In Costa Rica, Panama, Argentina, Jamaica, and Peru, pension systems are estimated to have replacement rates greater than 70 percent of salaries. At the other end of the spectrum, gross replacement

FIGURE 7.3

Gross replacement rate, 2014
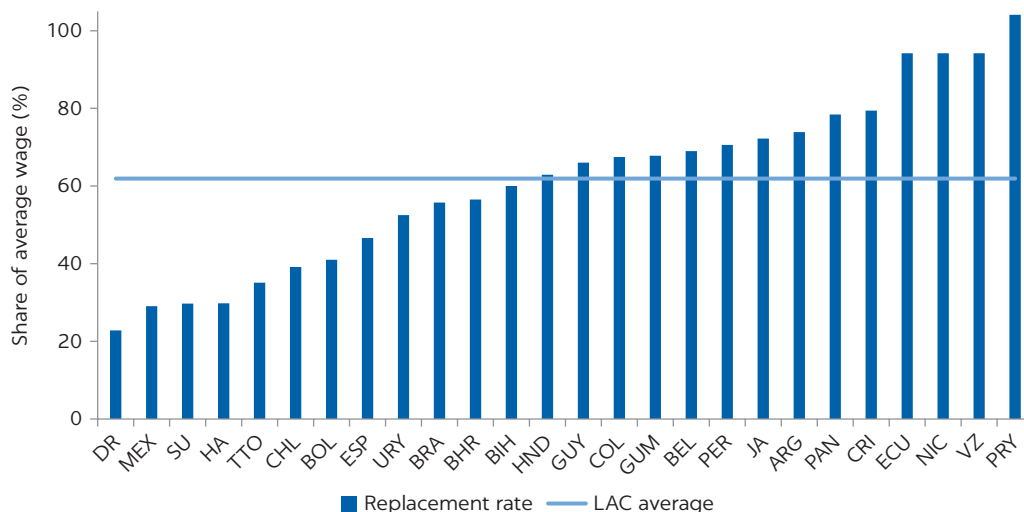
Source: OECD, IDB, and World Bank 2014.
Note: LAC = Latin America and the Caribbean.

rates in the Dominican Republic, Mexico, Suriname, Haiti, Trinidad and Tobago, Chile, and Bolivia are reported to be below 45 percent of labor earnings.

This heterogeneity of replacement rates reflects differences in how pension systems are designed. For a number of reasons, the pay-as-you-go–defined benefit programs tend to provide larger benefits than the funded plans. First, defined benefit plans have more space for discretionary, political decisions in establishing replacement rates; policy makers can ignore actuarial imbalances in the medium and long terms. Among funded plans, benefits are defined on the basis of accumulated contributions and life expectancy, so they need to be sustainable in actuarial terms.

Sustainability

The sustainability of a pension system may be considered from three different and increasingly broad perspectives. Financial sustainability considers the system's internal capacity to pay the promised benefits with the available resources. Fiscal sustainability considers the impact that potential system imbalances may have on fiscal accounts if the state acts as the system's formal or de facto guarantor. Finally, economic sustainability refers to the efforts a society must make to fund consumption by the elderly, whether through the state, private systems, or other programs.

The three perspectives can be considered separately, given that they include different financing sources and focus on different effects, but they share a core principle that is critical in the assessment of any pension system: the role of budget restrictions. To make a system sustainable, designers and implementers need to assess how generous the system can be (that is, how wide coverage and how high benefits can be) within certain restrictions (which can be defined by the system's revenue, fiscal space, or societal capacity to finance the program).

Furthermore, demographic trends cause these needs and restrictions to change over time, reducing the financial space.

Financial sustainability focuses on whether a system is able to finance its commitments in the present and in the future. This approach is particularly relevant for pension systems that aim to be self-sufficient, and thus are financed by workers' contributions. For pay-as-you-go plans, the challenge is more critical in the medium and long terms because population aging and system maturation (that is, aging of the participant population) require continuous adjustments to the system parameters. In many cases, the proposed solutions suggest the need to reduce the system's generosity, either by limiting coverage (through increases in retirement age or in vesting periods) or by reducing expected replacement rates. In other cases, proposals focus on finding new financing sources, such as increases in contribution rates, application of specific taxes to finance the program, or financial support from the national treasury. In pure funded plans, financial sustainability is guaranteed by definition, at the expense of restricting benefit replacement rates (because annuity rates will change with changes in demography).

Fiscal sustainability—that is, the ability of the state to generate enough resources to cover the expenditures committed at each stage—comes into play when the state makes a commitment to support the system. This is the case in most Latin American countries, where participating in pension systems is compulsory and the state provides an explicit or implicit guarantee to its citizens. Pay-as-you-go programs are usually more exposed to these issues because they are often managed by government agencies and the right to receive benefits is guaranteed by legislation. For funded plans, the commitment is less visible, but political and social reasons are likely to force the state to take responsibility in any case.

An older population means that there is greater financial pressure from pension systems, particularly in pay-as-you-go plans. Figure 7.4 illustrates the ratio between public spending on pensions and the old-age dependency ratio for 2015.

FIGURE 7.4

Public spending on pensions and old-age dependency ratio, 2015
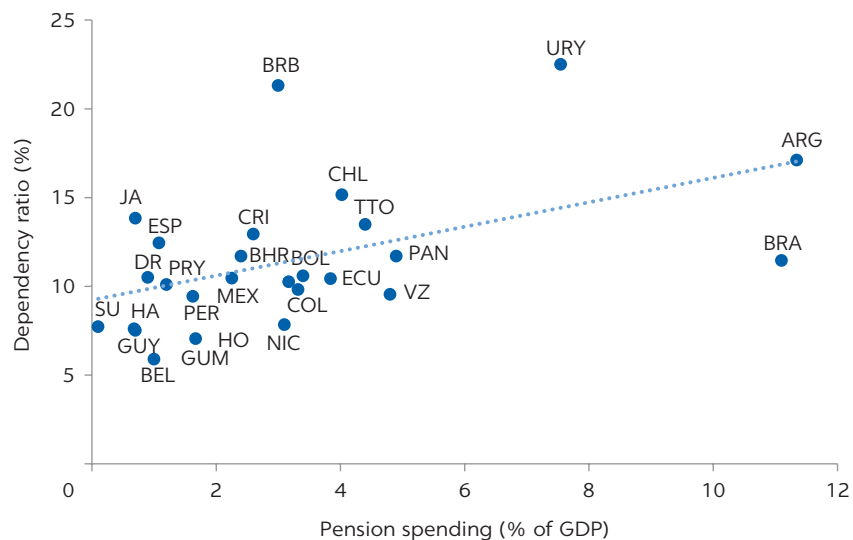
Sources: World Bank calculations based on OECD, IDB, World Bank (2014)*;* budgetary execution data from countries; UN (2017).

Public spending on pensions is positively and significantly correlated with an aging population. Argentina, Brazil, and Uruguay allocated the largest shares of gross domestic product (GDP) to funding their public pension systems. Caribbean countries such as Belize, Guyana, and Suriname, with younger populations, spent less on pensions.

Chile and Colombia are special cases: the introduction of funded plans managed by private companies reduced fiscal exposure (public pension spending accounts for 3.5–4.0 percent of GDP). That does not mean, however, that their economies as a whole are exempt from the pressure that demographics exert on pension funds. An increase in life expectancy means a longer period of consumption after retiring from the labor market, which requires either a higher level of savings for individual accounts or a reduction in mean benefits.

The discussion around figure 3.7 shows that, if no modifications are introduced to alter the benefit generosity ratio (BGR) (that is, the conditions under which an individual can receive a pension benefit and its magnitude), the region will see a strong increase in spending. Expected reforms (limiting the possibility of retiring young, reducing survivor benefit rules, eliminating special benefit programs, and other similar reforms) would result in a moderation of this trend, but the median spending on pensions should still rise from 3.25 percent of GDP to 6.7 percent between 2015 and 2045.

Finally, economic sustainability, as stated, refers to the effort made by society as a whole, beyond the funding mechanism per se, to fund consumption by the elderly who have retired from the labor market. Although funded plans ensure actuarial sustainability, it is necessary, in the context of an aging population with a larger number of beneficiaries and a longer funding period, for the economy as a whole to make a greater financial effort. Economic sustainability is particularly important in countries where, pursuant to the reforms described above, pension systems depend partly or entirely on privately managed funded plans. Although pensions do not, under such plans, draw on public expenditures, society still assigns part of its output to retirees' consumption, and if the number of retirees grows too fast, adjustments will likely occur, either through legislative changes or through the markets.[1] This consideration is particularly relevant in countries where funded plans are close to reaching maturity. In Chile, for instance, pensions paid by the funded plan are close to 1.5 percent of GDP.

CHALLENGES POSED BY POPULATION AGING

Pension systems in Latin America were designed in the early to mid–twentieth century, when a very different demographic pattern was prevalent. All systems have gone through significant reforms since their creation, but in most cases these reforms have been reactive—they aim to correct problems that have already emerged—instead of proactive, that is, preparing the systems for the future. If pension system parameters do not change, financial pressure is likely to increase in the medium and long terms. Rofman and Apella (2014, 2016) predict increased public spending on pensions in both Argentina, which has a defined benefit system, and Uruguay, which has a mixed system, as both countries leave the period of demographic dividend to enter the period of population aging.

As previous chapters discuss, pension spending can be broken down into two conceptual components: population aging, as measured by the old-age

dependency ratio; and system generosity, that is, coverage scope and adequacy. Expenditures in societies in which the demographic shift is further along should be higher than in younger societies if pension systems are equally generous. As the previous section notes, there is a significant and positive correlation between the old-age dependency ratio and public spending on pensions as a share of GDP among Latin American countries. In other words, the higher the dependency ratio of the elderly, the greater the financial effort to fund it. Inversely, countries with higher coverage and replacement rates—that is, countries with more generous pension plans—will face higher levels of expenditures.

Based on the methodology described in chapter 3, it is possible to model the expected evolution of pension expenditures and to disentangle its two components. Because of great heterogeneity in the design of pension systems throughout the region, they are classified into the categories presented in table 7.1.

A simulation exercise involving two alternative scenarios offers some insights. In the first scenario, "public policy preference" is assumed to be constant, while the population structure changes. In other words, coverage and replacement rates and, consequently, benefit generosity as measured by the BGR do not change as the population structure changes. The second scenario, as discussed in chapter 3, assesses the impact of changes in public policy preferences in addition to demographic change. The BGRs are adjusted to converge with those in OECD countries, considering the differences in system design.

Each scenario suggests a different public policy preference, given that the BGR is the result of the benefit replacement rate and the coverage level of the eligible population. The decision to converge the BGRs in the region with those in OECD countries requires reshaping the proposed targets for both performance indicators, which, in turn, means a change in public policies. It is assumed, therefore, that as per capita GDP in the region increases thanks to the demographic dividend and development advances, social preferences will also change and tend toward the preferences prevalent in developed countries.

Based on that assumption, the future BGR depends on the type of pension system that each country adopts or maintains. In the case of pay-as-you-go or defined benefit plans, the BGR is estimated on the basis of the current ratio of replacement rates and the BGR in OECD countries with pay-as-you-go programs. In the case of pure funded plans and countries with parallel programs, systems are assumed to move toward the average BGR in OECD countries with those pension models. Similarly, countries with mixed pension systems could reach the minimum BGR of current-day OECD countries.

Figure 7.5 shows public spending on pensions for 2015 and estimates for 2045, considering the demography-only scenario and assuming BGR levels close to current levels in developed countries. If no changes occur in the BGR (that is, there are no changes in design or implementation practices), the region's aggregate spending on pensions is expected to rise by more than 100 percent between 2015 and 2045 as a direct result of the increase in the old-age dependency ratio. That average conceals, however, significant heterogeneity across the region. Figure 7.5 groups countries according to pension system funding arrangement. In countries with a pay-as-you-go system, public spending on pensions is expected to double if there are no changes in the rules of the game or behavior. The largest increase in spending would be in Brazil, with a jump from 11.1 percent of GDP in 2015 to 29 percent in 2045. Next are Nicaragua (from 3.1 percent to 7.4 percent) and the República Bolivariana de Venezuela (from 4.8 percent to 10.5 percent). Paraguay and Guatemala are at the other end. Spending is expected

Public spending on pensions by country, 2015–45
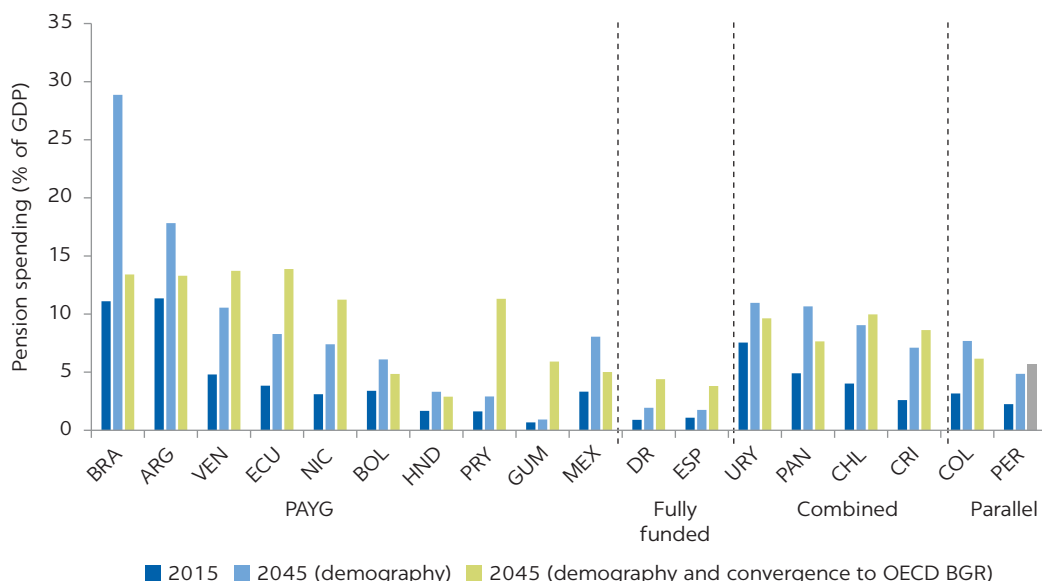
Sources: World Bank calculations and forecasts based on population data from UN (2017) and pension spending data for Latin American countries from country budgetary execution data and for OECD countries from OECD (2017).
Note: BGR = benefit generosity ratio; GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development; PAYG = pay-as-you-go.

to jump by 79 percent (from 1.6 percent to 2.91 percent) in the former and by 36 percent (from 0.68 percent to 0.93 percent) in the latter. Differences are driven by the current stage and expected rate of demographic change in each country. Brazil is at the extreme because of its large benefit generosity with wide coverage of people younger than age 65, a topic discussed shortly; Guatemala, at the other extreme, has such a limited pension system now that aging will not have any significant financial impact.

Population aging would lead to considerable financial effort in countries such as Argentina and Brazil, where pension systems have high BGRs. Such high ratios pose not only a considerable fiscal challenge but also a challenge to the economy as a whole. In a comparative analysis, Rofman and Apella (2017) show that, because of pension systems with high BGRs, Argentina and Brazil spend more of their GDP on pensions than many OECD countries.

In an alternative scenario, further economic development and policy debates could bring about changes in public policy preferences. If that were the case and Latin American countries were to gradually implement reforms to bring their systems to parameters similar to those current in OECD countries, sustainability would improve in most (but not all) cases. If the countries with the higher spending levels now in each category (Argentina and Brazil in the pay-as-you-go group, Mexico in the funded group, Panama and Uruguay in the mixed group, and Colombia in the parallel one) move toward OECD standards, the expected increase in spending would be significantly lower. In Brazil, more than 15 of the expected 17.5 percentage points of GDP increase would be offset. In Argentina, the same would occur with 4.5 of the 6.5 percentage points of increase that would be expected. In other words, for countries with such high levels of generosity, reaching current ratios for OECD countries would mean reducing the BGR by reducing either the replacement rate or coverage levels.

These two examples (Argentina and Brazil) are interesting. The great generosity of their pension systems is partly due to high levels of pension coverage (more than 90 percent of the elderly population receives a benefit) and high replacement rates. However, overcoverage seems to be the main driving force. In both countries the number of those receiving benefits greatly exceeds the number of adults older than 65. This overcoverage occurs because of both a high level of underage coverage (caused by the existence of special rules that allow certain groups to retire early in life) and the duplication of benefits (in Argentina, nearly 80 percent of the women receiving a survivors' pension are also retired). Overcoverage is even higher in Brazil. In 2015, the federal program alone paid out 32.6 million benefits, but only 16.1 million beneficiaries were older than age 65, yielding an overcoverage rate of more than 100 percent.[2] Figure 7.6 shows pension beneficiary distribution by age for 11 countries in the region; in Brazil, the concentration of beneficiaries younger than 65 is considerably higher than in other countries. Hence, if the pension systems in these countries were more exclusively oriented toward the elderly, as they are in developed countries, the number of beneficiaries would fall considerably.

Countries with less generous defined benefit pension systems (Ecuador, Guatemala, Nicaragua, Paraguay, and the República Bolivariana de Venezuela, for instance) would have to increase pension spending if they decide to strive for current OECD levels. The BGR in this group of countries is lower than in developed countries, largely because of the low coverage rates of their elderly populations. A change to more generous systems similar to the ones in OECD countries would require increasing pension coverage.

In the set of countries with funded plans, the average increase in public spending as a result of population aging is projected to be about 107 percent. Mexico would increase outlays on pensions from 3.3 percent of GDP in 2015 to 8.05 percent in 2045 (a 143 percent variation), the Dominican Republic from 0.9 percent to 1.94 percent (115 percent), and El Salvador from 1.08 to 1.75 percent (62 percent). The effects of adjusting pension systems so that they resemble the systems in developed countries are, then, heterogeneous. Mexico is the only country projected to experience a lower-than-estimated increase in spending under a demography-only scenario, just 5 percent of GDP, than under a scenario in which the public component reaches BGRs equivalent to the current-day minimum in OECD countries. The Dominican Republic and El Salvador would have to increase their BGRs considerably (and their elderly population coverage rates in particular), which would yield a larger increase in pension expenditures than in the demography-only scenario. Given the current performance of their pension systems, these countries will have to make a great effort to expand coverage so that it resembles the public policy preferences of OECD countries with the same financial arrangements.

