



**United Nations**

Department of  
Economic and  
Social Affairs

# Leaving No One Behind In An Ageing World

World Social  
Report 2023



# DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

WORLD SOCIAL REPORT 2023:  
LEAVING NO ONE BEHIND  
IN AN AGEING WORLD



**United  
Nations**

# CHAPTER 3

## WHAT POPULATION AGEING MEANS FOR ECONOMIES AND INTERGENERATIONAL EQUITY

### KEY MESSAGES

- Changes in population age structure unfold at different times and speeds. The impact of ageing on the economy depends on where countries are in their demographic transition as well as their economic structure and level of social development, including education and human capital formation.
- The young and the old consume, on average, more than they produce through formal labour. Families, markets and governments mediate the reallocation of economic resources from one age group to another to smooth consumption over the life course. An ageing population calls for the continuous adaptation of channels for redistribution.
- Ageing societies may face fiscal challenges due to rising health-care, long-term care, retirement and other old-age support costs, combined with a potential reduction in government revenue from fewer working-age taxpayers. Addressing these issues starts with making ageing integral to economic development and ensuring that older people can use their expertise and skills in ways that benefit them and the broader economy.
- Women's labour force participation rate remains below that of men in every age group, reflecting gender gaps in education and the predominant share of women in unpaid work, among other concerns. Such patterns mean that women generally receive lower pension benefits in most countries. Pension systems need to be transformed to help reduce gender gaps and protect women's income security in old age.
- In all societies, policymakers must support the reconciliation of conflicting work and family demands through effective and equitable social and economic policies.

# FACTS FROM CHAPTER 3

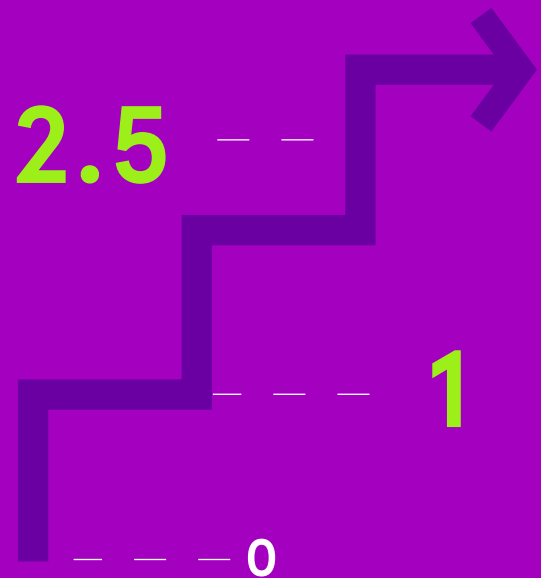
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THE SHIFT IN THE  
AGE STRUCTURE OF A  
POPULATION CAN RESULT  
IN DEMOGRAPHIC  
DIVIDENDS THAT CAN  
CONTRIBUTE BETWEEN

**1 AND 2.5**

**PER CENT**

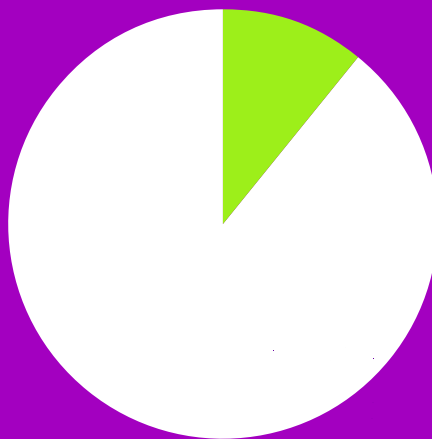
OF ANNUAL GROWTH  
IN GDP PER CAPITA



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**2015**

the life cycle deficit, or  
unmet resource needs of all  
older persons worldwide



was estimated at

**11.5**

**PER CENT**

of the total labour  
income

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As more countries move from high to low fertility and mortality levels, the global population is undergoing major changes in age distribution. This shift is unfolding at different times and speeds across countries and regions, producing ageing at intermediate and advanced stages.

The young (aged 0 to 19) and, in most societies, the old (aged 65 or older) consume, on average, more than they produce through their labour. Most working-age people (aged 20 to 64), by contrast, consume less than they produce through their own labour. Families, markets and governments support this pattern of income and consumption over the life course by mediating the reallocation of economic resources from one age group to another. For older people, intergenerational reallocations can arise from their individual accumulation of wealth, including savings or other financial capital and property or physical capital. Other reallocations come from private transfers, such as between family

members, and public transfers, including through government programmes.

Public systems for intergenerational transfers are based on the prevailing social contract. Children, young people and older persons receive education, health care, pensions and other support from the working-age population, which benefitted from such support from earlier generations when it was young and can expect the same from future generations when it grows old. Older people often continue to contribute to the economy and society through various forms of formal and informal work, including childcare, volunteerism and part-time employment as well as productive investment. Within families, older persons may make net transfers to their children.

In 2015, the life cycle deficit, or unmet resource needs of all older persons worldwide, was estimated at 11.5 per cent of the total labour income of all those who work, irrespective of their age, on average, based on a sample of 119 countries (Mason and Lee, 2018). This deficit, which is larger in high-income than low-income countries, needs to be financed through either public or private transfers.

Countries significantly diverge in how they finance the deficit. Most rely on some combination of public transfers, asset-based reallocations (net asset income or spending down of savings) and private or family transfers. This combination and overall available resources determine the financial impact of ageing on a society and the potential policy responses. In many low- and middle-income countries, older persons depend heavily on asset-based reallocations and to a smaller extent on public transfers. Family transfers play a significant

but comparatively smaller role in many countries. Net private/family transfers to the older population tend to be negative; older persons generally transfer more to their children and grandchildren than what they receive from them.

Rapid population ageing may escalate needs for health care, long-term care and pension expenditures at a time when a growing share of older people may constrict the productive capacity of the economy (IMF, 2019). This can translate into impacts on public finances, requiring mitigation through effective and equitable strategies. Significant population ageing may require reforming economic and social protection structures, public finances, and public and private pension schemes, bearing in mind that the effects of ageing on the economy and public finances are not inevitable. Much depends on policy choices.

## The effects of ageing on the economy and public finances are not inevitable. Much depends on policy choices

How countries measure population ageing is continuously evolving as people live longer and healthier lives. Chronological ageing or the share of people aged 65 years and older has traditionally informed fiscal and social planning as a summary statistic indicating the scale of economic, social security and health needs among older persons. Older people are not a homogeneous group, however. While chronological age is a valuable measure of ageing, it is also important to examine how different

age groups compare in terms of economic productivity, health, functional abilities and/or biological age, as these attributes may more directly capture socioeconomic and health requirements. Current measures of labour force participation similarly do not adequately reflect the significant role that older people play in the informal economy, underlining the need to develop more accurate measures of the economic contribution of older people.

This chapter examines how countries can navigate the economic challenges and opportunities of ageing. This includes assessing key labour market variables, such as the size and composition of the working-age population and the labour force participation rate, given their impact on overall productive capacity. The chapter also considers core strategies to harness the opportunities of ageing and ensure its positive contribution to the economy and society more broadly.

# A.

## AGEING OPENS DOORS AND POSES CHALLENGES

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The multiple economic impacts from population ageing require careful navigation through appropriate policy responses tailored to different stages of demographic transition. Dimensions to consider include demographic dividends, the productive capacity of the economy, consumption patterns, financing consumption and achieving sustainable economic growth.

### 1. TWO DEMOGRAPHIC DIVIDENDS CAN DRIVE GREATER GROWTH

The shift in the age structure of a population can result in two demographic dividends that at their height can contribute between 1 and 2.5 per cent of annual growth in GDP per capita (Mason and others, 2017). A first demographic dividend can take place when declines in both fertility and mortality rates result in an increasing share of the working-age population. Having fewer dependents and more workers frees resources for consumption or investment in accelerated economic and social development. During the first dividend period, the ratio of effective producers to effective consumers in the economy is rising. This period can be quite long, often lasting five decades or more (figure 3.1). But eventually, lower fertility reduces the growth of the labour force even as longer life spans accelerate the growth of the older population. As a result, increases in per capita income start to slow.

The first demographic dividend can have a lasting impact on economic growth if gains in per capita income are used to increase human capital through investment in health and education, to accumulate physical capital, to support technological innovation and to strengthen growth-inducing institutions. Realizing the first demographic dividend also depends on the ability of labour markets to absorb and provide decent jobs for the rapidly growing working-age population.

