



GROUP OF THIRTY



FIXING THE PENSIONS CRISIS

Ensuring Lifetime Financial Security

Disclaimer

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Copies of this paper are available for US\$25 from:

The Group of Thirty
1701 K Street, N.W., Suite 950
Washington, D.C. 20006
Tel.: (202) 331-2472

E-mail: info@group30.org, www.group30.org



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Table of Contents

vii	Foreword	47	SECTION 5 Policy and Industry Responses for Successful Lifetime Financial Security
ix	Acknowledgments	65	Conclusion
xi	Working Group	67	APPENDIX 1 Comparative Taxonomies
xiii	Abbreviations	69	APPENDIX 2 Sweden's Notional DC system
xv	Executive Summary	70	APPENDIX 3 Modeling Lifetime Financial Security Trends
1	Introduction	77	Bibliography
5	SECTION 1 A Conceptual Framework of Lifetime Financial Security Provision	80	Group of Thirty Members 2019
11	SECTION 2 The Economics of Lifetime Financial Security	84	Group of Thirty Publications Since 2000
25	SECTION 3 Demographic, Economic, and Policy Trends		
41	SECTION 4 A Brief Survey of Lifetime Financial Security System Designs		

FIGURES

2	Figure 11.1 Scope of Lifetime Financial Security	14	Figure 2.2 Sensitivity of dependency ratio to retirement age, Europe, 2015	21	Figure 2.6 Central government debt (% GDP)
5	Figure 1.1 Conceptual framework of a Lifetime Financial Security System	15	Figure 2.3 Dependency ratio revisited for the United States, 2015	26	Figure 3.1 Life expectancy at birth for selected countries and regions, 1950–2055
7	Figure 1.2 Public expenditure on pensions, health care, and housing (% GDP, 2015)	16	Figure 2.4 Historic dependency and productivity trends, Germany, 1950–2015	27	Figure 3.2 Fertility rate for selected countries and regions, 1950–2055
13	Figure 2.1 Postwar dependency ratio, life expectancy, and fertility rate, United States and Japan, 1950–2015	16	Figure 2.5 Dependency, productivity, and real incomes, Japan, 1980–2015	28	Figure 3.3 65+ dependency ratio for selected countries, 2010–2050

- 29 **Figure 3.4** Dependency ratios for selected countries, under “proportional principle,” 2010–2050
- 30 **Figure 3.5** Forecasted statutory retirement age based on current policies, by country
- 32 **Figure 3.6** Dependency ratio under current and expected average retirement age; and with the proportional principle applied from 2010 for the United States, the UK, and Japan
- 33 **Figure 3.7.** Japan’s GDP per capita growth, 2000–2050, and dependency drag
- 33 **Figure 3.8** Developed country GDP per capita growth, 2000–2050, and dependency drag
- 34 **Figure 3.9** China’s GDP per capita growth, 2000–2050, and dependency drag
- 34 **Figure 3.10** Middle-income country GDP per capita growth, 2000–2050, and dependency drag
- 36 **Figure 3.11** Drivers of lifetime financial security
- 37 **Figure 3.12** Average and range of five “real natural rate of interest” estimates for the United States
- 37 **Figure 3.13** Historical return for 20-year Treasury Inflation-Indexed Security
- 38 **Figure 3.14** Projected global lifetime financial security gap, 2000–2050
- 40 **Figure 3.15** Reduction in LFS gap in 2050 based on various policy levers
- 57 **Figure 5.1** Allocation of assets in funded and private pension arrangements, 2016
- 68 **Figure A1.1** Illustration of taxonomies
- 71 **Figure A3.1** Illustration of key model mechanisms
- 74 **Figure A3.2** Stylized example of LFS demand and supply building blocks

TABLES

- 6 **Table 1.1** G30 taxonomy of a Lifetime Financial Security system
- 20 **Table 2.1** Two types of longevity risk
- 30 **Table 3.1** Different types of policies to encourage private saving
- 39 **Table 3.2** Assumed rate of return by income group and asset class
- 45 **Table 4.1** Pension pillar structures and characteristics
- 49 **Table 5.1** Required increases in retirement age under the proportional principle (in line with higher life expectancy) in 2050
- 71 **Table A3.1** Average annual real wage growth rates, 2000–2016
- 72 **Table A3.2** Forecasted increase in health care spending as % of GDP
- 73 **Table A3.3** Government spending on pension
- 74 **Table A3.4** Assumed rate of return by income group and asset class
- 75 **Table A3.5** Summary of LFS projection assumptions

WINDOWS

- 8 **Window 1.1** Migration and LFS
- 12 **Window 2.1** The significance of closed compared to open systems
- 12 **Window 2.2** The changing concept of a working life
- 14 **Window 2.3** The interplay of longevity and fertility in increasing population dependency
- 17 **Window 2.4** The relationship between aging and productivity
- 21 **Window 2.5** Is there a problem with debt?
- 37 **Window 3.1** Low interest rate environment
- 42 **Window 4.1** Should saving be mandated?
- 43 **Window 4.2** Universal compared to means-tested benefits
- 51 **Window 5.1** Engaging more female capacity and talent
- 54 **Window 5.2** Shifting burdens and benefits
- 55 **Window 5.3** The annuity puzzle
- 56 **Window 5.4** Notional accounts
- 59 **Window 5.5** Private wealth and the housing conundrum
- 63 **Window 5.6** Case Study: How Denmark carried out pension reforms

Foreword

The Group of Thirty (G30) aims to deepen understanding of international economic and financial issues, and to explore the international repercussions of decisions taken in the public and private sectors. The G30 is characterized by its knowledge of the past and broad-minded, forward thinking.

This report, *Fixing the Pensions Crisis: Ensuring Lifetime Financial Security*, continues the G30's 40-year history of considered, evidence-based, actionable study. The report lays out the shared challenges societies face as they seek to reform and strengthen pension systems to ensure they are sustainable and up to the task of providing lifetime financial security in response to demographic shifts, slower growth, and diminished long-term expected returns on pension fund investments.

The report's analysis is sobering. It makes clear there are no simple fixes to pension systems, no options

that are without significant adjustments to be made by workers, retirees, employers, and governments, if we are to close the gap between expected retirement income and projected resources.

The report underscores the need for honest recognition of these challenges, and of the need for adjustments to achieve lifetime financial security goals and preserve inclusivity. The changes will not be easy. The distribution of burdens and obligations among different groups in society, and between today's and tomorrow's generations, must be a major issue of political debate and consensus building. It cannot be postponed indefinitely.

We hope that the report's policy recommendations, when taken together and considered within the context of national economies and pension systems, will support the necessary debate on how we can best provide lifetime financial security going forward.



Jacob A. Frenkel

Chairman, Board of Trustees
Group of Thirty



Tharman Shanmugaratnam

Chairman
Group of Thirty

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I would like to thank the members of the Steering Committee and Working Group of this project, who guided our collective work at every stage and added their unique insight and inputs. The intellect and experience brought to the table by the nine members of the Steering Committee and Working Group on the important subject of Lifetime Financial Security and the challenges that confront policy makers, workers, retirees, and societies in the future were critical to the report's proposals.



Adair Turner

Chair, Working Group on Pension Funds

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Working Group

Steering Committee

Adair Turner, Chair

*Senior Fellow, Institute for New Economic Thinking
Former Chairman, Financial Services Authority*

Gerd Häusler

*Member of the Supervisory Board, Munich Reinsurance
Former Financial Counsellor and Director, International Monetary Fund*

Tharman Shanmugaratnam

*Chairman, Group of Thirty
Senior Minister and Coordinating Minister for Social Policies, Singapore*

Working Group Members

Jaime Caruana

*Member of the Board of Directors, BBVA
Former Financial Counsellor, International
Monetary Fund*

Guillermo de la Dehesa

*Vice Chairman and Member of the Executive
Committee, Grupo Santander
Chairman, Institute of Santa Lucía Vida y
Pensiones*

John Heimann

*Senior Advisor, Financial Stability Institute
Former Comptroller of the Currency, United States*

Philipp Hildebrand

*Vice Chairman, BlackRock
Former Chairman of the Governing Board,
Swiss National Bank*

Masaaki Shirakawa

*Distinguished Guest Professor of International
Politics, Economics, and Communication,
Aoyama Gakuin University
Former Governor, Bank of Japan*

Axel A. Weber

*Chairman, UBS
Former President, Deutsche Bundesbank*

Project Director

Colin Brereton

Experts

Karen Dickson
Nick Forrest

Miles Kennedy
Stuart Mackintosh

Jeremy May
Jinny Park

Abbreviations

CFS	Completed Family Size
CPF	Central Provident Fund (Singapore)
DB	defined benefit
DC	defined contribution
GDP	gross domestic product
G20	Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States
IMF	International Monetary Fund
LFS	Lifetime Financial Security
OECD	Organisation for Economic Co-operation and Development
PAYG	pay-as-you-go
PwC	PricewaterhouseCoopers LLP
QE	quantitative easing
SSGS	Special Singapore Government Securities
TFR	total fertility rate
UN	United Nations

Executive Summary

PROVIDING FOR LIFETIME FINANCIAL SECURITY

Countries across the globe face a mounting challenge: how to offer adequate financial security for retirees, today and sustainably into the future. Most systems already fall short of providing the Lifetime Financial Security (LFS) needed to meet essential living expenses including health care and housing needs and maintain a desired standard of living through to the end of life, or have sought to provide LFS for today's retirees in a manner that imposes an unsustainable burden on future generations.

Public and political discussion has tended to obfuscate or postpone the choices and adjustments needed to solve this brewing crisis. However, the ongoing aging of populations will mean that the longer we postpone these adjustments, the more difficult they will become economically, socially, and politically. Responsible and realistic debate is urgently needed on how the benefits and costs of providing LFS should be fairly spread across groups, and between retirees today and tomorrow.

This report lays out the challenge ahead and identifies the options to address it. We hope the report will add to discussion on this critical issue among lawmakers, the public, and the financial community.

LONGER LIVES, FEWER WORKERS

In developed countries with good health care systems, average life expectancy for children born today is over 90, and longer still for higher-income groups or people who maintain healthy lifestyles. Developing countries that achieve successful economic growth will catch up to this level in the coming years, and modern medicine is delivering still further improvements.

International comparative databases reflect the trend of rising life expectancy but actually understate the absolute level. To make comparisons easier, they typically use a measure known as “period life expectancy,” which fails to fully reflect further additional improvements in life expectancy for younger cohorts. The United Kingdom, for instance, has estimated life expectancy for women at their time of birth as 82.9 years on the period basis, but it is 91.8 years on the more realistic cohort basis. As a result, United Nations (UN) figures, which suggest global average life expectancy will rise from 72 today to 77 in 2050, significantly underestimate both the current and future level.¹

Even more important for retirement systems, the life expectancy of people reaching typical retirement age is increasing fast. The UN “period” figures suggest that global average life expectancy at 65 was 15 years in 1995, is 17 years today, and could reach 19 years by 2050, but this underestimates the shift. Cohort figures for the UK, for example, show an increase in

¹ As the 2017 United Nations *World Population Prospects* glossary explains, “period” life expectancy is defined as “The average number of years of life expected by a hypothetical cohort of individuals who would be subject during all their lives to the mortality rates of a given period.” For life expectancy at birth in 2015, it thus calculates what life expectancy would be for an individual who experienced the age-specific mortality rate of a one-year-old in 2015, a two-year-old in 2015, and so on to a 100-year-old in 2015. In fact, however, a person born in 2015 will experience the age-specific mortality rate of a one-year-old in 2016, a two-year-old in 2017, and so on to a 100-year-old in 2115. Since age-specific mortality rates tend to fall over time, the “period” calculation thus fails to fully capture the impact of falling mortality rates on life expectancy. The “cohort” approach captures this reality, and cohort life expectancies are available in most individual national statistics but are not pulled together into one place within the United Nations population database. In short, the “cohort approach” captures the dynamics of shifts in statistical patterns on a more timely basis and therefore more realistically.

life expectancy at 65 from 17 years for men and 20 years for women in 1995, to 21 years for men and 23 years for women today, and to 24 years for men and 26 years for women by 2050.²

Rising life expectancy at 65 (or any other defined “retirement age”) reduces the number of working-age people relative to the number of retirees, unless accompanied by longer working lives. This decline is exacerbated by falling fertility rates, especially in countries achieving reasonable economic success where trends indicate a strong tendency to fall below, and often far below, the replacement rate needed for each new generation to be as large as the one before.

As a result, the ratio of retirees to workers (the dependency ratio) will rise. In the United States in 1950 there were 14 people aged over 65 for every 100 aged 20–64; by 2000, the ratio had increased to 21, and it is forecasted to reach 40 by 2050. This trend can in part be offset by increasing the age at which people retire or receive pensions, but even where increases in the standard retirement age have been agreed, they have been far from sufficient to stabilize the dependency ratio.

The fundamental problem is that most retirement and pension systems were designed when life expectancy at age of retirement was far lower than it is today and have been adjusted only minimally to changing realities. To illustrate, the average American retiring at 65 in 1950 needed to plan on the assumption that they would live 14 years in retirement. By 2050, a 67-year-old in America will likely need to plan for an average 23 years of retirement, and possibly considerably longer. By comparison, the normal retirement age has only gone up by one year, from 65 to 66. In Germany, the “normal” retirement age is being progressively raised from 65 to 67; in a later decision by lawmakers, however, the retirement age was lowered to 63 for a sizable portion of the working population that entered work life at an early age. As in many other countries, therefore, an LFS shortfall will be practically inevitable unless urgent action is taken.

PRODUCTIVITY GROWTH IS NO PANACEA

To address the LFS challenges created by increasing lifespans and fewer workers providing for retirees, difficult policy and individual choices cannot be avoided.

Some commentators argue that the challenges would go away if only productivity growth could be increased. **But for two reasons we caution against any assumption that future productivity increases alone will make pension problems manageable.**

First, it is unclear whether and how productivity rates can be increased. In a world where current productivity growth is disappointing in many developed countries and where the reasons for the recent productivity growth slowdown are contested, it is imprudent to assume that more rapid growth will emerge as a *deus ex machina* to answer LFS challenges, removing the need for other adjustments.

Second, greater productivity and income growth will likely simply increase people’s expectations of income in retirement, as has happened in the past. Rapid productivity growth only helps make pension systems more affordable if expected incomes in retirement do not rise in line with average earnings, and this will realistically only happen with conscious decisions to reduce income replacement rates.

POTENTIAL CRISIS AND THE UNAVOIDABLE CHOICE

If public policies and individual behaviors do not change, many countries’ systems for providing LFS will face a severe crisis, threatening either unaffordable public expenditure pressures or inadequate income provision for retirees.

Our indicative estimate of the gap between expected or promised LFS benefits and what can likely be provided is \$15.8 trillion among 21 countries (comprising 90 percent and 60 percent of world gross domestic product (GDP) and population respectively).³ This

² UK Government Actuary’s Department 2017.

³ Australia, Brazil, Canada, China, Denmark, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, the Russian Federation, Singapore, South Africa, Spain, Sweden, Turkey, the United Kingdom, and the United States.

is even with optimistic assumptions for economic growth, wages and rates of return on pension investments. Estimates in other studies, for specific countries or regions, similarly illustrate the challenge. A €2 trillion annual pension savings gap has been estimated for Europe, for example.⁴

Given the demographic reality of longer lives and falling fertility, existing approaches to LFS provision are unsustainable. **People cannot save the same amounts during their working years as they do currently, retire at the same age as today, and still receive the same retirement payouts, unless future generations pay additional taxes to enable them to do so.** And there are almost certainly political limits to how much of the burden can be shifted to future generations of workers.

Countries must inevitably therefore choose some combination of the following adjustments:

1. Increasing the retirement age and enabling people to work longer, while strengthening employer responsibility for employing older workers and enhancing productivity
2. Encouraging or incentivizing higher savings during working life, and/or increasing taxes to support public pension provision, both of which imply reduced consumption by working-age people today or tomorrow
3. Accepting that expected incomes in retirement may need to be lower, with reduced income replacement rates, to ensure sustainability and intergenerational equity.

In most countries it will be neither politically feasible nor desirable to rely on just one of these levers alone. For the first option to be sufficient, the retirement age would have to rise more than proportionately with life expectancy, significantly reducing the number of years spent in retirement. For the second alone to work, significant increases in savings or taxation rates would be needed. And if we relied on the third alone, severe reductions in replacement rates would be required, in ways that will not be socially equitable.

It is therefore only realistic to adopt a balanced mix of these three main levers. In Section 3, we set out our indicative estimate of the total size of the “LFS gap” to illustrate how effective the different policy levers could be in closing the disparity. Increases in the retirement age are likely to play the greatest single role. Increases in savings and taxation and reductions in replacement rates for certain groups could also contribute significantly as part of a fair deal between current and future generations.

In addition, policies should seek to support the “win-win” of increased net returns on savings over the long run. Improved net returns, unlike the three main levers, do not require either more work or less consumption by either workers or retirees. However, the global environment is likely to see historically low investment returns over the coming decade at least. Hence, any improvements in net returns, especially through more efficient schemes and lower fees, can only complement rather than substitute for the three main levers.

1. Increasing retirement age and strengthening employer responsibility

We recommend that the retirement age rise at least in proportion to increases in life expectancy, so as to keep the length of typical retirement durations stable (in proportion to working life). For the countries we analyzed, this would imply an increase in the average retirement age by at least four to six years between now and 2050. This action on its own would, however, eliminate only 15 percent of the aggregate LFS gap. Larger moves would be needed among countries that today have a particularly low retirement age (often well below 65 and even below 60), to increase the retirement age more than in line with future increases in longevity, catching up with the failure to make adjustments in the past. If the retirement/pensionable age rose to 70, we estimate that 50 percent of the aggregate gap could be closed by 2050.

In addition, it is important that as people work to later ages they can be as productive as possible, in some cases requiring changes to company practices and a

⁴ A 2016 Aviva study (Mind the Gap – Quantifying the pension savings gap in Europe) noted that raising retirement ages by 5 years would close a quarter of the EU pension savings gap, while raising retirement ages by 10 years would close half of the funding gap. In the US, a 2012 AARP publication noted that raising the full retirement age to 68 by 2028 would close 18 percent of the Social Security funding gap, while raising the full retirement age to 70 in 2040 would fill 44 percent of the funding gap.

greater focus on improving health during working life. These changes should also seek to enable people who wish to work beyond the official or standard retirement age to do so, perhaps on a flexible or part-time basis. **If, on average, retirees today worked 20 percent of the time worked by standard-aged workers, approximately 25 percent of the estimated LFS gap could be closed.**

2. Increasing private savings and/or taxation to support public pensions

Current savings rates during adult working years are in most countries well below what is required to fund retirement, and especially so in an environment of low returns. We recommend that policies support growth in workers' savings, as an important complement to extending their working years. Encouraging greater levels of savings, through either public or private savings schemes, will increase individual retirement income, and in some countries may also enable increased capital investment and thus growth of productivity and incomes.

A multilayered savings approach may be needed, including (a) a base level of mandated saving, (b) a supplementary layer that is auto-enrolled, and (c) a third layer that is advisory.

In many countries, closing the LFS gap will also require tax policy changes, whether (a) to increase incentives for personal or employer-funded pension saving, or (b) to ensure adequate finance of state-provided pensions and other welfare benefits where private channels are insufficient or considered inappropriate.

If average pension savings rates could be increased by 2 percent of GDP, about 22 percent of the estimated LFS gap might be closed. Increased taxes to support higher pay-as-you-go state pensions could also achieve the same effect. Either option would imply a roughly equivalent reduction in the consumption workers could afford during their working years, in order to avoid larger drops in consumption in their retirement years.

3. Expecting less in retirement, recalibrating replacement rates

In some, but not all, countries, a third policy response will likely be needed: lowering expectations of retirement income relative to

earnings during working life (that is, changing expected income replacement rates).

It is sometimes asserted that post-retirement income of about 70 percent of average pre-retirement income is needed to maintain a “reasonable” standard of living in retirement. Some private and public pension schemes have sought to achieve this level. While this replacement rate may be required to ensure adequate security for low-income earners, as an average target it may be unrealistic in a world of increasing longevity and reduced fertility, as well as unnecessary at higher levels of income.

We therefore recommend policy makers plan for adequate LFS provision on the assumption that target replacement rates can be lower than 70 percent for middle- and high-income individuals. If average income replacement rates were 60 percent instead of 70 percent, around 25 percent of the estimated LFS gap might be closed.

A DIFFERENT BALANCE IN DIFFERENT COUNTRIES

The balance among the three main levers will inevitably, and should, vary by country to reflect different starting points (in particular the generosity of existing pension promises) and political choices. **It is clear that most countries will have to combine action along each of these three dimensions; solutions which rely on changing one dimension alone will rarely if ever be feasible.**

REFORMING LFS SYSTEM DESIGN TO HELP INDIVIDUALS: ENABLING A FAIRER DISTRIBUTION OF RISK AND ENHANCING RETIREMENT SAVINGS

In many countries, the basic balance within pension systems has been shifting from public to private provision, and from “pay-as-you-go” defined benefit (DB) schemes, which are collective in nature, to defined contribution (DC) schemes, which are self-funded and often self-managed. **In most such cases, these shifts have increased costs or moved responsibility to individuals, slashing into the net returns that individuals earn on their savings and increasing**

the risk of poor investment decisions. Reforms in LFS system design should be made to mitigate the potential adverse consequences of these changes.

Reforms require both policies aimed at improving the efficiency of pension schemes, and hence the net (post-cost) return that savers receive, and policies to better redistribute responsibility and risks between individuals and scheme sponsors.

Improving cost-efficiency and investment returns

The most certain way to increase net returns is to eliminate unnecessary costs. We therefore recommend reforms to reduce the administration and asset management costs that reduce the net yield earned on pension assets. There is substantial scope to cut costs through the aggregation of funds and processes within DC schemes, more effective use of information technology, and through better product design and simplification.

The total costs faced by pension savers vary massively by size and design of pension scheme or system. Individuals of average income who purchase pensions on an individual basis can face costs of over 2 percent per year, while very large corporate or government-sponsored schemes can achieve combined administrative and asset management fees below 0.1 percent. This reflects the vital role of economies of scale in scheme administration and of bulk buying power in the purchase of asset management.

Public policy should seek ways to deliver these benefits to employees working for small companies and to the self-employed. One way to do this is by establishing a national utility to provide bulk processing and purchase of asset management services. Potentially, this could incorporate a variation on auto-enrolment which, by default, directs new money toward such a utility.⁵

Net returns to savers could also in principle be improved by increasing gross investment returns. This is, however, particularly a challenge in today's environment of low, risk-free interest rates. Achieving increased return without increased risk is by definition very difficult. But in some countries, there are opportunities to improve the available set of risk-return choices

by relaxing regulatory constraints that have led to sub-optimal diversification of assets in pension funds.

If net returns to savers could be increased by 2 percent per year (whether by reduced costs or increased gross returns), we estimate that about 10 percent of the LFS funding gap could be closed.

As discussed above, it is impossible to close a large share of the LFS gap without deploying some mix of the three main levers, which effectively requires either more work (longer working lives) or reduced consumption (for some groups of workers or retirees). But it is essential to complement this mix of levers by pursuing the “win-win” of lower costs and increased net return to the maximum extent possible.

Redistribute responsibility and risks, including through hybrid DB/DC system designs

The shift in recent decades from DB to DC schemes has shifted responsibility and risk onto the shoulders of individuals for achieving LFS.

In some ways this shift has been inevitable. Corporate DB schemes were often not organized to enable portability of individuals' retirement plans, especially needed in a labor market where they change employers more frequently. Corporate DB schemes have themselves been increasingly unable to meet fixed retirement payout promises in the face of investment and actuarial risks (that is, unanticipated changes in life expectancy). For their part, public DB schemes in several countries have been burdened by a legacy of promised increases in payouts that have not been matched by increased contributions, and failure to adjust the scheme's basic design parameters to the reality of aging populations.

DC schemes, being fully funded by design, do not pose such problems. In addition, the shift from DB to DC may have created useful incentives for people to work longer to boost retirement payouts.

The shift of responsibility and risk to individuals has in many systems not worked well for all. Studies show that most individuals have not been able to absorb risk and make investment decisions well for the long term and have hence tended to underperform

⁵ The creation of public utilities may be an option where private sector solutions are not available. Certain U.S. states are experimenting with this approach. In addition, a number of countries, like Australia, have provided this option.

the markets. And many individuals, by cashing in their accumulated DC pension pots as allowed in some countries, rather than making annuity investments that yield a stream of income to the end of life (as in most DB schemes), have exposed themselves to the risk of outliving their savings.

An LFS system is needed to serve the interests of ordinary individuals. It should seek a better allocation of responsibilities and risks. One way to do so is by combining elements of DB and DC structures. We recommend policy makers and companies consider the following policy options:

1. Modifying existing DB schemes to allow the pensionable age to rise automatically with increases in life expectancy, thus enabling sustainability and a better distribution of benefits and costs across generations.⁶
2. Developing hybrid systems that combine features of both pay-as-you-go DB and fully funded DC schemes. This could involve either (i) creating within public DB schemes notional accounts that expose individuals to the risk of slower GDP growth or changes in life expectancy arising pre-retirement. Such a system can create a stronger link between individuals' contributions and benefits and increase incentives to work longer. Similar to the first option, it would share risk more fairly among generations; or (ii) incorporating some of the collective features of DB schemes into DC pension schemes, for instance, via the pooling of investment returns and/or the provision by the scheme sponsor of minimum return guarantees.⁷
3. Ensuring that DC schemes are complemented by adequate public safety nets (possibly on a means-tested basis) to provide minimum income insurance.

Adapting to the changing dynamics and nature of work

LFS systems and policies need to reflect changing work environments, lifestyles, and cultural norms. For example, millennials do not expect and are unlikely to work for only a few employers during their working lives. They will work for many firms and

organizations, from large multinationals to self-employment in the gig economy.

Potential adaptations include building more flexibility into pension systems to accommodate people's life and career choices, targeting and designing LFS policies for workers in careers with new structures, and improving pension portability through simplifying processes for consolidation of pension savings from multiple providers.

Improving public financial literacy

As workers and retirees take more responsibility and risks associated with LFS outcomes, we need to improve worker and retiree financial literacy so they can better carry that burden. Recent surveys show financial literacy falling among the younger generations. Policies to build public awareness and improve financial literacy could include initiating broad-based public and stakeholder education, mandated through multiple channels including government publicity, schooling, employment, financial services promotional material and financial "health screening"; and bundling education and advice into auto-enrolment mechanisms and prompts triggered by threshold events such as leaving school, entering the workplace, and buying property.

SHIFTING PUBLIC ATTITUDES AND OVERCOMING POLITICAL FRICTIONS TO SYSTEM REFORM

Reforming LFS systems is never easy. Changes are often highly contested, as the recent political controversy over proposed retirement system changes in Brazil, Germany, and Russia has demonstrated. Disputes pitch one group against another, or one generation against another. **Those who stand to lose some benefits tend to defend their interests more forcefully than those who stand to gain**, who are typically younger and less focused on their retirement years. Those who are better educated or more aware of how policy reforms will affect them will often be able to exert greater influence in public

⁶ The Nordic countries have moved furthest in this direction.

⁷ Some countries have adopted this solution, such as Denmark and Singapore.

debate. Relatively high voter participation among older generations also works in favor of maintaining the status quo or even increasing payouts in some cases. And, of course, those not yet born are without a voice of their own, but their interests are no less relevant to responsible public policy.

Mechanisms should therefore be designed to better inform public debate about the trade-offs and choices that have to be made and the costs of inaction, and to build consensus around workable combinations of policy. **Countries should consider institutionalizing mechanisms to redress the basic asymmetries in public debate, as mentioned above.** In some countries, independent agencies with defined mandates and powers to set key policy parameters (such as the standard retirement age) will be best placed to ensure adequate and sustainable LFS. In other countries, independent advisory bodies,

or standing legislative committees, can be tasked with developing multistakeholder consensus and providing independent and consistent advice to governments.

The value of international comparison

Given the multiplicity of different national starting points, and the need to consider the relationship among multiple dimensions of LFS provision, the mix of actions required to address the global LFS gap will differ from country to country, making it unwise to define a single, universally applicable answer.

But there is great scope to learn from other countries' experiences. Policy should be based on a rich understanding of the different combinations of approaches that different countries are using to address the common LFS challenge.

Introduction

Humanity has made phenomenal progress in the last century, with amazing breakthroughs in science and technology and consequent improvements in the human condition.

With each advance, however, new challenges emerge, such as climate change, bacterial resistance to antibiotics, and the proliferation of weapons technology, to name a few.

One of the most spectacular examples of progress has been in the field of medicine and general health, which has resulted in increases in average life expectancy across the globe. Humans born in 2015 can expect to live to age 72 (80 in the United States) compared to 47 (69 in the United States) for those born in 1950.⁸ However, while the average age of the human population has been increasing, there has been a gradual tailing off in the rate of human reproduction, itself the result of improved economic and environmental conditions, education, and health care.

Why does this matter? A fundamental characteristic of human societies is that they have always taken care of their young and old, and there is every reason to believe that practice will continue. However, with the aging of the population, the number of those needing care has been increasing relative to the number able to finance and provide care. As that process continues, the capacity of those financing and providing care becomes stretched, making it more difficult to sustain both their own livelihoods and the livelihoods of those in their care. This is the scenario societies are facing as they look ahead to the next century and contemplate the likelihood that increasing numbers of people will live for a century or more.

Demographers, policy makers, actuaries, and others interested in this issue have long been aware of this looming problem, and the challenges and policy

implications have been studied extensively. Sadly, the general political debate has largely ignored demographic facts and focused on “rewarding” the older generation, whose propensity to vote in general elections exceeds that of younger cohorts by a substantial margin. In the case of Germany, the retirement age has even been lowered for a large portion of employees, aggravating the pension issue as well as the shortage of labor.