By replacing the traditional pay-as-you-go plans with funded programs, these nations can alleviate financial pressure on the public sector and shift risk over to individual accounts. Nevertheless, the introduction of tax-funded minimum pensions for a redistribution effect requires some public participation in overall pension expenditures and, hence, exposure to the impact of demographic change. The period estimated in this analysis corresponds to the shift from a pay-as-you-go system to a funded system, which means fiscal spending encompasses funding the obligations the state took on before the reform.

Chile, Costa Rica, Panama, and Uruguay currently have mixed systems, that is, a combination of public funding that provides a basic pension (first pillar) and

Pension beneficiaries' distribution by age for selected countries, 2015
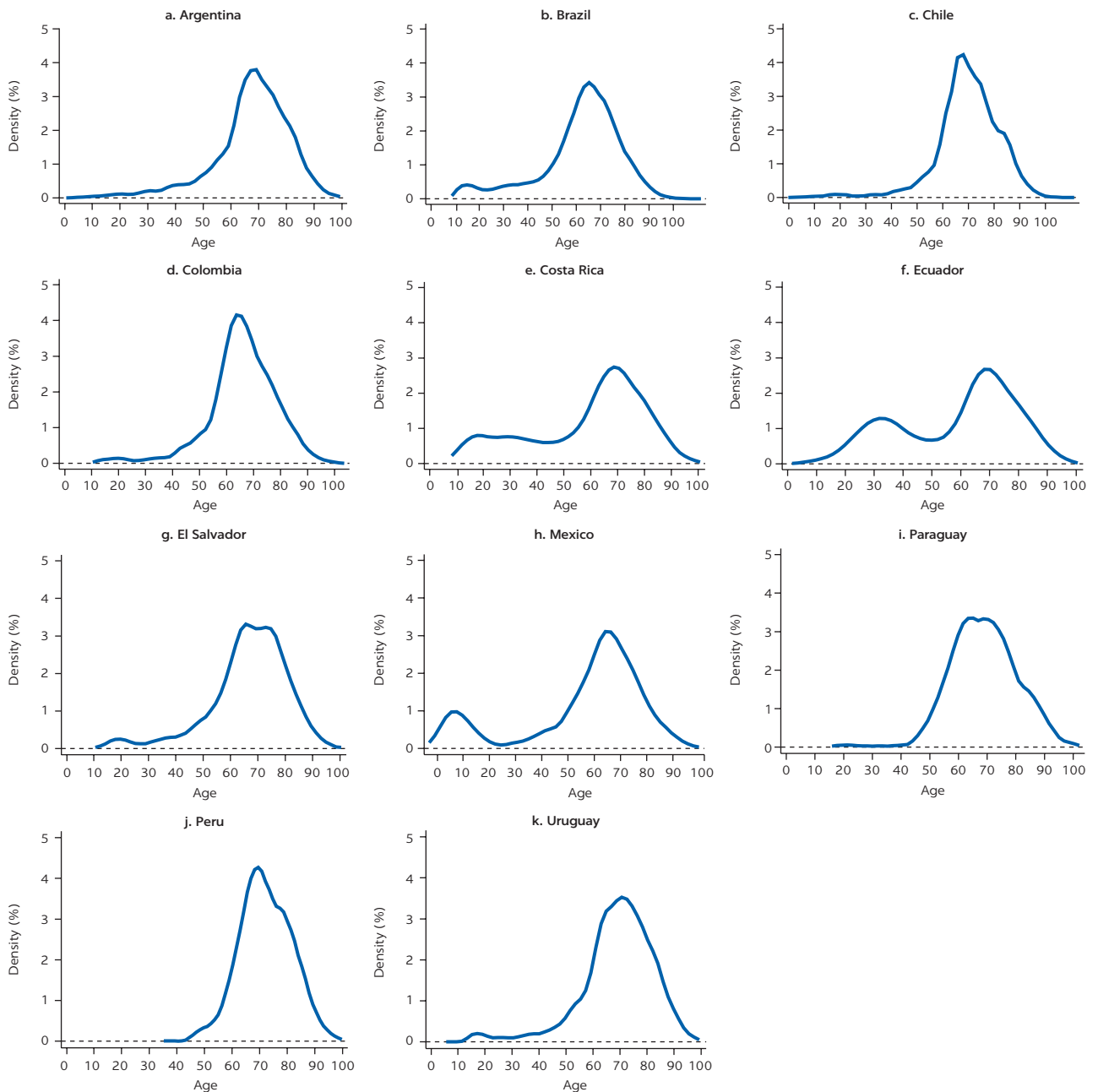
Source: World Bank calculations based on household surveys.
Note: The y-axes measure the level of concentration of beneficiaries.

a second, funded pillar. Because the public sector is an active participant through the first pillar, public spending on pensions is affected by demographic change and by state preferences regarding the BGR.

Assuming current replacement rates and coverage, population aging alone would drive an increase in public spending in this set of countries of, on average, 115 percent. In Uruguay, spending would jump from the current level of 7.6 percent of GDP to 11 percent in 2045, and in Panama from 5 percent to 10.6 percent.

If, on top of demographic change, public policy preferences also change with efforts aimed at modifying the replacement and coverage rates to resemble current rates in OECD countries, the average variation in public spending would be similar (116 percent). There are relative differences, though, because of the starting point of each country. In Panama and Uruguay the public spending variation would be smaller than under a demography-only scenario, but in Chile and Costa Rica the relative increases would be larger. These differences are associated with the current performance of each pension system. The current generosity ratios in Panama and Uruguay are, because of their level of coverage, higher than the ratios in developed countries. In Chile and Costa Rica, though, replacement rates are relatively low. Those countries would have to make an enormous effort to reach the BGR of OECD countries.

In Latin America, Colombia and Peru are the only two countries with parallel pension programs in which the public system competes with privately managed funded programs. Public spending on pensions is 3.17 percent in Colombia and 2.5 percent of GDP in Peru. Once again, in these two countries forecasts vary under a demography-only scenario and a scenario in which preferences converge with preferences in OECD countries. In Peru, in the absence of nondemographic changes, public spending would grow by more than 100 percent, to 4.86 percent of GDP. If the public sector in Peru acted to reach current OECD pension system performance—namely, increasing coverage—public spending would jump even further, to 5.71 percent of GDP. In Colombia, though, benefit generosity is similar to generosity in developed countries. That means that reaching OECD levels would not entail additional effort as a result of the increase in the dependency ratio. But there is a difference in benefit generosity between Colombia and Peru, chiefly because of the overcoverage of Colombia's pension system. Some 43 percent of beneficiaries of the Colombian pension system are younger than age 65, whereas in Peru they make up just 20 percent.

This section contributes to assessing how public spending will react to projected economic and demographic changes in the region. The analysis presented so far does not consider private spending on pensions by pension funds or insurance companies. Although this spending is relatively modest from a fiscal perspective, it could well affect economic sustainability. In public systems, aging implies more public spending. For individually funded plans, aging implies a decline in benefit levels, and does not necessarily increase public spending (unless the state ends up compensating for this decline through minimum benefits or other similar arrangements).

Pension outlays from funded plans in the region will tend to increase in the coming years because of the maturation of the plans implemented in previous decades. Rofman and Apella (2016) estimate that the pension outlays of AFAPs (Administradoras de Fondos de Pensiones) in Uruguay, for instance, will grow rapidly until the early 2040s and then settle at about 3.5 percent of GDP. In Chile, current benefit outlays of the funded plan are about 1.7 percent of GDP, but they are projected to increase as the system matures. It appears, then, that although fiscal pressure will be less in countries with funded plans, economic sustainability challenges in those countries should not be disregarded.

In summary, pension systems in Latin America are heterogeneous not only in design and outcome but also in how they are affected by population aging. Beyond the differences described above, the public sector in all countries will have to make more significant financial efforts to deal with greater demand for pension benefits. This challenge to the system's sustainability calls for public policy action.

PUBLIC POLICY OPTIONS

Demographic transition toward an older population exerts pressure through a larger population that is dependent on third-party transfers. The forecasts given in the previous section show that in coming decades, countries in the region will have to take effective action to ensure the sustainability of their pension systems.

The three dimensions of sustainability (financial, fiscal, and economic) must be considered. Although the financial sustainability of pure funded programs is ensured by their design, benefit levels may have to be adjusted, perhaps to the detriment of income replacement or protection against poverty. The financial sustainability of pay-as-you-go systems or programs with a public funding component may be improved by allocating specific, tax-based resources. That alone, though, will not improve fiscal sustainability because it only reallocates resources. Creating new taxes may improve sustainability, but doing so takes a toll on production and activity level, thus undermining economic sustainability.

Mechanisms that extend the active life of workers, increase their productivity, and, consequently, generate resources to finance pension systems must be identified. These mechanisms should become flexible programs that provide incentives for voluntary behavioral changes. Two areas that could be useful for driving institutional change in the region's pension systems are coverage and benefit levels.

Labor informality is, as noted, prevalent in Latin America and the Caribbean. The current contributory design of most pension systems in the region establishes minimum vesting periods for eligibility. Because most workers spend significant periods in the informal sector, they may not be eligible for benefits at retirement age, even if they have made significant contributions. In contexts in which transition between informal and formal employment is common, a more flexible model that combines basic universal (or social) pensions with contributory plans that recognize past contributions without setting minimum vesting periods and voluntary long-term savings plans would probably be more effective in responding to the main goals of pension systems (figure 7.7).

A multipillar system of this type would promote horizontal equality within the beneficiary population and generate incentives for workers to remain in the labor market, thus making the economy more productive. A higher contributory density would mean greater future pension benefits.

Instead of postponing the minimum retirement age, offering a flexible program with strong incentives for workers to delay their retirement voluntarily would be more effective because it would allow different workers to better adjust their behavior to their needs and possibilities. In fact, in most Latin American countries, workers are already postponing retirement from the labor market. This postponement is partly in response to some incentives, but also in response to their own inclinations to keep working. CELADE (Centro Latinamericano de Demografia) projects a steady increase in the economic participation of the elderly, particularly among workers age 65–79 (Rofman and Apella 2014). A natural extension of the retirement age would alleviate financial pressure on the social security system. Similarly, Apella and Zunino (2017) show an average increase in the economic participation of the population older than age 55 throughout the region, from 40 percent in 1995 to 47 percent in 2015.

FIGURE 7.7

Universal benefit plus a proportion based on contributions
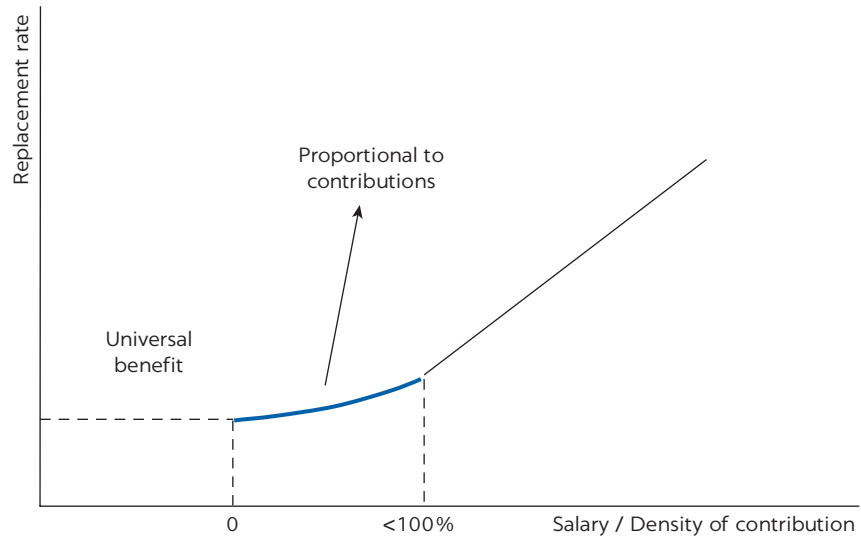
Source: World Bank.

That trend, along with improvements in health and greater accumulation of human capital, could, in a properly designed incentives framework, help offset the sustainability challenges described previously. To generate incentives for remaining in the labor force, it is necessary to review the regulations that govern retirement age and benefit replacement rates. Incentives take the shape of workers' financial gain, as described by Stock and Wise (1990) and Gruber and Wise (2002). That gain is composed of two components: (1) the present value of the salary while performing economic activity, and (2) the future social security benefit associated with a "bonus" for the additional number of contribution periods and with a reduction in years over which the expected benefit is received. Incentives of this sort operate naturally in a funded plan: a longer contribution period favors the accumulation of a larger pension fund, which—if benefits are received for the same number of years—implies a larger benefit. For pay-as-you-go systems, incentives need to be built into the benefit formula.

Population aging is gradual but certain. The countries in the region need to adapt their institutions to make their pension systems more effective in a new demographic pattern. Although aging impacts will be felt over time, advancing policy reforms is urgent. On the one hand, it takes time to design and implement institutional changes and to build a political and social consensus; and on the other hand, because today's workers will be part of the elderly population after 2060, their current decisions are conditioned by the existing rules of the game. In other words, the decisions people make throughout their labor histories are framed by current and future social and economic institutions, which determine economic security in old age.

In most cases, the political reality requires a long period of transition before a new regulatory framework becomes fully effective. If a necessary reform is put off, the need for it will only intensify and its implementation will become more dramatic. The cost of the existing systems is likely to keep rising for the entire transition period—a matter of years—before a reform's stabilizing effects set in. Because the demographic transition is not yet complete in the region, now is the

time to start designing medium- and long-term strategies to strengthen pension system performance while heeding each country's specific social, economic, fiscal, and demographic realities.

CONCLUSIONS

The demographic transition under way in the Latin American and Caribbean countries poses some challenges to state-run old-age income protection systems, specifically to their financial sustainability and fiscal effort. Funding sources, as well as coverage and incentive levels, are limited by frequent transitions between formal and informal work and between employment and unemployment. These problems are not, of course, homogeneous throughout the region's countries. They are influenced by each country's stage in the population aging process, as well as by pension system design and level of generosity.

A simulation of overall public spending to fund the pension system from 2015 to 2045 shows that unless the rules of the game and social preferences about generosity (levels of coverage and replacement rates) change, population aging will require that public spending (measured as a percentage of GDP) be increased by 130 percent. If the region's per capita GDP increases thanks to the demographic dividend and if public policy preferences veer toward pension systems with benefits and coverage similar to those in current-day OECD countries, the increase in public spending would be 45 percent.

These values vary significantly from country to country. When their coverage and replacement rates are combined, the BGR of the pension systems in Argentina, Bolivia, Brazil, Colombia, Honduras, Mexico, Panama, and Uruguay is higher than the ratio in developed countries today. Converging with those countries in public policy preferences would mean decreasing the BGR and the variation in public spending on pensions. To achieve coverage levels and replacement rates similar to those in the OECD countries, Chile, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Nicaragua, Paraguay, Peru, and the República Bolivariana de Venezuela will have to increase public spending on their pension systems.

The demographic transition in the region's countries is still at the early or middle stage, which makes this the right time to start designing medium- and long-term strategies to strengthen pension system performance. Flexible retirement mechanisms could, potentially, curtail increases in pension demand and correct some coverage inequalities. Increases in pension demand could be countered by generating incentives for workers to remain in the labor market for longer, allowing the economy as a whole to seize workers' productivity and shorten retirement periods. As for correcting coverage inequality, flexible and proportional benefit programs would prevent two workers with different contribution levels from being considered in the same terms when neither meets minimum eligibility requirements.

NOTES

1. For example, declines in interest rates would affect pension fund values and, consequently, benefit levels.
2. *Anuario Estadistico da Previdencia Social* 2016.

REFERENCES

Apella, I., and G. Zunino. 2017. "Technological Change and the Labor Market in Argentina and Uruguay: A Task Content Analysis." Policy Research Working Paper 8215, World Bank, Washington, DC.

Brasil, Ministerio de Economía. 2016. "Anuário Estatístico de Previdencia Social." Governo do Brasil, Brasilia.

Gruber, J., and D. Wise. 2002 "Social Security Programs and Retirement around the World: Micro Estimation." Working Paper 9407, National Bureau of Economic Research, Cambridge, MA.

Mesa-Lago, C., and F. Bertranou. 1998. "Manual de economía de la seguridad social en América Latina." Centro Latinoamericano de Economía Humana, Montevideo.

Mesa-Lago, C., and E. M. Hohnerlein. 2002. "Testing the Assumptions on the Effects of the German Pension Reform Based on Latin American and Eastern European Outcomes." *European Journal of Social Security* 4 (4): 285–330.

Müller, K. 2003. *Privatizing Old-Age Security: Latin America and Eastern Europe Compared*. Cheltenham, UK: Edward Elgar.

OECD (Organisation for Economic Co-operation and Development). 2017. *Pensions at a Glance 2017: OECD and G20 Indicators*. Paris: OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2017-en.

OECD (Organisation for Economic Co-operation and Development), IDB (Inter-American Development Bank), and World Bank. 2014. *Pensions at a Glance: Latin America and the Caribbean*. Paris: OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2014-en.

Rofman, R., and I. Apella. 2014. "El Sistema de Protección Social Argentino en un Contexto de Transición Demográfica." In *Los años no vienen solos: Oportunidades y desafíos económicos de la transición demográfica en Argentina*, edited by M. Gragnolati, R. Rofman, I. Apella, and S. Troiano, 143–68. Buenos Aires: World Bank.

Rofman, R., and I. Apella. 2016. "La protección social uruguaya en un contexto de transición demográfica." In *Cambio demográfico y desafíos económicos y sociales en el Uruguay del siglo XXI*, edited by R. Rofman, V. Amara, and I. Apella. Montevideo: World Bank.

Rofman, R., and I. Apella. 2017. "Envejecimiento poblacional y desafíos económicos para la Argentina en el mediano y largo plazo." Unpublished manuscript, World Bank.

Rofman, R., I. Apella, and E. Vezza, eds. 2013. "Más allá de las pensiones contributivas: Catorce experiencias en América Latina." World Bank, Buenos Aires.

Rofman, R., and L. Oliveri. 2011. "La cobertura de los sistemas previsionales de América Latina: conceptos e indicadores." Serie de Documentos de Trabajo sobre Políticas Sociales 7, World Bank, Washington, DC.

