

Addressing the Fiscal Costs of Population Aging in Latin America and the Caribbean, with Lessons from Advanced Countries

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ADDRESSING THE FISCAL COSTS OF POPULATION AGING

IN LATIN AMERICA AND THE CARIBBEAN,
WITH LESSONS FROM ADVANCED COUNTRIES



CAROLA PESSINO & TERESA TER-MINASSIAN



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Abstract

This paper presents projections for 18 Latin America and Caribbean countries of pensions and health expenditures over the next 50 years, compares them to advanced countries, and calculates estimates of the fiscal gap due to aging. The exercise is crucial since life expectancy is increasing and fertility rates are declining in virtually all advanced countries and many developing countries, but more so in Latin America and the Caribbean. While the populations of many of the region's countries are still relatively young, they are aging more rapidly than those in more developed countries. The fiscal implications of these demographic trends are severe. The paper proposes policy and institutional reforms that could begin to be implemented immediately and that could help moderate these trends in light of relevant international experience to date. It suggests that LAC

countries need to include an intertemporal numerical fiscal limit or rule to the continuous increase in aging spending while covering the needs of the more vulnerable. They should consider also complementing public pensions with voluntary contribution mechanisms supported by tax incentives, such as those used in Australia, New Zealand (Kiwi Saver), and the United States (401k).

In addition, LAC countries face an urgent challenge in curbing the growth of health care costs, while improving the quality of care. Efforts should focus on improving both the allocative and the technical efficiency of public health spending.

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Keywords: fiscal implications of population aging

Acronyms

ACA	Affordable Care Act	KS	Kiwi Saver
AWG	Aging Working Group	LAC	Latin America and the Caribbean
BPC	Beneficio de Prestação Continuada	LTC	Long-term care
CBO	Congressional Budget Office	NDC	Notional defined contribution
CHIP	Children's Health Insurance Program	NZS	New Zealand Superannuation
CoA	Cost of aging	OECD	Organization for Economic Co-operation and Development
DB	Defined benefit	PAYGO	Pay-as-you-go pension system
DC	Defined contribution	RSPB	Required Structural Primary Balance
DSA	Debt Sustainability Analysis	SGP	Stability and Growth Pact
EC	European Commission	TFP	Total factor productivity
EU	European Union	UN	United Nations
GAO	Government Accountability Office		
GDP	Gross domestic product		

Introduction

Virtually all advanced countries and many developing countries are confronting increasing life expectancy and declining fertility rates. This means that populations are aging at a more or less rapid rate depending on the country. While the populations of many Latin America and Caribbean (LAC) countries are still relatively young, they are aging more rapidly than those in more developed countries.

The changing age structure of populations has wide-ranging and substantial economic and fiscal implications. The good news is that people in the LAC region are living longer and healthier lives. The bad news is that a longer-living, aging population poses serious long-term fiscal challenges as a result of a shrinking labor force, rising old-age dependency ratios (defined as the ratio of those over 65 to working-age people), and if countries continue with current aging spending policies. It can also lead to increasing deficits of defined-benefit (DB) pay-as-you-go (PAYGO) pension systems and to inadequate retirement incomes in defined-contribution (DC) systems. The aging of the population also contributes to the escalation of health and long-term care (LTC) costs. The growth of aging-related expenditures in pensions, healthcare, and LTC is offset only

slightly by an expected decrease in education expenditures.

The region's considerable rate of informality also prevents social security systems from covering a large amount of the workforce with contributory pensions. Therefore, most LAC countries have introduced noncontributory pensions, which increase coverage and also the pension liabilities of the State. As DC systems became insufficient to cover even basic benefits, most LAC countries instituted state-guaranteed minimum pensions, shifting part of the system back to deficit financing, as in PAYGO. Many LAC countries spend heavily on pensions and health benefits today, even though their populations are still relatively young. This fiscal burden will increase further in the coming decades as the number of older people rises much more rapidly than it did in Europe. However, LAC countries are far from adequately responding today to aging-related risks for long-term fiscal sustainability.

This paper focuses on the fiscal implications of these demographic trends in LAC countries. It proposes policy and institutional reforms that could begin to be implemented immediately and that could help moderate these trends in light of relevant international experience to date.

Section II reviews available estimates of the prospective aging costs in the European Union (EU) and other selected countries, their impact on fiscal sustainability, and the reforms enacted by some of these countries in recent years to moderate these costs. Section III outlines the types of pension and health systems in the LAC region, demographic trends and projections, and recent estimates by IDB staff of the long-term impact of aging on pension and health spending and on fiscal sustainability in the region.

Section IV discusses the role that some institutional mechanisms (in particular, the preparation and dissemination of long-term fis-

cal projections, independent fiscal councils, and fiscal rules) could play in triggering more timely policy responses to contain the costs associated with population aging in LAC. It outlines the trade-offs in pension reforms in the economic and institutional contexts of the region and discusses some options to lower health care costs. The analysis of institutional and policy reform options emphasizes the fact that the appropriate responses to the aging challenge will vary across countries, policies, and institutional settings, including how pensions, health, and other costs are determined and financed, will necessarily be country specific. Finally, Section V concludes.

An Overview of the Experiences of Selected Countries in Assessing and Addressing the Fiscal Costs of Aging

2

The countries that comprise the G-20 account for a large share of the world economy and population. Their populations are aging at different rates, and their policy responses also vary. This section focuses on some experiences in the European Union (EU) and other selected advanced countries.

The focus on the EU is justified by the fact that the European Commission (EC) has developed a comprehensive, standardized framework to analyze the costs of aging in EU member states, which it uses as a tool for fiscal surveillance. The other advanced countries analyzed were chosen because, as is the case in the LAC region, they employ different models of protection of their population from aging-related risks. The analysis thus highlights ways in which the institutional context influences policy response options. Moreover, countries whose populations are aging more rapidly can provide useful lessons for LAC countries, which have begun this demographic transition more recently.

1. General Trends in the G-20 Countries

All G-20 countries are likely to experience a significant further aging of their popula-

tion in the decades ahead, albeit at different rates. The 2017 UN population projections suggest that by 2060, all G-20 countries will have fertility rates lower than the 2.1 replacement rate and will experience increases in longevity of 4 years on average. As a result, the number of people over 65 for each working-age person will at least double in most G-20 countries by 2060. The share of individuals over 80 in the population will rise even faster, especially in some of the more advanced countries in the group.

The impact of population aging on growth and living standards will depend on the evolution of employment, the capital intensity of production, and total factor productivity (TFP), which is likely to differ across countries. However, there is broad consensus among scholars that, in the absence of appropriate policy changes, population aging is likely to have a negative impact on GDP growth and living standards in most G-20 countries (OECD, 2019a). Moreover, this impact is likely to be unequally distributed within each country, disproportionately affecting poorer and rural inhabitants.

Aging will also adversely impact the public finances of G-20 countries by requiring more spending on pensions, health care,

TABLE 1. PUBLIC AND MANDATORY PRIVATE PENSION SYSTEMS IN G-20 COUNTRIES

	Basic	Minimum	Social assistance	Public	Private
				Type	Type
Argentina	✓	✓	•	DB	
Australia	✓	•	•		DC
Brazil	•	✓	•	DB	
Canada	✓	•	✓	DB	
China	•	✓	•	NDC+DC	
France	•	✓	•	DB +Points	
Germany	•	•	•	Points	
India	•	✓	•	DB + DC	
Indonesia	•	•	•	DC	
Italy	•	✓	•	NDC	
Japan	✓	•	•	DB	
Korea	•	•	✓	DB	
Mexico	•	✓	•		DC
Russia	✓	•	•	Points	DC
Saudi Arabia	•	✓	•	DB	
South Africa	✓	•	•		
Turkey	•	✓	•	DB	
United Kingdom	✓	•	•	DB	
United States	•	•	•	DB	

Source: OECD (2019).

Note: DB: defined benefit; DC: defined contribution; NDC: notional defined contribution.

and LTC. The extent of the impact can be expected to vary significantly across countries, reflecting in particular the model of insurance against income and health risks prevailing in each country.

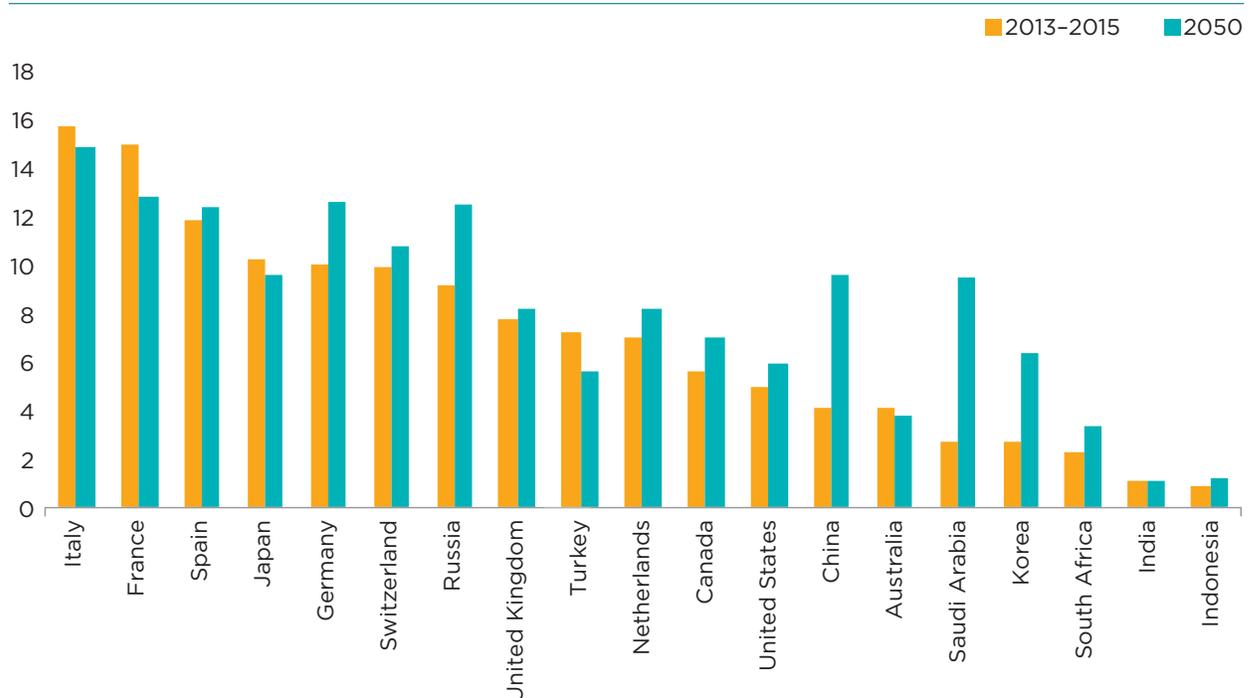
As Table 1 shows, pension systems vary across G-20 countries by type—DB, DB, DC, or notional defined contribution (NDC)¹—and by whether they include a contributory basic or minimum, or noncontributory social assistance pension. Other features of each system that affect the fiscal cost of DB pensions are the statutory retirement age, the existence of provisions for early retirement, earnings

replacement rates, and pension indexation mechanisms.

As a result of these factors and the current age structure of the population, public expenditures on pensions in 2013–2015 ranged from a low of 0.8 percent of GDP in Indonesia to a high of 15.7 percent of GDP in Italy. The G-20 coun-

¹ NDC systems are funded on a PAYGO basis but designed to mimic a DC system. Each participant’s contributions are credited to a notional account, which earns a predefined rate of return. Its size at retirement determines the amount of pension that the individual receives (in most countries with a guaranteed minimum).

FIGURE 1. PROJECTIONS OF PUBLIC EXPENDITURE ON PENSIONS IN G-20 COUNTRIES EXCLUDING LATIN AMERICA AND THE CARIBBEAN, 2013-2050, AS A PERCENT OF GDP



Source: Authors' elaboration based on OECD (2019).

Note: Figures based on baseline scenarios, which assume no further policy changes in the projection period. Announced but not yet legislated changes are not reflected. Projection for Australia 2050 corresponds to 2055.

tries (excluding LAC countries) can be divided into four groups, depending on the ratio of public expenditures on pensions to GDP: low (under 4 percent): India, Indonesia, Korea, Saudi Arabia, and South Africa; medium-low (between 4 and 7 percent): Australia, Canada, China, and the United States; medium-high (between 7 and 10 percent): Germany, the Russian Federation, Switzerland, Turkey, and the United Kingdom; and high (above 10 percent): France, Italy, Japan, and Spain.

Based on a number of national and international sources, OECD estimates suggest that, without further corrective measures, these expenditures will rise in most G-20 countries in the coming decades, except in France, Italy (where they would decline as

a result of already enacted pension reforms but remain relatively high), and Turkey. Saudi Arabia, and to a lesser extent Korea, will experience the largest increases.

In the few G-20 countries that have DC systems, aging will pose a different challenge, namely, ensuring that mandatory or voluntary savings accumulated by individuals in their pension funds are sufficient to support adequate living standards during lengthier retirements. This challenge is made more acute by changing patterns of employment—more frequent job rotation and job losses due to automation—and by historically low rates of return on financial assets. Moreover, these low DC replacement ratios are prompting countries to institute public minimum guaranteed

FIGURE 2. PUBLIC EXPENDITURES ON HEALTH CARE IN G-20 COUNTRIES AS A PERCENT OF GDP, 2000–2017



Source: OECD (2019).

Note: Public health expenditures include health expenditures through government schemes and social security schemes.

pensions, especially in DC systems that were instituted to avoid government intervention. This transfers a big part of the risk back to the government.

Population aging will also contribute to boosting public spending on health and LTC. Public expenditures on health care vary widely among G-20 countries and have risen in most of them relative to GDP in the last two decades (Figure 2).

The main driver of this growth has been excess cost growth,² which reflects the combined impact of various non-demographic factors. These include an elasticity of demand greater than 1, supply constraints, and the availability of more advanced but costlier modalities of care. The averages of

ECG estimates from a country fixed effects model for advanced economies are 0.8 percent and 1.7 percent, respectively, for the periods 1980–2008 and 1995–2008 (IMF, 2010). OECD (2006) finds ECG to be 1.0 percent for 1980–2005 using a decomposition approach. The Congressional Budget Office (CBO, 2012) calculated 1.6 percent per year from a weighted average of the annual growth rates between 1985 and 2010. But aging has also contributed, as the probability of disease tends to increase with age (or specifically, with individuals' proximity

² Excess cost growth is defined as the excess of growth in real per capita health expenditures over growth in real per capita GDP after controlling for the effect of demographic change.

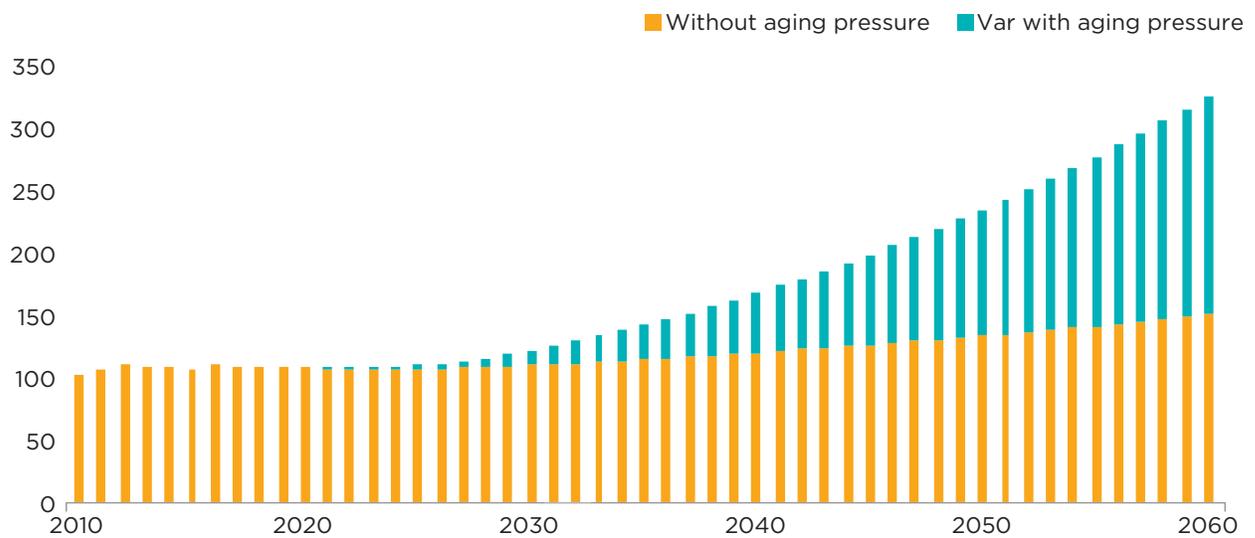
to death), and the epidemiological profile changes with age, toward chronic diseases with higher costs of care.