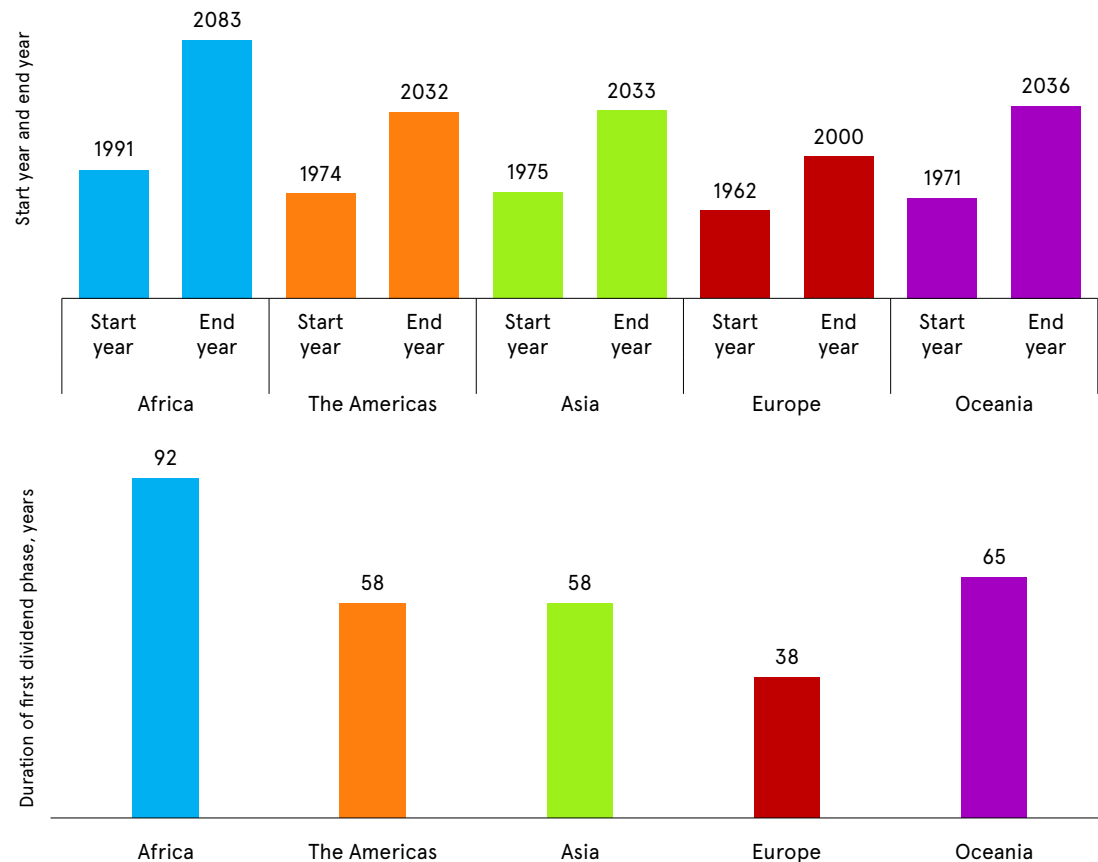
A second dividend may occur later in the demographic transition, driven by the increased capital intensity of the economy and the savings of working-age individuals for retirement. A population concentrated at older working ages and facing an extended period of retirement has a powerful incentive to accumulate assets, unless people are confident that families or governments will provide for their needs. The rise in savings among people at older working ages can support greater human and physical capital accumulation, increased productivity and higher national income, and stimulate further economic growth. Raising the ratio of capital to labour makes labour more productive, a “capital deepening” that drives the second dividend. This period remains as long as savings generated in the economy are invested productively in human, physical and environmental capital.

The timing and duration of the first demographic dividend has varied considerably across regions (figure 3.1). In the Americas, Asia and Oceania, it likely started in the 1970s, with an end predicted in the 2030s. Ageing in Europe started earlier with the first demographic dividend phase estimated to have concluded around 2000. In Africa, the demographic dividend phase likely started in the early 1990s but may last much longer than in other regions, ending only in the early 2080s (Mason and others, 2017).<sup>17</sup>

17 The United Nations Department of Economic and Social Affairs has published the *National Transfer Accounts Manual: Measuring and Analysing the Generational Economy*. This methodology provides a link between population trends and economics. Its foundation is a life course analysis of income and consumption for 60 countries and territories that make up a large part of both the global population and GDP. Participants in the National Transfer Accounts project have extended the estimates and analyses to another 106 countries, bringing the total to 166.

Figure 3.1

Years marking the beginning and end of the demographic dividend (upper panel) and average duration of the first demographic dividend (lower panel), both by region



Source: Mason and others (2017).

## 2. AGEING HAS AN IMPACT ON PRODUCTIVE CAPACITY

The changing size and composition of the working-age population and labour force are key factors in the impact of population ageing on productive capacity. In any economy, productive capacity drives growth and structural economic transformation. Such capacity encompasses the diverse competencies, resources, skills, infrastructure, technological capabilities, institutions and knowledge systems that a country needs to produce and deliver progressively more so-

phisticated goods and services in an efficient and competitive manner (UNCTAD, 2021).

Economic activity varies by the age structure of a population. As it shifts to older ages, the proportion of workers (net producers) first increases and then declines while the share of older persons (net consumers) rises. This compositional change can reduce aggregate economic output unless sufficient increased productivity, brought about by investment in human and physical capital, offsets the effects of a shrinking labour force.



#### A. *SIZE AND COMPOSITION OF THE WORKING-AGE POPULATION*

An expanding working-age population provides opportunities for faster economic growth. It also poses challenges for job creation due to the increasing number of people entering the labour market. By contrast, a shrinking working-age population can slow economic growth, reduce competitiveness and increase the old-age dependency ratio. If a society is to maintain or raise its standard of living, the working-age population must produce enough to provide for its own material needs while funding public and private transfers to children and older persons and saving for retirement.

In numbers, the global working-age population is expected to grow from 4.5 billion people in 2021 to 5.4 billion in 2050. As a share of the global population, however, it is projected to decline from 57 to 56 per cent. This relatively modest aggregate change averages out greater shifts in some regions, particularly Africa, with a projected doubling in the number of working-age people from 639 million in 2021 to 1.3 billion in 2050.

The working-age population is also growing older, which may further reduce productive capacity, especially in countries relying heavily on manual labour. The number of older working-age people (55 to 64 years) is projected to increase from 723 million in 2021 to 1,075 million in 2050 and to 1,218 million by 2100. Africa is expected to account for two thirds of the projected global increase in older workers from now

until the end of the century. The number of older workers in Africa is projected to rise from 63 million in 2021 (9 per cent of the world population aged 55 to 64) to 160 million in 2050 (15 per cent) and 432 million in 2100 (35 per cent).

#### B. *SIZE OF THE LABOUR FORCE*

A decline in the working-age population can affect aggregate output and income in an economy unless it is countered by higher labour force participation rates. The labour force participation rate, as defined by the International Labour Organization (ILO), is the percentage of the working-age population 16 years or older that is employed or actively looking for work.<sup>18</sup> It does not include those employed in the informal sector, however. The global labour force participation rate in 2019 was 60.7 per cent: 74 per cent for men and 47 per cent for women (ILO, 2020).

The labour force participation rate generally declines with age, which reduces per capita and even aggregate output and income. Since 1990, the global labour force participation rate has trended downward partly due to the ageing of the working-age population, a direction projected to continue until at least 2030 (ILO, 2018a). This should be of concern especially in regions where the working-age population is shrinking, for reasons that include the higher price of labour expected with a declining labour force. Further, in developing countries, where most older persons work informally in agriculture, a structural economic transformation resulting in a shift

<sup>18</sup> The United Nations Population Division defines the working-age population as individuals aged 20 to 64 years. The ILO defines the labour force participation rate, however, as the percentage of the working-age population that is 16 years or older that is employed or actively looking for work. This means that the two indicators are not fully comparable.

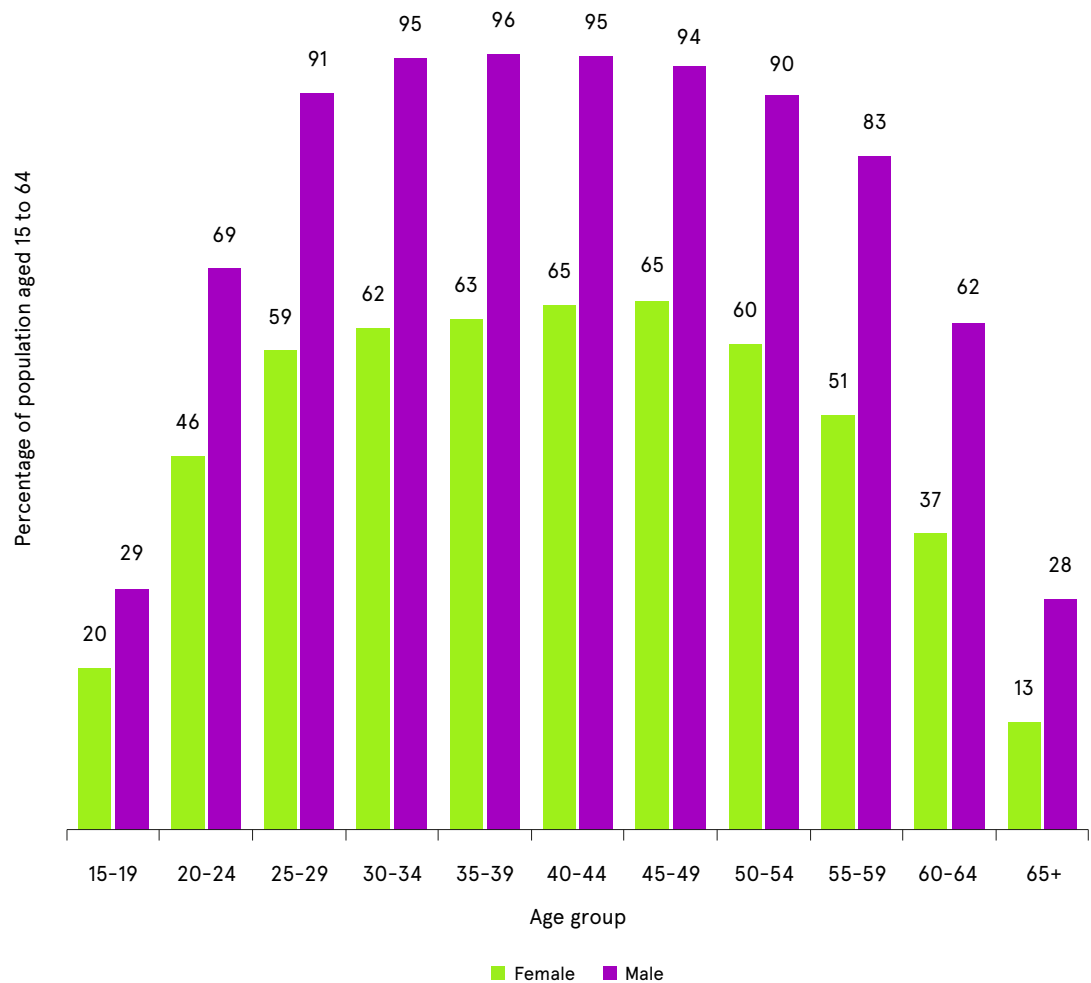
of employment away from this sector has caused many to lose their jobs. Changes in Asia, which accounts for over half the world’s population, have driven the declining global labour force participation rate.