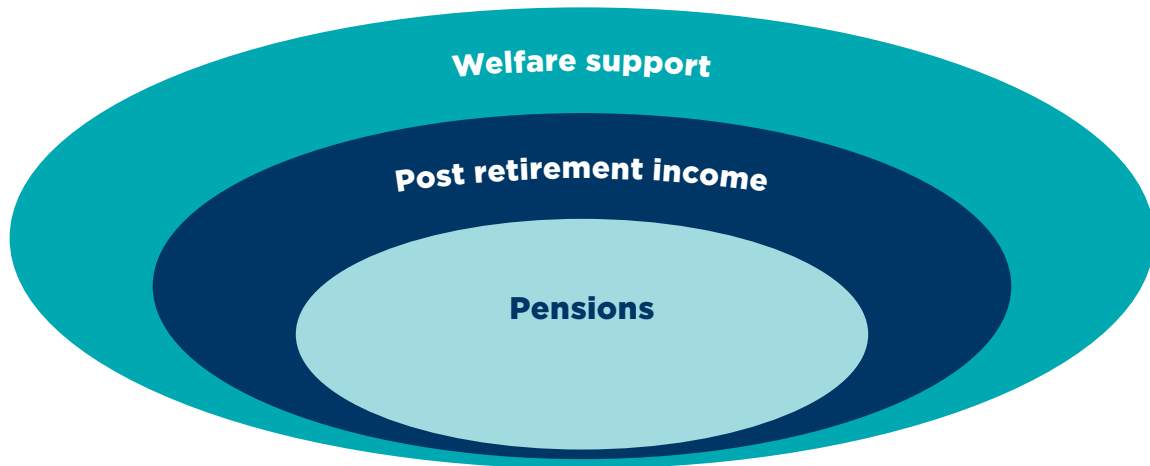
One of the features of this demographic change that has attracted particular attention is the sustainability of pension systems. As we describe later in this report, pensions of various kinds have emerged as a key mechanism by which the livelihoods of older people have been sustained. With national pension systems under pressure, those livelihoods are under threat, and national governments are rightly focusing on what they need to do in response.

Given that backdrop, and that the impending challenges have been studied extensively, why is this report needed?

First, while much of the focus has been on policy implications at the national level, the underlying issue is a global one, and we believe the implications are somewhat different when the issue is viewed as such.

Second, while much of the focus has been on pensions, as the title of this report indicates, we see the issue more broadly as one of Lifetime Financial Security (LFS), which is a bigger, more complex picture, as seen in Figure I1.1. While pensions play a crucial role in delivering overall LFS, LFS is also heavily dependent on the availability of other sources of income and other sources of welfare support such as public health, other public amenities such as housing and transport, and informal community and family support. It is therefore important to consider public policy in these areas, as

⁸ United Nations 2017.

FIGURE II.1 SCOPE OF LIFETIME FINANCIAL SECURITY

well as background socioeconomic conditions and cultural norms, in evaluating Lifetime Financial Security. Likewise, measures to improve LFS should not be restricted to the reform of pension systems but could be more effective if combined and coordinated with reforms in these other areas.

Third, although much attention has been devoted to this issue, even in the relatively narrow sphere of pension reform, we believe insufficient progress has been made, considering the scale and importance of the challenge. We need to examine why.

Finally, this is not just a matter for public policy. All actors must play their part. We want to call attention to the subject and the challenges we face. While we fully acknowledge that the existing literature is extensive and of a high standard, we believe that the Group of Thirty (G30), as a global, independent body with a membership drawn from the government, regulatory, industry, and academic spheres, can make a valuable contribution to the debate.

OBJECTIVES AND SCOPE

The objective of this report is to inform global policy choices and industry responses to ensure the ongoing provision of Lifetime Financial Security, defined as people having the ability to meet essential living

expenses, and to maintain a target standard of living, to the end of life.

To that end, we assess the status of Lifetime Financial Security provision around the world; consider the impact of future developments in demographics, economics, and other factors on the ongoing provision of LFS; and explore the need and scope for further public policy initiatives and other measures to improve it.

ABOUT THIS REPORT

Although many of the key policy questions (at least with respect to the design of pension systems), and many of the challenges faced by individual nations, have already been well aired, Lifetime Financial Security remains elusive. This report is the G30's contribution to framing the problem and trying to devise a long-term solution to it.

The factors affecting LFS differ enormously in different parts of the world, and there is no single prescription for how best to deliver LFS at a global level. However, there are certain trends and circumstances that fundamentally impact policy and are common to all nations. These commonalities and challenges will be examined in this report. There are also examples of national policy innovation that have potential application in other countries.

The report is organized as follows:

SECTION 1 - A Conceptual Framework of Lifetime Financial Security Provision presents a framework of objectives, environmental conditions, and policy choices.

SECTION 2 - The Economics of Lifetime Financial Security defines the demographic and economic building blocks and interrelationships that determine LFS outcomes.

SECTION 3 - Demographic, Economic, and Policy Trends looks ahead to 2050 and, based on forecasts from a variety of external sources, analyzes how the intersection of demographic, economic, and policy trends is likely to manifest in the supply and demand of LFS provision.

SECTION 4 - A Brief Survey of Lifetime Financial Security System Designs identifies the key models for LFS provision and highlights key system design choices.

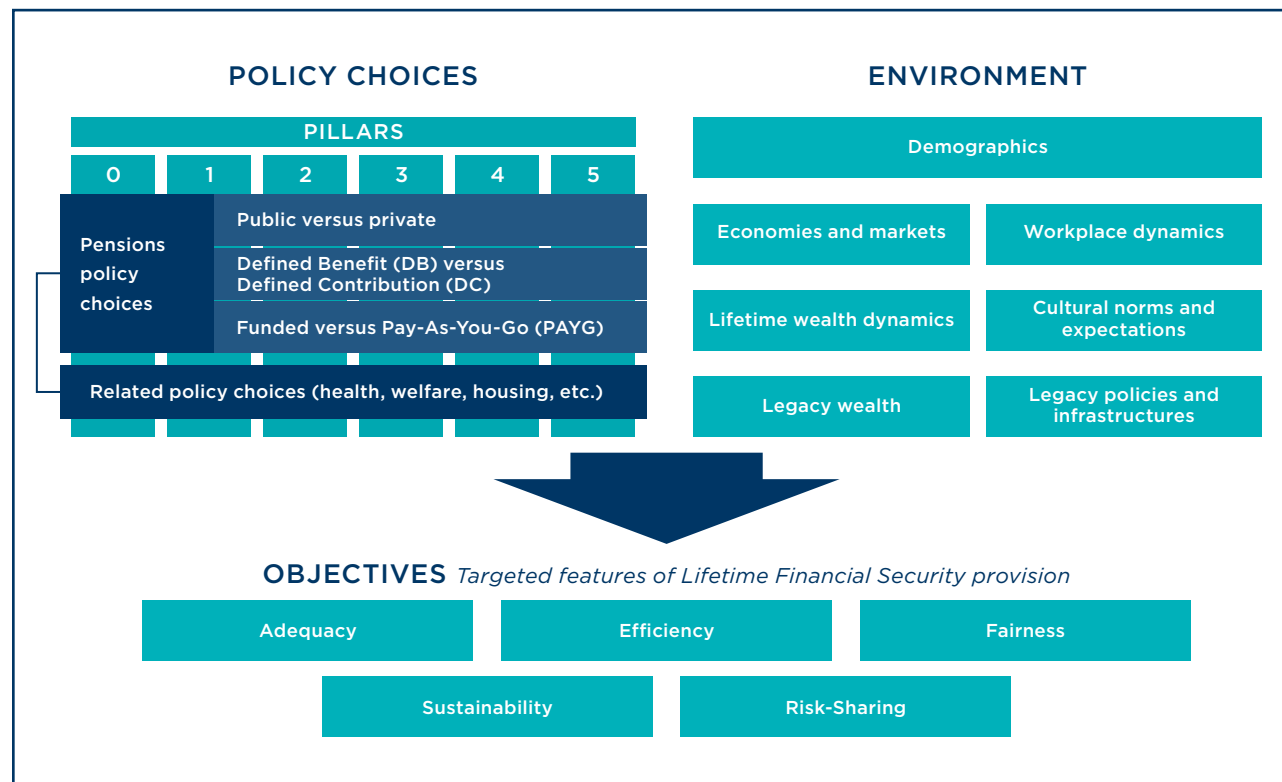
SECTION 5 - Policy and Industry Responses for Successful Lifetime Financial Security analyzes the challenges in delivering LFS and presents a “menu” of potential policy and industry responses.

A Conceptual Framework of Lifetime Financial Security Provision

Lifetime Financial Security (LFS) is the ability to meet essential living expenses while maintaining a target standard of living until the end of life. LFS systems are arrangements of policies and systems designed

according to certain explicit or implicit objectives, taking into account environmental conditions. This is illustrated in Figure 1.1.

FIGURE 1.1 CONCEPTUAL FRAMEWORK OF A LIFETIME FINANCIAL SECURITY SYSTEM



Source: PwC analysis

POLICY CHOICES

Historically, pensions have been the primary mechanism for delivering LFS. Pension policy choices include delivery channels (via the public or private sector); structure and who holds the risk, that is, in “defined contribution” (DC), “defined benefit” (DB), as well as middle-ground “hybrid” systems; and how they are funded (from previously saved earnings, or from current earnings as in public pay-as-you-go systems).

In a DC plan, a worker’s employer (and potentially the worker herself or himself) contributes into an individual’s account at a set rate, such as 7 percent of income annually. Contributions are generally invested in a plan chosen by the employee for the duration of the employee’s “work life,” and upon retirement the balance of the account becomes available to the individual. In a DB plan, a DB account guarantees a specific monthly amount of income is given to the employee for the duration of her or his life after retirement. For example, each month the employer may provide 10 percent of the worker’s average annual salary from the last year of employment.⁹

Policy choices should not be binary. That is, systems are a mix of policies and approaches, with a greater or lesser reliance on one pillar of the system or another. Indeed, there are now hybrid systems that

combine elements of individual-based DC and collective DB systems. These systems vary in their synthesis of DC and DB, but typically pool together individuals’ contributions in collective investment schemes that distribute responsibility and risk differently from traditional DC schemes. There are some DC schemes that build in publicly funded supplements for members with lesser means, not dissimilar to the progressivity embodied in many DB systems.

Within each of the pillars of an LFS system, further policy choices are made, with a greater or lesser emphasis on aspects ranging from the sharing of risk to level of compulsion for citizens to participate. This report’s taxonomy draws on the World Bank’s four-pillar approach,¹⁰ and we add a fifth pillar, as depicted in Table 1.1.¹¹

The adequacy of an individual’s pension and other retirement income depends on what services he or she is eligible for outside of formal retirement schemes. The larger the proportion of essential provisions (in particular, health care and housing) that is provided by governments (subsidized) or through private channels (insurance or employer provisions), the lower the demands on retirement payouts. The provision of these retirement-related services through public expenditure differs from country to country, as illustrated

TABLE 1.1 G30 TAXONOMY OF A LIFETIME FINANCIAL SECURITY SYSTEM

PILLAR 0	PILLAR 1	PILLAR 2	PILLAR 3	PILLAR 4	PILLAR 5
Public		Private			Public-Private
Basic safety net	Mandatory contributions, earnings based	Mandatory contributions	Voluntary contributions	Other private sources, outside pension system	Other provisions for retirement needs, in particular, housing and health care

Source: World Bank, PwC

9 U.S. Department of Labor, Employee Retirement Income Security Act (ERISA), “Types of Retirement Plans.”

10 World Bank 2008.

11 See Appendix 1. Comparative Taxonomies for further discussion and definition of these policy dimensions.

in Figure 1.2. In many systems, public expenditure on health care is higher than public expenditure on pensions, such as in the United States.

This report views policy choices in areas contained under Pillar 5—in particular, health care and housing—as important parts of the overall fabric of LFS provision, alongside pension policy choices. The provision of amenities through Pillar 5 is subject to many of the same supply and demand conditions affecting the provision of retirement incomes. Pillar 5 amenities rely on the productivity of workers within society, and on their capacity to provide for the welfare needs of those in society who can no longer contribute fully (or at all) to that output. As such, Pillar 5 amenities are also impacted by the same risks, including economic and longevity risks.

The focus in Pillar 5 is on the public provision of amenities. However, private provision, such as help from families, local communities, and charities, also plays an important part. LFS is delivered through some combination of Pillars 1 through 5. To the extent that it is not delivered adequately through the initial pillars, private provision is a last resort or fallback. As such, it can be regarded as a supplementary safety net. However, in countries that lack adequate public

safety nets, Pillar 5's private provision (that is, through family and community) may be the de facto primary safety net.

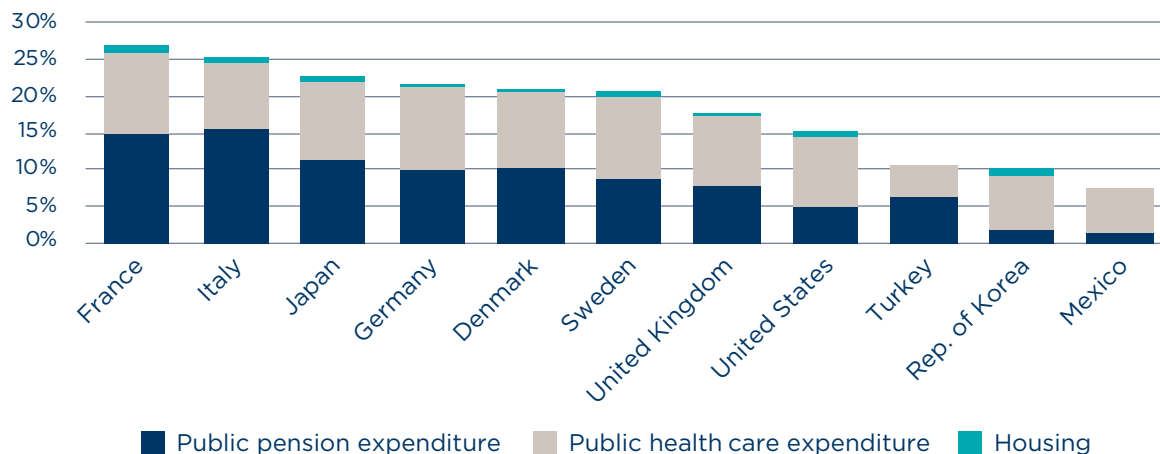
ENVIRONMENT

Reform of pension systems must respond to changing demographic profiles.

Patterns differ from state to state and region to region, but in recent decades, almost all countries have seen a combination of increasing longevity and declining fertility, which significantly shifts the balance between the working-age population (aged 20 to 64) and those in retirement (aged 65 and over). Whereas in the 1950s there were on average approximately 10 working-age people for every retired person in a cross-section of developed countries (10 in Japan, 15 in Brazil and Turkey, and 6 in Germany), by 2015 that had dropped to around 5. If current trends continue, and subject to further changes in official retirement ages, by 2050, that number is projected to decline to 1.25 to 2.5.¹²

Without substantive policy changes, including increases in average retirement age, this continuing demographic trend will increase the level of dependency of nonworking populations on working populations,

FIGURE 1.2 PUBLIC EXPENDITURE ON PENSIONS, HEALTH CARE, AND HOUSING (% GDP, 2015)



Sources: OECD 2015; PwC analysis.

¹² United Nations 2017.

putting severe financial, social, and cultural strains on societies.

In addition to this demographic shift, the implications of changes in other environmental factors that affect LFS must be considered. These include:

- **Economies and markets:** The rate of economic growth and productivity in the economy, which supports welfare provision and generates income and capital returns on private retirement savings
- **Workplace dynamics:** The nature of work, or careers, is changing dramatically. This affects people's ability and propensity to save for retirement
- **Migration:** The effect of large migration flows on countries' economies and populations (see Window 1.1)
- **Lifetime wealth dynamics:** The interplay among wealth accumulation, decumulation,¹³ and inheritance, alongside pension contributions and drawdowns

WINDOW 1.1 MIGRATION AND LFS

Population migration can have positive and negative effects on LFS.

Migration can affect dependency ratios for the recipient countries, via increased numbers of working-age adults. Migration can also impact national fertility rates, as young migrant workers have children. In addition, immigrant workers can help support economic growth in the destination countries. Net outward migration flows can result in the reverse effects on the countries affected by the loss of productive young workers.

Migration flows may cause strains on stretched social welfare systems and safety nets, particularly if fiscal constraints faced by many governments result in cuts to expenditure at the time when such net migration occurs.

When net migration takes place over several years, social and political tension can rise if existing working populations perceive a negative impact from new workers, as competitors for both jobs and social benefits, particularly in cases where such inflows were very large within a short time span and comprised mostly immigrants with little education. Indeed, recent electoral results in many countries signal that certain voters are conflicted and uneasy about the effects of migration.

The impact of migration on LFS is an area of considerable ongoing political and economic controversy. Some countries have begun encouraging increased migration from a low base (that is, Japan), while others are grappling with legal migration limits and refugees (that is, the United States and the UK).

When migration consists of unskilled and low-skilled workers, the recipient countries face ongoing challenges as they integrate and educate the new arrivals to maximize their productivity and ensure they contribute fully to society and the economy.

The debate over the pros and cons of migration flows cannot be addressed in this report, but we observe that it is probable that migration flows will continue to be seen, driven by geopolitical, economic, and environmental factors. Given this, political leaders and policy makers will need to consider the impact of migration (both positive and negative), upon LFS planning and policies within relevant regional and national contexts. They should do so carefully and rationally and eschew emotional language. Dealing with the political, social, and economic effects of migration requires calm, strong leadership, while seeking to craft workable solutions for society as a whole.

¹³ Decumulation is the spending of savings to fund retirement.

- **Cultural norms and expectations:** How society in general views and addresses the needs of older people¹⁴
- **Legacy wealth:** Including sovereign wealth (that is, government savings) and private wealth handed down through generations and thus available to generate private income, fund consumption in retirement, and absorb risk
- **Legacy policies and infrastructure:** Legal and regulatory instruments, and the existence and strength of public and private institutions and infrastructure that support the delivery of LFS.¹⁵

OBJECTIVES OF AN LFS SYSTEM

The existing literature provides alternative approaches to defining objectives of an LFS system. For example, Mercer and the Australian Centre for Financial Studies (2017) developed a system of performance indicators with three broad objectives—adequacy, sustainability, and integrity—that they use to rate the overall quality of national pension systems.

This report adopts a wider set of objectives and appraises LFS systems on the basis of:

- **Adequacy:** Across the whole system, supporting the ability of individuals to (a) meet essential

living expenses, and (b) maintain a target standard of living to the end of life¹⁶

- **Efficiency:** Delivering maximum overall LFS outcomes from available resources, including invested savings, net of administrative and other costs
- **Risk Sharing:** Appropriate allocation of responsibility and risk between collectives (for example, state, plan sponsors) and individuals
- **Fairness:** In the availability and spread of benefits, as well as allocation of burdens across both groups and generational cohorts
- **Sustainability:** Being robust to future developments, for example, with respect to demographics, economic conditions, and changes in productivity.

We recognize that LFS systems can create externalities, that is, unintended costs or benefits, in other areas of public policy (such as social, industrial, environmental, educational, and immigration policies) and public policy objectives (such as employment, economic growth, social mobility, and financial stability). However, the scope of this report does not include such effects. Where appropriate, these impacts may be flagged but not addressed in detail.

14 It is preferable to be poor and old in an environment where public safety nets and community support structures are strong than where they are weak or nonexistent.

15 This category includes entrenched policy positions and political factors that constrain policy options at least in the short term.

16 Both elements (a) and (b) are important, and the distinction between them can be used to characterize the intent of public pension schemes. In some cases, they do not go much beyond (a), that is, poverty prevention, whereby the onus for (b) rests in private hands. In other cases, public schemes take on more of (b), maintaining a target standard of living to the end of life. The convention of wrapping these together under the umbrella of “replacement rates” (the ratio of post-retirement to pre-retirement income) and setting a certain replacement rate as a benchmark for adequacy is, in our view, too blunt, and in certain conditions can drive unrealistic expectations. See Section 5 for further discussion.

The Economics of Lifetime Financial Security

BUILDING BLOCKS

The economic context for Lifetime Financial Security (LFS) is the need and propensity for individuals to consume throughout their lifetimes while not having the capacity to produce throughout their lifetimes.

For individuals, this results in a process of “accumulation” and “decumulation” of savings. It has periods of dependency, that is, supporting dependants when able to work, or being dependant when not, or a combination of both.

At a system level, this gives rise to dynamics on which the LFS of individuals within the system depends, as follows:

- **Demographics and dependency:** The age profile, and level of dependency, within the system’s overall population
- **Productivity and living standards:** The level of economic output that the system’s productive population can generate harnessing capital, technology, and other factors, and how this spreads across the whole population, working and nonworking
- **Savings, investment, and wealth:** The flow of net savings, including pension savings, to finance new investment in capital and technology, and the stock of wealth resulting from the accumulation of net savings and investment. (For

a discussion on how this operates at the system level, see Window 2.1)

- **Investment yields:** The financial output generated by the accumulated stock of capital wealth and the consumption this enables
- **Risk:** The danger that resources may be insufficient to cover essential living expenses and afford target living standards due to lower-than-expected income or greater-than-expected expenses
- **Fiscal capacity:** The capacity of governments to deliver and underwrite LFS from current and future tax receipts, including in adverse risk scenarios.

These dynamics dictate the economic parameters of LFS, that is, the capacity of the economy to sustain the living standards of the population, including the nonworking population.

The share of economic output that is distributed to the nonworking population is a matter of political choice,¹⁷ and may affect work incentives and economic performance.

The means by which economic output is distributed to nonworking populations, via taxes and benefits, or via the requirement to save, is also a political choice. Such choices may have positive economic implications in terms of efficiency, incentives, the generation of investment finance, and other factors.

¹⁷ In the case of private savings, there is an element of personal choice, as well, although that choice is typically exercised in the context of what is expected to be distributed publicly. For more on the interaction between savings and transfers, see subsection on Savings, investment, and wealth.

WINDOW 2.1 THE SIGNIFICANCE OF CLOSED COMPARED TO OPEN SYSTEMS

At the system level, LFS is a zero-sum game; that is, the overall economic output that is available to sustain the population is a fixed sum. It is a closed system, at the global level, because the system cannot invest or borrow outside of itself. For open systems operating

within that overall closed system, which is most countries, the closed nature of the system is still evident through the demographic cycle because whatever is borrowed to fund current consumption must ultimately be repaid out of future output.

DEMOGRAPHICS AND DEPENDENCY

At a system level, the sustainability of LFS relies on a balanced profile of people at different stages of life (see Window 2.2), so that the productive output of the working population is at all times sufficient to sustain the consumption needs of the entire population.¹⁸

The demographic profile of a population is driven by two phenomena: longevity, that is, how long people

live; and fertility, that is, the rate at which the population replaces itself through reproduction.

At a global level, increasing longevity and falling fertility are causing an increase in dependency. This is a problem in terms of the long-term trend and the rate of change, which can result in short-term demographic imbalances, and thus economic imbalances and disturbances (see Window 2.3).

Longevity, influenced primarily by advances in health care, is increasing gradually, predictably, and more or less consistently, across all populations. It is relatively easy to anticipate and plan for, despite the reality that its long-term effect on dependency, absent policy responses, is still significant.

In contrast, fertility, influenced more by behavioral and cultural phenomena, is less predictable and more disruptive in the medium term. Contrast the experience of Japan, with a current fertility rate of 1.41, and the strain of both a declining and aging population, with the United States, where the fertility rate has declined from 3.65 in 1960 to 1.89 in 2015.¹⁹ The result is that Japan's 65+ dependency ratio will be 52 percent in 2020 compared with the U.S.'s 28 percent.²⁰

Figure 2.1 illustrates how longevity and fertility changes have influenced dependency ratios in the United States and Japan from 1950 onward.

WINDOW 2.2 THE CHANGING CONCEPT OF A WORKING LIFE

Historically, LFS systems have been established on the assumption of a "typical" working life involving continuous employment from about 20 to 64 years of age.

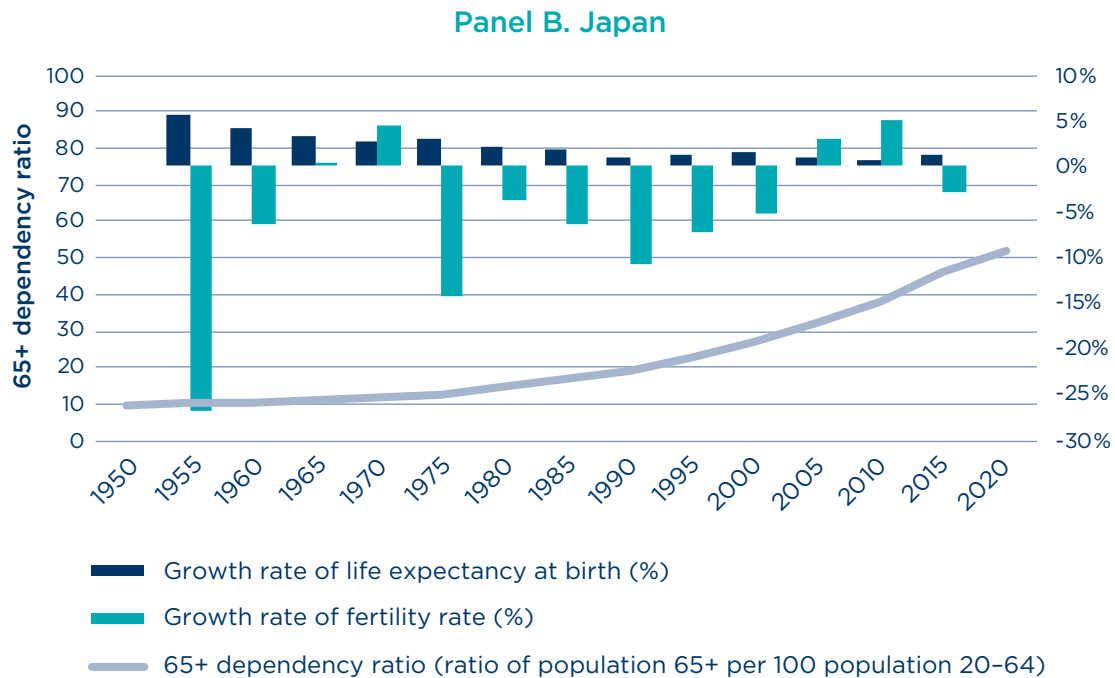
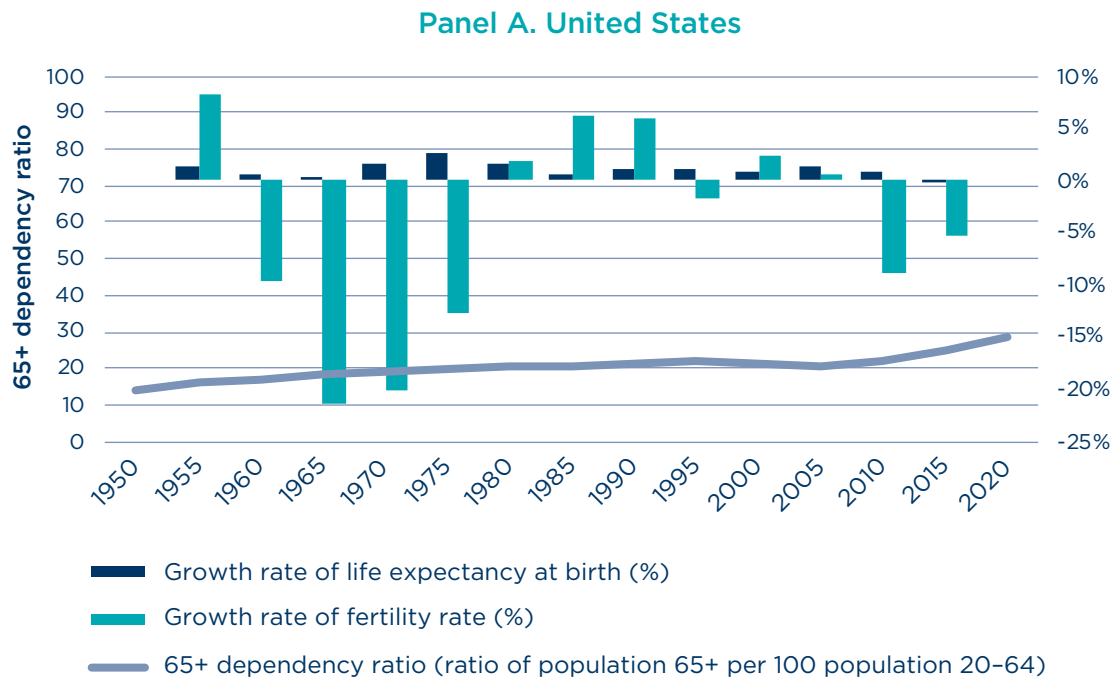
Due to changes in technology, culture, industrial, and firm-level systems, as well as demographics, the concept of working life is rapidly evolving. Careers are becoming more fragmented and diverse, and less defined in terms of start and end points. LFS systems need to adapt to these changes.

18 By different stages of life, we mean different stages in the evolution of their productive capacity throughout life. The important point is that the aggregate output of work, broadly defined, and regardless of who is doing it, ultimately needs to cater to the consumption needs of the entire population.

19 With fertility rates, stability and convergence around a level that roughly maintains population size (subject to environmental considerations) is generally accepted as the desirable target. This is generally accepted to be around 2.1. The concern is that many countries are substantially and consistently either undershooting or overshooting that target.

20 United Nations 2019.

FIGURE 2.1 POSTWAR DEPENDENCY RATIO, LIFE EXPECTANCY, AND FERTILITY RATE, UNITED STATES AND JAPAN, 1950-2015



Sources: United Nations 2019; PwC analysis.

WINDOW 2.3 THE INTERPLAY OF LONGEVITY AND FERTILITY IN INCREASING POPULATION DEPENDENCY

A steady, gradual increase in longevity drives dependency steadily upward.

Because a change in fertility tends to take the form of a shift rather than a continuous trend, it sets off waves of dependency through the population. For example, the postwar baby boom generation created an increase in dependency (youth dependency), then a sharp fall in dependency as that generation entered the workforce, and it is now pushing dependency up again as baby boomers retire. That same dynamic can happen in reverse if there is a sharp drop in fertility, such as happened with China's one-child policy.

A steady-state fertility rate also affects dependency. If the steady state is below the level required to maintain a stable population, it creates a constant upward dependency bias as it increases the proportion of post-working-age

people in the population. This can be offset to some degree by a lower proportion of pre-working-age people; it is generally the case that youth dependency is less financially costly than old-age dependency.

A low steady-state fertility rate therefore exacerbates the dependency of increasing longevity, as in Japan, North America, and Western Europe. Conversely, a higher steady-state fertility rate can offset some of the effects of increasing longevity, as in parts of Africa, although most traditionally high-fertility regions are now experiencing sharp falls.

The fertility rate also has an impact on the rate of total population growth, the sustainability of which is ultimately bound by environmental constraints. Although a high fertility rate can help mitigate dependency, it must ultimately decline to a sustainable level.