Long-term care costs (which include both health- and non-health-related costs for individuals unable to attend to their basic tasks) are typically shared between the public and the private sectors, including families, with the public share tending to rise with the country's level of development. The OECD estimates that LTC expenditures by government and mandatory insurance schemes averaged 1.4 percent of GDP for the area in 2017, ranging from 0.2 percent in Russia to 3.4 percent in the Netherlands.

Available long-term projections for public health and LTC spending in G-20 countries suggest that they would rise strongly over the next few decades unless a range of effective measures are taken to curb excess cost growth (de la Maisonneuve and Oliveira Martins, 2013; Lorenzoni, 2019). Specifically, health expenditure as a share of GDP is projected to rise to 10.2 percent of GDP by 2030, from 8.8 percent of GDP on average for OECD countries, and even faster in emerging G-20 countries. The contribution of aging to this increase will vary across countries but will generally remain below that of non-demographic factors. In most emerging

FIGURE 3. PUBLIC DEBT SCENARIOS FOR G-20 COUNTRIES^a AS A PERCENT OF GDP

G20 Advanced



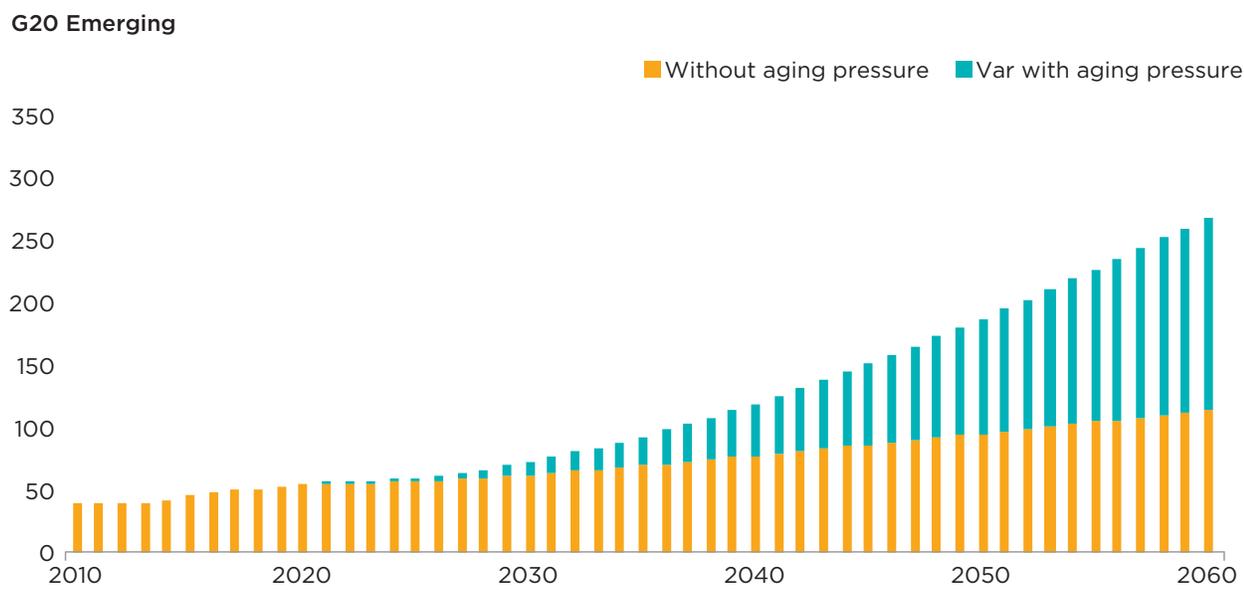
^a The calculations predate the sharp increase in debt levels in 2020 due to the impact of COVID-19. They are based on a simple debt dynamics equation

$$\Delta d_t = \frac{r-g}{1+g} * d_{t-1} - pb_t$$

where d is gross public debt as a percent of GDP, r the real interest rate, g the real growth rate, and pb the primary balance. In the scenario without aging pressures, the cyclically adjusted primary balance as a percent of GDP is held constant at the (then projected) 2020 level. The aging pressure scenario includes pension, health, LTC, and education expenditures projections; other primary expenditures are assumed constant in real per capita terms. Primary revenues are held constant as a percent of GDP. Growth and interest rate projections are based on the OECD Long-Term Model. Aggregates are weighted averages using GDP at market prices.

(continued on next page)

FIGURE 3. PUBLIC DEBT SCENARIOS FOR G-20 COUNTRIES AS A PERCENT OF GDP *(continued)*



Source: OECD (2019).

G-20 countries, a broadening of coverage of public health and LTC systems would raise the fiscal cost of such systems even further.

The likelihood that wage growth, and consequently contributions to pensions and health systems, will lag that of age-related spending in most, if not all, G-20 countries over the next decades points to significant risks for fiscal sustainability in several of those countries, and therefore to the urgency of adequate corrective measures.

In 2019, prior to the COVID-19 pandemic, the OECD published some illustrative debt scenarios for advanced and emerging G-20 countries (Figure 3) which highlighted the sharp upward pressure that population aging is likely to place on public debt levels in the absence of substantial revenue increases and/or expenditure containment measures. The specific nature and scope of such measures would vary significantly across the

G-20 members. Options for some of these countries are discussed in the following subsections.

2. The European Union

Populations in EU member states have been aging for decades, reflecting a decline in fertility rates to well below the 2.1 natural replacement level and increases in life expectancy (2.2 years on average per decade since 1960 for both men and women). Moreover, net migration into the EU has slowed significantly, albeit with year-to-year fluctuations.

Concern about the fiscal implications of these demographic trends prompted the EU to form a technical working group, known as the Aging Working Group (AWG), in the early 2000s under the aegis of the EU's Economic Policy Committee. It includes repre-

representatives of all member states, who oversee the preparation of long-term projections of age-related public expenditures, based on an agreed methodology and common demographic and relevant macroeconomic assumptions. The use of common assumptions facilitates inter-country comparisons but may bias the results for individual countries if differences in the relevant initial conditions are not quickly eliminated during the projection period. The projections are updated and published every three years.

The latest Aging Report, published in 2018, covers the period 2016–2070 (EC, 2018). The main demographic assumptions underlying the baseline age-related expenditure projections can be considered relatively optimistic in light of past trends, as they include increases in the average fertility rate for the EU from 1.58 to 1.81 and in life expectancy of only 1.4 years per decade for men and 1.2 years for women. Under these assumptions, and with net migration projected to continue to decline, the dependency ratio would increase from less than 30 percent in 2016 to over 51 percent in 2070 for the EU as a whole, albeit with significant variation from country to country.

These projected demographic developments are expected to lead to a decline in the labor supply, despite increasing participation rates that partly reflect the impact of already legislated increases in the statutory retirement age and measures to discourage early retirement in many countries of the region. In turn, the decline in labor input will negatively affect average potential GDP growth in the region. This impact is projected to be largely offset by a 0.9 percent average growth of TFP, resulting in broadly stable average

annual GDP growth of around 1.4 percent over the period, with significant variation across countries (ranging from 1 percent in Italy to 2.5 percent in Latvia).

Both the demographic and the macroeconomic baseline assumptions are subjected to a range of sensitivity tests. These show the projected GDP growth rates to be especially sensitive to the assumptions on the fertility rate and TFP. If the projected recovery in the fertility rate and TFP growth do not materialize, the average annual GDP growth rate for the EU will be close to 1 percent, significantly lower than the baseline.

The fiscal impact of population aging is projected separately for each component of age-related spending. The methodologies utilized for these projections are the same for all countries with respect to non-pension expenditures, and the EC staff, in collaboration with the AWG, prepares the projections. For pension expenditures, the national authorities prepare the projections for individual countries using common assumptions but country-specific models that reflect the characteristics of the respective pension systems. These projections are peer-reviewed within the AWG.

a. Pension Expenditures

Pension systems in the EU vary significantly across countries with respect to structure, funding, and main parameters. Most countries have a contributory DB system, with a minimum guaranteed pension that is often means-tested and generally funded by taxes rather than contributions. These systems are typically PAYGO, although some have statutory requirements for partial

pre-funding. Six countries have an NDC system. Some EU countries have also introduced complementary mandatory occupation-related DC systems.

Pension systems also differ across EU countries in various features which affect importantly the impact of population aging on pension expenditures. These include the statutory and average effective retirement ages and the rules for calculation and indexation of benefits.

In 2016 (latest available year), statutory pensionable ages varied across countries, between 62 for men (60 for women) and 67 (for both). They are scheduled to rise in the coming decades as a result of already enacted reforms. By 2030, the lowest will be 64.2 for men (60 for women) and the highest 68.7 for both, with further increases scheduled in subsequent decades. Several countries have adopted provisions for statutory retirement ages to be raised in line with increases in life expectancy.

All EU countries allow for early retirement with reduced pension benefits, although the size of the disincentive varies across countries. As a result, average effective retirement ages are typically below statutory ones. The average effective retirement age in the EU in 2017 was 63.4 years (ranging from 60.9 in Slovenia to 65.9 in Sweden).

Pension systems in the EU also differ with respect to the definition of pensionable earnings, the rate of accrual of pension benefits (which determine the replacement rate of earnings at retirement), and their indexation (EC, 2018). Some countries index pensions to prices, several others to a mix of wages and prices, while a few countries index them to a mix of GDP growth and

prices. Several countries (e.g., Germany, the Netherlands, Spain, and Sweden) have introduced an automatic balancing mechanism whereby pension indexation is linked to the fiscal sustainability of the social security system.^{3,4} Some countries (e.g., Finland) also include an adjustment mechanism linked to life expectancy in the determination of initial pension benefits.⁵

Under the AWG's baseline scenario, public pension expenditures for the EU as a whole are projected to rise by 0.8 percent of GDP between 2016 and 2040 and to decline subsequently by 1 percent of GDP by 2070 to a level slightly below the 2016 level in terms of GDP. This is because the moderating impact of the already enacted reforms of the retirement age and benefit formula is expected to more than offset the positive contribution of demographic developments to the growth of pension expenditures (6.5 percent of GDP through 2070).

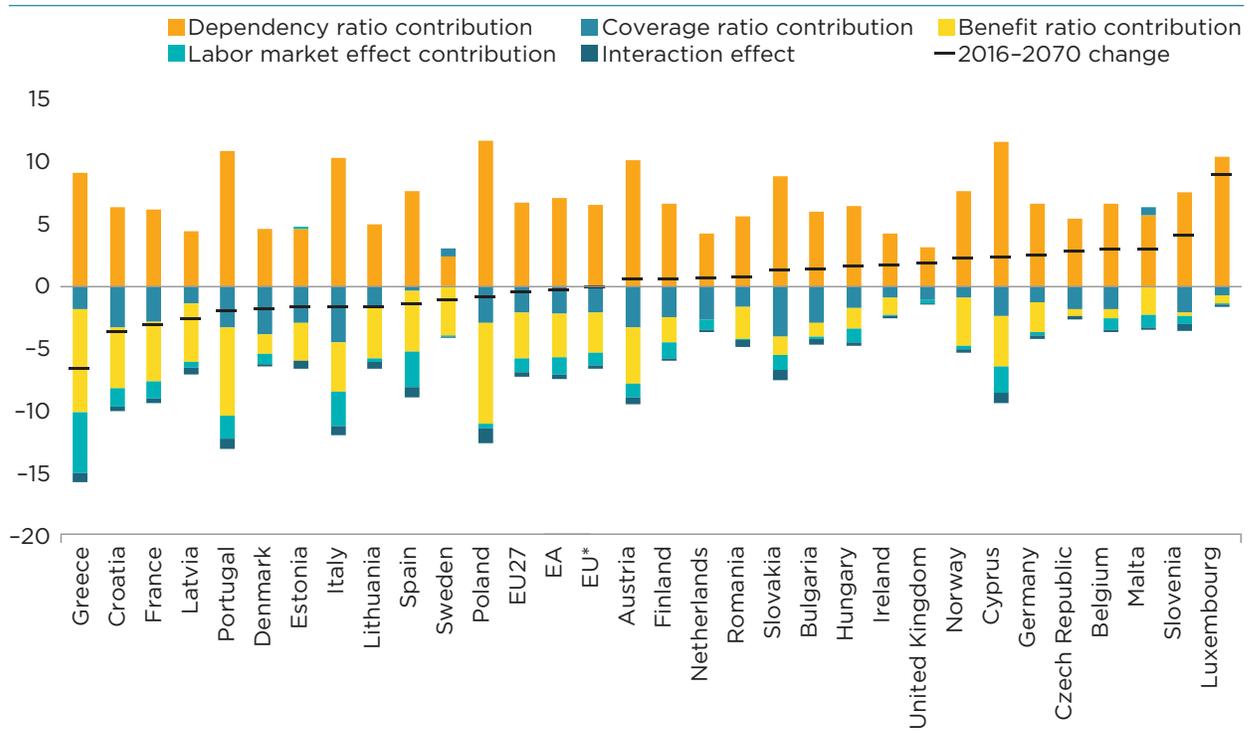
The 2018 Aging Report includes country-by-country estimates of the contributions of changes by the dependency ratio, the coverage ratio (number of pensioners as a per-

³ Details on the specific mechanisms of adjustment in these countries can be found in OECD (2019b).

⁴ However, Spain suspended the automatic mechanism, and in 2018 and 2019 indexed pensions with CPI inflation, increasing them more than with the automatic formula (OECD, 2019b).

⁵ In Finland, since 2010 the initial level (at retirement) of PAYGO earnings-related pensions has been adjusted to consider changes in life expectancy at age 62. The life expectancy coefficient lowers initial pensions by the ratio of average life expectancy at 62 in 2005–2009 to average life expectancy at 62 in the five years prior to retirement. The life expectancy coefficient was 0.957 in 2019 and is projected to be equal to 0.867 in 2064 (the year in which someone entering the labor market now will be allowed to retire). See OECD (2019b) for more information.

FIGURE 4. CONTRIBUTION TO CHANGE IN GROSS PUBLIC PENSION EXPENDITURE, 2016-2070 AS A PERCENT OF GDP



Source: EC (2018).

cent of the population over 65 years of age), the benefit ratio (pension spending per pensioner), and the labor market effect (changes in the employment rate of people aged over 65). The latter three components reflect the impact of past or scheduled reforms of the pension system (Figure 4).

This reassuring picture in terms of fiscal sustainability is subject to the following caveats:

- The variation across countries is substantial, reflecting both the differential impact of demographic changes and the extent of the reforms adopted to date. Projected changes in pension expenditures between 2016 and 2070 range

between a positive 8.9 percent of GDP in Luxembourg and a negative 6.6 percent of GDP in Greece. Eight countries are projected to experience increases exceeding 2 percent of GDP. In contrast, 12 countries would experience declines.

- The picture would be significantly less favorable under less optimistic assumptions. The abovementioned sensitivity tests suggest that lower fertility rates and TFP growth could add several percentage points of GDP to the growth of pension expenditures in some of the countries.
- The political sustainability of the reforms to date is not guaranteed, especially since in several countries they have resulted

in significant reductions in the average benefit ratio (albeit much less so for the minimum benefit ratio). For example, some Eastern European countries have rolled back scheduled increases in the statutory retirement age, and most of them have also abandoned the DC systems introduced in the 1990s and 2000s.

b. Health and Long-term Care Expenditures

Public expenditures on health care in the EU averaged 8 percent of GDP in 2015, with significant variation across countries, ranging from under 3 percent of GDP in Cyprus to 9.6 percent in Sweden. They have been generally rising, despite temporary retrenchments during periods of fiscal consolidation, such as in the late 1990s and during the global and euro area's financial crises, when several countries adopted cost- and demand-containing measures.

Developments in health care spending are the result of both demand- supply-related factors. The age structure of the population is an important determinant since health spending is typically higher in early childhood and in the later years of life. However, the size of the impact of increased life expectancy depends on the extent to which the additional years are spent in good health.

Other important determinants of health care spending are income, technological progress, supply of relevant skills, and institutional arrangements, notably, the respective roles of the public and private sectors in the provision of health care. These are grouped under the label of “excess cost growth” of health spending, namely, growth that cannot

be explained by demographic developments. Available empirical estimates of the income elasticity of health spending are inconclusive.⁶ In contrast, there is strong evidence of the impact of excess cost growth as a whole. This may reflect: (i) technological advances in the medical field that make available more costly equipment and treatment; (ii) shortages of relevant skills that boost the compensation of medical and paramedical personnel; (iii) market imperfections in the provision of drugs; and (iv) inefficiencies in the provision of health services more generally.

Given the range of factors affecting public health spending, the 2018 Aging Report included a range of simulation scenarios that explore the impact of different assumptions regarding some of these factors, specifically, increase in life expectancy, changes in morbidity in later years, income elasticity, and wage developments in the health sector.