The global labour force participation rates of men and women diverge by some 30 percentage points, on average, for persons aged 20 to 64 (figure 3.2). While the global labour force participation rate of women aged 30 to 54 is 60 per cent or higher,

it is 51 per cent for those aged 55 to 59. This may reflect an earlier retirement age for women in some countries and other factors such as greater expectations that women will care for older family members. Many gender-based patterns and norms constrain the ability of women to participate in the formal labour force. A large proportion of the work that women do is informal and/or unremunerated care work that goes unrecognized by current labour measures.

Figure 3.2

Global labour force participation rate by age and sex, 2019



Source: Calculations based on ILO (2020).

Several factors underlie declining labour force participation among older workers over time: poor working conditions, ill health, low job satisfaction, labour market rigidities and the overall ageing of the working-age population. In addition, the institutional arrangements of pensions systems may reduce incentives for older workers to remain on the job. In many developed countries, for example, some workers choose to retire early, prior to the official or statutory retirement age (usually at age 65, although increasingly at older ages). For them, generous early pension benefits make the choice of work over leisure unattractive. Cultural norms and discrimination against older workers, including when it comes to recruitment, retention and retraining, may also help explain early retirement in some countries.

### **While encouraging older persons to work longer is important, there should always be an option to retire and live with basic income security above a certain age**

Worldwide, an estimated three out of four older people work in the informal sector, which is not reflected in the global labour force participation rate. In 2019, Asia's labour force participation rate was the lowest of all regions (figure 3.3), partly reflecting sizeable informal sector employment. The labour force participation rate noticeably declines with increasing age in all regions after people reach age 55, although less so in Africa. Africa also stands out in terms of the proportion of people older than 65 remaining in the labour force,

at 40 per cent. The same ratio in Europe and Latin America and the Caribbean is 8 per cent and 9 per cent, respectively. Africa's high ratio is likely due to the lack of adequate retirement benefits, which gives older persons no choice but to continue working. While it is important from an economic perspective to incentivize older people to work longer in ageing societies, there should always be an option to retire and live with basic income security above a certain age.

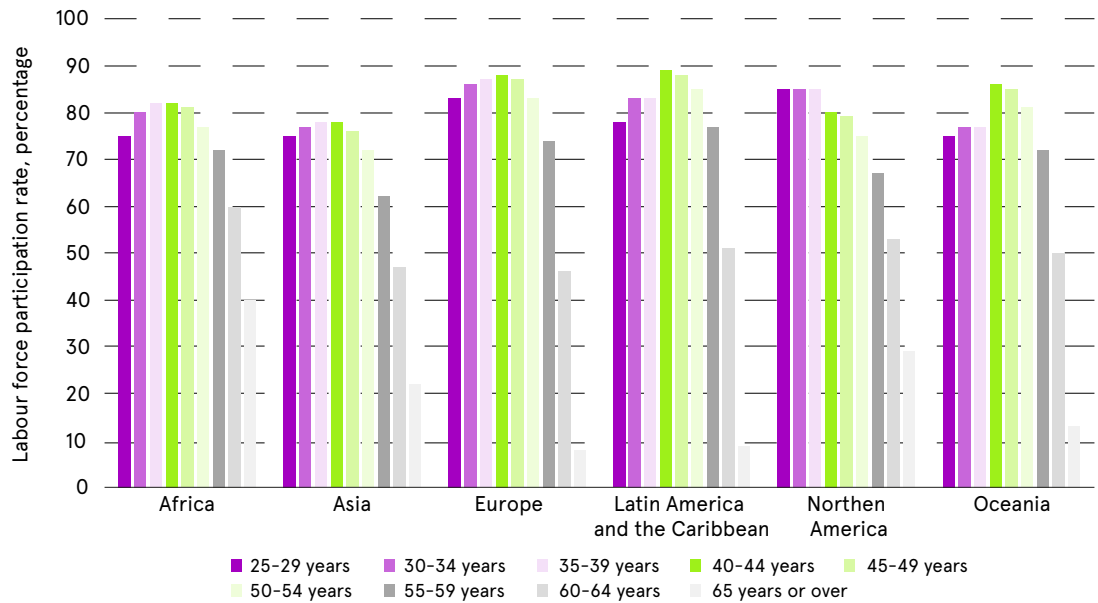
### **3. AS PEOPLE GROW OLDER, CONSUMPTION PATTERNS CHANGE**

As income, needs and preferences change over the course of life, so do consumption behaviour and the marginal propensity to consume. This has implications for the composition and level of consumption in society.

Consumption patterns at older ages display some distinctive differences across countries (figure 3.4). One is the tendency in developed economies for consumption to increase sharply after people reach age 80. In some high-income countries, consumption at older ages exceeds that of younger adults by 30 per cent or more. This is due mainly to a large jump in the use of health care. Countries with more generous public transfer and welfare systems, such as Sweden, generally have higher consumption levels later in life compared to other developed countries such as Australia and Canada, where such systems are less extensive. In low- and middle-income countries, consumption remains relatively constant across all adult ages.

Figure 3.3

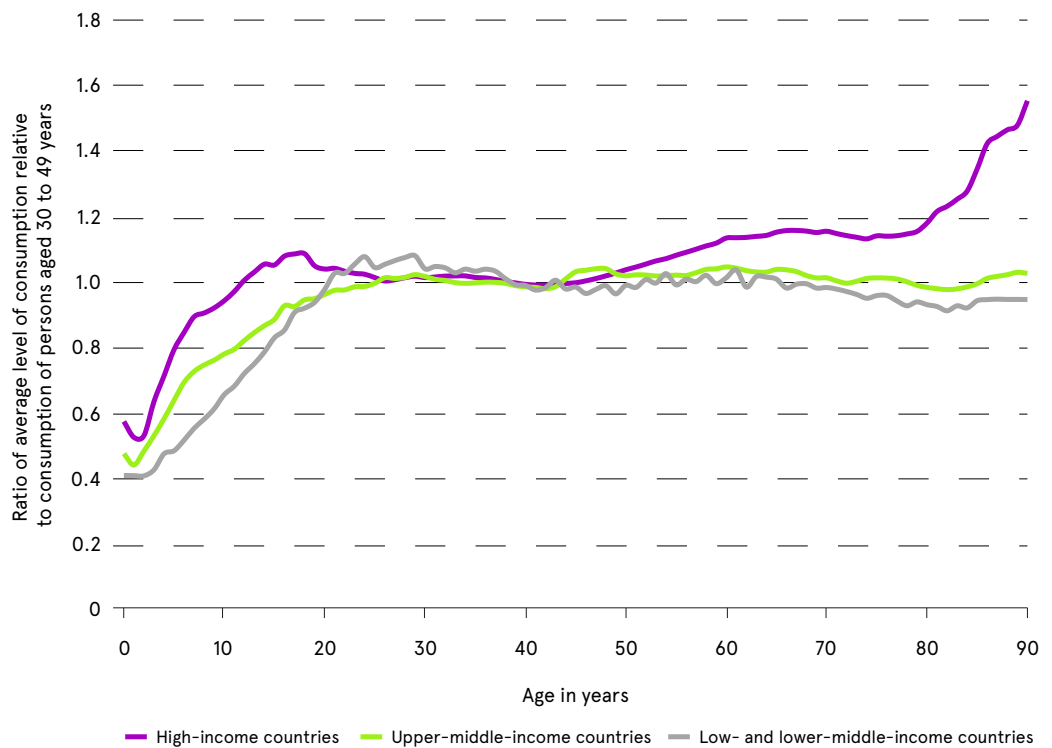
Labour force participation rate by region and age group (in years), 2019



Source: Calculations based on ILO (2020).