Stock, J., and D. Wise. 1990. "Pension, the Option Value of Work, and Retirement." *Econometrica* 58 (5): 1151-1180.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

8 Population Aging and Labor Markets

INTRODUCTION

One of the challenges population aging presents is maintaining per capita GDP growth. Economic growth is traditionally understood to be a function of productive factors—namely, labor and capital, whether physical or human—and a residual component known as total factor productivity. Thus, a reduction in the size of the working-age population—that is, the labor force—implies a reduction in GDP growth capacity.

The demographic transition toward an older population presents some questions related to the potential impacts on the labor market and, through those impacts, about the level of national product and the social well-being of the population. The demographic transition consists of a process in which age groups change not only in size but also in their proportion of the total population. In particular, as a consequence of the fall in mortality and fertility rates, along with increased longevity, the proportion of elderly people grows, while the percentage of children and youth declines. Population aging tends to limit the growth of per capita consumption because the income of each active person must be shared with a higher number of inactive people. Sheiner, Sichel, and Slifman (2007) calibrate this mechanism to the US economy's parameters and anticipate permanent drops in per capita consumption of 4.4 percent. It should be noted that the demographic evolution in Latin America is occurring much more quickly, so even stronger effects can be expected. According to these authors, in the absence of a significant increase in the labor force participation rate of groups with relatively low participation, population aging will lead to a reduction in per capita consumption.

However, before reaching this stage, the countries in the region face a unique opportunity: the demographic dividend. The demographic dividend, discussed in chapter 3, consists of a window of opportunity in which the share of the working-age and saving-capacity population relative to the total population is at its highest level. This temporary effect creates a chance that, if properly used, may result in a faster increase of growth and capital accumulation. This process has two stages, known as the first and second demographic dividends, as discussed in chapter 4.

The first dividend is temporary by definition, and its magnitude and duration depend, in part, on behaviors of population groups (in particular, women and older adults) in relation to the labor market. The dividend implies that more people will be of "working age" than ever before or after, but this dividend is only useful if these people join the labor force in productive jobs. Older people could delay their retirement and remain active, and women can increase their participation rates. These changes may extend the dividend, creating further opportunities to increase the accumulation of capital that will then lead to a strong second dividend. Furthermore, if these additional workers have the necessary skills to contribute to an increase in productivity across the economy, their impact could be critical to ensuring that countries stay on a path of economic growth, regardless of long-term demographic trends.

To ensure that workers continue to acquire relevant skills, strengthening lifelong learning programs should be the focus of any labor policy aimed at improving the quality of the labor force in a context of population aging. Traditionally, formal education systems at all levels were designed to provide the skills required to carry out tasks in manufacturing jobs, in which workers' employment paths were clearly outlined. This employment model has become less common as new technologies have been adopted and labor markets have evolved, and individuals working lives have changed quite often. Therefore, the opportunity to combine work activities with training and skills upgrading is essential. Generally, access to training is limited because workers have little free time and employers are not presented with incentives to finance their skill upgrades. Lifelong learning programs, whether subsidized or provided directly by the public sector, usually assume that beneficiaries should focus on them full time, making it difficult for many workers to take advantage of these opportunities.

Finally, increasing women's labor force participation is critical to compensate for the expected decline in the working-age population. Although female labor force participation increased between 1995 and 2015, it remains well below that of their male counterparts. One of the most important determinants of the recent increase in women's participation is their higher education level. In fact, as far as education level is concerned, no difference is found between the rate of women's participation in Latin America and the current rate in OECD countries.

In this context, the purpose of this chapter is to analyze the implications of population aging on future labor market trends. The discussion is based on evidence from nine countries in the region: Argentina, Bolivia, Brazil, Chile, the Dominican Republic, El Salvador, Mexico, Peru, and Uruguay. These countries were selected not only because of the information available about them but also because they represent a mix of geographic distribution and economic development.

DEMOGRAPHY AND THE LABOR MARKET

Demographic change affects the size and characteristics of labor markets. As the population ages, the working-age population decreases and a main driver of economic growth falters. Some behavioral changes could delay or partly offset the shrinkage of the labor force caused by aging. Once the first dividend period has come to an end, if the capital necessary to trigger a second dividend has not

FIGURE 8.1

Age-specific labor force participation rates, 1995 and 2015
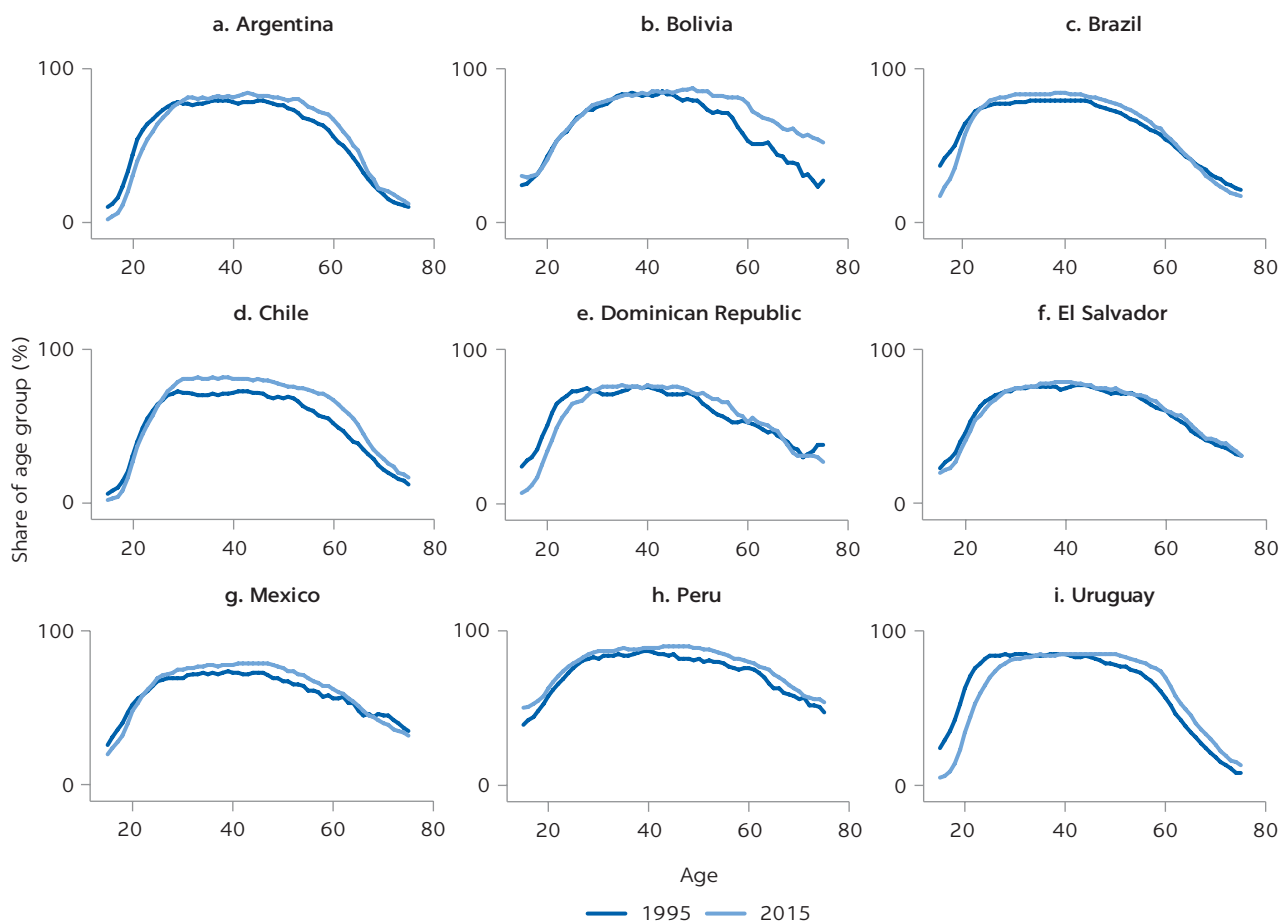
Source: World Bank estimations based on household surveys.

been accumulated, the only way to keep economic growth from faltering is to sustain the size of the labor force. The adverse labor market effects of aging could be minimized if the elderly population delays retirement and women increase their participation (Apella and Troiano 2015).

To better understand the impact of behavioral changes on the size of the labor force, this chapter presents some simulations of labor force evolution for a set of Latin American and Caribbean countries.[1] Figure 8.1 shows the working-age population for 1995 and 2015, by gender and age.

With a few exceptions, both the age at entry into the labor market and the retirement age have been postponed between 1995 and 2015. Participation rates at younger ages declined in every country except Bolivia and Peru, two cases where the incidence of rural family work is still high. Among older adults, labor market participation of people older than 55 increased on average from 40 percent in 1995 to 47 percent in 2015. There are several reasons for lower labor force participation on the part of younger people, not all of them economic. Extended formal education, for instance, increases the size of human capital in the medium term (Apella and Troiano 2015).

The delay in retirement can be attributed to two sets of factors—one supply side, the other demand side. On the supply side, there are incentives within

social security (that is, higher pension benefits for those who retire later), as well as a possible preference for continuing to work (Bertranou and Mastrángelo 2003). For example, Apella et al. (2019) find for Chile that participation rates among the elderly are positively correlated to individuals' health conditions and education level, suggesting the presence of a preference effect by individuals to continue in the labor market. As workers' human capital increases, so does the incentive to remain active with a view to continuing using the returns on such capital for a longer period. How pension systems are organized may influence workers' retirement decisions. According to Stock and Wise (1990) and Gruber and Wise (2002), older people's participation in the labor market depends on the financial gain yielded by remaining active for longer than minimally required. Argentina and Chile display a negative and significant correlation between the decision not to continue in the labor market and the decision to apply for pension benefits. This correlation is higher among individuals who expect a high pension benefit (Apella and Troiano 2015; Apella et al. 2019)

Likewise, the age of entry and retirement from the labor market, both of which increased between 1995 and 2015, may continue to change in the future, especially if pension systems generate the right incentives for older workers to stay in the labor market, as discussed in chapter 7. On the demand side, early retirement in some developed countries is often not voluntary, and may be promoted or even required by employers or the state (Dorn and Sousa-Poza 2004). When unemployment is high, public policies may encourage early retirement to reduce pressure on the labor market. In addition, demand for older workers is usually lower than for other age groups because employers expect lower productivity from them.

Demographic changes will have a direct impact on labor force participation rates. Assuming no change in age-specific rates, total participation rates will tend to decline over time as the population becomes older. Projections for the nine analyzed countries and the region as a whole are presented in figure 8.2.

The size of the gender gap in labor market participation varies widely from country to country. Peru and Uruguay have the smallest gaps, while Bolivia, the Dominican Republic, El Salvador, and Mexico have the largest. The region is markedly heterogeneous, not only economically and socially but also culturally, and public policy design must reflect each country's distinct specifics. For that reason, some countries will find it harder than others to increase female participation in the labor market. Though rates may vary, all countries in the region will experience a decline in the working-age population as the demographic dividend period comes to an end. Unless behavior is changed and age-specific participation rates increase, demography alone will reduce the economic support ratio.

To offset the negative impact of population aging on the size of the labor force and on long-term growth capacity, public policy traditionally aims to increase female labor force participation, delay retirement age, or both. Both initiatives increase the labor market participation of specific population groups. Miller, Saad, and Martinez (2016) argue that the demographic transition favors increased labor market participation of working-age women because a lower fertility rate would reduce the burden of childcare and household chores, which traditionally fall on women. As a result, women would have more time to engage in the labor market. Figure 8.3 shows the results of a simple simulation, assuming the gender gap closes completely, and women reach male labor force participation rates.

These results match those presented by Amarante and Collace (2016) for Uruguay and by Apella and Troiano (2015) for Argentina: although an increase

FIGURE 8.2

Forecast of the working-age population, demography-only scenario, 2015–2100
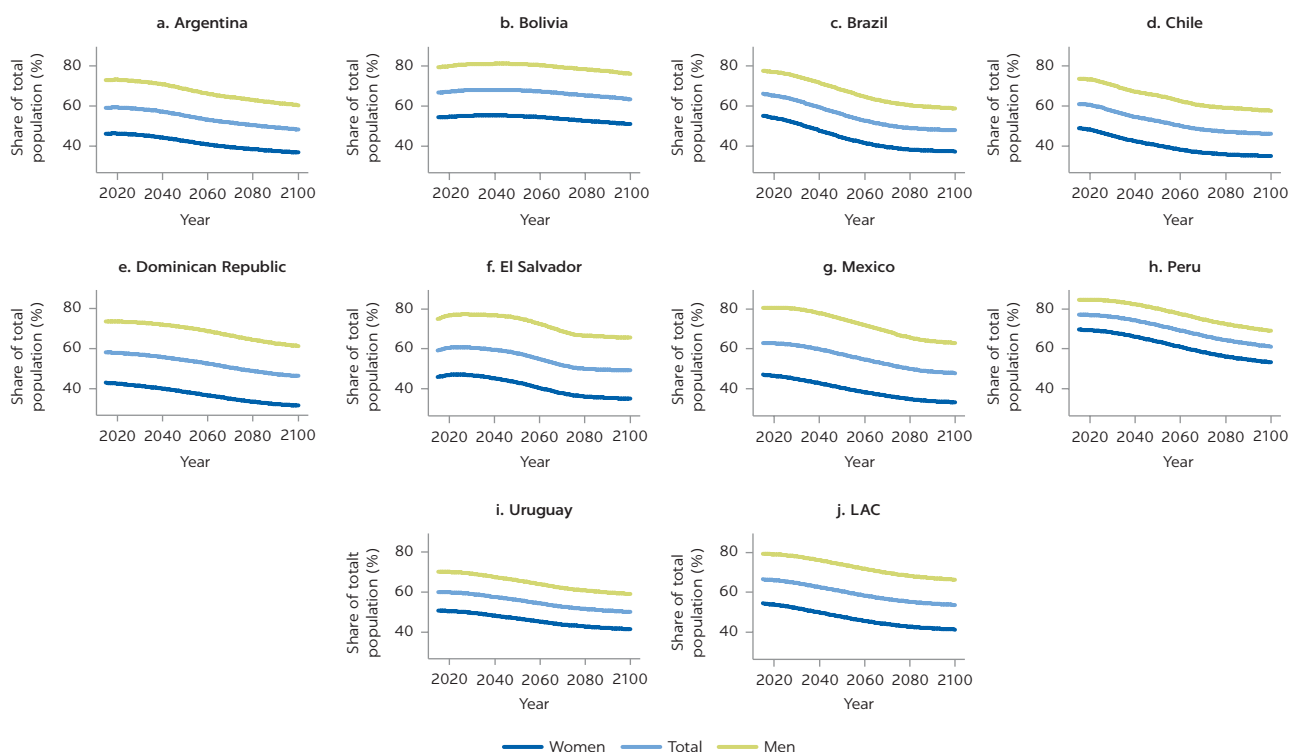
Sources: World Bank estimations based on household surveys and UN (2017).
Note: LAC = Latin America and the Caribbean.

in women's labor market participation would increase overall labor market participation rates, the downward trend will prevail. However, the decline would be smoother, and the delay would expand the first dividend period, creating more opportunities to accumulate capital before the onset of the demographic tax period. In Bolivia, the Dominican Republic, El Salvador, and Mexico, where the current gaps are large, there could even be an increase in participation rates in the short term.

The expected decreases in labor force size could be compensated for by an increase in labor productivity. This increase may come from two sources: an increase in capital availability and total factor productivity (which would occur under a second dividend scenario) or an increase in average labor productivity resulting from changes in the labor force. The second factor is also affected by population aging, because this process not only affects the size of the labor force but also its profile, including the mean age of active workers. An older population results in an older labor force. Figure 8.4 shows a projection of the age distribution of the working-age population for three specific years: 2015, 2050, and 2100. In all cases, the mean distribution tilts to the right, that is, toward older groups: as the population ages, the mean age of the labor force increases.[2]

The question is, therefore, whether an older labor force is more or less productive than a younger one, all else remaining equal. This is a topic open for discussion, and the literature has offered strong arguments in both directions. The effect of aging on productivity seems to depend on the type of occupation

Labor force participation rates, assuming closure of gender gap, 2015–2100
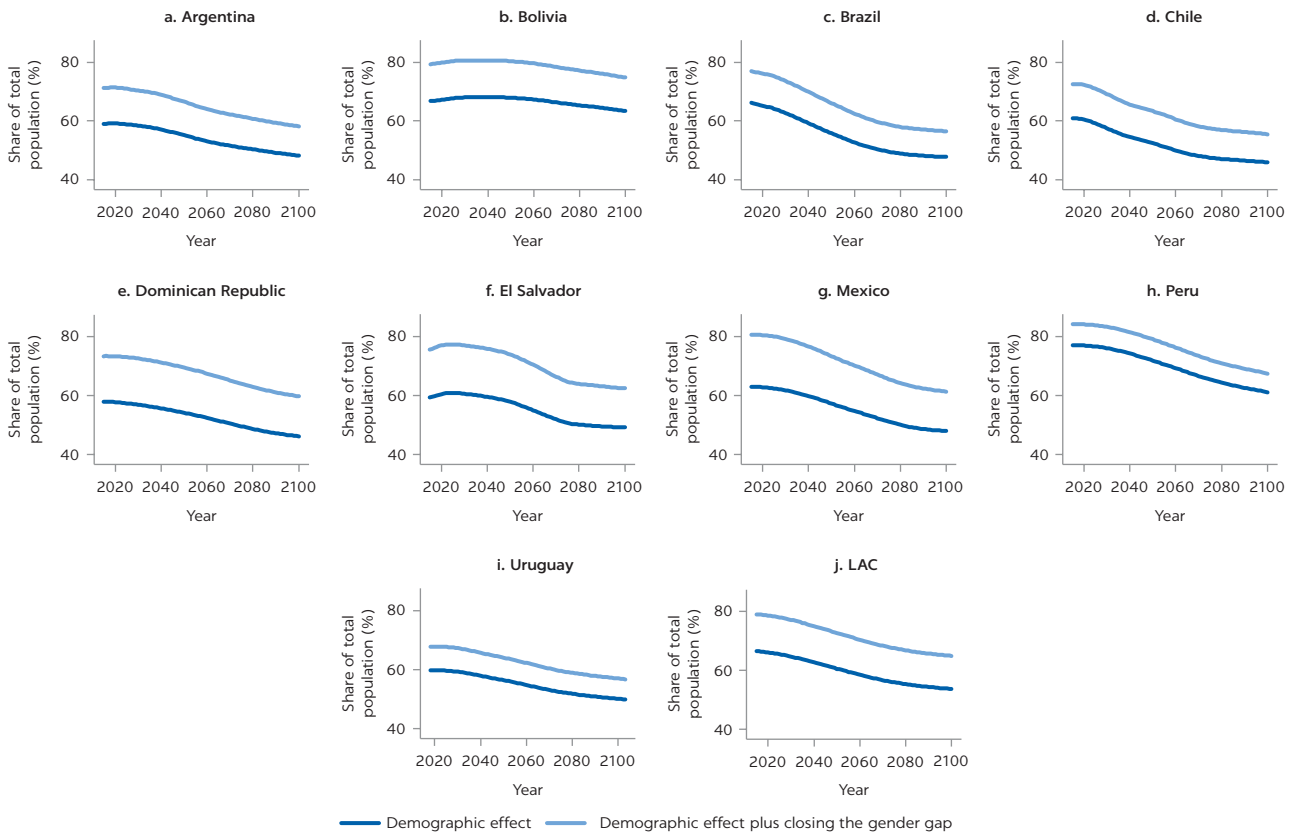
Sources: World Bank estimations based on household surveys and UN (2017).
Note: LAC = Latin America and the Caribbean.

and labor market requirements (Skirbekk 2003). Variation in worker productivity by age group is defined by factors such as cognitive and physical skills, health status, type of occupation, workplace turnover, and others.