The baseline (AWG reference) scenario uses the same baseline demographic projections as those used for pensions; it assumes that half of the future gains in life expectancy are spent in good health, and that the income elasticity of health care spending converges linearly from 1.1 in 2016 to 1 in 2070. The joint impact of those factors is a projected increase in health spending of about 0.9 percent of GDP in the EU as a whole by 2070. Individual countries' results range between 0.3 and 2.7 percent of GDP. The increases would be significantly larger (1.6 percent of GDP on average) if the initial income elas-

⁶ Estimates of income elasticity of health expenditures range from above 1 to under 1. Moreover, these estimates (based on time series or panel data) typically suffer from omitted variables or endogeneity biases. See Clements et al. (2012) for details.

ticity were assumed to be 1.4, a level closer to the empirically estimated average in the region.

The projections incorporate the estimated effects of the reforms undertaken by some of the EU's member states in recent years. Some of these reforms, such as ceilings on the level (Austria) or growth rate (Belgium) of health expenditures, and multi-year budget caps on the same (Italy), have a restraining effect on health spending. Others, such as wage increases for health workers or steps to improve access to health services, mainly in Eastern European countries, boost such spending.

In summary, the projections point to a clear need for further reforms to moderate the demand for, and reduce the cost of, provision of health services in the EU in the coming decades. This need will be particularly acute in Austria, Greece, Malta, Portugal, the United Kingdom, and some Eastern European countries.

Public expenditures on LTC are also growing rapidly in the EU. In 2015, they were equivalent to about 1.2 percent of the area's GDP. Aging affects LTC expenditures to the extent that it increases the share of disabled individuals in the population. The size of its impact thus depends on the extent to which increased life expectancy is accompanied by increased disabilities. Other contributing factors are the shift from informal care by relatives at home to formal care in institutions provided or paid for by the government, and the supply of workers (frequently immigrants) in the LTC field.

The EC's projections of spending on LTC show a fairly wide range of estimates of increases, depending on the assumptions

regarding such factors. The baseline scenario incorporates the same demographic and morbidity assumptions used for the health care projections: a growth of wages in the sector in line with the growth of per capita GDP, and that the share of formal in total LTC would remain constant over the projection period.

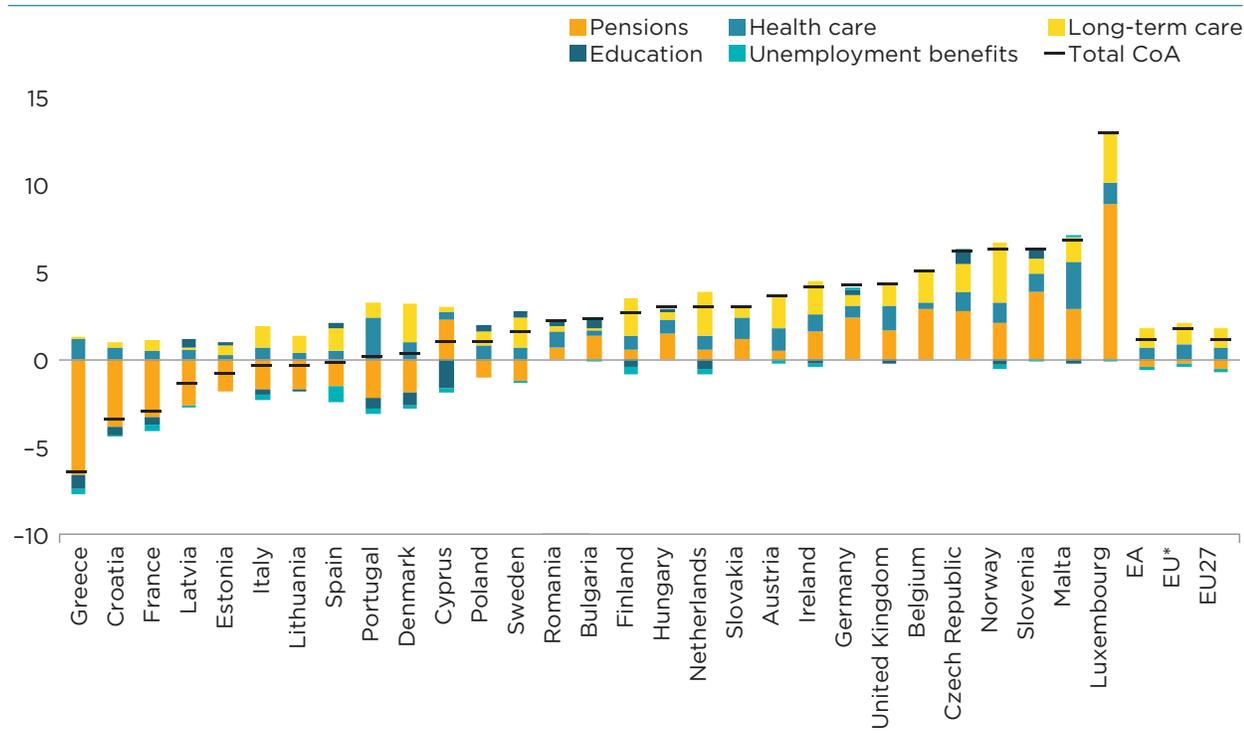
Under these assumptions, spending on LTC would double as a percent of GDP to 2.4 percent for the EU as a whole, but in some countries the increase could exceed 2 percent of GDP. Alternative scenarios based on less favorable assumptions, specifically regarding the expansion of coverage of formal care and the growth of unit costs in countries where they are currently below the EU average (a convergence hypothesis), point to significantly higher potential increases in LTC expenditures over the coming decades (EC, 2018). Thus, addressing the determinants of the rise in LTC spending remains a substantial challenge in most EU member states.

Figure 5 shows the projected change over the period 2016–2070 in aging-related expenditures by component for each EU member state and for the area as a whole.

c. Impact on Fiscal Sustainability

The AWG's projections play an important role in the EU's surveillance framework. This framework aims to identify actual and potential risks to fiscal sustainability in the member states. In its 2018 Fiscal Sustainability Report, the EC defines fiscal (or public debt) sustainability as the ability of a government to service its debt at any point in time (EC, 2019). The EC's criteria for determining such sustainability are the objectives for general

FIGURE 5. PROJECTED CHANGES IN TOTAL AGING-RELATED EXPENDITURE IN THE EUROPEAN UNION, 2016-2070, AS A PERCENT OF GDP



Source: EC (2018).

government balances and debt enshrined in the Stability and Growth Pact (SGP) and its latest implementing regulations (the so-called Two Pact) (EC, 2019). The EC's analysis enables its recommendations or, when appropriate, requests by the EU Council for corrective actions by member states that do not meet the criteria.

The literature distinguishes between two types of fiscal sustainability indicators: (i) baseline projections of the budget balance and debt and (ii) synthetic indicators (Shaw, 2017). The former are unconstrained baseline projections for major fiscal aggregates (primary spending, general balance, debt), considering the current tax system and spending programs, based on given demographic and

macroeconomic assumptions. Synthetic indicators based on the government's inter-temporal budget constraint (e.g., fiscal gaps) are an extension of baseline projections. They measure the size of the increase in tax revenue and/or the reduction in non-interest expenditure required to ensure that the present value of all future primary spending balances equals a specific level of debt. They may be calculated against a specific terminal date and/or an infinite time horizon to illustrate the magnitude of the policy response necessary to maintain a specific level of debt in the future.

The main tools used by the EC for its fiscal surveillance are three synthetic indicators (S0, S1, and S2), and medium-term and long-term debt sustainability analysis (DSA)

scenarios. The S0 is an indicator for short-run fiscal challenges which is a composite of 25 short-term economic, fiscal, and financial indicators and aims to identify risks of a financial crisis occurring in the near term (within one year) in any of the member states. The only country identified at such risk in 2018 was Cyprus, reflecting mainly vulnerabilities in its banking sector.

The medium-term fiscal sustainability indicator S1 shows the additional fiscal effort required (in terms of improvement in the general government's structural primary balance) over five post-forecast years to reach the SGP's 60 percent ceiling on the ratio of general government debt to GDP by 2033. The indicator incorporates the AWG's baseline projections of developments in aging costs over the time horizon of the indicator.

The S2 indicator assesses the long-term fiscal challenges, showing the upfront fiscal adjustment to the government structural primary balance required to fulfill the infinite-horizon inter-temporal budget constraint, so as to stabilize the debt ratio over the infinite horizon. It incorporates the AWG's baseline long-term projections.

Table 2 shows the S1 and S2 indicators for the 28 EU member countries in 2019, identifying the portion of each that is attributable to aging (EC, 2020). For the EU as a whole, the structural primary balance (RSPB) required to reach sustainability in the medium term is 0.9 percent of GDP, of which 0.7 percent of GDP is due to aging. In the long run, the RSPB is significantly larger for most countries, especially due to the aging factor. For the EU as a whole, it is estimated at 2.4 percent of GDP, of which 1.7 percentage points reflect the increase in spending due to aging.

At the individual country level, the S1 indicator varies substantially from -5.3 percent of GDP for Estonia to more than 4 percent of GDP for Belgium and 8.8 percent of GDP for Italy. The S2 indicator points to 15 member states at high or medium fiscal risk in the long term. The upfront adjustment to the RSPB implied by the S2 indicator shown in columns 3 and 4 of Table 2 ranges from -2.1 percent of GDP in Croatia to 8.8 percent of GDP in Romania, and 8.6 percent of GDP in Luxembourg, both above the high-risk threshold. Other countries with fiscal gaps pointing to medium risk are Belgium, the Czech Republic, Finland, Slovakia, Slovenia, and the United Kingdom.

The three indicators are supplemented by DSA baseline and alternative scenarios. The baseline scenario is based on a set of macroeconomic assumptions regarding GDP growth, inflation, interest rate, and the euro's exchange rate and on the assumption that the structural primary balance of the general government (excluding aging costs) would remain at the same level relative to GDP as in the initial year of the projection. The assumption regarding aging costs is their baseline projection in the AWG.

Alternative scenarios include sensitivity analyses of the macroeconomic assumptions and of the aging costs projections (as discussed in the subsections above), and alternative policy assumptions about the behavior of the structural primary balance, including a no-policy changes scenario, one assuming the continuation of historical trends of the balance, and one assuming gradual convergence to the SGP's medium-term objective for the country in question. In addition to these deterministic scenarios, stochastic simulations of the DSA are also prepared.

TABLE 2. FISCAL SUSTAINABILITY S1 AND S2 INDICATORS AND THEIR AGING COMPONENT IN THE EUROPEAN UNION (2019)

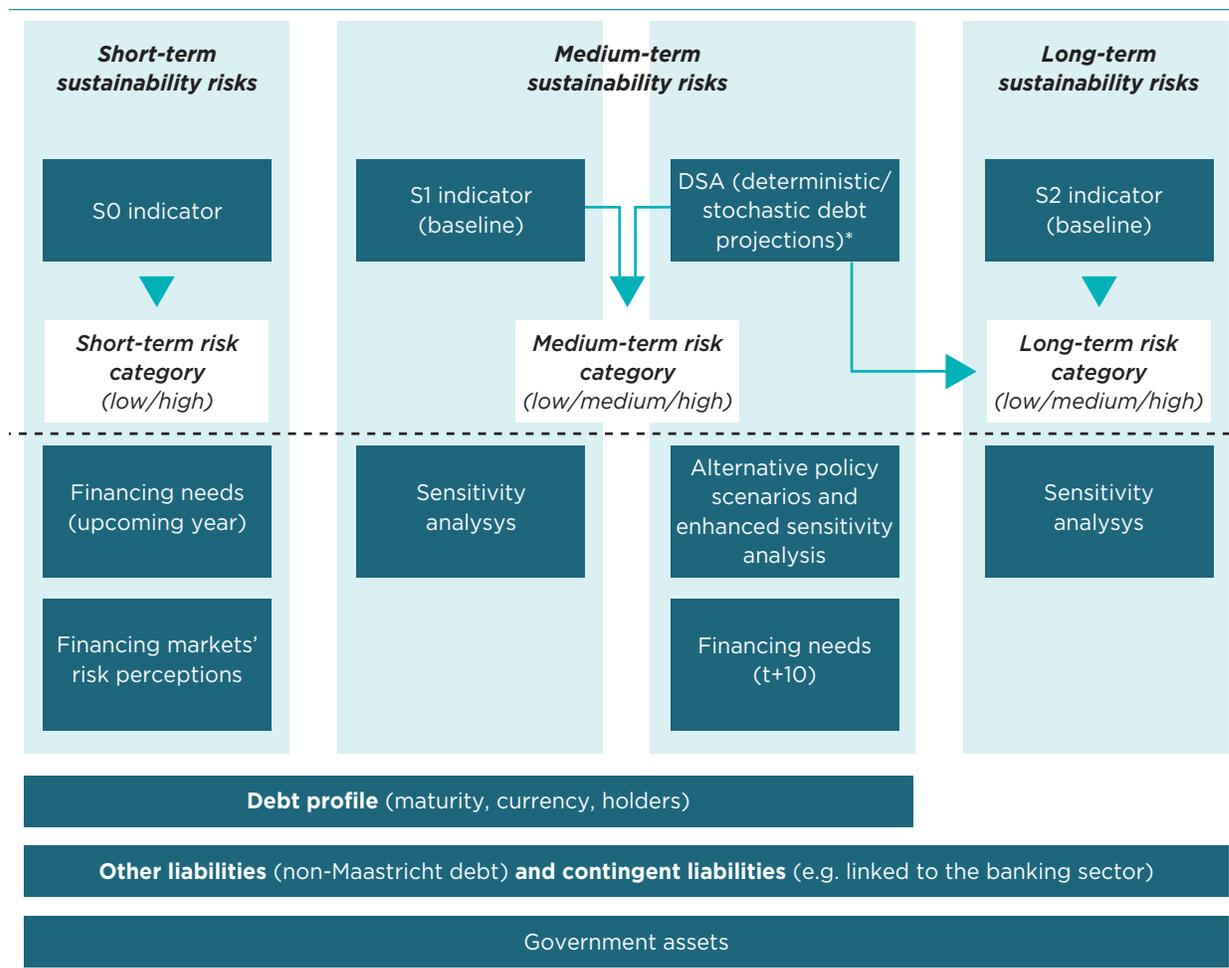
	S1		S2	
	Total required primary balance	Due to aging	Total required primary balance	Due to aging
Belgium	4.1	1.1	4.8	4.0
Bulgaria	-5.4	0.5	1.6	2.4
Czech Republic	-2.9	0.9	4.8	4.8
Denmark	-5.6	0.0	0.4	0.6
Germany	-2.4	1.2	2.2	3.0
Estonia	-5.3	0.0	0.8	0.2
Ireland	-2.6	1.3	2.9	3.9
Spain	3.8	0.3	1.8	0.1
France	3.9	0.4	0.2	-1.9
Croatia	-2.0	-0.2	-2.1	-1.9
Italy	8.8	0.8	2.1	0.6
Cyprus	-2.4	-0.2	-0.7	0.9
Latvia	-3.3	0.3	0.3	-0.3
Lithuania	-2.7	0.7	0.5	0.3
Luxembourg	-5.7	1.1	8.6	9.4
Hungary	-2.7	-0.2	2.7	3.3
Malta	-6.4	0.3	3.0	5.2
Netherlands	-3.2	0.4	2.8	2.8
Austria	-2.3	0.8	2.3	3.2
Poland	-2.2	0.3	1.9	1.2
Portugal	2.3	0.5	-0.3	0.8
Romania	5.7	1.8	8.8	3.7
Slovenia	-1.0	1.4	5.4	5.4
Slovakia	-1.8	0.1	3.8	2.6
Finland	0.5	1.3	3.6	1.9
Sweden	-5.4	0.3	1.2	1.8
United Kingdom	1.9	0.8	4.3	3.3
EU-28	0.9	0.7	2.4	1.7

Source: EC (2020).

The projections are updated, and the methodology has been refined in triennial Fiscal Sustainability Reports. The latest such report (EC, 2019) includes an

expanded analysis of contingent liabilities, as well as an initial assessment of government assets and their mitigating effects on fiscal unsustainability risks. Figure 6 sum-

FIGURE 6. MAIN BUILDING BLOCKS OF THE EU'S FISCAL SUSTAINABILITY ASSESSMENT FRAMEWORK



Source: EC (2019).

Notes: * Baseline no-fiscal policy change scenario, historical primary balance scenario, three stress test scenarios (on growth rate, interest rate, and primary balance) and stochastic projections (2000 shocks simulated).

1. The top panel of the diagram (above the dotted line) presents the core tools used to derive the fiscal sustainability risk classification. The bottom panel of the diagram presents the additional risk/mitigating factors considered in the overall assessment, either specific to the time dimension considered (e.g., additional sensitivity analysis), or of horizontal nature (e.g., contingent liabilities).