Figure 3.4

Per capita consumption by age relative to the consumption level among those aged 30 to 49, latest year available, 2005–2016



Source: National Transfer Accounts database. Available at <https://ntaccounts.org> (accessed on 4 April 2022).

Among the many drivers of consumption patterns, ageing is probably less important than factors such as income or education. At the same time, different age groups vary in how they consume. Evidence from the European Union suggests that older persons spend more on services, housing and health care than younger cohorts, and less on transport (figure 3.5).

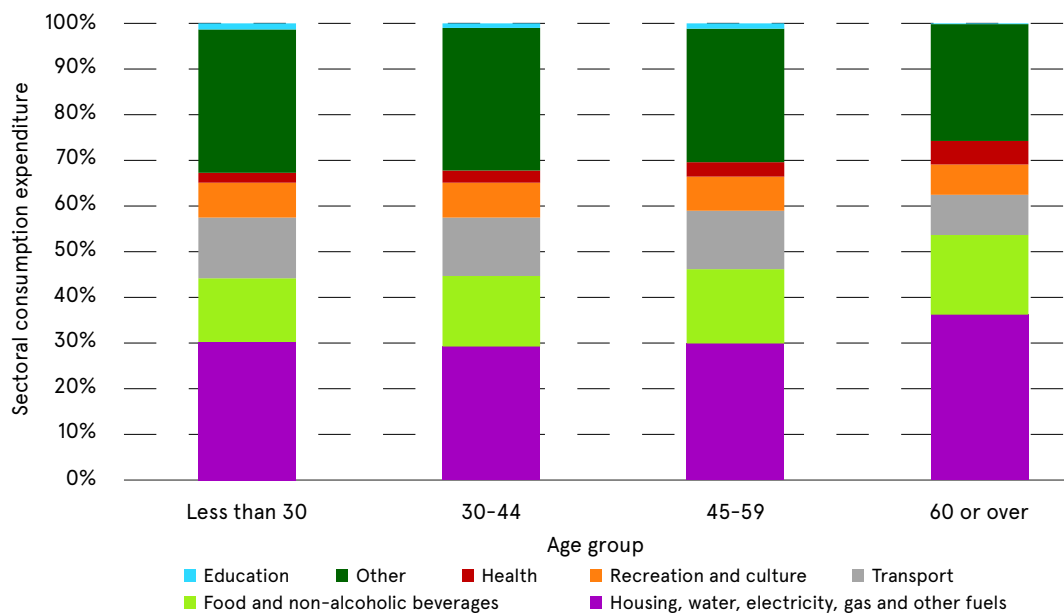
In the United States, older households, where the household reference person is above age 65, spend a larger share of income on housing, utilities and fuel, household operations, housekeeping supplies and health care compared to working-age people. They spend significantly less on alcoholic beverages, apparel and services, tobacco and smoking supplies, and insurance and pensions. A study from Germany found that age influences the amount that individuals spend for different purposes, implying that “during the lifecycle, a pri-

vate household adapts its consumption behaviour to the actual habits and needs as well as the income situation” (Stoever, 2012, p. 3). Data on consumption patterns in China show two consistently high-value expenditure categories in older households compared to younger ones: health care and housing. For older households in the lowest income quintile, food consumption is significantly lower than in younger households (Khan, 2022).

Age structure and consumption patterns have implications for inflation in coming decades (Juselius and Takats, 2016) but the burden of rising prices may not be equitably shared across age groups. For example, between 2014 and 2017, inflation for online goods was at least 1 full percentage point lower every year than inflation for equivalent goods in the overall consumer price index (Goolsbee and Klenow, 2018). Should this tendency continue to hold, older per-

Figure 3.5

Structure of consumption expenditure by age, European Union countries, 2015



Source: Eurostat. Available at <https://ec.europa.eu/eurostat/data/database>.

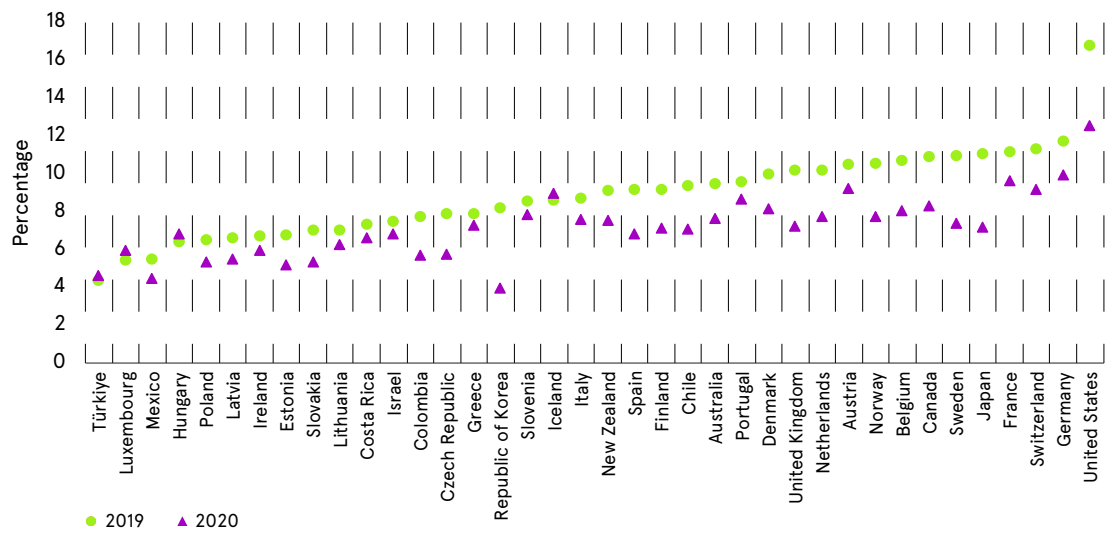
sons, who are more likely to shop in stores than online, may face higher prices than other age cohorts (although such an effect would decline as people accustomed to shopping online age). Online shopping is also more common among high-income groups, and as this interacts with age, it can make some less affluent older persons particularly vulnerable to higher inflation.

The United States Bureau of Labor Statistics calculated an experimental consumer price index for households with a reference person or spouse aged 62 or older, finding that older persons face a higher inflation risk. In past decades, older Americans, according to this index, have on average seen slightly higher inflation than people in general (Stewart, 2008). This finding is particularly important because many countries link pension benefits to the consumer price index. If that index does not properly reflect cost-of-living increases for older persons, applying it may further accentuate income inequality.

Without policy reforms, population ageing tends to put upward pressure on age-related public spending. Global health-care expenditure, as a share of GDP, has consistently risen over the years, increasing in comparable terms (PPP, or purchasing power parity) from about \$8.3 trillion in 2011 to \$13.4 trillion in 2019. Data from Organisation for Economic Co-operation and Development (OECD) countries show that most have seen increases in public health expenditure since 2000 (figure 3.6). This is not just explained by population ageing. It also relates to the increasing prevalence of unhealthy and sedentary lifestyles. This trend is likely to continue, with the European Union expecting public spending on health care and long-term care to rise by 0.7 and 1.3 percentage points of GDP between 2013 and 2060, respectively (Nerlich and Schroth, 2018). Studies on emerging economies predict that population ageing will have a significant impact on public and private health-care expenses (Zhou and others, 2020).

Figure 3.6

Total annual expenditure on health as a share of GDP in OECD countries



Source: OECD.Stat. Available at <https://stats.oecd.org/>.

As the share of people aged 65 or older grows, both public and private health-care expenditures are expected to increase. The old-age dependency ratio has a significant impact on per capita health-care expenditure, after controlling for other factors (Khan, 2022). Yet the effect is not straightforward, depending on a host of variables. Both the number of older persons and their health status determine the relationship between ageing and health-care spending. Education level also directly links to better health and lower health-care expenditure among older persons. Long-term investment in education can thus have significant positive spillover effects on the health-care budget (Borrescio-Higa and Valenzuela, 2021).

**Without equitable and sustainable systems in place, however, rising pension, health-care and long-term care costs can pose challenges to both individuals and the macroeconomy, raising risks of poverty and inequality among older people**

The impacts of ageing also differ by modes for financing health care. In past decades in the United States, for instance, average medical costs have been strongly associated with time until death but only weakly associated with age (Miller, 2001). This is due in part to a health-care industry that uses costly new treatments and offers limited options for end-of-life care. In high-income countries, nearly 10 per cent of the aggregate annual health budget goes to the less than 1 per cent of people who die each year (Normand and others, 2021).