In sectors in which physical strength is relatively unimportant, cognitive skills may be the best predictors of productivity (Hanushek and Kimko 2000; Tyler, Murnane, and Willett 2000). In these cases, younger workers might have an advantage over their older peers: according to Skirbekk (2003), they are faster adopters (and, consequently, beneficiaries) of new technologies, which are likely to boost productivity. Also, workers' capacity to acquire new knowledge is particularly important in settings characterized by permanent organizational and technological change. According to Smith (1996), continual change could affect the productivity gap between younger and older workers, given that learning capacity and speed decrease with age. Early retirement is widespread in industries characterized by quick technological change, where skills become obsolete more rapidly and workers are subject to constant performance assessment.

However, older workers may have an advantage over their younger peers at managerial positions that require experience. Some studies suggest that older workers have more efficient labor strategies. According to Ericsson and Lehmann (1996), a minimum of 10 years seniority heightens productivity at jobs for which strategies and analytical skills are important. In an empirical study of the

Age distribution of the working-age population, 2015, 2050, and 2100
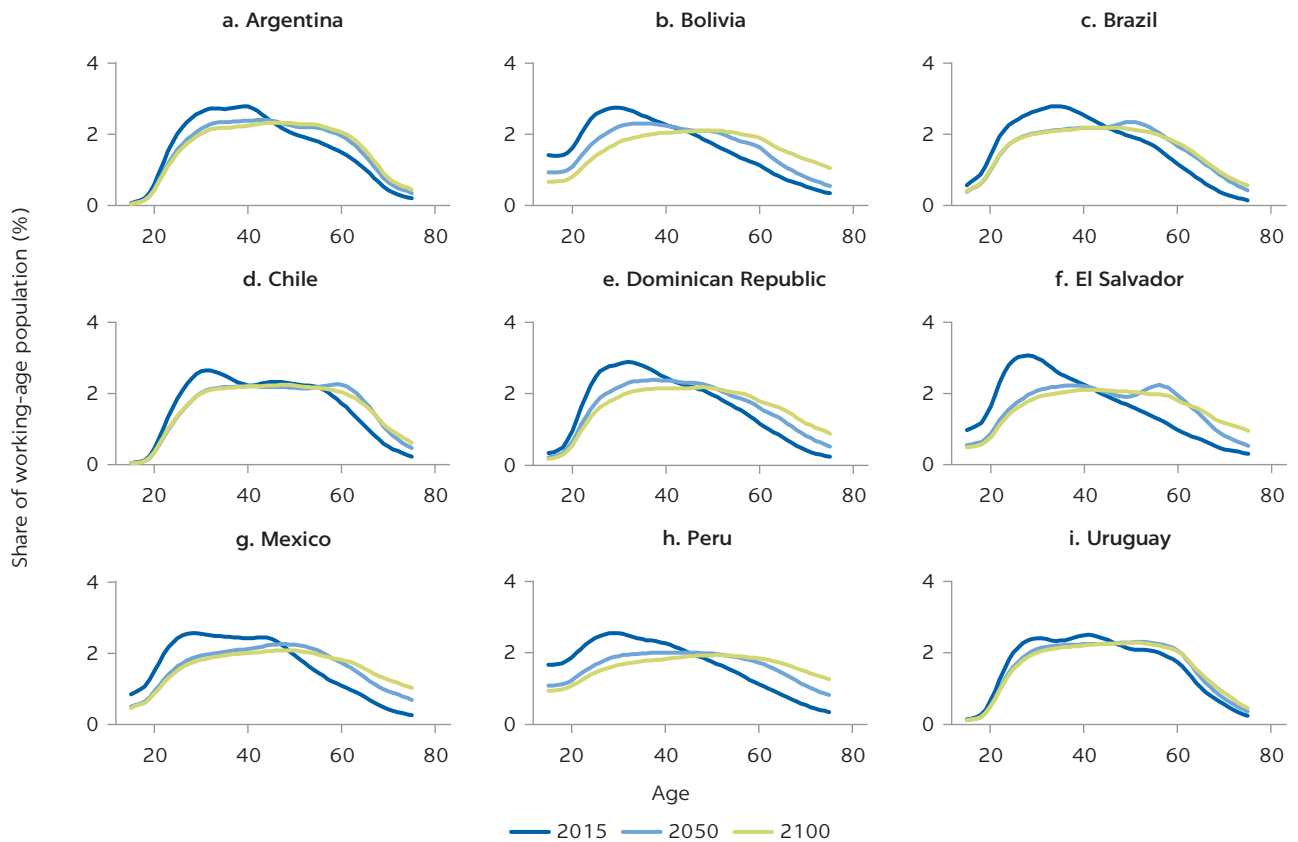
Sources: World Bank estimations based on household surveys and UN (2017).

manufacturing sector, Blakemore and Hoffman (1989) find evidence for the positive impact of seniority on productivity.

Technological changes seem to have accelerated in recent years and could be the driver of a quick increase in productivity that would compensate for the decline in the labor force. Acemoglu and Restrepo (2017) propose that, as the labor force shrinks, new technologies may replace humans for different tasks. According to this logic, a smaller labor force might drive up mean productivity as well as relative profits, thus creating incentives for labor substitution while also yielding productivity increases.

The technological change taking place on a global scale is a potential driver of global economic productivity. It poses, however, several labor market challenges. Apella and Zunino (2017) argue that innovations increase productivity and are capable of offsetting the shrinking labor force. However, they also pose serious challenges, making institutional and public policy reform necessary.

Apella and Zunino (2017) show how the content of the tasks performed by workers has changed since 1995 in some of the region's countries. Nonroutine cognitive tasks are becoming more prevalent, to the detriment of manual tasks. Routine cognitive tasks have also increased, despite being at higher risk of being replaced by automation. This creates a serious risk in the medium term because the number of workers exposed to the risk of technological

unemployment is increasing. Given that these workers are typically in the middle of the distribution of education and earnings, this process could result in wage polarization that would increase inequality in the region. Hence, public policies that focus on promoting the adoption of productivity-enhancing technologies while facilitating transitions and reducing the risk of technological unemployment and polarization should be in place.

CONCLUSIONS AND POLICY OPTIONS

The populations of the countries in Latin America and the Caribbean are aging. This gradual but certain transition has a direct impact on the labor market's structure and dynamics, and it must be analyzed from a global perspective. Population aging affects not only the size of the labor force but also its productivity. As the results described in this chapter suggest, the transition toward an aged population reduces the size of the working-age population and, hence, the size of the labor force. The overall share of the working-age population is projected to decrease as countries leave the demographic dividend period. Unless behavior changes and the labor force participation rate of each age group increases, demographics alone will bring about a reduction in the economic support ratio.

Population aging also results in an increase in the mean age of the working-age population, which has major implications for average labor productivity. If worker productivity is assumed to be inversely proportional to age, an aging workforce could become an impediment to global economic productivity. If no other factors change to drive economic growth, the evolution of the labor force participation rate and of the characteristics of the labor force as the population ages is likely to cause a decline in per capita GDP.

But because the demographic transition is gradual, countries have time to begin designing strategies and institutional changes aimed at alleviating its negative impact on labor supply. Institutional changes take time, as does generating the required political and social consensus. Public policy has room to promote higher labor force participation among women and the elderly. Incentives, elimination of discriminatory practices, and better childcare services would help increase the participation rate of the female working-age population in the labor force.

Although female labor force participation has increased since 1995, it is still well below the rate for men, which means that the region still has an untapped and powerful economic asset. Greater female participation in the labor force is tied to the educational level of the female population. In upper-middle-income countries in Europe and East Asia, public policy interventions aimed at increasing women's participation set out to improve the balance between work and family life. Family care responsibilities act as a decisive limitation on female labor force participation. A paid parental leave system is essential, as is providing quality childcare to make it possible for more women to join the labor market. Such policies should be coupled with mechanisms that combat gender discrimination in hiring. To encourage women to further invest in education, the gender pay gap must be eliminated.

With regard to the elderly, retirement is taking place later thanks to a larger stock of human capital at old age. Financial incentives that bolster this spontaneous trend would alleviate the effects of aging on the reduction of the

labor force in the medium term, if not in the long term, when the labor force participation rate would drop anyway.

To meet the policy objective of encouraging later retirement, particularly in the higher-productivity population, a more flexible plan with the right incentives must be devised, one that allows for partial or gradual retirement that benefits those who choose to continue working. Two major factors inform workers' labor market retirement decisions: (1) preferences, that is, the desire to continue working; and (2) restrictions, that is, the absence of another way to finance consumption. Evidence suggests that preference is the greater factor among high-productivity workers, while restriction is more operative for less skilled, low-productivity workers. Any incentive policy, such as greater financial benefits with delayed retirement, should aim to influence the preferences of high-productivity workers. Enhanced benefits should consist not only of a higher ordinary salary for performing the job but also of higher pension income with later retirement, as discussed in chapter 7.

Older people tend to value flexibility, which means that labor codes' stringent regulations on, for instance, where work is performed, as well as requirements on the number of hours performed at a formal job, could act as disincentives for delaying retirement or as incentives to work at less-productive informal jobs. Later retirement could be key to improving older people's well-being and to the sustainability of public expenditures. Hence, more freedom to choose the workplace and number of working hours could contribute to later retirement. Employers may believe that older people do not have current skills and, as a result, may be reluctant to hire them. In a context of technological change, access to skills development and training is essential, as are subsidies for specific jobs.

In this sense, lifelong learning programs to reskill older people to promote their participation in the labor market have an important role. Given the process of technological change that countries are involved in, changes in labor demand are forcing workers to upskill and upgrade their knowledge and abilities to maintain their competitiveness in the market throughout their working lives. In a context of aging, this includes the elderly.

To promote greater participation of the elderly in the labor market, policy makers should consider strategies to facilitate upskilling of these workers. The literature suggests that the results of adult training depend, to a great extent, on previous life experiences (CAF 2017). Although skill acquisition is generally associated with formal education, that is only one of the many ways in which individuals develop their abilities. People spend an average of 30 to 40 years in the labor market, and investments in human capital over those years is essential to increasing and maintaining productivity.

Information for nine countries in Latin America and the Caribbean maintains that more educated people not only have an initial advantage over people with lower education levels, but the gap widens throughout their working lives. In this regard, workers with lower education levels have more chances of becoming freelancers or filling informal positions and are less likely to make a transition toward formal employment (Kheyfets and Pomes-Jimenez 2017). A higher proportion of these workers show low permanence in the position, and their profit patterns are consistent with lower skill development over time.

Therefore, lifelong learning policies should address two coexisting realities. The first is that education and training programs should assist less-educated workers in closing the skills gap between them and others with higher qualifications. The second is that such policies also need to offer reskilling to

currently employed workers that are in occupations that will be more exposed to task automation. Thus, lifelong learning policies should be addressed to both the employed and the unemployed.

Demographic trends demand that labor force participation be increased by incorporating currently inactive persons and upskilling workers who have lost their jobs. There are three policy strategies for achieving this objective. First, intermediation services provide information and facilitate the link between individuals and their potential employers. The second strategy focuses on providing on-the-job training, while the third focuses on more formal training services through classes or workshops. The experience in other countries shows that a combination of these approaches maximizes their impact.

Developing an effective skills-training program for adult workers is a serious challenge because it requires not only adequate funding but also a strategic vision, implementation capacity, and a network of quality providers.

As part of its effort to reskill the elderly, Chile has removed the maximum age limits to become eligible for the training and skills-development programs operated by the National Training and Employment Service. Traditionally, formal education systems at all levels were designed to foster the skills required to carry out tasks in the industrial era, in which workers' labor future was clearly outlined. Presently, it represents neither how people join the labor market nor how they wish or need to work as they age.

As mentioned, combining work activities with training and skills upgrading is essential. Working people, however, are often unable to devote their time to training activities. In fact, continuous training programs, whether subsidized or provided directly by the public sector, assume that beneficiaries should stop working to participate, which is an unnecessary obstacle to lifelong learning.

These public policy strategies would alleviate the effect of aging on the reduction of the labor force in the medium term, but not in the long term, when labor force participation will decrease anyway. It is essential to create incentives to make the most of the first demographic dividend before the shrinking of the labor force. That means encouraging savings and investment in human and physical capital to reach the second dividend period with bolstered productivity— as the next chapter discusses.

NOTES

1. The purpose of this simulation is to provide an understanding of the potential trends and stress points on the size of the labor force. The quality of human capital is not considered.
2. Uruguay is the only exception because its demographic transition is already quite advanced.

REFERENCES

Acemoglu, D., and P. Restrepo, 2017. "Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation." Working Paper 23077, National Bureau of Economic Research, Cambridge, MA.

Amarante, V., and M. Collace. 2016. "Mercado Laboral y Productividad." In *Cambio Demográfico y Desafíos Económicos y Sociales en el Uruguay del Siglo XXI,* edited by R. Rofman, V. Amarante, and I. Apella. Santiago: Economic Commission for Latin America and the Caribbean.

Apella, I., T. Packard, C. Joubert, and M. Zumaeta. 2019. "Retos y Oportunidades del Envejecimiento en Chile." World Bank, Santiago.

Apella, I., and S. Troiano. 2015. "The Argentinean Labor Market in a Context of Demographic Transition." In *As Time Goes By: Economic Opportunities and Challenges of the Demographic Transition in Argentina*, edited by M. Gragnolati, R. Rofman, I. Apella, and S. Troiano. Directions in Development. Washington, DC: World Bank. doi:10.1596/978-1-4648-0530-1.

Apella, I., and G. Zunino. 2017. "Technological Change and the Labor Market in Argentina and Uruguay: A Task Content Analysis." Policy Research Working Paper 8215, World Bank, Washington, DC.

Bertranou, F., and J. Mastrángelo. 2003. "Envejecimiento, Trabajo, Retiro y Seguridad Social en Chile." IV Conferencia Internacional sobre Investigaciones en Seguridad Social "La seguridad social en una sociedad longeva." Antwerp.

Blakemore, A., and D. Hoffman. 1989. "Seniority Rules and Productivity: An Empirical Test." *Económica* 56 (223): 359–71.

CAF (Corporación Andina de Fomento). 2017. *More Skills for Work and Life: The Contributions of Families, Schools, Jobs, and the Social Environment*. Caracas: CAF. http://scioteca.caf.com/handle/123456789/1060.

Dorn, D., and A. Sousa-Poza. 2004. "Motives for Early Retirement: Switzerland in an International Comparison." Discussion Paper 99 of the Research Institute for Labor Economics and Labor Law at the University of St. Gallen, FAAHSG, St. Gallen.

Ericsson, K. A., and A. C. Lehmann. 1996. "Expert and Exceptional Performance: Evidence of Maximal Adaptation to Task Constraints." *Annual Review of Psychology* 47: 273–305.

Gruber, J., and D. Wise. 2002. "Social Security Programs and Retirement around the World: Micro Estimation." Working Paper 9407, National Bureau of Economic Research, Cambridge, MA.

Hanushek, E., and D. Kimko. 2000. "Schooling, Labor-Force Quality, and the Growth of Nations." *American Economic Review* 90 (5): 1184–208.

Kheyfets, I., and M. Pomes-Jimenez. 2017. "Skills for Jobs and Productivity: Policy Responses to the Changing World of Work in Latin America and the Caribbean." Technical Background Paper for the Latin America and Caribbean Regional Policy Report (P161047), World Bank, Washington, DC.

Miller, Tim, P. Saad, and C. Martinez. 2016. "Population Ageing, Demographic Dividend and Gender Dividend: Assessing the Long-Term Impact of Gender Equality on Economic Growth and Development in Latin America." In *Demographic Dividends: Emerging Challenges and Policy Implications*, edited by R. Pace and R. Ham-Chande, 23–43. Cham, Switzerland: Springer International Publishing.

Sheiner, L., D. Sichel, and L. Slifman. 2007. "A Primer on the Macroeconomic Implications of Population Aging." Finance and Economics Discussion Series, Divisions of Research and Statistics and Monetary Affairs, Federal Reserve Board, Washington, DC.

Skirbekk, V. 2003. "Age and Individual Productivity: A Literature Survey." Working Paper 28, Max Planck Institute for Demographic Research, Rostock, Germany.

Smith, A. 1996. "Memory." In *Handbook of the Psychology of Aging*, 4th ed., edited by J. Birren and K. Schaie, 236–47. New York: Academic Press.

Stock, J., and D. Wise. 1990. "Pension, the Option Value of Work, and Retirement." *Econométrica* 58 (5): 1151–80.