2. Financing needs of the current year are one variable entering the S0 indicator.

marizes the EU's fiscal sustainability analysis framework.

The results of the baseline DSA and S indicators are the basis for the construction of a heat map of fiscal sustainability risks for each member state (with countries classified as low, medium, or high risk in each time

dimension). Generally, the indications of the DSA and the S indicators regarding fiscal sustainability converge. In a few instances, they may differ, such as when the initial debt level is especially high but the country has taken significant steps to contain its aging costs over the longer term. Table 3 shows the

TABLE 3. HEAT MAP OF FISCAL SUSTAINABILITY RISKS IN THE EUROPEAN UNION

	Overall short-term risk category	Overall medium-term risk category	S1 indicator - overall risk category	Debt sustainability analysis - overall risk category	S2 indicator - overall risk category	Overall long-term risk category
Belgium	Low	High	High	High	Medium	High
Bulgaria	Low	Low	Low	Low	Low	Low
Czech Republic	Low	Low	Low	Low	Medium	Medium
Denmark	Low	Low	Low	Low	Low	Low
Germany	Low	Low	Low	Low	Medium (Low)	Medium (Low)
Estonia	Low	Low	Low	Low	Low	Low
Ireland	Low	Low	Low	Low	Medium	Medium
Spain	Low	High	High	High	Low (Medium)	Medium (High)
France	Low	High	High	High	Low	Medium
Croatia	Low	Low (Medium)	Low (Medium)	Low (Medium)	Low	Low (Medium)
Italy	Low	High	High	High	Medium	High
Cyprus	Low (High)	Low (Medium)	Low	Low (Medium)	Low	Low (Medium)
Latvia	Low	Low	Low	Low	Low	Low
Lithuania	Low	Low	Low	Low	Low	Low
Luxembourg	Low	Low	Low	Low	High	High
Hungary	Low	Low (High)	Low (Medium)	Low (High)	Medium	Medium (High)
Malta	Low	Low	Low	Low	Medium	Medium
Netherlands	Low	Low	Low	Low	Medium	Medium
Austria	Low	Low	Low	Low	Medium	Medium
Poland	Low	Low	Low	Low	Low (Medium)	Low (Medium)
Portugal	Low	High	Medium (High)	High	Low	Medium
Romania	Low	High (Medium)	High (Medium)	High (Medium)	High (Medium)	High (Medium)
Slovenia	Low	Low (Medium)	Low (Medium)	Low	Medium	Medium
Slovakia	Low	Low	Low	Low	Medium	Medium
Finland	Low	Medium (Low)	Medium (Low)	Medium (Low)	Medium	Medium
Sweden	Low	Low	Low	Low	Low	Low
United Kingdom	Low	High	Medium	High	Medium	High

Source: EC (2020).

heat map included in the European Commission’s 2019 Debt Sustainability Monitor.

Importantly, the results of the sustainability analysis feed into the country-specific fiscal policy recommendations prepared by the

EC each year in the context of the so-called European Semester (namely, the analysis of member states’ budget plans for the following years). In particular, the above mentioned decomposition of the determinants of pro-

jected aging cost developments helps the EC formulate specific recommendations to each member state on actions to contain such costs (EC, 2014). These include country-specific mixes of parametric reforms of pension systems (such as increases in statutory retirement age, tightening requirements for early retirement, and modifications to the calculation of benefit formulas or their indexation), steps to reduce excess cost growth of health spending, and increases in social security contributions or in copayments for health services.

3. The United States

The United States has a two-pillar pension system—a public one, the Social Security system, and a private one that includes occupational and individual retirement accounts, mostly of a defined-contribution nature, funded by voluntary contributions that enjoy preferential tax treatment.

The Social Security system was established in 1935. It includes a major program, the Old-Age and Survivors Insurance Trust Fund, and a smaller one, the Disability Insurance Trust Fund. Both are financed mainly through payroll taxes, which are currently levied at the rate of 12.4 percent (evenly split between employers and employees) on wages below a ceiling, and of 12.9 percent on net earnings of the self-employed.⁷ The system is a DB one, with benefits funded by the Trust Funds on a PAYGO basis. Benefits are also calculated on wages under the ceiling and are adjusted annually in line with a cost-of-living index.

Social Security expenditures are estimated to have amounted to nearly 5 percent of GDP in 2019, having risen by about 0.8 per-

cent of GDP over the last three decades. Population aging has been largely responsible for this increase, only partly offset by a 1983 reform that gradually raised the statutory retirement age (to 67 years by 2025). Contribution rates were also increased progressively to the current rates mentioned above.

In its latest (pre-COVID-19) Long-Term Budget Outlook (CBO, 2019), the Congressional Budget Office (CBO) projects Social Security spending on unchanged legislation to rise further in the coming decades, to 6.4 percent of GDP by mid-century. The CBO also estimates the growth of Social Security taxes to be lower than that of benefits. The resulting deficits would lead to an exhaustion of the combined balances of the OASI and DI Trust Funds by 2032.

Further aging of the population continues to explain such developments, through both a direct impact, that is, the increase in the number of beneficiaries, and an indirect dampening effect on GDP growth. It should be noted that the projections reflect relatively optimistic assumptions of a rise in both fertility rates and net immigration over the coming decades. Both are, however, more than offset by a projected significant increase in life expectancy.⁸ Under these assumptions, the dependency ratio would rise from 16 percent in 2019 to 22 percent by 2049.

The United States is an outlier among OECD countries with respect to total health

⁷ Payroll taxes currently account for 96 percent of Social Security revenues. The remaining 4 percent comes from individual income taxes paid on Social Security benefits.

⁸ The CBO utilizes a suite of demographic, micro, and macroeconomic models for its projections. See CBO (2019) for details.

spending. In 2018, it was close to 17 percent of GDP, nearly five percentage points higher than in the next highest country (Switzerland) and more than double the OECD average. It has risen by nearly three percentage points of GDP since the beginning of the 2000s. However, the United States lags behind some other advanced countries in indicators of population health (OECD, 2019a), pointing to significant inefficiencies in the provision of health care.

About half of all U.S. health spending is privately funded. The public component includes outlays on health programs for retirees (Medicare), the poor (Medicaid), children from low-income households (the Children's Health Insurance Program, or CHIP), and in recent years subsidies for private health insurance purchased through the marketplaces established under the Affordable Care Act (ACA). Even after the enactment of the ACA, a significant portion of the population does not have health insurance coverage. Federal expenditures on health are estimated to have amounted to 5.2 percent of GDP in 2019, compared with 2.1 percent in 1989. They are funded in part by payroll taxes (levied at a combined rate of 2.9 percent).

The growth in health spending in recent decades has been driven not only by population aging, but also more importantly by demand and supply factors, especially advances in costly treatments, subsumed under the excess cost growth heading. A number of reforms, mainly changes in reimbursement norms for services by private providers, proved inadequate to stem the overall growth of health spending.⁹

Based on the same demographic and macroeconomic assumptions as under the pension baseline scenario and on an extrapo-

lation of the historical trend of the excess cost growth, the CBO's 2019 Budget Outlook projects public health expenditures to continue to rise rapidly over the next 30 years, reaching 9 percent of GDP by 2050. From 2020 through 2050, the average rate of excess cost growth in CBO's projections is 1.2 percent for Medicare and 1.5 percent for Medicaid. Excess cost growth accounts for about two-thirds of the increase in spending, measured as a share of GDP, for the major health care programs between 2019 and 2050. This highlights the urgency of further measures to contain the growth of health care costs (including for drugs) and to moderate the demand for public health services in the United States, including through higher co-payments (preferably means-tested) by the recipient of the services.

Overall, the 2019 CBO projections suggest that the share of aging-related spending in total federal non-interest spending will rise further in the absence of adequate corrective actions over the next three decades, from the current 53 percent to 68 percent by 2050. This will substantially erode the fiscal space for other priorities, including spending on education, infrastructure, and R&D, contributing to an escalation of the federal debt to 130 percent of GDP by 2040 and to 180 percent of GDP by mid-century (presumably significantly higher post-COVID-19). The picture would be even more worrisome under less favorable assumptions about demographic and macroeconomic developments.¹⁰ Unfortunately, however, and despite significant academic debate on reform options to

⁹ See Tyson and Karpowicz (2012) for details.

¹⁰ More details about the CBO's projections can be found in CBO (2019; 2020).

correct such trends, there appears to be no political appetite for action.

The CBO methodology also uses a synthetic measure of fiscal sustainability. How much would policies have to change to avoid unsustainable increases in government debt? A useful answer comes from looking at the so-called fiscal gap. The gap represents the extent to which the government would need to immediately and permanently raise tax revenues, cut spending, or undertake some mix of both to make the government debt the same size (relative to the size of the economy) at the end of a given period as prevailed at the beginning of the period. If lawmakers wanted debt in 2049 to match its 2019 level of 78 percent of GDP, they could cut non-interest spending or raise revenues (or do both) in each year beginning in 2020 by amounts totaling 1.8 percent of GDP. The GAO (2020) estimated that, to close the fiscal gap, policymakers would need to reduce program spending, increase revenue, or, more likely, do both. To illustrate this point, the GAO estimates that an immediate 17.3 percent cut in spending, or a 21.2 percent immediate increase in revenues would be required to maintain the debt held by the public as a share of GDP at the end of the 75-year projection period at its fiscal year 2019 level of 79 percent, under a baseline extended simulation (i.e., assuming that current laws continue into the future, including that some current tax provisions expire as scheduled).

4. Japan

Japan is a world leader in population aging, reflecting a low fertility rate, significant increases in life expectancy (the highest among advanced countries), and limited

immigration. The dependency ratio is already close to 40 percent and is projected to rise further to 57 percent in 2030. The aging of the population will undoubtedly make it harder to achieve needed fiscal consolidation in the medium term without timely corrective actions, especially in the health spending area.

The pension system is a defined-benefits PAYGO, with a universal flat-rate component and an occupation-related one, which pays benefits linked to wages. The universal component is 50 percent subsidized by the national budget, with the rest cross-subsidized by contributions (at a rate of over 18 percent of earnings) to the occupation-related component. The eligibility age for the basic pension is 65 years for both men and women. The age for the earnings-related component is scheduled to rise gradually to that level over the next decade. The average replacement rate is a relatively low 50 percent, but it is higher for lower-income groups, given the flat nature of the basic pension. Public expenditures on pensions (old age, survivors, and disability) exceed 12 percent of GDP, well above the OECD average of around 8 percent of GDP.

In 2004, Japan adopted an automatic mechanism to adjust pension benefits over time, with a view to stabilizing pension spending relative to GDP. The mechanism is based on changes in both the number of contributors and life expectancy. The sustainability factor is the sum of two components: a life-expectancy index (currently -0.3%) and the average change in the number of contributors over the past three years (0.1% in 2019). However, this adjustment mechanism is not applied at times of negative inflation. Hence, a catch-up system was introduced in 2018,

which carries over downward benefit revisions in years of negative inflation to later years. In 2019, as both price and wage increased, the macroeconomic indexation was applied, and in addition the unrealized benefit reduction in the previous year was reflected through the carryover mechanism (OECD, 2019b).

Given the already relatively low average replacement rate, it may be preferable to focus further reform efforts on increasing the pensionable age and eliminating (possibly for upper incomes only) the exemption of pensions from the personal income tax.

Health spending is another major source of current and prospective fiscal pressures in Japan. Public health expenditures amounted to about 9 percent of GDP in 2018. They rose at a rapid (nearly 3 percent average annual) rate in real per capita terms in the first decade of the 2000s, before decelerating to a 2 percent rate in the more recent years. The fastest growing component was expenditure on long-term care, which rose at an annual average rate of 4.6 percent in real terms between 2005 and 2015 (OECD, 2017).

Japan fares relatively well in the OECD context with respect to health outcome indicators, but it still suffers from various allocative and technical inefficiencies in the delivery of health care, notably limited primary care facilities and an excessive number of hospital beds and related high use of inpatient care. The funding of the health care system is fragmented and complicated, and the national budget has been involved in frequent gap-filling of deficits of the components (mainly LTC) funded by municipalities, with related moral hazard. Addressing these weaknesses is likely to be key to moderating the fiscal cost of aging over the medium to long term.

5. Australia

Australia has a classic three-pillar pension system, which includes a public component, the Age Pension, which provides a budget-financed, means-tested basic pension; a private, mostly DC-type, component (the occupational superannuation) funded by compulsory employer contributions (currently levied at the rate of 9.5 percent, but scheduled to increase to 12 percent by mid-2025); and a third (also DC) component funded by voluntary individual, and in some cases employer, contributions that enjoy tax preferences.

The public component consists of a flat rate benefit, which tapers off gradually with the levels of income and assets of the recipient and is indexed to the larger of changes in consumer prices or average weekly earnings of male workers. Its amount is typically below the minimum threshold for the individual income tax. The pensionable age is currently over 65 years, and it is scheduled to increase to 67 years by 2024. There is no provision for early retirement under the system.

Superannuation funds have grown rapidly in recent decades, contributing importantly to the development of the Australian capital market. They are now equivalent to over 120 percent of GDP. Their rise reflects a robust growth of wages, a progressive increase in compulsory contributions, and the significant tax incentives provided.¹¹ The budgetary cost of the tax preferences is significant but probably overestimated, since it

¹¹ The tax treatment of pension contributions and benefits is rather complex and has evolved over time. See Clare (2014) for details.

does not consider the reduction in benefits under the Age Pension that, under a means-testing mechanism, result from increased superannuation pensions.

Public expenditures on pensions are relatively low compared to those of other countries (about half of the OECD average in relation to GDP). Specifically, those for old age and survivors amount to around 3 percent of GDP, and those for disability pensions to around 1 percent of GDP. Although they will be adversely affected by aging, they will remain at manageable levels.

The government is required by law to publish, at least every five years, projections of age-related public expenditures. The latest available report, dating back to 2015 (Australian Government, 2015) suggests that, based on present legislation, total pension expenditures would rise by about half a percentage point of GDP by the middle of the century.

The projections assume a stable fertility rate (1.9), an increase in the dependency ratio from the current 22 percent to 37 percent, the continuation of net immigration at around current levels, a labor force participation rate fluctuating narrowly around a stable trend from 2025 onward, and a growth of labor productivity of 1.5 percent a year, in line with its historical average. Under these assumptions, the growth of GDP would slow perceptibly, to an average rate of 2.8 percent a year in the next 40 years, compared with 3.1 percent in prior years. Sensitivity analysis in the report suggests that more pessimistic, but still realistic, assumptions would worsen the projected outcomes but not threaten the long-term sustainability of public finances.

This relatively favorable outlook reflects not only underlying demographic and eco-

nomic trends, but also the fact that the public component of the pension system in Australia is essentially a safety net, intended to complement the superannuation system¹² and to prevent anyone not adequately covered by that system (e. g. self-employed or individuals with large gaps in their contribution history) from falling into poverty in old age.

Superannuation pensions funded by mandatory contributions still provide only relatively low replacement rates (around a third on average) for high earners. Together with tax incentives, this promotes a healthy growth of voluntary contributions. The fact that balances in superannuation funds are likely to continue growing substantially in the coming decades implies that replacement rates can be expected to rise over the medium to long term.

Aging costs in the health care area represent a more significant fiscal challenge for Australia. Total health spending in the country is estimated at 9.3 percent of GDP in 2018 (OECD, 2019a). About 40 percent is funded by the national budget and an additional 27 percent by state and local budgets. Public expenditures on LTC for the aged amount to around 1 percent of GDP. The federal government funds the Medicare and pharmaceutical benefits programs, contributes to the funding of state-run hospitals, subsidizes the purchase of private health insurance through the tax system, and funds medical research.

The 2015 Intergenerational Report projects federal health expenditure to rise by the

¹² The OECD estimates that the public pension provides a relatively low (about 50 percent) replacement rate for workers earning half the average wage, but a zero-replacement rate (due to means testing) for those earning the average wage or more.

equivalent of 1.5 percent of GDP, to 5.7 percent of GDP by the middle of the century, with spending per capita increasing by a cumulative 135 percent in real terms between 2015 and 2055. However, most of the increase would be attributable to non-aging factors, in particular the abovementioned excess cost growth factors operating in other advanced countries as well. Addressing these drivers of health spending remains a key challenge in Australia as in other advanced economies.

6. New Zealand

New Zealand has a well-established record of sound macroeconomic and fiscal performance, underpinned by strong institutions. It has enjoyed several decades of moderate and relatively steady GDP growth, low inflation, broad budget equilibrium over economic cycles, and low public debt (around 20 percent of GDP, net of liquid financial assets, in 2019).