**4. FINANCING OLD-AGE CONSUMPTION DEPENDS ON REALLOCATING RESOURCES**

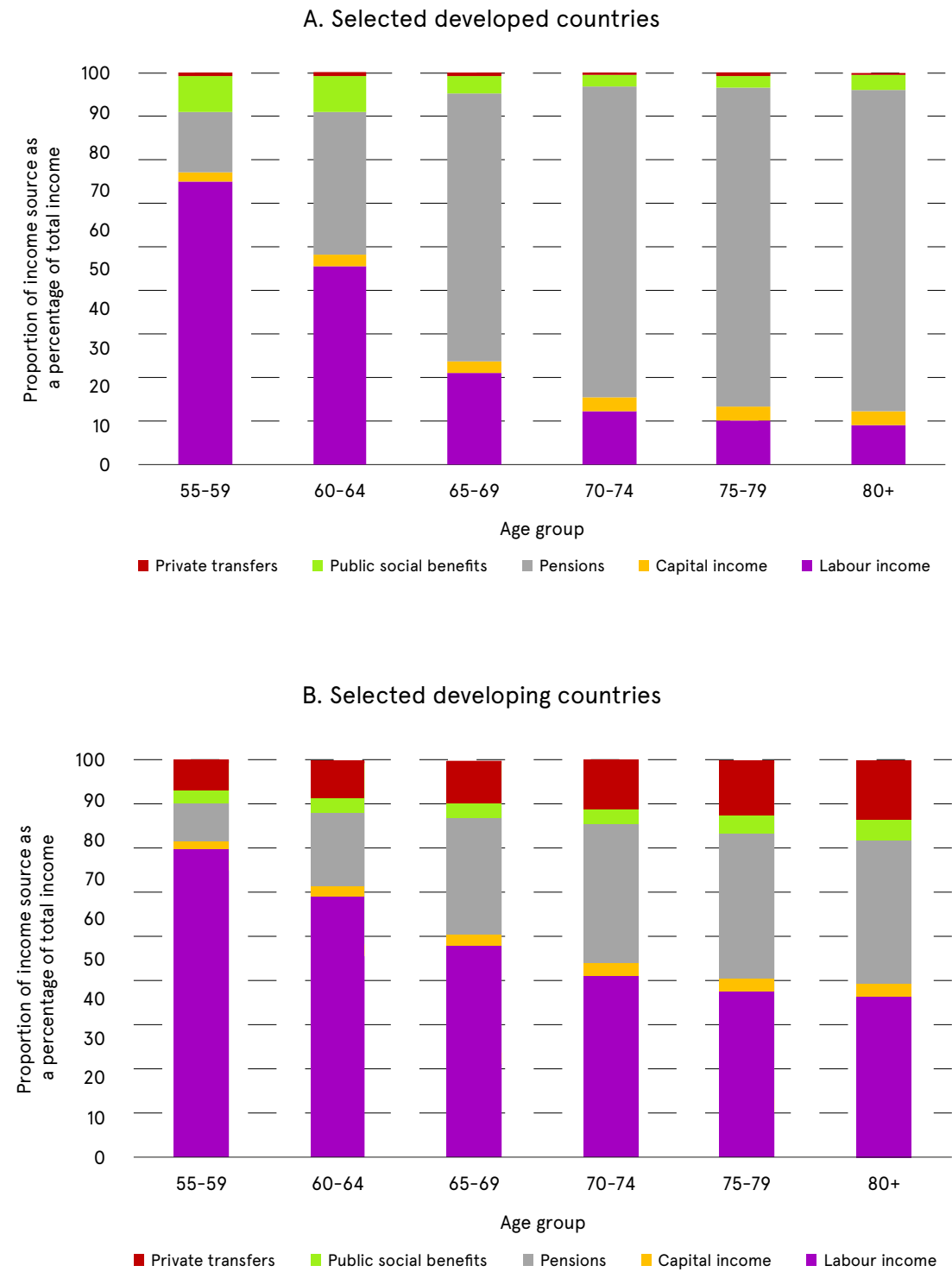
Patterns of income and consumption across the life course, including deficits for certain age groups, are not necessarily a macroeconomic problem if systems to reallocate resources are balanced and sustainable. At the individual level, adequate private savings and pensions can ensure the welfare of older people. Without equitable and sustainable systems in place, however, rising pension, health-care and long-term care costs can pose challenges to both individuals and the macroeconomy, raising risks of poverty and inequality among older people (Pandey and others, 2018).

*A. SOURCES OF FINANCING*

How older people finance their consumption differs across countries. The main sources of finance are people's own work, savings and other assets, and private and public transfers. In developed countries, public transfer systems, including for pensions and health care, meet at least two thirds of consumption needs among older persons. In developing countries with limited public transfer systems, older persons tend to work longer, rely on assets accumulated when younger or turn to their families for support (figure 3.7). In low-income countries, where public transfer systems are poorly developed, older persons rely more on assets than on private or family transfers. Asset-based reallocations fund about 95 per cent of the old-age deficit in India. In East Asia, family support remains important in many countries even if its role has been declining over time.

Figure 3.7

Sources of income by age group



Source: Calculation based on the Luxembourg Income Survey (LIS) Database, latest year available. Available at [www.lisdatacenter.org](http://www.lisdatacenter.org).



Significant differences in financing the consumption of older persons operate among countries at similar levels of economic development and stages of demographic transition. For example, older people in Brazil receive much larger public transfers than their counterparts in Mexico, primarily through pension benefits. Brazilians become net beneficiaries of public transfers at age 52 while Mexicans pay more in taxes than they receive in public benefits until age 58. While Brazilians receive generous pension benefits throughout old age, people in Mexico work longer and tend to support themselves more through asset income than public transfers (Lee and Mason, 2011).

Without mitigating reforms, total expenditure on pensions will increase with population ageing. In advanced and emerging economies, pension spending as a percentage of GDP rose from around 7 per cent in the 1970s to 8 per cent in 2010. By 2050, public pension spending in these countries is projected to increase by 1 to 2.5 percentage points of GDP, to an average of 9.6 per cent of GDP (Amaglobeli and others, 2019). In the European Union, demographic changes alone are expected to raise pension spending by 7.6 per cent of GDP from 2013 to 2060 (Nerlich and Schroth, 2018).

#### *B. IMPLICATIONS FOR GOVERNMENT REVENUE*

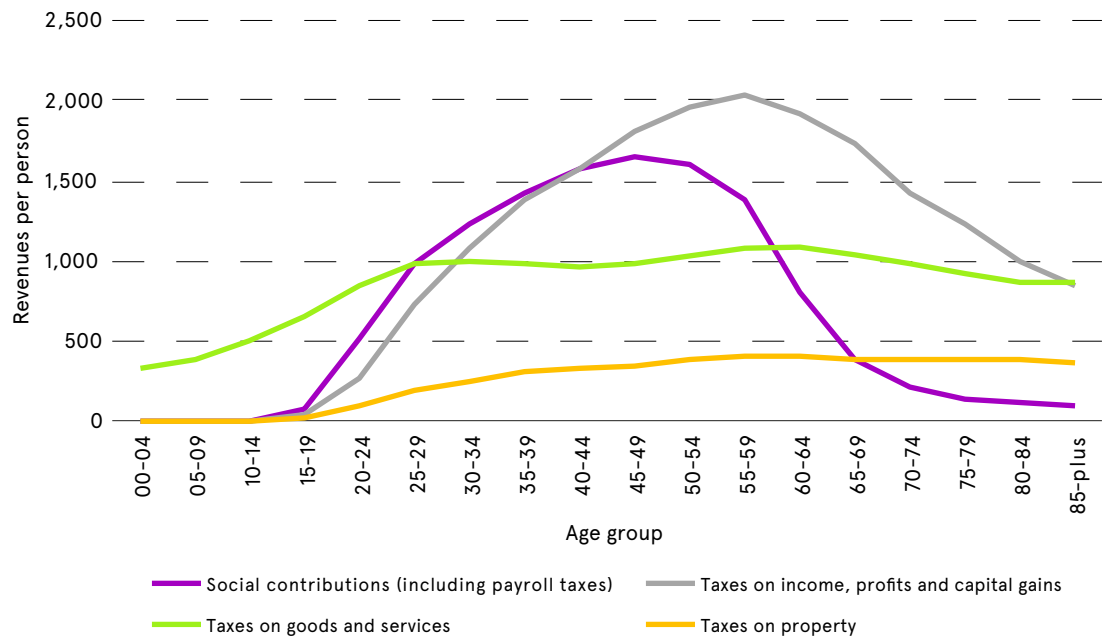
Population ageing may have implications for government revenues, amid concerns about potential declines in the labour force and uncertain effects on labour productivity. Government revenue tends to change with the number of taxpayers and their income, so it is more directly related to the working-age or employed population than to the total population. Since taxes and social contributions vary over the life course, population ageing may imperil or dampen the growth of fiscal revenues.

Countries in the early stages of ageing may see their tax revenue increase as all income sources have the potential to grow. Countries that are more advanced in ageing may see declines in fiscal revenue from social contributions linked to the labour market as well as taxes on income, profits and capital gains. Offsetting this effect would require older persons to remain gainfully employed or otherwise generate income (Cylus and others, 2019).

Figure 3.8 outlines the age profile of different types of tax revenues and potential changes in revenue sources as populations grow older. These trends would shift if older persons were healthier, better educated and work longer. The overall impact of ageing on government revenue thus depends on the combined effect of these factors.

Figure 3.8

### Per capita taxes and social contributions across the life course, selected countries in Europe, Asia and the Americas



Source: Cylus and others (2019).

Note: Revenue types were averaged across six countries with available data: Italy, Japan, Sweden, Thailand, Uruguay and the United States.