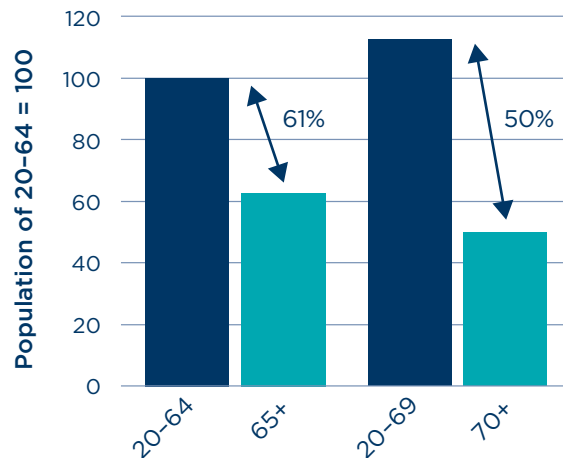
The sharp and sustained drop in Japanese fertility after 1970 has combined with a steady increase in longevity to produce a sharply higher rate of dependency growth than in the United States.

Setting aside the individual countries, at a global level, underlying demographic trends are forcing a re-evaluation of the sustainability of the dependency relationship, particularly given the prevailing policy climate and cultural expectations about retirement.

Ultimately, much of this re-evaluation must rely on the official retirement age, which in many countries has for many decades remained at around 65, even though longevity has increased significantly.

Figure 2.2 demonstrates the sensitivity of dependency to changes in the retirement age, in this example, from 65 years to 70 for Europe as a whole. It shows that, all else being equal, a change in the retirement age from 65 years to 70 reduces the notional dependency ratio from 61 percent to 50 percent. It is notable that even quite small shifts in retirement ages can have a marked impact on the dependency ratio, as they simultaneously increase the working-age population

FIGURE 2.2 SENSITIVITY OF DEPENDENCY RATIO TO RETIREMENT AGE, EUROPE, 2015



Sources: United Nations 2017; PwC analysis.

(the denominator) and decrease the post-working-age population (the numerator).

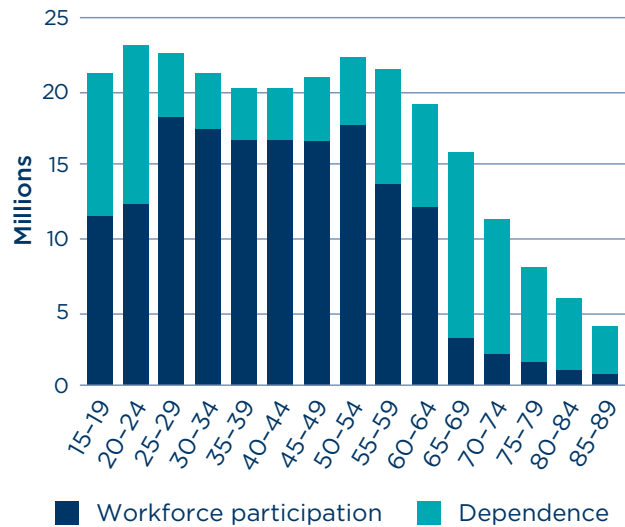
In principle, the increase in dependency due to demographic change could be reversed simply by increasing the retirement age. But practical and political factors require that we look beyond that simple remedy.

First, people may not be able to work proportionately longer; that is, people may be living longer but many may not be able to work due to illness or incapacity. Also, today people tend to be incapacitated for longer periods before they die. In general, the capacity for productive work declines before medical incapacity occurs. This is an obvious issue for people working in physically demanding professions such as construction, agriculture, and manufacturing.²¹ But it also applies more generally because both physical and cognitive frailties set in at some point, and while improved health care can clearly extend people's living lives, it is less clear that it can extend, to the same degree, people's working lives.

Second, given the changing concept of a working life (see Window 2.2), what matters is the aggregate capacity for productive work in the economy. A perhaps more realistic and helpful concept of dependency is illustrated in Figure 2.3, which takes account of a population's current workforce participation across the entire age spectrum.²²

For example, the population dependency ratio for the United States is 59 percent (total dependent population in relation to total participating workforce²³). This would clearly decline if a higher proportion of the population worked past age 65. The dependency ratio would also decline if a greater proportion of other age groups participated in the workforce. Here, the notion of an aggregate active, productive working population within the system, as opposed to the numbers of people either side of a defined age threshold, is the relevant consideration.

FIGURE 2.3 DEPENDENCY RATIO REVISITED FOR THE UNITED STATES, 2015



Sources: PwC analysis; United Nations 2017; U.S. Bureau of Labor Statistics.

Third, people simply might not want to work proportionately longer as they live longer, preferring instead to lower their consumption levels during working life, and/or in retirement.

PRODUCTIVITY AND LIVING STANDARDS

This report places the emphasis on productive work for two main reasons.

First, the effectiveness of increasing retirement ages, or of increasing and extending the profile of productive workforce participation, requires that people remain productive as they work longer.

Second, what ultimately matters are living standards, which are a function of outputs,²⁴ not inputs.

21 Designing systems that address physically demanding jobs that may negatively impact a worker's ability to work proportionately longer in the same role, is not to suggest such individuals be given a free pass. Rather we suggest policy makers structure the shift to longer working lives in a manner that recognizes this reality for sections of the workforce, including providing retraining and other options, as appropriate.

22 This profile can also look quite different for different demographic groups, such as gender, where there can be marked differences in both age profiles and workforce participation levels.

23 The productive dependency ratio for the United States of 59 percent is higher than the traditional measure of dependency (25 percent in 2015), because the additional dependency (through nonparticipation) among working-age cohorts is greater than the workforce participation of people over 65 years of age.

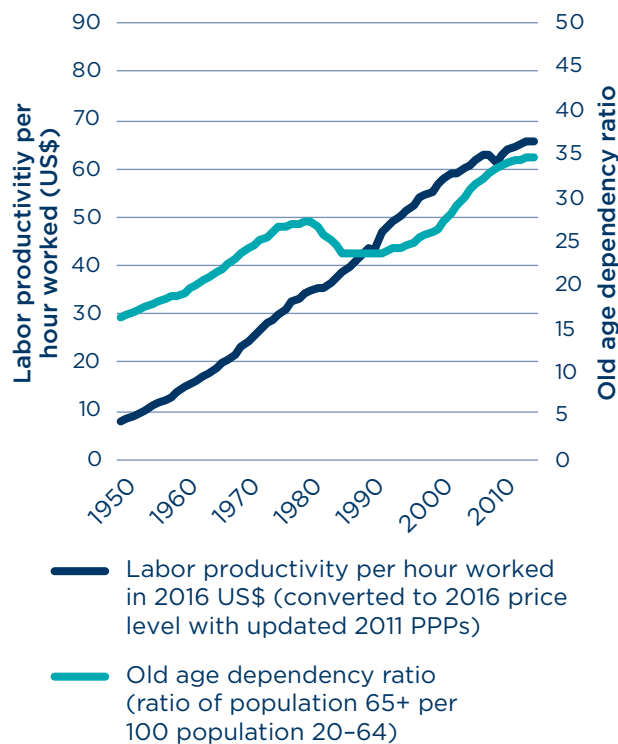
24 Including outputs from informal productive activity not necessarily captured in national economic statistics. The scope to boost this through, for example, community schemes involving both working-age and retired populations is considered in Section 5.

When inputs are constrained, the efficiency with which we produce outputs—that is, economic productivity—is a crucial determinant of LFS. This applies across the economy and population cohorts, not just work performed by 65-to-70-year-olds. In the past, increased productivity has enabled an increase in living standards for all, despite an aging population and an increasing dependency ratio.

From the 1950s through 2015, the drag on average living standards from increased dependency was more than offset by improvements in economic productivity (see Figures 2.4 and 2.5).²⁵

As Figure 2.4 shows, labor productivity in Germany grew alongside the increase in dependency, helped in part by reunification. Because German GDP per capita has also grown in real terms over that period,

FIGURE 2.4 HISTORIC DEPENDENCY AND PRODUCTIVITY TRENDS, GERMANY, 1950–2015



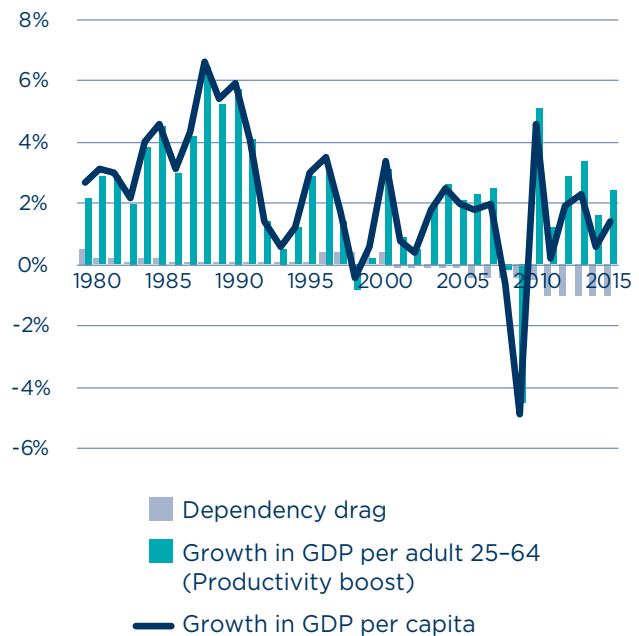
Sources: Total Economy Database; PwC analysis.

we find that growth in GDP per capita of the nominally working-age population (workforce productivity improvement) has been sufficient to deliver growth in GDP per capita of the entire population, despite the increase in dependency.

Even in Japan, where the demographic changes have been more acute and are further advanced than in other developed countries, productivity improvements have so far more than offset the dependency drag. Figure 2.5 deconstructs overall Japanese GDP per capita growth from 1980 to 2015 into growth in GDP per nominally working-age adult and the total dependency drag. This shows that while the dependency drag has been significant, particularly since 2011, over which time it has reduced GDP per capita growth by about 1 percent per year, this has still not caused overall living standards to fall.

We underscore that the future sustainability of LFS will be highly dependent on the future balance

FIGURE 2.5 DEPENDENCY, PRODUCTIVITY, AND REAL INCOMES, JAPAN, 1980–2015



Source: PwC analysis.

²⁵ Here, we assume a baseline requirement that average living standards across the system’s population should not fall. The question of whether that is a sufficient test, and how changes in living standards should be apportioned between working and nonworking populations, is examined in later sections.

WINDOW 2.4 THE RELATIONSHIP BETWEEN AGING AND PRODUCTIVITY

An aging population increases the dependency ratio and may affect productivity, but the precise parameters are still being debated.

An aging population increases demand for certain types of social and health care services. Those types of services, although essential and socially worthwhile, have a relatively low level of productivity. As the population ages, and in some cases shrinks due to lower total factor fertility rates, the ability of municipalities and the private sector to support the population is placed under strain, potentially impacting the productivity of individuals and countries.

In addition, the relative productivity of an aging workforce, may also change, as those who wish to continue to work take up different roles, occupations, and habits.

Even if aging itself is neutral from a productivity standpoint, the shift in societies still has many economic and political implications. Regarding the former, if innovation is in part

a function of youth, then aging populations may mean less innovation and potentially less productivity gains. Regarding the latter, in aging societies the political balance can shift with active retiree voters asserting their rights and interests ahead of those of subsequent younger and less politically engaged workers, with implications for society and the economy.

Currently, there is no clear theory on the relationship between aging and productivity. When analyzing the relationship between aging and productivity, social, political, and economic dynamics play an important role. Each society will be impacted differently depending on the interaction of these various factors.

Given that this issue is important for all countries surveyed for this report, we urge academics and the policy community to undertake further research on the subject so that the policy discussion and decision-making process can be better informed.

between dependency and productivity.²⁶ The precise links between an aging population and productivity is an area of debate (see Window 2.4).

This report does not address the dynamics of productivity growth in general. However, we observe that maximizing the productivity of work requires the optimal combination of work (labor) with other factors of production, notably capital. This puts a premium on the mobility of these factors, the development of technologies to connect them better, or both. Two issues arise that are particularly relevant for our analysis—concerns about robots and unemployment, and the need for investment.

Concerns about robots and unemployment are often expressed in terms of risks to jobs in a world where an increasing percentage of all work activities can in principle be automated. Accelerated automation could have both a positive impact on increasing

dependency and be a potential cause of additional problems.

For example, automation will increase productivity, helping to offset the effect on income per capita of increases in dependency. Low fertility rates could also provoke real wage increases, resulting in increased incentives for capital/labor substitution. Japan, faced with both rising longevity and low fertility, is at the forefront of robotics developments, including those potentially related to eldercare.

Further, although low fertility stimulates an offsetting productivity increase, automation might produce increased inequality. Most people's LFS is strongly linked to employment during their working life. If automation threatens or in fact reduces or eliminates the employment and/or the real wages of specific groups of workers, it could reduce their ability to accumulate sufficient pension rights and savings. This highlights

²⁶ We are not claiming a causal relationship either way between demographics and productivity, although such claims are made (see, for example, Skirbekk 2003a). We merely point out that the sustainability of Lifetime Financial Security thus far has resulted, on balance, from a *coincidence* of these two phenomena.

the importance of the distinction between adequate income and wealth creation in the aggregate, compared to the implications of income and wealth distribution.²⁷

Given the importance of productivity to maintaining average living standards and given the crucial role of capital and technology in driving future productivity growth, investment—and the adequate supply of finance for investment—is a key determinant of LFS, as the Group of Thirty has made clear in the past.²⁸

SAVINGS, INVESTMENT, AND WEALTH

If people are to smooth consumption over their lifetimes, they either need a mechanism for deferring consumption to a later time, that is, the ability to save, either individually or collectively, or they need a form of “social contract” whereby, in exchange for supporting others early in life, they get to depend on others later in life. This is the essential difference between funded and pay-as-you-go (PAYG) systems. But does this difference matter?

We think the difference is of less relevance in this context because, at the global level, everything ultimately resembles a PAYG structure at its core; in any period, the world can only consume what it can produce.

Indeed, there is a certain fallacy in the supposition that savings, at the overall system level, at least, can mitigate the effects of demographic change and increasing dependency. Only investment can do that.

To understand this, consider what happens to savings in a closed system.

First, savings can be offered as loans to other people who want to bring their consumption forward, or to the government, which may need to borrow to fund current expenditure against future tax receipts. In a closed system, this exchange of consumption deferred with consumption brought forward, via savings and loans, nets down to zero. Second, savings may be invested, via loans or other financial securities, in the creation of new productive capacity, enabling higher consumption in the future. In a closed system, this form of saving is a genuine system-wide investment, because it results in a slight increase in the capacity for consumption in the future, that is, less consumption now in exchange for more consumption later.

In a closed system, what matters is not so much that money is put aside for later,²⁹ but rather that a proportion of consumption capacity is invested in the new productive capacity to allow higher consumption in the future (see Window 2.1). The role of savings is to generate finance for investment.³⁰

Even in an open system, many of the same dynamics apply. In the short run, countries can borrow to smooth out the effects of demographic imbalances, importing or exporting capital or labor to maximize economic output. Countries can trade their output to take advantage of comparative production advantages. Ultimately, however, through the demographic cycle, open systems are bound by the same constraints, and presented with the same imperatives, particularly the

27 In principle, as long as per capita output is going up, the overall capacity to sustain living standards across the population is being improved, even if a substantial share of that output is accruing to capital, not labor. In terms of distribution, again in principle, what does not trickle down naturally can be taken care of through the tax and welfare system. While the threats posed to certain people in certain professions at certain stages of their careers are real, at a system level it is difficult to reconcile a concern about labor substitution and unemployment with a background concern about a shortage of productive labor due to demographic change. We assume, therefore, that the impact of capital investment and new technology development is to *maximize total output in a full employment scenario*, rather than to remunerate capital at the expense of labor. We recognize that a lot rides on this assumption. We also recognize that there are some important and related economic realities, such as the fact that real wage growth has lagged productivity growth in recent decades, and the persistence of high unemployment in some countries, which need closer examination and a more effective remedy.

28 Group of Thirty 2013.

29 In a closed system, there is no such thing as “aside” and, in any case, when “later” comes around, money can only buy what is capable of being produced. Unless that “money” is backed by real investment generating higher output, its purchasing power, that is, its “real” value, will be eroded by inflation.

30 Private savings are not the only source of finance for investment of this kind. Indeed, when it comes to public infrastructure, or the capital that goes toward the provision of public services (schools and hospitals, for example), it is often assumed that these investments should be publicly funded. Our characterization still works in this case: there is a deduction from current consumption ability (taxes to fund public investment), which is followed in due course by an accretion of consumption ability (better transport, education, and health care, for example). The level of private savings, and the levels of the balance between private and government investment, are thus closely related and potentially significant to aggregate economic performance.

need to invest, as in the closed system. If countries fail to invest, they would see an erosion in national wealth and in the Lifetime Financial Security of their citizens.

INVESTMENT YIELDS

The yield on investment is the financial output generated by the accumulated stock of capital wealth (including pensions), and the future consumption capacity that this enables. The role of yield from invested capital is a function of ownership. If the capital is publicly owned, the yield generated contributes directly to public revenue, helping to meet the cost of publicly provided pensions and benefits. If the capital is privately owned, the yield generated provides an income stream to support the LFS of individuals.

The yield from publicly owned capital is spread naturally across the population. In contrast, privately owned capital tends to be more concentrated in higher wealth brackets. For private investment yields to cater broadly to people's LFS needs, this tendency may need to be countered or remedied through some form of redistribution, such as:

- Redistributing capital ownership through wealth and inheritance taxes
- Redistributing capital returns via company and income taxes
- Means testing entitlements to public benefits
- Incentivizing more widespread private saving through progressive tax concessions.

In recent years, real investment yields have collapsed to very low levels, reflecting a buildup of savings coinciding with weak economic growth and, thus, a surplus of savings relative to the availability of investable assets.

This is a concern because it signals that public and private sector actors across the global economy are struggling to identify capital and technology investments that will deliver the increases in output needed to offset future increases in dependency.

One key implication for private pension systems, to which we return in Sections 4 and 5, is the central importance of ensuring that administration and asset management costs are kept as low as possible, so that low returns are not reduced still further.

Given the need to re-equip the global economy through, for example, infrastructure renewal,

conversion to renewable energy, and adaptation of industrial and economic systems to new technologies, there is no shortage of things in which to invest. The challenge is, instead, the features that make potential investment targets unattractive to potential investors.

Possible explanations for this unattractiveness include a weak risk appetite following the global financial crisis; challenging risk and term profiles for long-term infrastructure projects, combined with a reduced willingness and capacity of government to participate in these projects; a short-to-medium-term contraction of banking industry investment in such projects; and failure of alternative finance providers and platforms to fill the void.

Whatever the reasons, the low-yield environment will probably be with us for a while. (See Section 3 on Interaction of demographic, economic, and policy trends for further discussion on the outlook for yields and the implications for LFS.)

RISK

In Section 1 we distinguished between the two classic pension constructs—defined contribution (DC) and defined benefit (DB). These systems differ in where risk resides—with recipients in DC systems, or with providers in DB systems. We also defined risk, in relation to LFS, as the possibility that resources may be insufficient to cover essential living expenses or to afford target living standards, due to lower-than-expected income or greater-than-expected expenses.

In the case of private provision, such risks manifest through a failure to earn sufficient income during working life—due to unemployment, under or part-time employment, low pay, or in combination—to make adequate provision for post-working life, especially as such periods get longer with rising lifespans. Alternatively, income saved during working life may generate unexpectedly low returns, and not grow sufficiently in value or not deliver sufficient income in retirement. Private savers also face the risk that inflation will erode the purchasing power of their savings.

Private savers can seek and select risk to match their risk appetite, investment horizon, or other aspects of investment strategy, as a way to increase their expected incomes in retirement. Private individuals can diversify or hedge economic risks to some degree, although there is always a residual economic systemic

risk, or beta, which cannot be diversified away and that carries an economic cost.³¹

In the case of public provision, the risks to income are seen in a failure to generate sufficient tax receipts, due to lower-than-expected economic activity, or changes in tax policy, to meet pension commitments. In the case of public provision, there is typically less investment and inflation risk because the pension systems generally operate on a pay-as-you-go basis. Risks are diversified naturally, or they can be hedged through holding sovereign reserves, but again, there is a residual systemic risk that cannot be diversified away.

Risks to expenditures or outlays are essentially demographic and are related to people living longer than expected (longevity risk) and the resultant greater-than-expected aggregate living expenses. This longevity risk faced by people can be broadly categorized into two periods—one prior to retirement and the other post-retirement (see Table 2.1).

As with economic risk, in the case of public provision, longevity risk is diversified naturally except when (as is increasingly the case) whole populations, on average, live longer than expected. With private provision, longevity risk is less well diversified,³² but it can be diversified through insurance, at some cost both to individuals and the wider system.³³

Although economic and demographic risks dominate, there are a variety of other risks to LFS. These include credit and operational risk, such as the financial and operational failure on the part of pension or other amenity providers; behavioral risks, with people and/or governments failing to make adequate provision for future needs; and idiosyncratic circumstances that can impair people’s financial security, such as loss, incapacity, ineligibility, and even the need unexpectedly to have to care for adult children or grandchildren. Many of these risks are insurable, at some cost, and some are not.

TABLE 2.1 TWO TYPES OF LONGEVITY RISK

LONGEVITY RISK	DESCRIPTION
<p>Pre-retirement longevity risk</p>	<p>Longevity risks that crystallize before retirement age; for example, when someone gets to their mid-60s, their life expectancy is higher than anticipated when they/their employer/or the state made decisions/promises about savings/pension rights years earlier.</p> <p>In defined benefit systems, these risks reside with the provider (state/company), which faces a larger subsequent financial burden unless benefits are adjusted. In a defined contribution scheme, the risks reside with the individual, who either needs to work longer or have a lower level of income in retirement than planned.</p>
<p>Post-retirement longevity risk</p>	<p>Longevity risks that crystallize after retirement; for example, when someone retiring at age 65 lives longer than anticipated after the date of retirement.</p> <p>In defined benefit systems, such risks again reside with the provider, unless benefits are adjusted. In a defined contribution scheme, these risks can be shifted from the individual, but only if they take out an annuity contract at retirement.</p>

31 In general, both risks to income and risks to outlay have both idiosyncratic and systemic components, the former being that the residual is not diversifiable, and the latter being risk that can be diversified away. Idiosyncratic risk may or may not manifest, depending on how LFS systems are structured, and systemic risk is ever present, regardless of how it is packaged or distributed, but may be more or less concentrated. This has important policy implications, which we discuss in Section 5.

32 The exception being large occupational defined benefit schemes.

33 The market for private longevity risk distribution—in the form of annuity products—is generally less deep and less frequently availed of than the market for economic risk distribution. We discuss this issue further in Section 5.

We explore questions surrounding where risks reside, and how efficiently they can be distributed, including with what degree of frictional cost, in Section 5.

FISCAL CAPACITY

Governments play major fiscal and legislative roles in LFS provision through several channels. They can be the direct provider of public pensions, health, and other amenities; use fiscal instruments to guide and incentivize others; channel public finance into capital assets that combine with other inputs to deliver the economic output on which LFS ultimately depends; or bear other attendant risks. These roles rest on governments having the fiscal capacity to fulfil their roles effectively,

either from current taxation or, if that is insufficient, by drawing down reserves or borrowing against future tax receipts. This fiscal capacity can be squeezed by external events such as abnormally deep or enduring recessions, conscious fiscal expansionary measures to stimulate growth, an overcommitment of expenditure, or an unwillingness to raise taxes to pay for it.

In 2018, fiscal capacity in many countries was squeezed to the point that governments' ability to fulfil their fiscal role in delivering LFS was constrained (see Window 2.5). A number of governments, but not all, are cutting back on investment and welfare expenditure as a consequence of, or in anticipation of, future fiscal demands on their revenues.

WINDOW 2.5 IS THERE A PROBLEM WITH DEBT?

The International Monetary Fund and the Bank for International Settlements have warned of potential macroeconomic risks associated with the overall level of debt and leverage in the global economy, as has the Group of Thirty.

The concern is over gross indebtedness. The extent to which the rising (gross) debt is a problem depends on what it is for, how serviceable it is, and what happens in the event of a shock.

Individuals, companies, and governments incur debt for two reasons: to move consumption forward in time, exchanged with others who are willing to defer theirs; and to invest in assets.

The first category (accelerating consumption) is of potential concern for both borrowers and their creditors and for the stability of the system.

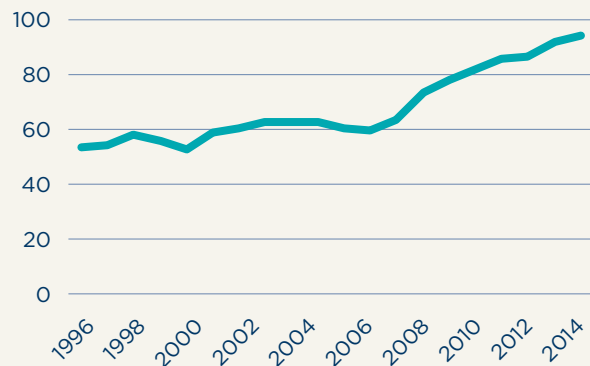
The second category is less of a risk, as growth in investment is generally a good thing. However, if gross debt is increasing because of leverage, not because underlying investment is increasing, this is a cause for concern, as increased leverage can lead to future risks or potential risks.

Government debt has risen substantially in recent years, both in absolute terms (S&P estimates that global sovereign debt hit US\$44 trillion in 2017) and relative to GDP (see Figure

2.6). This is attributed to the 2008–2009 global financial crisis and subsequent recession.

It is normal for debt to GDP to fluctuate through the economic cycle. Governments support consumption and boost investment during recessions. But government debt has been on an upward trend since 2008, and a relatively weak global growth outlook are potential red flags. Looking ahead, fiscal adjustments will be required in many countries to arrest and reverse this trend, and to fund future increases in dependency.

FIGURE 2.6 CENTRAL GOVERNMENT DEBT (% GDP)



Source: World Development Indicators: Central government finances.

By default, governments are leaving it to private individuals and the private sector to make adjustments. This is a major potential pitfall, coming as it does when demographic and economic pressures and risks to LFS are building.

LIFETIME FINANCIAL SECURITY FOR INDIVIDUALS

We have so far concentrated on the economics of LFS at the system level. What about individuals?

Individuals require one crucial thing: when they reach a stage where they qualify for retirement or are no longer productive, they need the security of a recognized claim on the productive output of others. This claim can take a variety of forms. It can be:

- Conferred by citizenship or residency, as in the case of safety net payments (provided through Pillar 0) and some elements of other (Pillar 5) entitlements, particularly health care and housing
- An earned claim in recognition of having made a contribution to others in earlier life, as in the case of earnings-based public pensions (Pillar 1)
- Saved as a consequence of having been compelled or having chosen to defer consumption so as to be able to consume later in retirement, via private pensions (Pillars 2 and 3)
- Otherwise owned, in the form of private wealth either saved, as above, or granted by others through inheritance or other means (Pillar 4)
- Otherwise granted on the basis of societal or familial ties (other elements of Pillar 5).

These types of claims are not equivalent in terms of where investment and longevity risks sit. If risk is borne by the provider, as with DB schemes, individuals bear a further risk that benefits may not be delivered as promised. This second order risk is difficult for individuals to do anything about, other than to supplement their entitlements with private savings.

System design choices should distribute responsibility and risk in a manner that enables efficient investment decisions and performance, and avoids excessive risks being borne by the individual. Where individuals are substantially reliant on their own resources, bearing the investment and longevity risk

themselves, they need access to, and awareness and knowledge of, the risks, as well as the skill and tools to manage the risks effectively. This is a crucial factor that cannot be overemphasized in the widespread transition from public to private LFS provision and, in the case of pensions, from DB to DC pension provision.

There is a very real danger that, for tens of millions of workers approaching retirement across the globe, their pensions savings and private wealth may be insufficient to provide for their remaining lifetime.

DELIVERING LIFETIME FINANCIAL SECURITY - THE POLICY CHOICES AHEAD

The demographic and economic pressures and risks discussed above, combined with the contraction of government fiscal capacity, raises the key question of how these pressures and risks can be alleviated.

The fundamental issue is this: given aging populations, even if increasing productivity proves sufficient to sustain overall average living standards, as it has in the past, harsh realities need to be confronted.

As people are living longer, the status quo in LFS policies cannot remain. Retirement benefit levels of today cannot be maintained if people continue saving the same amount or paying the same taxes during their working years, and retiring at the same age, unless higher taxes on the future generation are imposed. And there are almost certainly political limits to how much of the burden can be shifted to future generations of workers.

There is hence the unavoidable policy and social challenge of adjusting to new realities through a combination of the following fundamental options:

1. Increasing the retirement age and enabling people to work longer
2. Encouraging or incentivizing higher savings during working life
3. Reducing payouts and spending less in retirement, that is, accepting reduced replacement rates.

Placing the weight of change on a single option would be inequitable, unwise, and politically unachievable. A central task of policy debate and political consensus building must therefore be to establish a

fair distribution of future contributions and benefits across different groups.

The solution to this challenge cannot be determined in the abstract, or universally across all national circumstances.

At the national level, it depends on how acute the underlying issue is, which depends on the current and

future mix of demographic dependency and economic productivity; how the individual propositions might substitute for, or otherwise interact with, one another; what behavioral responses they would each induce; and a variety of political and ideological choices.

A menu of policy choices available to governments and policy makers is presented in Section 5.

Demographic, Economic, and Policy Trends

Lifetime Financial Security cannot be assessed fully without a close analysis of the trends present in ever changing demographics, economic status, and developing policies.

DEMOGRAPHIC TRENDS

Demographic trends are central to understanding the evolution in working and nonworking populations and the shifting demands for LFS.

Longevity

Substantial improvements in global longevity have occurred in recent decades. Global average life expectancy at birth³⁴ in 1950 was just 47; in 1995 it was 65. By 2025, it is expected that no country will have a life expectancy of less than 50 years.³⁵ These trends are driven by better medical provision, lifestyle changes, and improvements in environmental quality. Figure

3.1 shows an expected continued rise in global life expectancy from 72 today to 77 by 2050.³⁶

We observe considerable difference in life expectancy at birth between the least developed countries and other developing countries. This has narrowed from 11 years during 2000–2005 to 8 years during 2010–2015. Such differences are expected to diminish significantly by 2050.