Tyler, J., J. Murnane, and B. Willett. 2000. "Do the Cognitive Skills of School Dropouts Matter in the Labor Market?" *Journal of Human Resources* 35 (4): 748–54.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

9 Human Capital in a Population-Aging Context

INTRODUCTION

Taking full advantage of the first and second dividends is critical to ensuring that economies across Latin America and the Caribbean maintain a path of growth during the population aging process. Managing the fiscal and economic impacts that this process has on key public services such as health, long-term care, and pension systems, as well as ensuring that labor market regulations promote increased labor force participation rates among older individuals and women, require important policy initiatives that must be designed and implemented quickly. The role of the education system is somewhat different. On the one hand, as in other public policies, education costs will be affected by the aging of the population. As the proportion (and, in some cases, the absolute number) of children decline, the potential demand for education services should also decline and fiscal resources necessary to finance the education system should be reduced. Figure 9.1 shows the expected evolution of public spending on education between 2015 and 2045. Spending is expected to increase in 10 of the 18 countries considered, decline in 4, and remain stable in the other 4.[1]

This relative stability in spending disguises some interesting effects. As expected, the proportion of children is expected to decline with time and, as a consequence, changes in the demographic dependency ratio should result in savings. Savings will be higher in countries that are still in the early stages of the aging process and smaller in those that are more advanced, ranging between 2.8 percentage points of gross domestic product (GDP) (in Honduras) and 0.7 percentage point (in Panama) and a median value of 1.4 percentage points. However, expected changes in generosity (that is, coverage and spending per student) will have the opposite effect, increasing spending and compensating for (or even reversing the total impact of) the savings in each country (figure 9.2).

The role of education systems in aging societies is critical not only because of their fiscal impacts but also because these systems are where basic skills are acquired and human capital accumulation starts. Therefore, their performance is critical for the necessary increase in productivity that should occur as part of the second demographic dividend. The focus of this chapter is on this dimension: what these skills are and how they are acquired, as well as policies that can help bolster them.

FIGURE 9.1

Public education expenditures in Latin America, 2015 and 2045
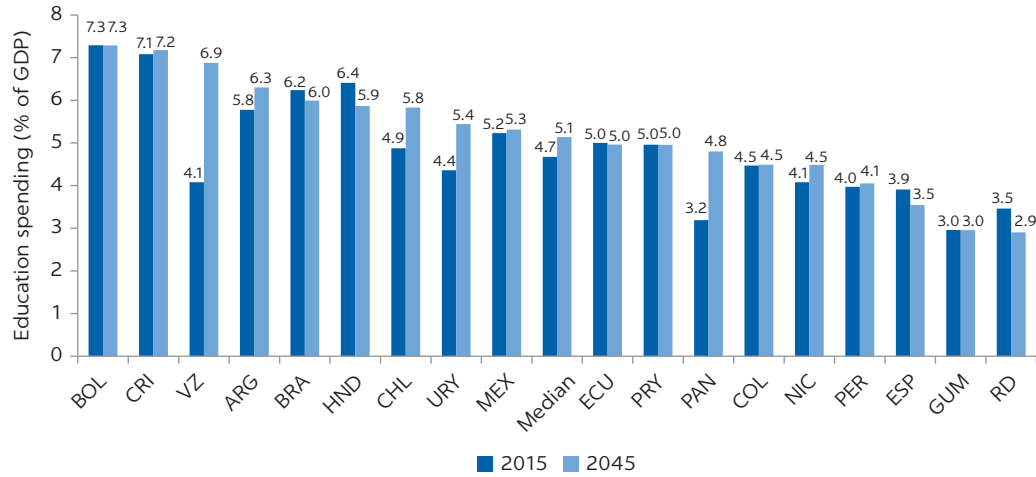
Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, education spending data from UNESCO (2016), and population data from UN (2017).
Note: GDP = gross domestic product.

FIGURE 9.2

Expected variation in public expenditures on education, 2015 and 2045
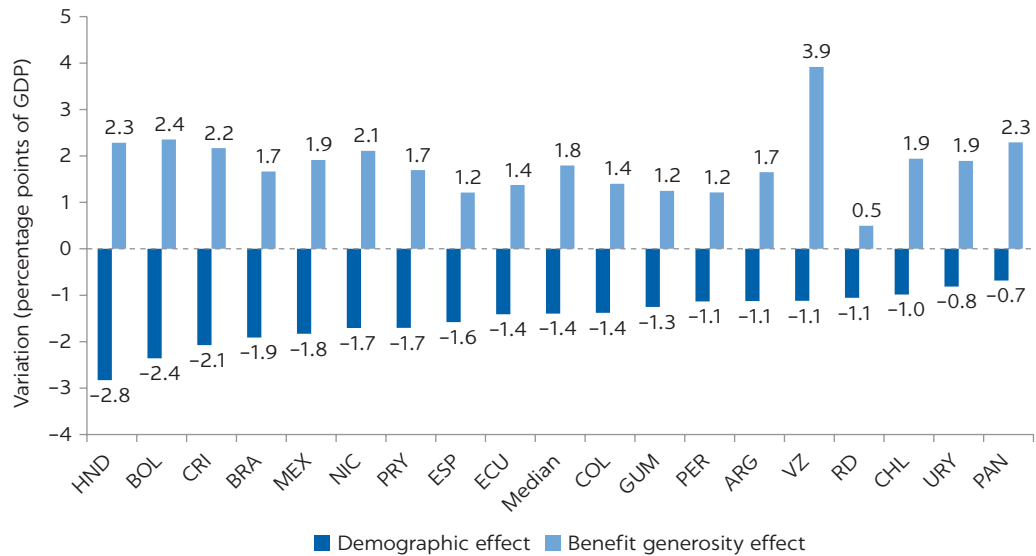
Sources: World Bank calculations and forecasts based on GDP per capita from its World Development Indicators, education spending data from UNESCO (2016), and population data from UN (2017).
Note: GDP = gross domestic product.

Identifying the building blocks of skill acquisition requires understanding, among other things, life's different stages. Much critical and long-lasting neurological development occurs before age three or four (some of it is even prenatal). The construction of the brain's basic architecture begins before birth and continues into adulthood. Early experiences establish either a sturdy or a fragile foundation for everything that follows in learning, health, and behavior.

At primary-school age—typically from age 5 to 12 or 13—children's brains undergo additional changes. Memory and social skills, in addition to reading and numeracy, are largely developed between the ages of 4 and 8. The use of these capacities and skills at that age is critical for further and more complex learning between the ages of 8 and 12. Indeed, that second stage is highly dependent on the earlier stage, though it is also an opportunity—if significant effort is made—to correct, or at least to improve, basic neural connections and capacities that may not have developed fully in those earlier years.

Starting in early adolescence, a different developmental stage creates the conditions for acquiring more cognitive competences, such as problem solving, creativity, teamwork and cooperation, learning to learn, analytical thinking, and soft emotional skills. These abilities will eventually define how individuals engage in society as adults as they define their capacity to perform different types of tasks in the labor market.

Education systems have traditionally ignored this process. Public policies focused, during most of the twentieth century, on primary education, neglecting the important stages that occur before that, and eventually on secondary education, with a subject-based model that does not focus on developing competences and skills. Many countries in Latin America and the Caribbean and around the world have introduced reforms to their systems, trying to shift them toward a process that more effectively follows children's development, but advances have been slow (figure 9.3).

LABOR FORCE AND EDUCATION

Access to quality education is a human right and is necessary for individuals' realization. These reasons should be sufficient to justify adequate investment in and management of education services, but policy makers must consider an additional dimension: the literature shows a consistent and robust relationship between educational achievement and per capita GDP in almost all cross-sectional analyses. In other words, there is a strong and positive correlation between human capital and economic growth.

Despite these correlations, it is hard to establish a causal link between education and GDP growth because of spuriousness and selectivity. Correlation between growth rates and educational achievement is not significantly robust, which casts doubt on a simple link between education and growth. Finally, even when there is a correlation as strong as the one presented in figure 9.4, heterogeneity is high and the share of adults that have completed lower secondary school can vary from 50 percent to 100 percent in countries with similar per capita GDP. Although there is no clear causality, in no country with very high per capita income has less than 70 percent of the economically active population completed at least lower secondary education.[2] This suggests that educational achievement and per capita GDP interact and enable one another, although neither is sufficient to drive the other.

Similarly, many studies have claimed that education, productivity, and growth are related in one way or another. Nelson and Phelps (1966) argue that a more educated labor force would adopt frontier technology faster. The further a state is from the frontier, the greater the benefits of this catch-up. Benhabib and Spiegel (1994) expand on that earlier work, arguing that a more educated labor force would also innovate faster. Lucas (1988) and Mankiw, Romer, and Weil

Alternative models of public education
Transitional perspective

Traditional model
- Creation of human capital by the state starts at primary school
- Basic literacy and numeracy in primary school; universal coverage
- Subject-based content and closed routine learning in middle school (mass but not universal)
- Subject-based pre-university training in upper high school, preparing students for tertiary level; elite coverage
- Vocational options for lower-income groups on trades, crafts, and skills
- Meritocratic university professional training providing income based on professional enclosure; elite coverage
- Minor research-oriented postgraduate systems

Transitional
- Creation of human capital begins at preschool level (4 and 5 years old); mass coverage
- Basic literacy and numeracy at primary school; universal coverage; soft skills and emotional intelligence included as new goals
- Subject-based content is questioned; capabilities, competencies become the aims of middle school; universal coverage
- Subject-based pre-university training in upper high school prepares students for tertiary level; elite and middle-class coverage
- Vocational options with training in specific skills for lower- and middle-income groups
- Meritocratic university professional training provides income based on professional enclosure; elite and middle-class coverage
- Some extension in research-oriented postgraduate systems

Target model
- Creation of human capital starts at gestation and birth through ECEC and family protection
- Preprimary and primary school focus on basic extended literacies (languages, mathematics, digital) and soft and transversal competencies
- Middle school and upper high school shift toward competency framework (problem solving, creativity, teamwork and cooperation, learning to learn, analytical thinking, and soft emotional skills)
- Tertiary level goes beyond traditional university studies; shorter technological degree programs and significant increases in postgraduate research-oriented options

Source: World Bank.
Note: ECEC = early childhood education and care.

(1992) observe that the accumulation of human capital could increase the productivity of other factors, thus driving growth.

In the first half of the twentieth century, Latin America was a pioneer among developing regions in educational achievement, though its performance was only mediocre from the 1960s to the 2010s. Of all developing regions, Latin America had the smallest percentage of population with no schooling by mid-century, and that continues to be the case (figure 9.5). During the second half of the twentieth century, however, the region fell behind East Asia and the Pacific; South Asia closed the gap with Latin America and the Caribbean between the 1970s and the 1990s. The only developing region with worse performance than Latin America is the Middle East and North Africa, largely because of scant female access to education resulting from overt discrimination. The region has clearly fallen behind East Asia and the Pacific, as well as Europe and Central Asia, for the share of the population with a high school degree (figure 9.6).

Such differences are to be expected, it could be argued, because they reflect differences in overall economic and social development. That may hold true in comparison with most of Europe, but not with East Asia. There, education seems

FIGURE 9.4

Adult population that has completed lower secondary education, by per capita GDP, 2015
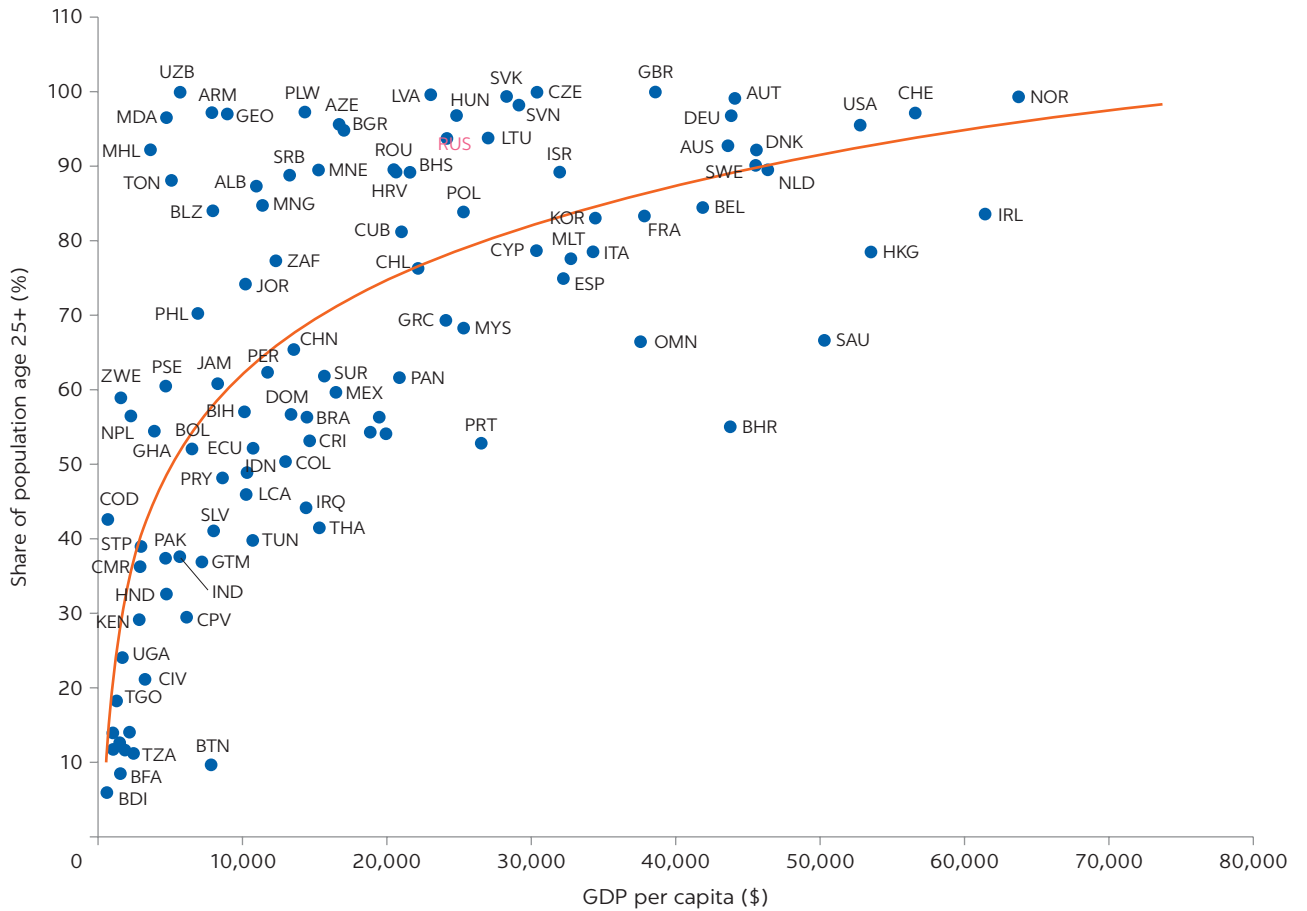
Sources: World Bank based on data from its World Development Indicators and UNESCO (2016).
Note: 2015 GDP per capita in purchasing power parity. GDP = gross domestic product; R^2 = 0.5307; $ = constant 2011 international dollar.

FIGURE 9.5

Evolution of population age 15 or older with no schooling, 1950–2010

Source: Barro and Lee 2013.

Evolution of population age 15 or older that has completed secondary school, 1950–2010
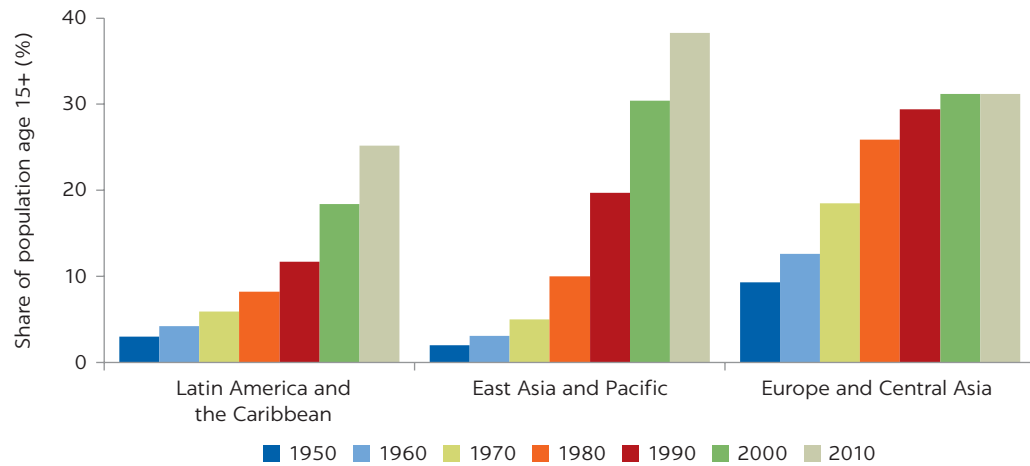
Source: Barro and Lee 2013.

to be an explanation for economic development rather than a consequence of it. Too many Latin American countries fall well below what might be expected on the basis of a simple regression between GDP per capita and educational attainment, measured as the secondary education completion rate (figure 9.7). By contrast, most Central Asian countries, as well as a large proportion of European and some East Asian countries, perform better than would be expected given their GDP per capita.

As figure 9.7 suggests, the regional average hides major variations in the overall educational level of the active population and of the professional potential workforce, on the one hand, and in trends, on the other. Data from the Economic Commission for Latin America and the Caribbean (ECLAC) place the educational level of the population between the age of 25 and 59 into large categories: less than primary school, complete primary school and some lower secondary school (6 to 9 years), some or all upper secondary school (10 to 12 years), and complete secondary school plus some tertiary education (13 or more years). Some countries (Bolivia, Brazil, and Chile) made steady and substantive progress between 1990 and 2014, whereas others (Costa Rica, Uruguay, and, to a lesser extent, Argentina) made only limited progress (table 9A.1).