Like most other advanced countries, however, it faces significant long-term aging-related fiscal challenges. Accordingly, its Fiscal Responsibility Act requires the Treasury to prepare and publish a quadrennial Long-term Fiscal Statement, including 40-years forward on-current policy projections for the main fiscal aggregates, including spending on pensions, health and LTC. The latest available such statement was published in November 2016 (New Zealand Treasury, 2016).

With respect to pensions, New Zealand is the only OECD country where public pensions are entirely funded from general revenues¹³ rather than payroll contributions. The New Zealand Superannuation (NZS), a DB, PAYGO¹⁴ system, provides every New Zealand

resident¹⁵ with a flat-rate pension equivalent to 45 percent of the average wage upon reaching the statutory retirement age of 65. Therefore, the system is significantly redistributive, entailing replacement rates that are inversely related to pre-retirement incomes. Pension benefits are indexed to the average wage.

In addition, employees are automatically enrolled (with an opt-out provision) in a saving-for-retirement scheme (the so-called Kiwi Saver, KS) to which they can contribute between 4 and 8 percent of their earnings. Employers can also contribute to this scheme at the same rates. Contributions to the scheme are exempted from taxes. There are also other occupational retirement schemes that predate the creation of the KS, but employers are progressively phasing them out in favor of the KS.

Expenditures under the NZS were equivalent to 4.8 percent of GDP in 2015. The Long-term Fiscal Statement projects that, in the absence of corrective actions, they would rise to 6.3 percent of GDP in 2030, and to nearly 8 percent of GDP by 2060.¹⁶ Possible correc-

¹³ New Zealand's tax burden, at around 32 percent of GDP, is somewhat lower than the 34 percent of GDP OECD average.

¹⁴ There is an NZS Fund, but it is relatively small, and the government has not been contributing to it in recent years, preferring to use operating surpluses to fund public investments and reduce the public debt.

¹⁵ To be eligible, an individual must have lived in New Zealand for at least 10 years since turning 20, with at least 5 years spent in the country after the age of 50.

¹⁶ The assumptions underlying the baseline projections are detailed in Annex II of the Statement. The main ones include a fertility rate of 1.9, a slight increase in average life expectancy at birth to 88 years for men and 90.7 years for women, an increase in net immigration, labor productivity growth of 1.5 percent a year, somewhat below the historical average, and a continued rise in the labor force.

tive actions would include a gradual increase in the retirement age and a shift to indexation to prices. The latter, however, is unlikely to be politically viable, given the strong commitment in New Zealand's highly equity-oriented society to maintain the relative income position of the aged. The 2012 Long-term Fiscal Statement analyzed the option of instituting another DC pillar funded by mandatory contributions (along the Australian model), but no action has been taken so far.

Health and LTC spending have also been on a rising trend in New Zealand, with the public component reaching 8 percent of GDP in 2018, broadly in line with the OECD average. Excess cost growth was responsible for most of the increase. The 2016 Long-term Fiscal Statement projects these expenditures to rise to the equivalent of 9.7 percent of GDP by 2060, on the assumption that the historical trend of excess cost growth would per-

sist during the period. Demographic factors would be responsible for about one quarter of the increase.

Clearly, timely actions to moderate the growth of demand for health services and make their delivery more efficient will be essential to avoid preempting the fiscal space that New Zealand currently enjoys as a result of its strong fiscal performance to date. The 2016 Statement highlights the fact that, in the absence of timely measures to curb the growth of age-related spending and/or to increase the tax burden, the net public debt would rise rapidly in future decades, to levels that could prove eventually unsustainable. However, in contrast to its 2012 version,¹⁷ the 2016 Statement does not discuss in detail corrective policy options in this respect.

¹⁷ See New Zealand Treasury (2012) and Ter-Minassian (2014) for details.

The Fiscal Costs of Aging in Latin America and the Caribbean

3

1. The Institutional Context¹⁸

a. Pension Systems

Pension systems vary widely across the LAC region. Most of the countries have a DB system, or at least one component of the system that is of a DB nature. Bolivia, Chile, the Dominican Republic, El Salvador, and Mexico have switched to a DC system for new entrants in recent decades but are at different points in the transition process for workers who were already in the system when the shift occurred. Colombia, Costa Rica, Panama, Peru, and Uruguay have mixed system. Workers must contribute to both pillars in Costa Rica, Panama, and Uruguay, but have a choice among them in the other countries.

Statutory pensionable ages in LAC are generally lower than the OECD average, and some countries' actual retirement ages are even lower, since their systems allow early retirement under certain conditions (e.g., long history of contributions) and with some reduction in benefits. However, gross replacement rates tend to be higher than the OECD average in DB systems, but lower in DC ones.

Benefits are indexed to inflation in most countries. In some, however, they are indexed

to the average wage, and in a few (Guatemala, Panama, and Peru) they are adjusted periodically at the government's discretion. Contribution rates also vary widely, with those in some Southern Cone countries being higher than the OECD average. Most countries have a number of special regimes (typically for the armed forces, and frequently for members of the legislative and the judiciary, and for the staff of state-owned enterprises). These regimes tend to be significantly more generous than the general one.

The coverage of contributory systems in LAC is low. It is estimated that less than 60 percent of active workers in the region contribute to a pension system, and only about a third of individuals aged 65 and above are entitled to a pension from a contributory scheme. Coverage varies across countries but tends to be lowest in those with lower per-capita incomes (Mexico being an exception in this respect¹⁹). The low coverage mainly reflects the high

¹⁸ For more details on the characteristics of pensions and health systems in the region see Izquierdo, Pessino, and Vuletin, eds. (2018) and Pessino, Panadeiros, and Susmel (2021).

¹⁹ See Levy (2018) for a discussion of the causes and implications of the high degree of labor informality in Mexico.

degree of informality in the labor markets of the region, and the fact that workers move frequently between formal and informal jobs during different phases of the economic cycle, thereby not attaining the number of contributory years needed to qualify for a pension (Izquierdo, Pessino and Vuletin, 2018; Levy and Schady, 2013; Altamirano et al, 2018).

In summary, LAC compares poorly on average with advanced economies with respect to equity in pension systems. The average coverage of its DB systems (less than 60 percent) is well below the nearly universal coverage of such systems in the advanced world. In contrast, replacement rates average nearly 70 percent in LAC, compared with around 50 percent in the OECD area. Thus, LAC countries treat the smaller portion of their population that manages to qualify for a public pension relatively generously, even compared to advanced countries.

The low coverage of contributory pensions has necessitated the introduction in most countries (the exceptions being the Dominican Republic, Honduras, and Nicaragua) of non-contributory pensions, in amounts generally less than the minimum contributory one, frequently means-tested, and obtainable at ages ranging between 54 and 70, depending on the country and the recipient's gender. These pensions are funded from general revenues. Their fiscal cost in 2015 ranged between less than 0.2 percent of GDP (in the Bahamas, Colombia, El Salvador, Guatemala, and Peru) and 3.8 percent of GDP in Argentina (when including the pension moratorium as a noncontributory system) (Lustig and Pessino, 2014).

In addition to financing DB and non-contributory pensions, governments in LAC added a fiscal burden with newly instituted guar-

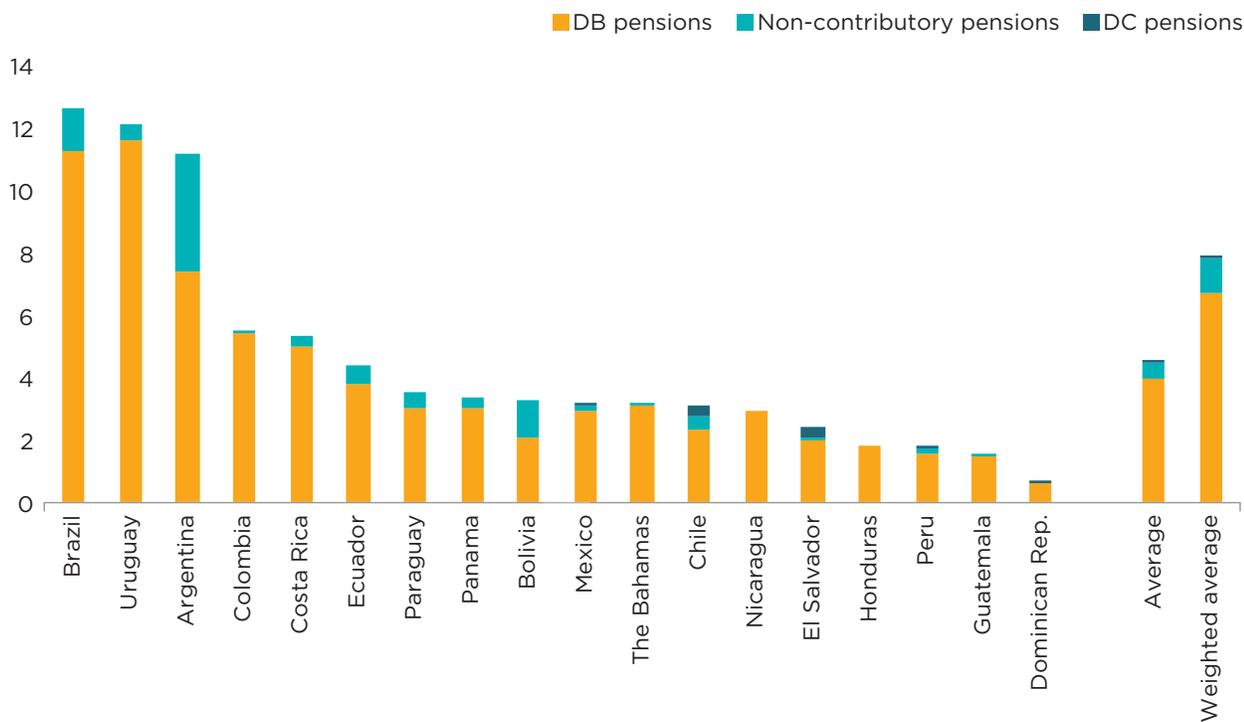
anteed minimum pensions in the DC system. With the low interest rates and returns, most of these guarantees are starting to be triggered, converting part of what were designed to be private liabilities into contingent liabilities for governments (Cont and Pessino, 2021).

Total public expenditures on pensions (including those under DB systems, minimum pension guarantees under DC systems, and noncontributory pensions) averaged around 4.5 percent of GDP in 18 main LAC countries in 2015, ranging between 0.6 percent in the Dominican Republic and 12.6 percent in Brazil (Figure 7). Figure 8 shows their evolution in selected countries in the period 2005–2015, indicating that they rose fastest in Argentina, Brazil, and Costa Rica, while declining or remaining relatively stable in the countries that had shifted to DC regimes.

The significant differences in spending on defined benefits contributory pensions among LAC countries reflect differences in both demographic characteristics and the key features of their pension systems. The countries that spend less tend to also have lower than average old-age dependency ratios, while those that spend more (Argentina and Uruguay) tend to have older populations. These countries (as well as Brazil) also have pension systems with higher coverage ratios than the average. In contrast, Honduras, Paraguay, and Guatemala have especially low coverage ratios (16 percent, 18 percent, and 26 percent, respectively). But some of them have extremely high replacement rates (Honduras, 112 percent; Paraguay, 97 percent; and Ecuador, 92 percent).

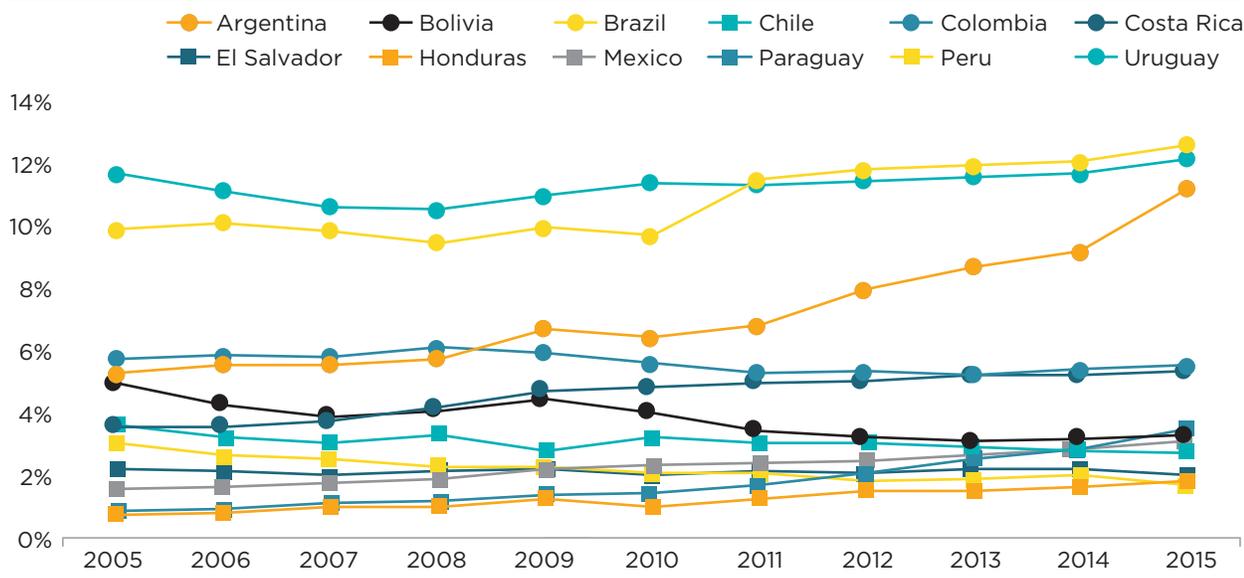
The differences in the levels and evolution of public expenditures on pensions across LAC countries reflect the demo-

FIGURE 7. PUBLIC EXPENDITURES ON PENSIONS IN SELECTED LATIN AMERICAN AND CARIBBEAN COUNTRIES, 2015, AS A PERCENT OF GDP



Source: Pessino, Panadeiros, and Susmel (2021)

FIGURE 8. EVOLUTION OF PUBLIC EXPENDITURES ON PENSIONS IN SELECTED LATIN AMERICAN AND CARIBBEAN COUNTRIES, 2005-2015, AS A PERCENT OF GDP



Source: Pessino, Panadeiros, and Susmel (2021).

graphic profile, the specific features of the pension system, and labor market conditions in each country. The main drivers of pension spending are the dependency ratio, the pension system's coverage, the replacement rate, the inverse of employment, and the share of labor in GDP (Clements et al., 2014). Pessino, Panadeiros, and Susmel (2021)'s estimates of these drivers in 2015 suggest that, in countries with relatively high ratios of pension spending to GDP, high old-age dependency ratios and the pension system's coverage are the main determinants of spending. In contrast, in countries with lower pension expenditure ratios, spending is driven by high replacement rates for the (relatively small number of) formal workers that qualify for coverage.

b. Health Care Systems

Health care systems in LAC are also quite diverse. The public sector plays a comparatively large role in total health provision in Argentina, Costa Rica, and Uruguay (Panadeiros and Pessino, 2018; Pessino, Panadeiros, and Susmel, 2021). Private health plans are relatively more important in Brazil and Chile, while out-of-pocket expenditures cover half or more of total health spending in Guatemala and Paraguay.

The coverage of contributory health care systems also suffers from the prevalence of informality, but all countries have implemented budget-subsidized programs (administered by the Social Security institutions or by the Ministry of Health) to provide basic health care to that part of the population not covered by contributory systems. The access to, and quality of, public health care remains, nevertheless, quite uneven in the region, with the poorer countries in

Central America, Bolivia, and Paraguay well below the region's average.

Public and Social Security health care spending in LAC averaged 4.3 percent of GDP in 2015, lower than in advanced countries and in emerging Europe, but higher than the average for emerging countries. It showed a wide variance across the region, ranging from a low of 1.9 percent of GDP in Guatemala to a high of 7.1 percent in Argentina (Pessino, Panadeiros, and Susmel, 2021). Health outcome indicators are not strongly correlated with spending levels in most countries of the region, suggesting that there is significant scope to improve the targeting and efficiency of health spending in those countries (IMF, 2018; Izquierdo, Pessino, and Vuletin, 2018). Public spending on health has risen by an estimated 1 percentage point of GDP between 2000 and 2015 (Figure 9).