Fertility

Fertility rates vary significantly by region, but in almost all countries they are declining. United Nations projections suggest that, by the end of the 21st century, fertility will be at or below population replacement levels in almost all countries (see Figure 3.2).³⁷

In all developing countries, total fertility rates (TFRs) are now at or below (and sometimes significantly below), the population replacement rate of

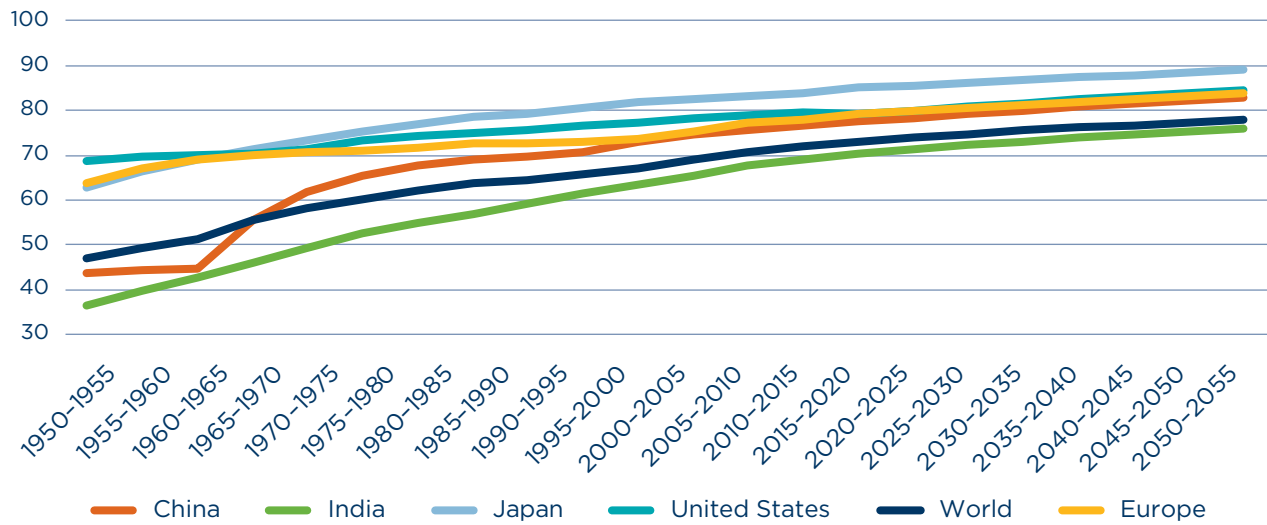
34 Life expectancy generally means years left to live given current age. Thus, the terms “longevity” and “life expectancy at birth” can be used interchangeably. We follow the convention of using the term “longevity” in generalized contexts (for example, in reference to longevity improvement; longevity risk), and “life expectancy” when referring specifically to demographic statistics. Unless otherwise stated, by “life expectancy” we mean “life expectancy at birth.”

35 United Nations 2017.

36 Median variant used. The UN’s published life expectancy at birth is equivalent to cohort life expectancy at age zero for each year. Probabilistic cohort-component methods were used to project future fertility and mortality levels, to derive trajectories of life expectancy at birth. Due to uncertainties about future changes (for example, medical advances, improved nutrition) that may affect realized life spans around the world, the UN projection further provides confidence intervals for their estimation. For more information, see *Methodology of World Population Prospects: The 2017 Revision* (United Nations 2017).

37 To understand long-term trends in fertility, it is best to concentrate not on “birth rates” (number of births per thousand people), but on how many children the average woman has during childbearing age. The precise number (known as the Completed Family Size [CFS]) can of course only be known when women have reached the end of childbearing age; therefore, CFS is a lagging indicator providing imperfect information about recent trends in fertility rates. But the estimated total fertility rate (TFR), which is based on analysis of the age-specific fertility rates of women currently of childbearing age, produces a reasonably robust forward indicator of CFS, and is therefore the best measure of underlying fertility trends (see United Nations *World Population Prospects* for TFRs, past and projected, for all countries and regions).

FIGURE 3.1 LIFE EXPECTANCY AT BIRTH FOR SELECTED COUNTRIES AND REGIONS, 1950-2055



Sources: PwC analysis; United Nations 2019.

around 2.05,³⁸ which would be required to keep each generation the same size as the previous one.³⁹ For most developed countries, TFRs range from 1.4 (in Germany) to 1.9 (in France). There are a few low-fertility outliers (for example, Japan, at 1.2), and a few small developed countries (Iceland, Ireland, and New Zealand) where fertility rates are close to but still just below the population replacement level.

In most middle-income countries, TFRs have also fallen significantly, with a clear tendency to fall below population replacement rates once high middle-income levels are achieved.

Given the observed data from developed and middle-income countries over the last several decades, the UN Medium Variant demographic projections assume that all developed and middle-income countries eventually converge to a TFR of 1.85.

Many governments have enacted family-supportive policies designed to increase TFRs (such as France, Japan, and most recently China). The extent to which

these policies proved effective is poor to mixed, at best. Changing TFRs once strong cultural and social shifts are underway is difficult. Almost all regions except Africa will go below population replacement rates by 2050.

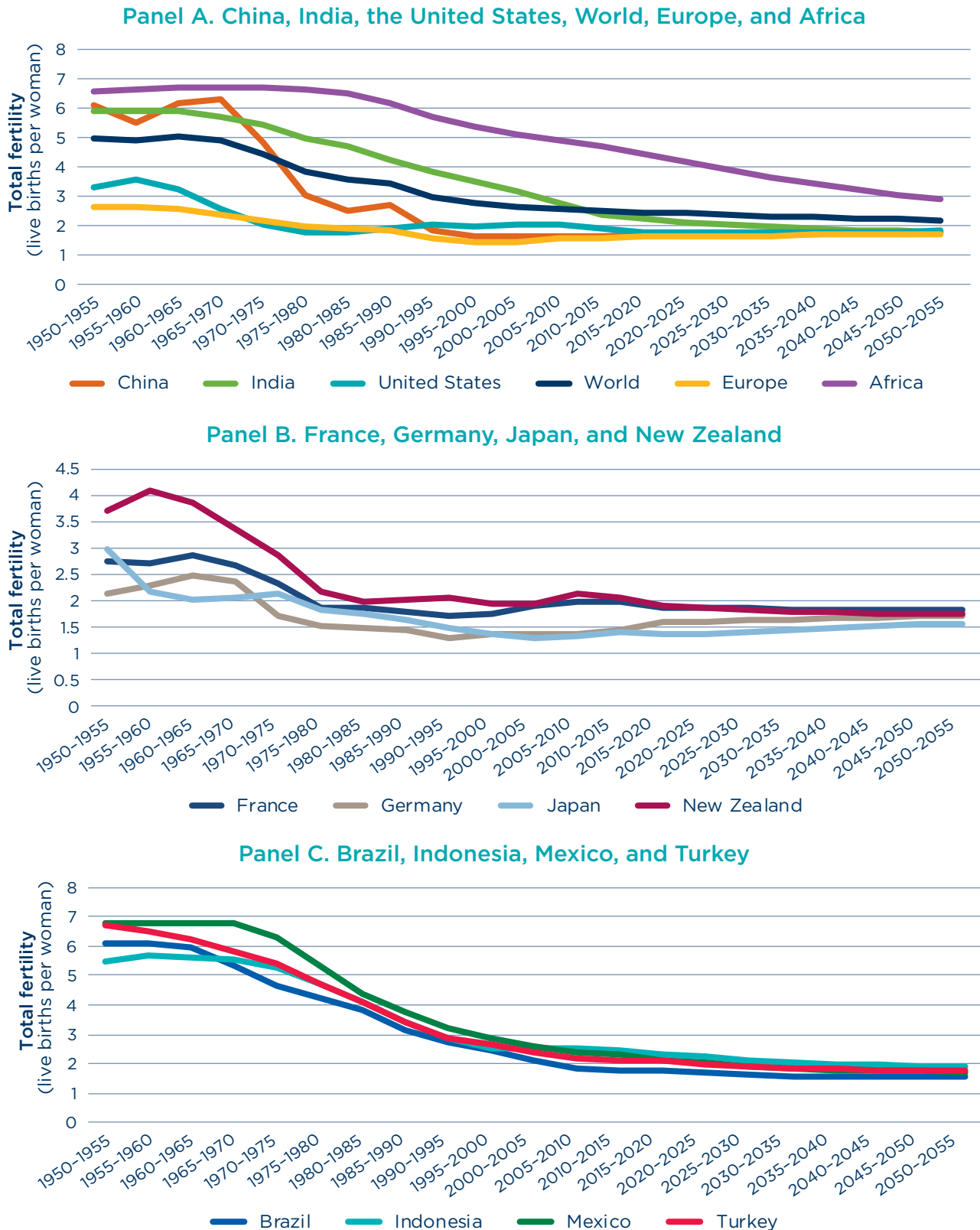
In Africa, while fertility rates have also declined significantly, they are still well above population replacement levels in many countries and may remain so for several decades. As a result, Africa’s population is forecast to grow from 1.2 billion in 2010 to 4 billion by 2100, only approaching stabilization at the very end of the 21st century.

The fall in fertility and the resulting slowdown (and potential eventual cessation) of human population growth are positive developments, mitigating environmental pressures. However, the (divergent) rates at which TFRs are falling is causing significant disruption to demographic profiles both overall and among countries and regions.

38 The “population replacement rate” of TFR is a function of female mortality before reaching childbearing age. If no women died in infancy or childhood before reaching childbearing age, the TFR replacement rate would be exactly 2.0. It therefore varies among regions and countries in line with variations in infant and child mortality. While sometimes conventionally stated as 2.1, it is somewhat higher than that in low-income countries with high childhood mortality. Conversely, in higher-income developed countries, it is about 2.05 and slowly declining over time as infant and childhood mortality declines.

39 Note that even if the TFR were exactly equal to the replacement rate, so that each generation were the same size as the previous one, the total population would still continue to grow with increased life expectancy.

FIGURE 3.2 FERTILITY RATE FOR SELECTED COUNTRIES AND REGIONS, 1950-2055



Sources: PwC analysis; United Nations 2019.

Dependency

If the only factor at work were a rise in life expectancy, and if retirement age rose in line with life expectancy to keep stable the proportions of adult life spent working and in retirement, there would be no tendency for the ratio of retirees to workers to increase. But when fertility rates decline, there is a one-off increase in dependency ratios even if retirement ages are increased in line with the proportional principle, whereby retirement ages vary to keep constant the proportions of adult life spent working and in retirement.

Figures 3.3 to 3.6 show the outlook for dependency ratios in developed and middle-income countries, based on current and planned retirement ages and the application of the proportional principle from 2010 to 2050.⁴⁰ Specifically:

- Figure 3.3 shows the past and projected increase in the ratio of 65+-year-olds to 20-to-64-year-olds in major developed countries plus China. In each case, there is a period in which dependency ratios increase rapidly because of the fertility decline. Even after the fertility rate has stabilized

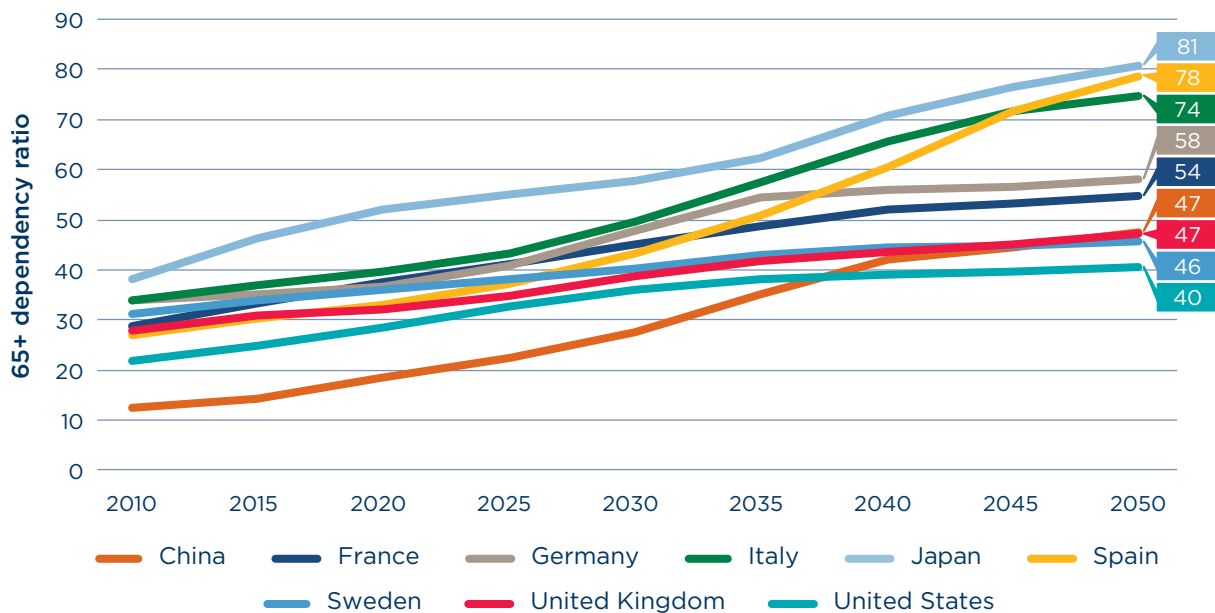
at a lower level, there is an ongoing increase arising from the life expectancy effect.

- Figure 3.4 shows what the ratios for these countries would be if the proportional principle were applied. In this case, the shift to a lower fertility rate still produces increases in the ratio of retirees to workers, but once this one-off effect has occurred, the rate, in the long term, stabilizes and does not increase further.

Despite increased life expectancy, retirement ages have remained largely static since inception, although there would be some logic in applying the proportional principle onward from 1950. We find that the increase in dependency since then has been largely absorbed through a combination of underlying economic growth and improvements in public welfare provision. This is evidence of the other legs of the policy response working, particularly leg two.

It is not realistic for increased fiscal transfers to continue bearing most of the burden. Rather than winding the clock back to 1950, we identify 2010—the point at which fiscal strains started to emerge—as

FIGURE 3.3 65+ DEPENDENCY RATIO FOR SELECTED COUNTRIES, 2010–2050



Source: PwC analysis; United Nations 2019.

⁴⁰ The different starting points in 2010 in the figures reflect the fact that the current retirement ages are in many cases below 65; the key difference is thus the progression in, rather than absolute levels of, the ratios in question.

a base year for our calculations. It is appropriate to use 2010 because the upward inflection in sovereign debt-to-GDP ratios post-financial crisis (see Window 2.5) indicates that governments' capacity to fund increased welfare costs from current taxation, without undermining growth, was approaching its limit. In our modeling of the LFS gap, 2010 was when the gap started to widen and was the juncture at which policy changes, including in retirement ages, were needed.⁴¹

POLICY TRENDS

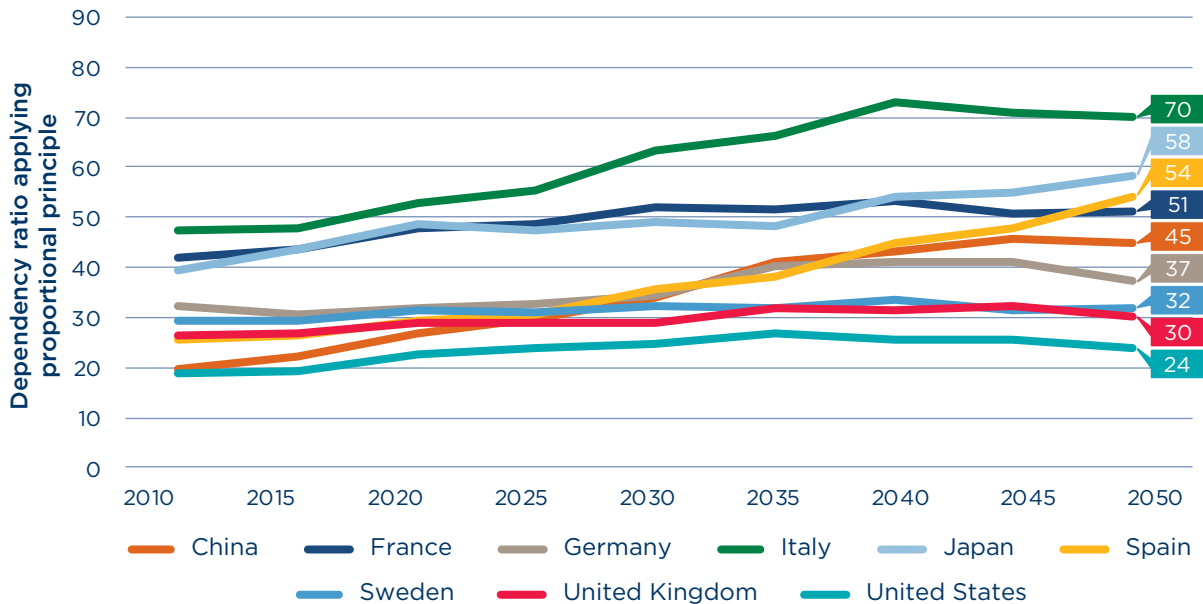
The existing global policy agenda has three main elements:

- Changes to official retirement ages, to mitigate the fiscal burden associated with the increasing longevity of public pension recipients, and to induce people to extend their working lives. This is a powerful policy lever; the impact is felt relatively quickly in terms of fiscal burden and people's behavior; that is, they work longer. Governments have been hesitant to implement

this retirement age shift due to its unpopularity among retiring cohorts, and their increasing electoral influence. Figure 3.5 shows statutory retirement ages for current and future retirees. The UK, for example, is expected to raise the retirement age to 66 by 2020, 67 by 2028, and 68 by 2046. The current retirement age for Indonesia is 56 but is expected to rise to 65 by 2043.

- Moving away from a heavy reliance on public DB pensions in many countries to a mixture of public DB pensions and other forms of provision, notably private DC schemes (a similar trend is underway in occupational pensions).
- Introducing various arrangements to stimulate private saving, with the aim of ensuring that any gap left from rolling back DB provision is filled. These arrangements range from prompting, to economic inducement, to outright compulsion. Table 3.1 provides some examples.

FIGURE 3.4 DEPENDENCY RATIOS FOR SELECTED COUNTRIES, UNDER "PROPORTIONAL PRINCIPLE," 2010-2050

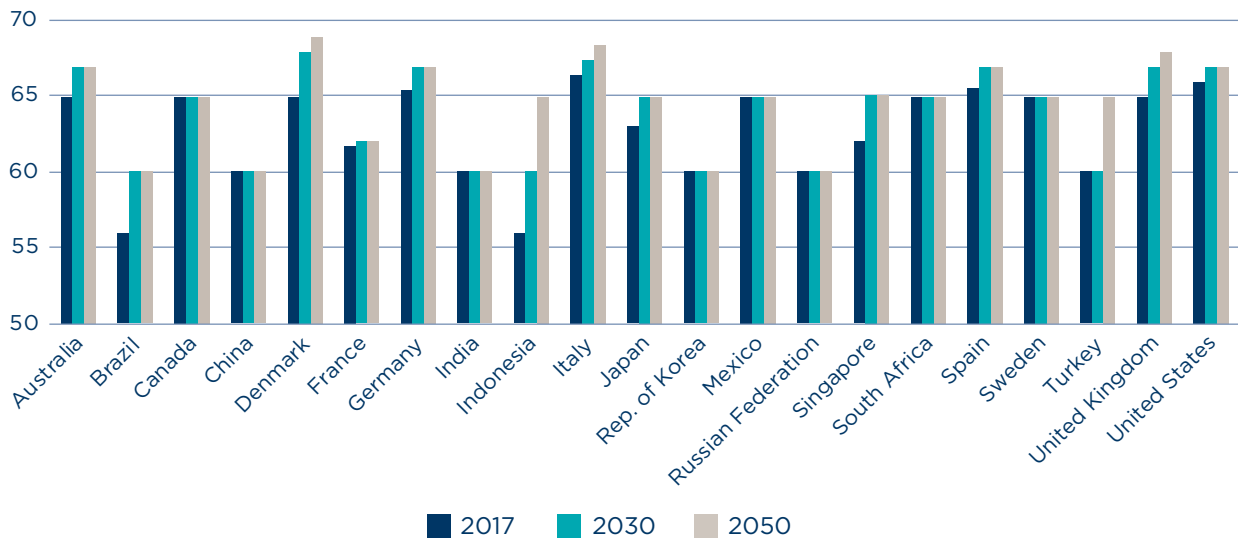


Sources: PwC analysis; United Nations 2017.

Note: Assumes retirement age to grow proportionately in line with the increase in life expectancy.

41 See later discussion on Outlook for Lifetime Financial Security.

FIGURE 3.5 FORECASTED STATUTORY RETIREMENT AGE BASED ON CURRENT POLICIES, BY COUNTRY



Sources: PwC analysis; "OECD Pensions at a Glance"; Australian Department of Human Services; Singaporean Ministry of Manpower; European Commission's 2009 Ageing Report.

Note: We only include one country from Africa in our study, namely South Africa. We note the particular LFS challenges facing African countries with rapidly increasing populations, many of which have little or no LFS provision at present. It is outside the scope of this study to address this facet of the LFS challenge.

TABLE 3.1 DIFFERENT TYPES OF POLICIES TO ENCOURAGE PRIVATE SAVING

POLICY OPTIONS	EXAMPLES
Financial incentives	<ul style="list-style-type: none"> • Tax-free lifetime individual savings accounts – United States, UK • Low management fees for pension funds and flexibility to withdraw early – Spain • Improving confidence in the financial markets with a stable monetary environment (real interest rates, inflation) – Turkey
Behavioral “nudge”	<ul style="list-style-type: none"> • Auto-enrolment/pension protection schemes – UK • Savings tools such as Save More Tomorrow™ – United States
Compulsion	<ul style="list-style-type: none"> • Compulsory contributions to pension accounts with a compulsory minimum employer contribution – Australia, Germany, Switzerland • Targeting of minimum pensions level – Brazil
Information aid/encouragement	<ul style="list-style-type: none"> • Readily accessible pension aggregation and forecasting service (Pension-Wise)/transparency in pension fund costs and charges – UK

Source: Thaler and Benartzi 2004.

Some countries are also looking at a middle path between defined benefit and defined contribution to try to mitigate some of the fiscal burdens of defined benefit provision while not shifting such a big burden onto private individuals.

While these are all positive developments, only the first—the increase in official retirement ages—directly addresses the issue of increasing dependency ratios.

In Figure 3.3, we projected dependency as the ratio of over 65s to under 65s, and in Figure 3.4, we showed how it would develop if countries adopted a proportional principle. Figure 3.6 shows for the United States, the UK, and Japan how the dependency ratio would change under the proportional principle.

Both the United States and the UK have announced changes in the public pension age that will produce a stable dependency ratio by the 2040s. In Japan, only minimal increases in the state pension age have been announced. In all three cases, existing policy changes and commitments fall short of applying the proportional principle.

INTERACTION OF DEMOGRAPHIC, ECONOMIC, AND POLICY TRENDS

As illustrated above, a significant one-off rise in dependency ratios is an inevitable consequence of lower fertility and would occur even if pension ages rose in line with the proportional principle. How much does this matter? In Section 2, for Japan, we showed that from 1950 to 2015 there was a broad offset between the detrimental impact on average living standards of increasing dependency and the beneficial impact on average living standards of improved economic productivity.

The key question, then, is how robust productivity will be in the years ahead.

Figure 3.7 presents historic and forecasted growth for Japan to 2050 in real GDP per capita, relative to the ongoing dependency drag. Real GDP per capita growth (which embodies increases in both dependency and productivity) remains comfortably above 1 percent per year, which is reassuring. It is also reassuring that the prospective dependency drag component (the dashed line) does not accelerate and remains at a

level (between 0.25 percent to 1 percent per year) well below recent productivity growth.

As a lead indicator of what might follow in the rest of the world, from the major developed economic regions of North America and Western Europe, plus China, and followed in due course by middle-income and developing regions as their economies grow and dependency levels rise with falling fertility, this is reassuring. To provide further context, Figures 3.8–3.10 provide additional forecasts for per capita GDP and projected dependency drag for certain developed countries (excluding Japan), China, and middle-income countries. All countries face varied degrees of dependency drag in the future.

Figure 3.8 shows the outlook for certain developed countries excluding Japan (France, Germany, Italy, Spain, Sweden, the UK, and the United States), representing a “next wave” of countries to experience a material and sustained dependency drag.

Figure 3.9 shows China’s outlook separately due to its scale and particular economic and demographic features (high growth, and relatively advanced dependency growth, due in part to its one-child policy between 1979 and 2015).

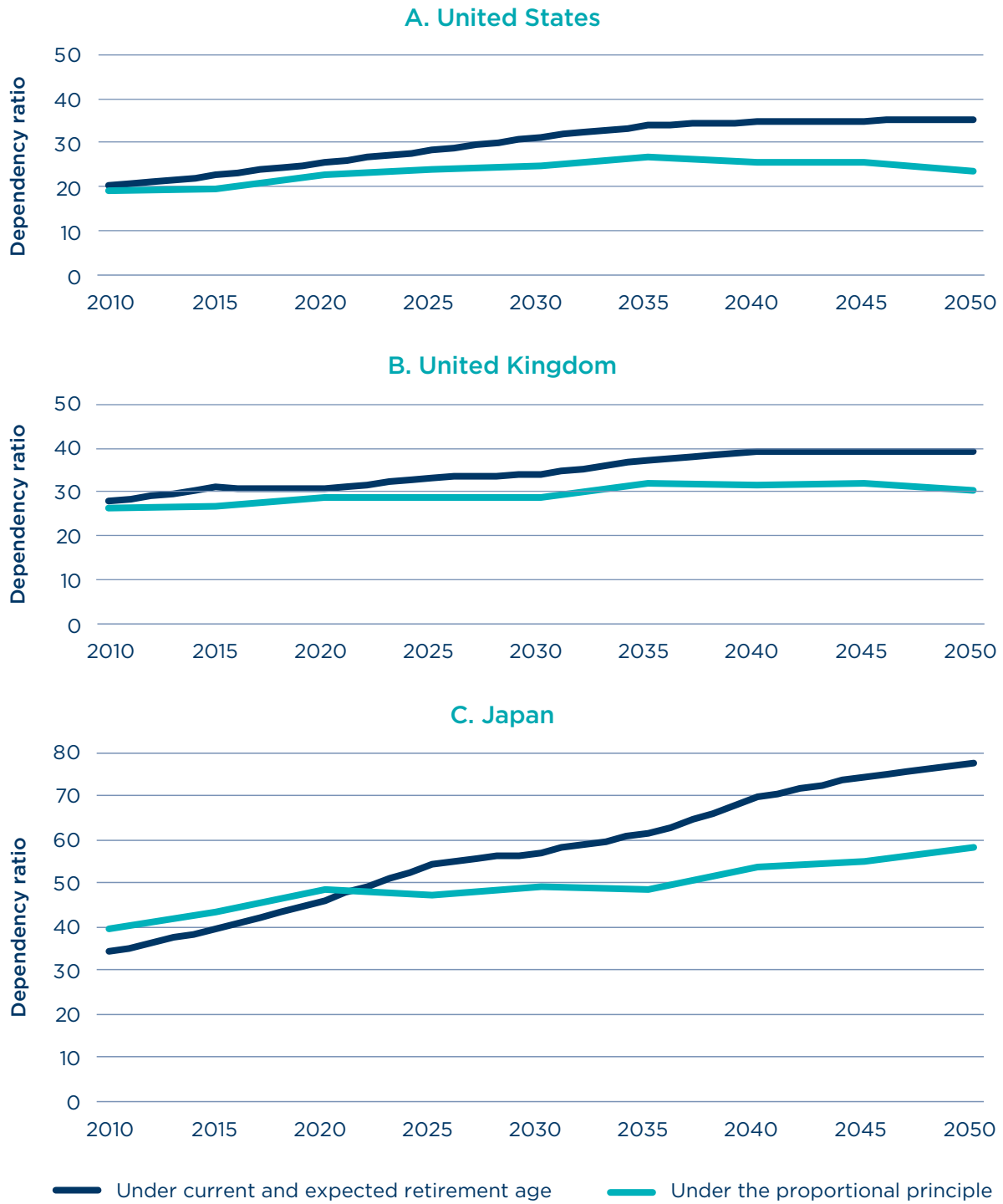
Figure 3.10 shows select middle-income countries (Brazil, Indonesia, Mexico, Turkey), representing countries with more favorable demographics but where a dependency drag will nevertheless start to build from about 2035 onward.

Note that during 2000–2015, the countries shown in Figures 3.9 and 3.10 experienced an *inverse* dependency drag, meaning that 65+ dependency has fallen due the lagged effect of still-high fertility rates 20 years prior and slower progress on life expectancy. This situation reversed in China around 2015.

Based on these projections, and the assumption that productivity growth in the working-age population can be maintained, it appears that there could be the economic capacity to absorb the impact of aging populations while avoiding drops in overall average living standards. But there are three important caveats.