The educational achievement of the population as a whole and of the working-age population in particular is related to productivity and economic growth, though not linearly or perfectly. After an initial takeoff, educational advancement appears to be a necessary condition for economic development, but not capable of driving that development. The evidence suggests that the quality and pertinence of what is learned is no less important to fostering economic change and development than expanded coverage of formal education and promotion and graduation rates among those enrolled. Quality is not an attribute limited to a single educational level. It is the capacity of society and educational systems to provide all their members with the opportunity to learn as much as they can and to learn things relevant to their futures (Opertti, Brady, and Duncombe 2009).
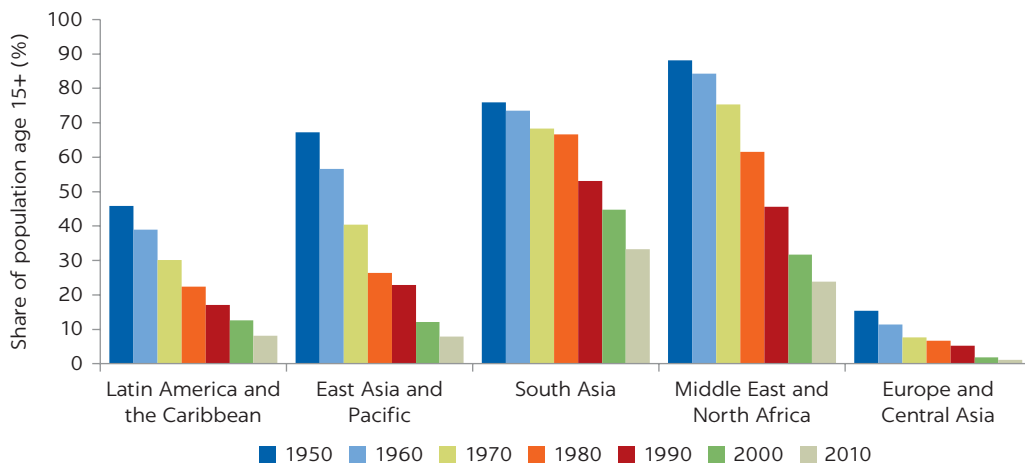
FIGURE 9.7

**Adult population that has completed secondary school, by per capita GDP**
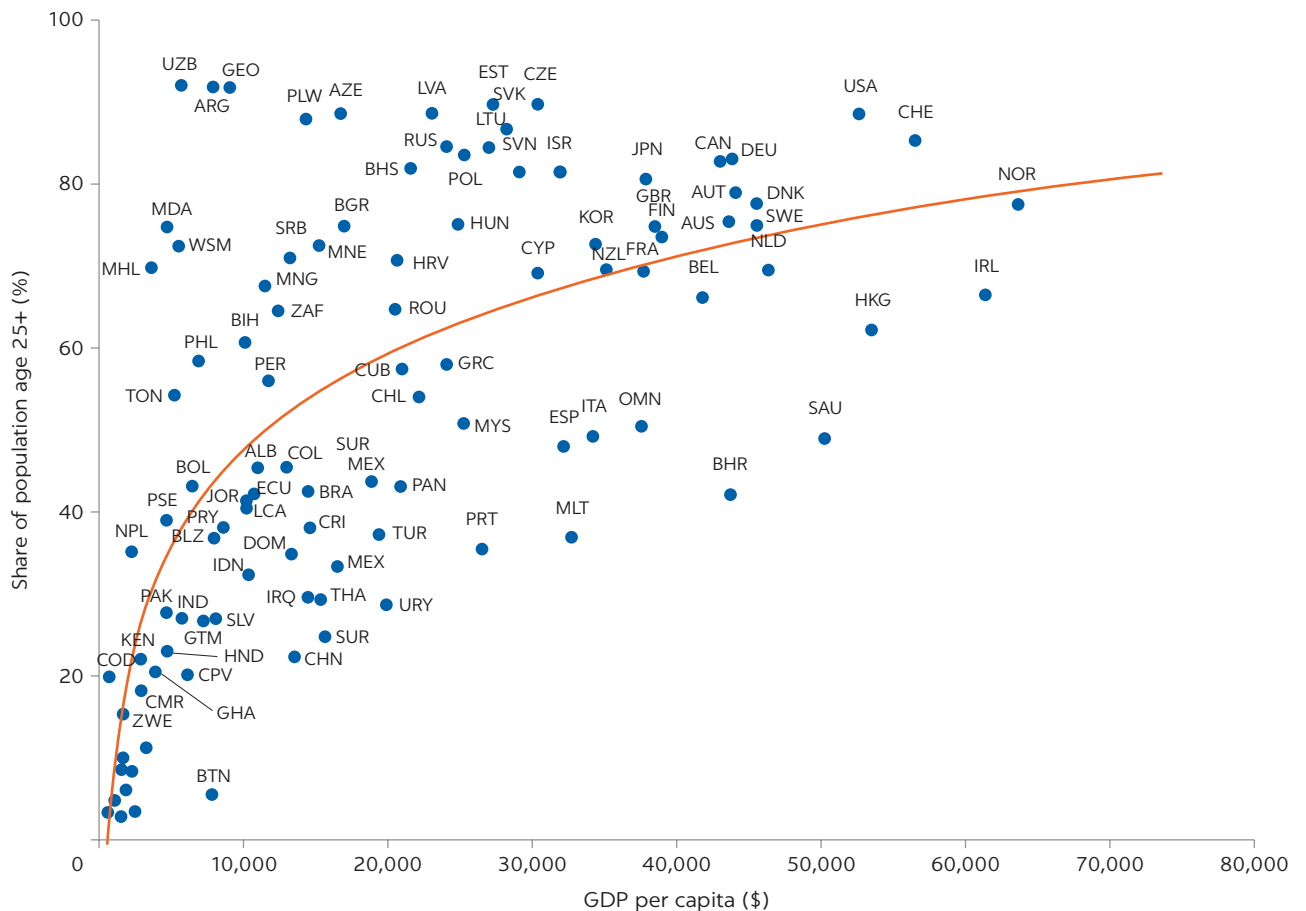
Sources: World Bank based on data from its World Development Indictors and UNESCO (2016).
Note: 2015 GDP per capita in purchasing power parity. GDP = gross domestic product; R^2 = 0.4891; $ = constant 2011 international dollar.

CREATING HUMAN CAPITAL WITH AN EYE ON AGING

If the link between education system performance, human capital, and economic growth is as solid as the previous section's discussion indicates, a more careful look at the different components of education systems in the region is necessary to identify possible policies that would result in higher income and welfare for the population. This section discusses the current challenges and opportunities in the three main components of the education system: early childhood education, primary education, and secondary and youth education.

Early childhood education and care

Childcare services in Latin America consistently and dramatically underperform their counterparts in Europe and other developed regions. According to ECLAC, net enrollment in care services of children between the age of zero and three is about 5 percent in the Dominican Republic, Guatemala, Honduras, and

Paraguay, and 20 percent in Cuba and Mexico. The net enrollment rate for children between three and six is much higher, but only in Cuba and Mexico is it near universal (figure 9.8). Enrollment levels in Argentina, Brazil, Colombia, Panama, Peru, and Uruguay hover between 60 and 70 percent (ECLAC 2011). Enrollment in childcare services is highly stratified by socioeconomic level: the high-income population has greater access to services, while lower-income sectors have little or no access to early childcare.

The design of childcare services in Latin America varies between countries. Public facilities exist alongside private services or services provided by civil society organizations, usually with public subsidies (Salvador 2007; Vegas and Santibáñez 2010). Since 2000, countries such as Chile, Mexico, and Uruguay have expanded childcare infrastructure, increasing the availability of services to children age three or younger (Staab 2010). Inequality is a major issue in the recent development of childcare and preprimary school enrollment. Although no comparative data broken down by income level are available for very early childhood education and care (age zero to three), the data for children age four to five paint a troubling picture.

Enrollment is highly stratified. Though the pattern has evolved, there has been no convergence between socioeconomic terciles. Even when children age five are considered, gradients appear resistant to expansion; the lowest socioeconomic level remains a clear laggard. This stratification may explain, in part, how a region that was at the forefront of developing regions in the preprimary gross enrollment ratio in the 2000s has fallen behind (figure 9.9). The inability to expand coverage to lower-income children seems to cause overall average coverage to stagnate given the already high relative rates of enrollment.

Although early childhood policies are increasingly at the center of the social policy agenda, there is still a long way to go. To increase female labor force participation, decrease child poverty, promote early acquisition of soft

FIGURE 9.8

Net enrollment in preprimary age 3 to 6, and estimations of net enrollment in care services age 0 to 3, 2010
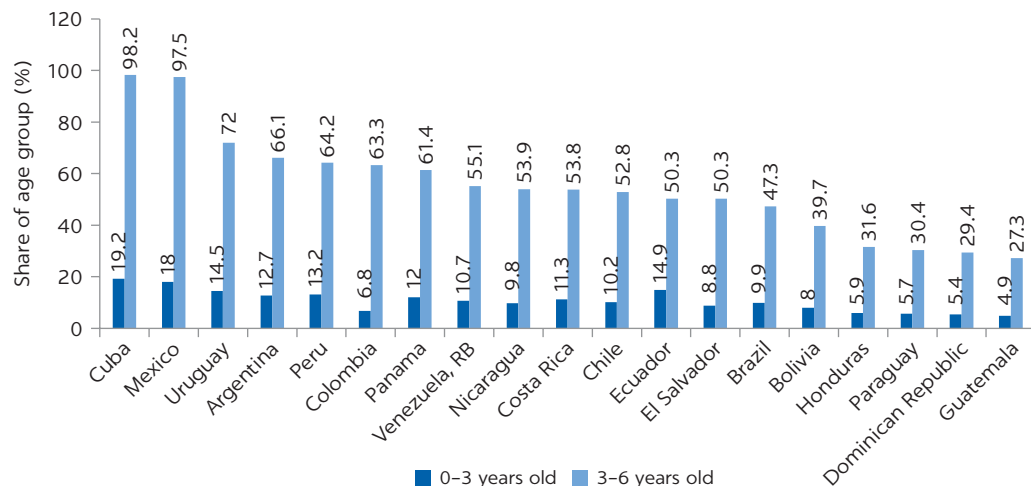
Source: ECLAC 2011.

FIGURE 9.9
Gross enrollment ratio for preprimary school by region, 2000 and 2014
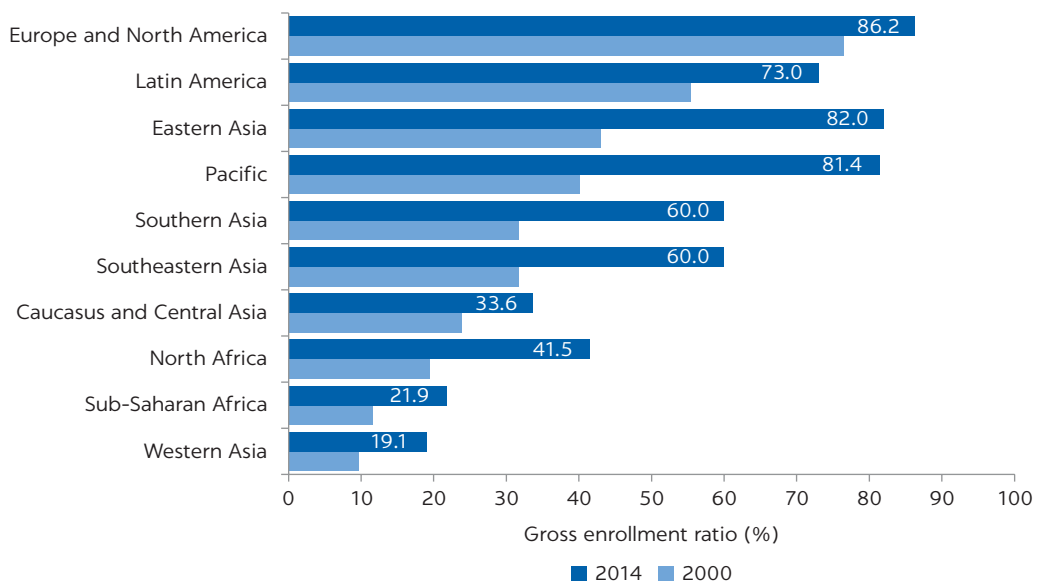
Source: UNESCO 2016.
Note: Gross enrollment ratios are higher than net enrollment because they include children older than age six who are enrolled in preprimary education.

and transversal skills, and foster equality of opportunity, more robust income-transfer systems, as well as leave models and early childhood care and education, are required.

Primary education

Enrollment in primary education in Latin America is nearly universal (table 9A.2). Mass if not universal coverage was achieved in most countries in the mid- to late twentieth century. Free public education brought about mass enrollment. Latin America was indeed a pioneer in extending public education free of charge to most people. In 2013, four countries still lagged in educational coverage: Guatemala and Nicaragua, with almost 10 percent noncoverage; and Honduras and El Salvador, with close to 5 percent. Although mass primary education has been a reality since the mid–twentieth century, true universal access, especially for those at the bottom of the socioeconomic ladder and for children in rural areas, is relatively recent. As recently as 2000, children from the poorest income tercile and from rural areas in half of the countries in Latin America had a coverage deficit of between 10 percent and nearly 30 percent.

Graduation rates are also near universal in much of the region, though many more countries are still lagging in this area (table 9A.3). Significant improvements have been made in the twenty-first century, but a large proportion of children in lower-income groups and in rural areas still do not finish primary school. Even though great progress has been made toward reaching universal enrollment and graduation rates since 2000, primary education outcomes remain an obstacle to building more productive workforces and more egalitarian societies. UNESCO has been administering standardized comparable achievement tests to third and

sixth graders in the region for language and mathematical abilities. The results are unsettling. In many countries, a quarter—and sometimes more—of all students do not have what the Third Comparative and Explanatory Study on Education Quality (TERCE) considers basic literacy and numeracy. With the exception of Chile, Costa Rica, and Mexico, academic achievement is at least 10 percent below basic sufficiency levels in all countries in the region in one or both of the subjects considered (figure 9.10).[3]

The good news is that, in most cases, this state of affairs did improve compared with the previous round of UNESCO evaluations (Second Regional Comparative and Explanatory Study, performed in 2006) (figure 9.11). Still, results suggest that the region is far from a first basic goal: preparing all children to learn in the future.

The primary school system in the region makes relatively wide use of the grade repetition mechanism—that is, repeating the grade when, according to teachers' evaluations, students have not reached a given standard for learning. Although that mechanism has proven inefficient at improving learning, it persists, sometimes at stubbornly high levels, in many countries. The result is a large proportion of children older than appropriate for their grade. As shown in figure 9.12, the only region with higher overage rates is Sub-Saharan Africa.

Some countries have stopped using or drastically diminished the use of repetition, but others continue to use it widely, leading to overage students. Furthermore, the repetition mechanism is more commonly used for low-income children, leading to a greater overage rate among them (see table 9A.4). Most studies in the region show that, controlling for other variables, being over age is the single most important predictor of likelihood to drop out in high school.

Primary school education remains a challenge for the region. Although soft targets such as universal coverage and, to a lesser extent, graduation rates have

FIGURE 9.10

Percentage of 6th-grade students with mathematics and reading scores below basic sufficiency levels, TERCE, 2013
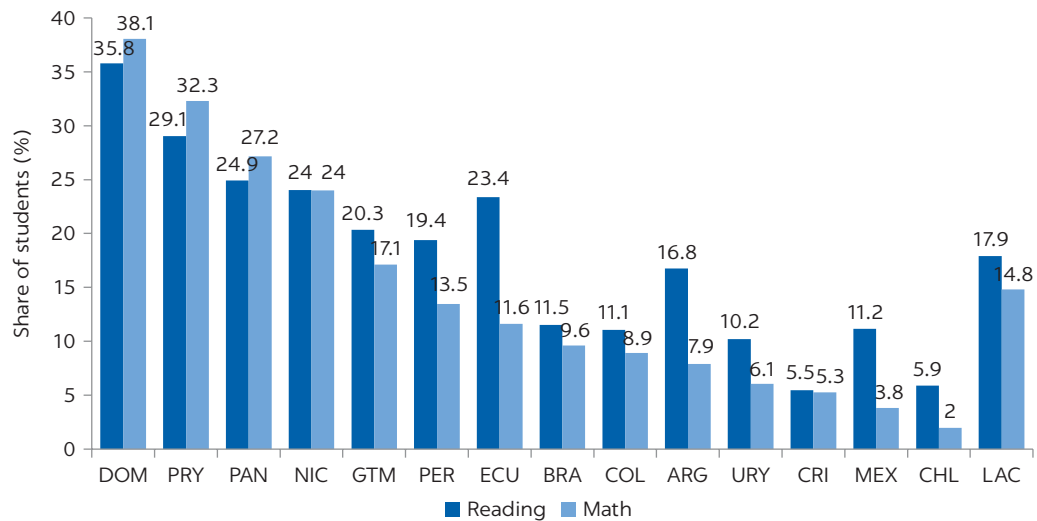
Source: World Bank based on UNESCO (United Nations Educational, Scientific and Cultural Organisation) database, http://data.uis.unesco.org/.
Note: LAC = Latin America and the Caribbean; TERCE = Third Comparative and Explanatory Study on Education Quality.

FIGURE 9.11

Evolution of students with mathematics scores below basic sufficiency, SERCE, 2006, and TERCE, 2013
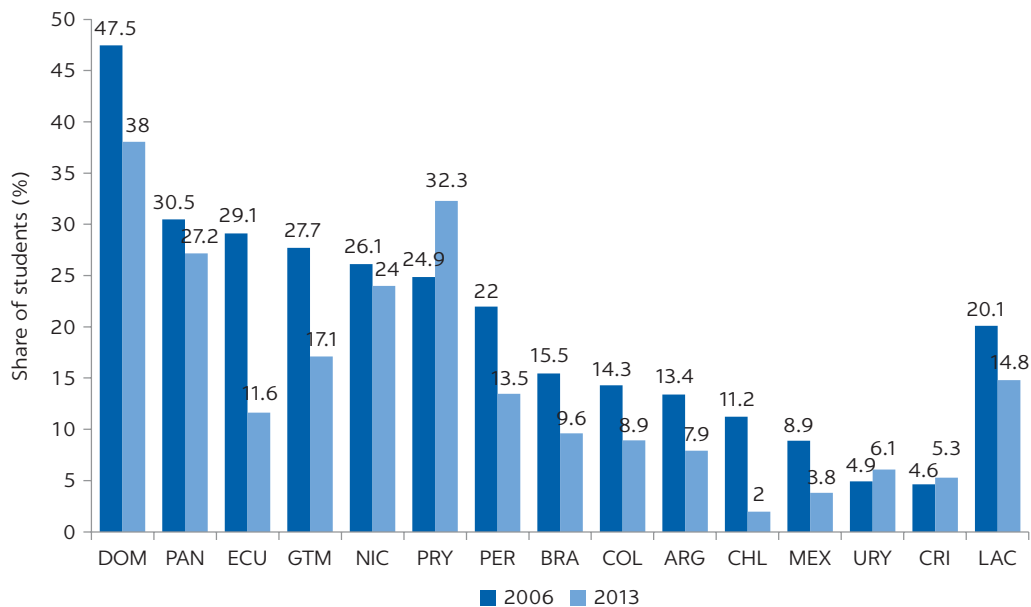
Source: World Bank based on UNESCO (United Nations Educational, Scientific and Cultural Organisation) database, http://data.uis.unesco.org/.
Note: LAC = Latin America and the Caribbean; SERCE = Second Regional Comparative and Explanatory Study; TERCE = Third Comparative and Explanatory Study on Education Quality.