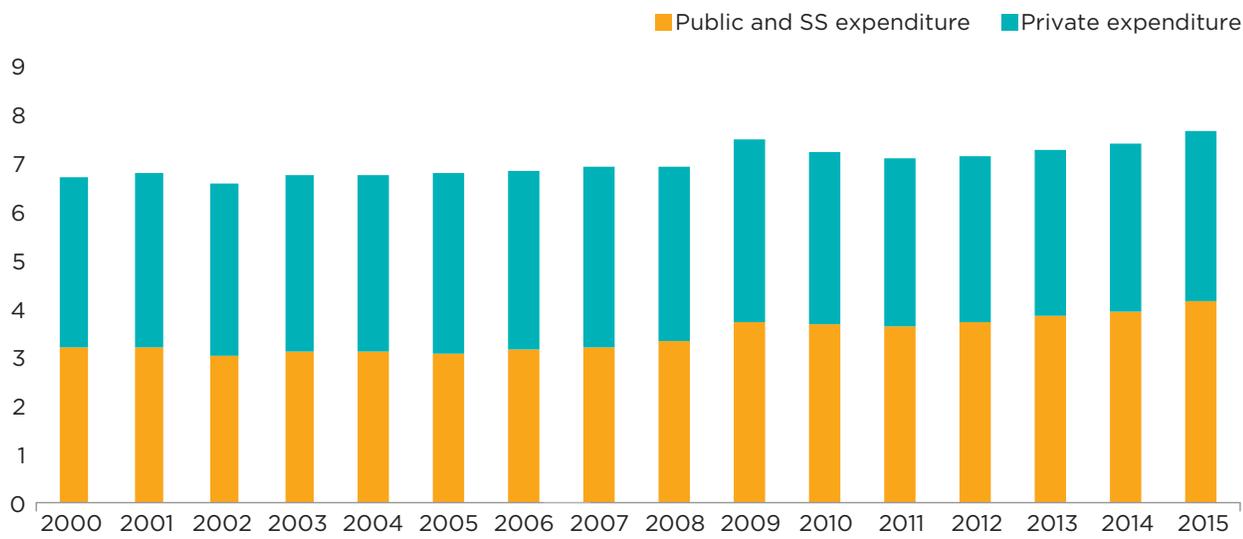
A decomposition of the increase into demographic and non-demographic factors suggests that the latter have played a preponderant role, accounting on average for more than two-thirds of the total. In some countries (notably Brazil, Chile, and Costa Rica), changes in the demographic structure of the population have been responsible for more than 40 percent of the total (Panadeiros and Pessino, 2018).

2. Demographic Trends and Prospects

The demographic dividend is closing rapidly for most LAC countries.²⁰ The demo-

²⁰ See Pessino, Panadeiros, and Susmel (2021) for details on the demographic projections summarized in this section.

FIGURE 9. EVOLUTION OF AVERAGE PUBLIC AND PRIVATE HEALTH SPENDING IN 18 LATIN AMERICAN AND CARIBBEAN COUNTRIES, AS A PERCENT OF GDP



Source: Pessino, Panadeiros, and Susmel (2021).

graphic dividend is closing rapidly for most LAC countries. A country can be said to experience a demographic dividend when the share of its population under 15 years of age is less than 30 percent and the share of those aged 65 and above is less than 15 percent. These conditions maximize the share of the working-age population. The region has experienced a steady fall in fertility rates in recent decades. The number of births per 1,000 inhabitants has declined from around 43 in the early 1950s to around 16 in the second half of the current decade. Mortality rates have also fallen in recent decades. The average life expectancy at birth in LAC has risen from around 51 years in 1950 (compared with 64 years in advanced countries) to 75 years, a level much closer to the advanced economies' average (78 years) in 2020. This reflects the growth of per-capita incomes and improvements in health care over the period.

These combined trends have led to significant changes in the demographic profiles of LAC countries, specifically a fall in the share of the population under 15 years of age and an increase in the share of people 65 and over. There remain, nevertheless important differences in country-by-country demographic profiles. The countries with highest old-age dependency ratios in 2015 were Argentina, Chile, and Uruguay. Those with the lowest ones were Guatemala, Honduras, and Nicaragua.

Population aging in LAC is expected to accelerate in the coming decades. Under the UN's medium-fertility scenario, the fertility rate for the region as a whole is projected to continue to decline, albeit at decelerating rates, throughout the current century. Life expectancy at birth is projected to continue to rise over the same period, to 87 years by 2100. As a result, the LAC region's average old-age dependency ratio is projected

to exceed the advanced countries' average by the end of the century, and the period in which this aging will occur is expected to be much shorter. These projections are subject, of course, to uncertainty, but their trend is quite robust, as evidenced by alternative scenarios under the low- and high-fertility variants of the UN projections.

Country-by-country demographic projections suggest that population aging will progress at different speeds within LAC, reflecting differences in initial conditions and in the evolution of both birth and death rates. As a result, the demographic dividend will dissipate over different time horizons in different countries of the region. Specifically, Uruguay has already exhausted it; Chile, Costa Rica, and The Bahamas are projected to do so within the next 10 years; Brazil and Colombia within 15 years; Argentina within 20 years; and Bolivia, Honduras, Paraguay, and Guatemala after 30 years.

3. Fiscal Implications of Population Aging in Latin America and the Caribbean

As discussed in previous sections, projections of the impact of population aging on public pension and health expenditures reflect both the methodology and the demographic and other assumptions used in the projections. Cross-country projections are generally based on models that, to remain manageable, require a number of simplifying assumptions and therefore cannot take fully into account the specificities of different country pension and health systems.

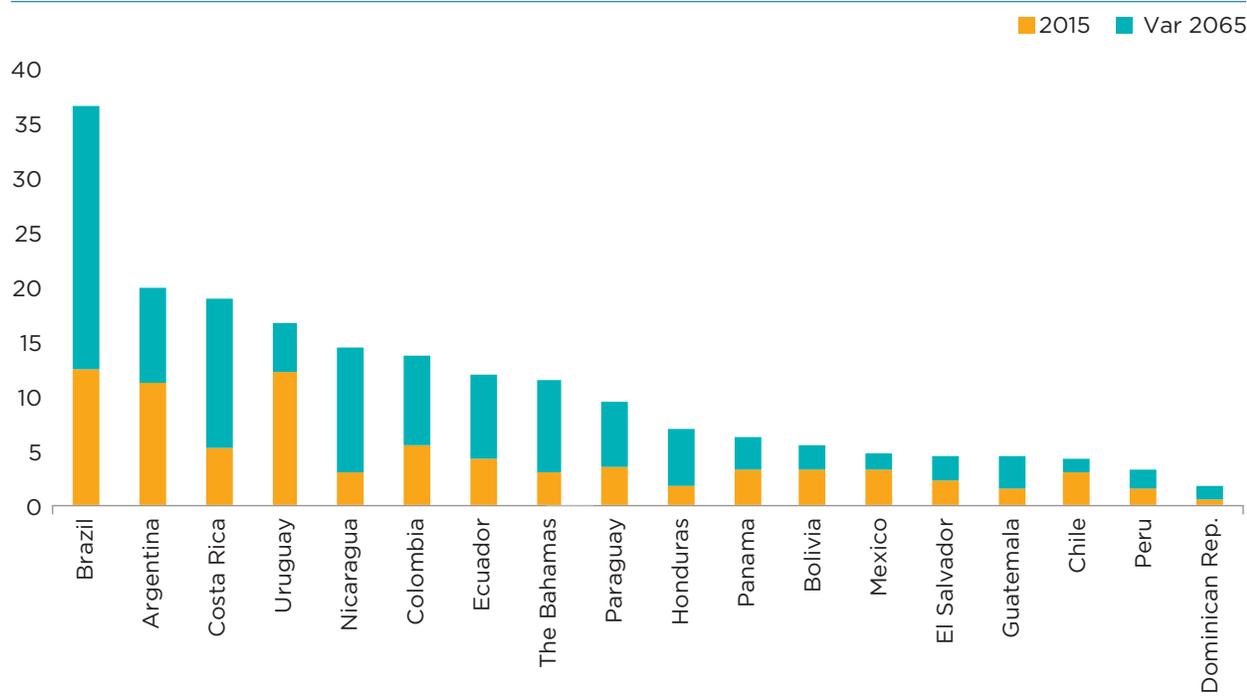
Country-specific analyses are therefore preferable when the purpose of the anal-

ysis is to quantify the impact as accurately as possible, to conduct a range of sensitivity tests, and especially to simulate the effects of alternative reform options. On the other hand, cross-country studies utilizing a common methodology are best for comparative analyses. The results of the projections of pension and health spending prepared by the IDB staff for 18 LAC countries are discussed below. These projections and their underlying methodologies are discussed in detail in Pessino et al. (2021).

In summary, the study projects separately public pension expenditures for DB systems, noncontributory pensions, and minimum pensions for DC and mixed systems. The projections for expenditures under DB systems and noncontributory pensions are based on the formula that decomposes them into the dependency ratio, the coverage ratio, the replacement rate, the inverse of the employment rate, and the share of wages in GDP. This allows simulation of a purely demographic scenario and of alternative scenarios assuming changes in the other determinants of pension spending. Projections for minimum pensions for DC and mixed system pensions utilize household surveys to estimate the probability of individuals in different age cohorts not meeting the requirements for a minimum contributory pension.

The health projections include various scenarios. Some are purely demographic, assuming that per-capita health costs of different age cohorts in terms of GDP per capita remain constant. These scenarios incorporate different assumptions about the portion of the additional years of life expectancy that is lived in good health. Other scenarios incor-

FIGURE 10. PROJECTED RATIOS OF PUBLIC PENSION EXPENDITURES TO GDP IN SELECTED LATIN AMERICAN AND CARIBBEAN COUNTRIES, 2065



Source: Pessino, Panadeiros, and Susmel (2021).

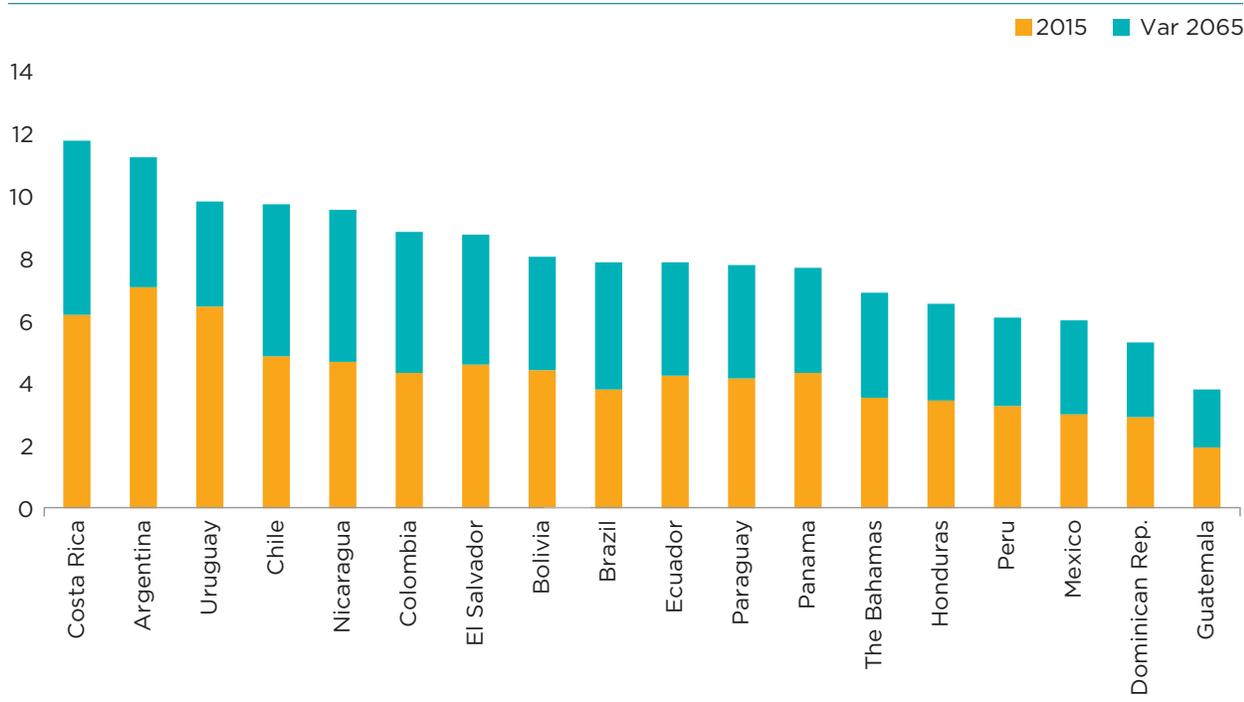
porate different assumptions (common for all the countries) about excess cost growth.

The two studies found that population aging alone (under a medium fertility hypothesis) would add on average nearly 6.5 percentage points of GDP to pension spending between 2015 and 2065 (from 4.5 percent to 10.9 percent of GDP). The increase would be largest in Argentina, Brazil, Costa Rica, and Nicaragua. Pension spending as a percent of GDP at the end of the period would be highest in Argentina, Brazil, Costa Rica, and Uruguay. The Bahamas, Colombia, Ecuador, and Paraguay would also experience substantial increases. The increases would be relatively small in the other Central American countries, the Dominican Republic, Chile, and Peru (Figure 10).

With respect to spending on health care, population aging alone would add 1.5 percent of GDP to it on average in the main LAC countries between 2015 and 2065.²¹ However, the drivers of excess cost growth could further boost such spending by the end of the period to levels difficult to sustain (Figure 11). The increases would be especially large in Chile, Colombia, Costa Rica, and Nicaragua. The increases would be driven less by expansion in coverage, which is now nearly universal in the region, than by improvements in access to and the quality of health care. This highlights the urgent need for reforms of the

²¹ Due to data limitations, the projections of health spending do not include public expenditures on long-term care.

FIGURE 11. PROJECTED RATIOS OF PUBLIC HEALTH EXPENDITURES TO GDP IN SELECTED LATIN AMERICAN AND CARIBBEAN COUNTRIES, 2065



Source: Pessino, Panadeiros, and Susmel (2021).

health systems in LAC that could ensure that such needed improvements remain compatible with long-term fiscal sustainability.

The study also projects contributions to public pension and health systems in LAC. It shows that, under the assumption of a constant share of wages in GDP, the development of the ratio of contributions to GDP depends only on the contribution rates and the degree of labor informality, not on aging.

Putting together the projections summarized above allows a projected total fiscal aging gap to be calculated. This is defined as the net present value of the cumulative change in pension, health, LTC, and education spending net of contributions, relative to GDP, in the sample LAC countries over different time horizons. It is indicative of the fis-

cal upfront effort, in terms of reductions in aging and non-aging-related spending and/or increases in contributions needed to stabilize the public debt owing to aging during the reference period.

Figure 12 shows the projected aging fiscal gaps for the 18 LAC countries over different periods, using a common discount rate of 3.5 percent. It suggests that the fiscal adjustment needs for the 2015–2065 projection are largest (over 5 percent of GDP) in The Bahamas, Brazil, Colombia, Costa Rica, and Nicaragua and smallest (under 2 percent of GDP) in Bolivia, the other Central American countries, the Dominican Republic, and Peru. The 2015–2100 measure is close in definition to the aging component of the EU fiscal sustainability long-term gap S2.

FIGURE 12. FISCAL AGING GAPS IN SELECTED LATIN AMERICAN AND CARIBBEAN COUNTRIES AS A PERCENT OF GDP, 2015–2050, 2050–2065, AND 2065–2100.



Source: Pessino, Panadeiros, and Susmel (2021).

The fiscal aging gap in LAC (6.9 percent for 2015–2100) is four times higher than in the EU (1.7 percent with infinite horizon) (EC, 2019). The shorter-term fiscal aging

gap (until 2050) in LAC (2.3 percent for 2015–2050) is 28 percent, higher than in the United States (1.8 percent for 2019–2050) (CBO, 2019).

Options for Institutional and Policy Reforms to Address the Fiscal Costs of Aging in Latin American and Caribbean Countries

4

1. Strengthening Fiscal Institutions to Promote a Timely Policy Response

a. Assessing the Costs and their Impact on Fiscal Sustainability

Reliable assessments of, and transparency about, the prospective fiscal costs of aging are necessary, albeit not sufficient, conditions to promote timely and appropriate policy measures to contain such costs. Unfortunately, as evidenced by the discussion in previous sections, only some advanced countries (mainly European and Anglo-Saxon ones) systematically prepare and adequately publicize long-term projections of the impact of aging on public expenditures on pensions and health, and ultimately on fiscal sustainability.

Comparative studies of such costs by international institutions fill this gap only partially, because (except for the EC) they tend to be one-off exercises and are based on common methodologies which cannot fully incorporate the institutional specificities of pension and health systems of different countries. Moreover, these projections are not necessarily “owned” by national authorities,

given adequate prominence in the national policy debate, even less incorporated in the annual budget processes, which tend to focus on at most two to three years hence.

Against this backdrop, it would be highly desirable for national fiscal responsibility legislations (or in their absence, organic budget laws) to require the periodic preparation and disclosure by governments of long-term projections of the fiscal cost of aging. Obviously, different countries in LAC are likely to have different capacities to prepare such projections, and the requirements would need to be appropriately modulated accordingly.