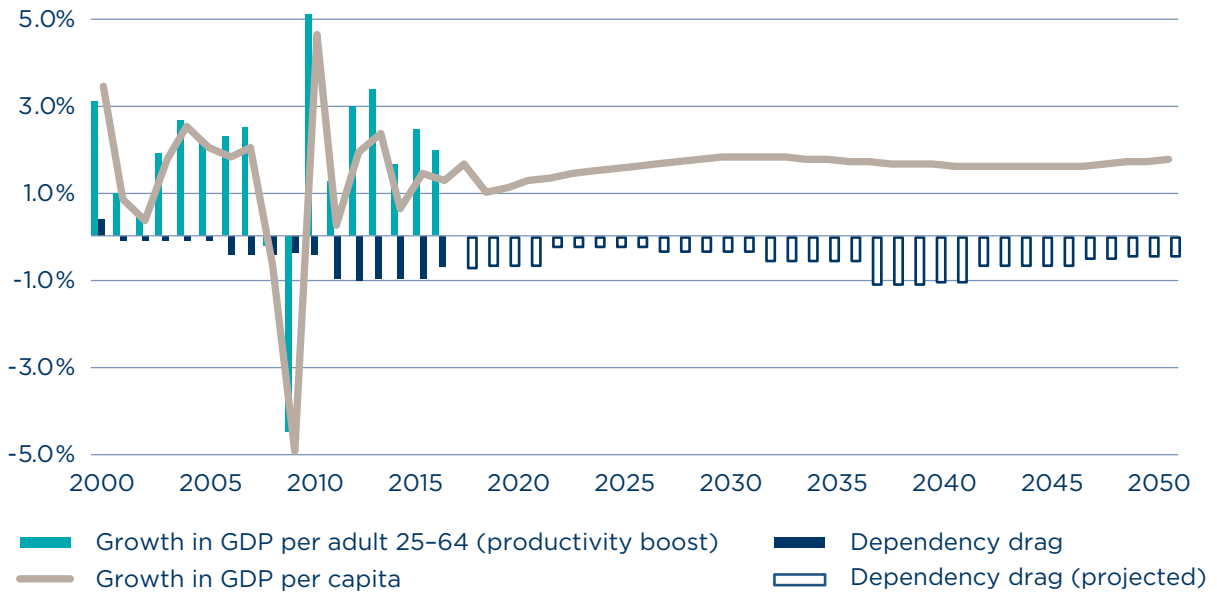
First, GDP growth and workforce productivity growth across our modeled economies have been volatile and are currently at historically low levels. Current concerns over future productivity, prompted by evidence that the rate of productivity growth in key parts of the world has stagnated, suggest that sustained

FIGURE 3.6 DEPENDENCY RATIO UNDER CURRENT AND EXPECTED AVERAGE RETIREMENT AGE; AND WITH THE PROPORTIONAL PRINCIPLE APPLIED FROM 2010 FOR THE UNITED STATES, THE UK, AND JAPAN



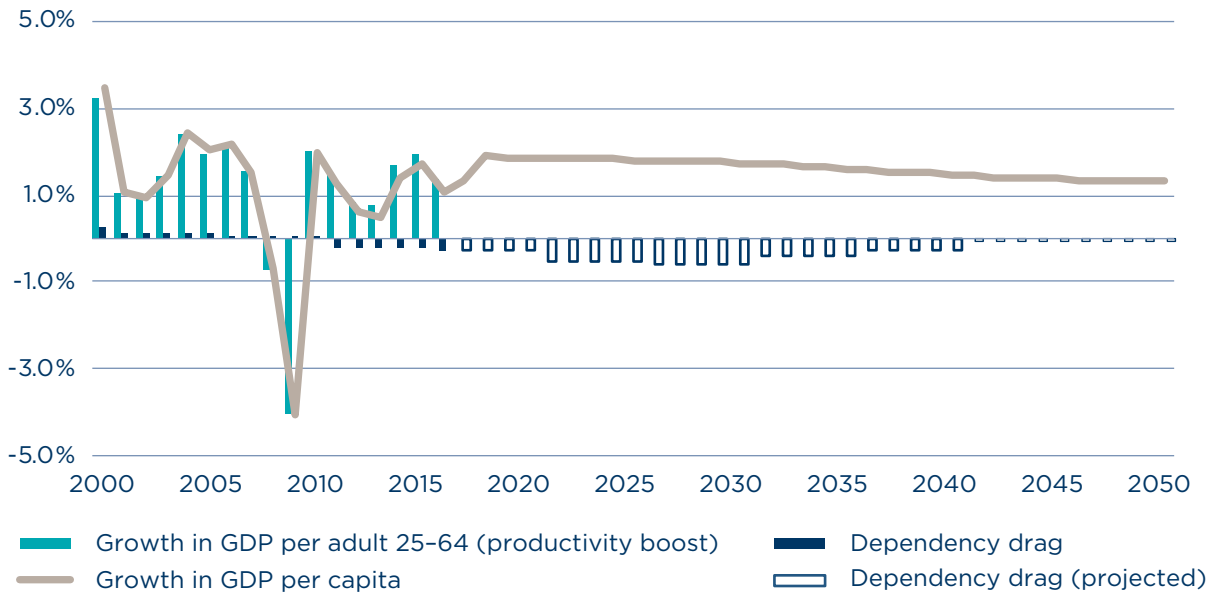
Sources: PwC analysis; United Nations 2017.

FIGURE 3.7. JAPAN'S GDP PER CAPITA GROWTH, 2000-2050, AND DEPENDENCY DRAG



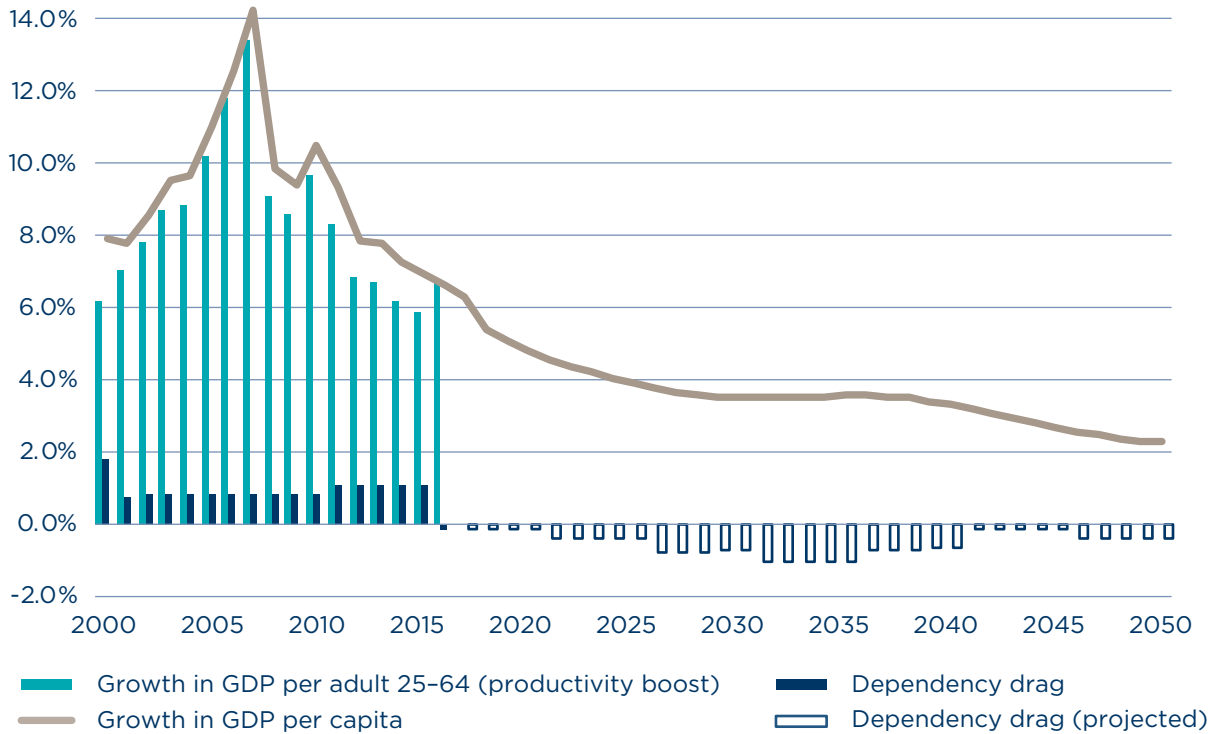
Sources: United Nations 2017; OECD; PwC analysis.

FIGURE 3.8 DEVELOPED COUNTRY GDP PER CAPITA GROWTH, 2000-2050, AND DEPENDENCY DRAG



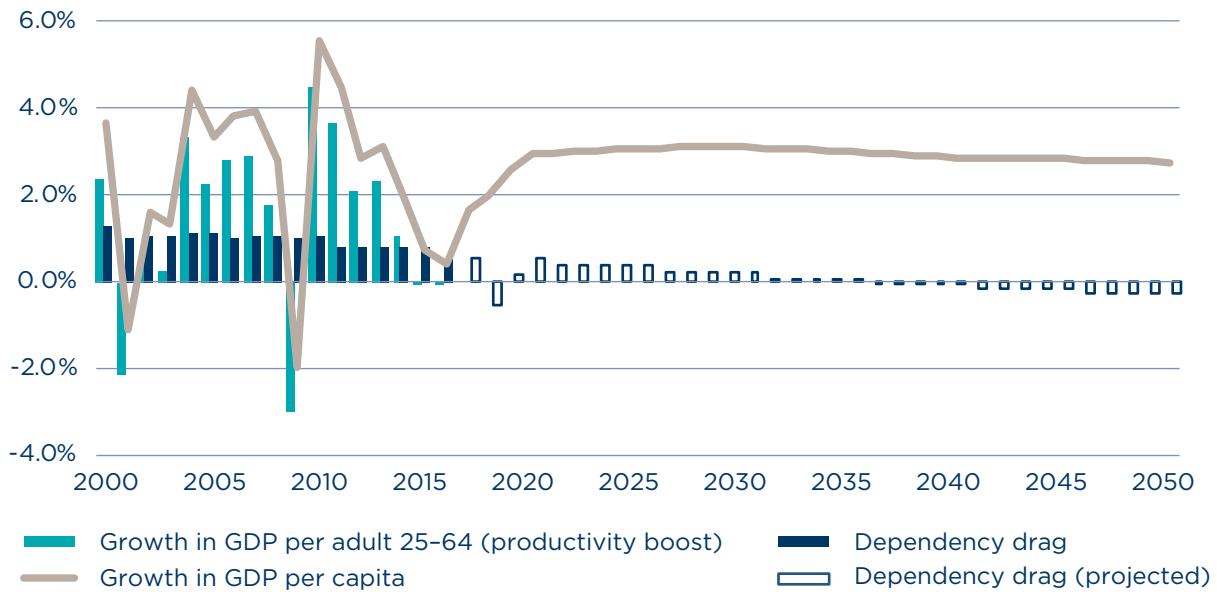
Sources: United Nations 2017; OECD; PwC analysis.

FIGURE 3.9 CHINA'S GDP PER CAPITA GROWTH, 2000-2050, AND DEPENDENCY DRAG



Sources: United Nations 2017; OECD; PwC analysis.

FIGURE 3.10 MIDDLE-INCOME COUNTRY GDP PER CAPITA GROWTH, 2000-2050, AND DEPENDENCY DRAG



Sources: United Nations 2017; OECD; PwC analysis.

growth of about 2 percent a year in workforce productivity, as implied by the Organisation for Economic Co-operation and Development's (OECD's) overall GDP growth forecast, could be somewhat optimistic.

A more conservative assumption on prospective workforce productivity growth of 1 percent per year would leave per capita GDP growth in the range of 0.5 percent to 1 percent per year. Furthermore, while future productivity trends are inherently uncertain, the demographic trends driving the dependency ratio, while uncertain over the long term, are steady and sticky over the short term. And even if over many decades productivity growth helps offset the dependency impact of a shift to lower fertility, there may well be periods when per capita GDP growth falls away or goes into reverse.

Second, although one might take comfort in the prospect that the net per capita income growth trend will likely still be positive, it is unclear how widely distributed the proceeds of productivity growth will be, and therefore what degree of redistribution will be required, especially but not only from working to non-working populations, in order for it to meet the needs of people in retirement. This is difficult to determine *ex ante*. To the extent that productivity growth accrues to working populations through growth in real wages, it will need to be accompanied by a substantial increase in either taxation, private savings, or both.

And we observe that, over recent decades, real wage growth has not kept pace with productivity growth, meaning that the proceeds have accrued disproportionately to capital. If this pattern continues, then the distribution/redistribution questions become still more important. Regardless of whether the redistribution issue is addressed head on, it seems inevitable that broadly based private savings will need to play a major part in ensuring the sustainability and fairness of LFS.

A further crucial consideration concerns the yields that savers can expect in bridging from current savings levels to future income needs. The collapse in real yields since the financial crisis suggests that less reliance can be placed on compound interest to deliver much better

than a one-for-one exchange between current and future consumption. This would also exacerbate the already challenging issue of persuading people to save sufficiently to fund their retirement.⁴² Will people save less or more if they make little or no return?

Third, whatever the outcome in the balance of dependency and productivity, some shift on at least two, and more likely all three, of the principal policy choices will likely be required to prevent the emergence of a substantial financial gap between what is demanded by workers and workers nearing retirement and what is feasible. Expectations may exceed what is possible and may need to change, in tandem with adjustments in the various legs in the policy response. Without it, there will be a substantial gap between expectations and reality. The following section quantifies the size of this gap.

OUTLOOK FOR LIFETIME FINANCIAL SECURITY

This section analyzes the prospective size of the supply-demand gap across all our modeled countries. Figure 3.11 illustrates the key drivers of demand and supply that we incorporate into our analytical framework.⁴³

Demand for Lifetime Financial Security

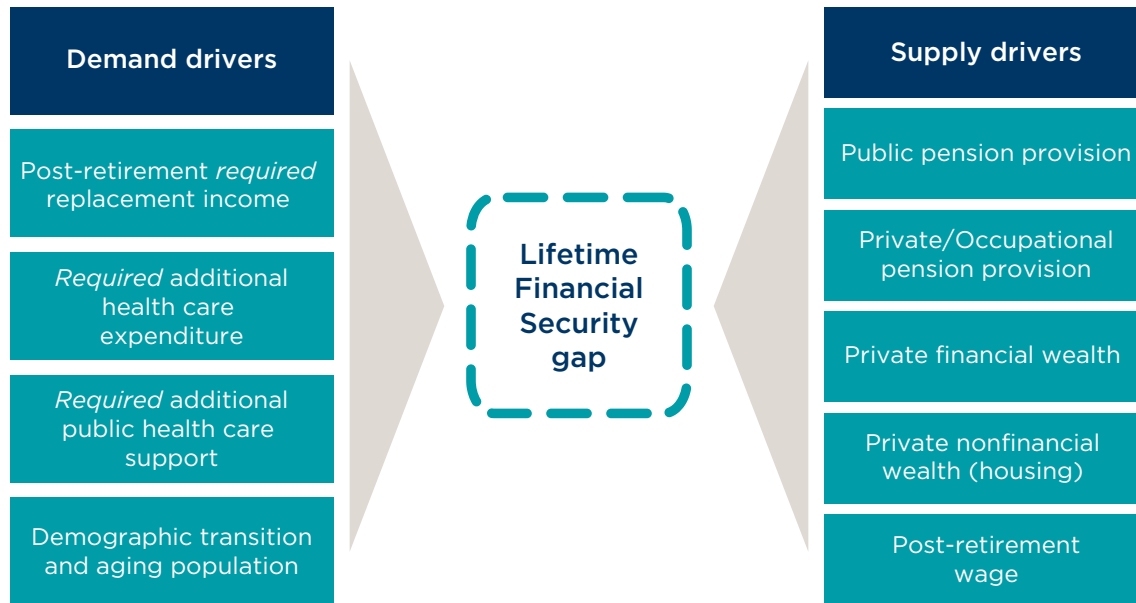
Demand for LFS refers to what all members of society reasonably require once they retire in order to meet essential living expenses and maintain a target standard of living to the end of life.

This is measured and modeled as the ratio of pre- and post-retirement incomes, also known as the replacement income or the replacement rate. The OECD's rule of thumb for the target replacement income is 70 percent, under the broad assumption that roughly 30 percent of working populations' income is spent on a mortgage, which should not be required in retirement.⁴⁴ The use of a proportionate benchmark implies that retired persons demand a standard of

42 With lower yields, the trade-off between current and future consumption has been made less compelling, while at the same time the amount that needs to be saved to enable a certain future income stream has increased dramatically. See Window 3.1 for more on the background and implications of this issue.

43 For more detail, please refer to Appendix 3.

44 OECD 2009.

FIGURE 3.11 DRIVERS OF LIFETIME FINANCIAL SECURITY

living that grows alongside that of the working populations around them.

In constructing our baseline scenario out to 2050, we stick with the OECD benchmark replacement rate of 70 percent, and we return to the question of whether and how it should be recalibrated in Section 5.

Another demand driver (that can widen the LFS gap) is rising health care and old-age care costs. These expenditures are rising at a rate significantly above inflation, because of improved medical technology, increasing lifespans, and a concentration of health and care expenditure in older age. With stretched public health budgets, there will be an increased demand for post-retirement income to meet these inflating costs.⁴⁵

Finally, the demand for LFS in the economy depends on the size of the retired population. For our model, we use official government policies on statutory retirement ages (for current and future retirees) to estimate the size of the retired population in each country over time.

Supply of Lifetime Financial Security

The biggest source for the provision of LFS is pensions, whether these be public, privately financed, or occupational pensions. This represents most of individuals' pre-retirement savings, although this can be supplemented through other forms of wealth, savings, and housing assets.

In addition to pension entitlements and personal wealth, retirees can take on a phased retirement where they gradually reduce work or continue to work flexible hours after retirement. In that case, post-retirement wages can provide an additional income source to provide for LFS.

Our baseline scenario incorporates an assumed level of post-retirement wages equivalent to 5 percent of the average wage level in 2015, gradually increasing to 10 percent by 2035 and onward (equivalent to half of the retired population working approximately one day per week). We would expect more post-retirement work to be carried out by recent retirees.

A critical assumption and source of uncertainty is the rate of return on funded pensions schemes, and other financial assets. This affects both the accumulation of

⁴⁵ We do not incorporate all health and care spending costs, but just the super-inflating element, which adds to the demand for Lifetime Financial Security in our model. There are, of course, wider issues in relation to the funding of public health and care provision that go beyond the scope of this report.

WINDOW 3.1 LOW INTEREST RATE ENVIRONMENT

A decade on from the global financial crisis, the consensus is that the real “natural” rate of interest—that is, the inflation-adjusted short-term interest rate expected to prevail when the economy is operating at its full potential—has declined in advanced economies (Laubach and Williams 2016) (see Figure 3.12). The factors that explain the decline in the real risk-free rates include:

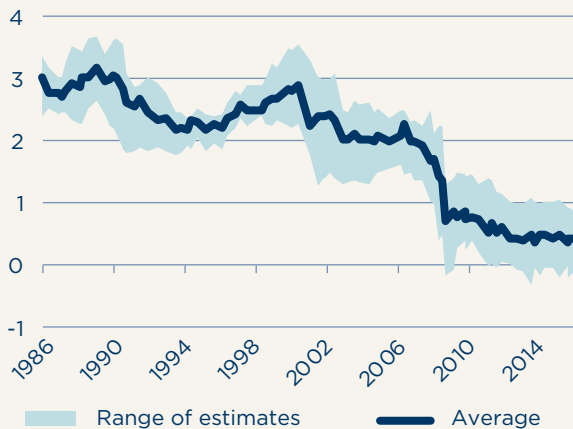
- **Expectations of future growth:** Summers (2016) suggests that weak economic recovery has led to reduced expected future economic growth and real rate of interest.
- **Demographic transition:** This may reduce productivity and economic growth over the

medium to longer term. Such trends are slow moving and more apparent in countries like Japan, with an older population and lower inward migration.

- **A higher global propensity to save:** This was a significant factor driving the lowering of global interest rates in the mid-2000s.
- **Shifts in the demand for safe assets and supply of safe assets.**
- **Quantitative easing (QE):** QE policies by the central banks, specifically target long-term interest rates.

To some extent, the 2008–2009 financial crisis and its ensuing impacts reinforced the already lowering expectations for rates of return, as indicated in Figure 3.13.

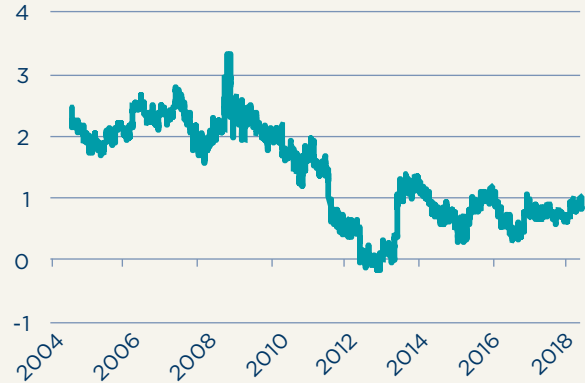
FIGURE 3.12 AVERAGE AND RANGE OF FIVE “REAL NATURAL RATE OF INTEREST” ESTIMATES FOR THE UNITED STATES (%)



Source: U.S. Federal Reserve Bank of San Francisco.

The high return expectations of the 1990s were dampened by the bursting of the dot.com bubble in 2000 and have been under general pressure since 2008. The longer-term decline of real rates of return is visible for many countries with major financial markets (such as Germany, Japan, the United Kingdom, and the United States).

FIGURE 3.13 HISTORICAL RETURN FOR 20-YEAR TREASURY INFLATION-INDEXED SECURITY (%)



Source: Federal Reserve Economic Data.

This lowering of the natural rates of interest is clear in fixed-income investments with government bond yields at historic lows, but it also impacts asset returns across the risk spectrum.

The ongoing fluctuations in asset prices and the likely “new normal” future of low real asset returns for a protracted period of time create major uncertainties for individuals, policy makers, and pension fund professionals.

wealth and the income that can be earned on financial assets during retirement. The rate of return is a combination of a real, riskless rate of return, inflation, and the risk premia attached to different asset classes, where overall returns across all asset classes are constrained by economic capacity to generate returns.^{46,47}

Outlook for Lifetime Financial Security

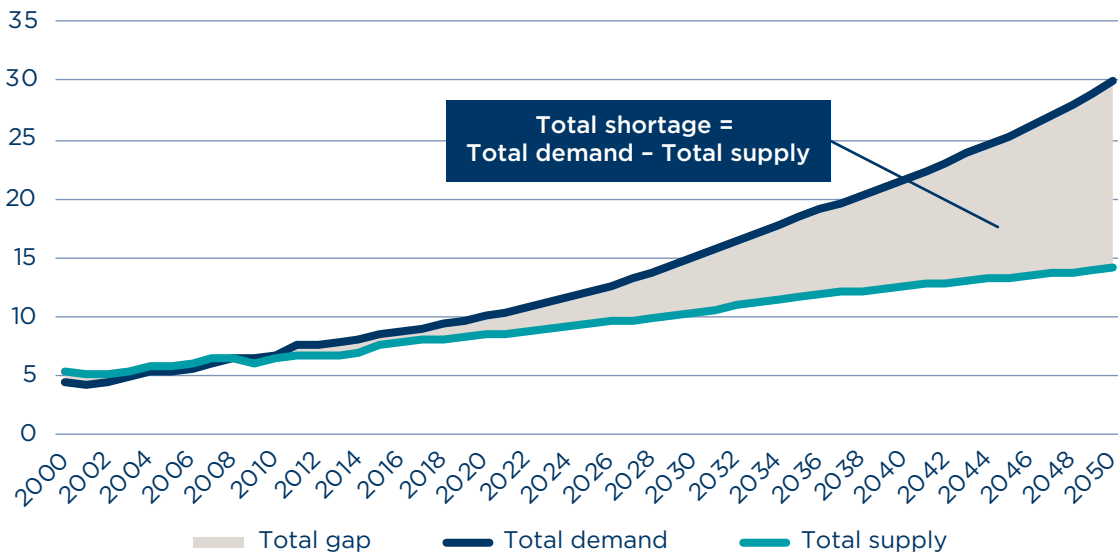
We use 21 countries⁴⁸ in our analysis, which together represent about 90 percent of world GDP and 60 percent of world population, thus providing an overall picture of the global challenges in providing LFS and the gap that exists.

Our baseline scenario includes known and future committed policy changes and constitutes a “do nothing further” financial projection for LFS up to 2050.⁴⁹

In our baseline scenario, we estimate that the global LFS gap, in real terms at 2017 prices, will grow from US\$1.1 trillion in 2017 to US\$15.8 trillion in 2050. This represents a financial gap, based on current expenditure patterns, policy settings (including planned changes), and expectations of income in retirement, equivalent to 23 percent of GDP in 2050. The evolution of this gap is shown in Figure 3.14.

There are two key explanations for the rising trend in the global LFS gap. On the demand side, despite existing planned changes to official retirement ages, the combination of increasing dependency ratios and static replacement rates increases the gap. Indeed,

FIGURE 3.14 PROJECTED GLOBAL LIFETIME FINANCIAL SECURITY GAP, 2000–2050 (IN 2017 PRICES, US\$ TRILLION)



Source: PwC analysis.

46 See Piketty (2013) and Jordà, Schularick, and Taylor (2017) on whether the rate of return (and therefore wealth accumulation) can exceed the rate of economic growth over long periods.

47 Appendix 3 provides further details on the parameters built into our analysis, including in relation to the above demand and supply drivers.

48 The countries are Australia, Brazil, Canada, China, Denmark, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, the Russian Federation, Singapore, South Africa, Spain, Sweden, Turkey, the United Kingdom, and the United States.

49 Our model drivers of demand and supply include demographic changes, GDP growth, pension policy parameters (including retirement ages and expenditures as percent of GDP), and financial investment returns. Where the aggregated supply is less than the aggregate demand for a particular year, we consider there to be a Lifetime Financial Security funding gap in that year. As such, the modeled gap is per year, not cumulative. Wherever possible we have used independent sources to populate our model; however, in places, we have substituted our own assumptions based on literature review and in-house analyses. See Appendix 3 for the full model methodology used in calculating the US\$15.8 trillion gap.

planned existing changes to the retirement age in many countries are falling well short of what is necessary to have a significant impact on the LFS gap; in some countries, political pressure has resulted in a lowering of retirement ages for certain groups, as will be discussed further in Section 5.

On the supply side, given public fiscal pressures and the increasing reliance on private savings, our assumption of a protracted low rate of return on financial assets (see Table 3.2⁵⁰) limits the growth of wealth accumulation and income generation to help close the gap and meet that demand.

The total return is sensitive to the annual rate of return used in the calculations; changing this assumption demonstrates the impact that the current low growth, low investment return environment has on retirement income systems.

The estimates below for the assumed rates of return for different cohorts of countries, and asset types, may nonetheless be too optimistic. If so, the LFS gap would increase. Risk-free assets are in fact trading far below these projected returns. For example, German government bonds were trading at below zero interest rates in April 2019. If these trends continue, the LFS gap, and the desperate reach for yield, will become even more pronounced in the years ahead and the challenges for policy makers and investors even more severe.

Figure 3.15 shows that even with what many may regard to be drastic changes to the retirement age, savings and taxes, and replacement rates, each step individually would close less than half of the US\$15.8 trillion gap we estimate in our base case, “do nothing further,” scenario.

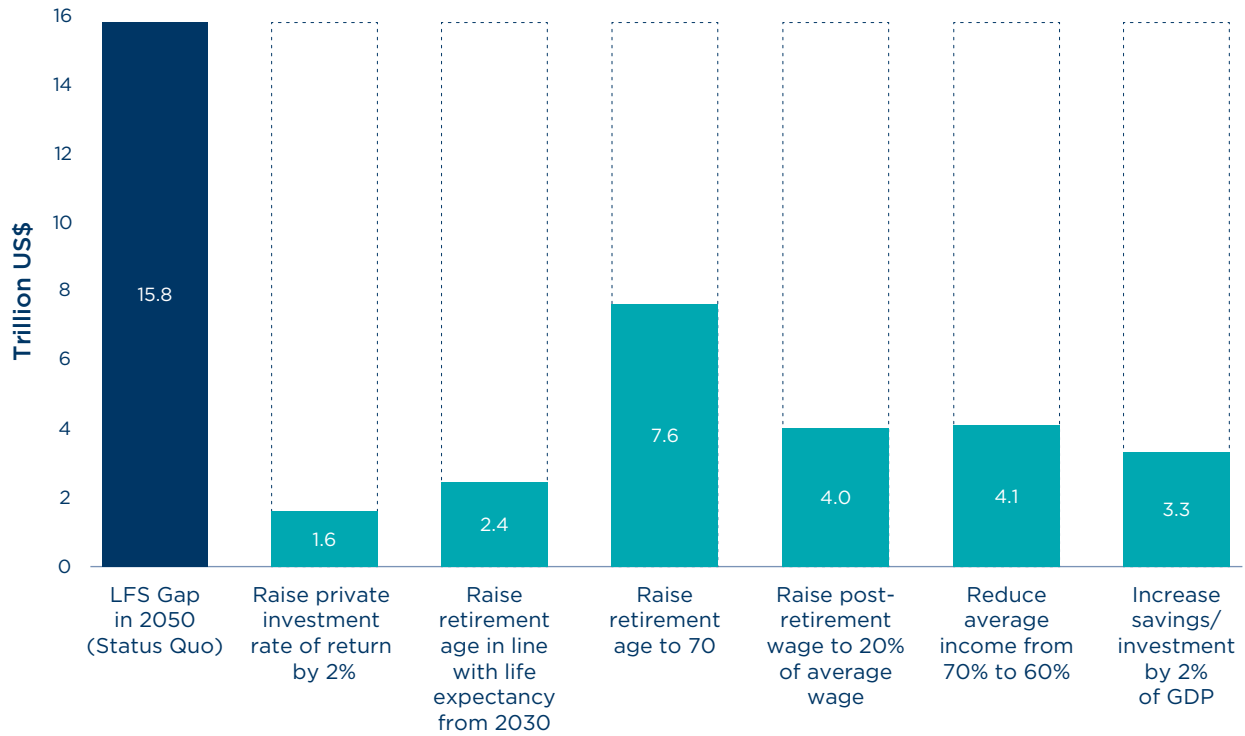
TABLE 3.2 ASSUMED RATE OF RETURN BY INCOME GROUP AND ASSET CLASS

COUNTRY INCOME GROUPS	EQUITIES	BILLS AND BONDS	CASH AND DEPOSITS	OTHER
High income	6.25%	3.00%	2.00%	5.27%
Upper-middle income	6.75%	3.50%	2.00%	5.27%
Lower-middle income	9.25%	3.50%	2.00%	5.27%
Low income	9.25%	4.00%	2.50%	5.27%

Sources: PwC analysis; JP Morgan 2017.

⁵⁰ The 21 countries in our model are categorized into four income groups: high income, upper-middle income, lower-middle income, and low income, based on the *Credit Suisse Global Wealth Databook 2016*. Then, using J.P. Morgan’s “2017 Long-term Capital Market Assumptions,” the returns by asset class are used for different income groups.

FIGURE 3.15 REDUCTION IN LFS GAP IN 2050 BASED ON VARIOUS POLICY LEVERS (IN 2017 PRICES, US\$ TRILLION)



Source: PwC analysis.

A Brief Survey of Lifetime Financial Security System Designs

Workers and retirees tap many sources for their Lifetime Financial Security (LFS). These can include state welfare, pensions, personal wealth, and family and community support.

The architecture of LFS systems is a function of several design choices. One of the first choices to be made is which pillar or combination of pillars to use to deliver financial security. Other important choices include:

- What to provide through the system (that is, income, housing, and/or health care)
- What type of claim by retirees on benefits is prioritized
- How various risks are distributed across the system
- The level of compulsion for individuals to participate in the system.

All these choices ultimately determine the level, duration, and stability of benefits that retirees receive.

These design choices vary across different LFS systems around the world, and are shaped by individual countries' social, cultural, economic, and political circumstances. Some LFS systems are also used to achieve other objectives, such as to encourage employment or facilitate economic growth.

BASIC DESIGN CHOICES: STATE VERSUS PRIVATE; DEFINED BENEFIT VERSUS DEFINED CONTRIBUTION

Notwithstanding the diverse range of circumstances and objectives, the structure of most LFS systems globally can be largely described as a combination of two key design choices: how to determine benefits across generations and how to distribute risks across the system. In practical terms, these are the choices between a state and a privately provided system, and between a defined benefit (DB) and a defined contribution (DC) system. Each choice will predispose the resulting system to different opportunities and risks.

The choice between a state-based or private system will typically influence the coverage and efficiency of the system. Generally speaking, a state-based system will have more economies of scale⁵¹ and can cover a larger segment of the population (see Window 4.1). In contrast, private systems can benefit from market competition and may offer greater flexibility to individuals. When coupled with policies mandating participation, or auto-enrolment as a default, they can achieve broad coverage of a working population.