A smaller labour force can have a substantial impact on government revenue. In Slovenia, for example, the projected decrease in the working-age population, from 66 per cent of the total population in 2016 to 58 per cent by 2040, together with a rising share of older persons could cause government revenues to contract by a projected 1.6 per cent as a share of GDP (Colin and Brys, 2020). Simulations for Germany indicate that annual income tax revenue could decrease by around 7 per cent by 2035 compared to 2016 despite greater labour market participation by older people (Beznoska and Hentze, 2017). This outcome, however, could be offset by changes to the tax system, such as by increasing marginal tax rates on the highest wage earners.

Population ageing may diminish revenue from value added taxes due to reduced taxable private consumption and a shift in demand towards specific services, such as health care, that are often subject to tax exemptions. Since the consumption tax burden of the oldest households is generally lowest, fiscal revenue will fall as the size of that age group increases. Revenue from taxes on capital, property and corporate income are likely less influenced by population ageing. In some countries, such revenue may even increase due to asset accumulation by older persons

An OECD simulation found that without policies to increase tax revenues to offset age-related increases in expenditures, public debt levels in advanced and emerging

economies may increase dramatically and unsustainably over the next 40 years (Guillemette and Turner, 2018; Rouzet and others, 2019). The simulation incorporates demographic changes and the future impacts of already legislated increases in retirement age, built-in pension system stabilizers, the phasing out of early retirement provisions and changes to benefit formulas. Significant variations arise due to differences in pension commitments, however (figure 3.9).

### 5. ADAPTING TO SUSTAIN ECONOMIC GROWTH OVER TIME

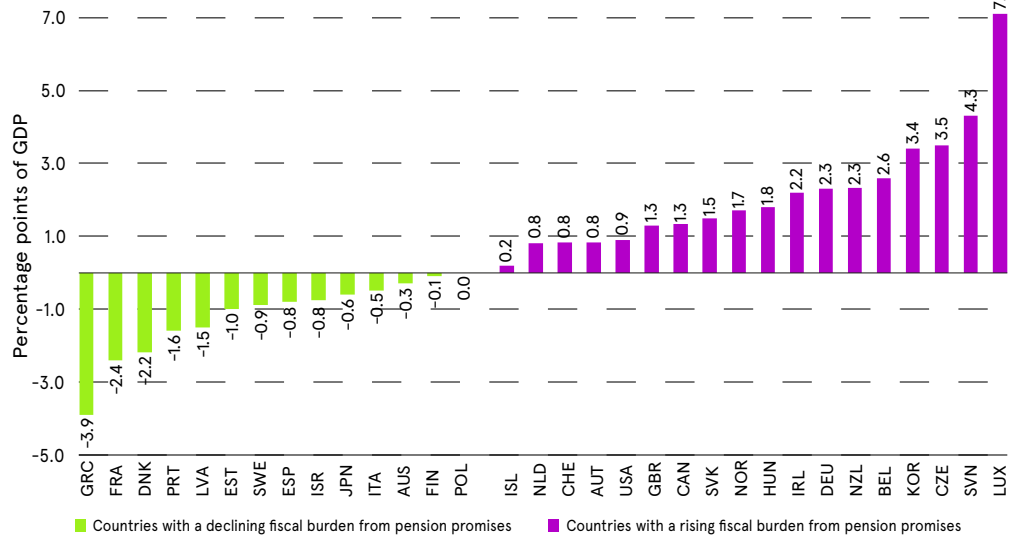
Economic growth may slow during the demographic transition as population growth levels off and societies move towards ageing. Ageing tends to increase capital accumulation and investment in the economy through many channels, as discussed earlier. While greater capital in-

tensity raises productivity, the magnitude of this effect varies across countries and depends on different factors. In general, the retirement savings of working-age individuals takes on added importance as it can contribute to capital accumulation and investment in both domestic and international assets, resulting in higher national income.

Total investment in the economy may decline if expected growth in aggregate demand slows as an ageing population moves towards a different consumption profile (Aksoy and others, 2019). A shift in demand towards less capital-intensive services such as health care may reduce needs for capital investments (Lee, 2016). Ageing thus amplifies the need for countries to adopt policies that foster structural economic transformation, including through digitalization, investment in physical and human capital and the greening of the economy.

Figure 3.9

Changes in the fiscal burden due to pension promises in 32 OECD countries, percentage of GDP, 2018–2060



Source: Guillemette and Turner (2018).

Note: The change reflects the primary fiscal revenue needed between 2018 and 2060 to offset additional pension costs and stabilize public debt to GDP at the 2018 value.

Ageing can also alter the trajectory of productivity, especially in sectors requiring particular abilities. It is usually assumed that as work becomes increasingly dependent on digital tools and technology, an older workforce with fewer relevant skills will be less productive. This assumption is increasingly challenged, however, by successive cohorts of technologically sophisticated older persons. Moreover, older people have accumulated knowledge that may compensate for lower rates of technology adoption. The overall impact of ageing on labour productivity thus depends on the combined effect of these factors.

One promising approach to population ageing is to invest in technology and more capital-intensive economic activity. Already, the rapid advance of automation and artificial intelligence is reducing reliance on labour. Some evidence suggests that additional capital investment in automation in some advanced ageing economies is helping to accelerate economic growth (Acemoglu and Restrepo, 2020).

Other research indicates that ageing and shrinking populations may have a positive influence on the collective demand for resources, food production, energy use and pollution (Clements and others, 2015). The clearest influence is perhaps on changes in demand for environmental resources, with positive effects on natural capital (SDG target 12.2). This results from shifts in production towards more capital-intensive industries and methods and in consumption from material-intensive goods towards health and leisure activities. Countries with higher old-age dependency ratios have smaller ecological footprints.<sup>19,20</sup>

The influence of ageing on other sustainability measures is less clear but does offer opportunities to make progress in halving per capita global food waste and reducing food losses along production and supply chains (SDG target 12.3), and in improving prevention, reduction, recycling and reuse systems to reduce waste generation (SDG target 12.5). Population ageing also raises important questions around how to recognize unpaid care work in economic growth accounting, an issue briefly discussed in box 3.1.

19 The ecological footprint is a measure of how much area (in global hectares) of biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices.

20 Population ageing may also increase the consumption of energy from heating and cooling. It is important to consider sources of energy generation in assessing the overall impact on the environment.

## BOX 3.1

**ACCOUNTING FOR UNPAID CARE  
INFORMS POLICIES EQUIPPED TO  
MANAGE AN AGEING SOCIETY**

The ILO (2018a) has estimated that unpaid care work for household production accounts for 16.4 billion hours of work time annually, equivalent to around 2 billion jobs. Data from the UN SDG Global Database, based on a sample of 32 developing and 24 developed countries (56 in total), suggest a significant gender difference in the proportion of time spent on unpaid care and domestic work in countries at different stages of population ageing.

In developing countries, which tend to be at earlier stages of the demographic transition, women on average spend 17.3 per cent of their time on unpaid care and domestic work, compared to 17.1 per cent in mostly older developed countries. In contrast, men in ageing societies tend to spend a greater portion of their time on unpaid care work, at 8.7 per cent on average, than men in developing countries, at 5.8 per cent. Men's share in both cases remains much lower than women's share. Globally, women currently perform three quarters of unpaid care work hours, reflecting entrenched gender inequality (ILO, 2018a).

The neglect of unpaid care work in economic accounting results in inaccurate assessments of changes in individuals' well-being and the value of time (OECD, 2014; Lequiller and Blades, 2014). A more complete calculation would capture both the aggregate amount of unpaid care work

and its distribution. It is also essential to assess the quality of care work, based on the experiences of those receiving care services. This emphasis is consistent with the "beyond GDP" movement's call for a shift from measuring economic production to measuring people's well-being (Stiglitz, Sen and Fitoussi, 2009). Quality is particularly pertinent for ageing countries as it is already low and could further deteriorate without sufficient investment to match rising demand.

From a policymaking perspective, insufficient measurement of unpaid care work limits analysis of gender gaps in labour market outcomes, such as labour force participation, wages and job quality – as well as effective measures to rectify these disparities. The lack of measurement also obscures the true scale of caregiving in an ageing society and limits proactive actions enabling unpaid caregivers (often women) to become full participants in the labour force.

With population ageing, a better understanding of unpaid care work could inform more accurate assessment of measures to mitigate adverse economic effects. For example, since unpaid care work is not included in GDP and unpaid care workers are not considered part of the labour market, national accounts miss a full reflection of the productivity of the women and men who carry out unpaid care work.

**BOX 3.1**

Further, calculations to estimate the economic benefit from narrowing the gender gap in labour force participation, with the implicit assumption that women who are not “participating” in the labour market are unproductive, would likely overstate the impact of potential policy measures to bring more

women into paid work. It would be more appropriate to interpret the potential boost to growth as a ceiling, indicating its limits. A more accurate estimate would require better understanding and measurement of the economic contribution of unpaid, predominantly female, care workers.

**B.**

### **KEEPING UP WITH AGEING CALLS FOR SHIFTING CONSUMPTION AND PRODUCTION STRATEGIES**

In both developed and developing countries, opportunities and challenges from population ageing warrant adopting effective, equitable strategies for both the production and consumption sides of the economy. Ageing should be central to economic development agendas, includ-

ing to ensure that the broader economy benefits from the expertise and skills of older persons.