Specifically:

- The first step could be the preparation of aggregate baseline long-term (30 to 50 years forward) projections of pension and health expenditures, based on methodologies of the types used in this study and in the other studies discussed in previous sections, with the relevant parameters (dependency, coverage, and employment ratios, and replacement rates for pensions; demographic and other cost drivers for health) set at values that best reflect the institutional

context and the relevant economic data for each country.

- The pension projections should cover not only public expenditures under DB systems, but also those on account of minimum pension guarantees under DC systems, and those under noncontributory systems. This would require assumptions about the development of labor market informality and of average returns on investments for DC pension funds. They should also include subnational pension spending, which is especially high in Argentina and Brazil.
- These projections should be accompanied by a range of sensitivity analyses of the assumptions, to allow for their inherent uncertainty. Over time, such deterministic projections could be complemented by stochastic ones, to allow probabilistic assessments of the projected outcomes.
- If there are adequate data and capacity, aggregate projections could be tested against those generated by micro-simulation models utilizing information from household surveys on relevant socio-economic characteristics of the population (such as age, gender, education, employment status, etc.). A further refinement could involve the use of dynamic general equilibrium models, incorporating behavioral reactions to the demographic trends. However, caution should be exercised not to overload the analysis, risking reduced transparency of the results. Actuarial projections could also be warranted every five years since they are rather expensive, or updated before if there is a major pension or health reform planned.
- The projections should be vetted by independent experts, both with respect to the method of analysis and the underlying assumptions. Fiscal councils, which are increasingly being adopted by LAC countries, could be used for this purpose, provided that they have adequate resources in the form of in-house expertise or for the recruitment of well-qualified outside experts. International institutions with the required technical expertise and resources can also provide support to national authorities in the preparation of the long-term projections.
- The projections should be updated periodically. The frequency of such updates would depend on capacity and resources. Annual updating is unlikely to be necessary, as demographic trends change relatively slowly, but the interval between updates should preferably not exceed three years, especially in relatively volatile economies like those in LAC, where GDP and employment can change significantly over a few years.

To assess the prospective impact of aging on long-term fiscal sustainability, the spending projections would need to be complemented by projections of pension and health contributions and of the resulting deficits of the pension and health systems. These projections should be incorporated into long-term public DSAs, as is currently done by the EC.

There is by now a well-developed technology to conduct DSAs in different types of countries (those with market access and low-income ones), including a range of sensitivity analyses, stress tests, and stochastic fan charts (Borensztein et al., 2013; IMF, 2013a;

2013b; 2017; 2021). Sustainability is generally assessed with respect to the dynamics of gross public debt,²² that is, whether or not it converges to a stationary level. However, the assessment should also include the specification of threshold levels of the debt and gross financing requirements beyond which solvency or liquidity risks can be regarded as too high in the country's circumstances. These long-term DSAs would in a first approximation only focus on the prospective impact of aging on the public debt, in the absence of corrective actions, and assuming constancy of other revenues and non-interest expenditures relative to GDP.

As mentioned in previous sections, the literature has also proposed a number of summary indicators of the impact of aging costs on public finances. These include the above-mentioned S1 and S2 indicators developed by the EC to estimate the fiscal adjustment needed to reduce the public debt to a given ratio to GDP (60 percent for EU countries) by a given year, or to stabilize it over the indefinite horizon, respectively. The S1 indicator is sensitive to the choice of the debt limit and the time horizon of the adjustment. The S2 indicator may underestimate the magnitude of the fiscal adjustment needed if the stabilization of the debt occurs at a higher than prudent level.

The aging components of the S1 and S2 indicators are similar to the fiscal aging gap indicators for LAC countries discussed in the previous section. Another indicator that can be used to highlight the magnitude of the long-term fiscal costs of aging is the net present value (NPV) of projected deficits of the contributory pension, health systems, LTC, and education over the projection period, relative to the base-year GDP. Other

indicators can measure the increase in contributions (or the reductions in expenditures) needed to equilibrate the contributory pension and health systems by a target date, or the increase in taxes and/or the reduction in non-aging-related spending needed to offset the projected pension and health deficits.

b. Promoting a Timely Policy Response

As important as a careful assessment of aging costs is its transparent dissemination to the public. A clear explanation to the public of the unsustainability and intergenerational inequity of current pension and health systems in rapidly aging societies is essential to promote social consensus for corrective measures that require sacrifices, in terms of higher tax/contributions burdens and/or reduced benefits, from one generation for the benefit of another.

For this purpose, it is important that the long-term projections discussed above be credible (a characteristic that requires both analytical rigor and independent vetting) but also that they be communicated to the public at large in a clear, user-friendly, and socially sensitive manner, focusing not only on fiscal sustainability, but also on equity.²³ The message that waiting to address the costs of

²² DSAs focus on the gross debt of the national government, the general government, or the overall public sector, depending on the fiscal framework, and data availability, for the country in question. Data permitting, a broader coverage is to be preferred, especially since disequilibria in the pension systems of subnational governments and/or SOEs are significant and growing in many countries.

²³ The recent pension reform in Brazil, discussed further in section IV.3 below, offers a good example in this respect.

aging makes the eventual inevitable adjustment much more costly needs to be strongly emphasized to the population.

In addition to transparency, there are features of the institutional fiscal framework that can be useful in promoting a timely policy response to the fiscal challenges of aging. The following are potential roles of numerical fiscal rules, fiscal responsibility legislation, and independent fiscal councils.

The inclusion in a country's fiscal framework of a public debt limit can be especially useful. A DSA along the lines discussed in the previous section can highlight the risk of the debt limit (or preferably a lower prudential trigger) being exceeded at some point during the projection period as a result of the aging costs. The legislation underlying the debt rule (or a more general fiscal responsibility law adopted by the country) should stipulate that in such circumstances, the government should be required to present to Parliament a program of corrective actions adequate to ensure the respect of the debt rule. The adequacy should be assessed on the basis of the long-term projections, incorporating the effects of the proposed actions.

A number of LAC countries have also included in their fiscal framework rules setting limits on total or primary public expenditures as a ratio of actual or potential GDP or constraining the real rate of growth of those expenditures. The long-term projections of aging-related spending discussed above can also be used to highlight the risks of prospective breaches of such rules, triggering corrective actions envisaged in the legislation underlying the rules.

A variant of this approach could be a rule constraining the growth of aging-

related spending, which would require the government to introduce adequate corrective reforms of the pension and health systems whenever projections of such spending pointed to a likely non-observance of the rule over the medium to long term. Further variants of this approach would be the inclusion in pension systems of automatic adjustment mechanisms like the pension sustainability factors adopted by countries such as Finland, Germany, Japan, the Netherlands, and Sweden, and the adoption of ceilings on health spending, as in Austria, Belgium, and Italy.

However, expenditure-based rules concentrate the burden of adjustment entirely on the spending side, while in countries with low contribution or tax burdens, there may be scope for a more balanced menu of corrective policies (e.g., including measures to broaden the revenue base or to better exploit less distortive tax handles).

While the level and composition of corrective policy packages are political choices to be left to elected officials in the executive and legislative branches, independent fiscal councils can play a useful role in analyzing the proposed measures in terms of their economic and distributional impact and their adequacy to comply with the existing fiscal rules. These councils need unfettered access to official and other data to carry out these analyses, in addition to adequate technical capacity, to make their role effective.

2. A Brief Overview of Policy Reform Options

Latin American and Caribbean countries vary widely in terms of their demographic structures and prospective development over the

longer term, the characteristics of their pension and health systems and labor markets, and their socio-political contexts. Therefore, policy strategies to mitigate the costs of aging need to be tailored to each country's circumstances. There is no one-size-fits-all prescription. Eventually, however, all the countries will exhaust the window of opportunity of the demographic dividend and their populations will begin rapidly aging. This subsection of the paper sets forth a range of policy options that policymakers could consider when designing their own corrective strategies and discusses some of the tradeoffs that they may face in the process.

The main policy options for LAC countries with a pension system of the DB type (or a mixed one, with a significant structural or phasing-out-DB pillar) are parametric reforms. Since most of them would involve reductions in the generosity of their pension benefits, these countries could also consider introducing a complementary DC pillar. In light of the experiences in LAC and Eastern Europe of reversals of compulsory DC systems, it may be more realistic to rely on voluntary contribution mechanisms supported by tax incentives, such as those used in the United States (401k), Australia, and New Zealand (Kiwi Saver).

Progressive increases in statutory retirement ages are obvious options, especially for countries with retirement ages below 65 for men (generally lower for women, and frequently even lower under special regimes). The statutory retirement age could also usefully be linked to changes in life expectancy, as is done in a number of advanced countries. Consideration should also be given to increasing the penalty for early retirement, except in cases of proven total disability.

In principle, it would be desirable to consider the significant variations in life expectancy across genders and socioeconomic groups.²⁴ However, the feasibility of such an approach hinges on the availability of reliable data on life expectancy. Most countries need to improve their databases in this area. In LAC countries, where the poor tend to have significantly lower than average life expectancies, it would be important to complement increases in retirement age with improved support for the aged poor.

There is a wide range across LAC countries in terms of the coverage and the generosity of their pension systems. In some of them (e.g., Ecuador, Nicaragua, and Paraguay) gross replacement rates for the relatively low share of the elderly who are covered by a formal pension scheme are quite high. This raises serious equity issues, in addition to boosting fiscal costs. Parametric reforms of the period and/or the formula for calculating pension benefits should be considered in those cases.

Reforms of indexation system for pension benefits could also be considered, specifically a shift to indexation to prices rather than average wages, in the countries that have not yet done so. Such a move would be justified because pensioners do not contribute to gains in labor productivity. However, it would worsen their relative position in the economy and in household incomes. Accordingly, consideration could be given to preserving indexation to wages for pen-

²⁴ For instance, Mosquera et al. (2019) found that differences in remaining life expectancy at age 50 between individuals with low and high educational attainment range from 1.6 years in Finland for women to 11.3 years in Estonia for men.

sions below a specified threshold, such as the national poverty level.

Other measures to moderate pension costs could include taxing pension benefits in countries that currently exempt them or tax them at reduced rates and limiting the cumulativeness of pensions. In most countries, there is scope for significant savings by eliminating (at least for new entrants) special regimes which tend to be significantly more generous than the general one.

Finally, some countries with especially low pension contributions (e.g., Ecuador and some Central American countries) could consider gradually increasing them, albeit at some risk of increasing labor informality.²⁵

The recently enacted pension reform in Brazil offers an example of significant parametric changes in a DB system that was becoming unsustainable. The main features of the reform and its prospective savings are discussed in Box 1.

Other LAC countries that have introduced significant parametric pension reforms in recent years include Colombia, Costa Rica, and Ecuador. For example, Colombia and Costa Rica increased the statutory retirement age; Ecuador and Colombia moved to indexation to prices; and Costa Rica increased contribution rates.

LAC countries with DC pension systems also face significant challenges from aging. In these countries, the main problems are low coverage and inadequacy of pensions, which are exacerbated by rising life expectancies and low interest rates that translate into relatively low rates of return for pension funds. These problems are likely to lead to rising fiscal costs in the medium to long term, as public guarantees for minimum pensions

are triggered and social pressures escalate to improve them (Cont and Pessino, 2021). Reform efforts in such countries should focus on increasing the minimum retirement age; improving the governance and efficiency of pension funds; broadening the base of contributions, including through citizens' education campaigns and some fiscal incentives; and raising contribution rates when they are particularly low.²⁶

All LAC countries face a substantial and urgent challenge in curbing the growth of health care costs, while improving access to and the quality of care. As recent works in this area highlight (e.g., Izquierdo, Pessino and Vuletin, 2018), efforts should focus on improving both the allocative and the technical efficiency of public health spending. The specific mix of reform options would depend on the institutional setup of the country's health system and should be informed by

²⁵ While not within scope of this research, informality influences every aspect of fiscal and economic policy in LAC countries. It should be addressed on its own, since it hinders policies such as this. Rather than increasing social security taxes that impact informality, financing pensions through general taxes might be a better option in LAC. Also, informality contaminates the social security system since many workers in LAC navigate between the informal and formal sector, making their total life contribution less than the usual mandatory 30 years. This precludes them from benefiting from the contributory pension scheme or a big portion of it in most countries.

²⁶ At this point, it is important to highlight that the commitment that the Treasury will cover the supplement to achieve at least a minimum pension is undoubtedly the result of establishing mandatory contributions to obtain a pension benefit. This is a contingent liability for the government given the fiscal pressures caused by this arrangement. It would be advisable to reconsider options for DC systems that rely more on tax incentives than mandatory contributions.

BOX 1: THE 2019 PENSION REFORM IN BRAZIL

There has been a long-standing consensus among Brazilian and international experts that the pension system in Brazil before the recent reform was both fiscally unsustainable and inequitable. The system was quite generous by international standards in terms of retirement age and replacement rates.

The pension system for private sector workers (RGPS) and federal civil servants (RPPS) allowed contributors to retire by length of service alone, regardless of age. Workers covered by the RGPS who retired by length of service alone did so on average at less than 55 years of age. Moreover, statutory minimum retirement ages for those workers who retired by age were also relatively low by international standards, especially for women, rural workers, and public sector workers. The average retirement age under the RGPS was around 60 years.

Average replacement rates were also above the OECD average, reaching 100 percent for many workers. Rural and noncontributory social pensions (Benefício de Prestação Continuada, or BPC) were linked to the minimum wage.

As a result, pension expenditures in the RGPS had reached some 8 percent of GDP, while those in the federal and subnational RPPS systems exceeded 4 percent of GDP (higher than in any OECD country). Despite relatively high contribution rates, the combined deficit of the various systems was approaching 4.5 percent of GDP and was projected to rise sharply over the medium to long term.^a

The system was also flawed from an equity standpoint. It was effective in terms of reducing poverty among the aged, but it was highly regressive, as its benefits, including those linked to the minimum wage,^b accrued disproportionately to upper-income groups.^c

Awareness of the severe shortcomings of the pension system has prompted repeated reform efforts in recent decades, mostly of a parametric nature. The exception was the structural 2003 reform that closed access to the RPPS systems for new civil servants, replacing it with a defined-contributions regime (Previdência Complementar). The reform effort was significant and achieved some successes between 1998 and 2003 but did not correct the fundamental weaknesses of the system.

In December 2016, the Temer government proposed a more comprehensive parametric reform, but its approval by Congress was stymied by the political turmoil besetting that government. The Bolsonaro government re-introduced the reform with a number of modifications. It was finally approved with some dilutions in late 2019, and became effective in 2020, with extensive transition provisions^d.

The main features of the reform can be summarized as follows. With respect to the RGPS, the reform eliminates the option of retirement by length of service alone. It raises the minimum statutory retirement age for women by two years (to 62 years) and the minimum contribution period from 15 to 20 years for men. It modifies the base of calculation of pension benefits, to encompass the entire contributive history of the pensioner (as opposed to

(continued on next page)

BOX 1: THE 2019 PENSION REFORM IN BRAZIL *(continued)*

the 80 percent with highest salaries before) and requires 40 years of contributions before reaching a 100 percent replacement rate (subject to an absolute monthly pension ceiling of R\$5839.45, or nearly six minimum wages). It also reduces the cumulateness of pension and survivor benefits.

Minimum pensions continue to be indexed to the minimum wage, while those above the minimum are adjusted annually in line with inflation in the consumer price index. The rules for noncontributory and rural pensions remain largely unchanged. The reform modifies the calculation and the progressivity of the employees' portion of contributions to the RGPS (also subject to a ceiling on taxable wages equivalent to that on pensions).

With respect to the regime for federal civil servants (RPPS), the reform also abolishes the retirement by length of service option and stipulates minimum statutory retirement ages of 65 for men and 62 for women and a minimum contribution period of 25 years, at least 10 of which must be in the public sector. It also modifies the base of calculation of pensions along the same lines as for the RGPS, without the ceiling. Employees' contributions are levied on the entire salary, with a progressive rate schedule ranging from 7.5 percent for minimum wages to 16.79 percent for monthly salaries in excess of R\$39,000 (39 minimum wages).

Members of the armed forces maintain a special regime which allows retirement by length of service alone (raised from 30 to 35 years), a 100 percent replacement rate, and a lower flat contribution rate (increased from 9.5 percent to 10.5 percent of salary).

The reform does not apply to the extremely generous subnational civil servant pension regimes, but Congress is currently considering another proposed constitutional amendment that would require states and municipalities to adopt the provisions of the reformed RPPS. Recent studies by the Ministry of Economy and the Independent Fiscal Institution highlight the urgency of such an extension, given the severity of current, and especially prospective, imbalances in the pension systems of many states and municipalities.⁶

The government estimates that the reform would yield cumulative budgetary savings of nearly R\$1 trillion (equivalent to about 13 percent of 2019 GDP) over the next 10 years, with a rising but unspecified (year-by-year) time profile. Nearly 60 percent of the savings would stem from the changes in the RGPS. Estimates by the Independent Fiscal Institution are somewhat lower, but still envisage savings of over 10 percent of GDP during the same period.