The choice between DB and DC also presents trade-offs in LFS provision. DB schemes provide assurance to members. But as benefits to retirees are paid by current workers, the basic parameters of DB schemes have to be adjusted to cope with changing demographics. DB schemes also tend to be subject to political pressure to enhance benefits without corresponding

⁵¹ This does not mean that state-based systems are the only way to have economies of scale and introduce efficiency into an LFS system. Systems that can achieve sufficient scale, such as the large collectively agreed occupational funds in the Netherlands, or master trusts in the UK, will also be able to reap scale efficiencies.

WINDOW 4.1 SHOULD SAVING BE MANDATED?

Mandating that individuals set aside a portion of their incomes for retirement provisions is an important lever to increase the coverage of an LFS system and ensure that individuals have reasonable LFS provisions in retirement. It also overcomes the common behavioral bias of individuals focusing on present consumption and attaching little weight to consumption needs in retirement.

State-based systems, or private/occupational systems with a significant level of state intervention or management, tend to be more amenable to mandatory saving. This is because they can be backed by legislation or collective agreement and complemented by other state levers such as tax policy.

Mandating saving can benefit economies, as well, as it can help generate larger pools of private savings that can finance investment in infrastructure and technology and support economic and productivity growth. Returns on investment can be used to supply retirement

benefits to citizens, or else be reinvested for further growth.

For example, Australia's Superannuation system has created a US\$1.5 trillion pool of investable wealth, equivalent to 124 percent of Australia's GDP, compared with the OECD weighted (by GDP) average of 83 percent of GDP.* The mandatory saving requirement in Australia's system, and the various options for savings vehicles, which include annuities, and widespread use of so-called Self-Managed Superannuation, enables the pool of finance to be channeled into productive assets.

However, mandating saving can prove politically unfeasible in certain environments. To raise citizens' receptiveness, different levels of compulsion can be explored. For example, some states have successfully increased coverage through implementing an auto-enrolment mechanism (with the option of opting out). Alternatively, tax incentives or matching of contributions could be provided to encourage participation in a pension scheme.

* "OECD Pensions at a Glance" 2017. The growth in pension assets in Australia's Superannuation system has undoubtedly been assisted by the two decades of strong Australian equity market performance since the system's introduction.

increases in contributions or retirement ages. Many DB schemes have hence become unsustainable.

DC schemes, in contrast, are by design financially sustainable, as individuals get benefits in retirement that are tied to their own contributions during their working lives. However, they face the risks of inequity and inadequate coverage as individuals with lower incomes or irregular employment may not save enough on their own. DC schemes are also able to provide greater flexibility in both accumulation and draw-down of savings than most DB schemes.

The key characteristics of state-based, private, DB and DC system structures are set out in Table 4.1.

UNCONVENTIONAL AND HYBRID APPROACHES

Policy makers can also consider structural measures that mitigate some of the downsides of particular design choices. For example, DB schemes can be made more sustainable if benefits are regularly adjusted according to life expectancy, and if sufficient buffer funds are built up. Similarly, DC schemes can be made more equitable through some risk-pooling and redistribution mechanisms that can provide more support to more vulnerable members. These measures can be found in hybrid scheme structures,⁵² which marry

52 We refer to hybrid scheme structures as those that merge textbook characteristics of DB and DC in a single pension scheme, such as in "collective DC" and "notional DC" schemes. We do not consider schemes that have separate pure DB and pure DC components as truly "hybrid." Nonetheless, diversification across different components within a single pension structure is another way to tap the strengths of DB and DC pension schemes, while mitigating their shortfalls.

the characteristics of both DB and DC schemes to capitalize on their advantages while mitigating their pitfalls. The characteristics of these hybrid schemes are described in Table 4.1.

MANAGING RISKS WITHIN THE LFS SYSTEM

As Table 4.1 illustrates, no one system structure provides a perfect solution to LFS provision. There are areas of over- and underprovision, and trade-offs to be made.

Policy makers must assess which system features can best meet their policy objectives, taking into account sustainability and demographics, among other national circumstances. They also have to manage the attendant risks of their system design choices, at different levels of the system. For example:

- At the system level, LFS systems that deliver retirement provisions through one pillar will require safeguards to ensure their sustainability and avoid concentration risk. Conversely, systems that diversify LFS delivery through multiple pillars will require integration efforts

to protect individuals against the risks of inefficiency such as higher costs and fragmentation of benefits.

- Within each pillar, longevity and financial risks have to be effectively managed so that individuals are assured they will have enough to live on in their retirement. Risk-pooling is a particularly useful feature that LFS systems should tap to lower the risk burden on both LFS system providers and individuals.
- There should be safety nets to protect vulnerable individuals, whose needs are not met by any of the pillars within the system, from poverty. This is particularly the case where there has been a conscious policy shift from public to private provision, from DB to DC, and where public awareness, attitudes, and behaviors have yet to make the transition. However, depending on how benefits are calibrated, safety nets can also introduce inefficiency. Policy makers can consider means testing to ensure their safety nets are targeted while remaining fiscally sustainable and fair to working populations (see Window 4.2).

WINDOW 4.2 UNIVERSAL COMPARED TO MEANS-TESTED BENEFITS

The policy choice between providing universal or means-tested Pillar Zero state benefits such as pensions, health care, and housing are part of a long-running debate.

Universal state benefits have advantages. Administering the benefits is simpler; the cost of providing the benefit is reasonably predictable. However, some may see offering a universal benefit to those who do not need it as a waste of government spending, because the benefit is not targeted to the poorest members of society.

A means-tested approach provides benefits only to those who need them, which will

allow higher spending per eligible individual, from the same resources. This achieves the aim of redistribution, which is common in many systems. There are downsides to means testing, however, as it brings added complexity and frictions compared to universal benefits. In addition, individuals who have a valid claim to a means-tested benefit may not make their claim.

Finally, there is an element of moral hazard. Means-tested schemes must be designed to ensure that individuals are not disincentivized to work, earn higher incomes, and save, as their means-tested benefits are withdrawn.

TABLE 4.1 PENSION PILLAR STRUCTURES AND CHARACTERISTICS

POLICY OBJECTIVE	DEFINED BENEFIT (DB)		DEFINED CONTRIBUTION (DC)		HYBRID
	State DB	Private DB	State DC	Private DC	
<p>Adequacy: Comprehensive benefits that adequately meet retirement needs</p>	<ul style="list-style-type: none"> - Benefits are typically lifelong and guaranteed - Easy to incorporate insurance schemes (e.g., annuity, unemployment, disability) due to built-in risk-pooling 	<ul style="list-style-type: none"> - Enhances flexibility in making contributions and planning drawdowns, but financial literacy needed to optimize savings accumulation and avoid bad drawdown decisions - Without compulsion or appropriate incentives, individuals are at risk of inertia and might not save - May require supplementary public provision to plug adequacy shortfalls for those who are unable to save 	<ul style="list-style-type: none"> - Benefits need not be guaranteed but may be adjusted to enhance system sustainability - Mitigates DC adequacy shortfalls by providing default annuity schemes, removing the need for individuals to find one themselves - May still need to be complemented by public provision to support those who are unable to save or have savings shortfalls 	<p>E.g., Collective DC (CDC)/ Notional DC (NDC)''</p>	<ul style="list-style-type: none"> - Individuals' longevity risk remains pooled, but some systemic longevity risk is passed on to individuals - Lower risk and responsibility on individuals compared to pure DC schemes, due to higher level of compulsion to save and collective investment model
	<ul style="list-style-type: none"> - Where it is present, usually forms main pillar of retirement income 	<ul style="list-style-type: none"> - Typically complements state pillar - Occupational and collectively agreed 	<ul style="list-style-type: none"> - More amenable (than private DC) to encouraging savings as it is easier to compel savings or implement auto-enrolment 	<ul style="list-style-type: none"> - Typically requires supervision or incentives to ensure sufficient accumulation of savings 	
<p>Risk-sharing: Optimize risks borne by state and citizens</p>	<ul style="list-style-type: none"> - Pooling of individuals' longevity risk (risk of greater burden from those living longer balanced by those who live shorter lifespans than expected) - Provider is susceptible to systemic longevity risk (population living longer than expected) and economic shocks 	<ul style="list-style-type: none"> - Reduces individual's incentive to save; may lead to greater reliance on the state 	<ul style="list-style-type: none"> - Longevity, investment, interest, and inflation risks are borne wholly by individuals - Requires financial literacy to manage investment risks 		
	<ul style="list-style-type: none"> - Greater incentive (than state DB) to stay in work 				

	<ul style="list-style-type: none"> - Economies of scale due to large size, centralized administration, and disbursement with other state benefits 	<ul style="list-style-type: none"> - May not be portable across employers, leading to fragmented coverage and less optimal financial returns 	<ul style="list-style-type: none"> - Likely to be of lower cost (than private DC) due to larger economies of scale and centralized administration - May be fragmented, especially if members keep changing jobs - Costs from multiple plans may snowball - Members could suffer from high transaction costs, thus reducing efficiency 	<ul style="list-style-type: none"> - Centralized administration and typically backed by the state, to obtain required economies of scale
<p>Efficiency: Delivering maximal outcomes from available resources with minimal costs</p>	<ul style="list-style-type: none"> - Susceptible to fiscal strain with adverse demographics and weak economy - Prone to political pressures to enhance benefits without corresponding adjustments to contributions or other measures to ensure that benefits are funded - Requires buffer fund, means-testing of benefits, and/or mechanism to adjust benefits to stay sustainable 	<ul style="list-style-type: none"> - Fair in that payouts are correlated with participants' contributions - Where such systems are the main pillar, a separate Pillar Zero or other forms of social assistance may be required to provide for those who are unable to save 	<ul style="list-style-type: none"> - Less susceptible to fiscal strain, unless there are investment guarantees - May require supplementary provision to make up for contribution shortfalls, especially during times of poor economic/employment conditions 	<ul style="list-style-type: none"> - Less susceptible to fiscal strain if appropriate benefit adjustments are made - Requires buffer fund, means-testing of benefits, and/or mechanism to adjust benefits
<p>Sustainability: Fiscally sustainable and resilient</p>	<ul style="list-style-type: none"> - Typically, progressive within cohorts but potentially inequitable across generations if not kept sustainable 	<p>India, New Zealand (KiwiSaver), Sweden (premium pension)</p>	<p>Australia (Supers), Chile (AFPs), the United States (401(k)s/IRAs)</p>	<p>CDC: Denmark (ATP), the Netherlands (occupational schemes) NDC: Norway, Sweden (income pension) DC with government support and risk pooling: Singapore (Central Provident Fund, CPF)</p>
<p>Fairness and Universality: Strong safety nets for all</p>	<p>Canada, Finland, France, Japan, the UK, the United States (Social Security)</p>	<p>Switzerland</p>	<p>Switzerland</p>	<p>Switzerland</p>

* These are DC in terms of fixed individual contributions but have a DB slant in how contributions across the scheme are pooled and invested collectively. In retirement, the same fund serves as a drawdown vehicle (à la DB annuities) without individuals having to purchase separate retirement products.

** These take the pay-as-you-go funding structure and risk-pooling approach inherent in DB schemes, but mimic DC schemes in crediting contributions to individual "notional accounts." At retirement, the notional amount accumulated is converted into an annuity stream. However, benefits are subject to adjustment based on life expectancy and the financial stability of the fund.

HOLISTIC PROVISION FOR RETIREMENT NEEDS

Beyond retirement income, LFS systems should also have Pillar 5 amenities such as housing and health care, which are essential needs in retirement. It is not possible to provide an exhaustive analysis here of design choices in health care systems and housing markets. However, it is worth flagging considerations from the preceding analysis that apply for housing and health care provision as well. They are:

- State versus private/market provision: This will determine how far individuals bear responsibility for securing their housing and health care needs in retirement. Given the criticality of such provisions, some state intervention is warranted. But the degree of state provision, whether in terms of subsidies or centralization, will depend on fiscal sustainability. State involvement may present an opportunity for centralized coordination of policies and efficient delivery across multiple channels.⁵³

- Distribution of risk: This is an especially pertinent choice in health care. Risk-pooling interventions can help ensure that a basic level of affordable health care is available to all. This can be in the form of a combination of insurance and copayments for acute care and long-term care.

STRENGTHENING LFS ACROSS ALL SYSTEM STRUCTURES

This section has briefly outlined some of the structures that various countries have adopted to deliver LFS for their citizens. All these LFS systems have applied different approaches to address the economic and demographic challenges described in Section 3.

Policy makers should also consider complementary policy measures to strengthen their LFS systems in an adequate, sustainable, and fair manner. These include encouraging people to work longer and more productively, improving financial literacy, strengthening family and community support, and shaping realistic expectations of retirement needs and aspirations.

⁵³ For example, Singapore's Central Provident Fund is a fully funded mandatory contribution scheme that enables individuals to save for not only retirement income but also for housing and health care expenses. This is complemented by means-tested grants for public housing as well as health care subsidies.

Policy and Industry Responses for Successful Lifetime Financial Security

We are entering a period of rising dependency ratios and sustained lower growth. As highlighted in Section 3 of this report, even with optimistic assumptions, we face a US\$15.8 trillion Lifetime Financial Security (LFS) gap. **The longer we delay action, the more difficult the trade-offs, and the more drastic the reforms that will eventually be necessary.** We must therefore act boldly within the window of opportunity that we still have, to avoid painful social costs later.

Acting now is also an opportunity to positively redefine how societies view aging and retirement. Populations can be healthier and productive longer. Economies can benefit from a larger workforce, while individuals get to contribute and save more.

The policy challenge everywhere is: **How can we provide both current and future retirees a decent retirement, in a sustainable, efficient, and equitable manner?**

In the rest of this section, we set out a realistic and responsible policy agenda to deal with the LFS gap. It has three main prongs:

1. Address the unavoidable policy challenge of balancing the three key actions needed:
 - Extend the retirement age and strengthen employer responsibility for employing older workers and enhancing productivity
 - Increase savings during working life and/or increase taxes to support public pension provision
 - Recalibrate replacement rates in retirement to ensure sustainability and intergenerational equity

2. Reform LFS system design to enable fairer distribution of risk and enhance retirement savings:
 - Redistribute responsibility and risks, including through hybrid DB/DC system designs
 - Improve long-term investment returns through higher allocation to risk assets and better global diversification
 - Improve cost-efficiency
3. Prepare for new realities in working lives and retirement:
 - Adapt to the changing dynamics and nature of work
 - Improve public financial literacy
 - Shift public attitudes and overcome political frictions to system reform.

There must also be greater sharing of international best practices, and credible and transparent assessments that enable stakeholders to compare their systems with others. There is considerable scope to learn from each other's experiences and the combination of approaches taken to address this common challenge.

ADDRESS THE UNAVOIDABLE POLICY CHALLENGE

LFS systems have to balance the contributions and benefits allocated to working and nonworking populations, now and in the future. Hence, there are three interlinked questions that must be addressed in LFS reforms:

- Who to bear the adjustments
- When the adjustments are made

- How to balance between adequacy and sustainability.

People cannot save the same amounts or pay the same taxes during their working years, retire at the same age, and still receive the same retirement payouts as today, unless higher taxes are imposed on future generations to make up the shortfall.

To close the gap, countries must therefore opt for a combination of increasing the retirement age, increasing taxation or mandatory savings, and reducing relative retirement income or expenditures. Corner solutions involving any one of these actions on its own will not be politically or even administratively feasible, for the following reasons.

First, relying wholly on increasing the retirement age to close the LFS gap is politically unrealistic, while increasing the retirement age only in accordance with the proportional principle would be insufficient. Table 5.1 applies the proportional principle in a step toward closing the LFS gap in 2050. This entails significant increases in the retirement age but still leaves many countries with a retirement age well below 70. Applying an across-the-board increase to age 70 would roughly halve the estimated LFS gap, which still leaves a large gap. However, closing the gap entirely via retirement age increases would significantly reduce the number of years spent in retirement, which is both politically unrealistic and undesirable. Other studies in the European Union and United States have corroborated that raising the retirement age alone is insufficient to fully close the gaps.⁵⁴ We therefore suggest that while increasing the retirement age in accordance with increasing life expectancy should form the foundation of any LFS reform package, this must be complemented by other measures in savings, replacement rates, and system design and governance.

Second, relying wholly on increased taxation or mandatory savings would place a heavy burden on working populations. Our model forecasts that closing the LFS gap in 2050 solely through a tax or forced savings would impose an incremental fiscal burden

(through the tax or forced savings) of approximately 16 percent of nominal GDP.

Third, without some elements of the first and second points, the default outcome would be to accept significantly lower replacement rates, that is, lower incomes or standards of living in retirement. It is estimated that doing so would result in an effective replacement rate in 2050 of approximately 40 percent, compared to the OECD benchmark of 70 percent.⁵⁵ This could create substantial income disparity between working and nonworking populations, pushing retirees into relative or even absolute poverty.

A realistic policy agenda must hence involve a combination of policy around retirement age, savings and taxation, and replacement rates.

Increase the retirement age and strengthen employer responsibility for employing older workers and enhancing productivity

We believe that a primary focus in addressing the demographic and economic challenges to LFS should be to increase the length and productivity of working lives. While governments or legislatures make decisions on the official retirement age, they are not responsible for enhancing productivity. Employers play a significant role in driving innovation, changing company practices, and supporting efforts to improve health during working life.

RETIREMENT AGE

In many countries, employees already have varying degrees of choice about when to retire from work. But raising the “official” retirement age or standard age for public PAYG pension access is a powerful policy instrument, because in the majority of countries it also marks the start of public or occupational pension benefits. By encouraging people to keep working and accumulating pension rights longer, resources available in retirement are increased and the proportion of adult life spent in retirement is decreased. Therefore, the total need for LFS provision is minimized.

⁵⁴ A 2016 AVIVA study (“Mind the Gap: Quantifying the Pension Savings Gap in Europe”) noted that raising the retirement age by 5 years would close a quarter of the European Union pension savings gap, while raising the retirement age by 10 years would close half of the funding gap. In the United States, a 2012 AARP publication noted that raising the full retirement age to 68 by 2028 would close 18 percent of the Social Security funding gap, while raising the full retirement age to 70 in 2040 would fill 44 percent of the funding gap.

⁵⁵ OECD 2009.

TABLE 5.1 REQUIRED INCREASES IN RETIREMENT AGE UNDER THE PROPORTIONAL PRINCIPLE (IN LINE WITH HIGHER LIFE EXPECTANCY) IN 2050

COUNTRY	2010	2050
	Official retirement age	Under proportional principle applied from 2010
Brazil	65	72
China	60	65
France	60	64
Germany	65	70
Indonesia	55	59
Italy	60	64
Japan	64	68
Mexico	65	71
Spain	65	69
Sweden	65	69
Turkey	50	56
United Kingdom	65	70
United States	66	71

Sources: United Nations 2017; "OECD Pensions at a Glance" 2017; Australian Department of Human Services 2017; European Commission 2009; PwC analysis.

A number of countries have already committed to or have implemented increases in their official or standard retirement age. However, the steps taken to date will not on their own be sufficient to close the LFS gap; rising longevity and dependency will outpace these increases. In other words, the planned changes fall substantially short of the proportional principle.

Increases in the official or standard retirement age according to the proportional principle from now on should be the foundation of any policy reform package. At a minimum, it will help keep the overall proportions of pre- and post-retirement-age populations stable as lifespans increase, keeping demand for LFS provisions stable.

The right retirement age for individual countries is, of course, ultimately a function of national circumstances. With the proportional principle as a starting point, countries can make further adjustments taking into account potential improvements in the aggregate workforce participation and productivity, and the impact of the other policy options set out in this section. The ongoing transformation of

modern workplaces, such as digitalization, working from home, and much less focus on physical demand, would greatly facilitate raising the retirement age, at least on average.

Countries should also keep in mind that their current retirement age may already lag past improvements in life expectancy. For example, the retirement age in the United States, the UK, Germany, and Spain would be up to five years higher than the age today if the proportional principle had been applied from 1960. Future increases should take this into account.

PRODUCTIVITY

A higher retirement age will best mitigate LFS challenges if productivity is successfully upheld among older workers. Otherwise, a productivity dip would partially offset the effect of longer working lives. It is critical to support older workers to work as productively as possible for as long as they wish to do so, including beyond the official retirement age.

However, even in the context of lower and/or declining productivity, a higher retirement age would,

all other things being equal, help reduce demands on the pension system when payouts kick in later.

It is not fully clear whether productivity suffers from an aging workforce. What is critical, however, is to take actions to ensure that any such effects are minimized.

The challenge is to get people to view remaining active as an opportunity in the lead-up to and beyond official retirement. We believe such policies could also generate positive externalities, including with respect to health, community, and social outcomes.

Policy reforms could include public and corporate interventions in the following areas⁵⁶:

- Retraining, to enable people to move between career paths as they age⁵⁷ and to keep pace with evolving technologies and working practices
- Continuing professional development, to update and maintain skill levels within existing career paths, both in work and during career interruptions
- Occupational health actions, to boost the physical and cognitive abilities of people as they age and to mitigate the risk of workplace injuries to which older workers may be more prone
- Establishment of dedicated agencies, to enable older skilled and experienced people to find continued productive activity on an ad-hoc or part-time basis
- Targeted investments in research and development, directed toward workplace technologies and practice aids, to enable older workers to overcome physical or other limitations
- Mentoring structures and other interventions in the workplace, to enable older workers to more readily impart the benefits of their accumulated skills and experience to others
- In countries with large inflows of unskilled and in some cases illiterate immigrants without

knowledge of the local language, there is a need for wholesale investment in education at all levels.

GENERAL WORKFORCE PARTICIPATION

Beyond older workers, there is scope to boost workforce participation at other stages of life (pre- the official or standard retirement age), perhaps by targeting particular demographics such as women (see Window 5.1) and young parents who are keen to resume their careers following maternity or paternity leave.⁵⁸ This recognizes that dependency is affected by the proportions of working and nonworking people aggregated across all stages of adult life.

Policy actions that could support increases in workforce participation include:

- Tapering taxes and benefits to manage the marginal transition out of work and avoid cliff effects (analogous to similar tapering systems as people transition into work)⁵⁹
- Smoothing transitions in and out of the workforce at all ages to accommodate career interruptions such as childrearing, other care commitments, further education, and periods of unemployment and incapacity
- Subsidizing the provision of continuing professional development, targeted at young mothers and fathers and other “workforce absentees,” to help them maintain their skills and confidence for when circumstances allow them to return to the workplace
- Targeted investments in communications and transport technology, to enable people to participate productively in the workforce from remote locations or on a part-time or flextime basis
- Facilitating the investment of private wealth holdings, including pension lump sums, into new commercial ventures that also confer working opportunities for retirees and others.

56 An International Monetary Fund working paper modeled the positive effects of some of these and found them to offer material scope for improvement in productivity (Aiyar, Ebeke, and Shao 2016).

57 As Aiyar, Ebeke, and Shao (2016) point out, different professions and vocations have different profiles of productivity improvement and deterioration in relation to age and experience. The ability, therefore, to change career paths could enable people to remain more productive longer.

58 PwC 2018; Chartered Insurance Institute 2018.

59 Without which the marginal tax rate at the boundary can be prohibitively high. This is arguably a more acute issue for people contemplating exiting the workforce, who may feel they have more choice and a stronger sense of entitlement, than for people entering it.

WINDOW 5.1 ENGAGING MORE FEMALE CAPACITY AND TALENT

The world economy is currently missing out on the full capacity and talent of women, as shown by the wide range in female participation rates, pay, and workforce representation across countries.

Nordic countries perform particularly well in female employment. If other countries increased their female employment rate to match that of Sweden, GDP gains across the OECD could be over US\$6 trillion.

Engaging more female talent will also support better LFS across the population. In “Securing the financial future of the next generation,” the UK Chartered Insurance Institute (2018) notes that at ages 65 to 69, the average woman’s peak pension wealth is £35,700, one-fifth of men’s.

Increase savings and/or taxes to support public pension provision

There is no inherent advantage of private savings over taxation or vice versa as a means of delivering the resources required to secure financial security for retirees. Rather, both should play a role. Reforms are needed on both fronts and will be most effective where they function together.

SAVINGS

Private savings will play an increasingly important role in funding future retirement needs no matter how the tax system is designed. This is partly to offset an otherwise heavy tax burden and the societal and political resistance that could accompany that burden, partly to promote widespread capital ownership and profit participation, and partly to generate crucial private finance for investment in future productive capacity.

Currently, the level of savings is insufficient, due to a combination of real current financial hardship, a lack of awareness of the importance of saving, behavioral inertia compounded by generally low levels of financial literacy, and more recently, very low returns (if any) for low-risk investments. In a number of industrial countries, especially in metropolitan areas, rapidly rising property prices can depress private pension savings since a larger proportion of income needs to be devoted to purchasing or renting housing. Rising home prices put particular strain on younger workers seeking to save for retirement while also wishing to enter the housing market in larger cities (such as young workers in parts of Europe).⁶⁰

Attempts have been made to stimulate higher savings, including through tax incentives, improving public awareness, auto-enrolling people in pension plans, and making saving compulsory. Ultimately, these mechanisms differ only in the extent to which they reflect how public policy should persuade or require workers to save for their future.

A balance needs to be struck between taking responsibility for making active savings decisions away from workers and leaving them with all the responsibility. If responsibility is taken away from workers, and if mandated or auto-enrolled saving mechanisms are insufficient to fully fund their LFS needs, it will be harder to convince workers to take care of the rest. If the entire responsibility for saving is left with workers, the evidence suggests that behavioral biases and inertia will increase the risk of their failing to save enough. That is why many countries are either mandating or auto-enrolling (with the ability to opt out) at least a minimum level of saving.

The answer might be to move away from the idea that responsibility for saving involves picking a single point on the spectrum from no intervention at all to a fully mandated savings regime, to a multitiered approach.⁶¹ This could involve, for example:

- A base level of mandated saving, designed to ensure that no one with the ability to work and save is left relying only on the public safety net

⁶⁰ Not only do these workers save less because of the cost of renting and real estate, but the rate of family formation can be adversely affected (i.e. a delay in marriage and procreation). Workers may also consume less due to the higher proportion of income locked up in housing costs, thus affecting the economic growth rate. Finally, rising real estate costs may also increase intergenerational tension.

⁶¹ The policy goal should be to achieve a savings rate which, in addition to any PAYG benefits, helps secure the desired replacement rate and thus LFS.

- A supplementary tranche that is auto-enrolled, with the likely result that people will not opt out, but at the same time allows some flexibility and engages workers on what they need in retirement
- A third tranche that is voluntary but prompts action through guidance measures as well as public education.

TAXATION

In systems where tax revenues are used to partially or fully fund the LFS needs of retirees, the tax base should in principle include returns to capital (including, for example, company profits and dividends), as well as returns to labor (employment income). If any increased tax burden is disproportionately borne by employees, it could be viewed as unfair and give rise to various distortions, including, perversely, in decisions about whether to work or not.

To the extent that increased tax revenue is needed to meet higher LFS costs, it will be critical to provide a clear justification of why tax changes are superior to other options, such as mandatory saving, or forced or higher employer contributions. This applies particularly to countries with PAYG systems that have seen sharp increases in tax contributions to the pension system over the most recent years.

Specific policy actions on taxation could include:

- More clearly positioning taxes as a funding source for public pension and welfare expenditure, to facilitate greater transparency, fiscal discipline, and public confidence⁶²
- Aligning tax concessions provided to promote private saving with subsequent entitlements to public pension and welfare benefits⁶³
- Providing incentives to employers to contribute to private pension schemes on behalf of their employees.

Recalibrate replacement rates in retirement to ensure sustainability and intergenerational equity

Increasing dependency requires greater economic transfers from working to nonworking populations, typically via taxation, or across working and non-working stages of life, typically via private savings. These could place an unsustainable burden on the working-age population.

To relieve this burden, and given the potential limits to feasible or desirable increases in the retirement age, nonworking populations in some countries may need to lower their expectations for income in retirement.

In countries where it is appropriate to reduce replacement rates, particularly in PAYG schemes, choices also need to be made about the pace of any reduction. Reduction can in part be achieved by increasing replacement rates at a slower pace than average earnings increases. In most countries, however, it will be extremely difficult politically, as well as undesirable, to reduce the real value of pensions. As a result, it is likely that policies should lie between upper and lower boundaries:

- A lower bound set by the requirement to keep post-retirement income constant, in which case any increase in per capita real income would accrue mostly to working populations
- An upper bound set by the amount required to deliver the same per capita real income growth (net of taxes or required savings⁶⁴) to both working and nonworking populations.

The choice of position within those boundaries, and of how long increases below average earnings rates are maintained, needs to reflect the different replacement rates currently delivered in different countries.

62 This does happen in some regimes where social security taxes are levied separately from general personal and business taxes, and personal welfare entitlement is partly predicated on having previously paid social security tax.

63 Many would argue that tax concessions are necessary to stimulate an adequate level of *private* savings in the system, and, therefore, that such concessions should not be clawed back through reductions in future *public* welfare entitlements. Nevertheless, there are other ways to induce savings (see the subsection on Savings), and there are considerations of fairness and proportionality when it comes to the interplay between the tax/welfare and private savings channels for funding retirement needs.

64 It is important to capture the fiscal burden implicit in funding retirement needs, because what matters most to people's living standards throughout their lives is their level of *disposable* income.

REFORM LFS SYSTEM DESIGN TO ENABLE FAIRER DISTRIBUTION OF RISK AND ENHANCE RETIREMENT SAVINGS

There is room in many countries to improve LFS system design to enable individuals to more assuredly build up and enjoy a secure, adequate stream of benefits in retirement. **We urge that actions be taken to improve the distribution of responsibility and risk, investment performance, and cost-efficiency of LFS systems.** Three main considerations are as follows.

First, in many countries, individuals currently face substantial responsibility and risks to their retirement savings. This has followed from the large shifts in certain countries from public to private pension provision and from DB to DC pension schemes. The weakening of public social safety nets heightens threats to financial security in retirement. **We recommend adopting hybrid DB/DC LFS system structures that can better distribute risks across individuals and scheme sponsors.** This could include greater collective investment management for DC systems and modifying existing system elements such as recalibrating payout adjustment mechanisms in line with economic or demographic circumstances. It could also involve adding new channels of provision, for example, broad-based safety nets. However, those countries that have largely retained and consistently focused on PAYG systems in the DB form would be well advised to alleviate strains by allowing and fostering occupational DC systems on top of existing arrangements as opposed to doing nothing.