FIGURE 9.12

Percentage of overage students in primary school, by region, circa 2014
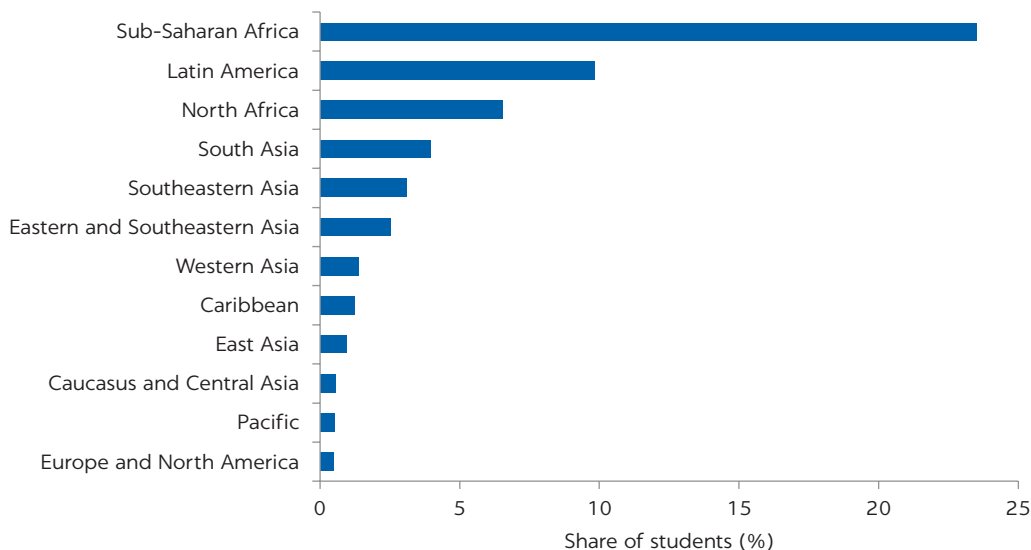
Source: World Bank based on UNESCO (2016).

largely been met, learning outcomes and flow through the system continue to lag. Coverage, graduation rates, and basic literacy and numeracy are primary school's main functions. In the twenty-first century, students must be trained in a far broader set of skills—many of them dependent on primary schooling.

Secondary schooling and youth education

In the 1990s, various international and national reports showed stagnation in the region around the reach, efficiency, and quality of secondary schooling. Efforts to expand coverage, combat dropping out, and improve efficiency by increasing graduation rates were undertaken in many countries in the region. Learning outcomes were not tackled with the same energy, even though standardized evaluations were making the system's learning deficits increasingly clear. The debate about the role of education in fostering a more competitive economy through investment in human capital was instrumental to the educational reforms of that decade.

Secondary school enrollment is, with few exceptions, still far from universal. Nevertheless, compared with other regions around the world, enrollment in Latin America is high. Coverage is near universal for lower secondary school, and three-quarters of teenagers age 15–17 are enrolled in upper secondary school (figure 9.13).

Completion or graduation rates are a different story. Despite wide variation within the region, completion rates in Latin America were, on average, low in 2000. In 2015, the region's completion rate was moderate in relation to its GDP per capita and overall level of socioeconomic development.

For lower secondary school, completion rates in Latin American countries are medium to high; they fall within the expected range, given GDP per capita. However, "average" in this case means little, given that variation is so wide. Specific comparable country data by socioeconomic strata available for 2013 show that whereas some countries, such as Chile, have high graduation rates, others with similar GDP and social development levels, such as Uruguay, have extremely low ones (table 9.1).

The regional average shows that only half of young people age 21–23 in the poorest tercile have graduated from high school. Even in the richest tercile, 2 out of 10 have not, and probably will not, finish high school. This is very bad news for the region. Basic adaptive skills and the capacity to continue learning

FIGURE 9.13

Net enrollment rates in lower and upper secondary school, by region, 2015
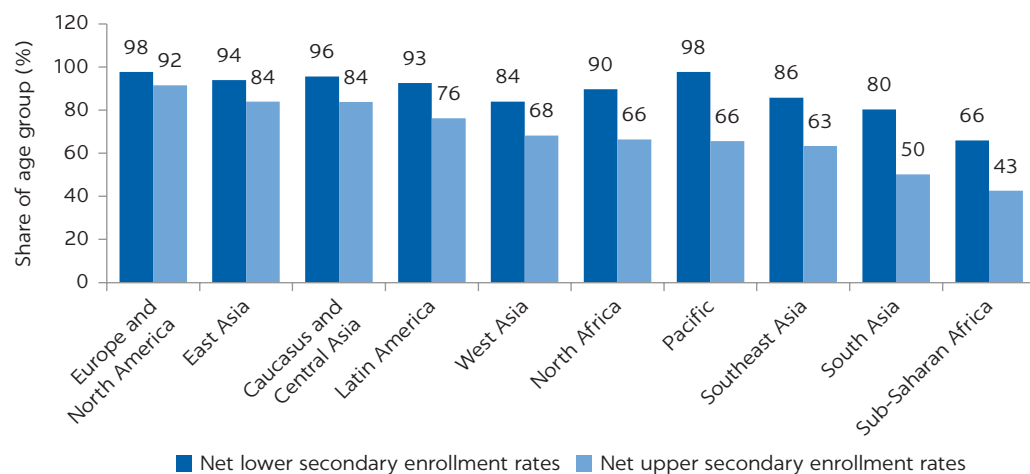
Source: World Bank based on UNESCO (2016).

TABLE 9.1 Upper secondary school graduation rates in Latin American countries, by socioeconomic status, area of residence, and sex, 2013

Percent

COUNTRY	TOTAL	SOCIOECONOMIC STATUS		AREA		SEX	
		LOW	HIGH	URBAN	RURAL	MEN	WOMEN
Argentina	63.5	46.3	84.7	63.5	—	59.7	67.8
Bolivia	75.3	78.7	85.4	82.3	46.8	76.3	74.5
Brazil	58.8	38.4	83.4	62.5	33.2	52.8	64.7
Colombia	62.7	64.6	85.5	72.1	29	65.3	69
Costa Rica	53	39.3	81.6	59.4	42.8	48.4	58.6
Chile	81.2	72.6	94.1	82.5	69.3	78.4	83.8
Dominican Republic	58.8	58.1	77.5	65.8	44	52.4	66.5
Ecuador	65.3	55.3	89.6	73.5	44.8	64.5	66.2
El Salvador	42.2	29.1	69.4	53.7	21.5	40.1	44.1
Guatemala	25.1	12.7	53.1	38.3	11	25.4	24.8
Honduras	33.6	28.8	64.1	48.8	18.2	30.5	36.5
Mexico	50.5	34.6	73.5	56.8	25	50.5	50.5
Nicaragua	32.6	16.1	52.5	42.7	17.4	29.6	35.7
Panama	61.2	54.7	84.1	70.2	38	54.7	67.7
Paraguay	60.7	51.9	82.2	72.8	38.9	56.3	65.3
Peru	61.8	55	70.6	65.7	42.3	62.3	61.2
Uruguay	36.8	19.5	58.7	38.6	26.2	31.6	41.9
Venezuela, RB	66.4	49.7	78.9	66.4	—	61	71.6
Total	63	52	81.1	67.1	29.6	60.5	65.5

Source: SITEAL (Sistema de Información de Tendencias Educativas en América Latina) database.
Note: — = not available.

throughout the life cycle depend on basic capabilities, many of them acquired during adolescence and early youth. Failure to graduate from high school imperils the ability to acquire those capabilities. Part of the tragedy in the region is that the high school curriculum is irrelevant or inadequate to the twenty-first century; indeed, it is perceived as such by many young people, which fuels high dropout rates (Opertti 2011).

Significantly, the countries that have made the greatest progress in secondary education have placed emphasis on technical training for jobs and high-quality trades, and on short technological degree programs—all of them housed within the formal education system (figure 9.14). In other words, these countries have rarely universalized high school completion based on a purely pre-university model. Nevertheless, Latin America as a region still opts for pre-university secondary schooling; few advances have been made in technical and professional education, and options for technical or vocational programs at the secondary level are limited.

The magnitude and quality of middle-high technical education is poor, especially compared with that in industrial countries. The region lacks robust national dual apprenticeship systems, especially at the middle-high or short-tertiary level. Those systems have been fundamental to the educational

Percentage of secondary school students enrolled in vocational or technical schools, 2015
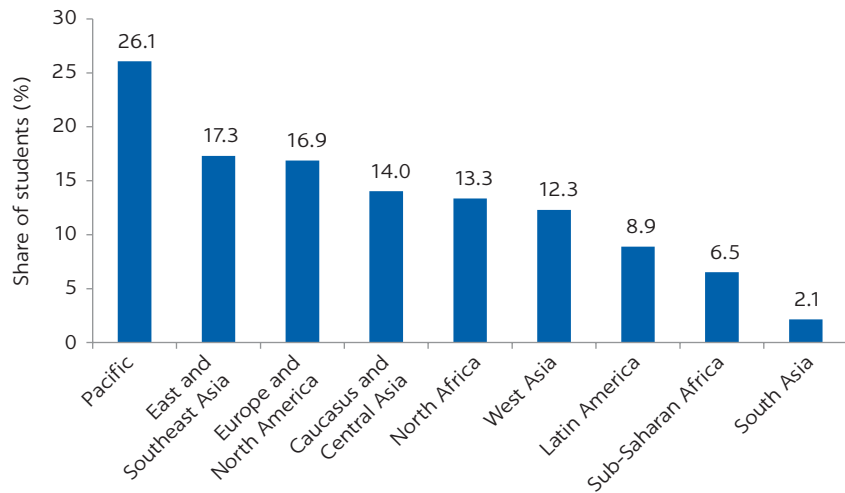
Source: World Bank based on UNESCO (2016).

matrices of coordinated capitalist or continental European countries, as well as to Asian models of work and education. The absence of such models in the region indicates a failure to articulate education and work. According to Salazar-Xirinachs (2015), a number of large companies and sectors have engaged in dual apprenticeship systems, but no country has institutionalized dual apprenticeship systems with a significant level of ambition at the national level, which means LAC [Latin America and the Caribbean] is missing on one of the most effective skills development models known. Most countries in the region have a wide variety of institutions that offer professional, vocational, and technological training, usually at least partly outside the sphere of ministries of education and of the formal education system. These institutions vary vastly in service model, coverage, degree of articulation with the accreditation system, cost and financing mechanism, institutional locus, and governance. In addition to underdeveloped vocational and technical education, the secondary school curriculum underemphasizes science, technology, and math education and yields poor learning outcomes in basic capabilities and scientific literacy (Opertti 2011).

As figure 9.15 shows, the region's results on the Programme for International Student Assessment have been systematically disappointing. Student performance in Latin American countries lags far behind not only the performance of students in Western Europe and the United States but also in other emerging market economies, especially in Asia and Eastern Europe.

BEYOND CLASSIC ACHIEVEMENT INDICATORS

Increasing early childhood education and care coverage, universalizing completion of primary school and coverage of secondary schooling, and improving secondary school completion rates are necessary targets. No less important is improving learning outcomes in reading, math, and the sciences, and lowering

FIGURE 9.15
Average PISA scores in math by region, 2015
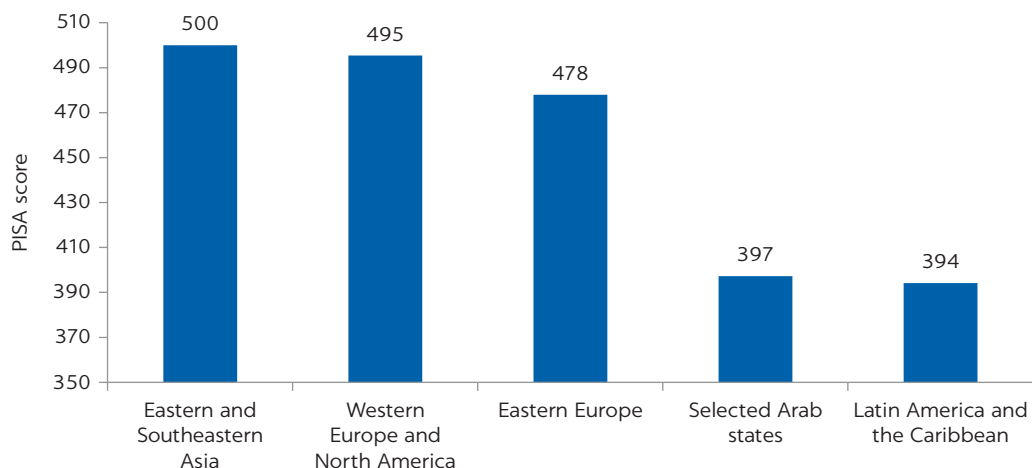
Source: Based on OECD (Organisation for Economic Co-operation and Development) PISA Database, https://www.oecd.org/pisa/.
Note: PISA = Programme for International Student Assessment.

the percentage of students below basic sufficiency levels. But it is also necessary to change the "what, what for, and how" of teaching and learning (Tedesco, Opertti, and Amadio 2014).

A now-famous quote says that the region's education systems have students of the twenty-first century, teachers of the twentieth century, and programs and curricula of the nineteenth century. Students today are digital natives, and that has a number of implications. They have spent more time playing video games, managing content in their social networks, and sending and reading short texts as virtual conversation and as content than reading books or writing letters and essays. They seek knowledge for the immediate requirements of such communication and gaming, and they do so in a horizontal and collaborative fashion. They have shorter attention spans for passive exposure to knowledge and relatively large attention spans for hands-on activities, such as video gaming, where they can spend two straight hours trying to get from one level to another. They tend to lack a predisposition for learning the theory behind basic skills (in math, reading and writing, and science, for example), yet are able to deploy those skills in problem solving. They do not lack access to information, but they may lack criteria for classifying, grouping, and relating one piece of information to another.

Furthermore, digital natives know they will face a world in which many of the canonical, closed, and stable sets of knowledge and routines at play in what are called subject matter and disciplines are no longer relevant. Traditional schooling is incompatible with both what needs to be learned and how it is learned during the digital revolution (Tedesco, Opertti, and Amadio 2014).

Personalized learning is now a real possibility. Throughout most of the twentieth century, schooling was thought of as a process of mass production in which everyone should learn the same thing at the same time. Such an approach is misguided on many counts. Children and teenagers learn in different ways and at different paces. Because of genetic and environmental factors, children develop different interests and different talents. Current technology makes possible customized and personalized learning that would have been inconceivable only a

few years ago. Computers can respond to a learner's specific interests and difficulties and provide content on any topic of interest. Yet rigid, content-based prescriptive curricula, as well as traditional space-and-time arrangements in the classroom, keep these changes and potentials from permeating the learning experience.

Schooling is built on the notion that teachers are the experts. It is their job to pass their expertise along to students. Teachers trained in the traditional ethos and culture will react negatively when challenged by students who find new information or question their expertise. But great teachers have always enticed and guided students, providing them with the tools they need rather than positioning themselves as the sole holders of information and truth. In the twenty-first century, this approach to teaching is paramount; what matters now is not the amount of information one has, but the capacity to critically assess its usefulness and mobilize it to solve problems.

This last point relates to the distinction between knowledge as something you have versus knowledge as something you know how to seek. Many teachers and parents believe that to really learn something, it must be internalized, without reliance on outside resources. That means that on tests, students are usually not allowed to use books or calculators, let alone computers or the web. But in adult life, technology supports people's use of outside resources. At the workplace, employees are often judged on how well they can mobilize resources to accomplish a task.

The information revolution has brought about an exponential growth in knowledge. One way to deal with that explosion is to add more and more content to already extensive curricula. That approach makes learning shallow as students and teachers alike scramble to cover endless content. The way to harness the knowledge revolution is not to cover all its ground but to master the ability to navigate between different problems and areas of knowledge. Learning how to learn and gaining the flexibility of mind required to unlearn and relearn is far more important than covering the encyclopedic content in prescriptive curricula. These times are marked by quick change and uncertainty, which means that setting knowledge in stone is self-defeating. This reality does not justify content-less education or education that veers away from certain routine tasks or the capacity to engage in them. It is not a question of whether certain content and routines should be taught, but of whether they are taught as an end in and of themselves or as tools to gain other capacities.

Crucial to this is how people learn. The culture of schooling holds that, through memory and repetition, students should passively incorporate a large body of facts, theories, and works of art and science, without linking that content to practical or immediate endeavors. Technology permits a more hands-on, activity-based education. The digital and communications revolution is, by definition, interactive; it provides a variety of tools with which to accomplish meaningful tasks. It is more aligned with the "learning by doing" model of education than with the "acquisition of cultural knowledge" model that permeates schooling. The notions discussed here have, to a large extent, made their way into the Latin American debate on education, but they are still a long way from becoming mainstream in educational policy and practice.

At least four domains must be transformed to usher in a new paradigm in education in the region: curriculum, pedagogy and teaching, access to and the use and role of information and communication technology (ICT) in the educational process, and new boundaries and interactions between the school and the broader learning ecosystem (Tedesco, Opertti, and Amadio 2014).

Curricula must be reformed to move from an extensive and prescriptive content-based approach to a framework based on competencies and open to different and flexible content combinations; from subject-based organization to flexible, problem-based organization that allows for a range of knowledge inputs; from high-stakes examinations structured around subjects and based on memory and standardized routine learning in artificial environments to evaluations that serve an educational purpose and are based on problem-solving skills in which real-life situations and different sources of knowledge are combined; and from individualized to cooperative learning (Tedesco, Opertti, and Amadio 2014).

Changes in teaching and pedagogy would seek to move the system from a traditional classroom-lecture structure to open workshops and interactive learning; from standardized expectations and teaching methods to personalized goals and strategies; from single-source teaching (teachers) to multiple teaching agents (teachers, peers, parents, social media, ICT); from static content to dynamic learning strategies; from emphasis on making students ingest information and knowledge to allowing them to produce information and knowledge. Evaluation transformation is part and parcel of curricular reform and of teaching innovation. Evaluation should become an integral part of the teaching experience rather than a filter or system of meritocratic progression.