There is little doubt that, even with the dilutions experienced during its approval process, the reform is an important improvement, in terms of both fiscal savings and equity. However, available independent projections, such as those by the IDB staff discussed in the previous section (Pessino, Panadeiros, and Susmel, 2021), suggest that the reform would not be sufficient to ensure compliance with the federal expenditure rule and with long-term debt sustainability.

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BOX 1: THE 2019 PENSION REFORM IN BRAZIL *(continued)*

It would be highly desirable that, as recommended in the text above, the Brazilian authorities begin to prepare and publish long-term fiscal projections, incorporating the year-by-year impact of the pension reform. If these projections still show significant risk that the public debt would rise to ultimately unsustainable levels in the absence of further reforms, their clear communication to the public could help generate social and political consensus for such reforms in the not-too-distant future.

^a See IMF (2018); Izquierdo, Pessino, and Vuletin (2018); and Pessino et al. (2021) for more information.

^b The World Bank estimated that some 70 percent of the BPC accrued to the upper three quintiles of the income distribution. In contrast, only 16 percent of the Bolsa Familia benefits those groups. Izquierdo, Pessino and Vuletin (2018) document the leakages in social programs in Brazil especially coming from the BPC.

^c More than 80 percent of pension subsidies (difference between benefits and contributions) under the RGPS accrued to the three upper quintiles of the income distribution, and only 4 percent of them to the bottom quintile. Per-capita pension benefits were much higher under the RPPS systems than under the RGPS and also accrued to civil servants, who on average enjoy significantly higher incomes than comparable private sector workers.

^d A description of the fairly complex transitions provisions can be found at <https://www.bbc.com/portuguese/brasil-49746324>. The complete text of the Constitutional Amendment enacting the reform can be found at http://www.planalto.gov.br/ccivil_03/Constituicao/Emendas/Emc/emc103.htm#art1.

^e See, for example, Brazilian National Treasury (2019) and Pellegrini (2019) for more information.

a careful analysis of the available empirical evidence on the drivers of the excess cost growth in each country.

In general, the following options should be considered:

- Increasing the share of public health spending devoted to preventive and primary care, especially in underserved rural and urban areas
- Reducing fragmentation through better coordination among different levels of government involved in the provision of health care and among different segments of the health care system through governance reforms and investment in improved information systems
- Setting, monitoring, and enforcing budget caps on hospitals, based on realistic medium-term expenditure forecasts that consider the demographic and epidemiological characteristics of the populations they serve
- Changes in public reimbursement systems for private provision of health care services (e.g., from a fee-for-service-based to a capitation- or caseload-based system)
- Increasing the supply of health care workers, including through improved training and increased responsibility for nurses, while containing wages of public health non-medical workers, which are usually significantly higher than in the private sector in LAC
- Promoting competition among producers of medications and greater use of generic drugs

- Increasing competition among insurers and service providers
- Making more effective use of health-care technologies, by making them more accessible, reducing import tariffs, and promoting health information technology. Technology also holds great promise to make life better for the elderly, assist caregivers, and importantly help prevent expensive healthcare and long-term care costs (Clements, Cody, and Gupta, 2012).

Even if some of these pension and health care reforms are enacted, many countries will still have difficulty fully offsetting the effect of demographics on age-related spending. They will need to enact intertemporal fiscal rules, strengthen their fiscal frameworks, improve their tax systems, and generate efficiencies in public spending programs outside of pensions and health. On the tax side, this could include shifting the burden of taxes from labor to consumption by broadening the base for value-added taxes,²⁷ strengthening taxation of the digital economy, making greater use of energy taxation to account for environmental effects, and strengthening tax compliance. On the expenditure side, coun-

tries should strive to improve the efficiency of public spending while ensuring adequate fiscal support for labor market policies aimed at boosting formalization of the labor force and upgrading human capital.

Finally, all LAC countries should consider enacting fiscal or regulatory policies appropriate to their circumstances, designed to increase labor participation rates, especially for women, older, and part-time workers and promote formalization in labor relations. Although unlikely to produce substantial results in the near term, these efforts would contribute to raising potential GDP growth rates and expand the contributions and tax bases, thereby helping to mitigate the fiscal impact of aging over the long term.

²⁷ In analyzing optimal financing of aging expenditures, McGrattan, Kazuaki Miyachi, and Peralta-Alva (2019) find that a sustained but gradual adjustment of consumption taxes dominates all other policy options such as increasing social security contributions, delaying adjustment, and increased health care copayment rates, by having a smaller adverse effect on long-run GDP and welfare. Financing higher health care costs through increases in labor income tax rates is highly distortive, and results in a 7 percent lower long-run GDP and significantly lower welfare for young workers and future generations.

Conclusions

5

This paper has focused on the fiscal costs of aging both within and outside the LAC region. It has highlighted some of the many different ways in which countries outside the LAC region assess and manage such costs. Some common threads running can be identified.

The seriousness of the fiscal challenge caused by the aging of the population is a function of many factors. The first one is the degree to which the population has aged in a given country. In most advanced economies, the increase in life expectancy and decline in fertility rates have been going on for longer than in developing countries. Some emerging and most low-income countries are projected to continue enjoying a demographic dividend over the medium term, but in others the aging of the population is projected to accelerate rapidly in the years ahead. And this acceleration will be much faster in developing countries than in advanced economies, and it is coming to LAC countries before they are able to assume the cost.

A second important factor is whether a country has already taken steps to address the implications of aging through fiscal and non-fiscal corrective measures. The analysis conducted by the EC in its Sustainabil-

ity Report highlights how parametric and structural pension reforms have significantly moderated the risks to sustainability from pension systems in some EU countries. Outside of the EU, Australia and Japan also offer good examples in this respect.

However, limited progress has been made so far in moderating the excess growth of health care costs, especially of long-term care costs, in most advanced countries. Unless more effective corrective actions are taken in the coming years, the aging of the population will lead to increases in the ratio of health spending to GDP that is likely to pose risks for fiscal sustainability, especially in countries with already weak initial fiscal positions. Emerging countries must reform their health systems to improve coverage, reduce spatial disparities and out-of-pocket costs, reduce technical inefficiencies, and shift resources toward preventive and primary health care.

The choice between different corrective options in the design of pension system largely reflects the relative weight that countries attach to income security for the aged vs. containment of the fiscal cost of pension systems. Countries that prioritize

the former objective typically have opted for DB pension systems, the others for DC ones. However, even countries that primarily rely on DC systems have found it necessary to include a guaranteed minimum pension and a social safety net for the aged in the form of a universal basic pension, means-tested or not.

Depending on the nature of a country's pension system (or pillar, in a multi-pillar system), the focus of reforms has been on changes in the parameters of a DB system (retirement age, formulas for calculation of the initial pension, indexation mechanisms), the rate of contributions for both DB and DC systems, the tax treatment of contributions, and the regulatory regime for retirement savings funds in DC systems.

One positive international trend is increased transparency about the long-term costs of aging, through the requirement in a growing number of countries for the preparation of long-term fiscal projections by the relevant government agencies or independent fiscal institutions. Although transparency has not always led to the adoption of corrective policies (e.g., in the United States and New Zealand), raising public awareness about the unsustainability of current trends is often a precondition for eventual societal acceptance of such policies. Long-term projections can also highlight the eventual inconsistency of present pension and health care policies with existing fiscal rules, potentially facilitating the adoption of corrective measures.

LAC countries also differ widely in the nature, features, and coverage of their pension and health systems. This fact, as well as the differences in their demographic structure and trends, in their labor markets, and

in other relevant economic, fiscal, and socio-political characteristics, implies that the severity of their fiscal challenges resulting from the aging of the population also varies significantly among them, as do their options for corrective policies. The projections discussed in this paper suggest that the countries with the greatest fiscal challenges in the pension area are Argentina, Brazil, and Costa Rica. The 2019 reform in Brazil appears to have moderated, but certainly not eliminated, the risk of fiscal unsustainability of pensions. Several countries in LAC also face significant risks from aging-related health spending trends unless they make rapid progress in addressing the drivers of excess cost growth.

This paper has argued that reliable assessments of and transparency about the prospective fiscal costs of aging are necessary, albeit not sufficient, conditions to promote timely and appropriate policy measures to contain such costs. To date, LAC countries are faring poorly in this regard. Therefore, it would be highly desirable that all countries begin soon to prepare periodic long-term projections of age-related public spending and its impact on fiscal sustainability, under a range of scenarios regarding its main determinants. To promote their credibility, independent experts, such as independent fiscal councils, should vet these projections. It is important that the projections be disclosed to the public in a user-friendly manner, highlighting the costs of inaction in addressing the problems.

To promote a timely policy response to the risks revealed in the projections, the legislation mandating the preparation of the projections should also require the govern-

ment to propose a program of corrective measures. Independent fiscal councils should assess the adequacy of these proposals.

While corrective strategies need to be tailored to individual countries' circumstances, it appears that all LAC countries with DB pension systems (or pillars) could benefit from progressive increases in statutory and effective retirement ages. In countries with low coverage and high replacement rates, changes in the vesting period and in the benefits formulas could help make the system

more sustainable and equitable. Countries with DC system would need to concentrate efforts on expanding coverage, increasing the minimum retirement age, and improving the regulatory regime and governance of pension funds. As discussed in this paper, all countries, but especially those with low coverage of contributory pensions, need to strike an appropriate balance, in setting the level of noncontributory pensions, between minimizing the risk of old-age poverty and avoiding disincentivizing labor formality.

References

- Altamirano, A., S. Berstein, M. Bosch, M. García Huitrón and M. L. Oliveri. 2018. *Presente y futuro de las pensiones en América Latina y el Caribe*. Monografía N° 649. Washington, DC: Inter-American Development Bank.
- Australian Government. 2015. *2015 Intergenerational Report*. Canberra, Australia: The Treasury, Government of Australia.
- Borensztein, E., E. Cavallo, P. Cifuentes, and O. Valencia. 2013. *Integrated Template for Debt Sustainability Analysis: Version 2.0, Instruction Manual, Revised Version*. Washington, DC: Inter-American Development Bank.
- Brazilian National Treasury. 2019. *Boletim de Finanças dos Entes Subnacionais*. Brasília, Brazil: Brazilian National Treasury.
- Clare, R. 2014. *Australian Pensions: An Equitable and Sustainable Arrangement in a Post-Crisis World?*. in Clements et al. 2014. *Equitable and Sustainable Pensions*. Washington, DC: International Monetary Fund.
- Clements, B., Coady, D. and S. Gupta, eds. 2012. *The Economics of Public Health Care Reform in Advanced and Emerging Economies*. Washington, DC: International Monetary Fund.
- Clements, B., F. Eich, and S. Gupta (eds.) 2014. *Equitable and Sustainable Pensions*. Washington, DC: International Monetary Fund.
- CBO (Congressional Budget Office). 2012. *The Long-term Budget Outlook*. Washington, DC: CBO.
- _____. 2019. *The Long-term Budget Outlook*. Washington, DC: CBO
- _____. 2020. *The Budget and Economic Outlook, 2020-2030*. Washington, DC: CBO.
- Cont, W. and C. Pessino. 2021. *Proyección del gasto público en pensiones mínimas en países con sistemas de capitalización*. Washington, DC: Inter-American Development Bank.
- de la Maisonneuve, C., and J. Oliveira Martins. 2013. *Public Spending on Health and Long-term Care: A New Set of Projections*.

- OECD Economic Policy Paper No.06. Paris, France: OECD Publishing.
- EC (European Commission) 2014. "Identifying fiscal sustainability challenges in the areas of pension, health care and long-term care policies" EC Occasional Paper no. 201, Brussels
- _____. 2018. The 2018 Aging Report. Institutional Paper No. 079. Brussels, Belgium: European Commission.
- _____. 2019. Fiscal Sustainability Report 2018. Institutional Paper No. 094. Brussels, Belgium: European Commission.
- _____. 2020. Debt Sustainability Monitor 2019. Institutional Paper No. 120. Brussels, Belgium: European Commission.
- GAO (Government Accountability Office). 2020. The Nation's Fiscal Health: Action is Needed to Address the Federal Government Fiscal Future. Washington, DC: GAO.
- IMF (International Monetary Fund). 2010. Macro-Fiscal Implications of Health Care Reform in Advanced and Emerging Economies. Washington, DC: IMF.
- _____. 2013a. Staff Guidance Note for Public Debt Sustainability Analysis in Market-access Countries. Washington, DC: IMF.
- _____. 2013b. Staff Guidance Note on the Application of the Joint Bank-Fund Debt Sustainability Framework for Low-Income Countries. Washington, DC: IMF.
- _____. 2017. Review of the Debt Sustainability Framework in LICs: Proposed Reforms. Washington, DC: IMF.
- _____. 2018. Growing Pains. Is Latin America Prepared for Population Aging? Western Hemisphere Department Paper 18/05. Washington, DC: IMF.
- _____. 2021. Review of The Debt Sustainability Framework for Market Access Countries. IMF Policy Paper, January. Washington, DC: IMF.
- 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.
- Levy, S. 2018. Under-Rewarded Efforts: The Elusive Quest for Prosperity in Mexico. Washington, DC: Inter-American Development Bank.
- Levy, S., and N. Schady. 2013. Latin America's Social Policy Challenge: Education, Social Insurance, Redistribution. *Journal of Economic Perspectives* 27(2): 193-218.
- Lorenzoni, L., A. Marino, D. Morgan, and C. James. 2019. Health Spending Projections to 2030. OECD Health Working Papers, No. 110. Paris, France: OECD Publishing.
- Lustig, N. and C. Pessino. 2014. Social Spending and Income Redistribution in Argentina during the 2000s: The Increasing Role of Noncontributory Pensions. *Public Finance Review* 42(3): 304-25.
- McGrattan, E., R. Kazuaki Miyachi, and A. Peralta-Alva. 2019. On Financing Retirement, Health Care, and Long-Term Care in Japan. No. 586. Minneapolis, MN: Federal Reserve Bank of Minneapolis.
- New Zealand Treasury. 2012. The Long-Term Fiscal Statement. Wellington, New Zealand: Office of the Auditor-General.
- _____. 2016. The Long-Term Fiscal Statement. Wellington, New Zealand: Office of the Auditor-General.
- Mosquera, I., Y. González-Rábago, U. Martín, and A. Bacigalupe. 2019. Socio-Economic Inequalities in Life Expectancy and Health Expectancy at Age 50 and over in European Countries. Insights for

- the Debate on Pension Policies. *Sozialer-Fortschritt*, 68(4): 255–88.
- OECD (Organisation for Economic Co-operation and Development). 2006. Projecting OECD Health and Long-Term Care Expenditures: What are the Main Drivers? Economic Department Working Paper No. 477. Paris, France: OECD Publishing.
- . 2017. Health at a Glance 2017: OECD Indicators. Paris, France: OECD Publishing.
- . 2019a. Fiscal Challenges and Inclusive Growth in Aging Societies. OECD Economic Paper No. 27. Paris, France: OECD Publishing.
- . 2019b. Pensions at a Glance 2019: OECD and G-20 Indicators. Paris, France: OECD Publishing.
- . 2020). Assessing Chile's Analytical Framework for Long-Term Fiscal Sustainability. Paris, France: OECD Publishing.
- Panadeiros, M. and C. Pessino. Consecuencias Fiscales de Envejecimiento Poblacional: Proyecciones Agregadas del Gasto en Salud para 10 Países de América Latina. IDB Discussion Paper No. 601. Washington, DC: Inter-American Development Bank.
- Pessino, C., Panadeiros, M., and N. Susmel. 2021. Proyecciones Agregadas del Gasto en Envejecimiento Poblacional y su Efecto en la Sostenibilidad de Mediano y Largo Plazo en América Latina. Washington, DC: Inter-American Development Bank.
- Pellegrini, J. 2019. A Situação das Previdências Estaduais. Instituição Fiscal Independente, Estudo Especial No. 9, Brasilia, Brazil.
- Shaw, T. 2017. Long-term Fiscal Sustainability Analysis: Benchmarks for Independent Fiscal Institutions. *OECD Journal on Budgeting* 17/1. Available at <https://dx.doi.org/10.1787/budget-17-5jfb4lcpkhh>.
- Ter-Minassian, T. 2014. External Review of the New Zealand's Treasury Policy Advice.
- Tyson, J., and I. Karpowicz. 2012. Public Health Expenditure Reforms in Canada, Finland, Italy, the Netherlands, Sweden, the United Kingdom, and the United States. In Clements, B., Coady, D. and S. Gupta, eds. 2012. *The Economics of Public Health Care Reform in Advanced and Emerging Economies*. Washington, DC: International Monetary Fund.