Second, yields on savings need to be high enough to help bring people closer to their retirement goals. To achieve higher yields, savings need to be channeled into appropriate investments. Where this has not been done, it is usually due to regulatory limitations. **We recommend structural measures in tax and regulation to expand the range of investment choices available.**

Third, with the shift from public to private provision and DB to DC, costs have proliferated, and

some scale economies have been lost. Such costs, compounded over a lifetime, erode LFS benefits substantially. **We recommend aggregating assets and liabilities across different plans where possible for greater scale. Industry costs could also be lowered through establishing cost benchmarks and deploying new technologies.**

Redistribute responsibility and risks through hybrid DB/DC system designs

In reaction to the LFS gap and the funding crisis faced by traditional DB pension providers, there has been a shift over recent decades from public to private pension provision and from DB to DC pension schemes in a number of countries. **This has shifted the responsibility for saving, together with the attendant risks, onto individuals, who must now make sure that they are making adequate provision for their own future financial security.**

The shift toward more private, DC provisions has had some system-wide benefit in alleviating the funding gap caused by public fiscal constraints, promoting widespread capital ownership and profit participation, and creating private finance for investment. At the individual level, workers benefit from greater flexibility to plan how to spread their disposable incomes over their lifetimes. Moreover, it can be argued that the responsibility to save for retirement reinforces the incentive to work, in a way that being taxed more heavily possibly does not.

However, this shift of responsibility has resulted in a general failure by workers to save enough toward their retirement, as individuals have so far not adapted their behavior sufficiently.

There has also been a corresponding shift in who bears investment and longevity risks. The loss of the risk pooling that is intrinsic to large DB schemes has left recipients with the task, and cost, of managing and insuring these risks themselves (that is, through investment diversification and the purchase of annuities). Yet, behavioral biases, low awareness and understanding of financial concepts, and low budgets mean that individuals may neglect to manage these risks or cannot afford the advice or insurance required.⁶⁵ If

65 The relatively low uptake of insurance indicates that, for whatever reason, a lot of this risk remains uninsured. See Window 5.3.

they do purchase insurance, the cost burden has potential redistributive implications (see Window 5.2.).

If individuals fail to manage risk and self-insure, they are left exposed to the possibility that they might outlive their savings and fall back into public safety nets. However, these too are generally weakening. Hence, a lack of savings and risk coverage threatens to leave large numbers of retirees exposed to serious financial hardship.

Alternative LFS system designs should be considered to better distribute responsibility and risk. **An ideal system may be a hybrid that combines the best elements of public, private (including occupational), DB and DC schemes, together with their analogues in the delivery of housing, health, and aged care, while mitigating as far as possible some of the adverse, unintended consequences.**

There are a number of avenues for pursuing such an ideal hybrid system, which include:

- Modifying existing DB schemes to allow pensionable ages to rise automatically with increases

in life expectancy, thus enabling sustainability and a better distribution of benefits and costs across generations. The Nordic countries have moved furthest in this direction.

- Developing hybrid schemes combining features of both pay as you go (PAYG) DB and fully funded DC schemes. This could involve either (i) creating within public DB schemes notional accounts (see Window 5.4), which expose individuals to the risk of slower GDP growth or changes in life expectancy arising pre-retirement, which create a stronger link between individuals' contributions and benefits, and so increase incentives to work longer⁶⁶; or (ii) incorporating some of the collective features of DB schemes into DC pension schemes, for instance, via the pooling of investment returns or the provision by the scheme sponsor of minimum return guarantees. Some countries, such as Denmark and Singapore, have adopted this solution.

WINDOW 5.2 SHIFTING BURDENS AND BENEFITS

An important feature of the shift from public to private LFS provision is that it is essentially regressive.*

Public DB pension schemes are funded and underwritten by taxpayers under broadly progressive tax regimes.** This is not the case with private savings, where there is a clear link between contributions made and benefits received, with the result that higher incomes are correlated with higher contributions and benefits. The picture is somewhat

complicated by the structure of tax concessions attaching to private pension savings, as well as the taxation of pension drawdowns. But it is generally the case that private provision lacks the degree of progressivity seen in public schemes.

To the extent that regressivity is an unintended feature of a shift to private pension provisions, adjustments to the tax code to reinstate the desired level of progressivity in the system may be warranted.

* A regressive burden, for example, in taxation, is one that falls disproportionately on those least able to bear it. A progressive burden is one that falls disproportionately on those best able to bear it. Most tax regimes have a degree of progressivity built into them, though the degree varies considerably.

** Some social security taxation is less progressive than general taxation (some is even strongly regressive). However, taking the full spectrum of LFS provision (including the funding and provision of public health), and looking at the allocation of both burdens and benefits in relation to income, most public systems are progressive, and most governments desire that they remain so.

66 The World Bank Pension Reform Primer on "Notional Accounts..." (World Bank 2005) provides further analysis and examples of notional account schemes currently in operation. Among other things, this paper argues that the key features and benefits of notional accounts could be replicated through the modification of existing public defined benefit schemes (potentially with less administrative cost), but that notional accounts may be more palatable and thus easier to introduce.

WINDOW 5.3 THE ANNUITY PUZZLE

The creation of annuities through the conversion of a lump sum into a steady income stream for life should be a compelling option, and annuities are an important tool supporting LFS for retirees. However, reforms to LFS provision, which desire to put people more in control of their financial affairs, have led to the unintended result that many retirees have chosen to leave themselves exposed to the possibility of outliving their savings.

The inadequate uptake of annuities could be:

- A short-term behavioral response to the removal of government compulsion, in which case uptake could be expected to revert to an appropriate and natural level in due course.
- Related to concerns about cost and value for money, including a perceived lack of cost transparency and an associated suspicion of overcharging, cost deterioration

over time as a result of adverse changes in underlying pricing parameters, or general affordability concerns, given the current pressures on family finances.

- Due to people's resistance to tying up their finances at the point of retirement in the way that traditional annuity products require them to do. Given that a traditional annuity is a composite of an investment and an insurance contract, the purchase of the insurance component necessarily ties the customer into the investment and thus precludes alternative investment choices that they might otherwise make, including planning for their estate.

Further, in-depth analysis of why people have reservations about annuities is needed. The results should motivate policy makers and insurance providers to create innovative products to help encourage more people to cover an important risk in their lives.

- Promoting DC plans with innovations such as “in-plan annuities” that provide income streams to retirees within their DC pensions.
- Strengthening public safety nets and means testing if necessary, to ensure that people who end up with insufficient provision, for whatever reason, do not do so in a state of poverty.
- Modifying the tax code with respect to the tax treatment of contributions and benefits, or more generally, rectifying any unintended redistributive features of these or other related reforms.

In practice, most countries are likely to achieve reforms by introducing elements of these features into the various strata of their existing LFS systems or creating new additions to the fabric of what is already there.⁶⁷ This might involve, for example:

- A basic means-tested public safety net, unrelated to earnings or contributions
- An earnings-based public DB scheme, or notional account scheme, with inbuilt stabilizers to adjust annuity benefits in line with national economic and demographic circumstances
- Occupational and/or private DC schemes, with a spectrum of mandates, auto-enrolment, and tax incentives to stimulate participation; a range of options for the investment of savings to enable people to build financial profiles and investment strategies according to their needs and preferences; and a degree of flexibility in the drawdown of savings (as a lump sum or annuity), together with the capacity subsequently to vary levels of insurance protection.

⁶⁷ Sweden, having reformed its pension system in the late 1990s, is a good example of a country that has introduced many of these features (see World Bank 2005).

WINDOW 5.4 NOTIONAL ACCOUNTS

Notional accounts have been introduced in Italy, Latvia, Poland, and Sweden. They can maintain public defined-benefit-type provision for individuals, but with a mechanism to match the level of provision to demographic and economic circumstances at the point of retirement. The introduction of notional accounts systems means that countries using a pay-as-you-go (PAYG) approach can maintain them rather than attempt the difficult shift to a funded approach.

An individual's income at retirement is based on the anticipated life expectancy of his or her cohort and on funding levels of the scheme. The rate of return for pension contributions is set by the government/provider and not directly tied to the investment earnings. For the provider, these arrangements help avoid some of the pitfalls of DB provision. The individual benefits by avoiding the responsibility and risk of achieving adequate investment returns to fund their retirement.

Notional account arrangements are viewed in certain countries by workers as fairer; the longer you work and contribute, the higher your income will be. Notional accounts also allow

opportunities for redistribution. Furthermore, the knowledge and acceptance that pension incomes are affected by changes in demographics and funding levels may mean that individuals begin to understand and internalize the need for periodic future pensions reforms.

But there are issues with this type of arrangement. As the benefit amount is linked to life expectancy at retirement, it is important to set the retirement age high enough to provide individuals with an adequate level of income for the rest of their life.

In addition, there is a degree of uncertainty for individuals around the amount they will receive when they retire, as it is linked to life expectancy, which changes over time. In this regard, some countries may not have the necessary data and analysis on life expectancy to be able to administer notional account systems. Finally, the system is still a PAYG system, meaning it is still subject to the same demographic pressures as other PAYG systems.

Additional information on a specific example, featuring Sweden, is presented in Appendix 2.

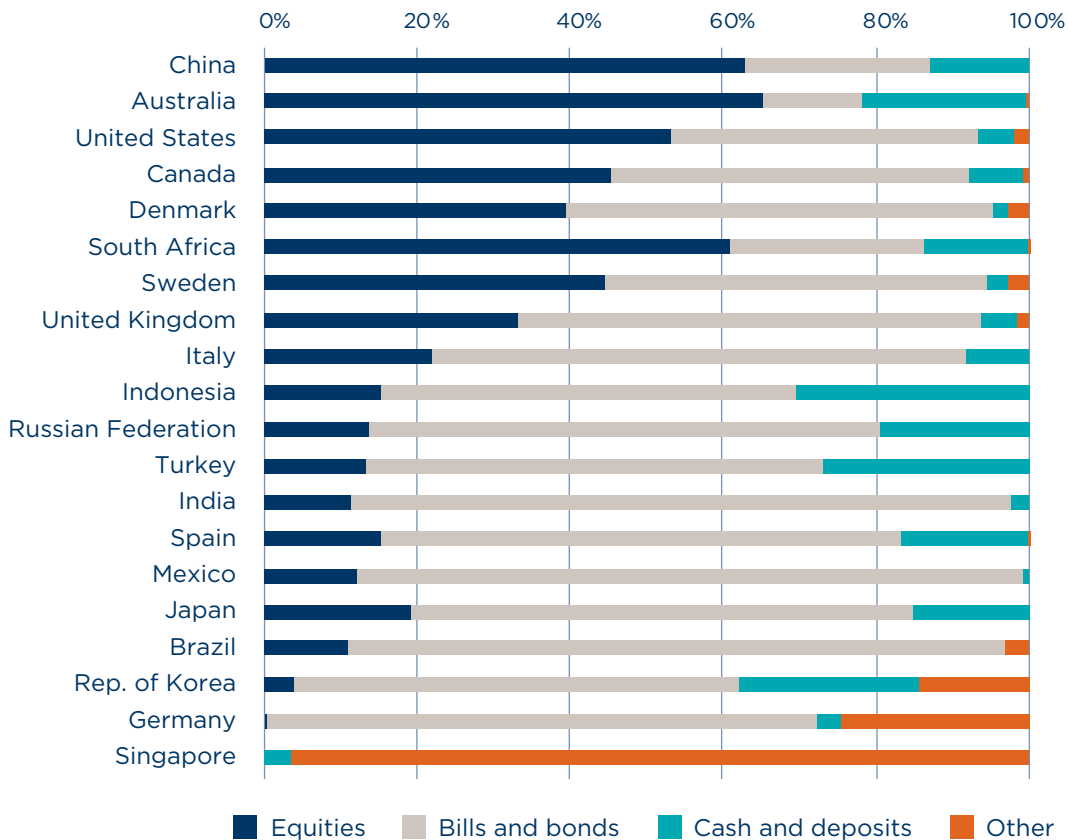
In the case of non-pension-related LFS provision, such as health and aged care, analogous reforms could be envisaged to help with the distribution and management of associated risks. For example, essential health and aged care, publicly funded from general taxation and delivered without qualification, could be supplemented with earnings-based Notional Public Health and Aged Care Schemes. Similar stabilizers could distribute systemic economic and longevity risks associated with public health and aged care provision, while pooling the idiosyncratic risks, and supplemented further with private health and other insurances.

A more radical possibility would be to combine key strands of LFS provision together, allowing for individual pension contributions, for example, to go toward subsidizing health care or housing needs. After

all, expenses in retirement include health and aged care services, as well as housing and day-to-day living expenses. These must also be funded through some combination of taxes and prior savings. These services can thus be consolidated into a single system. Such a framework could facilitate further efficiency and fairness in the distribution and management of risk.

Improve long-term investment returns through higher allocation to risk assets and better global diversification

Savings accumulated in private and occupational DC pension schemes tend to be allocated to lower-risk, liquid assets such as large-cap equity stocks, blue-chip corporate and government bonds, and cash (see Figure 5.1).

FIGURE 5.1 ALLOCATION OF ASSETS IN FUNDED AND PRIVATE PENSION ARRANGEMENTS, 2016

Source: OECD 2016.

Note: Central Provident Fund (CPF) savings in Singapore are invested in risk-free Special Singapore Government Securities (SSGS), which are non-tradeable government bonds issued to the CPF Board, fully guaranteed by the Government of Singapore. The SSGS offers stable returns pegged to comparable fixed-income instruments. Singaporeans can earn up to 6 percent interest per year on their CPF savings, while enjoying minimum interest rates of 2.5 percent per year on CPF Ordinary Account monies and 4 percent per year on CPF Special, MediSave, and Retirement Account monies. The government invests the SSGS proceeds together with its other assets in a globally diversified portfolio, aimed at achieving good long-term returns. Under the rules of the Singapore Constitution, it is unable to use the SSGS proceeds to fund government spending.

In addition, money held in call deposits with banks are a sizable proportion of savings. These earn virtually nothing for savers and tend to get channeled into financing less productive, low-risk assets.⁶⁸ This is due in part to bank regulatory capital requirements, and

regulations on liquidity and funding, which steer banks away from holding riskier and less liquid assets.⁶⁹

These limitations may be justified on the grounds that small depositors' balances, and retirees' wealth and incomes, should not be exposed to undue levels

68 There is, of course, the argument that people need houses, and somebody has to own them, so housing finance is as critical to Lifetime Financial Security as any other finance. The counter to that, though, is that regulatory capital settings have stimulated housing finance to a degree that has distorted asset markets, driven financial instability, and restricted the supply of finance to the real economy.

69 The compression of bank interest margins caused by low interest rates and new rules on funding and liquidity, coupled with the dilution of equity returns caused by higher prudential capital requirements attaching to balance sheet assets, is leading many banks to run leaner, lower-risk "vanilla" balance sheets while seeking commercial opportunities instead from noninterest income (fees and charges for ancillary services). By implication, savers' money in the banking system is possibly not being competed for as much, nor worked as hard (in pursuit of margin income from risky commercial lending on the other side), as it used to be.

of risk. Defensive assets in retirement portfolios are an important protective asset for those approaching retirement.

However, low-risk liquid investments reduce or even eliminate expected returns, which is ultimately in the interest of neither savers nor the wider economy. In many systems, this also means the economy gets less finance channeled into investments that can deliver productivity, which further dampens domestic returns for finance providers and pension fund investors. Lower yields widen the gap between what people are able to save while working and the wealth and incomes they need in retirement.

While it is generally true that to achieve higher returns, one should expect to take more risk, this trade-off must be mitigated through appropriate diversification across asset classes. Increasing retirees' pensions exposure to equities is one route, but equity-like risk, or economic growth risk, can also be achieved through public credit assets or through private assets. It is notable that many equity-heavy pension portfolios have not achieved their growth and income objectives; asset portfolios have underperformed liabilities in key regions. Risk budgeting and management is a nuanced art, and simply increasing equity-like risk can come at the expense of reducing diversification.

Carefully regulated and overseen, illiquid assets can provide many benefits and may be appropriate for inclusion in significantly large pools of capital with long time horizons.⁷⁰ Such investments could also help boost productivity and growth in the economy.

There are other factors that arguably distort the investment landscape and reduce risk-return options available to private savers, with similar consequences. They include:

- The differential tax treatment of debt and equity instruments, for both issuers and investors. This

tends to strongly favor debt in virtually all tax regimes and thus distorts marginal financing and asset allocation choices.⁷¹

- The lack of tax and regulatory harmonization among different jurisdictions. This complicates cross-border capital flows, thereby restricting the universe of investors available to borrowers and vice versa.⁷²
- The ubiquity of the bank deposit as the default, low-risk, low-stress, low-transaction-cost option, underwritten in many regimes by government guarantees.
- Issues related to homeownership, as described in Window 5.5.

Innovation by the pension fund industry is providing some possible solutions to workers and those approaching retirement. Target date funds, for example, address asset allocation head-on. The asset allocation for these funds is constructed with respect to demographics, and each allocation is unique to a specific targeted retirement year (typically in five-year increments). Because the appropriate fund for each beneficiary is a function of the remaining length of working life, this may alleviate some of the asset allocation challenges (including the sizing of the fixed-income allocation and decision to include alternatives), while still giving the asset-owner the flexibility of choice.

Specific responses to improve long-term investment returns could include:

- Supporting the modification of asset allocation regulation of private pension funds to accommodate more equity and other notionally risky asset classes, subject, of course, to prudent portfolio risk management principles⁷³

70 Indeed, we would go further and say that less liquid investments with long-dated time horizons and long-term growth potential are a good strategic allocation for investors with long investment horizons or pension funds with long-dated liabilities.

71 It could be argued that this is inconsequential at a system level: the underlying assets are the same however they are financed, and whatever is taxed away gets recycled back through the public sector. However, it can still have the distorting effect of diverting finance away from businesses that are generally more reliant on equity than debt finance, that is, small, high-growth enterprises, in favor of large, established corporations and government agencies with more capacity for leverage and (in the case of corporations) more capacity for tax absorption. In other words, the assumption that the underlying assets are the same might not be right.

72 The decision of many governments to scale back public defined benefit pension provision, putting the onus instead on individuals and the private sector, makes it incumbent on governments to do all they can to allow the world of private sector investment, including through private pension schemes and asset and wealth management providers, to function smoothly, efficiently, and without distortion or bias.

73 The G30 has previously advocated this step in its report, *Long-Term Finance and Economic Growth* (2013).

WINDOW 5.5 PRIVATE WEALTH AND THE HOUSING CONUNDRUM

Private wealth has long played an important role in delivering LFS, providing a source of income, a capital buffer in case of need, and capital for subsequent generations via inheritance. However, as lifespans increase, the amount of private wealth capital held by average households is likely to become depleted and will no longer be sufficient as a risk buffer for either current or subsequent generations. At the same time, private wealth is becoming more concentrated and, through inheritance, this dynamic is driving big differences in how people start their financial journeys as well as how they end them.

In particular, homeownership plays an important role in facilitating LFS. However, a cultural emphasis on homeownership, often reinforced by capital gains tax relief, and the

widespread perception of housing investment as a “sure bet,” can result in workers placing much of their wealth and savings in real estate, exposing them to very high concentrations of risk, often with high leverage in the early years.

The challenge is in preserving the undoubted financial, social, and economic security that private housing can provide, while enabling investment diversification and avoiding property gambles. Financial innovations may help people establish more balanced financial profiles earlier in life, even as they strive to become homeowners. At the other end of the age spectrum, the advent of reverse mortgages and home equity release products has given people a way to access their equity without having to sell or move.

- Rebalancing/neutralizing the tax and regulatory treatment of asset and instrument types both domestically and internationally, to provide a more coherent and efficient risk-return selection from a bigger universe of investable assets
- Modifying regulatory requirements to rebalance finance supply in favor of asset classes that are deemed important to growth in the real economy⁷⁴
- Establishing public investment vehicles or mechanisms, with appropriate incentives such as tax concessions or guarantees, and/or the direct provision of seed and bridge financing, to attract pension money into designated government-sponsored investment schemes, such as the Australian Future Fund.

Improve cost efficiency

The shift in some countries from public to private provision, DB to DC scheme structures, and the relative demise of large employer-sponsored schemes and the advent of smaller

outsourced and self-managed pensions, has resulted in a proliferation of asset management and administrative costs, a dilution of bulk purchasing power, and a loss of operational scale economies. This might be offset to some degree by competition and potentially greater utility from greater choice, but in several countries the net impact appears clearly negative.

These risks and problems can be masked during periods of high growth, high yield, and/or asset price inflation, but when conditions deteriorate, they can dramatically erode benefits, particularly from lower-return instruments.

For example, in Europe, during 2013 to 2015, retail equity funds experienced reductions of 239 basis points or 15 percent of gross returns, and institutional equity funds faced a reduction of 155 basis points or 11 percent of gross returns. Despite lower absolute reductions, bond fund investors lost on average a higher share of the available gross profits (32 percent in retail and 17 percent in institutional funds).⁷⁵

Compounding such charges over the lifetime of a retirement product can be substantial. The UK

⁷⁴ Group of Thirty 2013.

⁷⁵ European Securities and Markets Authority 2017.

Financial Conduct Authority found that the difference in cumulative value growth was 44 percent over 20 years when comparing higher-cost and lower-cost products, when including fees, charges, and transaction costs (critically, this assumes the same gross returns are achieved).⁷⁶

Cost efficiency may be potentially improved by taking advantage of the benefits of scale associated with aggregating assets/liabilities, such as fee reductions. In the UK, large liability pension scheme owners have in general outperformed medium-sized schemes, in part because of cost efficiencies. But this is not always the case. Pooling or aggregating assets/liabilities across multiple defined benefit markets can be logistically challenging, and the heterogeneity of liabilities can be a challenge.

Policy options to lower costs include:

- Supporting greater consolidation of savings pools to improve scale economies and the affordability of professional input
- Incentivizing industry to develop and deploy new technologies to lower operating costs and charges
- Promoting a combination of improved transparency/cost benchmarking based on the standards set in large public and occupational pension schemes, and helping improve performance and service standards in the industry
- Establishing a pension consolidator or “bulk buyer” for small and medium-sized enterprises and individuals to provide scale economies equivalent to public and larger corporate schemes
- Introducing a variation on auto-enrolment which, subject to an opt-out, has some built-in automated asset management functionality.

PREPARE FOR NEW REALITIES IN WORKING LIFE AND RETIREMENT

Working life and retirement have changed drastically in the last 50 years. Both are now longer and the boundary between them has blurred. Forms of work have also evolved with digitization. While some

LFS systems have made the necessary adjustments, they have often been belated. **LFS systems need to better anticipate and respond to changes in working life and retirement.**

Public awareness and financial skill need to be increased. With the shift toward more private and DC provision, individuals bear a greater responsibility to build their retirement savings. They should be equipped with the capabilities to do so. They should also be sensitized to the need for and the impact of LFS reform. The following three actions are paramount.

First, LFS systems should adapt to shifting career models. There has been a trend away from traditional full-time careers. This has reduced the effectiveness of traditional occupational pensions and hampered the uptake of private pensions. Responses should be twofold: LFS systems should accommodate varied life and career choices, and mitigate the risks to retirement financial security inherent in such choices.

Second, public financial literacy must be improved. This is essential in LFS systems where the responsibility for saving has been shifted to individuals. Individuals should be equipped with an appropriate level of financial capability and have access to relevant financial planning tools. This will better equip them to plan appropriate LFS provision.

Third, policy makers and other actors need to build consensus around LFS reform and policy implementation processes to be successful.

Adapt to changing dynamics and the nature of work

The trend away from stable, secure, continuous employment with large employers is undermining the efficacy of occupational pensions in delivering Lifetime Financial Security. In addition, the perception of job insecurity, irrespective of whether people actually face periods of unemployment, may make it harder for people to commit to long-term savings in private pensions. Finally, a lack of portability of private pension arrangements between jobs and career phases, particularly where careers span multiple jurisdictions, can deter savings, eroding the efficiency of savings plans.

⁷⁶ Financial Conduct Authority 2016.

The notion of retirement is changing as people gravitate toward multiphase careers and retiring by stages. Yet, many pension schemes and the rules that govern them are still designed rigidly around the traditional pattern of working life, that is, working full-time up to a certain age and then stopping. This needs to change so that people are treated fairly by the system if, either by choice or necessity, they do not conform to that traditional pattern. While ensuring sufficient contribution to the pension system is still made, we should be accommodating or even encouraging these changes in workplace dynamics if they result in reduced dependency, greater productivity, and greater efficiency, all of which support LFS goals.

Specific policy responses could include:

- Building flexibility into pension systems to accommodate people’s life and career choices and introducing specific incentives for such choices that improve sustainability.
- Designing policy measures to target particular cohorts and demographic groups, given the risks they face and their behavior patterns in relation to those risks and issues. This may involve developing tailored policy formulations for new workforce entrants, women, freelance workers, self-employed and sole traders, temporary/contingent (commission-based) workers, migrant employees, already retired/nearing retirement, semi-retired, low income, and unemployed.
- Prioritizing policy responses where the issues are most acute in terms of projected shortfalls, while also strengthening safety nets.
- Improving pension portability through simplifying processes for the consolidation of pension savings from multiple providers.

Improve public financial literacy

It is crucial that any shift from public to private provision, and from DB to DC, goes hand in hand with a concerted push to ensure that private individuals do prepare to save, and provide for their own LFS, to pick up where governments and corporations are

retreating. Today, choices such as how long to continue working, how much to save or spend, and how to invest pension savings are increasingly left to individuals to make. However, we have real concerns that these choices are not being made responsibly, or with sufficient knowledge, understanding, and skill.

There is a clear need to educate workers, savers, and retirees to make them more financially astute and literate, and improve access to providers, products, and guidance. Sadly, recent European polls indicate a deterioration in the levels of financial literacy.

To bridge the financial knowledge gap, governments and industry have an important role to provide appropriate incentives, guidance, and support. Specific responses to the need for greater financial literacy could include⁷⁷:

- Initiating broad-based public and stakeholder education, mandated through multiple channels, such as:
 - Providing and/or mandating financial “health screening” checks at key life stages such as age thresholds, changes in work status, retirement, and at regular intervals in retirement
 - Strengthening the financial advisory framework, with appropriate safeguards to restore public and customer trust, to enable industry to resume advising with confidence⁷⁸
 - Introducing refinements on the spectrum from compulsion to facilitation in private savings, for example, bundling education and advice into prompts triggered by events such as taking a job, entering auto-enrolment schemes, buying property, or retiring
- Providing clear guidance on the principles of asset allocation and risk management through various channels such as schools, libraries, public agencies, and industry product disclosures
- Building aspects of professional wealth manager functionality into retail investor products and funds, and at lower price points, through automation and so-called “robo-advice”

⁷⁷ Some of these proposals coincide with those offered earlier in the context of helping people improve the performance of their saving portfolios.

⁷⁸ In some countries and industry sectors where there have been major mis-selling scandals, and corresponding sanctions, the industry has become so reticent as to leave gaps in the advice available to customers. This gap needs to be filled.

- Ensuring the industry has clear regulatory guidance on fiduciary requirements in the provision of customer advice and the marketing and selling of financial products and services.

Shift public attitudes and overcome political frictions to system reform

The issues with respect to shifting public attitudes and overcoming political frictions to system reform include the following:

- Resistance and reluctance to change due to the unpopularity of crucial reforms, such as raising the retirement age and reducing entitlements, particularly where demographic changes mean that retirees are wielding increasing political influence.
- Conflicts between cohorts and generations, between the “haves” and “have-nots.” These conflicts can include grievances associated with transitioning from legacy unfunded DB schemes to DC schemes.
- Feelings of moral entitlement; people worked hard for decades and built their lives around a belief and expectation that they would be supported in old age. In countries showing a tendency to push reforms toward the wrong direction, for example, Germany and Italy, they do so in the name of moral obligation or entitlement as opposed to looking at the financially sound or affordable.
- Changes in political leadership, which can cause abrupt changes in political ideology, making it difficult to set and stick to long-term reforms.
- Mistrust of government motives fueled by political tribalism and electoral expediency.

Policy makers and other actors need to focus on depoliticizing the reform and policy implementation process as much as possible. Specific responses could include:

- Establishing independent agencies at the national level with defined mandates and discretionary executive powers, to set key policy parameters (for example, the standard retirement age) and to design integrated reforms.

- Creating independent advisory bodies or standing legislative committees (along the lines of the UK’s Office of Budget Responsibility) to develop a multistakeholder consensus and foster public consultations to provide independent and inclusive advice to governments.
- Depoliticizing transitional arrangements and financial facilities to smooth the impact of policy changes.

The value of international comparison and coordination

Reports of this type typically end with a call-out on the importance of policy coordination, both domestic and international, and while everyone agrees about its importance, it hardly ever happens. That is because national and international coordination is difficult. But so is getting LFS right.

The required coordination includes potential contributions from government, employers, financial services providers, charities, local communities, extended families, and private individuals. Prioritizing, organizing, and delivering all of this through a coherent national agenda requires policy makers and others to look beyond narrow policy domains and delivery channels.

Further, in setting national agendas, it is important to also look beyond national borders. After all, the key demographic and economic factors that impact national LFS outcomes are, to a large extent, global phenomena. Lessons can and should be learned from how other nations are responding to similar challenges. There is a need and scope for greater domestic and international policy coordination. This is not a distinct policy recommendation as such, but more a generalized recommendation for coordination and information sharing.

Given the interdependence of pensions and other areas of public policy, there is always scope for better coordination and delivery. People are living longer, and this means that their lifetime needs are increasing, and this must be addressed.

As already emphasized, the solution is relatively simple but is still very difficult to achieve: a combination of people working longer, saving more during their working years and, in some cases, accepting lower payouts and spending less in retirement. Between this basic issue and basic solutions, there is

a complex array of policies and systems, with corresponding gaps, overlaps, and frictions.

Better coordinated policies and better targeted interventions across pensions, health, housing, and aged and social care systems could alleviate some of the financial, administrative, and logistical frictions arising and result in better outcomes for retirees at reduced overall cost.

Potentially, there are positive feedback loops that could come with coordinated progress. An older person who is productively engaged in the workforce will be more financially secure. It is also likely that he or she will be better supported socially and be physically and mentally healthier. This, in turn, could better enable them to remain productively engaged in the first place. Coordinating policies and interventions should help to sustain feedback loops and thus promote reduced levels of dependency for individuals and across the system as a whole.

Governments clearly have the lead role to play in coordinating the system, including those areas that they deliver directly (that is, public pensions, health, housing, and aged and social care) and, via legislation and regulation, those that are delivered by others.

There are examples of such mechanisms, from special-purpose commissions and task forces to

permanent agencies. One example of the former is the UK Pensions Commission, which stood from 2002 to 2006 with a mandate to review and recommend changes to the UK private pension and long-term savings systems. Another is the German government commission formed in the spring of 2018 tasked with making recommendations on a plan for a “long-term and generation-friendly” pension system.

An example of a permanent structure is the Australian Government Productivity Commission, a permanent agency with a wide-ranging mandate covering all levels of government and encompassing all sectors of the economy, as well as social and environmental issues, to advise on key policy or regulatory issues bearing on Australia’s economic performance and community wellbeing.

Governments and private sector actors can and should share information across national boundaries. Best practices should be highlighted and shared.