ICT in education means much more than access to computers. Coding and programming should be learned as early as primary school. Social media should be incorporated as a part and source of learning. Use of smartphones and computers should be encouraged, not restricted. Furthermore, ICT can foster learning processes and teaching innovations by means of adaptive tests, virtual learning communities, flipped class models, and personalized, tailor-made tests and learning devices. Teachers and students should share a virtual space that goes beyond schools and classrooms.

Finally, redrawing the boundaries between formal education and education in different life situations is fundamental; traditional approaches have become less effective because access to information and knowledge has been made easier through the internet and other channels. Families and peer groups should be brought into purposive education. The dynamics of formal education can be transformed with the intervention of peer-to-peer interactions, interactions with parents, and the incorporation of leisure and entertainment.

CONCLUSIONS

Demography meets technology in Latin America at a critical juncture in the region's history. Automation, robotization, and task and employment destruction and re-creation will ensue in many countries, alongside a population-aging process in which the economically active cohort will reach the largest size ever before beginning to decrease as the number of elderly people grows. Future cohorts of the economically active population should embrace and fuel technological change and innovation. But to reach that ambitious, but necessary, goal, both old and new educational challenges must be tackled, and human capital stock must increase rapidly.

Basic early childhood education and care must be expanded to reach a far greater percentage of children than they do today. On the regional level, the percentage of children in primary school and in early adolescence at risk of lacking basic skills is lower. Improvements in coverage at the primary and early

secondary school levels, as well as high primary school completion rates, are responsible for that reduction in risk. Because of a lack of coverage, learning deficits, or low completion rates, most countries with full data sets (PISA outcomes are only available for 10 countries) show high percentages of teenagers and youth at risk of lacking basic skills. Looking at a single indicator (completion rates) improves the value for some countries, but only marginally.

Latin America needs to confront long-standing educational challenges in coverage, completion, and basic quality. Educational systems must be adjusted so that they are in line with the societies of the future, not the past. These two goals—meeting long-standing challenges and reorienting education toward the future—go hand in hand: it will be extremely hard to improve coverage, completion rates, and learning as long as twenty-first-century children continue to be taught nineteenth-century curricula by twentieth-century teachers.

Reforming education systems to ensure that they perform at levels consistent with current and future demands is an important step toward seizing the opportunities that the first and second demographic dividends offer to spur productivity and sustain economic growth. These, together with the necessary adjustments to other sector policies (such as health, long-term care, pensions, and labor market regulation), should be the focus of policy makers in Latin America concerned with the population-aging process and its consequences to achieve a basic policy objective: to become rich before we are too old.

ANNEX 9A STATISTICAL DATA

TABLE 9A.1 Evolution of educational achievement of population age 25 to 59 in selected Latin American countries, by years of formal education, 1990–2014

	ARGENTINA					BOLIVIA			
YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE	YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE
1990	14.1	68.2	—	17.7	1989	35.5	16.3	26.2	22.0
1994	12.0	68.2	—	19.8	1994	29.7	18.4	26.7	25.2
2000	8.6	37.7	29.4	24.3	2000	27.6	17.3	26.9	28.2
2005	6.4	27.0	36.8	29.8	2004	33.0	18.1	25.7	23.3
2010	5.0	22.3	39.5	33.2	2009	23.3	13.8	30.1	32.8
2014	3.3	28.3	36.1	32.3	2013	16.1	11.1	30.4	42.3

	BRAZIL					ECUADOR			
YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE	YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE
1990	55.7	17.0	16.8	10.6	1990	16.1	43.0	21.9	19.0
1995	51.7	19.5	18.3	10.5	1994	11.7	39.8	24.6	24.0
2001	43.2	21.9	23.4	11.5	2000	12.8	37.7	25.4	24.1
2005	36.8	21.3	28.5	13.4	2005	10.1	34.5	27.5	27.8
2011	27.5	20.1	34.9	17.5	2010	9.6	31.8	28.6	30.0
2014	24.0	19.6	36.4	20.0	2014	8.4	32.7	31.7	27.3

	COLOMBIA					CHILE			
YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE	YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE
1991	39.9	23.0	21.3	15.8	1990	15.8	29.4	34.5	20.3
1994	35.9	22.9	25.3	15.9	1994	14.1	24.2	38.9	22.8
1999	33.3	21.5	27.6	17.6	2000	9.6	22.8	40.6	27.1
2005	31.1	18.4	29.1	21.3	2006	8.3	21.2	43.8	26.7
2010	28.3	16.6	30.4	24.6	2009	7.5	19.5	44.7	28.3
2014	23.8	15.2	32.3	28.8	2013	5.5	16.2	45.0	33.2

	COSTA RICA					MEXICO			
YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE	YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE
1990	16.9	40.9	22.3	20.0	1989	29.6	47.1	9.6	13.7
1994	14.1	39.5	24.9	21.5	1994	23.0	48.4	11.8	16.8
2000	13.4	43.0	20.7	22.9	2000	17.7	50.4	13.2	18.7
2005	10.2	41.4	21.3	27.2	2005	14.4	42.8	20.3	22.5
2010	9.2	41.9	22.6	26.3	2010	11.4	42.0	21.8	24.8
2014	9.2	40.4	22.2	28.2	2014	8.5	41.0	24.0	26.5

	URUGUAY					LATIN AMERICA (SIMPLE AVERAGE)			
YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE	YEAR	0–5 YEARS	6–9 YEARS	10–12 YEARS	13 AND MORE
1990	17.2	46.3	23.6	12.8	1990	28.6	34.0	24.1	15.4
1994	14.5	46.3	25.3	13.8	1994	26.5	34.0	25.1	16.5
2000	8.5	48.7	26.6	16.3	1999	22.5	33.7	24.4	19.4
2005	7.0	43.2	26.6	23.1	2005	20.2	31.0	26.3	22.5
2010	6.8	43.5	25.1	24.6	2010	17.2	29.0	28.5	25.2
2014	4.7	40.9	26.2	28.1	2014	15.4	27.5	29.7	27.4

Sources: ECLAC 2017; CEPALSTAT (Economic Commission for Latin America and the Caribbean) database, https://estadisticas.cepal.org/cepalstat/Portada.html.

TABLE 9A.2 **Primary school enrollment rates**

Percent

| | | 2000 | | | | | 2013 | | | |
| | | SOCIOECONOMIC STATUS | | AREA | | | SOCIOECONOMIC STATUS | | AREA | |
COUNTRY	TOTAL	LOW	HIGH	URBAN	RURAL	TOTAL	LOW	HIGH	URBAN	RURAL
Argentina	99.2	97.7	99.9	99.2	—	98.9	99.7	98.8	98.9	—
Bolivia	93.4	88.8	98.6	95.7	90.0	97.5	95.7	98.4	98.1	96.5
Brazil	95.5	93.5	98.1	96.1	92.9	98.4	97.7	99.1	98.6	97.6
Colombia	95.2	91.9	99.2	96.4	92.4	96.6	94.5	98.2	97.5	94.4
Costa Rica	96.3	92.3	99.4	97.9	95.1	98.8	97.6	100.0	99.1	98.4
Chile	98.6	95.8	99.6	99.0	96.0	99.2	98.2	99.2	99.2	98.9
Dominican Republic	93.8	90.0	99.3	93.8	—	98.0	94.9	98.6	98.2	97.7
Ecuador	95.8	91.0	98.8	97.3	93.4	99.0	98.2	99.6	99.3	98.6
El Salvador	85.7	79.9	99.4	91.2	80.1	95.0	92.7	99.5	95.5	94.4
Guatemala	75.3	71.2	97.4	84.7	70.6	91.3	89.6	97.9	93.2	89.9
Honduras	91.1	88.0	98.5	94.4	88.8	95.3	93.0	98.4	96.7	94.3
Mexico	96.5	93.4	99.2	97.1	95.2	98.9	97.2	98.9	99.1	98.5
Nicaragua	86.1	81.2	98.0	91.2	80.2	89.7	84.8	93.3	94.9	84.5
Panama	97.8	95.1	99.4	98.8	96.7	98.8	96.0	100.0	99.5	97.4
Paraguay	94.1	91.5	99.3	97.0	91.6	98.7	96.5	99.9	99.0	98.4
Peru	97.0	96.7	98.9	98.0	95.6	97.3	95.2	98.3	97.7	96.3
Uruguay	98.9	97.6	99.5	98.9	—	99.3	99.0	99.5	99.4	99.0
Venezuela, RB	95.8	90.9	99.1	95.8	—	98.0	94.3	99.0	98.0	—
Total	95.1	91.6	99.0	96.4	91.9	97.2	94.9	98.5	97.9	95.3

Source: UNESCO 2016.
Note: — = not available.

TABLE 9A.3 **Primary school completion rates**

Percent

| | | 2000 | | | | | | | 2013 | | | | | |
| | | SOCIOECONOMIC STATUS | | AREA | | SEX | | | SOCIOECONOMIC STATUS | | AREA | | SEX | |
COUNTY	TOTAL	LOW	HIGH	URBAN	RURAL	WOMEN	MEN	TOTAL	LOW	HIGH	URBAN	RURAL	WOMEN	MEN
Argentina	97.8	91.5	99.7	97.8	—	97.3	98.3	98.6	92.1	99.6	98.6	—	98.3	98.8
Bolivia	83.6	64.7	96.9	92.7	64.2	82.9	84.3	95.8	91.9	98.3	97.3	92.7	95.8	95.8
Brazil	89.5	84.9	93.4	92.5	75.2	87.1	91.8	90.3	87.6	93.2	91.3	86.2	89.6	91.1
Colombia	91.3	82.3	89.9	94.9	81.5	88.6	93.9	94.7	90.2	99.6	96.9	88.3	94.6	96.6
Costa Rica	90.9	80.0	99.1	93.1	89.0	89.9	91.9	96.6	88.7	98.9	97.7	95.4	96.3	97.0
Chile	85.5	65.4	96.0	87.4	74.5	83.3	87.8	98.9	95.7	99.3	98.9	98.5	98.4	99.4
Dominican Republic	66.6	47.6	95.9	66.6	—	61.3	71.9	84.9	71.1	97.0	86.9	80.6	80.3	89.9
Ecuador	89.8	77.6	97.4	94.0	83.1	88.7	90.9	96.5	90.4	98.8	97.2	95.1	96.0	97.0
El Salvador	30.8	16.2	64.9	42.2	16.7	28.2	33.3	84.2	72.4	98.3	89.7	76.0	82.5	85.9
Guatemala	58.1	47.8	97.2	80.8	43.2	59.4	56.7	75.0	66.5	96.0	83.5	67.2	76.3	73.7
Honduras	74.7	63.7	93.0	84.7	65.7	72.0	77.5	87.7	79.9	99.1	93.9	82.8	85.4	90.3
Mexico	93.0	86.6	100.0	95.7	86.3	92.8	93.2	97.7	92.6	100.0	98.5	95.2	97.9	97.5
Nicaragua	72.4	58.4	97.0	85.6	50.0	69.3	76.1	74.8	63.1	85.3	85.7	62.0	69.5	80.4
Panama	94.3	80.1	99.0	96.9	90.3	93.1	95.5	96.8	88.4	99.7	98.4	93.9	96.6	97.0
Paraguay	80.4	69.2	99.5	88.4	70.8	74.7	87.0	95.3	87.3	98.9	97.6	92.4	94.0	96.6
Peru	91.7	79.8	97.5	96.8	83.2	93.5	89.8	96.9	91.9	99.3	98.3	93.0	97.1	96.8
Uruguay	96.2	84.0	99.6	96.2	—	96.1	96.3	97.9	92.1	99.6	98.0	97.7	97.1	98.8
Venezuela, RB	89.4	74.8	98.7	89.4	—	85.7	93.2	95.8	86.3	98.6	95.8	—	94.4	97.1
Total	89.7	80.5	97.7	93.4	78.6	87.6	91.8	93.9	88.6	98.7	95.8	87.9	93.8	95.4

Source: UNESCO 2016.
Note: — = not available.

TABLE 9A.4 **Overage children in primary school**

Percent

COUNTRY	2000					2013				
	TOTAL	SOCIOECONOMIC STATUS		AREA		TOTAL	SOCIOECONOMIC STATUS		AREA	
		LOW	HIGH	URBAN	RURAL		LOW	HIGH	URBAN	RURAL
Argentina	6.6	14.5	2.2	6.6	—	3.7	14.5	1.9	3.7	—
Bolivia	18.4	30.8	4.7	11.6	28.7	8.2	15.3	3.1	5.3	12.4
Brazil	13.0	17.2	9.9	10.2	25.0	4.5	7.6	2.5	3.5	9.1
Colombia	19.6	31.2	4.0	14.9	29.9	12.8	21.1	3.9	9.5	21.0
Costa Rica	6.9	11.9	3.0	4.8	8.5	2.4	5.4	0.8	2.3	2.5
Chile	7.9	17.9	4.4	7.2	12.1	8.2	19.2	5.4	8.2	7.9
Ecuador	9.1	19.4	1.5	6.3	13.4	6.2	13.1	2.9	5.1	8.2
El Salvador	13.6	19.6	0.9	8.4	19.0	8.7	14.0	1.2	6.4	11.6
Guatemala	20.9	24.6	3.7	13.0	24.9	16.0	20.2	1.5	10.7	20.0
Honduras	11.5	15.8	0.7	7.3	14.6	6.2	9.4	1.1	3.8	7.8
Mexico	7.2	12.9	0.7	5.1	11.5	4.7	10.2	2.4	4.1	6.3
Nicaragua	15.2	20.2	0.4	11.3	19.8	15.5	22.7	9.8	8.6	22.1
Panama	9.4	24.5	1.3	6.7	12.2	9.1	24.3	2.1	6.2	13.1
Paraguay	21.3	29.9	5.5	15.3	26.1	11.8	22.9	3.3	8.8	15.2
Peru	14.4	26.4	2.1	8.2	22.6	5.9	14.3	1.7	3.5	11.9
Uruguay	10.1	26.7	2.1	10.1	—	6.1	13.4	1.4	6.4	5.1
Venezuela, RB	16.3	29.1	4.0	16.3	—	6.4	14.8	2.8	6.4	—
Total	16.2	25.8	4.3	12.4	25.3	9.7	17.6	3.4	7.2	16.3

Source: UNESCO 2016.
Note: — = not available.

NOTES

1. The República Bolivariana de Venezuela seems to be a special case—2015 spending is low by regional standards, possibly because of data quality issues.
2. Oil-rich Arab nations would be the only exception.
3. Mexico data are based only on the state of Nuevo Leon.

REFERENCES

Barro, R. J., and J. W. Lee. 2013. "A New Data Set of Educational Attainment in the World, 1950–2010." *Journal of Development Economics* 104 (C): 184–98.

Benhabib, Jess, and Mark Spiegel. 1994. "The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data." *Journal of Monetary Economics* 34 (2): 143–74.

ECLAC (Economic Commission for Latin America and the Caribbean). 2011. *Social Panorama of Latin America 2010*. Santiago: United Nations.

Lucas, Robert. 1988. "On the Mechanics of Economic Development." *Journal of Monetary Economics* 22 (1): 3–42.

Mankiw, Gregory, David Romer, and David Weil. 1992. "A Contribution to the Empirics of Economic Growth." *Quarterly Journal of Economics* 107 (2): 407–38.

Nelson, Richard, and Edmund Phelps. 1966. "Investment in Humans, Technological Diffusion and Economic Growth." *American Economic Review* 56 (1/2): 69–75.

Opertti, Renato. 2011. "Hacia la reforma de la educación media: temas, desafíos y propuestas." *Páginas de Educación* [online] 4 (1): 11–32.

Opertti, Renato, Jayne Brady, and Leana Duncombe. 2009. "Moving Forward: Inclusive Education as the Core of Education for All." *Prospects: Quarterly Review of Comparative Education* 39 (3): 205–14.

Salazar-Xirinachs, José M. 2015. "6 Ways Latin America Can Close Its Skills Gap." World Economic Forum. https://www.weforum.org /agenda/2015/05/6-ways-latin -america-can-close-its-skills-gap/.

Salvador, S. 2007. "Comercio, género y equidad en América Latina: generando conocimiento para la acción política—Estudio comparativo de la 'economía del cuidado' en Argentina, Brasil, Chile, Colombia, México y Uruguay." Red Internacional de Género y Comercio - Capítulo Latinoamericano.

Staab, S. 2010. "Social Investment Policies in Chile and Latin America: Towards Equal Opportunities for Women and Children?" *Journal of Social Policy* 39 (4): 607–26.

Tedesco, Juan Carlos, Renato Opertti, and Massimo Amadio. 2014. "The Curriculum Debate: Why It Is Important Today." *Prospects* 44 (4): 527–46.

Thompson, R. A., and C. A. Nelson. 2001. "Developmental Science and the Media: Early Brain Development." *American Psychology* 56 (1): 5–15.

UN (United Nations). 2017. "World Population Prospects: The 2017 Revision." Population Division, United Nations, New York.

UNESCO (United Nations Educational, Scientific and Cultural Organization). 2016. *Education for People and the Planet: Creating Sustainable Futures for All*. Paris: UNESCO.

Vegas, E., and L. Santibáñez. 2010. *La promesa del desarrollo en la primera infancia en América Latina y el Caribe*. Washington, DC: World Bank.

Latin American countries are in the midst of a demographic transition and, as a consequence, a population-aging process. Over the next few decades, the number of children will decline relative to the number of older adults.

Population aging is the result of a slow but sustained reduction in mortality rates, given increases in life expectancy and fertility. These trends reflect welcome long-term improvements in welfare and in economic and social development. But this process also entails policy challenges: many public institutions—including education, health, and pension systems and labor market regulations—are designed for a different demographic context and will need to be adapted.

When We're Sixty-Four discusses public policies aimed at overcoming the two main challenges facing Latin American countries concerning the changing demographics. On one hand, older populations demand more fiscal resources for social services, such as health, long-term care, and pensions. On the other, population aging produces shifts in the proportion of the population that is working age, which may affect long-term economic growth.

Aging societies risk losing dynamism, being exposed to higher dependency rates, and experiencing lower savings rates. Nonetheless, in the interim, Latin American countries have a demographic opportunity: a temporary decline in dependency rates creates a period in which the share of the working-age population, with its associated saving capacity, is at its highest levels. This constitutes a great opportunity in the short term because the higher savings may result in increases in capital endowment per worker and productivity. For that to happen, it is necessary to generate institutional, financial, and fiscal conditions that promote larger savings and investment, accelerating per capita economic growth in a sustainable way.

WORLD BANK GROUP