#### **1. WOMEN AND OLDER WORKERS ADD VALUE IN LABOUR MARKETS**

As societies age, labour force participation rates need to rise accordingly, particularly for women, older workers and other groups traditionally excluded from the formal labour market. This applies especially to countries with advanced ageing.

Women’s greater role in the labour force has been integral to positively transforming the structures of economies in many countries in recent decades. Yet they still participate at rates well below those of men in every age group, reflecting distinct gender roles and social status, among other issues. Women’s increased participation would slow the projected decline in the size of the labour force.

**Ageing should be central to economic development agendas, including to ensure that the broader economy benefits from the expertise and skills of older persons**

Towards that end, a key challenge for policymakers is to reconcile conflicting work and family demands. Employment and social policies need to make it possible for women to have children while remaining in the labour market and continuing to develop their careers. Policies can include the provision of subsidized childcare, maternal and paternal leave, and tax credits, among others.

## **Employment and social policies need to make it possible for women to have children while remaining in the labour market and continuing to develop their careers**

The greater participation of women and older workers in the labour force will require workplaces to make changes in occupational safety and health, working hours and organization, such as more flexible working hours and arrangements and taxation systems, as well as enhanced support to families with children. For older workers, it may be important to eliminate distortions in pension and social transfer programmes that discourage them from remaining in the labour force. Older persons should be able to work as long as they wish and can do so productively. This will require systematically countering age-based discrimination, the main challenge to realizing older people's right to work at all levels of the labour market (United Nations, 2021b).

The economic benefits of closing the gender gap in labour force participation are significant according to a recent examination of historical factors contributing to economic growth in 178 countries.<sup>21</sup> The analysis reaffirmed the essential importance of improving labour productivity and women's participation in the labour force. In 2018, roughly one third of working-age people globally remained outside the labour force, with significant variation by gender. Globally, a 20-percentage-point gap exists between male and female rates of labour force participation (figure 3.2). The gap is as high as 31.2 percentage points in Asia and as low as 8.7 percentage points in Northern America.

Expanding female labour force participation provides a major opportunity to boost GDP per capita and expand the economic base in countries with ageing populations. Closing the gender gap would add another 30 per cent to global GDP per capita. In effect, this amount represents the global opportunity cost of women's lower labour force participation.

In Europe, legislated pension reforms, particularly a higher retirement age, track an expected rise in employment rates among women and older persons. These are projected to raise the labour force participation rate of workers aged 55 to 64 from 62 per cent in 2019 to 72 per cent by 2070. An even larger increase is predicted for women, leading to a convergence with men (European Commission, 2021a). These forecasts also envisage long-term improvements in the employment ratio and a lowering of the unemployment rate from 6.8 per cent in 2019 to 5.8 per cent by 2070.

21 Based on an unpublished internal research note by the Development Research Branch of the United Nations Department of Economic and Social Affairs in April 2022.

In OECD countries, the relaxation of rules stipulating mandatory retirement and the promotion of more flexible working arrangements are projected to raise GDP growth by an additional 2.5 percentage points, on average. The OECD projects that giving older workers greater opportunities to work would enhance GDP per capita by as much as 19 per cent over the next three decades (United Nations, 2021c).

**Every society needs to focus on investing in the education and skills of people of all ages, including during the demographic transition towards older societies**

**2. GREATER LABOUR PRODUCTIVITY DEPENDS ON INVESTING IN SKILLS**

Lifelong learning improves the labour productivity of all workers, especially amid rapidly changing technologies. In ageing societies, labour productivity may fall because of declining average physical and cognitive abilities among older workers without commensurate efforts to enhance their skills and knowledge. An ageing labour force thus provides an additional incentive for firms to invest in new technologies that enhance labour productivity. The combined impact of these measures will ultimately determine the overall effect of population ageing on labour productivity.

Every society needs to focus on investing in the education and skills of people of all ages, including during the demographic transition towards older societies (box 3.2). This enhances labour productivity while also transforming economic structures and incentives, leading to accelerated application of digital and green technologies as instruments of sustainable development.



## BOX 3.2

## HOW TO AMPLIFY ECONOMIC GROWTH DURING THE DEMOGRAPHIC TRANSITION

Increasing labour productivity is imperative for countries seeking to mitigate ageing's adverse effects on income growth. Based on a recent analysis, the needed rate of improvement depends on achieving gender parity in labour force participation, increasing the statutory retirement age from age 65 to age 70, and maintaining or increasing the level of international migration.

The analysis estimated labour productivity growth required to reach a given target for income growth, considering demographic changes projected in the *World Population Prospects* (United Nations, 2019b). The annual income growth targets were a 2 per cent per year increase between 2020 and 2050 for OECD countries and others with higher income than the group's average, and, for other countries, halving the income gap with the OECD average by 2050. The exercise applied alternative scenarios for the three factors and quantified the extent to which they can help to achieve the target income growth.

On average and across countries, achieving gender parity in labour force participation, an increase in the retirement age and maintaining existing migration flows could lower the annual labour productivity growth required during 2020–2050 to achieve the above income growth target by 9.5 per cent, 6.7 per cent and 1.0 per cent, respectively, or 17.2 per cent combined. Significant regional variation reflects different development conditions (figure 3.10). The 10 countries that could benefit most from

the three factors would see the required labour productivity growth reduced by 44 per cent on average.

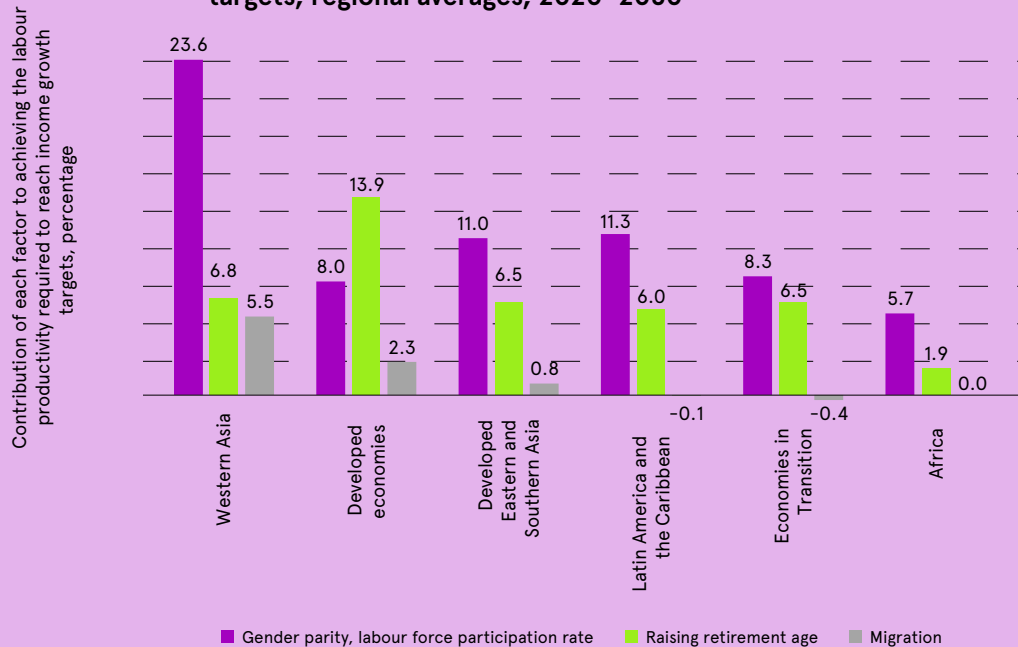
Among the three factors, attaining gender parity in labour force participation makes the biggest difference for 99 countries out of 167 sampled, comprising 113 developing and 54 developed countries. It is followed by raising the retirement age, which would be the most impactful in 67 countries, half of which are developed countries. Among all countries with available data, only one will gain more from continued migration (compared to no migration) than from the other two factors.

A push for higher fertility would have a limited impact in increasing per capita income between 2020 and 2050. Increased fertility would slow population ageing and over time result in a larger working-age population. But it would also immediately raise the share of dependent children, limiting favourable impacts on growth from a larger workforce.

Even accounting for the three factors conducive to economic growth, most countries would still need to accelerate labour productivity growth from levels before the pandemic to achieve the targeted income growth. This includes those with a growing working-age population, suggesting that nations cannot rely on favourable demographic trends alone to narrow the income gap. On average, the required increase in annual labour productivity growth is 3.2 percentage points.

## BOX 3.2

**Figure 3.10** Projected contributions of three factors to achieving the annual average labour productivity growth required for income growth targets, regional averages, 2020–2050



Note: Regions are ordered in terms of the sum of the average of each of the three factors, starting from Western Asia, which has the greatest sum. The income growth target is 2 per cent annual growth during 2020–2050 for OECD countries and countries with incomes higher than the OECD average. For other countries, the income target is to halve the income gap with the OECD average by 2050.