As the report has made clear, the challenges of constructing national solutions to LFS policy are significant and politically fraught. It is in the collective interest of all concerned to achieve common goals nationally, and to support achievement of those goals through existing mechanisms that facilitate international coordination and cooperation.

WINDOW 5.6 CASE STUDY: HOW DENMARK CARRIED OUT PENSION REFORMS

We end this section with a case study that shows how, despite the many challenges facing LFS, successful reforms are possible. The case of Denmark not only illustrates how multiple policy levers must be used in LFS reform, but also testifies to the importance of transparency and good governance in policy implementation.

Denmark implemented a series of pension reforms early in this millennium as part of a broader suite of reforms known as the 2006 Welfare Reform and the 2011 Agreement on Later Retirement. The reforms sought to reduce early retirement, and increase employment among older workers. Specific reforms included gradually increasing the public old-age pension (retirement) age from 65 to

67, and the early retirement age under the Voluntary Early Retirement Pension from 60 to 62. A mechanism to link both age thresholds to changes in life expectancy was introduced, and the duration of Voluntary Early Retirement Pension benefits reduced. The OECD credited Denmark with having implemented substantial policy initiatives in response to its recommendations on aging and employment in a 2015 report. In addition, not only has Denmark enjoyed sustained growth in the labor force participation rate of older workers since, but it is also expected to have the highest retirement age, at around 72, by 2050 (Finnish Centre for Pensions 2019). Our examination of what worked revealed the following.

1. A strong political commitment to carry out the reforms

The reform proposals were first proposed by the ruling conservative People's Party in April 2006. In June of the same year, Parliament passed the reform, with a majority of 158 of 179 backing the proposals. The 2011 Agreement on Later Retirement was also proposed by the conservative government, and reforms were also passed quickly by the new coalition government of Social Democrats, Socialists, and Social Liberals following the September 2011 election. In fact, the political commitment to follow through with the 2006 reforms was so strong that increases to both the pension age and early retirement age were brought forward by five years with the 2011 agreement. This is in contrast to elsewhere in the European Union, for example, in Poland, where the retirement age was lowered from 67 to 65 (for men), reversing a previously approved policy.

2. Clear policy objectives and evidence-based policies

Both sets of reforms clearly set out the goal of promoting employment, particularly among older workers, to reduce the fiscal burden of an aging population. This goal also reflected the broader goals of the European Union's employment strategy to promote increased employment, quality of work, and social cohesion. At the same time, the design of the reforms was based on a 2003–2005 OECD multicountry review of aging and employment policies, the 2005 OECD report on "Ageing and Employment Policies: Denmark," and

two-year-long research by the independent Danish Welfare Commission.

3. Future-proofing changes to the retirement age

Indexing pension age and early retirement age to future changes in life expectancy was a means to ensure both age thresholds kept pace with demographic changes. The indexation mechanism for calculating both age thresholds is now based on a specific formula using mean life expectancy for 60-year-olds, and changes to the thresholds are calculated every five years based on the latest observed life expectancy. To future-proof these reforms, the mechanism has been incorporated into legislation, and it is a requirement that the government's long-term fiscal strategy closely follows the indexation rule described in the legislation.

4. Gradual use of carrots and sticks

The broad suite of reforms comprised both positive and negative incentives. Education and assistance via the "Seniorjob" scheme to help the elderly find employment were implemented alongside increases in retirement age, reductions in pension payments, and tightening eligibility conditions for pensions. In addition, the gradual pace of reforms, particularly giving advanced notice of retirement age increases, could have helped build public support and acceptance of the reforms. In particular, changes to the early retirement and pension age would have to be confirmed by Parliament at least 10 years before they can take effect, with increases to the thresholds necessitating a majority vote in Parliament.

Sources: Brief on Pension System, Denmark Ministry of Finance; Büdenbender 2018.

Conclusion

All governments, workers, retirees, and populations (as voters) face the complex and difficult challenge of securing Lifetime Financial Security for all. This must be achieved in tandem with adjusting the demographic and fertility shifts that impact the dependency ratio and which cannot be avoided or overstated.

In this report, we have sought to illuminate the policy choices available to policy makers, workers, and retirees. We find that the potential LFS gap in 2050 can be bridged, but it will require the use of multiple policy levers to succeed.

Those policy levers include a gradual upward adjustment to statutory retirement ages (ideally using the proportional principle); increasing savings rates by workers and taxation rates, as needed; and an acceptance of a lower replacement rate at retirement.

No single lever could close the ever increasing LFS gap; the scale of the challenge is simply too large. A new consensus on sustainable LFS provision may indeed leave many unhappy with the outcome, as large

groups must accept or take actions that impact their current and future plans for retirement.

What makes today's LFS challenge even more arduous is that it occurs at a time when governmental institutions are increasingly mistrusted, mainstream political parties are under strain, and voters are becoming more diverse and heterogeneous, as well as susceptible to populist rhetoric and demagoguery.

In this environment, creating the space to discuss and address LFS challenges that affect us all and require collective solutions is especially important. Some countries have partially succeeded in this endeavor, while others have not yet found a consensus on LFS.

We hope this study supports the necessary and important discussion that is already underway in many societies. We are hopeful a new and lasting consensus on LFS can be reached. We believe it is not only possible—as demonstrated, we have the tools—but it is also necessary, and we must succeed.

Comparative Taxonomies

Throughout the existing literature, pension systems are defined with reference to key design features, summarized as follows:

- **Ownership:**

- **Public** – administered centrally; contributions pooled,⁷⁹ and benefits distributed according to defined policy specifications, with or without reference to contingent facts about individuals' capacity to contribute/history of contribution; required benefits; and other circumstances
- **Private** – individuals' benefits in retirement linked directly to their contributions pre-retirement, either financial or as private sector employees, public servants, or other special categories such as armed services personnel.

- **Basis of determination:**

The relationship between amount saved toward retirement, and the consumption in retirement that this enables, is subject to a number of risks. These include financial risk, inflation risk, and longevity risk. It is therefore not possible to lock both sides of this equation: amounts saved per year pre-retirement, and purchasing power per year post-retirement. Risk is an intrinsic feature of pension provision.

Pension schemes are typically classified in terms of where this risk resides—on pension providers or on pension recipients—as follows:

- **Defined benefit (DB)** – Pension benefits are defined within the scheme, and therefore the risk is on the *provider* to ensure that those benefits can be funded

- **Defined contribution (DC)** – Pension benefits are not defined within the scheme, and therefore the risk is on the *recipient* as to what benefits will ultimately flow from a defined set of contributions.

There has been a notable shift from DB to DC schemes in the private sector. In addition, there has also been a policy shift in many countries: a relative shrinkage of public schemes, which are generally DB, and a greater reliance on private schemes and other savings. The two trends have driven a major shift in the incidence of risk from pension providers to pension recipients.

- **Funding:**

- **Funded** – where benefits are financed out of prior savings
- **Pay-as-you-go (PAYG)** – where benefits are financed either out of contemporaneous income (taxes in the case of public schemes; earnings in the case of corporate schemes) or else borrowed against future expected income.

Corporate/occupational pensions play a critical role in many regions, for example, Continental Europe. In terms of taxonomy, they are generally classified as private, even if the employers in many cases are in the public sector, and these pensions feature both DB and DC schemes. They can also be funded or PAYG.

The traditional prevalence of DB in corporate/occupational schemes, coupled with negative trends related to their financial sustainability, workers' and retirees' lifespans, and underlying economic conditions, has created a major funding crisis for many employer-sponsored pensions.

⁷⁹ Although they may not be directly attributed as pension contributions.

In some countries, legislative increases to the value of the benefits and regulatory pressure to ensure that DB “promises” are fully backed by assets (that is, fully funded) have accentuated the problem.⁸⁰ The resulting policy shift among employers to deal with this crisis is largely responsible for the overall shift from DB to DC and the shift of risk onto pension recipients.

Pension systems at the national level tend to comprise combinations of subsystems. For example, the OECD and World Bank studies provide taxonomies as illustrated in Figure A1.1.

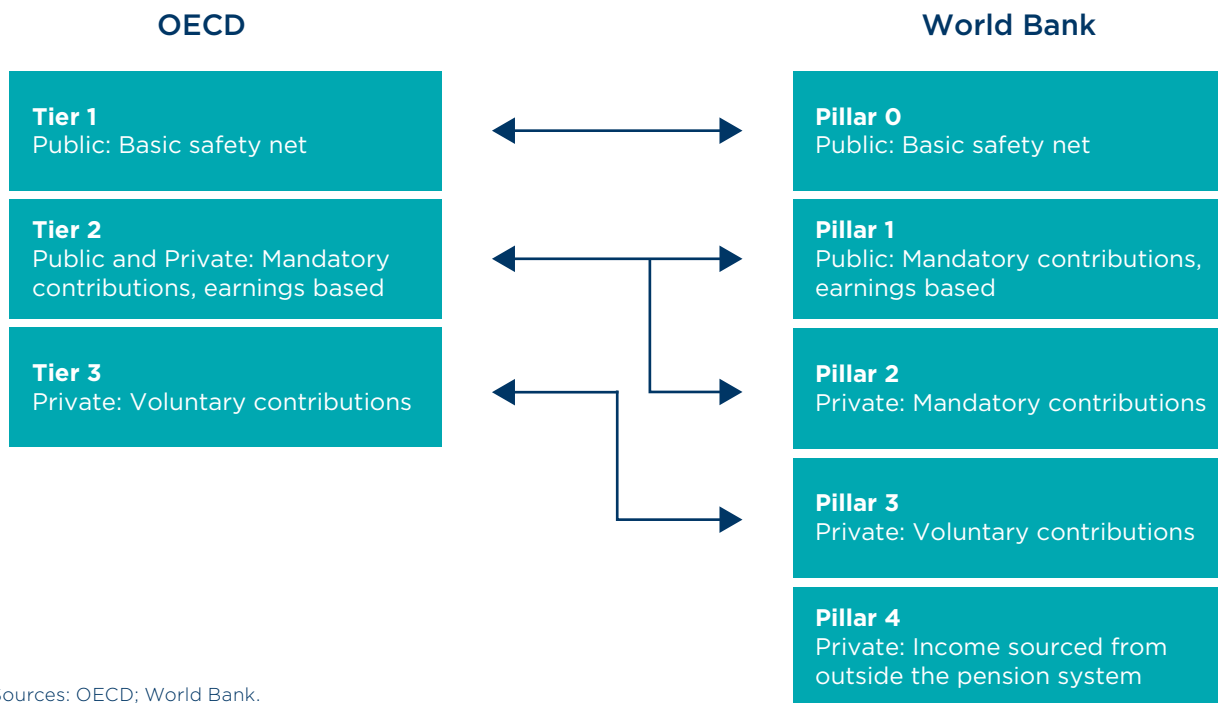
These two taxonomies are reconcilable with one another. The main difference is the greater granularity of the World Bank taxonomy structure, and the explicit recognition in Pillar 4 of other non-pension sources of retirement income. The boundary between pensions and other sources of post-retirement income can become blurred. For our purposes, the defining feature of a “pension” is that it should be intended explicitly

for drawdown post-retirement. We have drawn from both the OECD and World Bank approaches with the goal of complementing the existing literature and have used two primary sources for this: “The World Bank Pension Conceptual Framework” (2008), and “OECD Pensions at a Glance” (2015).

The main addition to the World Bank approach is the addition of a further pillar—Pillar 5—to accommodate the aspects of Lifetime Financial Security that do not derive from retirement income (for example, direct provision to aged populations of amenities such as health, accommodation, and aged care, through both public and private channels).⁸¹

We recognize that there is overlap between the categories and pillars. Indeed, some of the more promising innovations such as auto-enrolment in pension schemes result in a blurring of the boundaries. The model is used as an aid and is not supposed to be definitive or all encompassing.

FIGURE A1.1 ILLUSTRATION OF TAXONOMIES



Sources: OECD; World Bank.

80 DB “promises,” when first introduced, were typically aspirational rather than guaranteed. Decades of legislation have firmed up the promises, effectively requiring that they be guaranteed, thereby putting the risks of DB schemes—and resulting costs—firmly on the providers.

81 This should not be construed as a rival taxonomy structure; rather it is an expansion to take account of the wider focus on Lifetime Financial Security (as opposed to retirement incomes, or just pensions). Incidentally, the World Bank taxonomy began (in 1994) as a simpler structure focused on pensions, but was later modified (in 2008) by adding Pillar 4 (among other changes) to take in other sources of retirement income. We take this one step further.

Sweden's Notional DC system

Sweden's pension reforms in the 1990s introduced a notional accounts system for the mandatory earnings-related element of public pensions. In the Swedish system, individuals hold a notional account that is built up over a working life and then converted to an annuity at retirement. The account earns a presumed rate of return fixed to the rate of growth of per capita earnings but is also tied to economic performance.⁸²

At retirement, the notional account is converted into an annuity based on the expected life expectancy of the relevant age cohort at that time. The risk of changes in life expectancy prior to retirement is thus borne by the individual, who may decide to delay retirement to receive a higher annuity, while the state still absorbs the risk of uncertain life expectancy after

retirement. Annuities increase in line with average earnings, but a “balance mechanism” is applied if funding levels drop below a certain level, whereupon increases are adjusted downward.

Sweden's automatic calibration of entitlements mitigates the fiscal impact of public pension obligations without the need to shift more dramatically onto private/DC provision and the issues that can come with design choice (including, for example, insufficient private savings levels, and a loss of risk pooling).

The use of notional accounts, pioneered in Sweden and implemented in other countries such as Italy and Poland, is being considered by other countries seeking to effectively address LFS challenges.

⁸² Following the global financial crisis, workers' notional accounts were credited with a minus 1.4 percent rate of return in 2010 and minus 2.7 percent in 2011 to help the system stay in balance.

Modeling Lifetime Financial Security Trends

This appendix explains our model for estimating the LFS supply-demand gap.

Our economic model compares the demand for and supply of LFS, with a focus on post-retirement income. The model is intended to help assess how effective different policy levers can be in solving the challenges of sustaining LFS.

The countries used in the model represent 18 of the G20 economies⁸³ plus Denmark, Singapore, and Sweden. The model covers the majority of the global output and the global population, providing an overall picture of the global challenges in providing lifetime financial security.

The economic model estimates the total global current shortfall in retirement income provision between 2000 and 2050 based on current economic and financial arrangements. Our baseline model factors in known policy changes (for example, changes in retirement age) and provides a “do nothing” projection up to 2050.

Figure A3.1 illustrates the key drivers of demand and supply that we incorporate into our analytical framework.

DEMAND FOR LIFETIME FINANCIAL SECURITY

Demand for LFS refers to what all members of society reasonably require once they retire in order to meet essential living expenses. The key demand drivers for LFS we focus on are:

- Post-retirement *required* replacement income
- Required additional health care expenditure and care support
- Demographic transition and aging population.

A. Post-retirement required replacement income

Post-retirement required replacement income is the proportion of current income required to maintain a target standard of living to the end of life, also known as the replacement income. The OECD’s rule of thumb for target replacement income is 70 percent, under the broad assumption that roughly 30 percent of a working populations’ income is spent on a mortgage, which should not be required in retirement.⁸⁴ This level is required to provide retirees with an adequate retirement income that meets their needs, and means that retired persons reasonably expect a standard of living that grows alongside that of the working populations around them.

In constructing our baseline scenario out to 2050, we use an assumption of a target economy-wide replacement rate of 70 percent, while accepting that for some income groups this may need to be higher or lower.

As the demand for replacement income equals replacement income rate (that is, the OECD’s 70 percent) multiplied by average income level, understanding how pre-retirement wages grow over time is crucial in modeling the LFS supply-demand gap.

Table A3.1 shows the growth rate of average real wages, which shows that for all countries other than Japan, wages grew faster than inflation between 2000 and 2016. The average across these 11 countries was an annual growth rate of 0.92 percent.

We assume wages continue to grow faster than inflation, based on the International Labour Organization’s *Global Wage Report 2016/2017*. For Singapore, we refer to government statistics for historical wage growth.

We assess the growth rate of average (pre-retirement) incomes and use it to project *required*

⁸³ Argentina and Saudi Arabia are not included in this study due to data unavailability.

⁸⁴ Antolin 2009.

FIGURE A3.1 ILLUSTRATION OF KEY MODEL MECHANISMS

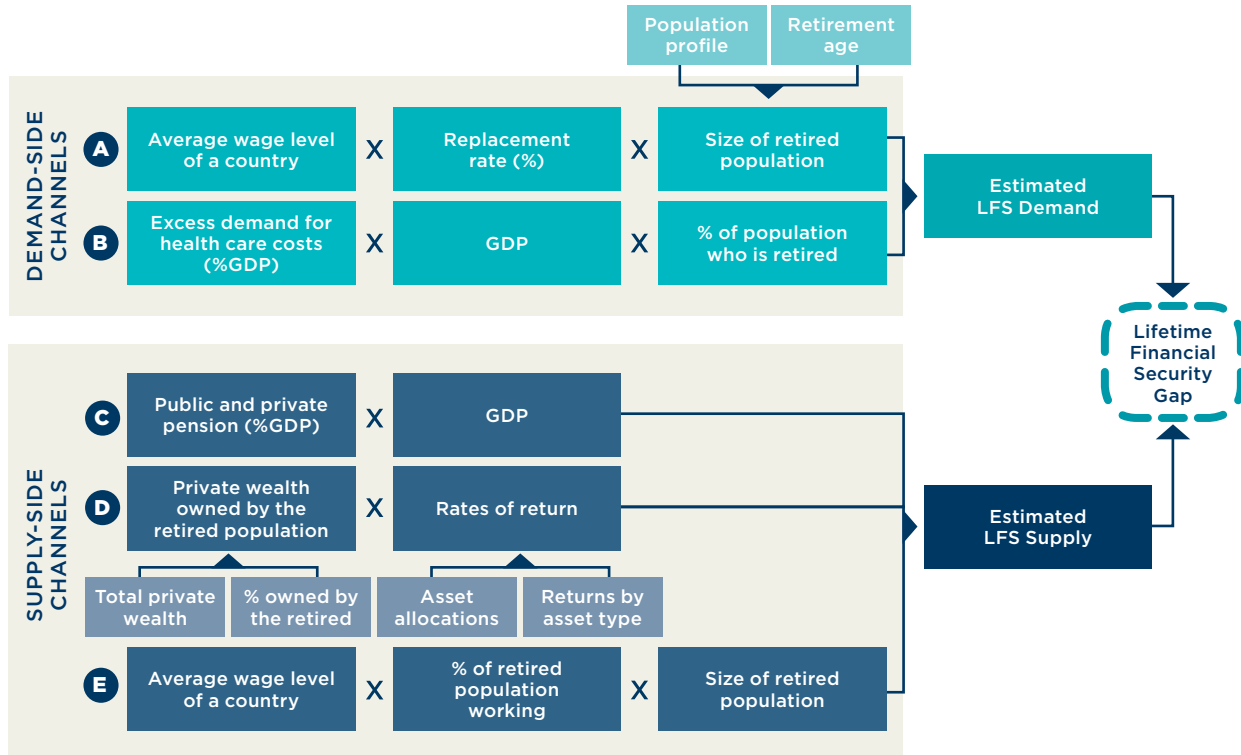


TABLE A3.1 AVERAGE ANNUAL REAL WAGE GROWTH RATES, 2000-2016

AUSTRALIA	CANADA	DENMARK	FRANCE	GERMANY	ITALY	JAPAN	REPUBLIC OF KOREA	MEXICO	SWEDEN	UNITED KINGDOM	UNITED STATES
1.02%	1.38%	1.38%	1.12%	0.72%	0.19%	-0.07%	1.45%	0.46%	1.62%	0.88%	0.93%

Source: OECD.

replacement income. Changing the replacement income rate influences total demand for LFS. For example, if we considered a lower absolute level of pre-retirement income that is sufficient to provide LFS, that would mean demand for LFS would grow more slowly over time.

B. Required additional health care expenditure and care support

Another demand driver is rising health care and long-term care costs. These expenditures are rising at a

rate significantly above inflation. Health care costs are rising, and lifespans are being extended. Both add to the LFS challenges ahead.

According to OECD’s recent projections, shown in Table A3.2, health care costs are expected to increase by between 5.8 to 10 percent of GDP by 2060. With stretched public health budgets, there will be an increased demand for post-retirement income to meet these inflating costs.⁸⁵

This places upward pressure on existing health care spending, driven by demand. Based on OECD’s

⁸⁵ We do not incorporate all health and care spending costs, rather just the super-inflating element that adds to the demand for LFS. This avoids the report becoming overly distracted by the policy issues relating to health and social care.

TABLE A3.2 FORECASTED INCREASE IN HEALTH CARE SPENDING AS % OF GDP

COUNTRY	% INCREASE IN GDP BY 2060 FROM 2010
Australia	7.6
Brazil	8.2
Canada	7.5
China	8.4
Denmark	6.9
France	7
Germany	7.3
India	7
Indonesia	7.8
Italy	7.6
Japan	7.7
Republic of Korea	9.6
Mexico	9.1
Russian Federation	6.3
Singapore	10
South Africa	5.8
Spain	8.2
Sweden	6.8
Turkey	9.4
United Kingdom	6.8
United States	6.9

Source: De La Maisonneuve and Oliveira Martins 2013.

projections, we apply how excess demand for health care costs increases as a percent of GDP and project it up to 2050, assessing both the required out-of-pocket *increased* health care expenses, and the required *increase* in public health care support. We estimate the required spending for over 65s by applying the share of retired population to the increase in total health care cost.

Demographic transition and aging population

The demand for LFS in the economy will depend on the size of the retiring population. The age composition of the population can be projected, but the point in time when individuals actually retire differs. For

the purpose of our model we approximate this by reference to official government policies on statutory retirement age (for current retirees and for future retirees) to estimate the retired population in each country, as was illustrated in Figure 3.5.

Most countries are already planning to increase their statutory retirement age over time. For example, the UK is expected to raise the retirement age to 66 by 2020, 67 by 2028, and 68 by 2046. The current retirement age for Indonesia is 56 but is expected to rise to 65 by 2043.

Supply of Lifetime Financial Security

Supply of LFS refers to the streams of income from the society and individuals themselves that support post-retirement living expenses. The key supply drivers for LFS are:

- Public and private pension provision
- Private financial and nonfinancial wealth
- Post-retirement wage.

C. Public and private pension provision

The biggest source for the provision of LFS is pensions, whether public, privately financed, or occupational pensions. This typically represents most of individuals' pre-retirement savings. This can be supplemented through other forms of wealth, savings and housing assets.

The public provision of pensions constitutes both Pillar 0 and Pillar 1 and aims to provide a basic safety net for retirees. Absent a policy shift, the ability of a country to finance pensions will be driven mainly by economic growth. Growing public pension expenditure above GDP growth can lead to other areas of public expenditure reducing their share of GDP.

Across the world, government spending on pensions has been increasing since 1990 and is expected to continue. Table A3.3 shows that alongside an absolute increase, public pension spending as a percentage of GDP will change by between -2 percent to 4.5 percent for the period 2010–2030 for 21 countries in our model.

The importance of non-public pension provision varies across countries. For some countries, including France, Germany, and Italy, this constitutes a relatively small proportion of retirement income (<0.5 percent of GDP).

TABLE A3.3 GOVERNMENT SPENDING ON PENSION (IN US\$, % OF GDP)

	2010	2030	2050
Australia	3.5%	+1.2%	+1.5%
Brazil	9.6%	+1.1%	+1.4%
Canada	4.3%	+1.9%	+2.2%
China	3.6%	+3.7%	+4.0%
Denmark	6.2%	-0.1%	+0.2%
France	13.8%	+0.3%	+0.6%
Germany	10.6%	+1.8%	+2.1%
India	4.3%	-0.2%	+0.1%
Indonesia	1.0%	+0.0%	+0.3%
Italy	15.8%	-0.9%	-0.6%
Japan	10.2%	+0.0%	+0.3%
Republic of Korea	2.2%	+4.3%	+4.6%
Mexico	1.7%	+1.0%	+1.3%
Russian Federation	8.5%	+1.9%	+2.2%
Singapore	3.5%	+4.3%	+4.6%
South Africa	3.4%	+0.5%	+0.8%
Spain	10.5%	+0.5%	+0.8%
Sweden	7.4%	-0.2%	+0.1%
Turkey	7.5%	+4.5%	+4.8%
United Kingdom	7.6%	+0.5%	+0.8%
United States	6.7%	+1.7%	+2.0%

Sources: PwC analysis; IMF 2013.

For our model, we estimate the size of public and private pensions by drawing on OECD data on annual pension expenditure by countries as a percentage of GDP and multiplying by the forecasted GDP level up to 2050.

D. Private financial and nonfinancial wealth

Retirees benefit from the return on private financial savings that they accumulated during their working years. Financial wealth and subsequent income is highly influenced by the asset allocation and asset returns. We use OECD's asset allocation of pension funds around the world to generate country-specific asset allocations for private financial wealth held by retirees.

The 21 countries in our model are categorized into 4 income groups—high income, upper-middle

income, lower-middle income, and low income—based on the 2016 *Credit Suisse Global Wealth Databook*. We use J.P. Morgan's "2017 Long-term Capital Market Assumptions" returns by asset class for different income groups. Table A3.4 presents our assumptions.

The total return is sensitive to the annual rate of return used in the calculations. Changing this assumption highlights the impact of the current low-growth, low-investment-return environment on retirement income systems.

Housing and homeownership also comprise a significant proportion of retirees' nonfinancial wealth, which can be an additional source of income through financial instruments such as lifetime mortgages and downsizing. For the baseline scenario, however, this is not considered.

TABLE A3.4 ASSUMED RATE OF RETURN BY INCOME GROUP AND ASSET CLASS

INCOME GROUP	EQUITIES	BILLS AND BONDS	CASH AND DEPOSITS	OTHER
High income	6.25%	3.00%	2.00%	5.27%
Upper-middle income	6.75%	3.50%	2.00%	5.27%
Lower-middle income	9.25%	3.50%	2.00%	5.27%
Low income	9.25%	4.00%	2.50%	5.27%

Sources: PwC analysis; J.P. Morgan 2017.

E. Post-retirement wage

In addition to pension entitlement and personal wealth, retirees can opt for a phased retirement where they gradually reduce work or continue to work reduced hours after retirement. In such cases, post-retirement wages can provide an additional income source to provide for LFS.

This is underway in several countries where retirees are continuing to work to varying degrees. For example, in the UK, the proportion of people who work after they turn 65 has doubled to about 10 percent since 2000.

The model incorporates a degree of post-retirement income to our baseline scenario, assuming retirees generate income equivalent to 5 percent of average wage level from 2015, gradually increasing to 20 percent of average wage level by 2035 and onward. We expect more post-retirement work to be carried out by recent retirees rather than older retirees.

Other assumptions for supply drivers

A critical assumption and source of uncertainty is the rate of return on funded pension schemes and other financial assets. The rate of return impacts both the accumulation of wealth and the income that can be earned on financial assets during retirement. The rate of return is a combination of a real, riskless rate of return, inflation, and the risk premia attached to different asset classes, where overall returns across all asset classes are constrained by economic capacity to generate returns.⁸⁶

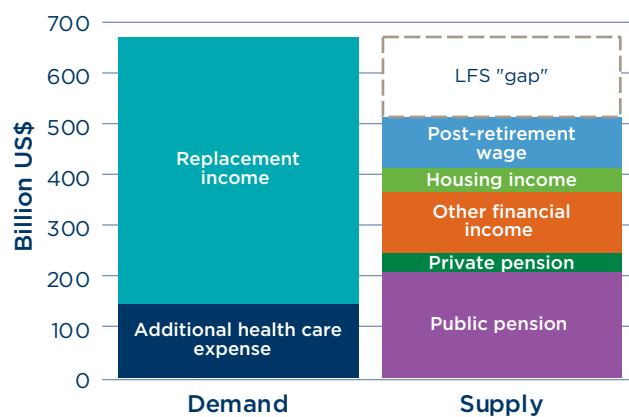
We recognize that global and country wealth is constrained by the economic output of a country, with some notable exceptions in the case of resource wealth and accumulated wealth.

A complete list of assumptions is provided in Table A3.5.

Illustrative example

The LFS shortfall is calculated by working out the demand drivers and supply drivers of lifetime financial security. Figure A3.2 illustrates the building blocks to our model and how the LFS gap is estimated.

FIGURE A3.2 STYLIZED EXAMPLE OF LFS DEMAND AND SUPPLY BUILDING BLOCKS



Source: PwC analysis.

⁸⁶ See Piketty (2013) and Jordà, Schularick, and Taylor (2017) for studies on whether the rate of return (and therefore wealth accumulation) can exceed the rate of economic growth over long periods.

TABLE A3.5 SUMMARY OF LFS PROJECTION ASSUMPTIONS

KEY AREAS	HOW ASSUMPTION IS APPLIED	DETAILS	KEY DATA SOURCES
Required replacement income for retirees	Applied equally across all countries	Set at 70% of average wage level of the country. This assumption is tested in Section 5 where we discuss policy options	<i>OECD Journal: Financial Market Trends</i> 2009 (2009)
Increasing required health care expenses	Country-specific	Demand for health care expense assumed to exceed the supply of health care support by 0.1–0.2% of GDP each year	“Public spending on health and long-term care: a new set of projections” (OECD 2013); OECD Health Statistics
Retirement age	Country-specific	Rely on current policies (now and forward-looking) for country’s statutory retirement age	Various government sources
Public pension growth	Country-specific	Government pension spending as a percentage of GDP is set to change by -2% to 4.5% for 2010–2030 and 2.3% to 4.8% for 2030–2050 for countries	IMF “Global Trends in Public Pension Spending and Outlook” (2013)
Wealth growth	Applied equally across all countries	Assumes a long-term steady state wealth-to-GDP ratio (historical average) and that countries reach their long-run wealth-to-GDP ratio by 2030 and sustain the ratio until 2050	Credit Suisse Research Institute <i>Global Wealth Databook</i> (2016); OECD statistics
Wage growth	Country-specific	Set wage levels to grow faster than inflation, on average, by 1% to 4%	International Labour Organization <i>Global Wage Report 2016/2017</i> (2016); OECD statistics; Singstat
Rate of return for financial investment	Country-specific	OECD’s asset allocation of pension funds by country to which we applied long-term rate-of-return assumptions	“OECD Pensions at Glance 2017” (2017); J.P. Morgan Asset Management “2017 Long-term Capital Markets Assumptions” (2017); Credit Suisse Research Institute <i>Global Wealth Databook</i> (2016)
Post-retirement income	Applied equally across all countries	Post-retirement income set to generate further income equivalent to 5% of average wage level from 2015, gradually increasing to 20% by 2035 and onward (i.e., working approximately once a week)	Literature review

Source: PwC analysis.

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