Japan is among the countries facing considerable economic impacts due to rapid population ageing. Based on a 2007 estimate, labour productivity would need to grow by 2.6 per cent per year to sustain annual per capita income growth of 2 per cent over a 30-year period (United Nations, 2007). A similar pattern holds, to a lesser degree, in other countries with ageing populations, such as Germany, Italy

and the United States. Required productivity growth in all these cases seems within reach by historical standards; an annual per capita income growth of 2 per cent is lower than the average achieved in the past. Yet maintaining an annual 2 to 2.5 per cent productivity growth rate for about five decades will not be easy, requiring sustained policy support to stimulate technological progress and innovation.

### 3. HARNESSING THE POTENTIAL OF THE TECHNOLOGICAL REVOLUTION

The world today is riding a new wave of technological change. The Fourth Industrial Revolution promises to alter people's work and lives in fundamental ways. New technologies such as artificial intelligence and robots are creating new occupations and taking over thousands of routine tasks. In many areas, new technologies are substituting for labour rather than complementing it.

Population ageing has become a key factor driving changes in work, technology and the globalization of markets. Some highly advanced ageing countries like Japan are systematically introducing new technologies to replace human labour in manufacturing and services (box 3.3). Many other countries are examining opportunities to mitigate negative fallout from ageing on their economies. While new technologies can improve economic productivity and the delivery of services, digitalized business models also pose risks in terms of labour rights and income inequality. Such issues will likely move to the forefront of global policymaking in coming decades.

In some industries, like automotive manufacturing, robots have already largely replaced people on the assembly line (Bloom, McKenna and Prettner, 2018). Mine operators use self-driving trucks that refuel only once a day. 3D printers increasingly produce goods that previously required extensive labour inputs, including tailor-made medical products like hearing aids. 3D printing, in fact, may become a lynchpin for boutique manufacturing in rural areas. Other technologies, like machine learning, have begun to diagnose diseases, among many other uses. These trends in technology accom-

pany shifts in working patterns, such as the rapid rise of the "gig economy" over the last decade. As the size of the working-age population declines and salaries increase in many countries in coming years, private and public institutions will likely continue to replace labour through the automation and digitalization of work.

In the United States, an estimated 9 to 47 per cent of jobs may be automated over the next two decades (Frey and Osborne, 2017; Arntz, Gregory and Zierahn, 2017). The International Federation of Robotics has estimated that 3 million robots operated in 2017 worldwide. They are increasing annually at a rate of 14 per cent and could reach 11 million by 2030 (Bloom, McKenna and Prettner, 2018).

The fast pace of innovation and technological development poses a particularly significant challenge for many developing countries. They will need to manage and make the most of such changes or risk being left behind in the economy of the future. One common and urgent priority is to increase investment in education, including early child development, as well as health and social protection, as a strategy to seize the potential of new technologies to accelerate sustainable economic development. It is also important to invest in the skills and knowledge of older persons and ensure that technology platforms are accessible to them.

Many developed countries have already lost a significant number of manufacturing jobs to automation. Technologies are also displacing people in low-skilled occupations. For example, robots play increasing roles in caring for older people, assisting with daily tasks such as bathing, dressing, eating, communications and transport (Pruchno, 2019). While new technologies

carry enormous potential to improve standards of living, many people remain rightly concerned about negative impacts on employment and inequality.

#### **4. PRONATALIST POLICIES SHOW MIXED RESULTS**

A longstanding concern is that population ageing will drag down public finances and standards of living. An analysis of data from 40 countries shows that fertility well above the replacement level would generally be most beneficial for government budgets. Fertility near the replacement level, however, would be most beneficial for the macroeconomy and the average standard of living. Considering the effects of age structures on families as well as governments, the total fertility rate that would maximize the economic support ratio is estimated at 1.8 births per woman in low-income countries, 2.0 in upper-middle-income countries and 2.3 in high-income countries (Lee and Mason, 2014).<sup>22</sup>

Many European societies view boosting birth rates as an important strategy to slow population ageing and reduce fiscal pressures. Most governments in countries that are past the demographic dividend, in Europe and elsewhere, have introduced pronatalist policies to respond to declining fertility and rapid population ageing. Examples include providing incentives to have more children through baby bonuses, family allowances, tax breaks, parental leave, subsidized childcare and flexible working schedules.

Different examinations of the impact of pronatalist policies on fertility show mixed

results. A United Nations expert meeting in 2015 concluded that maternity, paternity and parental leave, paid at a high level of wage replacement and for moderate durations, appeared to positively influence fertility (United Nations, 2015a). Similar results came from affordable, accessible, high-quality childcare and education services for children of all ages. Evidence on the response to cash benefits is mixed. Quebec, Canada's cash grant, France's birth grant, Australia's baby bonus, Germany's maternity leave and the Israeli child subsidy programme have demonstrated positive fertility responses according to some research (Lee, 2022). Other studies have found no significant fertility response to such benefits. The effect largely depends on the country, type of programme and research method. In general, small benefits may not counteract other, stronger factors in fertility decisions.

#### **5. BEYOND BORDERS: IMPETUS FOR NEW INVESTMENT FLOWS**

The accelerated outsourcing of production and enhanced global value chains will likely be key strategies that rapidly ageing countries deploy to address the economic implications of declining working-age populations. Ageing countries may need to diversify their investments beyond what is possible domestically and potentially obtain higher average rates of return as well. Ageing thus accelerates the impetus for international investment flows from upper-middle income and high-income countries to lower-middle and low-income countries, such as some in Asia and Africa with abundant labour. Such capital flows can increase labour productivity and wages and propel higher economic growth.

<sup>22</sup> The economic support ratio measures the share of the working-age population in the total population.

## BOX 3.3

## IN JAPAN, AGEING IS REORGANIZING INDUSTRY AND ADVANCING THE DIGITAL ECONOMY

Japan's population is predicted to decline from 126 million to 100 million people between 2020 and 2050. This could shrink the workforce by 20 per cent between 2020 and 2040 as it sheds from 65 million to 52 million people. By 2040, an estimated 36 per cent of the population will be older than 65, up from 29 per cent in 2020. The near certainty of labour shortages has already catalysed economic transformation.

Changing demographics have forced Japanese companies to accelerate digitalization, for example, and brought about a major reorganization of industrial architecture and policy. Japan, along with Germany, is now at the forefront of digital manufacturing. Japan's global market share in industrial robotics and machine vision technologies exceeded 50 per cent in 2019, up from 30 per cent in 2016. By 2020, plants and offices outside Japan generated more than half of manufacturing sales.

Managing global value chains is now central to how Japanese companies do business. As a result, the GDP share of manufacturing

exports rose from 8.8 per cent in 1995 to 18 per cent in 2020. Vertical farming and new agricultural technologies have transformed agriculture and resulted in more efficient use of natural resources. The rising average age of farmers, which topped 68 years in 2020, has in part driven the reinvention of agriculture.

Japan's digital transformation has offered a solution to the "succession problem" facing many companies, where hiring cannot keep up with retirement. Sharp increases in job mobility, the number of independent contractors and the use of dual employment systems have together brought about a significant rethinking of existing pension systems, including to improve coverage of workers in non-standard and informal forms of employment and to open opportunities to defer pension benefits until age 75. A low unemployment rate, less than 3 per cent in 2020, minimizes apprehensions around technological change. Further, educational reforms and major government and private investments in reskilling the workforce are helping workers adapt to momentous changes.

Source: Schaede and Shimizu (2022).

Africa has potential to become a major driver of global economic growth in the latter half of the twenty-first century – if countries adopt the right policies to realize a historic demographic opportunity. Policies need to nurture a rapidly growing pool of well-trained workers and advance economic and structural reforms that make the continent a magnet for foreign direct investment and technological diffusion. The digital revolution offers Africa an extraordinary chance to make the public and private sectors more cost-effective, efficient and transparent, a major catalyst for economic growth. It can also bypass traditional structural transformation anchored in the rapid expansion of a highly polluting manufacturing sector, choosing instead a lighter environmental footprint with greater emphasis on growth in services such as business process outsourcing, e-commerce and fintech.

## **Africa has potential to become a major driver of global economic growth in the latter half of the twenty-first century – if countries adopt the right policies to realize a historic demographic opportunity**

As digital technologies spread and ease the flow of both manufacturing and service jobs to offshore locations, global production networks will expand in developing economies with surplus labour. Continued improvement in education and skills and a readiness to transition to green and digital economies could make labour-surplus economies such as those in Africa into a hub for production

and global value chains, especially given their competitive wages. Increased investment in human capital and physical infrastructure will be key to making the most of this opportunity.

# C.

## **CAREFULLY TIMED POLICIES CAN STEER A SUCCESSFUL TRANSITION**

Success in extending human lives and reducing fertility rates have presented opportunities and challenges in managing economies. Harnessing the opportunities and mastering the challenges depends in part on government policies at different stages of the demographic transition. These need to recognize how changes in the size and composition of the working-age population and labour force heavily influence the impact of ageing on productive capacity. Furthermore, as income, needs and preferences change over the course of life, so does consumption behaviour, with implications for both government spending and revenue.

Governments need to adopt comprehensive strategies aimed at enhancing investments in health and education; fostering labour force participation, particularly among women and older workers; improving labour productivity; and raising fiscal revenue. Ageing needs to move to the centre of economic development agendas, towards ensuring that economies both thrive and benefit from the expertise and skills of older persons.